

L.T. MURRAY
-DRAFT-
WILDLIFE AREA MANAGEMENT PLAN
Washington Department of Fish and Wildlife



Prepared by Wildlife Area Managers Cindi Confer and Shana Winegeart
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2006

STATE OF WASHINGTON
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Washington State Wildlife Area Management Plan

L.T. Murray Wildlife Area

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

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November 2006

Director, Washington Department of Fish and Wildlife

Date

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EXECUTIVE SUMMARY

The L.T. Murray Wildlife Area Complex is comprised of three individual wildlife areas – the L.T. Murray, the Quilomene, and the Whiskey Dick. Together, the entire L.T. Murray Complex covers roughly 110,000 acres, with approximately 30,000 acres of Department of Natural Resources (DNR) and Bureau of Land Management (BLM) lands interspersed throughout in a checkerboard pattern. The first parcels of the L.T. Murray Complex were acquired in 1962 when WDFW (then named the Department of Game) purchased 11,180 acres of rangeland along the Quilomene drainage. Subsequent purchases included 17,027 acres in the Whiskey Dick area in 1966, and 343 acres in the Quilomene in 1974. All funding was provided by the Interagency Committee for Outdoor Recreation (IAC). The L.T. Murray Wildlife Area was purchased in 1968 from rancher/logger Lowell T. Murray, and is dedicated in his name. The purchase protected critical winter range for deer and elk, as well as providing and protecting upland game bird habitat. Funding for this purchase was provided by both Federal dollars from the Bureau of Outdoor Recreation (BOR), and State dollars from the IAC. Between 2004 and 2007, WDFW acquired the 17,382 acre Skookumchuck unit, which is managed as part of the Quilomene Wildlife Area. The property was acquired to provide connectivity between the Whiskey Dick and Quilomene Wildlife Areas, in addition to protecting sage-grouse habitat, critical elk wintering habitat, and endangered steelhead fisheries. Funding for the Skookumchuck purchase was provided by the Washington State legislature, Hanford mitigation funds, Grant County Public Utility District (PUD) and the Recreation and Conservation Office (RCO) (formerly IAC).

Primary management concerns and public issues identified in the L.T. Murray, Quilomene, and Whiskey Dick Wildlife Areas Management Plan are:

- Preserve habitat and species diversity of fish and wildlife resources
- Maintain or improve conditions for Priority Habitats and Species
- Protect critical elk winter range and upland game bird habitat
- Protect and restore native plant communities
- Control noxious weeds and other undesirable vegetation
- Provide diverse public opportunities to encounter, utilize, and appreciate wildlife and wild areas
- Address litter, poaching, illegal off-road vehicle use, and other enforcement issues

Public recreational opportunities on the L.T. Murray Complex are diverse, including hunting, camping, fishing, wildlife viewing, target shooting, wildflower tours, ATV and snowmobile riding, horseback riding, and hiking. Recently, the wildlife areas have seen a dramatic increase in non-hunting uses such as ATV riding, bird watching, and shed antler collection.

Approximately 2,000 head of elk are fed on the L.T. Murray Wildlife Area each winter to minimize depredation on private agricultural lands. From mid-December until mid-March hay is distributed daily at two feed sites, which provide popular elk viewing and educational opportunities for local school children and interested public.

Wildlife area staff control weeds on 600-1,000 acres annually, and participate in cooperative weed control efforts with the Kittitas County Noxious Weed Control Board. When feasible and necessary, native vegetation is reseeded in areas of recent weed control.

Grant funding is regularly sought to implement habitat restoration and improvement projects, and to supplement wildlife area operation funds.

Activities planned for 2007

- Maintain 13 miles of elk fence on the L.T. Murray to reduce elk depredation.
- Feed approximately 600 tons of hay from Dec-March (weather dependent)
- Plant 5 acres of degraded riparian habitat to native vegetation.
- Install vehicle barriers in riparian camping areas to protect fish and wildlife resources.
- Plant 20 acres of degraded shrub steppe habitat to native species.
- Evaluate the Skookumchuck road network and enroll appropriate roads in the Green Dot system
- Continue to address sediment delivery issues identified in the Road Maintenance and Abandonment (RMAP) Program process
- Treat at least 600 acres of upland weeds, including 30 miles of road-side weeds
- Enroll the Skookumchuck acquisition under a fire protection contract.
- All permanent wildlife area staff maintain requisite certifications, including red/blue card fire refresher, first aid certification, and pesticide applicators license.
- Repair/remove at least 1 mile of degraded interior fence that poses a wildlife entanglement hazard
- Complete required annual plans and reports, including Wildlife Area Management Plan annual update, RMAP report, and Pittman Robertson federal annual reporting.
- Meet with Citizen Advisory Group (CAG) at least once per year.

CHAPTER 1. Introduction

The Washington Department of Fish and Wildlife (WDFW) is entrusted with the management of fish and wildlife populations throughout the state, and is dedicated to preserving natural resources found on approximately 840,000 acres of WDFW owned lands. As a steward of the land, WDFW is dedicated to protecting, restoring, and perpetuating healthy ecosystems while fostering an attitude of partnership with the community.

This plan provides management direction for the L.T. Murray Complex, which is composed of the L.T. Murray, Quilomene and Whiskey Dick Wildlife Areas. WDFW developed a statewide Comprehensive Wildlife Conservation Strategy (CWCS), which guides wildlife area management across the state. Included in the CWCS are broad biodiversity protection measures, along with species-specific protection measures necessary to maintain fish and wildlife populations. Many of the species highlighted in this document occur on the L.T. Murray Complex, and their needs will be considered during management planning.

This plan will be updated annually to maintain its value as a flexible working document and address emerging issues. It identifies needs and guides management activities based on the WDFW Agency Mission to provide “Sound Stewardship of Fish and Wildlife” and its underlying statewide goals and objectives as they apply to local conditions.

1.1 Agency Mission Statement

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

1.2 Agency Goals and Objectives

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

- Objective 1: Develop, integrate and disseminate sound fish, wildlife and habitat science.
- Objective 2: Protect, restore and enhance fish and wildlife populations and their habitats.
- Objective 3: Ensure WDFW activities, programs, facilities and lands are consistent with local, state and federal regulations that protect and recover fish, wildlife and their habitats.
- Objective 4: Influence the decisions of others that affect fish, wildlife and their habitats.
- Objective 5: Minimize adverse interactions between humans and wildlife.

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.
- Objective 8: Work with tribal governments to ensure fish and wildlife management objectives are achieved.

Goal III: Operational Excellence and Professional Service

- Objective 9: Provide excellent professional service.

- Objective 10: Improve the effectiveness and efficiency of WDFW's operational and support activities.
- Objective 11: Provide sound operational management of WDFW lands, facilities and access sites.
- Objective 12: Develop Information Systems infrastructure and coordinate data systems to provide access to services and information.
- Objective 13: Recruit, develop and retain a diverse workforce with high professional standards.
- Objective 14: Maintain a safe work environment.
- Objective 15: Reconnect with those interested in Washington's fish and wildlife.

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
- WDFW Policies:
 - Acquiring and Disposing of Real Property
 - Protecting and Restoring Wetlands
 - Fish Protection At Water Diversions/Flow Control Structures and Fish Passage Structures
 - Road Management Recommendations
 - Recreation Management on WDFW Lands
 - Commercial Use of WDFW Lands
 - Forest Management on WDFW Lands
 - Weed Management on WDFW Lands
 - Fire Management on WDFW Lands
 - Other policies, contractual obligations and responsibilities

1.4 Wildlife Areas Goals

Management goals for the L.T. Murray, Quilomene and Whiskey Dick Wildlife Areas 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, and provide diverse opportunities for the public to encounter, utilize, and appreciate wildlife and wild areas.

1.5 Planning Process

A multifaceted approach will be used to identify local management strategies for the L.T. Murray Complex. This process includes identifying agency goals and objectives; reviewing the purpose for purchasing each wildlife area; reviewing existing habitat conditions and species present; forming a local Citizens Advisory Group; and incorporating review by an internal WDFW District Team.

The CAG will be used as an ongoing means to identify social, cultural, and economic issues important to the people of Washington, and provide input to the wildlife area manager in resolving current and future management issues on the wildlife area. CAG participation in planning adds credibility and support for land management practices and helps build constituencies for wildlife areas. The CAG is comprised of one representative from each major stakeholder agency or organization, and that representative acts as a spokesperson for their group's interests and concerns.

Table 1. Citizens Advisory Group Representatives

Name	Representing
Ballard, Shawn	Archery
Beck, Dan	Central Washington University (Biology)
Bloomfield, Betsy	The Nature Conservancy
Cordel, Diane	Non-Motorized Recreation (hikers, horsebackers, bicyclists, campers, cross-country skiing, kayaks, photographers, etc.)
Davis, Todd	Chelan, Kittitas, Yakima Co. Weed Boards
Eaton, Bob	Livestock interests
Essman, Bill	Kittitas Co. Field & Stream Club, and Hunting / Fishing interests
Hale, Mike	Rocky Mt Elk Foundation/ Mule Deer Foundation / Federation for North American Wild Sheep
Hankins, Wes	National Wild Turkey Federation / Bird Hunters / Hunting interests / Dog Training
Hedges, Neal	BLM
Jewett, Randy	Commercial Use / Tourism
Kinney, Dan	Audubon Society
McNamee, Ken	Department of Natural Resources
Paolella, Ray	Cowiche Canyon Conservancy
Stegeman, Bill	Wenatchee Sportsman's Assoc.
Stevenson, Jim	Yakama Nation
Warnock, Doug	Big Game Management Roundtable
Watanabe, Ann	Cascade Land Conservation
White, Bill	Land Management Advisory Council
Whitehouse, Joe	Motorized Recreation (4 wheelers, motorcycles, jeeps, snowmobiles, boats, etc.), WA State Snowmobile Association, WA State Parks
Witke, Don	Wenas Muzzleloader Club

The WDFW District Team will provide cross-program input and review at the regional and headquarters level by the Habitat, Wildlife, Enforcement, and Fish Programs. Pertinent information from existing species plans, habitat recommendations, watershed plans, ecoregional assessments, etc. will be used to identify local resource issues and needs and ensure that the Wildlife Area Management Plan is consistent with WDFW statewide and regional priorities and mandates.

The plan will be reviewed annually to solicit input from the District Team and CAG, and to monitor performance and desired results. Strategies and activities will be updated where necessary to accomplish management objectives and address newly emerging issues.

CHAPTER 2. Area Description and Map

2.1 Property Location and Size

WDFW owned lands that make up the L.T. Murray Complex encompass all or portions of sections within T.17, R.16, R.17, R.18, R.21, R.22; & T.18, R.16, R.17, & T.19, R.16, R.22 (L.T. Murray) and T.17, R.22, & T.18, R.21, R.22 (Whiskey Dick) and T.17, R.22, R.21 & T.18, R.20, R.21, R.22 & T.19, R.21, R.22 (Quilomene) (Figure 1). Many parcels are interspersed with Washington Department of Natural Resources lands which are being considered for exchange with WDFW in an attempt to block up ownerships for management efficiencies.

L.T. Murray

The 54,070-acre L.T. Murray Wildlife Area is located approximately 8 miles west of the city of Ellensburg, in Kittitas County, and contains the Taneum and Manastash Creek drainages (Figure 2). Within the L.T. Murray Wildlife Area, DNR owns 14,424 acres, which is currently either leased to WDFW or under WDFW management. The United States Forest Service (USFS) owns 341 acres in the Taneum drainage.

Quilomene

The Quilomene Wildlife Area is situated approximately 15 miles northeast of the city of Ellensburg in Kittitas County, and includes the Quilomene, Skookumchuck, and Parke Creek drainages (Figure 3). WDFW owns 11,523 acres in the Quilomene unit, interspersed with of DNR owned lands. The Skookumchuck unit includes parcels in the Skookumchuck and Parke Creek drainages, where WDFW owns 17,382 acres interspersed with approximately 4,800 acres of DNR land. Additionally, the Bureau of Land Management owns approximately 700 acres that are managed by WDFW as part of the Quilomene Wildlife Area.

Whiskey Dick

The Whiskey Dick Wildlife Area is situated approximately 15 miles east of the city of Ellensburg in Kittitas County (Figure 4). In this wildlife area WDFW owns 17,027 acres, interspersed with 11,522 acres of DNR property. In addition, the BLM owns approximately 1,960 acres that are managed by WDFW as part of the Whiskey Dick Wildlife Area.

Figure 1. Map of L.T. Murray, Quilomene, and Whiskey Dick Wildlife Areas

In holdings: DNR (green), Puget Sound Energy (PSE) (yellow), BLM (pink), USFS (dark green), Private (blue). Red hatch indicates Skookumchuck parcels.

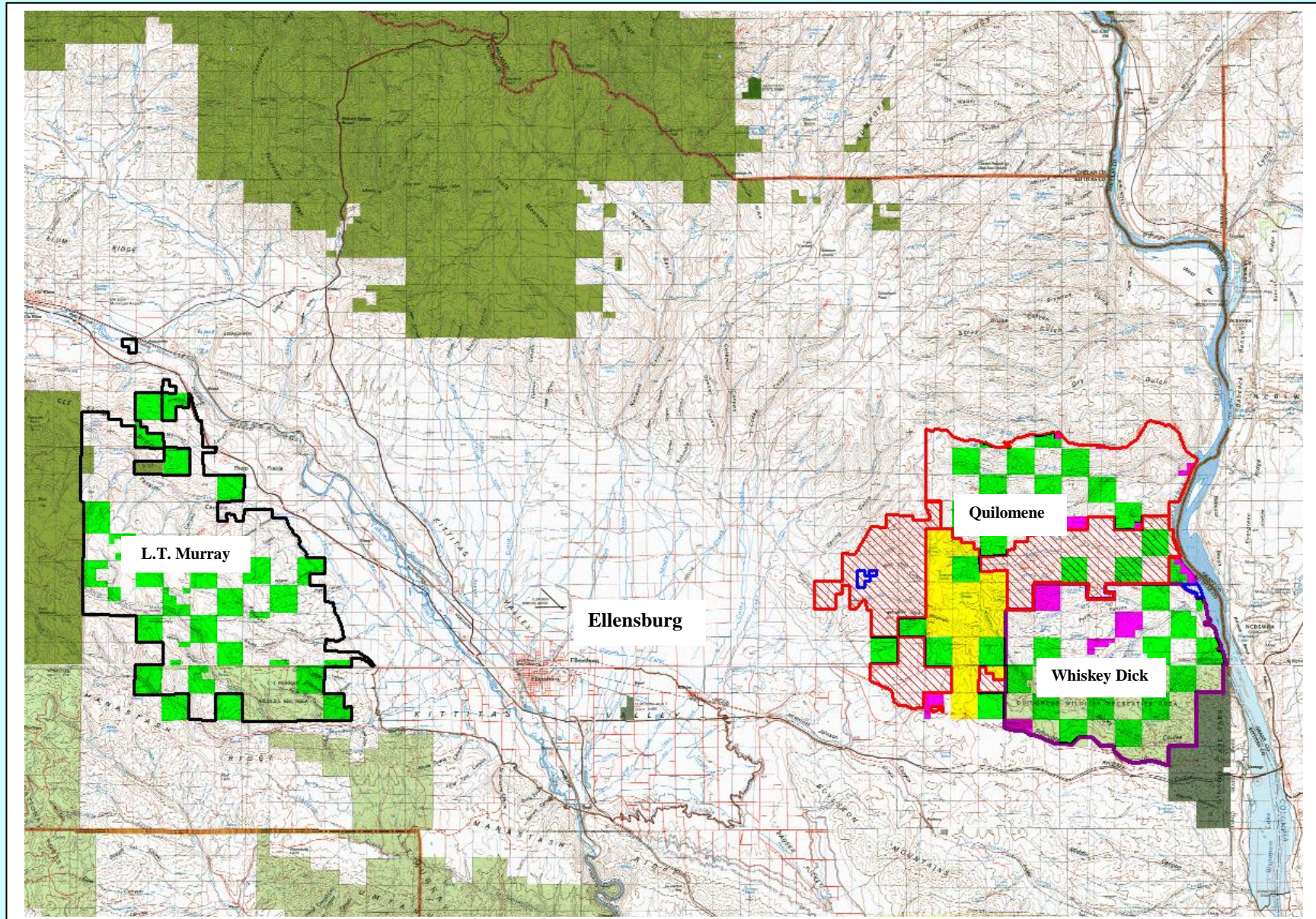


Figure 2. Map of L.T. Murray Wildlife Area (black outline)
In holdings and adjacent ownerships: DNR (light green), USFS (dark green)

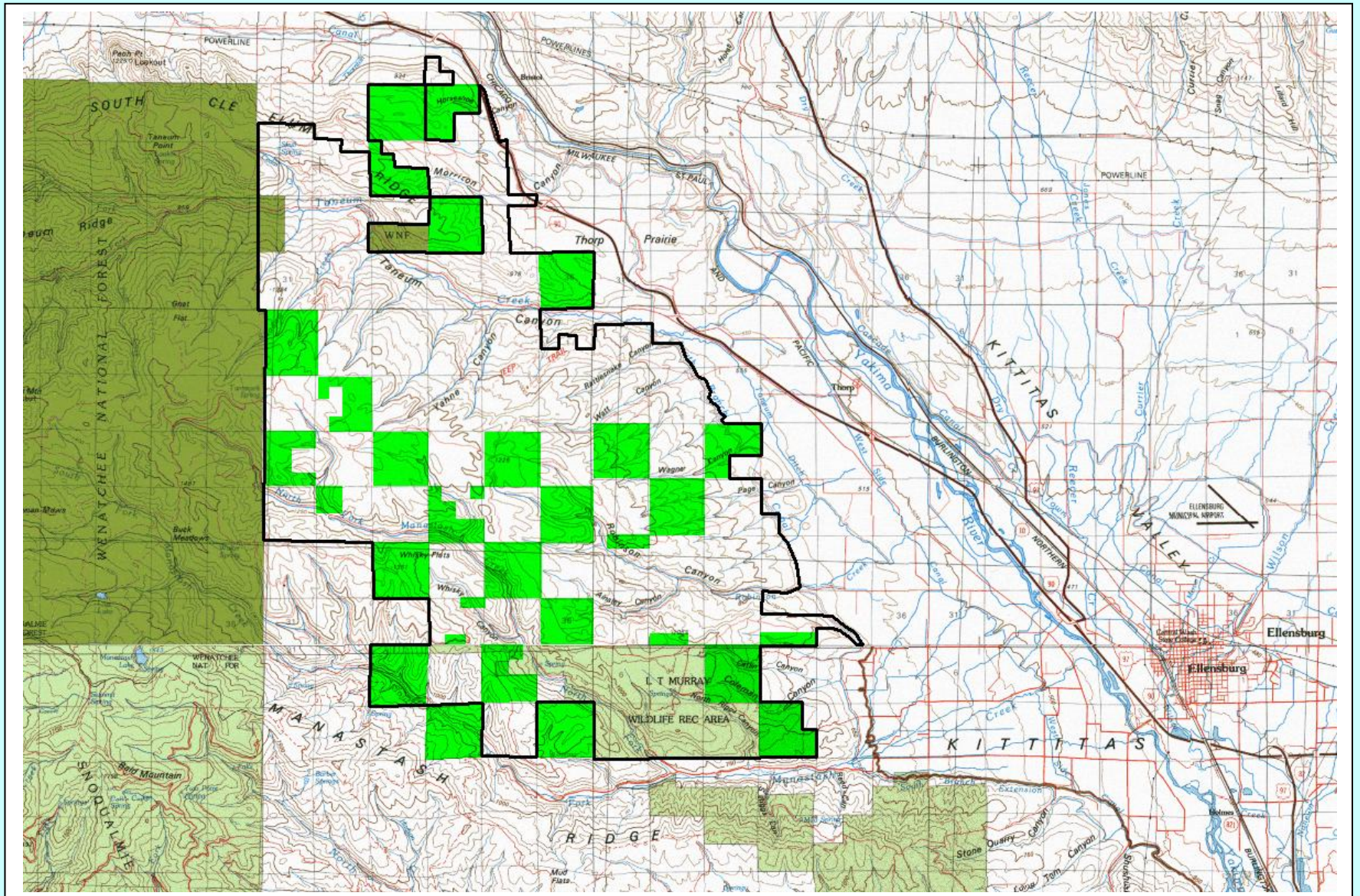


Figure 3. Map of the Quilomene Wildlife Area (red outline). Red hatching depicts recently purchased Skookumchuck parcels. In holdings: DNR (green), PSE (yellow), BLM (pink), Private (blue).

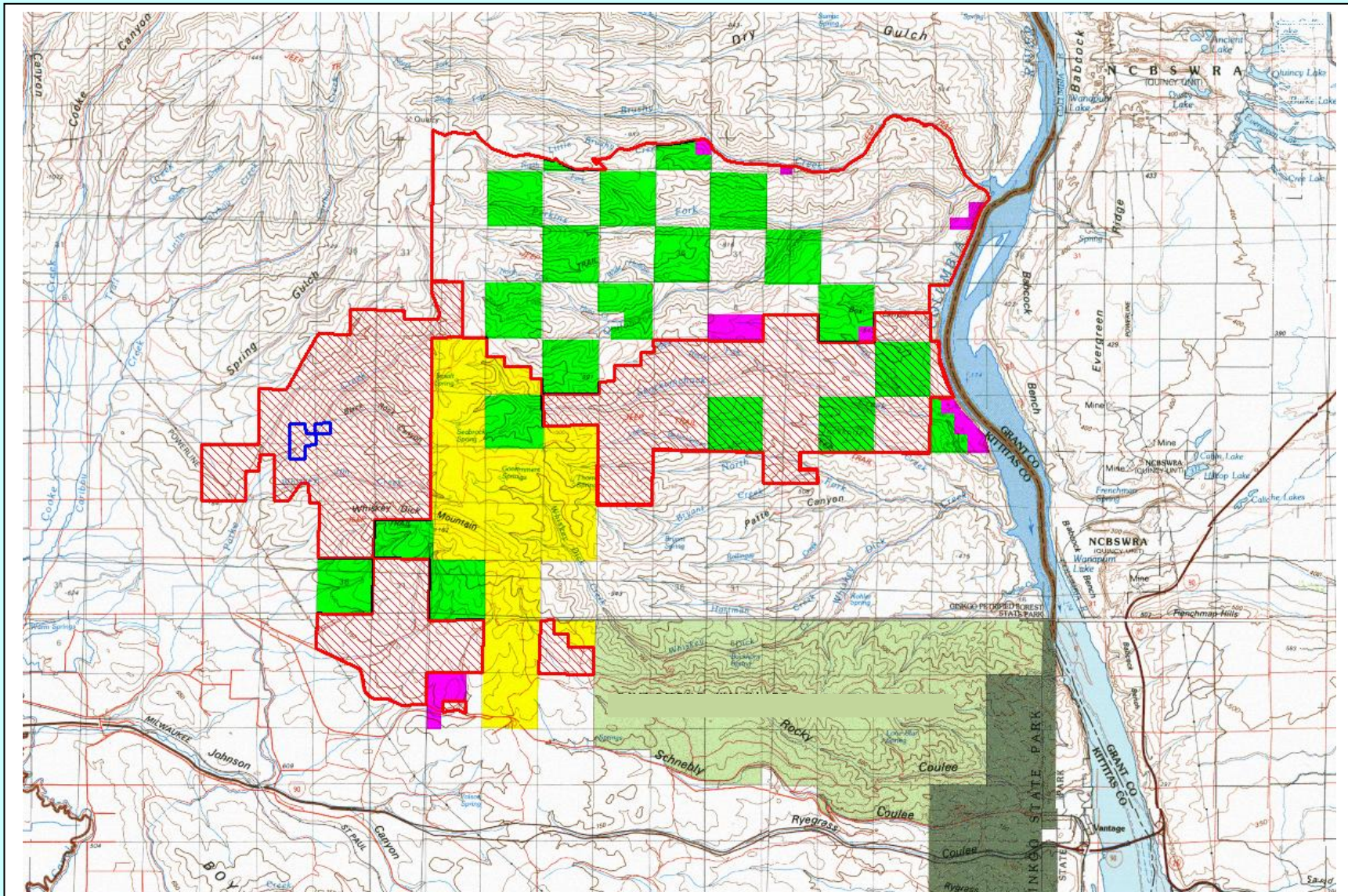
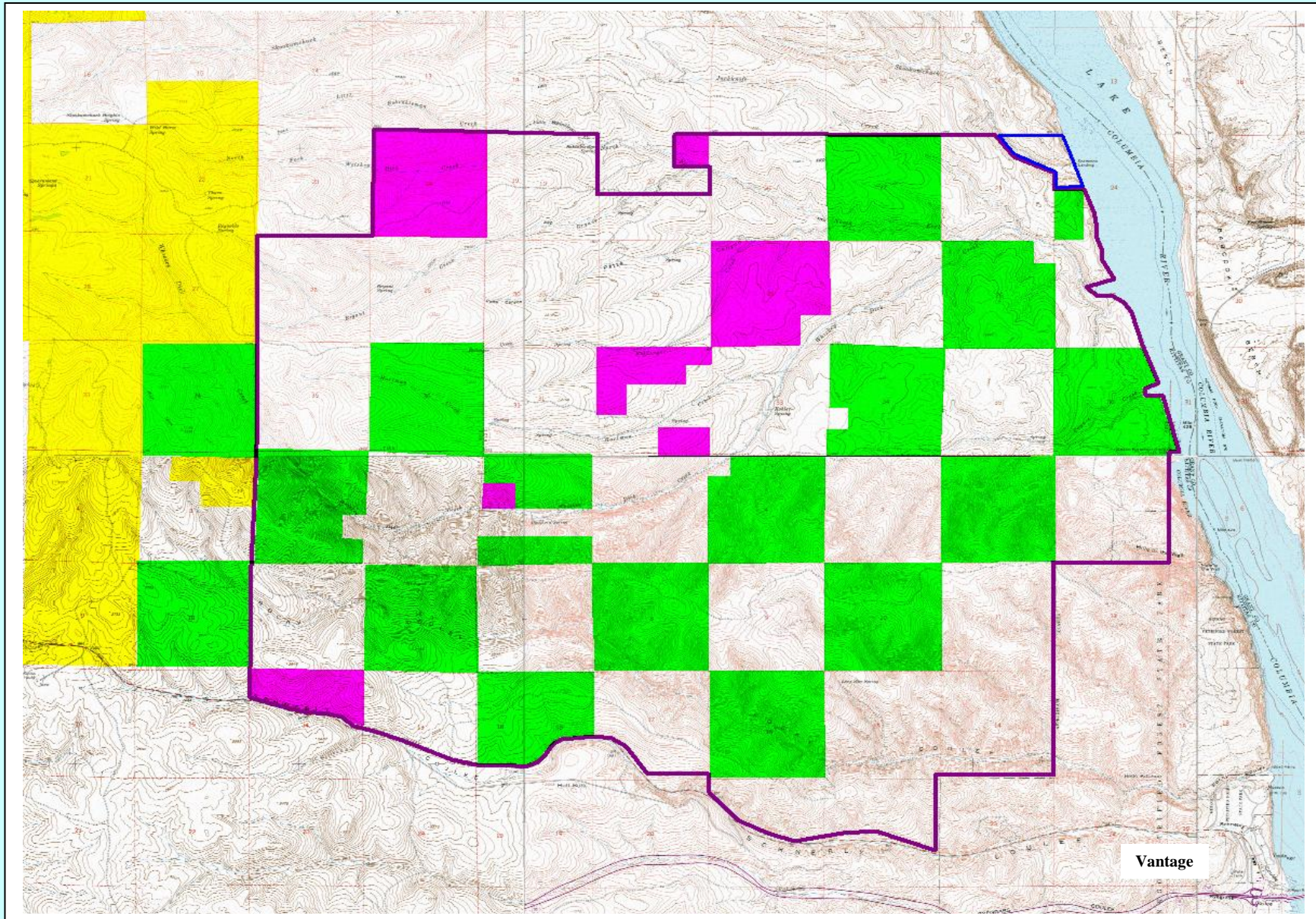


Figure 4. Map of the Whiskey Dick Wildlife Area (purple outline)
In holdings: DNR (green), PSE (yellow), BLM (pink), Private (blue).



2.2 Purchase History and Purpose

The L.T. Murray Wildlife Area was purchased by the Washington Department of Game in 1968 from rancher/logger Lowell T. Murray, and is dedicated in his name. The purchase was made to provide and protect critical winter range for deer and elk, as well as perpetuate and improve upland game bird habitat. Funding for this purchase was provided by both federal dollars from the Bureau of Outdoor Recreation (BOR), and State dollars from the Interagency Committee for Outdoor Recreation (IAC).

The first land acquisition in what would become the Quilomene Wildlife Area was made in 1962 when the Washington Department of Game purchased 11,180 acres of rangeland along the Quilomene drainage. Subsequent purchases were 17,027 acres in the Whiskey Dick area in 1966, and 343 acres in the Quilomene in 1974. All funding was provided by the IAC.

The Department of Game later merged with the Department of Fish and became the Washington Department of Fish and Wildlife (WDFW) in 1993. Between 2004 and 2007, WDFW acquired the 17,382 acre Skookumchuck property in four phases. This unit includes lands in the Skookumchuck and Parke Creek drainages, and is managed as part of the Quilomene Wildlife Area. The property was acquired to provide connectivity between the Whiskey Dick and Quilomene WA's, as well as provide habitat for sage-grouse and wintering big game. Funding for the Skookumchuck property was provided by the Washington State legislature, Hanford mitigation funds, Grant County Public Utility District (PUD) and the Recreation and Conservation Office (RCO) (formerly IAC).

2.2.1 Land Management History

Initially, the L.T. Murray, Quilomene and Whiskey Dick Wildlife Areas were managed by assistants and temporary labor directed by the Oak Creek Wildlife Area manager out of Yakima. Work consisted of fencing boundaries, signing entrances, coordinating and monitoring grazing leases, developing springs and habitat plots, and installing bird feeders and guzzlers. In April of 1976, the first permanent manager position was assigned to the L.T. Murray. Both State funds and Federal Pittman-Robertson funds were secured for operations and maintenance, and for implementation of capital developments. Boundary surveys, habitat enhancement projects, road management programs, and a complete review of domestic livestock grazing on all the areas were the first priorities.

As a condition of the original L.T. Murray land purchase, Mr. Murray retained the timber rights for a 25-year period. The resulting timber harvest in the late 1970s left numerous large clear-cuts. These areas were seeded by helicopter with grasses to provide wildlife forage and a cover crop to deter invasion of noxious weeds. The timber rights reverted back to WDFW on October 31, 1993.

Historically, the majority of the Murray Complex supported intensive livestock grazing in one form or another. Native vegetation communities have been altered as a result of past grazing, in addition to invasion by exotic plant species and an era of intensive fire suppression. When historic livestock grazing was in practice, numerous springs were developed by installing spring boxes and piping to off-site troughs. Several of those springs are still maintained by staff or volunteers for wildlife use. On the L.T. Murray, as a condition of the sale, grazing rights were retained for ten years after WDFW's purchase. Research and studies were conducted to determine impacts of livestock grazing on natural resources, and grazing practices were gradually reduced where they were not compatible with wildlife and habitat objectives.

Approximately 65 miles of stock fence are maintained on the Quilomene and Whiskey Dick Wildlife Areas to prevent livestock trespass and vehicular access into sensitive areas. Fences are inspected and repaired each spring prior to neighboring livestock turnout. On the L.T. Murray Wildlife Area roughly 13 miles of elk fence are maintained to reduce elk depredation and encroachment into agricultural lands.

Noxious weeds are controlled annually on the Murray Complex by use of Integrated Pest Management (IPM) practices, which implement appropriate and cost-effective methods, while causing minimal effects to non-target resources. Treatment methods include one or more of the following: herbicide application; mechanical control, i.e. mowing or burning; and release of biological agents, i.e. insects. Where feasible, native grasses are planted in treated areas to supplant weedy vegetation. Several projects have been identified to re-establish native vegetation in disturbed areas impacted by past livestock grazing. Project implementation began in fall 2003, and will continue as staff and funding allow.

Roads are managed in compliance with State Forest Practice regulations, and a complete Road Maintenance and Abandonment Plan has been completed for the forested portions of the L.T. Murray W.A. WDFW has closed numerous old logging roads on the L.T. Murray that had under-sized culverts or sediment delivery issues, including 21 miles closed under implementation of RMAP. Further field review and road maintenance/abandonment work is scheduled through 2015 to address fish passage barriers and potential erosion sources. Both the Quilomene and Whiskey Dick lack forested habitats, and are not subject to these requirements.

WDFW is working to establish a road network on the wildlife areas that balances the needs of both natural resource protection and public recreation. Many wildlife species are disturbed by traffic in areas with high road densities, and although visual obstructions such as topography or tall vegetation help limit disturbance impacts, open shrub-steppe habitats often require greater distances from roads to provide a similar buffering effect. Road densities were historically described as linear miles of roads per square mile of habitat, but current literature supports using “visibility” or “zone of influence” as a more accurate indicator of wildlife disturbance. Zone of influence evaluates road distance buffers and topography to determine human disturbance created by use of a given road system. To achieve management objectives, WDFW is prescribing a < 50% influence, which means that less than half of the landscape is visible from roadways, and the other half serves as a refuge area where wildlife can rest undisturbed. With data from the on-going Colockum Elk Herd study, biologists will study habitat needs, traffic patterns, and elk flight response to establish a road network prescription.

Roads open for motorized travel are managed under a Green Dot system established in 1990, and maps are updated as necessary to reflect closures and changes. Green Dot roads are posted with white carsonite markers labeled with a green dot to indicate which roads are open. WDFW will be conducting a comprehensive review of the Green Dot road management system in the Quilomene and Dick areas to ensure that roads open to vehicular travel are not causing resource damage or undue wildlife or habitat disturbance. Currently the Skookumchuck acquisition is not under the Green Dot management system, and resource needs are being evaluated in this area.

Habitat enhancement projects are implemented as feasible, and 2003 and 2004 also saw the completion of the first timber thinning/habitat improvement projects since the L.T. Murray timber rights reverted to WDFW. More thinning projects are scheduled as part of a long-range plan that addresses fuel accumulation, insect and disease damage, and catastrophic fire danger, as well as habitat improvement.

Although DNR is responsible for fire protection within the forested environment on the L.T. Murray, these thinning projects will help reduce the potential for a catastrophic wildfire, which has the potential to damage wildlife habitat as well as adjacent landowners' property.

The Murray Complex provides innumerable opportunities for the public to enjoy outdoor recreational activities. Thousands of visitors each year enjoy recreating on the Murray Complex, and the two most popular uses are hunting and wildlife viewing. Additionally, an increasing number visit the wildlife area to hike, horseback, bicycle, or watch birds. As in most areas of the state, the Murray Complex has also seen a dramatic rise in non-wildlife oriented recreation, including ATV and snowmobile riding, 4-wheeling, "mudding", and target shooting. Dispersed camping is allowed, although vehicles must stay within 100 feet of Green Dot roads unless otherwise posted. Camping is limited to 14 days within a 60 day period; however this is extended to 30 days in a 60-day period from September 1 through November 30. No permanent camps or structures are allowed. Woodcutting is not allowed on WDFW ownership.

2.3 Ownership and Use of Adjacent Lands

The L.T. Murray is bordered on the west by the Okanogan and Wenatchee National Forests, managed by the USFS. The northern border primarily consists of timbered land and shrub steppe owned by timber companies, land developers, or private individuals, and the eastern side is bordered by privately owned agricultural lands. The southern boundary is defined by Manastash Creek, with private, state and federal lands interspersed along the boundary.

The border of the Quilomene Wildlife area is directly adjacent to the WDFW owned, and with acquisition of the 17,382-acre Skookumchuck property, the Quilomene and Whiskey Dick Wildlife Areas are now contiguous. The 7,943-acre Wild Horse Wind Farm, owned and managed by Puget Sound Energy (PSE), is located within the boundaries of the Quilomene and the Whiskey Dick Wildlife Areas, and spans from the Quilomene Ridge Road south to the Vantage Highway. WDFW's Parke Creek unit forms a wildlife buffer along the wind farm's western boundary and helps to protect private agricultural lands from elk depredation. Most of the privately owned adjoining lands are used for grazing of livestock, and for recreational purposes.

The Whiskey Dick WA is bounded to the north by the Quilomene WA and to the west by the Wild Horse Wind Farm. The southern extent is bounded by the Vantage Highway. The Columbia River forms the eastern border of the Quilomene and northern portion of the Whiskey Dick, and Washington Parks and Recreation's Ginkgo State Park forms the remainder of the southeastern border of the Whiskey Dick WA.

2.4 Funding

The L.T. Murray Wildlife Area Complex is funded under the Federal Pittman-Robertson (PR) program, which provides operating monies for qualifying wildlife areas. The Murray Complex has a combined annual PR budget of \$72,139 (75% federal, 25% state match). An additional \$28,000 per year is provided by state general funds, and \$30,000 is generated by nine wind turbines established on a portion of the Whiskey Dick Wildlife Area, and managed as part of the Wild Horse Wind Farm.

Portions of three full time staff positions are supported including a Wildlife Area Manager (Fish and Wildlife Biologist 3), an Assistant Wildlife Area Manager (Fish and Wildlife Biologist 2), and a Natural

Resources Technician 2. In addition, a 3-month Career Seasonal position is funded to assist with winter elk feeding operations.

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

2.5 Climate

Climate is the most important environmental factor influencing the region. Lying in the rain shadow of the Cascade Mountains, less than 16 inches of annual precipitation falls on the eastern extreme of the L.T. Murray, but up to 100 inches of snow may fall in the higher more westerly locations. Elevations on the L.T. Murray range from 2,000 feet to near 4,500 feet, contributing to the widespread ecological diversity.

The Cascade Mountains and prevailing westerly winds have a significant influence on the climate of the region. The Quilomene and Whiskey Dick Wildlife Area's range in elevation from 550 feet above sea level at the Columbia River, to 3,200 feet in the northwest corner (a distance of some 10 miles). Total precipitation ranges from 9 to 11 inches annually, with the majority coming during the winter months.

2.6 Soils and Geology

The L.T. Murray Complex is characterized by steep ridges, rounding hills, and eroding plateaus, and lies in a geological region known as the "Yakima Marginal Folds". Drainage is eastward from the Cascade Mountains to the Yakima River where it traverses the fertile Kittitas Valley and makes a series of deep, meandering cuts through uplifted lava basalt creating the spectacular Yakima Canyon. On the lower southeastern parcels of the L.T. Murray, terrain is steep and broken, and can form shallow-soiled scablands. Forest soil types prevail in the north and westward units, often broken by deeper-soiled meadows.

The Quilomene and Whiskey Dick areas are characterized by steep, rocky slopes, and a rolling series of ridges and canyons. The Parke Creek drainage flows into the Yakima River system, while the majority of the drainages on the Quilomene and Whiskey Dick wildlife areas are situated east of Whiskey Dick Mountain, and flow into the Columbia River. The parent bedrock material in the region consists of basaltic rock, and includes fractured and folded lava flows. The basalt material has weathered down into coarse gravels, cobbles, and boulders, with fine silts and clays. The overlying soil is composed of fine-grained loess, deposits of volcanic ash, sandy loams, and silt loams.

2.7 Hydrology and Watersheds

The L.T. Murray wildlife area extends in a band approximately 11 miles wide from south of the City of Cle Elum to the northern bank of Manastash Creek. The lower portions of two major drainages, Taneum Canyon on the north, and Manastash Canyon on the south, are within the boundaries of the WA. The streams in these canyons flow east and empty into the Yakima River. Numerous smaller perennial and intermittent stream channels feed these two major drainages. The timbered portions of the L.T. Murray form the upper watersheds that culminate in Taneum and Manastash Canyons, and the agricultural lands of the eastern Kittitas Valley.

The Quilomene, Skookumchuck and Whiskey Dick watersheds run through the arid uplands west of the Columbia River. Parke Creek lies to the west of the Wild Horse Wind Farm and drains west to the

Yakima River. Little snow pack accumulates in this shrub-dominated landscape, so flows are not greatly influenced by spring snowmelt, but do remain fairly constant due to seeps and springs scattered throughout the drainage (WDFW 2003). Quilomene, Parke, Skookumchuck, and Whiskey Dick Creeks, in addition to some of their tributaries, provide habitat for resident trout.

There are numerous fish-bearing streams on the wildlife areas that contain both resident and anadromous fish stocks, and WDFW is actively coordinating with other landowners to remove stream barriers where historic runs of anadromous steelhead and Chinook salmon occurred. Most stream systems in the Quilomene and Whiskey Dick areas are ephemeral or have some stretch of underground flow, but many of the lower reaches support a host of resident species, in addition to providing off-channel rearing or other seasonal life requisites for species usually found in the larger Yakima or Columbia River watersheds. Steelhead trout have also been documented in Quilomene, Parke, and Skookumchuck Creeks. See **Appendix G** for a list of all fish species that occur, or have potential to occur, on the wildlife areas.

2.8 Fire History

Over the years several small fires have broken out on the L.T. Murray. In 1994, three lightning-caused fires, known as the “Murray Complex” Fires, burned a total of 300 acres. In 2003 the Elephant Head Fire in Taneum Canyon burned 250 acres as a result of arson. In 2004 the North Riggs Fire burned approximately 70 acres. Vigorous fire protection, development of ladder fuels, over-stocking, and insect/disease infestations have made timber stands on the L.T. Murray susceptible to stand-replacing fires, however, the wildlife areas have not experienced a catastrophic fire recently. This is one of the principal motivators for planning and implementing thinning/habitat improvement projects, which will minimize the potential for loss of human life, wildlife, habitat, watershed, and timber resources to fire. Prescribed burning will be an integral part of these projects as well. DNR is responsible for wildfire protection on the L.T. Murray.

Wildfires burned 7,000 acres on the Quilomene in 1976, 10 acres along Quilomene Bay in 1995, and 50 acres at Quilomene Bay in 2001. In 2003, two separate fires along the Vantage Highway burned approximately 850 acres on the Whiskey Dick. The Quilomene and Whiskey Dick Wildlife Areas are outside the Kittitas County Fire District, but an emergency fire suppression agreement between WDFW and DNR (#05-282) has been in effect since May 27, 2005 and will remain so until June 30, 2010. Quilomene and Whiskey Dick are captured under this agreement, and the parcels associated with the Skookumchuck acquisition (Skookumchuck and Parke Creek) will be added when the contract is updated in 2010.

Big sagebrush, *Artemisia tridentata*, is killed by fire, and as a result, uncontrolled wildfires in the Quilomene and Whiskey Dick areas can significantly alter the vegetation communities that shrub steppe obligate species such as sage grouse depend upon for both food and cover. In addition, fires in disturbed habitats often lead to diminished plant diversity as noxious weeds out-compete native grasses, reducing the quantity and quality of wildlife forage. It has been management policy to follow a wildfire event with the planting of native or near-native grass and forb species to suppress noxious weed invasion.

2.9 Vegetation Characterization

Approximately 33,000 acres of the L.T. Murray support conifer forest vegetation and the balance is predominantly shrub steppe, both interspersed with riparian corridors. Vegetation types vary from lower

elevation shrub/bunchgrass communities mixed with ponderosa pine, to higher elevation stands of timber, comprised mostly of Douglas fir, grand fir, and some western larch. Grasslands interspersed with rock outcrops and shrub-steppe communities dominate hillsides in mid-elevation transitional zones. Dominant grass communities consist of wheatgrasses, fescues, bluegrasses, and a variety of forbs, and common shrub communities are comprised of bitterbrush, ceanothus, snowberry, rose, serviceberry, and currants. Vegetation communities on the wildlife area are diverse, and a listing of some species that occur on the L.T. Murray Complex can be found in **Appendix G**, Table 12.

The majority of vegetation in the Quilomene/Whiskey Dick consists of shrub-steppe species, such as sagebrush and bitterbrush mixed with various bunchgrasses. Streams and springs provide narrow bands of riparian habitat, which support highly productive ecological communities.

Invasive weeds are one of the greatest threats to fish and wildlife habitat quality, and weed control is required by state law to protect public economic and natural resources. Weed control on the L.T. Murray Complex wildlife area has been an increasingly successful endeavor with the recent improvements to spray equipment, use of GPS data for locating new sites and relocating past areas of treatment, the release of biological control species, and cooperative efforts with Kittitas County Weed Board. Please see Table 4 in **Appendix B** for a listing of weed species found in Kittitas County.

2.10 Priority Habitats and Listed Plant Species

WDFW maintains a Priority Habitats and Species (PHS) list that catalogs habitats and species of Washington State considered high priorities for conservation and management. Priority Habitats are habitat types or elements with unique or significant value to a diverse assemblage of species. There are 20 Priority Habitats in Washington State, and each may consist of a unique vegetation type (e.g., shrub-steppe) or dominant plant species (e.g., juniper savannah), a described successional stage (e.g., old-growth forest), or a specific habitat feature (e.g., cliffs). More information on Priority Habitats and Species is available at <http://wdfw.wa.gov/hab/phslist.htm>

Management of priority habitats, particularly a habitat as large as shrub-steppe, must address needs on a landscape or ecosystem scale to assure protection of overall species biodiversity; as well as address local concerns, to protect micro-habitat features important to sensitive and other key species, and to assist landowners in managing their land.

2.10.1 Shrub-steppe

Shrub-steppe habitat is formed by a complex community of brush, bunchgrasses and cryptogam soils. Historically, Kittitas County contained over 580,000 acres of shrub-steppe habitat. Currently less than 325,000 acres remain, which constitutes a 44% loss. At least six wildlife species are considered shrub-steppe obligates (i.e., they need shrub-steppe habitat to meet some, if not all, of their life requisites), and a number of other species utilize this habitat type in some part of their life cycle. The majority of the Quilomene and Whiskey Dick WA's, and portions of the L.T. Murray WA, are comprised of shrub steppe habitat, and certain sites exhibit some of the state's best remaining native shrub-steppe communities. Two rare plant species, Hoover's tauschia (*Tauschia hooveri*) and hedgehog cactus (*Pediocactus simpsonii*), are reported to occur on the Whiskey Dick Wildlife Area. Hoover's tauschia occurs on lithosol soil types within shrub-steppe communities, and is listed as State Threatened and a Federal Species of Concern. The hedgehog cactus is listed in State Review Group 1, indicating that more data is necessary to assign a listing. Other listed plant species that have potential to occur on the

wildlife area include: Hoover's desert-parsley (*Lomatium tuberosum*) – State Sensitive and a Federal Species of Concern; Suksdorf's monkey-flower (*Mimulus suksdorfii*) – State Sensitive; bristle-flowered collomia (*Collomia macrocalyx*) – State Sensitive; white eatonella (*Eatonella nivea*) – State Threatened; beaked cryptantha (*Cryptantha rostellata*) – State Threatened; miner's candle (*Cryptantha scoparia*) – State Sensitive; and gray cryptantha (*Cryptantha leucophaea*) – State Sensitive and a Federal Species of Concern. Management practices that benefit shrub-steppe habitats and species include: surveying to better ascertain the amount, location, and quality of shrub-steppe present; purchasing large contiguous tracts of shrub-steppe habitat to protect from further fragmentation; controlling non-native herbaceous species; restoring shrub-steppe habitat where possible; restricting off-road vehicle use and other recreational activities detrimental to shrub-steppe habitat.

2.10.2 Old Growth/Mature Forest

Due to the influence of fire, climate and soils, old-growth and mature forest habitat types contain diverse structural components and tree species composition. Old growth stands are usually more than 150 years old, with 10 trees/acre greater than 21 inches diameter-breast-height (dbh), and 1-3 snags/acre that are 12-14 in dbh. Tree canopies may be single or multi-layered, and evidence of human-caused alterations to the stand will be absent or extremely slight. Mature forests are stands 80-160 years old, with an average tree diameter greater than 21 in dbh. The Quilomene and Whiskey Dick WA's contain only small, patchy forested areas in the upper reaches of Parke Creek, however, the majority of the L.T. Murray consists of forest habitat types. Although the L.T. Murray was logged heavily as a condition of the sale to WDFW, there are still existing pockets of old-growth and mature forest habitat in the upper elevations. These dense stands of trees provide hiding, escape and thermal cover, shade, and foraging and nesting sites for numerous species. Features such as snags and down logs provide important nesting, roosting, and foraging components for birds, bats, reptiles and amphibian species. Management practices designed to benefit old-growth/mature forest habitats are: protecting smaller tracts of old-growth and mature forest habitat that offer unique species composition and biodiversity; conducting timber thinning projects on younger, conifer/pine forested lands of the L.T. Murray WA to reduce the likelihood of a catastrophic wildfire; disallowing cutting of standing dead trees and snags for firewood; and restricting off-road vehicle use and other recreational activities detrimental to forest habitats.

2.10.3 Riparian

Riparian habitats are those sites adjacent to flowing or standing fresh water, and include the entire floodplain or wetland directly connected to the stream or water source. Even small streams, either perennial or intermittent, greatly influence vegetation, water tables, soils, microclimate, and wildlife. Riparian habitats are major contributors to ecosystem productivity and biological diversity, particularly in dry climates, and contribute to fish habitat quality by reducing surface water temperatures and maintaining stream bank stability. Riparian areas are designated by WDFW as a Priority Habitat type due to their potential to provide critical life requisites for a large diversity of fish and wildlife species. Riparian zones provide breeding, feeding, nesting, and cover requisites for a disproportionately high number of wildlife as compared to other habitat types, and also serve as important migration corridors and connective routes to other seasonal resources. The L.T. Murray has extensive riparian habitat along Manastash Creek and Taneum Creek, along with their associated tributaries. Riparian habitat in the Quilomene and Whiskey Dick Wildlife Areas can be found in limited locations along Skookumchuck, Quilomene, Whiskey Dick, and Parke Creeks. Many streams on the Quilomene and Whiskey Dick Wildlife Areas are seasonal or intermittently perennial and only have surface flow during the spring months. During the warmer months, drainages are generally dry except for those areas immediately

surrounding springs or seeps. Most channels are deeply incised and lack floodplains. Management practices designed to benefit riparian habitats are: controlling noxious weeds that compete with native vegetation; protecting riparian habitats from off-road vehicle use and other detrimental recreational activities; restoring riparian habitat where possible; and protecting riparian areas from conversion.

2.10.4 Talus/Cliffs

Talus slopes are homogenous fields of rock rubble ranging in size from 0.5 - 6.5 ft diameter, including riprap slides and mine tailings. Most often, these rubble fields are found at the base of cliffs and rock faces. Talus slopes and cliffs provide key habitat requisites such as security, hiding and escape cover for bighorn sheep and numerous reptiles and small mammals. Cliffs also provide perches and nesting sites for raptors such as golden eagles and peregrine falcons. Management practices designed to benefit talus/cliff habitats are: protecting talus/cliff habitats from off-road vehicle use; purchasing large contiguous tracts of habitat to protect from fragmentation; and enforcing buffers around nesting sites to reduce human disturbance.

2.11 Priority Fish and Wildlife Species

Protection and enhancement of fish and wildlife and their habitats is the main focus when developing wildlife area management strategies, and these strategies help prioritize needs of 'Priority' or 'at risk' species. Priority Species require protective measures for their survival due to their population status, sensitivity to habitat alteration, and/or recreational, commercial, or tribal importance. Priority Species include State Endangered, Threatened, Sensitive, and Candidate species; vulnerable aggregations (e.g., nesting bird colonies, or bat maternity colonies); and species of importance that are vulnerable in some way. Currently on the PHS list there are 152 vertebrate species, 41 invertebrate species, and 10 species groups or "guilds" that can be found state-wide. Guilds represent an association of species that share a common life requisite, such as shrub-steppe obligates, which, by definition, require functioning shrub-steppe habitat for all or part of their life.

Species known to currently be experiencing, or have already experienced, failing or declining populations due to: limited numbers, disease, predation, exploitation, or a loss of suitable habitat are identified as needing protection at the State and/or Federal level. Federally listed species (or those proposed for listing) are designated by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, and State listed species are designated by the Washington Department of Fish and Wildlife. State listing classifications are as follows:

- Endangered – any species native to the state of Washington that is seriously threatened with extinction throughout all or a significant portion of its range within the state.
- Threatened – any species native to the state of Washington that is likely to become an endangered species within the foreseeable future throughout a significant portion of its range within the state without cooperative management or removal of threats.
- Sensitive – any species native to the state of Washington that is vulnerable or declining and is likely to become endangered or threatened throughout a significant portion of its range within the state without cooperative management or removal of threats.
- Candidate – species that WDFW will review for possible listing if evidence suggests that they meet listing criteria defined for State Endangered, Threatened, or Sensitive categories.
- Species of Concern – species that are being monitored, or need further data to warrant listing.

Management of the wildlife areas focuses on maintaining quality habitat that will provide life requisites for a diversity of species. Any management activity will have both positive and negative impacts to the multitude of wildlife species found on the landscape. However, management decisions will be tailored to benefit the most species, or the highest priority species, while minimizing effects to adversely impacted species. On the L.T. Murray Complex, 62 fish and wildlife species occur, or have potential to occur, that have either State or Federal conservation status: 17 mammal species, in addition to roosting concentrations of bats; 24 bird species, in addition to nesting concentrations of herons; 12 fish species; 3 reptile species; 2 amphibian species and 1 invertebrate species (Table 3). All of these species are considered priorities for wildlife management and conservation efforts.

Table 2. Priority Fish and Wildlife Species That May Occur on the L.T. Murray Complex

Common Name	Scientific Name	State Status	Federal Status
MAMMALS			
Rocky Mountain elk	<i>Cervus elaphus nelsoni</i>	None	None
Rocky Mountain mule deer	<i>Odocoileus hemionus</i>	None	None
Bighorn sheep	<i>Ovis canadensis</i>	None	None
Northwest white-tailed deer	<i>Odocoileus virginianus ochrourus</i>	None	None
Fisher	<i>Martes pennanti</i>	E	C
Gray wolf	<i>Canis lupus</i>	E	E
Grizzly bear	<i>Ursus arctos</i>	E	T
Marten	<i>Martes americana</i>	None	None
Wolverine	<i>Gulo gulo</i>	C	SoC
Lynx	<i>Lynx canadensis</i>	T	T
Black-tailed jackrabbit	<i>Lepus californicus</i>	C	None
White-tailed jackrabbit	<i>Lepus townsendii</i>	C	None
Townsend's ground squirrel	<i>Uroditellus townsendii</i>	C	SoC
Western gray squirrel	<i>Sciurus griseus</i>	T	SoC
Merriam's shrew	<i>Sorex merriami</i>	C	None
Preble's shrew	<i>Sorex preblei</i>	C	SoC
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	C	SoC
Roosting concentrations of bats: Big brown, <i>Myotis</i> spp., Pallid			
BIRDS			
Bald eagle	<i>Haliaeetus leucocephalus</i>	S	SoC
Ferruginous hawk	<i>Buteo regalis</i>	T	SoC
Merlin	<i>Falco columbarius</i>	C	None
Northern goshawk	<i>Accipiter gentilis</i>	C	SoC
Golden eagle	<i>Aquila chrysaetos</i>	C	None
Peregrine falcon	<i>Falco peregrinus</i>	S	SoC
Prairie falcon	<i>Falco mexicanus</i>	None	None
Flammulated owl	<i>Otus flammeolus</i>	C	None

Northern spotted owl	<i>Strix occidentalis</i>	E	T
Burrowing owl	<i>Athene cunicularia</i>	C	SoC
Pileated woodpecker	<i>Dryocopus pileatus</i>	C	None
White-headed woodpecker	<i>Picoides albolarvatus</i>	C	None
Black-backed woodpecker	<i>Picoides arcticus</i>	C	None
Lewis' woodpecker	<i>Melanerpes lewis</i>	C	None
Greater sage-grouse	<i>Centrocercus urophasianus</i>	T	C
Dusky grouse (formerly blue)	<i>Dendragapus obscurus</i>	None	None
Sooty grouse (formerly blue)	<i>Dendragapus fuliginosus</i>	None	None
Sage sparrow	<i>Amphispiza belli</i>	C	None
Sage thrasher	<i>Oreoscoptes montanus</i>	C	None
Loggerhead shrike	<i>Lanius ludovicianus</i>	C	SoC
Vaux's swift	<i>Chaetura vauxi</i>	C	None
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	C	C
Black-crowned night heron (breeding areas)	<i>Nycticorax nycticorax</i>	None	None
Great blue heron (breeding areas)	<i>Ardea herodias</i>	None	None
Chukar (non-native)	<i>Alectoris chukar</i>	None	None
Wild turkey (non-native)	<i>Meleagris gallopavo</i>	None	None
REPTILES			
Sagebrush lizard	<i>Sceloporus graciosus</i>	C	SoC
Striped whipsnake	<i>Masticophis taeniatus</i>	C	None
Sharptail snake	<i>Contia tenuis</i>	C	SoC
AMPHIBIANS			
Columbia spotted frog	<i>Rana luteiventris</i>	C	None
Western toad	<i>Bufo boreas</i>	C	SoC
FISH			
Rainbow trout	<i>Oncorhynchus mykiss</i>	None	None
Steelhead - upper Columbia	<i>Oncorhynchus mykiss</i>	C	E
Steelhead - mid Columbia	<i>Oncorhynchus mykiss</i>	C	T
Spring Chinook salmon – upper Columbia	<i>Oncorhynchus tshawytscha</i>	C	E
Spring Chinook salmon – mid Columbia	<i>Oncorhynchus tshawytscha</i>	C	T
Cutthroat trout	<i>Oncorhynchus clarki lewisi</i>	None	None
Redband	<i>Oncorhynchus mykiss gairdneri</i>	None	None
Bull trout	<i>Salvelinus confluentus</i>	C	T
Coho salmon	<i>Oncorhynchus kisutch</i>	C	T
Pacific lamprey	<i>Lampetra tridentate</i>	None	SoC
White sturgeon	<i>Acipenser transmontanus</i>	None	None
Mountain sucker	<i>Catostomus platyrhynchus</i>	C	None
BUTTERFLIES			

Silver-boardered fritillary	<i>Boloria selene atrocotalis</i>	C	None
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Priority Fish and Wildlife – Significant Guilds and Habitat Associations

Freshwater Fish Species

Spring Chinook and coho salmon, in addition to several trout species - steelhead, rainbow, cutthroat, brook and bull trout – are all considered culturally, ecologically and economically important to the sub-basin. These species are present (or were thought to occur historically) throughout the watershed at some point in their life cycle. It is assumed that other aquatic life will benefit from managing toward suitable conditions for these species, due to their wide range of habitat requisites (DASP 2004). The most common limiting factors for both summer steelhead and spring Chinook salmon are stream flow, water temperature, habitat diversity, sediment load, and quantity of key habitats for various life stages.

Taneum and Manastash Creeks are the two major drainages within the L.T. Murray WA, and support numerous resident fish species in addition to anadromous runs of coho salmon, federally threatened steelhead, and federally endangered Chinook salmon (Table 4). These two drainages are fed by numerous tributaries (Robinson Creek, Shadow Creek, Whiskey Canyon, and Joe Watt Canyon) that contain diverse resident fish populations. Other smaller tributaries do not support fish, but have a positive influence on water quality and quantity in the lower watershed.

The Quilomene and Whiskey Dick Wildlife Areas are bordered on the east by the Columbia River, which has documented use by steelhead trout and other priority fish species. Although steelhead found on the L.T. Murray WA (considered mid-Columbia runs) are listed as threatened, the steelhead found in the Quilomene/Whiskey Dick WA’s (considered Upper-Columbia runs) are listed as federally endangered. While the creeks on the wildlife area do not provide year-round habitat for these priority species, the lower creek reaches often provide seasonally important off-channel rearing habitat for young fish, and species such as lamprey or young sturgeon have potential to occur. On these eastern wildlife areas the larger tributaries (Whiskey Dick, Skookumchuck, Parke, and Quilomene Creeks) provide miles of fish habitat that support rainbow trout along with other resident fish species. Steelhead redds have been documented in the lower reaches of Skookumchuck and Quilomene Creeks.

Big Game Wildlife Species

The L.T. Murray Complex Wildlife Area was purchased to provide and protect critical winter range for deer and elk, as well as perpetuate and improve upland game bird habitat. The Quilomene and Whiskey Dick are within the range of the Colockum Elk Herd and provide winter habitat for elk and deer populations in addition to year-round habitat for the Quilomene Bighorn Sheep Herd. The L.T. Murray is within the range of the Yakima Elk Herd and provides spring and fall transition range as well as winter habitat for elk and deer populations. Supplemental hay is provided to elk at two feed stations through the winter months to reduce depredation on adjacent agricultural lands. In 1971, approximately 13 miles of elk fence was constructed to restrict elk migration off the L.T. Murray and limit elk access to private agricultural fields. The increasing human development onto traditional winter range had resulted in problems with elk damage to crops, hay piles, fence, and other agricultural-related structures and production. The elk fence also serves as a means of holding the elk herd in the vicinity of the winter feed sites during the winter, and limiting the stress placed on the animals by interaction with humans during a critical time of year. The combination of fencing and winter-feeding has become the necessary solution to controlling elk depredation. The Game Management Plan calls for an increase in the

Colockum Elk Herd while maintaining the Yakima Elk Herd at current levels and increasing bighorn sheep populations in the Quilomene Herd.

Game Bird Species

The L.T. Murray Complex Wildlife Area was purchased to protect big game critical winter range, as well as maintain upland game bird populations. The Quilomene and Whiskey Dick Wildlife Areas are within the recovery area of the greater sage grouse and will be managed to provide habitat for this state threatened species. Populations of other upland birds such as chukar, California quail, Merriam's turkey, mourning dove, Hungarian partridge, ruffed grouse, blue grouse (now recognized as two separate species – sooty and dusky grouse) and ring-necked pheasant all provide significant recreational opportunities on the L.T. Murray Complex Wildlife Area. Populations of these species are not regularly monitored, but fluctuate annually depending on weather and food supply.

Shrub-Steppe Obligate Species

More than half of Washington's shrub-steppe habitat has been lost in the past century due to changes in land use practices. Dramatic increases in dry-land farming and irrigated crop production have reduced the once expansive shrub-steppe to a fragmented landscape with very few large areas of native vegetation (Dobler, F. et al, 1996). Shrub-steppe obligate species (i.e., sage grouse, sage thrasher, Brewer's sparrow, sage sparrow, pygmy rabbit, and sagebrush vole) require shrub-steppe habitat to survive, and any conversion away from native vegetation negatively influences these species. Three species – sage thrasher, sage sparrow, and loggerhead shrike – are also considered priority species by WDFW, because of their status as state candidate species. More than 100 bird species forage and nest in sagebrush communities, and about one-third of the neotropical migratory birds inhabiting Washington are considered habitat specialists. Shrub-steppe habitat supports the largest number of these specialists (Andelman and Stock 1994). In a recent analysis of birds at risk within the interior Columbia Basin, the majority of species identified as of high management concern were shrub-steppe species (Vander Haegen et al. 1999). In addition, over half of these species have experienced long-term population declines according to Breeding Bird Surveys (Saab and Rich 1997). Other PHS species that are strongly associated with shrub-steppe habitats include striped whipsnake, sagebrush lizard, chukar, ferruginous hawk, golden eagle, burrowing owl, prairie falcon, white-tailed jackrabbit, Merriam's shrew, elk, mule deer and bighorn sheep. Three-quarters of all known snake species in Washington occur in this region, as well as five known lizard species and five known amphibian species, and the lower elevations of the Whiskey Dick Wildlife Area lie within the largest core habitat for the striped whipsnake. White-tailed deer were historically limited to riparian lowlands, however they have recently been moving into shrub-steppe habitat. Pronghorn antelope, the ungulate most closely associated with shrub-steppe habitats, is no longer found in Washington. As recent as the late 1980's Pronghorn antelope occurred in the eastern portions of the Quilomene and Whiskey Dick Wildlife Areas and south to the Yakima Training Center. WDFW is currently evaluating the potential to re-introduce this historically native ungulate back into Washington. At least some portion of the L.T. Murray, Quilomene, and Whiskey Dick Wildlife Areas contain shrub steppe habitat.

Old Growth/Mature Forest Obligate Species

The L.T. Murray Wildlife Area is directly adjacent to USFS land and contains checkerboard DNR ownership scattered throughout. Historically these forests contained older timber stands that support mature forest obligate species such as goshawk, pileated woodpecker, and spotted owls. Between the 1960's and the 1990's most of the timber on the L.T. Murray WA was harvested under a condition of the sale to WDFW. Current timber management has been turned back to WDFW and will be managed

toward healthy conditions for each stand type. The USFS manages for spotted owls on adjacent lands, and dispersing owls occasionally inhabit WDFW lands for short periods of time. Goshawks have nested in the vicinity of Yahne Canyon within the last 15 years but after removal of the large, older trees, goshawks have not been found there. There is a stronger likelihood of goshawks re-inhabiting the area than spotted owls since they are not as vulnerable to predation. Pileated woodpeckers are occasionally found foraging throughout the northern portion of the L.T. Murray WA, and as mixed conifer stands continue to mature it is likely these birds will re-inhabit the area. Other Priority Species with strong association to this habitat type are: white-headed woodpecker, Lewis' woodpecker, flammulated owl, Vaux's swift, elk, Rocky Mountain mule deer, sooty and dusky grouse, and Merriam's turkey.

Priority Fish and Wildlife – Species of Recreational or Economic Importance

Rocky Mountain Elk

Elk are the second largest wild ungulate residing in Washington State. Zoological data from the Columbia Basin suggest elk were present and utilized by early inhabitants (Dixon et al. 1996 and McCorquodale 1985). As late as the 1800's elk may have been extirpated from the central Washington region (McCorquodale 1985), and the current Yakima and Colockum elk herds were developed from the re-introduction of Rocky Mountain elk captured in Yellowstone National Park in 1915 (Bryant and Maser 1982 and Pautske 1939).

The Yakima Elk Herd utilizes the northern portion of L.T. Murray WA (in Game Management Units 336, 340, and portions of 342) at various times throughout the year. To reduce elk depredation on adjacent agricultural lands, 12 miles of elk fence are maintained on the L.T. Murray WA's, southeastern boundary, and winter feeding operations are implemented at Joe Watt and Robinson Canyons. Plans for maintaining target herd numbers, managing hunting seasons, and addressing depredation problems on neighboring lands are addressed in the 2002 Yakima Elk Herd Plan. The Yakima Elk Herd plan (2002) currently has elk herd objective goals of 9,500 elk while the 2003-2009 Game Management Plan has a range of 9,025 – 9,975 elk. A study of the Yakima Elk herd was recently completed by WDFW, with data analysis now in progress that will identify elk distribution and seasonality of use. Its focus is to identify priority elk habitats and delineate how elk use the range in relation to human disturbance. A concurrent study is underway by the USFS dealing with forest habitat components related to this effort.

A significant portion of the Colockum Elk Herd resides within the Quilomene and Whiskey Dick WA's (GMU 329) during the winter, with most animals on site between November and April. A small number of elk may stay throughout the year in sites with water and cover, and where human disturbance is low. The Quilomene and Whiskey Dick were purchased specifically for big game winter range, recognizing that other wildlife would also benefit from such protection. The Colockum Elk Herd plan (2005) is currently in draft with expected completion due in the spring of 2006. Herd objective goals of 4,275 – 4,725 elk were laid out in WDFW's 2003-2009 Game Management Plan (2003). Ensuring habitat protection, habitat enhancement and limiting human disturbance are critical functions for both plans to be successful, and specific items needing management actions include: vehicle access management, fire protection, noxious weed management and general human access management. Recent wind power developments and rapid increase of ATV use are significant issues needing attention for successful management of this component of the Colockum Elk Herd.

Elk use of different habitat types depends on season, weather events, land use changes, human disturbance, etc., and all of these factors influence successful elk management. In attempt to address elk

impacts to local agricultural operations, the Kittitas County Big Game Management Round Table (BGMR) was formed. This group is comprised of farmers, ranchers, concerned citizens, and various agency staff who collaborate to find solutions to elk damage on private lands. In addition, the Rocky Mountain Elk Foundation is currently developing an East Slope Conservation initiative. The goal of this process is to produce a series of conservation strategies for the East Slope Cascades region that are shared by the majority of stakeholders and to lay out a plan for action associated with each strategy

Rocky Mountain Mule Deer

Historically, mule deer were an important member of eastern Washington's landscape, serving as food and clothing sources for Native Americans prior to Euro-American settlement. Today, mule deer continue to play an important role by providing food for Native Americans, recreational opportunities for hunters and wildlife watchers, and tremendous economic benefits to local communities and the state of Washington. Mule deer range throughout the L.T. Murray Complex (GMU's 329,336, 340 & portions of 342), and occupy various habitats from alpine communities in the Cascades, to shrub steppe/grassland habitats along the eastern fringes of the Yakima and Columbia Rivers. Summer range consists of bunchgrass communities interspersed with timber, which provide fawning and hiding cover. Summer range habitats are mainly located in the western units of the L.T. Murray Complex. The eastern units provide winter and spring forage in the form of forbs and bunchgrasses, particularly Sandberg's bluegrass communities. The most important habitat factors affecting mule deer in this area is the availability of suitable forage to survive harsh winter conditions and spring green up in preparation for fawning.

Mule deer are habitat generalists and populations in shrub-steppe communities take advantage of the best habitat when and where it is available. Many populations inhabiting the periphery of the shrub-steppe region in eastern Washington are migratory, spending much of the year in higher elevation forested habitat (J. Musser, personal communication). They move into lower elevation shrub-steppe habitat during winter seeking snow-free areas for food. Populations in the central, or drier portion of the Columbia Basin do not generally exhibit elevational migrations (there is very little elevational change in the topography), however some deer will move long distances, greatly extending their home ranges (J. Tabor, personal communication).

Food habits of mule deer in Washington's shrub-steppe region vary with the specific locality of the herd. Shrubs such as bitterbrush are very important to deer in the northern portion of the shrub-steppe region, along the Okanogan River (R. Johnson, personal communication) and the breaks south of the Columbia River (Carson and Peek 1987, Griffith and Peek 1989). Shrubs do not seem to be as important to mule deer in the central portion of the region (J. Tabor, personal communication). Here, deer seem to be more dependent on agricultural areas. Mule deer will also take advantage of riparian vegetation anytime during the year, although these areas are rare in central Washington's shrub-steppe region.

Steelhead Trout

Steelhead trout are genetically identical to resident rainbow trout, but steelhead are anadromous, meaning they migrate to the ocean. Steelhead in the Upper Columbia Subbasin are listed as federally endangered, and have potential to occur on the Quilomene/Whiskey Dick WA in creeks and tributaries that connect to the Columbia River. The Mid-Columbia Subbasin steelhead are listed as federally threatened, and have potential to occur, on the L.T. Murray WA in watersheds that connect to the Yakima River. Steelhead are known to exist in Taneum and Manastash Creeks and their tributaries on the L.T. Murray Wildlife Area, and have been observed in Parke Creek, Quilomene Creek, Whiskey Dick Creek, and Skookumchuck Creek within the Quilomene and Whiskey Dick Wildlife Areas.

The following information has been excerpted from the Yakima Sub-basin Plan (2004): Steelhead trout were widely distributed in the Yakima sub-basin prior to Euro-American settlement and were known to utilize virtually all of the major streams and tributaries for some aspect of their life cycle. It is probable that historical spawning distribution of summer steelhead included virtually all accessible portions of Yakima Basin, with highest spawning densities occurring in complex, multi-channel reaches of the mainstem Yakima and Naches, and in third and fourth order tributaries with moderate (1-4%) gradients. The historic abundance of steelhead trout is poorly known. Howell et al. (1985) estimated that over 80,000 adult steelhead trout might have returned to spawn in the Yakima Sub-basin.

The current range of steelhead/rainbow trout in the Yakima Subbasin is slightly smaller than under historic conditions. Fewer tributaries are utilized for spawning and rearing than historically. Sections of many streams thought to formerly support spawning and rearing are now utilized only as migration corridors due to habitat degradation. When compared to Columbia Basin systems with similar elevation, the proportion of the steelhead/rainbow trout population that exhibits anadromy is significantly reduced, and growth of juvenile rainbow trout is well below other systems. These facts reinforce the hypothesis that the young-of-the-year life stage is the limiting factor in rainbow/steelhead trout production in the Upper Yakima basin.

Key Findings for Steelhead:

- Steelhead populations have been dramatically reduced from pre-settlement abundance levels.
- Survival of steelhead kelts (mature spawned out fish with the potential to spawn again) migrating out of the Yakima Basin and through the main stem Columbia to the ocean is at or near zero.
- Capture, rehabilitation, and release of these fish in the Yakima Basin increases survival and could act as a source of broodstock/genetic material for reintroduction efforts.
- Production of Steelhead within the Yakima Basin is heavily weighted towards Satus and Toppenish Creeks, increasing population levels in other creeks within this area will decrease risk of extinction of steelhead in the Yakima Subbasin.
- Existing and forecast future levels of abundance and straying indicate that natural colonization of suitable habitats (after removal of obstructions to passage) would be very slow or non-existent in this Assessment Unit. Supplementation into newly re-opened habitats could accelerate/greatly improve the success rate of population reestablishment.

California Bighorn Sheep

Bighorn sheep were native to Washington and archeological evidence shows they inhabited uplands throughout the Yakima and Columbia River basins. Bighorns were extirpated from Washington around 1930. Efforts to bring them back were initiated in the 1950's, and continue to this day. The Colockum was one of the first areas where re-introductions were accomplished and the population thrived until a likely outbreak of pneumonia, *Pasteurella heamolytica*, occurred in the 1980's. Between 1993 and 1996 re-introductions were again initiated with 41 bighorns released at the mouth of Quilomene Creek. Since then bighorns have distributed themselves along the Columbia River from Malaga to the Skookumchuck drainage. Current population numbers are approximates 160 sheep (Bernatowicz, 2003) with herd objectives at 250-300 sheep.

Bighorns utilize cliffs, rocky outcrops, and talus slopes for security and travel corridors and to reach forage in adjacent grasslands. The greatest threat continues to be contracting diseases from domestic

sheep, which can carry multiple diseases without outward effect. The USFS has four domestic sheep allotments: three on the Naches Ranger District, and one on the Cle Elum Ranger District. Domestic sheep summer in the Naneum basin on mostly private land and some DNR lands. Bighorn rams are known to wander, but at this point it is unknown if bighorns from either of these populations are coming in contact with domestic sheep.

Merriam's Turkey

Merriam's turkeys were introduced in various areas of the region in the 1990's. The population has grown significantly, and is becoming a popular game bird on the L.T. Murray Complex Wildlife Area. Current distribution throughout the L.T. Murray is not well known, but flocks have been sighted in the eastern portion during winter periods, and are likely scattered throughout the area during mild weather. Some controversy surrounds the establishment of this game bird with concerns that they eat native species of invertebrates, which may, and compete with native upland birds for resources. Literature does make reference to turkeys eating insects and mollusks (Korschgen 1967), but to date no studies have been conducted on Washington turkeys to determine their dietary preferences or what impacts they may have on native populations of invertebrates. Turkeys are known to subsist on mast producing plants during the fall and winter months and rely on insects, forbs and succulent grasses during the spring and summer as well.

Chukar

Chukar is an exotic game bird introduced in the 1930's that has reproduced successfully and is highly sought after by sportsmen throughout the western United States. Chukar prefers deep, rocky canyons for security, and feed on grasses as well as seeds, forbs, berries, and insects. The Quilomene and Whiskey Dick support some of the best chukar habitat in the area, although severe winters and droughts can be extremely difficult in maintaining chukar populations.

Forest Grouse

Blue grouse (now separated into two species – Dusky and Sooty grouse) and ruffed grouse are the prominent grouse species on the L.T. Murray Complex WA's, with early season hunting affording the most opportunity. Although surveys have not been conducted to monitor populations, statewide harvest trend data suggests a decline in forest grouse populations since records have been kept in the early 1960's (Game Mgmt. Plan, 2003). Grouse require succulent vegetation adjacent to water sources during the breeding season. They have strong site fidelity to wintering areas and require large fir trees for food and roosting (Cade 1984). Forbs and grasses are major food sources during summer months, while fir species provide primary forage items in the winter. Habitat management requires a mix of dense conifer stands for wintering habitat, interspersed with open areas for breeding and brood rearing. Logging and fire can open low elevations stands and increase growth of herbaceous forage (Rodrick & Milner 1991).

Priority Fish and Wildlife – Species of Management Significance

Bald eagle

Bald eagles are commonly seen on the wildlife area in winter months, feeding on fish and waterfowl or scavenging on carcasses. Despite state and federal protection, many adult bald eagle fatalities are human-caused, including shooting, poisoning, vehicle collisions, electrocution, and black market trade. Large shoreline trees preferred by eagles are becoming a limited resource as more land is dedicated to residential development. One management practice that benefits bald eagles is the creation of winter closures on the L.T. Murray and Whiskey Dick WA's to reduce human disturbance. The bald eagle was

federally de-listed from threatened to sensitive status in June 2007, and state de-listing is expected to follow soon.

Golden Eagle

Golden eagles require large open areas for feeding and generally nest on cliffs or in large trees. They use the same territory annually but may use alternate nests in different years. On the L.T. Murray there is one identified territory that has been occupied with moderate success during the years monitoring has occurred. Another potential nest site has been identified, but it is unknown if this is a different territory, or just an alternate nest site. Limiting factors can vary on the success of individual sites, with the main threat most often being disturbance of nest sites. Recreational and commercial activities adjacent to nests can cause nest failure. Golden eagles prey mainly on hares, rabbits, ground squirrels, and prefer mature and old growth forests near the edges of clearcuts in higher elevations. Threats include limited habitat, lack of undisturbed nest sites, conversion of rangeland; poisoning from lead and other contaminants; electrocution from power lines; shooting and lack of prey. A general, recommended buffer distance of human disturbance from a golden eagle nest site is approximately 1,500 ft during breeding season and 1 mile nesting through fledging seasons (Suter and Jones 1981).

Peregrine falcon

Washington's peregrine population remains vulnerable due to small numbers, chemical pollutants and human disturbance. Peregrine falcons usually nest on cliffs 150 ft or more in height, which can be found on the portions of the Quilomene and Whiskey Dick WA's that border the Columbia River. Eggs are laid and young are reared in small caves or on ledges, and nest sites usually occur near water. The birds are sensitive to disturbance during all phases of the nesting season, from early March to late June. Disturbance can cause desertion of eggs or young, or cause older nestlings to fledge prematurely.

Greater Sage Grouse

As a shrub-steppe obligate species, much of the sage grouse annual diet, and in many cases the entire winter diet, consists of sagebrush leaves (Wallestad et al. 1975; Green and Flinders 1980a, b). In spring, sage grouse use traditional leks as courtship display areas, preferring open sites surrounded by dense stands of sagebrush with >20% canopy coverage (Wallestad 1975, Autenrieth 1981, Klebenow 1985). During brood rearing, sage grouse opt for habitats rich in insects and forbs (Klebenow and Gray 1968). Sage grouse numbers have dramatically declined from recent history and are listed as a state threatened species and a federal candidate species. Historically, sage grouse were widespread throughout shrub-steppe communities of eastern Washington, but with agricultural development, overgrazing and wildfire, approximately 92% of this historical habitat has been lost (Stinson, et al. 2004). Current remaining sage grouse populations exist on the U.S. Army Yakima Training Center in Kittitas and Yakima Counties, and on private property in Douglas County where CRP programs have allowed habitat to recover. Although the L.T. Murray Complex does not support large numbers of sage grouse, they historically occurred year-round in the Quilomene and Whiskey Dick areas, and are still occasionally observed. An historic lek was documented near Whiskey Dick Mountain in the 1960's, and rare sightings of sage grouse still occur on the Quilomene and Whiskey Dick WA's to this day. The Quilomene and Whiskey Dick WA's lie within the 146,565-acre Colockum Sage-Grouse Management Unit of the Sage-Grouse Recovery Area, and provide a critical habitat linkage between the Douglas and Kittitas County sub-populations. The State of Washington Greater Sage Grouse Recovery Plan (2004) identifies several key factors necessary to maintaining sage grouse populations in Washington. These factors include:

protecting remaining habitat, restoring degraded habitat, and re-establishing populations outside their current range.

Black-tailed & White-tailed Hare (Jackrabbit)

Both the black-tailed and white-tailed jackrabbits are listed as state candidates in Washington due to population declines, and hunting of these species is currently not allowed. White-tailed hares are the larger of the two species, weighing 6-9 pounds. The black-tailed hare, weighing only 4-6 pounds, is thought to be a relatively recent addition to Washington, invading the state from the south around 1870 (WA-PS-154). Black-tailed hares are found in shrub-steppe communities with less than 10 inches of rainfall. Both species feed on green herbaceous or woody vegetation during the summer, and in the winter they will consume any available vegetation including buds, twigs and bark. Hares are preyed on by raptors and coyotes, and play a significant role in raptor population abundance. Although the white-tailed hare is the more prominent species, both hares occur on the eastern portion of L.T. Murray WA, and throughout the Quilomene and Whiskey Dick WA's. Protection of shrub-steppe communities is key to maintaining viable populations of these two species.

2.12 Cultural Resources

Cultural, geological, and other non-renewable resources are protected, and may not be removed unless such removal is beneficial to wildlife, habitat, or the Wildlife Area, or for scientific or educational purposes. WDFW will coordinate with the appropriate agency of jurisdiction for the protection of such resources. Past issues have included the removal of various rock formations, Native American artifacts, plants, seeds, and other items by members of the public. Past cultural resource investigations in the region were driven by the development of dams along the Columbia River, and local research has focused on the Wanapum Reservoir.

The wildlife areas of the L. T. Murray Complex lie within the ceded territory of the Confederated Tribes and Bands of the Yakama Indian Nation, with particular historic association for the Yakama, Kittitas, and Wanapum Tribes. The region is also within the traditional-use territories of the Wenatchi and Sinkayuse, members of the Colville Confederated Tribes (Eastern Washington University 2008).

The Kittitas Valley was a focal point for the regional tribes, and there was a system of trails along the Quilomene, Skookumchuck, and Whiskey Dick creeks that connect the valley to the Columbia River (Eastern Washington University 2008). The Kittitas Valley contains important root and berry gathering grounds, and several large villages along the Columbia River took advantage of local fisheries. A number of economically important crops were gathered in the area, including plants with edible roots or bulbs such as bitterroot, biscuitroot, wild onions, and yellowbells, along with fruit-bearing shrubs such as serviceberry and chokecherry. Today, members of the Yakama Indian Nation and the Colville Confederated Tribes continue to gather plant resources throughout the L.T. Murray Complex, and Yakama Nation members exercise treaty hunting rights within the boundaries of the Colockum Elk Herd (WDFW 2006).

CHAPTER 3. Management Objectives, Issues & Strategies

Statewide goals and objectives listed in Chapter 1 shape management priorities on wildlife areas. Specific wildlife area information including why the area was purchased, habitat conditions, species present, and public issues and concerns are evaluated to identify wildlife area activities or strategies. *Public issues from past planning efforts and the Citizens Advisory Group are noted in italics and are captured in Appendix A.*

Objectives and associated strategies or tasks specific to the L.T. Murray Complex Wildlife Area is listed where appropriate under applicable agency objectives. Unfunded needs are underlined.

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

1. Maintain Big Game Populations

- A. *Strategy:* Feed roughly 600 tons of hay between Dec 15 and March 15 (weather dependant) at two feed sites on the L.T. Murray. *Justification:* Reduce winter elk depredation on agricultural lands. *Timeframe:* Annually.
- B. *Strategy:* Maintain 13 miles of elk fence along the eastern boundary of the L.T. Murray. *Justification:* Minimize elk damage to private property. *Timeframe:* Annually.
- C. *Strategy:* Maintain a winter closure area on a portion of the L.T. Murray WA restricting public access from start of feeding until May 1. *Justification:* Reduce stress to wintering elk and minimize damage to agricultural lands. *Timeframe:* Annually.
- D. *Strategy:* Install 8 car counters on the primary roads within the Quilomene and Whiskey Dick WA's. *Justification:* Evaluate traffic volume on the wildlife area during critical spring months when wildlife are in poorest condition and roads are easily damaged. *Timeframe:* 2006.
- E. *Strategy:* Control weeds on the two feed sites by spraying herbicide and/or seeding grasses to compete with invasive weeds. *Justification:* Weed control is legally required and establishment of native plants is desired. *Timeframe:* Annually.

2. Improve and Maintain Fish Populations

- A. *Strategy:* Survey fish species composition and abundance on all streams of the L.T. Murray Complex. *Justification:* Data is necessary to address habitat needs of fish and wildlife – particularly priority species – and prevent inadvertent detrimental impacts during project implementation. *Timeframe:* as funds allow
- B. *Strategy:* Continue annual Road Maintenance and Abandonment Planning work. *Justification:* Address fish passage barriers, sediment delivery sources and other watershed issues, particularly in the case of stream adjacent roads. RMAP work required by State law. *Timeframe:* Annually through 2015.
- C. *Strategy:* Correct known fish passage barriers and sediment delivery issues on Quilomene and Whiskey Dick creeks. *Justification:* Passage barriers prevent re-colonization by anadromous and resident fish and sediment reduces habitat quality. *Timeframe:* as funds allow.
- D. *Strategy:* Assess sediment delivery issues on roads within the Quilomene and Whiskey Dick WA's and develop a plan to address any issues found. *Justification:* Prioritize and address habitat quality issues for steelhead or other priority species. *Timeframe:* as funds allow.

- E. Strategy: Plant woody vegetation in Whiskey Dick, Skookumchuck, Parke and Quilomene drainages to improve riparian habitat function. *Justification:* Improve fish habitat by reducing sediment delivery and water temperature. *Timeframe:* as funds allow.

3. Manage for Upland Birds

- A. *Strategy:* Maintain springs to provide water for upland birds and other wildlife species. *Justification:* Ensure water is available across the landscape to improve use of all available habitats and encourage species distribution. *Timeframe:* as staff time and funds allow.
- A. Strategy: Assess all wildlife areas' springs and develop maintenance or restoration plans. *Justification:* Provide functional water sites for upland birds. *Timeframe:* as funds allow.

4. Manage for Species Diversity

- A. Strategy: Conduct surveys to catalogue species richness and diversity on the wildlife areas. Search particularly for priority species or those species currently lacking data. *Justification:* Data is necessary to address habitat needs of wildlife – particularly priority species – and prevent inadvertent detrimental impacts during land management. *Timeframe:* as funds allow
- B. Strategy: Assess health and function of habitats across the L.T. Murray Complex. *Justification:* Data will help prioritize habitat improvement projects to benefit the greatest number of species. *Timeframe:* As funds allow
- C. *Strategy:* See below Strategies 7-A and B (Protect and Restore Forest Habitats). *Justification:* Healthy, diverse forests support wildlife species diversity. *Timeframe:* Ongoing

5. Protect and Restore Riparian Habitat

- A. *Strategy:* Continue photo monitoring of Whiskey Dick Creek. *Justification:* Track trends in riparian vegetation after removal of historic livestock grazing. *Timeframe:* Annual
- B. *Strategy:* Continue to exceed riparian buffer widths recommended by Forest Practices regulations during all timber thinning/habitat improvement projects on the L.T. Murray. *Justification:* Minimize sediment delivery to creeks and maintain robust riparian corridors to benefit fish and wildlife. *Timeframe:* Ongoing.
- C. Strategy: Place barriers in primitive camping areas that become established along creeks. *Justification:* Protect riparian areas from degradation/destruction. *Timeframe:* As funds allow
- D. *Strategy:* See below Strategy 8-A (Protect and Manage Other Species). *Justification:* Maintains diverse riparian areas to provide quality habitat. *Timeframe:* Ongoing.

6. Protect and Restore Shrub-Steppe Habitat

- A. *Strategy:* Perform shrub-steppe condition surveys to assess habitat quality issues. *Justification:* Data is needed to monitor changes and trends, identify degraded areas and measure success of improvement activities. *Timeframe:* As funds allow
- B. Strategy: Evaluate use of prescribed fire to rejuvenate and improve shrub-steppe habitat and reduce the risk of catastrophic fires. *Justification:* Fire suppression has altered habitat conditions, and fire may restore some habitat features or functions. *Timeframe:* As funds allow
- C. Strategy: Continue to control weeds by planting native grasses in disturbed areas. *Justification:* Healthy native plant communities prevent weed invasion and create a more functional, self-sustaining ecosystem. *Timeframe:* As funds allow

- D. Strategy: Continue restoration efforts in Hell’s Kitchen area of Whiskey Dick WA through weed control and re-establishment of native vegetation. *Justification:* Restore functional native plant communities that best support native wildlife. *Timeframe:* As funds allow

7. Protect and Restore Forest Habitats

- A. Strategy: Conduct understory thinning and prescribed burns on 800 acres in the Robinson Canyon watershed. *Justification:* Reduce risk of catastrophic fire, create forest stands that more closely resemble historic conditions, reduce fuel load, and stimulate fire-dependant forage species preferred by ungulates and other early-successional wildlife species. *Timeframe:* as staff time and funds allow
- B. Strategy: Assess remaining low elevation timber stands on the L.T. Murray for understory thinning and prescribed burning needs. *Justification:* Reduce risk of catastrophic fire and insect and disease invasions. Create forest conditions more suitable to a diversity of species. *Timeframe:* As funds allow
- C. *Strategy:* Photo-monitor vegetation response to timber thinning operations and subsequent prescribed burning. *Justification:* Evaluate success of project implementation. *Timeframe:* As projects are implemented.
- D. Strategy: Protect and create snags when implementing timber thinning projects. *Justification:* Snags and logs are important habitat features, but many have been removed by firewood cutting and past logging practices. *Timeframe:* As funds allow for thinning projects.

8. Protect and Manage Other Species

- A. *Strategy:* Maintain high quality shrub-steppe, forest, and riparian habitat conditions to enhance obligate species’ populations. *Justification:* Quality habitat supports high wildlife species diversity and reduces weed intrusions. *Timeframe:* Ongoing.
- B. *Strategy:* Protect and preserve sensitive fish and wildlife sites such as active leks, nests, redds, lambing areas, and big game wintering areas from human disturbance. *Justification:* Human presence by any means increases stress and reduces survival of sensitive fish and wildlife. *Timeframe:* Ongoing.
- C. *Strategy:* Protect woodpecker habitat features such as nesting and foraging trees, snags, and logs. *Justification:* These significant features are often lacking due to past fire, logging, and other land uses. *Timeframe:* Ongoing.
- D. Strategy: See above Strategies 7-A, B, and D. *Justification:* Reduce risk of catastrophic fire, create forest stands that more closely resemble historic conditions, reduce fuel load, and stimulate fire-dependant forage species preferred by ungulates and other early-successional wildlife species. *Timeframe:* As staff time and funds allow
- E. Strategy: Maintain and expand nest box placement on all units. *Justification:* Limited cavity nest sites for passerine cavity nesters. *Timeframe:* As funds allow

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

1. Provide Public Access Compatible With Fish, Wildlife and Habitat Protection.

- A. *Strategy:* Use the Cooperative Green Dot Road Management System to provide open roads on WDFW ownership where no resource issues exist and when there are sufficient resources to maintain them. *Justification:* Provide public access consistent with management objectives. *Timeframe:* Ongoing
- B. *Strategy:* Identify criteria for managing wildlife area roads, i.e. – desired road density, recreational needs, wildlife impacts, weed issues, maintenance, etc. to direct future road management on the wildlife areas. *Justification:* Reduce wildlife impacts from road disturbance, address sediment delivery issues on non-forested roads (not covered under the RMAP process), and improve wildlife habitat use. *Timeframe:* As staff time and funds allow
- C. *Strategy:* Close road access, either seasonally or permanently, where road conditions are not safe or where conditions have a significant negative impact on fish and wildlife resources. *Justification:* Increase safety and reduce habitat and species impacts. *Timeframe:* Ongoing
- D. *Strategy:* Continue to implement the L.T. Murray Road Management and Abandonment Plan as required by Forest Practices regulations. *Justification:* WDFW seeks to improve fish and wildlife habitat and is legally mandated to address Forest Practice issues. *Timeframe:* Ongoing.
- E. *Strategy:* See above Strategy 8-B (Protect Sensitive Wildlife Sites). *Justification:* Manage roads to minimize wildlife disturbance during sensitive times of year (on critical winter range, nesting season) or in sensitive locations (riparian areas, nest sites). *Timeframe:* Ongoing.
- F. *Strategy:* Provide limited, primitive camping where no resource issues exist. *Justification:* Provide public access consistent with management objectives. *Timeframe:* Ongoing
- F. *Strategy:* Provide hunting opportunities for persons with disabilities. The North Riggs Canyon road, a non-Green Dot road, is currently available by permit to disabled hunters for motorized travel. *Justification:* Provide reasonable access to increase opportunities for the disabled. *Timeframe:* Ongoing.
- G. *Strategy:* Develop maps of all resources, roads, trails, parking and camping areas, and other facilities available to the public. *Justification:* Improve management efficiency and an aid to the public. *Timeframe:* As staff time and funds allow
- H. *Strategy:* Develop a GIS-based Green Dot Road Management map for distribution to the public. *Justification:* Improves management efficiency and aids the public. *Timeframe:* As staff time and funds allow

2. Provide Commercial Opportunities Compatible With Fish, Wildlife and Habitat Protection.

- A. *Strategy:* Lease land to Puget Sound Energy for the placement of nine wind turbines in Section 35 of the Whiskey Dick WA, as part of the Wild Horse Wind Farm development. *Justification:* Provide funding to hire additional staff and address resource needs on the Whiskey Dick WA. *Timeframe:* 2006.
- B. *Strategy:* Coordinate with PSE to ensure that impacts to fish and wildlife resources are minimized on the Whiskey Dick WA during construction and subsequent wind farm operations. *Justification:* Cooperative resource protection. *Timeframe:* Ongoing.

Agency Objective: Minimize Adverse Interactions between Humans and Wildlife.

1. Provide Refuge Areas For Wildlife and Reduce Winter Disturbance.

- A. *Strategy:* See Strategies 1-B and C (Public Access Compatible with Wildlife). *Justification:* Reduce human access to critical elk winter range when animals are in poorest condition and disturbance would cause animals to use dwindling energy reserves. *Timeframe:* Ongoing.
- B. *Strategy:* See above Strategy 8-B (Protect Other Species). *Justification:* Reduce human access to critical elk winter range. *Timeframe:* Ongoing.
- C. *Strategy:* See above Strategies 1-C and D (Maintain Big Game Populations). *Justification:* Implement an area closure to provide an elk refuge area and reduce winter disturbance. *Timeframe:* Ongoing

2. Implement Strategies to Reduce Elk Damage on Private Lands

- A. *Strategy:* See above Strategies 1-A, C and D (Maintain Big Game Populations). *Justification:* Reduce human disturbance to wintering elk and provide winter feed to keep animals on state land and off private ground. *Timeframe:* Ongoing.
- B. *Strategy:* See above Strategy 1-B (Maintain Big Game Populations). *Justification:* Maintain fencing to limit elk access to private lands. *Timeframe:* Ongoing
- C. *Strategy:* See above Strategies 7-A and B (Protect and Restore Forest Habitats). *Justification:* Improve habitat to make public lands more appealing to elk than private land. *Timeframe:* As funds allow.
- D. *Strategy:* See above Strategy 1-C (Public Access Compatible with Wildlife). *Justification:* Reduce human disturbance to wintering elk to keep animals on state land and off private ground. *Timeframe:* Ongoing.

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

- A. *Strategy:* Implement an integrated weed management plan (**Appendix B**) to include weed identification and inventory, risk/threat, control priorities, and monitoring. *Justification:* Increase weed control efficiency. *Timeframe:* Ongoing
- B. *Strategy:* Coordinate weed efforts with federal, state and local entities. *Justification:* Improve efficacy and minimize costs. *Timeframe:* Ongoing
- C. *Strategy:* Continue to use Integrated Pest Management strategies to control noxious weeds. *Justification:* Control weeds in a responsible and cost effective manner. *Timeframe:* Ongoing
- D. *Strategy:* Control weeds along all roads (65 to 80 miles) annually on the wildlife areas. *Justification:* Roads are chronically disturbed, making them susceptible to weed invasion and serving as weed dispersal routes. *Timeframe:* Ongoing
- E. *Strategy:* Purchase more current mapping and GPS equipment. *Justification:* Improve weed control efficiency, reporting, monitoring and mapping. *Timeframe:* As funds allow.
- F. *Strategy:* Complete a comprehensive noxious weed inventory of the Murray Complex. *Justification:* Weed infestation location data allows staff to address outbreaks quickly, while populations are small and control efforts are more effective. *Timeframe:* As funds allow.

2. Manage Species and Habitat in Compliance with the Endangered Species Act and Washington State Fish Passage, Road Management and Forest Practice Rules.

- A. *Strategy:* Establish undisturbed buffers adjacent to wetland and riparian habitats during land management projects. *Justification:* Wetlands and riparian areas are priority habitats that require protection. *Timeframe:* Ongoing
- B. *Strategy:* Implement the L.T. Murray Road Maintenance and Abandonment Plan. *Justification:* Legally required to address sediment deliver and water run-off issues. *Timeframe:* Ongoing
- C. *Strategy:* See above Strategy 5-B (Protect and Restore Riparian Habitats). *Justification:* Minimize sediment delivery to creeks and maintain robust riparian corridors to benefit fish and wildlife. *Timeframe:* Ongoing.
- D. *Strategy:* Map all ESA species and their habitats on the wildlife areas and develop GIS layers depicting the location and species. *Justification:* Increases management efficiency and effectiveness of ESA species management. *Timeframe:* As funds allow.

3. Provide Fire Management On Agency Lands (see Appendix C)

- A. *Strategy:* Contract with local, state or federal entities to provide fire suppression support on the L.T. Murray, Quilomene and Whiskey Dick Wildlife Areas. *Justification:* Protect fish and wildlife habitats and preserve adjacent private lands. *Timeframe:* Ongoing.
- B. *Strategy:* Provide/maintain red card fire training for wildlife area manager and assistant manager, and blue card fire training for other staff. *Justification:* Fire safety awareness. Allows staff to access fire lines when incidents occur on the wildlife areas. *Timeframe:* Annual.
- C. *Strategy:* Coordinate with fire-fighting entities. Maintain list of fire-responsible individuals. *Justification:* Improves efficiency of response. *Timeframe:* Ongoing.
- D. *Strategy:* Provide an on-site liaison to fire-fighting entities when a wildfire occurs on the wildlife areas. *Justification:* Improves efficiency of response, provides guidance on Agency priorities. *Timeframe:* Ongoing.

4. Protect Cultural Resources Consistent With State and Federal Law

- A. *Strategy:* Assess cultural resource value (historic and archaeological) of all structures before renovation or removal. *Justification:* Prevent inadvertent loss of culturally important structures or sites. *Timeframe:* As necessary.
- B. *Strategy:* Perform cultural resource surveys and assessments before any ground-disturbing activity, including digging fence postholes, installing toilets or facilities, plowing new agricultural fields, etc. *Justification:* Required by State law. *Timeframe:* As necessary.

5. Pay County PILT (Payment in lieu of taxes) and Assessment Obligations

- A. *Strategy:* Pay PILT and assessments to Kittitas County. *Justification:* State law requirement. *Timeframe:* Ongoing

Agency Objective: Reconnect with Those Interested in Washington’s Fish and Wildlife

1. Participate in Local Cooperative Groups

- A. *Strategy:* Participate in Big Game Management Roundtable (BGMR) meetings. *Justification:* Address elk depredation issues and design cooperative solutions. *Timeframe:* Ongoing.

- B. *Strategy:* Participate in the Wild Horse Coordinated Resource Management (CRM) team meetings. *Justification:* Increases management efficiency and coordination between landowners, government agencies, and other involved constituent. *Timeframe:* Ongoing
- C. *Strategy:* Participate in 1-2 Citizen Advisory Group meetings annually. *Justification:* Solicit public input related to wildlife area management and address public concerns, questions and emerging issues. *Timeframe:* Annually.

2. Involve the Public in Projects on the Wildlife Areas

- A. *Strategy:* Provide, as available, projects for Advanced Hunter Education (AHE) participants to complete their community service requirement. *Justification:* Assist in hunter education while accomplishing needed tasks. *Timeframe:* Ongoing.
- B. *Strategy:* Coordinate with local user groups on wildlife area clean-up projects. *Justification:* Assistance for WA staff in accomplishing desired projects and increasing public awareness. *Timeframe:* Ongoing
- C. *Strategy:* Solicit help from local conservation groups and clubs on habitat enhancement projects. *Justification:* Same as above. *Timeframe:* Ongoing
- D. *Strategy:* Utilize local interest groups such as Kittitas Audubon Society to assist in documenting species presence on the wildlife areas. *Justification:* Gathers valuable knowledge for land management in addition to involving public. *Timeframe:* Ongoing

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

1. Maintain Facilities to Achieve Safe, Efficient and Effective Wildlife Area Management

- A. *Strategy:* Maintain office, utilities, storage space, and equipment to provide safe and effective working conditions. *Justification:* Safe and efficient operation of the WA requires maintenance of a functional headquarters. *Timeframe:* Ongoing.
- B. *Strategy:* Assess/maintain 13 miles of elk fence on the L.T. Murray WA, and roughly 65 miles of stock fence on the Quilomene and Whiskey Dick WA's. *Justification:* Protect habitat from trespass livestock, and minimize elk damage on private land. *Timeframe:* Annually.
- C. *Strategy:* Survey L.T. Murray boundary line between WDFW and private landowner Mr. Brain and install fence on the surveyed boundary. *Justification:* Resolve property line dispute, exclude trespass livestock, and prevent development trespass. *Timeframe:* As funds allow.
- D. *Strategy:* Assess old stock fence and remove all unnecessary fence lines. *Justification:* Reduce wildlife barriers and entanglement hazards. *Timeframe:* As funds allow.
- E. *Strategy:* Maintain all signs, reader boards, and parking areas. *Justification:* Provides public access, informs public of land use regulations, increases public awareness, controls vehicle access into sensitive areas, and prevents resource damage. *Timeframe:* Annual.
- F. *Strategy:* Work with engineering staff to schedule and complete work on the five highest priority structures' issues based on safety concerns. *Justification:* Provide a systematic approach to ensure structures are safe to operate in and around. *Timeframe:* As funds allow.
- G. *Strategy:* Locate a Headquarters facility for the L.T. Murray Complex Wildlife Areas. *Justification:* Current location at the Ellensburg District Office does not provide sufficient space or necessary resources, i.e. water source, chemical storage, secure equipment and tool storage, interior shop space, etc. *Timeframe:* As funds allow.

2. Maintain Other Structures and Physical Improvements

- A. *Strategy:* Maintain all signs, gates, culverts, water structures, wells, irrigation systems. *Justification:* Required for efficient operation of Wildlife Areas. *Timeframe:* Ongoing.
- B. *Strategy:* Replace/install boundary and unit signs as needed. *Justification:* Inform the public. *Timeframe:* Ongoing.

3. Maintain Equipment

- A. *Strategy:* Service all equipment including trucks, tractor and implements, weed sprayers, trailers, etc. Request replacement equipment when needed. *Justification:* Increases service life of equipment, reduces down time. *Timeframe:* Ongoing.
- B. *Strategy:* Rent equipment when it is more efficient to do so or when needed. *Justification:* More cost effective. *Timeframe:* As necessary.

4. Pursue Funding Opportunities

- A. *Strategy:* Apply for grants and other funding opportunities consistent with planned priorities to supplement funding. *Justification:* Supplements limited budgets. *Timeframe:* Ongoing.
- B. *Strategy:* Where applicable, enroll lands in CRP and other federal programs to generate revenue and accomplish desired habitat conditions. *Justification:* Improve habitat, reduces erosion and weeds, and supplements budgets. *Timeframe:* As staff time allows.

5. Perform Administrative Responsibilities

- A. *Strategy:* Manage budgets. *Justification:* Sets management priorities. *Timeframe:* Ongoing.
- B. *Strategy:* Supervise employees. *Justification:* Legally required. *Timeframe:* Ongoing.
- C. *Strategy:* Write reports. *Justification:* Agency required. *Timeframe:* Ongoing
- D. *Strategy:* Coordinate and work with adjacent landowner to develop and share mutual objectives. *Justification:* Provides consistent management. *Timeframe:* Ongoing.
- E. *Strategy:* See Strategy 3.5.1.2 (Attend and participate in CRM meetings). *Justification:* Management actions addressed. *Timeframe:* Ongoing
- F. *Strategy:* See Strategy 3.5.1.1 (Attend Big Game Management Roundtable (BGMR) meetings). *Justification:* Enhances communications on resolving issues. *Timeframe:* Ongoing.
- G. *Strategy:* Work with staff to ensure high morale and job satisfaction. Promote self-motivation and good work ethics. *Justification:* General part of supervision. *Timeframe:* Ongoing
- H. *Strategy:* Supervise contractors, lessees, permittees, volunteers, Washington Conservation Corps employees, other WDFW personnel, and public and private organizations on the wildlife areas. *Justification:* Ensures job compliance and protects state interests. *Timeframe:* Ongoing
- I. *Strategy:* Write, update and implement wildlife area management plan, weed control plan and fire control plan. *Justification:* Agency policy and assists in systematic approach to management and control. *Timeframe:* Ongoing.
- J. *Strategy:* Conduct wildlife and habitat surveys. Identify and prioritize information and survey needs. *Justification:* Determine status of wildlife and habitat conditions for management options. *Timeframe:* As funds allow.
- K. *Strategy:* Manage wildlife area equipment listed on inventory. *Justification:* Ensures successful operation of projects and protects state investments. *Timeframe:* Ongoing.
- L. *Strategy:* Plan for and purchase supplies, tools and equipment. *Justification:* Standard WA administration. *Timeframe:* Ongoing.

- M. *Strategy:* Attend meetings and meet with private individuals and agency representatives as needed. *Justification:* Resolve issues, coordinate activities and act as agent of the agency. *Timeframe:* Ongoing.

6. Maintain a Knowledgeable and Well-trained Work Force

- A. *Strategy:* Provide red or blue card training for wildlife area staff. *Justification:* Increased fire safety and awareness for staff required to be on site during fire incidents. *Timeframe:* Annual
- B. *Strategy:* Send staff with public applicator licenses to recertification workshops. *Justification:* Legally required certification. *Timeframe:* Annual
- C. *Strategy:* Provide staff with first aid/CPR training. *Justification:* Agency policy. *Timeframe:* Annual.

7. Protect and Apply Water Rights For Best Use

- A. *Strategy:* Identify and record all water rights and uses of water (Appendix D). *Justification:* Determines management options. *Timeframe:* 2006.
- B. *Strategy:* Move all unneeded water rights permanently or temporarily into the State Trust Water Rights Program. *Justification:* Better use of water resources. *Timeframe:* 2006.

CHAPTER 4. Performance Measures

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

2006 Performance Measures for the L.T. Murray Complex Wildlife Area:

- Maintain 13 miles of elk fence on the L.T. Murray to reduce elk depredation.
- Plant 5 acres of degraded riparian habitat to native vegetation.
- Conduct site visits to at least five wildlife area springs.
- Develop maintenance and/or restoration plans for at least five springs.
- Install vehicle barriers in primitive camping areas along Taneum Creek.
- Plant 20 acres of degraded shrub steppe habitat to native species.
- Develop Green Dot Road Management maps for public distribution.
- Improve L.T. Murray roads: grade and gravel 4 miles of upper Hutchins road, 1.5 miles of Shadow Creek road, and 2 miles of Tamarack Ridge road.
- Sign a lease agreement with Puget Sound Energy for commercial use (wind tower installation) on section 35, T18N, R21E.
- Treat at least 100 acres of upland weeds, and an additional 50 miles of road-side weeds
- Map ESA species and habitats occurring on the wildlife areas. Not complete – lack of funds.
- Establish fire contracts for wildlife area protection.
- All permanent wildlife area staff maintain requisite certifications, including red/blue card fire refresher, first aid certification, and pesticide applicators license.
- Survey and fence boundary between L.T. Murray Wildlife Area and Brain property.
Repair/remove at least 1 mile of degraded interior fence that poses an entanglement hazard to wildlife.
- Implement prescribed burning on Joe Watt timber-thinning units.
- Complete bid process and implement Robinson Canyon timber-thinning project.
- Complete required plans and reports, including Wildlife Area Management Plan, RMAP report, and PR reports.
- Meet with CAG at least once per year.

Appendix A: Public Issues and Concerns

The purpose of meeting with the CAG and DT is to obtain input to help guide management actions on the wildlife area. A draft of the introduction and history of the wildlife area and copies of the Agency's goals and objectives were distributed for review and discussion. Below is a list of issues and concerns identified by the CAG and DT. This input will assist in developing strategies to implement management goals and objectives. Underlined statements below indicate that the input was received from the DT. Issues that are not underlined originated from the CAG.

Issue A: Weed Management

- Develop posters on noxious weeds, post interpretative signage, and use other means to educate users on weed species, how weeds are spread, and generally what to watch for.
- Good progress being made, work with County Weed Boards.
- Should raise fines for illegal off-road travel as a way of financing some outreach and education.
- Begin educating with kids in school, just like hunter education. Raise conservation awareness at an early age.
- Include something in the hunting/fishing pamphlets on weeds.
- Hit on user groups for help in outreach and projects.
- Many noxious weeds are spread by both domestic and wild animals.
- Prepare an integrated weed management plan.
- Comment reinforcing the need for re-vegetation efforts once weeds are under control, and encouraging more of that work.
- Re-vegetation agreed to be a priority to improve habitat that has deteriorated as a result of weed infestation. Some commented that native over non-native is good if the native species are hearty and aggressive enough to compete and establish, but felt that sometimes non-native species establish quicker.
- Question asked if WDFW receives much public input and identification of problem areas by users of the Wildlife Areas. Response was that input by users has been an important way of identifying weed infestations, particularly in the more remote areas that staff doesn't see regularly.
- Discussion followed with the consensus being that WDFW needs more education and interpretive signage and literature to help users know what species are weeds, how they are spread, and how they can be controlled.

Issue B: Recreation/Access

- Need more signage and education on littering.
- Limit camping to a maximum of 14 days within a 60-day period (during general hunting seasons, 21 days within a 60-day period).
- Acquire fee title or easements on key in-holdings to maintain public access.
- Need increased enforcement on the wildlife areas.
- Off road vehicles, "mudders", hill climbs, campfires, target shooting (safety issue), littering, damage to elk fence.
- Find new, more effective methods such as aerial reconnaissance, tell public how to report a violation (give them a phone number).
- Use annual report form enforcement to help focus efforts.
- Educate the public regarding public access and other regulations through Green Dot reader boards, other signage, and news releases. Issues include road management system, camping, fires, firewood cutting, permanent structures, mineral extraction, etc.
- Inventory public use of the areas using standard methods such as vehicle counters.
- Use monitoring to focus efforts; determine objectives for monitoring.
- Identify key areas of public use.

- Consider how to use local knowledge.

Issue C: Winter Range Protection:

- If areas need to be closed seasonally to protect elk, then WDFW should do it.
- Regulate public access in big game wintering areas. Seasonally close roads, snowmobile use etc.
- Too many elk are being pressured (particularly in late winter/early spring) by 4-wheelers and other ATVs. Example: Bruton Road on Colockum WA. How do we change that, enforce it, and improve the situation for elk?
- Comment that the degree to which a seasonal closure or restriction is needed has to be established. WDFW must quantify it somehow to prove undue pressure on the animals (monitor the elk traffic for example). Enforcement is key, and tough to carry off. Also, is it mostly activity that is already illegal that is most of the problem?
- Comment that this relates directly to elk depredation in the Kittitas Valley, and can mean weighing recreational opportunity (legal or not) against economic loss to the agricultural community.
- Discussion on closure options; vehicle closure only versus closure to access of any kind.
- Other factors to consider that relate to private ownership. Example of the Skookumchuck, which is an area that lies directly between the Quilomene and Whiskey Dick Wildlife Areas. This renders all three hard to control and enforce.
- Suggestion that one place to start with the Quilomene, Whiskey Dick, and Colockum would be to post signs and notify to block approach by water.
- Public outreach is needed to help fight mudding and other illegal practices like chasing elk.
- Comment that USFS regulations vs. WDFW, county, other state, etc. can be a problem; particularly with ATVs (different regulations are confusing).
- Four-wheel clubs want to get involved in advocating legal use of the resources, and there is a need to reach out to them.

Issue D: Road Management:

- Most users on roads are hunters paying for licenses; they expect and deserve access.
- Numerous hunters (he said most) want less roads to improve hunting and reduce the number of lazy road hunters.
- Need for more enforcement presence on the WAs. “You whack a few bad apples, and the word gets around.”
- Put up a reward of some sort for turning offenders in, like the points thing for hunters who do so.
- Limit access to permit only.
- Consider more road improvements on the roads we want the folks using (“harden the good roads”), to reduce illegal use of others and off-road infractions. Channel the people where we want them with road management and fence.
- Would hate to see the WAs become too restricted.
- Conduct more surveillance by staff or hidden camera at problem spots; also more gates in key places.
- Get volunteers (jeep club members and others) to work on some key spots (machinery and hand work) and routes. WDFW staff needs do outreach for help.
- We should we charge for Green Dot maps.
- Solid data and evidence of resource damage, etc. is needed to back up decisions for closure.
- Spend time with staff outlining things they need to document regularly when in the field. Get some data on paper, informal or not.
- WDFW shouldn’t worry so much about pleasing everyone, just do what is right. Only 10% gripe about what WDFW does for wildlife and habitat anyway.
- Closing road A may only mean more traffic for road B, and that always needs to be a consideration.
- Need more signage and education to explain road management practices.
- Include rules and information with the new ATV paperwork at dealerships, educate to tread lightly, establish and enforce speed limits.

- Work with Forest Service to resolve differences in Green Dot versus Green Diamond road management.
- Maintain/close roads to prevent impacts to water quality.
- Green Dot is a good road management system for the type of open country that we are dealing with.
- When closing roads, use physical barriers where and when they can be effective.

Issue E: Fences/Gates:

- Maintain the elk fence.
- Firm statement that there are enough public access locations already in place. Agreement that only more problems would result if new access points were established.

Issue F: Target Shooting:

- More signage and information needed on the sites where target shooting occurs to reduce littering and use of inappropriate targets (glass, televisions, washers/dryers).
- Consensus that there is a need for more enforcement presence by WDFW and by County Deputies. Someone expressed the feeling that there is sometimes a climate of fear over who is out there shooting auto and semi-auto firearms.
- No laws that restrict shooting on the wildlife areas, but safety issues, particularly at Sheep Company shooting area, are real.
- Look at creating backstops, formal ranges, or shooting restrictions.
- Question as to whether or not it boiled down to designating only certain areas for shooting and or imposing sanctions for use other than what is acceptable? John responded that if we provide the place and promote the use in any fashion, it increases the liability for WDFW. Dumpsters were suggested, so that people can dump their shooting trash (apparently done in Montana). The managers agreed that more than shooting trash would soon be dumped there.
- CAG consensus suggested more outreach, and communication that the litter associated with these shooting areas is unacceptable. WDFW needs to publicize, inform, and make people aware.

Issue G: Grazing

- Consensus that many riparian areas and degraded habitat should not be grazed, but recommended the agency use it as a tool where needed (with strict controls imposed).
- Consensus that grazing could be a good management tool, when used within strict guidelines for movement and rotation of stock. Timing is an essential component with regard to when land is grazed, and for how long.
- Generally the impact of spring grazing heavier than with fall grazing.
- WDFW needs to work with DNR and other agencies to control cattle grazing better, with riders, etc, and focus on protection of riparian and sensitive areas; require riders and/or fencing to keep moves/rotations of cattle on track. Need better assessment tools, and strict time frames that are enforced.
- Some would like to see more grazing tried on WDFW lands. Some felt that it fits as an enhancement to grazing on private lands, can be of economic benefit, and also work to enhance habitat.
- Do the managers decide whether or not it is appropriate to try?
- Comment that it can be bad public relations to discourage grazing, and limits revenue generated by the agency.
- Stressed that grazing needed strict planning and control, and there are contractors who do that sort of thing (like Solar Dollars).
- The Tarpiscan snafu was mentioned and the access that had been gated by a private individual as a result. Some felt that was a lost opportunity to cooperate with an adjacent landowner in good grazing practices, and the public lost an access to the Colockum Wildlife Area in the process.

Issue H: Fire Management

- Use media coverage to explain the reasons and justifications for prescribed burning.
- Need to be more consistent on implementation of campfire restrictions.

- Develop a fire plan. Treat fire (wild and prescribed) as an integral part of grassland and shrub land management. Recognize that fire is difficult to exclude.
- Question about existing contracts for fire districts or DNR to fight or control fires for WDFW. Discussion followed relative to liability in wildfire situations, the need for more adjacent landowner cooperation (whether public or private), and what success, or not, that WDFW has had with prescribed burning. The managers explained that it was pretty new for us other than on very small scale, and that the L.T. Murray work would be the first larger burn done in decades.

Issue I: Wildlife/Habitat Management

- Include watershed planning and Multiple Species Habitat Conservation Plan (HCP) information in all management plans.
- Cooperate within Planning Units.
- Protect and restore PHS habitats.
- Restore shrub-steppe for sage grouse.
- Use appropriate tools to protect key habitats on private lands.
- Stress the importance of snags and down logs to wildlife - many are removed by illegal firewood cutting. Educate and inform the public with info in the hunting and fishing regulations pamphlets.

Issue J: Wildlife Damage

- What about night hunting for damage control? It has been effective in Oregon.
- What about seeking out those lead cows in herds causing damage during dark hours?
- Suggestion of outsourcing some functions such as damage assessments.
- Suggestion to augment natural controls by predators (cougars, wolves, etc.).
- What about ungulate damage to sensitive habitats, and overuse by not just cattle, but elk?
- Reduction in overgrazing at higher elevations (USFS lands as example) needed to relieve the pressure put on WDFW lands and lower range, ag lands, protected areas.
- More spot hunts need to be organized, but in a better fashion. More communication with adjacent landowners, better coordination across ownerships.

Issue K: Forest Management

- Statement made against DNR logging in the Naneum Basin and other areas on the Colockum WA and the destruction of habitat, hiding cover, etc. Is purchase of some of it a solution? There are funding sources out there to pursue.
- Does WDFW have a timber/forest plan in place? Some areas are in need of thinning.
- Comment on the upcoming thinning/habitat improvement planned for an area of the Colockum WA on WDFW land, and how that could be a revenue generator for getting other things done. All seemed to be ok with timber management objectives (removal of small fir, focus on the pine habitat, prescribed burning, seeding, etc.) that are currently occurring on the WA's.
- Comment that if current thinning projects were successful WDFW should get the word out. That we needed the good public relations stuff in print to offset the negative that we invariably seem to get. "Let folks know!" Group stressed using the newspaper to promote this kind of work.
- Comment that WDFW needs to establish clear criteria for timber practices on their lands.
- Comment that lodgepole pine stands needed to be treated differently, and when thinned dramatically took out the watershed. He cited two examples in the Wenatchee area.
- Suggestion that we relate our goals to past successful work, and work in progress.

Issue L: Land Acquisition

- WDFW needs to take better care of what we have.
- Acquire strategic, key habitats and land parcels.
- Discussion of related tools such as agreements with private landowners and private sportsman's clubs to work cooperatively on projects like turkey management and protection of game birds.

- Comment regarding use of conservation easements; key is landowner incentives to participate, whether in the form of tax breaks or something else.
- Discussion on block management units in Montana where access to private lands adjacent to government lands bring day fees of \$10.00 or more per hunter. Benefit was providing control of hunting pressure by limiting the volume of hunters.
- Idea of incentive tags and or sale of access by other means.
- General feeling that private landowners definitely need some recourse, some incentives to allow wildlife on private ownership in any sort of density.
- Game species don't recognize changes in ownership.
- Concern over the potential land swap between DFW and DNR, and the danger of differing management practices affecting wildlife and habitat. Some felt that there might be alternatives to the land swap that could still help both DFW and DNR. Most felt cooperative management agreements are key to successful stewardship of public lands.

Issue M: Commercial Use/Non-Renewable Resource Extraction

- Statement that WDFW Commercial Use Permits are too cheap, and the realistic market for this commercial use will bear more. There is money for wildlife and habitat projects to be gained.
- Comment that commercial use fees need to go back to the WA.
- Promote it and the cost/benefit, and it can also be a tool to focus use where we want use.
- Question whether these fees limit use and reduce impact, or if there should be more restrictions on commercial use.
- CAG members wanted to know how much really gets to the WA? Is it really fee for service? Group consensus that it should be.
- Someone stated/asked that some Wildlife Areas have the potential to make more money than others; should fee money go to the Wildlife Program and be distributed?
- Comment that we may need to be prepared to sacrifice some areas for undesirable uses. WDFW could designate some areas for use by motorbikes, mudders, and the like to help limit those uses in more critical areas. There was no consensus amongst group members.
- The managers moved discussion on to commercial and related activity. They posed the question: Should we issue permits for rock pits, gold panning, removal of petrified wood, etc? There was some discussion about how this affects the habitat, who controls it, and who enforces it.
- Regarding mineral extraction and related activities, group consensus was that unless there is real money in it, or a benefit to fish and wildlife, then permits should not be issued at all. Discussion followed that spanned from rock hounds to gravel pits. Strong group consensus that strict guidelines need to be established in the plan to define what is allowable, then WDFW needs to make users aware of the rules. The feeling was that many times folks did not know what was allowed, and what was not.

Issue N: Wildlife Releases:

- Wild Turkey Management Plan: individual not supportive of only planting birds where a population already exists. Individual felt that economic benefit of more release sites would outweigh other factors.
- Comment that there are differing opinions on whether or not the turkeys and other game birds should be winter-fed. Most felt that it was dependent on the quality of the habitat how well they would survive, in the interim they should be fed in harsh winters, and over the long haul that good management and habitat development would create a climate for a healthy naturally sustained population. All felt that WDFW should manage for sustainable numbers.
- Some discussion on big horn sheep, more general comments supporting WDFW's winter-feeding programs for several species.

Issue O: Other

- Provide a headquarters/facility for the L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas. Co-locate this facility with the district office.

Appendix B: Weed Management Plan

Weed Control Goals

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

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

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

Weed Management Approach

State law (RCW 17.15) requires that WDFW use integrated pest management (IPM), defined as a coordinated decision-making and action process that uses the most appropriate pest control methods and strategies in an environmentally and economically sound manner to meet pest management objectives and accomplish weed control. The elements of IPM include:

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

Monitoring- Monitoring is necessary to implement prevention and to document the weed species, the distribution and the relative density on the management area.

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

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

Adaptive Management- Adaptive management evaluates the effects and efficacy of weed treatments and makes adjustments to improve the desired outcome for the management area.

The premise behind a weed management plan is that a structured, logical approach to weed management, based on the best available information, is cheaper and more effective than an ad-hoc approach where one only deals with weed problems as they arise.

Weed Species of Concern

Weeds of concern on the WA’s include Dalmatian toadflax (*Linaria dalmatica ssp. dalmatica*), diffuse knapweed (*Centaurea diffusa*), spotted knapweed (*Centaurea biebersteinii*), Russian knapweed (*Acroptilon repens*), whitetop (*Cardaria pubescens*), perennial pepperweed (*Lepidium latifolium*), Kochia (*Kochia scoparia*), musk thistle (*Carduus nutans*), purple loosestrife (*Lythrum salicaria*), Canada thistle (*Cirsium arvense*), Russian thistle (*Salsola iberica*) and cheatgrass (*Bromus tectorum*). This list is based on species that have been documented on the wildlife area (Table 5).

Table 3. Weeds of the L.T. Murray Complex, Including Class Listing and Acres Treated.

Weed Species	2005 State Weed Class	2005 County Weed Class	Wildlife Areas	2006 Treated Acres
Dalmatian Toadflax	B-Designate	B-Designate	all	2.5
Kochia	B	B-Designate	all	5.0
Musk Thistle	B	B-Designate	Quilomene, Whiskey Dick	0.1
Perennial Pepperweed	B	B-Designate	Quilomene	13.0
Purple Loosestrife	B	B-Designate	Whiskey Dick	2.5
Spotted Knapweed	B	B-Designate	L.T. Murray	8.0
Diffuse Knapweed	B	B	all	693.0
Russian Knapweed	B	B	Quilomene, Whiskey Dick	43.0
Whitetop	C	C	Quilomene, Whiskey Dick	80.0
Canada thistle	C	C	all	240.0
Russian thistle			all	34.0
Cheatgrass/ Bulbous bluegrass/ Foxtail barley/ Mustards			all	46.0

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

New Invader (not an official classification): species of which the county reserves the right to control.

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

Management of individual weed species can be found in the following Species Control Plans

CANADA THISTLE CONTROL PLAN

Scientific name: *Cirsium arvense*

Common name: Canada thistle

Updated: 2006

DESCRIPTION

Canada thistle is a colony-forming perennial from deep and extensive horizontal and vertical roots. Stems are 1 to 4 feet tall, ridged, and branching above. Leaves are alternate, lacking petioles, oblong or lance-shaped, divided into spiny-tipped irregular lobes. Flowers are purple and occasionally white, in heads ½ to ¾ inch in diameter.

Plants are male or female (dioecious) and often grow in circular patches that are one clone and sex. At flowering, female flowers can be readily distinguished from male flowers by the absence of pollen (abundant in male flowers) and presence of a distinct vanilla-like fragrance. A female Canada thistle plant can produce up to 5,200 seeds in a season but average is about 1,500 seeds/plant. Seed may be transported long distances by water, wind, or attached to animals, clothing, farm equipment and vehicles. Seed can remain viable in soil up to 20 years.

Over-wintering roots develop new underground roots and shoots in January and begin to elongate in February. Shoots emerge between March and May, when mean weekly temperatures reach 5 degrees C, and form rosettes. Early in the season plants remain near the soil surface until long days, over 14 hours of light, trigger flower stem elongation. Flowering occurs from June to October. Seeds mature July to October.

Canada thistle thrives in the Northern Temperature Zone due to its day length response and a high temperature limitation on growth. Although it mainly invades disturbed areas, it does invade native plant communities, open meadows (including wetlands), and ponderosa pine savanna. Canada thistle is adapted to a wide range of soil types and environmental conditions. It is best adapted to rich, heavy loam, clay loam and sandy loam, with an optimal soil depth of 20 inches. It can tolerate saline soils and wet or dry soil. Canada thistle usually occurs in the 17-35 inch annual precipitation zones or where supplemental soil moisture is available.

Canada thistle spreads rapidly through its horizontal roots, which give rise to shoots. Its root system can be extensive, growing horizontally as much as 18 feet in one growing season. Most Canada thistle patches grow at a rate of 3-6 feet per year, crowding out more desirable species and creating thistle monocultures.

Canada thistle is a state-listed class C noxious weed in Kittitas County.

MANAGEMENT INFORMATION

The key principal to Canada thistle control is to stress the plant and force it to use stored root nutrients. Canada thistle can recover from almost any stress, including control attempts, because of root nutrient stores. Success requires a sound management plan implemented over several years.

Mowing meadows can be an effective tool for Canada thistle control if combined with herbicide treatments. Mowing alone is not effective unless conducted monthly over several growing seasons.

Curtail (clopyralid + 2,4-D) and Transline (clopyralid), Tordon (picloram), Banvel/Vanquish/Clarity (dicamba) and Telar (chlorsulfuron) are effective against Canada thistle. These herbicides are most effective when combined with cultural and/or mechanical control.

Several insects are currently being used as bio-control agents for Canada thistle. *Ceutorhyncus litura* is a weevil whose larvae bore into the main leaf vein, then down into the plant's crown area. If the insect population is high enough, plant death can occur, otherwise Canada thistle is stressed and less vigorous. The Canada thistle stem gall fly (*Urophora cardui*) also can kill or stress the plant. The female lays eggs on apical meristems of developing shoots. Larvae burrow into shoots. Their feeding triggers huge galls to form that stress the plant. Galls that form near the terminal meristems keep the weed from flowering and reduce seed set.

CURRENT DISTRIBUTION ON THE SITE

Canada thistle is found throughout the Murray Wildlife Areas, from low elevation shrub steppe environments to higher elevation forests. It often occurs along riparian margins of major creeks and streams, and is also seen in areas disturbed by logging, especially in slash piles and landings.

ACRES AFFECTED BY WEED: 700 **WEED DENSITY:** Low

GOALS

Decrease occurrence of Canada thistle on the wildlife areas.
Increase quality of infested plant communities.

OBJECTIVE

Survey and map existing Canada thistle populations.
More accurately calculate the acres affected by Canada thistle.
Reduce Canada thistle densities by using an integrated weed management approach.
Rehabilitate degraded areas with competitive native plants.

ACTIONS PLANNED

Continue Canada thistle control with chemical, mechanical and cultural methods.
Research biological control agents for potential releases onto the wildlife areas.

CONTROL SUMMARY AND TREND

Canada thistle has been controlled on the WA as it has been encountered during other weed control activities. Past logging activity on the wildlife area has contributed to the proliferation of this weed, and the spread of Canada thistle in future timber thinning project areas can be reduced by more aggressive weed control and follow up seeding of disturbed areas.

2002 – Approximately 100 acres were treated.
2003 – Approximately 120 acres were treated.
2004 – Approximately 160 acres were treated.
2005 – Approximately 220 acres were treated.
2006 – Approximately 240 acres were treated.

CHEATGRASS CONTROL PLAN

Scientific name: *Bromus tectorum*

Common name: Cheatgrass, downy brome

Updated: 2006

DESCRIPTION

Cheatgrass is an erect winter or spring annual grass. The seedlings are bright green with conspicuously hairy leaves, hence the alternate common name, downy brome. It typically grows 20-24 inches tall, with a finely divided, fibrous root system that may reach a depth of about 12 inches. The stems are erect, slender and glabrous or may be slightly soft-hairy. The nodding, open panicles with moderately awned spikelets are very distinctive. Cheatgrass panicles change color from green to purple to brown as the plant matures and eventually dries out. The spikelets readily penetrate fur, socks and pants and its seeds may thus be widely dispersed by people and animals.

Cheatgrass is an alien grass that dominates disturbed ground in shrub-steppe ecosystems of the Western United States and Canada. Cheatgrass reproduces only from seeds, germinates in the fall or winter, expands its roots over winter, and rapidly exploits the available water and nutrients in early spring. Plants head out in late April to early May and seeds mature in mid to late June. It is common in recently burned rangeland, wildlands, winter crops, waste areas, abandoned fields, eroded areas, and overgrazed grasslands. In undisturbed sites, cheat grass will most commonly spread along soil cracks and work its way outward into the natural community. Cheatgrass is a very efficient competitor for early spring moisture, which would otherwise be used by native perennial grasses. In this way, the species can displace native vegetation and inhibit natural succession.

The change induced by cheatgrass in the fire cycle frequency is probably the species' greatest competitive advantage. Although fire is a natural part of the sagebrush grassland ecosystem, those fires usually occurred at intervals between 60-100 years. Cheatgrass infested areas burn at a much greater frequency, every 3-5 years. At this frequency, native shrubs and perennial grasses cannot recover and after a few cycles a cheat grass monoculture develops.

MANAGEMENT INFORMATION

The most effective control of cheatgrass involves adopting an integrated management approach that may include mowing and burning, chemical applications, and reseeding with competitive plants.

Mowing cheatgrass can be somewhat effective at controlling cheatgrass seed production, but must be repeated often in the spring, especially during wet periods. Mowed cheat grass plants will tiller and produce new seeds if moisture is available.

Cheatgrass is a highly flammable species due to its complete summer drying, its fine structure, and its tendency to accumulate litter. A fire will reduce the plants to ash, but fire intensity may not be great enough to consume the litter layer, and the seeds in the soil will probably survive. If a burn is not followed by reseeding, cheatgrass will recover to pretreatment proportions within 3 to 4 years.

There are several types of herbicides that can be used alone or combined to provide effective control of cheatgrass. Roundup (glyphosate) effectively controls cheat grass, but is non-selective. Roundup is often used in fallow crop fields to control cheat and preserve moisture for the next crop. Pre-emergent herbicides such as Prowl, DireX, Outlook, and Maverick can help control this annual grass. Treflan

(trifluralin), Hoelon (diclofop), Sencor (metribuzin), Finesse (metsulfuron), and Glean (chlorsulfuron) are herbicides commonly used to control cheat grass in grain crops. Fusilade (fluazifop-p-butyl), Poast (sethozidim), and Assure (quizalofop) are effective at controlling cheatgrass without harming broadleaf most broadleaf plants. Residual, non-selective control of cheatgrass in industrial sites, parking areas and similar areas can be accomplished with herbicides such as Krovar (diuron) or Casoron (dichlobenil). Several of these products can be effective at controlling cheat grass in non-crop, rangeland or Conservation Reserve Program (CRP) areas without harming desirable vegetation. Rates and timing are critical to avoid damage to perennial plants.

CURRENT DISTRIBUTION ON THE SITE

Cheatgrass is present throughout the wildlife areas. It is especially prevalent in old agricultural fields, degraded rangelands and in fire-prone areas.

ACRES AFFECTED BY WEED: 2,500

WEED DENSITY: Low-high

GOALS

Decrease occurrence of cheat grass on the wildlife areas.
Increase quality of infested plant communities.

OBJECTIVE

Survey and map severe cheat grass infestations.
More accurately calculate the acres affected by cheatgrass.
Reduce cheatgrass densities by using an integrated weed management approach.
Rehabilitate degraded areas with competitive native plants.

ACTIONS PLANNED

Control the spread of cheatgrass by herbicide application, mowing, and reseeding. Prevent re-occurrence through restoration efforts, and the introduction of native vegetation to provide competition.

CONTROL SUMMARY AND TREND

Recent success has been achieved on the wildlife area using herbicides (including pre-emergent herbicides) and reseeding.

2002 – Approximately 5 acres were treated.
2003 – Approximately 10 acres were treated.
2004 – Approximately 24 acres were treated.
2005 – Approximately 12 acres were treated.
2006 – Approximately 46 acres were treated.

DALMATIAN TOADFLAX CONTROL PLAN

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

Updated: 2005

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).

Dalmatian toadflax is a state-listed class B-Designate in the management areas.

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).

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

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 ON THE SITE

Small isolated sites on the L.T. Murray, Quilomene, and Whiskey Dick Wildlife Areas

The two areas currently being yearly assessed and treated as necessary are at Quilomene Bay, and next to the Vantage Highway where it borders the Whiskey Dick Wildlife Area. Other smaller infestations have been discovered and treated in the past, but effectively controlled.

ACRES AFFECTED BY WEED: 10 **WEED DENSITY:** Low (Widely Scattered)

GOALS

Control existing populations
Prevent new occurrences

OBJECTIVES

Survey and map existing populations
More accurately calculate the acres affected by Dalmatian toadflax
Treat all plants before they produce seed
Survey nearby areas for pioneering infestations

ACTIONS PLANNED

In 2006 the known infestations will be spot treated in the spring.

CONTROL SUMMARY AND TREND

2002 – Approximately 1 acres were treated.
2003 – Approximately 0 acres were treated.
2004 – Approximately 2 acres were treated.
2005 – Approximately 4 acres were treated.
2006 – Approximately 2.5 acres were treated.

DIFFUSE KNAPWEED CONTROL PLAN

Scientific name: *Centaurea diffusa*

Common name: Diffuse knapweed

Updated: 2006

DESCRIPTION

Diffuse knapweed is a diffusely branched biennial or short-lived perennial herb, 1 to 2 feet tall. It is a native from southern Europe to north-central Ukraine. This species reproduces only by seed. Diffuse knapweed plants first form low rosettes and may remain in this form for several years depending on environmental conditions. Rosettes over-winter and bolt in early spring. Floral buds are formed in early June, flowering occurs in July and August, and mature seeds are formed by mid-August. Flowers are generally white. A single diffuse knapweed plant can produce up to 18,000 seeds. Seed dispersal is mainly by wind. When the seed capsule sways in the breeze or is disturbed, the seeds fall from the small opening in the top of the flower head and are distributed around the parent plant. However, most involucre remain closed until the plant dries up, breaks off at ground level and effectively becomes a tumbleweed, dispersing seeds over long distances. The stalks readily lodge under vehicles, expanding their dispersal.

Diffuse knapweed is a pioneer species that can quickly invade disturbed and undisturbed grassland, shrub land and riparian communities. It is generally found on light, dry, porous soils. Once established, it out competes and reduces the quality of desirable native species. Diffuse knapweed contains allelopathic chemicals, which can suppress competitive plant growth and create single species stands. Diffuse knapweed stands can range in density from 1-500 plants/m². The replacement of native grasslands with knapweed can reduce biological activity and increase soil erosion.

Diffuse knapweed is a state-listed Class B weed. In Kittitas County it has spread rapidly and now infests roadsides, waste areas, disturbed sites, lots, pastures, forests and rangelands.

MANAGEMENT INFORMATION

Diffuse knapweed is best controlled by a combination of chemical, mechanical and biological methods. Herbicides such as Tordon (picloram), Transline (clopyralid), Curtail (clopyralid + 2,4-D) or Banvel (dicamba) can control diffuse knapweed. A single application of Tordon may control knapweed for two to three years, but the weeds will reinvade the area unless other management techniques are used.

Hand pulling and mowing can reduce knapweed densities, but must be repeated for several years to prevent seed production and deplete the soil seed bank. Much progress has also been made in biological control of diffuse knapweed, with several insects now available that can dramatically reduce knapweed infestations. Seeding competitive, desirable native plants after control of knapweed is required to prevent reinvasion.

CURRENT DISTRIBUTION ON THE SITE

Found throughout the wildlife areas. It is found most commonly along roadsides, in and around agricultural fields and in degraded rangelands on the wildlife areas.

ACRES AFFECTED BY WEED: 840

WEED DENSITY: Low-Medium

GOALS

Decrease occurrence of Diffuse knapweed on the wildlife areas.
Increase quality of infested plant communities.

OBJECTIVES

Survey and map existing populations.
More accurately calculate the acres affected by Diffuse knapweed.
Reduce knapweed densities by biological, chemical, and cultural methods.
Rehabilitate degraded areas with competitive native plants.

ACTIONS PLANNED

Continue chemical applications on local infestations where feasible, such as in agricultural fields or along roadsides and parking areas.
Continue release of biological control insects across the wildlife areas.

CONTROL SUMMARY AND TREND

2002 – Approximately 38 acres were treated. 500 seed eating beetles (*Larinus minutus*) released.
2003 – Approximately 272 acres were treated. 250 *Larinus* released.
2004 – Approximately 315 acres were treated.
2005 – Approximately 725 acres were treated.
2006 – Approximately 693 acres were treated.

Diffuse knapweed control has reduced weed infestations and occurrence across the wildlife areas. Roadsides have been consistently treated to stop seed production and spread by vehicles. Release of insects (*Larinus minutus*) has significantly reduced knapweed populations in the most heavily infested areas.

MUSK THISTLE CONTROL PLAN

Scientific name: *Carduus nutans*

Common name: Musk Thistle

Updated: 2006

DESCRIPTION

Musk thistle is an erect, freely branching biennial weed native to Europe and Asia. It is a deep, tap-rooted plant that grows up to 8 feet tall. The waxy leaves are dark green with a green midrib and mostly white margins. The large flowers are terminal, flat, nodding, purple, sometimes white and surrounded by numerous lance-shaped, spine-tipped bracts. Seedlings usually emerge early in spring, develop into rosettes and spend the first season in this growth stage. Seedling emergence can also occur in the fall. Early in the spring of the second year, over-wintered rosettes resume growth. Shoots bolt in late March through May. Musk thistle flowers and begins to produce seed 45 to 55 days after it bolts. Musk thistle is a prolific seed producer. One plant can produce up to 20,000 seeds, although only one-third of the seeds are viable. Seeds appear to remain viable for at least 10 years.

Musk thistle is a highly competitive weed, which invades disturbed areas, pastures, rangeland, forest land, cropland and waste areas. It does not appear to have any specific climatic requirements other than a cool period of vernalization for flowering. Musk thistle establishes best on bare soil, and small shallow cracks are ideal for seedling establishment. It grows in all soils, but soils must be well-drained. Musk thistle spreads rapidly and forms extensive stands, which force out desirable vegetation. Musk thistle may produce allelopathic chemicals that inhibit desirable plants.

Musk thistle reproduces by seed only. Wind and water are good dissemination methods and seeds also spread by animals, machinery and vehicles.

Musk thistle is a state-listed Class B-Designate noxious weed in Kittitas County.

MANAGEMENT INFORMATION

The best control of musk thistle results from an integrated management approach. Maintaining forest, pasture and rangeland in good condition is a primary factor for musk thistle management. To favor competitive grass growth, do not overgraze. Musk thistle can easily be removed by severing its root below the ground with a shovel or hoe. Mowing can effectively reduce seed output if plants are cut when the terminal head is in the late-flowering stage. Gather and burn mowed debris to destroy any seed that has developed.

Several herbicides are effective on musk thistle, including Tordon (picloram), Curtail (clopyralid+2,4-D), and Banvel (dicamba). Apply these herbicides in spring or fall to musk thistle rosettes. The use of a good surfactant will enhance penetration. Due to the long seed viability of musk thistle, control methods may have to be repeated for many years to completely eliminate a stand.

Several seed head weevils (*Rhinocyllus and Trichosirocalus spp.*) may be available and can reduce seed production significantly.

CURRENT DISTRIBUTION ON THE SITE

There is one known site on the Whiskey Dick Wildlife Area, and two in the Quilomene.

ACRES AFFECTED BY WEED: 0.05

WEED DENSITY: Low

GOALS

Control existing populations
Prevent new occurrences

OBJECTIVES

Survey and map existing musk thistle populations.
More accurately calculate the acres affected by musk thistle.
Reduce musk thistle densities by using an integrated weed management approach.
Rehabilitate degraded areas with competitive native plants.

ACTIONS PLANNED

Continue chemical applications on known infestations where feasible.
Continue digging and cutting flower heads when appropriate.
Research new advances in biological control of musk thistle.

CONTROL SUMMARY AND TREND

2002 – Approximately 0.0 acres were treated.
2003 – Approximately 0.0 acres were treated.
2004 – Approximately 0.1 acres were treated.
2005 – Approximately 0.1 acres were treated.
2006 – Approximately 0.1 acres were treated.

PERENNIAL PEPPERWEED CONTROL PLAN

Scientific name: *Lepidium latifolium*

Common name: Perennial Pepperweed

Updated: 2006

DESCRIPTION

Perennial Pepperweed is an erect, branching, perennial forb that grows one to three feet high, but may reach heights of eight feet in wet areas. The base of the stems is semi-woody. The roots enlarge at the soil surface to form a woody crown. The toothed leaves are lance-shaped and are bright green to gray-green and may have a leathery texture. Dense white flower clusters of six to eight tiny blossoms occur near the ends of the stems around mid-June. Perennial pepperweed is a prolific seed producer, capable of producing more than six billion seeds per acre of infestation. In addition to seeds, perennial pepperweed spreads by creeping underground roots (rhizomes) that may grow to a length of ten feet. New plants shoot up from the underground roots and enable perennial pepperweed to form dense monocultures.

Perennial pepperweed is most often found in open, un-shaded areas on disturbed and often saline soils. It is common in riparian areas, valley bottoms, and seasonally wet areas. It is a very competitive species that crowds out desirable vegetation and results in dense monocultures and a decrease in biodiversity. When established along rivers and streams, the plant interferes with the regeneration of willows and cottonwoods, reducing the quality of habitat for wildlife.

Perennial pepperweed spreads in many ways. The plant commonly travels in rivers and irrigation systems as seeds and rhizomes from eroded banks. Seeds are transported when they attach themselves to machinery and vehicle tires.

Perennial pepperweed is a state-listed Class B-Designate weed in Kittitas County.

MANAGEMENT INFORMATION

The best method of managing perennial pepperweed is to prevent the weed from becoming well established. Minimizing soil disturbances from vehicles, machinery and overgrazing will reduce areas where the weed might become established. Heavy, vigorous grass stands that are properly managed can limit the establishment of this weed.

Once perennial pepperweed is established, control is difficult because the plant is so competitive and spreads rapidly by its creeping roots. The weed is usually found on sites difficult to access and along waterways where control presents special challenges. Eradication of perennial pepperweed is impossible in most cases. Instead, efforts and resources should be focused on preventing its spread and using an integrated weed management program.

Mechanical control of perennial pepperweed is not recommended. Digging, mowing and tilling will only encourage new plants to sprout from the root crown and creeping roots. Chemical control of perennial pepperweed is best achieved by using Telar (chlorsulfuron) or Escort (metsulfuron). Apply Telar during bud to early bloom stage, and apply Escort before bud and bloom, but while plants are actively growing. To successfully manage perennial pepperweed with chemicals, competitive vegetation must be established immediately after its control to prevent reinvasion.

CURRENT DISTRIBUTION ON THE SITE

On the wildlife areas perennial pepperweed is found along streams, creeks and other riparian zones. It is common in disturbed areas such as old homesteads and abandoned agricultural fields in valley bottoms.

ACRES AFFECTED BY WEED: 15

WEED DENSITY: Low

GOALS

Control existing populations
Prevent new occurrences

OBJECTIVES

Survey and map existing populations.
More accurately calculate the acres affected by perennial pepperweed.
Reduce pepperweed densities by using an integrated weed management approach.
Rehabilitate degraded areas with competitive native plants.

ACTIONS PLANNED

Continue chemical applications on local infestations where feasible.
Research the availability of biological controls (insects) for perennial pepperweed.

CONTROL SUMMARY AND TREND

2002 – Approximately 3 acres were treated.
2003 – Approximately 27 acres were treated.
2004 – Approximately 4 acres were treated.
2005 – Approximately 8 acres were treated.
2006 – Approximately 13 acres were treated.

PURPLE LOOSESTRIFE CONTROL PLAN

Scientific name: *Lythrum salicaria*

Common name: Purple Loosestrife

Updated: 2006

DESCRIPTION

Purple loosestrife is an erect, long-lived perennial forb or sub-shrub introduced from Europe. The square, annual stems arise from a perennial rootstock and often grow 6-8 feet tall. The leaves are lance-shaped and entire, and are whorled. The magenta-colored flowers are arranged in racemes. A single flowering stalk can produce 300,000 seeds, and densities as high as 80,000 stalks per acre have been recorded. Purple loosestrife seed may remain viable for up to 20 years.

Purple loosestrife usually occurs in marshes, wet meadows, stream banks, and the shores of lakes and wetlands. It is commonly associated with cattails, reed canary grass, sedges, bulrushes, reeds, and willows. Purple loosestrife can tolerate a wide range of growing conditions (up to 50% shade), can grow on calcareous and acidic soils and will even grow in standing water.

Purple loosestrife is an aggressive invader of wetlands. Spring established seedlings grow rapidly and produce flowers 8 to 10 weeks after germination. Purple loosestrife germinates at such high densities that it out competes native seedlings. The invasion of purple loosestrife leads to a loss of plant diversity, which also leads to a loss of wildlife diversity. If left unchecked, the wetland eventually becomes a monoculture of loosestrife.

Purple loosestrife seeds are mainly distributed by water, but can also be dispersed by animals and humans. Seeds do not drop from the seed capsules until the air temperature becomes cold in the fall. The plant also reproduces by rhizomes, and detached root or stem fragments can take root and develop into flowering stems.

Purple loosestrife is a state-listed Class B-Designate weed in Kittitas County.

MANAGEMENT INFORMATION

Loosestrife populations, which extend over three acres are difficult to eradicate and may be a better target for containment rather than control. The key to effective control is early detection when infestations are small. It is fairly easy to control small numbers of loosestrife plants when the seed bank in the soil is small. Small loosestrife infestations should be eradicated by hand-pulling or herbicide application. Herbicides available for use in wetlands are limited. Biological control of loosestrife has shown very promising results. The *Galerucella* beetle defoliates the leaves and buds of the plant, and should be considered where the population of loosestrife has become large or inaccessible. However, 100% control is not feasible with the use of beetles alone.

CURRENT DISTRIBUTION ON THE SITE

On the Quilomene and Whiskey Dick Wildlife Areas, purple loosestrife is common along the banks of the Columbia River. It has also been found in the riparian areas along the major creeks and streams of the area, and around springs and ponds.

ACRES AFFECTED BY WEED: 5

WEED DENSITY: Low

GOALS

Control existing populations
Prevent new occurrences

OBJECTIVE

Survey and map existing purple loosestrife populations.
More accurately calculate the acres affected by purple loosestrife.
Reduce purple loosestrife densities by using an integrated weed management approach.
Rehabilitate degraded areas with competitive native plants.

ACTIONS PLANNED

Continue chemical applications on individual plants and small infestation where possible.
Encourage biological controls (insects) by restricting the use of insecticides in wetlands.

CONTROL SUMMARY AND TREND

2002 – Approximately 0.1 acres were treated.
2003 – Approximately 0.0 acres were treated.
2004 – Approximately 0.8 acres were treated.
2005 – Approximately 0.5 acres were treated.
2006 – Approximately 2.5 acres were treated.

Purple loosestrife is common along the Columbia River on the Quilomene and Whiskey Dick Wildlife Areas, but has not formed large colonies. This is most likely due to the effects of the *Galerucella* beetle and some careful herbicide applications.

RUSSIAN KNAPWEED CONTROL PLAN

Scientific name: *Centaurea repens*

Common name: Russian Knapweed

Updated: 2006

DESCRIPTION

Russian knapweed is a creeping, herbaceous perennial that reproduces from seed and vegetative root buds. Shoots, or stems are erect, 18 to 36 inches tall, with many branches. Flowers are urn-shaped, solitary and can be pink, lavender or white. Russian knapweed has vertical and horizontal roots that have a distinctive, brown to black, scaly appearance. It emerges in the early spring, bolts in May to June, and flowers through the summer into fall. It produces seeds sparingly, approximately 50 to 500 per shoot. Seeds are viable for two to three years in soil. Its primary method of reproduction is from vegetative propagation, with seeds of secondary importance.

Russian knapweed is native to southern Ukraine, southeast Russia, Iran, Kazakhstan and Mongolia. Locally, it can commonly be found along roadsides, riverbanks, irrigation ditches, pastures, waste places, clear cuts, and croplands, especially in areas of high water tables. It is not restricted to any particular soil but does especially well on clay soils. Russian knapweed typically invades degraded areas, dominating the plant community by forming dense colonies. It uses a combination of adventitious shoots and allelopathic chemicals to spread outward into previously undisturbed areas. Vertical roots can penetrate the soil up to 8 feet. Russian knapweed contains an allelopathic polyacetylene compound, which inhibits the root growth of competing plants. Stands may survive 75 years or longer.

Russian knapweed is state-listed Class B-Designate weed in Kittitas County. It is a relatively new invader to the county and is spreading rapidly.

MANAGEMENT INFORMATION

The most effective method of control for Russian knapweed is to prevent its establishment through proper land management. The healthier the natural community, the less susceptible it will be to Russian knapweed invasion. In areas already infested, the key to control is to stress the weed and cause it to expend nutrient stores in its root system. An integrated approach usually is more successful than one control technique. Mowing Russian several times a year can help suppress the plant. Applications of herbicides such as Tordon (picloram), Curtail (clopyralid + 2,4-D) and Escort (metsulfuron) and Roundup (glyphosate) can also suppress the weed, but in most cases an herbicide alone will not effectively manage Russian knapweed. Herbicide treatment, tillage to overcome the plant's allelopathic effects, and reseeding with competitive vegetation (e.g. perennial grasses), provide the most effective results.

CURRENT DISTRIBUTION ON THE SITE

Found throughout the Quilomene and Whiskey Dick Wildlife Areas from low to mid elevations in riparian zones, meadows and old agricultural fields.

ACRES AFFECTED BY WEED: 80

WEED DENSITY: Low

GOALS

Control existing populations

Prevent new occurrences

OBJECTIVES

Survey and map existing Russian knapweed populations.

More accurately calculate the acres affected by Russian knapweed.

Reduce Russian knapweed densities by chemical, mechanical and biological methods.

Rehabilitate degraded areas with competitive native plants.

ACTIONS PLANNED

Continue chemical applications on local infestations where feasible.

Use tillage and reseeding where possible.

Research new advances in biological control of Russian knapweed.

CONTROL SUMMARY AND TREND

2002 – Approximately 104 acres were treated.

2003 – Approximately 12 acres were treated.

2004 – Approximately 28 acres were treated.

2005 – Approximately 19 acres were treated.

2006 – Approximately 43 acres were treated.

Control has slowly reduced the number of acres affected by Russian knapweed on the wildlife areas.

Control is complicated by its prevalence in remote locations and proximity to high value riparian zones.

RUSSIAN THISTLE CONTROL PLAN

Scientific name: *Salsola iberica*

Common name: Russian thistle, tumbleweed

Updated: 2006

DESCRIPTION

Russian thistle is a brushy summer annual with numerous slender ascending stems that become quite woody at maturity. Stems are from 8 to 36 inches in length and usually have reddish to purplish stripes. Seedlings have very finely dissected leaves that are fleshy, dark green and about 1 inch in length. As the plant matures in July to October the older leaves are short and stiff with a sharp-pointed tip. The overall shape of the plant becomes oval to round and may attain a diameter of 18 inches to 6 feet at maturity. After the plant dries, the base of the stem becomes brittle and breaks off at soil level during fall and early winter. These round, thorny plants are capable of dispersing seed for miles as they tumble along in the wind. A large Russian thistle plant may produce 200,000 seeds.

The Russian thistle seed is a naked, coiled embryo that begins to uncoil when it is exposed to the proper temperature (52 to 90 deg. F) and moisture conditions. As it uncoils, the taproot extends into the soil within about 12 hours, making the germination period quite rapid and giving Russian thistle a decided advantage under limited moisture conditions. A limited amount of moisture, lasting only a few hours, will allow germination and root growth to deeper, subsurface moisture.

Likely sites for germination include vacant lots, agricultural fields, roadsides, fence lines, overgrazed rangelands, or any open site with loosened soil. Germination usually occurs in late fall or early spring, when the seed can take advantage of winter moisture. Seed viability is rapidly lost in the soil. Over 90% of the seed either germinate or decay in the soil during the first year.

In agricultural areas, Russian thistle can reduce yield and quality of numerous crops, particularly alfalfa and small grains. It depletes soil moisture, interferes with tillage and serves as shelter or food source to many insects, vertebrate pests, and crop diseases. Russian thistle can also threaten native plant ecosystems. It is very competitive when moisture is a limiting factor to the growth of other vegetation, when soils are disturbed, or when competing vegetation is suppressed due to overgrazing or poor crop establishment.

Russian thistle is not a state-listed noxious weed in Kittitas County.

MANAGEMENT INFORMATION

Cultural practices such as mowing or destroying young plants can prevent seed production. Burning is sometimes used to destroy accumulated Russian thistle plants. This may eliminate the accumulated organic debris and some seed, but much of the seed will already have been disseminated. Planting competitive, more desirable species can be an effective method of preventing Russian thistle establishment in most non-crop environments.

There are many herbicides that will control Russian thistle in agricultural crops and non-crop areas. On the L.T. Murray Complex Wildlife Area, some of the post-emergent herbicides that have been successfully used on Russian thistle include Tordon, Banvel and 2,4-D. For best results, these herbicides must be applied while the weed is in its early growth stages, preferably the early seedling

stage, before it becomes hardened and starts producing its spiny branches. If rain or irrigation occurs after a post-emergent application, additional seedlings may emerge and require future treatments.

CURRENT DISTRIBUTION ON THE SITE

Found throughout the wildlife areas, at elevations generally below 4,000 feet. Commonly found along roads, in old agricultural fields, and in degraded rangeland.

ACRES AFFECTED BY WEED: 800

WEED DENSITY: Low-medium

GOALS

Control existing populations

Prevent new occurrences

OBJECTIVE

Survey and map existing Russian thistle populations.

More accurately calculate the acres affected by Russian thistle.

Reduce Russian thistle densities by using an integrated weed management approach.

Rehabilitate degraded areas with competitive native plants.

ACTIONS PLANNED

Continue Russian thistle control efforts by herbicide treatments and planting competitive vegetation.

Continue roadside spray program to reduce occurrence of Russian thistle along roads and parking areas.

CONTROL SUMMARY AND TREND

Roadsides on the wildlife area have been treated for weeds since 1997. Russian thistle occurs only sporadically along roads and in parking areas, but can be spread by vehicle traffic. Major infestations have occurred in areas that were historically used for agriculture and livestock grazing, but have been somewhat reduced by establishing native perennial vegetation through restoration projects.

2002 – Approximately 5 acres were treated.

2003 – Approximately 10 acres were treated.

2004 – Approximately 25 acres were treated.

2005 – Approximately 48 acres were treated.

2006 – Approximately 34 acres were treated.

SCOTCH THISTLE CONTROL PLAN

Scientific name: *Onopordium acanthium*

Common name: Scotch Thistle

Updated: 2006

DESCRIPTION

Scotch thistle is an erect, biennial (and sometimes annual) weed that grows up to 12 feet tall. Its large, coarsely lobed, hairy leaves have a velvety-gray appearance and are lined with sharp, conspicuous spines. The stems are branching, with spiny leaf wings extending down the stems from the leaves. Scotch thistle has purple to violet flowers and a large, fleshy taproot.

Scotch thistle is a biennial that produces a large, ground level rosette the first year and a tall, spiny plant the second. It reproduces only by seed, with one plant producing 70-100 flowering heads containing 100-140 seeds per seed head. Seeds may remain viable in the soil for over 30 years. Plumed seeds are dispersed by wind and by attaching to clothing and animal fur. Seeds may also be transported in hay and machinery, or be carried by wind and water.

Scotch thistle grows in sunny areas where soils have been disturbed and competition from other plants has been reduced. It is often found along roadsides, irrigation ditches, waste areas, and on rangelands. It is especially fond of areas that are adjacent to riparian or sub-irrigated deeper soils along stream courses, lower alluvial slopes and bottomlands. Once scotch thistle becomes established and forms a defined colony, it spreads by dominating other plants. Its large size and quick growth takes light, nutrient and water from other plants, while its rigid growth and spines protect the plant from grazing and trampling. Scotch thistle also contains a germination inhibitor that allows only a portion of its seeds to germinate each year while stopping other plant seeds from sprouting.

Scotch thistle is a state-listed Class B noxious weed in Kittitas County. It is a fairly recent invader of the county and a high priority for control.

MANAGEMENT INFORMATION

Scotch thistle is best controlled in the rosette stage. Its taproot can easily be severed with a shovel 1-2 inches below the ground. Control can be enhanced by a follow-up application of herbicides to surviving rosettes. An integrated approach to scotch thistle management involves: 1) managing grazing to increase grass vigor and reduce ground disturbance; 2) spray rosettes with Tordon (picloram), Curtail (clopyralid), Escort (metsulfuron) or Weedmaster (2,4-D + dicamba); 3) follow-up with spot cutting of entire plants when the first flowers appear annually for several years to deplete the seed bank in the soil.

CURRENT DISTRIBUTION ON THE SITE

Scotch thistle has not been found on the L.T. Murray/Quilomene/Whiskey Dick Wildlife Areas. Several plants were found just north of the Quilomene in the Tekison Creek drainage at the Stray Gulch junction, and these plants were eradicated. Scotch thistle is also found to the south on the Wenas Wildlife Area. Therefore, the threat of spreading to the wildlife areas is high.

ACRES AFFECTED BY WEED: None Known

WEED DENSITY: Low

GOALS

Keep the wildlife areas free of Scotch thistle.
Reduce spread of Scotch thistle from adjacent lands.

OBJECTIVE

Survey and map any existing Scotch thistle populations.
More accurately calculate the acres affected by Scotch thistle.
Control Scotch thistle by using an integrated weed management approach.
Rehabilitate any degraded areas with competitive native plants.

ACTIONS PLANNED

Weed surveys will continue and any plants found will be eradicated.

CONTROL SUMMARY AND TREND

2002 – Approximately 0.0 acres were treated.
2003 – Approximately 0.0 acres were treated.
2004 – Approximately 0.0 acres were treated.
2005 – Approximately 0.0 acres were treated.
2006 – Approximately 0.0 acres were treated.

Scotch thistle has not yet become established on the wildlife areas. However, plants are present on neighboring lands and will likely spread to the wildlife areas.

SPOTTED KNAPWEED CONTROL PLAN

Scientific name: *Centaurea malculosa*

Common name: Spotted knapweed

Updated: 2006

DESCRIPTION

Spotted knapweed is a short-lived, perennial herb, 1-3 feet tall. It reproduces from seed and forms a new shoot each year from a taproot. Like diffuse knapweed, it is a native to central Europe. It can be distinguished from its close relative diffuse knapweed by the lack of a terminal spine at the tip of its bracts. Flowers are pinkish-purple or rarely cream colored. Spotted knapweed seeds germinate in spring or fall. The seedlings develop into and remain as rosettes for at least one growing season while root growth occurs. It usually bolts in May of its second growing season and flowers August through September. It is a prolific seed producer, and can produce up to 140,000 seeds/m². Seeds may remain viable in the soil for over 8 years. Seeds are spread by wind, with most seeds being shed immediately after reaching maturity.

Spotted knapweed is a highly competitive weed that invades disturbed areas and degrades desirable plant communities. It is found in light, porous soils, fertile, well-drained and often calcareous soils in warm areas. It occupies dry meadows, pastureland, stony hills roadsides and sandy or gravelly floodplains of streams and rivers. Spotted knapweed tolerates dry conditions, similar to diffuse knapweed, but survives in higher moisture areas as well, preferring areas that receive 12 to 30 inches of annual precipitation. Like diffuse knapweed, spotted knapweed has been reported to contain cnicin, an allelopathic chemical. Cnicin inhibits root growth of other plants, and destroys their ability to compete for limited soil moisture and nutrients.

Spotted knapweed is a state-listed Class B-Designate weed in Kittitas County. It has spread rapidly through many areas of the upper county and is now showing up in the lower county as well.

MANAGEMENT INFORMATION

Spotted knapweed can be managed similarly to diffuse knapweed. It is readily controlled with herbicides such as Tordon, Transline, Banvel or Clarity. One pint/acre of Tordon will control spotted knapweed for two to three years, but the weed will reinvade the area unless other management techniques are used. As with diffuse knapweed, seeding competitive, desirable native plant species after control of spotted knapweed is required to prevent reinvasion.

Hand pulling and mowing can reduce spotted knapweed densities but is labor intensive and not suited to large infestations. Seed production must be prevented for many years to prevent reestablishment. Similarly to diffuse knapweed, several insects have been found to be effective as biological control agents for spotted knapweed. These include seedhead flies (*Urophora, spp.*) a root-feeding beetle (*Cyphocleonus achates*), and several seedhead weevils (*Bangasternus and Larinus spp.*) The larvae of the yellow-winged knapweed moth (*Agapeta zoegana*) feeds in the roots of both knapweed species.

CURRENT DISTRIBUTION ON THE SITE

Spotted knapweed is found in a few localized areas of the L.T. Murray Wildlife Area, but infestations are not as severe as diffuse knapweed. Found in higher precipitation, higher elevation sites.

ACRES AFFECTED BY WEED: 15

WEED DENSITY: Low.

GOALS

Control existing populations of Spotted knapweed on the L.T. Murray Wildlife Area.
Prevent new occurrences

OBJECTIVES

Survey and map existing spotted knapweed populations.
More accurately calculate the acres affected by spotted knapweed.
Reduce spotted knapweed densities by chemical, mechanical and biological methods.
Rehabilitate degraded areas with competitive native plants.

ACTIONS PLANNED

Continue chemical applications on local infestations where feasible.
Continue release of biological control insects across the wildlife area.

CONTROL SUMMARY AND TREND

2002 – Approximately 5 acres were treated.
2003 – Approximately 4 acres were treated.
2004 – Approximately 9 acres were treated.
2005 – Approximately 9 acres were treated.
2006 – Approximately 8 acres were treated.

Spotted knapweed control has reduced weed infestations and occurrence across the wildlife area. Roadsides have been consistently treated to stop seed production and spread by vehicles. Insect releases (*Larinus*) have reduced knapweed densities but more releases of a variety of insects are needed.

WHITE TOP (HOARY CRESS) CONTROL PLAN

Scientific name: *Cardaria draba* **Common name:** White top, hoary cress

Updated: 2006

DESCRIPTION

White top is an erect, perennial herb growing up to 2 feet tall. Flowers are small, white with numerous flower branches giving the plant a dense, white, flat-topped appearance. The plant reproduces by seed and an extensive creeping root system. Roots spread vertically and horizontally with frequent shoots arising from the rootstock. One plant can produce from 1,200 –4,800 seeds. Seeds can remain viable for three years in the soil. Plants emerge very early in the spring. Plants flower from May to June, and set seed by mid-summer. If conditions are favorable, a second crop of seeds can be produced in the fall.

White top is invading rangelands throughout North America. It is a highly competitive weed once it becomes established. In the absence of a competitor, a single plant can spread over an area of 12 feet in diameter in a single year. It spreads primarily by its extremely persistent roots and will eventually eliminate desirable vegetation and become a monoculture. White top is found on generally open, unshaded disturbed ground. It grows well on alkaline soils that are wet in late spring and in areas with moderate amounts of rainfall. It is widespread in fields, waste places, meadows, pastures, croplands, and along roadsides.

MANAGEMENT INFORMATION

Properly managed plant communities help resist white top invasion. Early infestations can be pulled or grubbed, however this plant will re-sprout from any remaining roots, making mechanical control difficult. Tillage is generally considered ineffective and usually contributes to the spread of the infestation by spreading the root fragments. Mowing will prevent seed production but does not kill the plant and the infestation will continue to spread through underground root systems. Chemicals such as Escort (metsulfuron) and Telar (chlorsulfuron) are very effective when applied from bud to flower stage and also in the fall. Due to its hairy leaf surface, a good surfactant is required. Seeding competitive, desirable native vegetation after control is required to help prevent reinvasion.

White top is a state-listed Class C weed. In Kittitas County there has been a rapid increase of infestations in the last several years.

CURRENT DISTRIBUTION ON THE SITE

Found on the wildlife areas at low to mid elevations in riparian zones, old agricultural fields, old homestead areas and roadsides.

ACRES AFFECTED BY WEED: 200

WEED DENSITY: Low.

GOALS

Control existing populations
Prevent new occurrences

OBJECTIVES

Survey and map existing populations.

More accurately calculate the acres affected by white top.
Reduce white top densities by chemical, cultural and biological methods.
Rehabilitate degraded areas with competitive native plants.

ACTIONS PLANNED

Continue chemical applications where appropriate.
Seed treated areas to promote competitive vegetation.
Research advances in biological control of white top.

CONTROL SUMMARY AND TREND

2002 – Approximately 11 acres were treated.
2003 – Approximately 53 acres were treated.
2004 – Approximately 67 acres were treated.
2005 – Approximately 87 acres were treated.
2006 – Approximately 80 acres were treated.

Whitetop populations have been reduced by herbicide treatments in some areas. Infestations need continued work to keep them from spreading.

GENERAL WEEDS CONTROL PLAN

Scientific name: *Many*

Common name: General Weeds

Updated: 2005

DESCRIPTION

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

MANAGEMENT INFORMATION

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

Mechanical weed control may include mowing, burning, or plowing and disking entire fields.

CURRENT DISTRIBUTION ON THE SITE

All public accesses and roadsides, as well as old agricultural fields and degraded rangeland on the wildlife areas contain general weeds to varying degrees.

ACRES AFFECTED BY WEED: 1,500

WEED DENSITY: High

GOALS

Maintain public access, Restore agricultural fields, Reduce fire danger

OBJECTIVES

Treat high public use areas with residual herbicide to prevent seed production. Summer fallow fields in second phase of restoration.

ACTIONS PLANNED

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

CONTROL SUMMARY AND TREND

Roadside and access management have required a consistent, yearly maintenance effort. Some of the increase in general weed management reflects the restoration work that has occurred in recent years on the wildlife areas.

2002 – Approximately 300 acres were treated.

2003 – Approximately 400 acres were treated.

2004 – Approximately 530 acres were treated.

2005 – Approximately 565 acres were treated.

2006 – Approximately 500 acres were treated.

Table 4. 2005 Kittitas County Noxious Weed List

For more information on a specific weed, please visit the Washington State Noxious Weed Control Board website.

Red indicates those noxious weeds known to exist in Kittitas County. If you are aware of any noxious weeds in Kittitas County not highlighted in this list, please contact our office.

Class A Noxious Weeds

Common Name	Scientific Name	Common Name	Scientific Name
Bean-caper, Syrian	<i>Zygophyllum fabago</i>	Knapweed, bighead	<i>Centaurea macrocephala</i>
Blueweed, Texas	<i>Helianthus ciliaris</i>	Knapweed, Vochin	<i>Centaurea nigrescens</i>
Broom, Spanish	<i>Spartium junceum</i>	Kudzu	<i>Pueraria montana</i>
Buffalo bur	<i>Solanum rostratum</i>	Lawnweed	<i>Solvia sessilis</i>
Clary, meadow	<i>Salvia pratensis</i>	Mustard, garlic	<i>Alliaria petiolata</i>
Cord grass, salt meadow	<i>Spartina patens</i>	Nightshade, silverleaf	<i>Solanum elaeagnifolium</i>
Crupina, common	<i>Crupina vulgaris</i>	Sage, Clary	<i>Salvia sclarea</i>
Dense flower cord grass	<i>Spartina densiflora</i>	Sage, Mediterranean	<i>Salvia aethiopis</i>
Flax, spurge	<i>Thymelaea passerina</i>	Spurge, eggleaf	<i>Euphorbia oblongata</i>
Four o'clock, wild	<i>Mirabilis nyctaginea</i>	Starthistle, purple	<i>Centaurea calcitrapa</i>
Goatsrue	<i>Galega officinalis</i>	Thistle, Italian	<i>Carduus pycnocephalus</i>
Hawkweed, yellow devil	<i>Hieracium floribundum</i>	Thistle, milk	<i>Silybum marianum</i>
Hogweed, giant	<i>Heracleum mantegazzianum</i>	Thistle, slenderflower	<i>Carduus tenuiflorus</i>
Hydrilla	<i>Hydrilla verticillata</i>	Velvetleaf	<i>Abutilon theophrasti</i>
Johnsongrass	<i>Sorghum halepense</i>	Woad, dyers	<i>Isatis tinctoria</i>

Class B Noxious Weeds

Common Name	Scientific Name	Common Name	Scientific Name
Alyssum, Hoary	<i>Bertero aincang</i>	Knapweed, diffuse	<i>Centaurea diffusa</i>
Arrowhead, grass-leaved	<i>Sagittaria graminea</i>	Knapweed, meadow	<i>Centaurea pratensis</i>
Blackgrass	<i>Alopecurus myosuroides</i>	Knapweed, Russian	<i>Acroptilon repens</i>
Blueweed	<i>Echium vulgare</i>	Knapweed, spotted	<i>Centaurea maculosa</i>
Broom, Scotch	<i>Cytisus scoparius</i>	Knotweed, Bohemian	<i>Polygonum bohemicum</i>
Bryony, white	<i>Bryonia alba</i>	Knotweed, giant	<i>Polygonum sachalinense</i>
Bugloss, annual	<i>Anchusa arvensis</i>	Knotweed, Himalayan	<i>Polygonum polystachyum</i>
Bugloss, common	<i>Anchusa officinalis</i>	Knotweed, Japanese	<i>Polygonum cuspidatum</i>
Camelthorn	<i>Alhaga maurorum</i>	Kochia	<i>Kochia scoparia</i>
Carrot, wild	<i>Daucus carota</i>	Lepyrodiclis	<i>Lepyrodiclis holosteoides</i>
Catsear, common	<i>Hypochaeris radicata</i>	Loosestrife, garden	<i>Lysimachia vulgaris</i>
Chervil, wild	<i>Anthriscus sylvestris</i>	Loosestrife, purple	<i>Lythrum salicaria</i>

Cinquefoil, sulfur	<i>Potentilla recta</i>	Loosestrife, wand	<i>Lythrum virgatum</i>
Cordgrass, common	<i>Spartina anglica</i>	Nutsedge, yellow	<i>Cyperus esculentus</i>
Cordgrass, smooth	<i>Spartina alterniflora</i>	Oxtongue hawkweed	<i>Picris hieracioides</i>
Daisy, oxeye	<i>Leucanthemum vulgare</i>	Parrotfeather	<i>Myriophyllum aquaticum</i>
Elodea, Brazilian	<i>Egeria densa</i>	Pepperweed, perennial	<i>Lepidium latifolium</i>
Fanwort	<i>Cabomba caroliniana</i>	Primrose, water	<i>Ludwigia hexapetala</i>
Fieldcress, Austrian	<i>Rorripa austriaca</i>	Puncturevine	<i>Tribulus terrestris</i>
Floating heart, Yellow	<i>Nymphoides peltata</i>	Ragwort, Tansy	<i>Senecio jacobaea</i>
Gorse	<i>Ulex europaeus</i>	Saltcedar	<i>Tamarix ramosissima</i>
Hawkweed, mouseear	<i>Hieracium pilosella</i>	Sandbur, longspine	<i>Cenchrus longispinus</i>
Hawkweed, orange	<i>Hieracium aurantiacum</i>	Skeletonweed, rush	<i>Chondrilla juncea</i>
Hawkweed, polar	<i>Hieracium atratum</i>	Sowthistle, perennial	<i>Sonchus arvensis</i>
Hawkweed, queendevil	<i>Hieracium glomeratum</i>	Spurge, leafy	<i>Euphorbia esula</i>
Hawkweed, smooth	<i>Hieracium laevigatum</i>	Spurge, myrtle	<i>Euphorbia myrsinites L.</i>
Hawkweed, yellow	<i>Hieracium caespitosum</i>	Starthistle, yellow	<i>Centaurea solstitialis</i>
Hedge parsley	<i>Torillis arvensis</i>	Swainsonpea	<i>Sphaerophysa salsula</i>
Helmet, policeman's	<i>Impatiens glandulifera</i>	Thistle, musk	<i>Carduus nutans</i>
Herb-Robert	<i>Geranium robertianum</i>	Thistle, plumeless	<i>Carduus acanthoides</i>
Houndstongue	<i>Cynoglossum officinale</i>	Thistle, Scotch	<i>Onopordum acanthium</i>
Indigobush	<i>Amorpha fruticosa</i>	Toadflax, Dalmatian	<i>Linaria dalmatica</i>
Knapweed, black	<i>Centaurea nigra</i>	Watermilfoil, Eurasian	<i>Myriophyllum spicatum</i>
Knapweed, brown	<i>Centaurea jacea</i>		

Class C Noxious Weeds

Common Name	Scientific Name	Common Name	Scientific Name
Babysbreath	<i>Gypsophila paniculata</i>	Old man's beard	<i>Clematis vitalba</i>
Bindweed, field	<i>Convolvulus arvensis</i>	Poison-hemlock	<i>Conium maculatum</i>
Cockle, white	<i>Silene latifolia</i>	Reed, common, non-native	<i>Phragmites australis</i>
Cocklebur, spiny	<i>Xanthium spinosum</i>	Spikeweed	<i>Hemizonia pungens</i>
Cress, hoary	<i>Cardaria draba</i>	St. Johnswort, common	<i>Hypericum perforatum</i>
Dodder	<i>Cuscuta approximata</i>	Tansy, common	<i>Tanacetum vulgare</i>
Goatgrass, jointed	<i>Aegilops cylindrica</i>	Thistle, bull	<i>Cirsium vulgare</i>
Groundsel, common	<i>Senecio vulgaris</i>	Thistle, Canada	<i>Cirsium arvense</i>
Hawkweed, non-native species	<i>Hieracium spp.</i>	Toadflax, yellow	<i>Linaria vulgaris</i>
Henbane, black	<i>Hyoscyamus niger</i>	Water lily, fragrant	<i>Nymphaea odorata</i>
Iris, yellow flag	<i>Iris pseudocorus</i>	Whitetop, hairy	<i>Cardaria pubescens</i>
Mayweed, scentless	<i>Matricaria perforata</i>	Wormwood, absinth	<i>Artemisia absinthium</i>

Appendix C: Fire Management Plan

Responsible Fire-Suppression Entities: The majority of the L.T. Murray Wildlife Area contains forested habitats composed of ponderosa pine, Douglas fir, grand fir, western larch and other species. The Wildlife Area falls completely within the State Fire Protection Boundary and therefore wildfire suppression activities within this boundary are under the jurisdiction of DNR. WDFW pays a timber tax assessment fee for each acre within the fire protection boundary for these services.

The Quilomene and Whiskey Dick Wildlife Areas are non-forested, grassland and shrub-steppe habitats that are included in a fire suppression agreement between the Washington Department of Fish and Wildlife and the Washington Department of Natural Resources. This is not a guaranteed response contract but does provide a mechanism for DNR response. The agreement also clarifies the two agencies' roles and provides for payment of suppression costs.

The Kittitas County Fire District #4 (Vantage) also will respond to fires on the Whiskey Dick Wildlife Area. A portion of the Wildlife Area on its southern boundary is located within the Fire District #4. Vantage Fire District personnel will respond to brush fires, but is an all-volunteer force with limited resources stationed out of Vantage.

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

Wildlife Habitat Concerns: The L.T. Murray Complex Wildlife Areas contain fire sensitive habitats that are critical to the survival of certain wildlife species. Shrub-steppe habitats can be degraded with the loss of species such as big sagebrush and antelope bitterbrush. Shrub-steppe obligate (dependant) wildlife species such as the sage grouse may be directly affected by large scale, uncontrolled fires. The loss of important browse plants for big game species such as mule deer can dramatically reduce the quality of mule deer winter range. Due to these concerns, 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 areas as rapidly as possible. WDFW requests the Incident Commander to seek aerial support if needed to extinguish a fire on its land promptly. If, in the professional judgment of the Incident Commander, a fire on lands adjacent to one of the wildlife areas causes an immediate threat to the area, WDFW requests that he/she seeks aerial support as possible.

Reporting: Report any fire on or adjacent to the L.T. Murray Complex Wildlife Area to the local fire district, DNR, or WDFW (see local contact numbers below). The Central Washington Interagency Command Center (CWICC) coordinates all fire responses in this area and they will dispatch the appropriate fire-fighting entity. It is absolutely critical that any fire on the area is attacked as aggressively as possible during the initial attack. The importance of aerial support cannot be overstated.

Fire Districts – DIAL 911

NAME	TELEPHONE
Kittitas County Dispatch	509-925-8534
Kittitas County Fire District #4	509-856-2888

DNR – contact in order listed and request Operations or Staff Coordinator

NAME	TELEPHONE
DNR Dispatch (CWICC)	509-884-3473

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

WDFW Fire Contacts

Contact	Radio call Number		Contact Number
Shana Winegeart	Wildlife 896	Work	509-925-6746
L.T. Murray W.A. Manager		Cell	509-899-3427
		Home	509-925-2540
Wayne Hunt	Wildlife 548	Work	509-925-6746
L.T. Murray W.A. Assistant Manager		Cell	509-899-3428
Jody Taylor	Wildlife 567	Work	509-697-4503
Wenas W.A. Assistant Manager		Cell	509-952-8007
		Pager	509-225-1655
		Home	509-698-4005
Yakima Regional Office		Front desk	509-575-2470
Ted Clausing , Regional Program Manager		Work	509-457-9313

Appendix D: Water Rights

Table 5. L.T. Murray Wildlife Area Water Rights

File #	Stat	Doc	Priority Date	Purpose	Qi	Unit of Measure	Qa	Ir Acres	WRIA	County	TRS
S4-095616CL	A	Claim L		ST					39	Kittitas	16.0N 18.0E 12
S4-095627CL	A	Claim L		ST					39	Kittitas	16.0N 18.0E 12
S4-095638CL	A	Claim L		ST					39	Kittitas	16.0N 18.0E 12
S4-095651CL	A	Claim L		ST					39	Kittitas	16.0N 18.0E 12
S4-093199CL	A	Claim L		ST		CFS			39	Kittitas	17.0N 17.0E 05
G4-022516CL	A	Claim L		DG,ST					39	Kittitas	17.0N 17.0E 07
S4-147871CL	A	Claim L		IR,ST		CFS		40	39	Kittitas	17.0N 17.0E 07
G4-132016CL	A	Claim L		DG					39	Kittitas	17.0N 17.0E 08
S4-093200CL	A	Claim L		ST		CFS			39	Kittitas	17.0N 17.0E 15
S4-094360CL	A	Claim L		ST		CFS			39	Kittitas	17.0N 17.0E 15
S4-094362CL	A	Claim L		ST		CFS			39	Kittitas	17.0N 17.0E 22
S4-093188CL	A	Claim L		ST		CFS			39	Kittitas	18.0N 16.0E 07
S4-093189CL	A	Claim L		ST		CFS			39	Kittitas	18.0N 16.0E 11
S4-093190CL	A	Claim L		ST		CFS			39	Kittitas	18.0N 16.0E 11
S4-093193CL	A	Claim L		ST		CFS			39	Kittitas	18.0N 16.0E 15
S4-093194CL	A	Claim L		ST		CFS			39	Kittitas	18.0N 16.0E 15
S4-093195CL	A	Claim L		ST		CFS			39	Kittitas	18.0N 16.0E 15
S4-093196CL	A	Claim L		ST		CFS			39	Kittitas	18.0N 16.0E 15
S4-093191CL	A	Claim L		ST		CFS			39	Kittitas	18.0N 16.0E 17
S4-093192CL	A	Claim L		ST		CFS			39	Kittitas	18.0N 16.0E 17
S4-094336CL	A	Claim L		ST,DG		CFS			39	Kittitas	18.0N 16.0E 19
S4-093197CL	A	Claim L		ST		CFS			39	Kittitas	18.0N 16.0E 23
S4-144934CL	A	Claim L		IR,ST				500	39	Kittitas	18.0N 17.0E 19
S4-094326CL	A	Claim L		ST		CFS			39	Kittitas	18.0N 17.0E 20
S4-094323CL	A	Claim L		ST		CFS			39	Kittitas	18.0N 17.0E 28
S4-093198CL	A	Claim L		ST		CFS			39	Kittitas	18.0N 17.0E 32
S4-098532CL	A	Claim L		ST		CFS			39	Kittitas	19.0N 16.0E 27
G4-153416CL	A	Claim S		IR,ST					39	Kittitas	19.0N 16.0E 34
S4-093187CL	A	Claim L		ST		CFS			39	Kittitas	19.0N 16.0E 34
G4-24894AWRIS	I	NewApp	03/01/77	IR,ST	200	GPM		200	39	Kittitas	19.0N 16.0E 35

Table 6. Quilomene Wildlife Area Water Rights

File #	Stat	Doc	Priority Date	Purpose	Qi	UOM	Qa	Ir Acres	WRIA	County	TRS
S4-115633CL	A	Claim L		ST		CFS			40	Kittitas	18.0N 21.0E 01
S4-115634CL	A	Claim L		ST		CFS			40	Kittitas	18.0N 21.0E 02
S4-115628CL	A	Claim L		ST		CFS			40	Kittitas	18.0N 21.0E 05
S4-115629CL	A	Claim L		ST		CFS			40	Kittitas	18.0N 21.0E 09
S4-110721CL	A	Claim L		ST		CFS			40	Kittitas	18.0N 22.0E 03
S4-115630CL	A	Claim L		ST		CFS			40	Kittitas	18.0N 22.0E 03
S4-115632CL	A	Claim L		ST		CFS			40	Kittitas	19.0N 21.0E 25
S4-115627CL	A	Claim L		ST		CFS			40	Kittitas	19.0N 21.0E 29
S4-110723CL	A	Claim L		ST		CFS			40	Kittitas	19.0N 22.0E 22
S4-115631CL	A	Claim L		ST		CFS			40	Kittitas	19.0N 22.0E 22
S4-30344	A	New App	4/30/90	WL,ST	0.002	CFS			40	Kittitas	19.0N 22.0E 22
R4-01286CWRIS	A	Cert	7/10/64	WL		CFS	7.0		40	Kittitas	19.0N 22.0E 27
S4-01288CWRIS	A	Cert	9/2/64	WL	2	CFS			40	Kittitas	19.0N 22.0E 27
S4-01287CWRIS	A	Cert	11/12/64	WL, IR	1.7	CFS	60.0	15	40	Kittitas	19.0N 22.0E 27
S4-110722CL	A	Claim L		ST		CFS			40	Kittitas	19.0N 22.0E 33
S4-110724CL	A	Claim L		ST		CFS			40	Kittitas	19.0N 22.0E 34
S4-110725CL	A	Claim L		ST		CFS			40	Kittitas	19.0N 22.0E 35
G4-026671CL	I	Claim L		DS, ST	20.0	GPM	4.0		39	Kittitas	17.0N 21.0E 08
G4-24052PWRIS	I	Permit	8/8/75	DM	1785.	GPM	119.0		39	Kittitas	18.0N 20.0E 23
G4-23952GWRIS	I	Claim L		IR,ST		GPM			39	Kittitas	18.0N 20.0E 22
S4-123952CL	I	Claim L		IR,ST		GPM			39	Kittitas	18.0N 20.0E 13
S4-145944CL	I	Claim S		ST		CFS			39	Kittitas	18.0N 20.0E 14
S4-115878CL	I	Claim L		IR, ST	3.0	CFS	900.0	80.0	39	Kittitas	18.0N 20.0E 12
S4-25906AWRIS	I	New App		DS, IR	0.22	CFS	10.0		39	Kittitas	18.0N 20.0E 22
S4-30207AWRIS	I	New App		IR	0.05	CFS			39	Kittitas	18.0N 20.0E 23
S4-24430ALCWRIS	I?	Cert	10/22/76	ST	0.01	CFS	1.0		39	Kittitas	18.0N 21.0E 05
S4-28311AWRIS	I	New App	10/11/83	DM	1785.	GPM			39	Kittitas	18.0N 20.0E 23
S4-084248CL	A	Claim L	1/1/17	ST, FR	3.00	GPM	2.0		40	Kittitas	18.0N 22.0E 20
S4-084249CL	A	Claim L	1/1/17	ST, FR	2.00	GPM	1.0		40	Kittitas	18.0N 22.0E 17
S4-084250CL	A	Claim L	1/1/17	ST, FR	3.00	GPM	1.0		40	Kittitas	18.0N 22.0E 16
S4-084277CL	A	Claim L	1/1/17	ST, FR	2.00	GPM	1.0		40	Kittitas	18.0N 22.0E 08
S4-084278CL	A	Claim L	1/1/17	ST, FR	5.00	GPM	4.0		40	Kittitas	18.0N 22.0E 08
S4-084279CL	A	Claim L	1/1/17	ST, FR	6.00	GPM	4.0		40	Kittitas	18.0N 22.0E 07
S4-084282CL	A	Claim L	1/1/17	ST, FR	5.00	GPM	4.0		40	Kittitas	18.0N 22.0E 14
S4-084291CL	A	Claim L	1/1/17	ST, FR	6.00	GPM	5.0		40	Kittitas	18.0N 22.0E 14
S4-084292CL	A	Claim L	1/1/17	ST, FR	6.00	GPM	4.0		40	Kittitas	18.0N 22.0E 13
S4-084293CL	A	Claim L	1/1/17	ST, FR	6.00	GPM	5.0		40	Kittitas	18.0N 22.0E 12
S4-084301CL	A	Claim L	1/1/17	ST, FR	2.00	GPM	1.0		40	Kittitas	18.0N 22.0E 14

Table 7. Whiskey Dick Wildlife Area Water Rights

File #	Stat	Doc	Priority Date	Purpose	Qi	UOM	Qa	Ir Acres	WRIA	County	TRS
S4-099334CL	A	Claim L		ST		CFS			40	Kittitas	17.0N 21.0E 11
S4-110718CL	A	Claim L		ST		CFS			40	Kittitas	17.0N 21.0E 12
S4-110719CL	A	Claim L		ST		CFS			40	Kittitas	17.0N 21.0E 12
S4-098535CL	A	Claim L		ST		CFS			40	Kittitas	17.0N 21.0E 14
S4-098536CL	A	Claim L		ST		CFS			40	Kittitas	17.0N 21.0E 14
S4-099329CL	A	Claim L		ST		CFS			40	Kittitas	17.0N 22.0E 03
S4-110720CL	A	Claim L		ST		CFS			40	Kittitas	17.0N 22.0E 06
G4-048139CL	A	Claim S		ST		GPM			40	Kittitas	17.0N 22.0E 11
S4-099322CL	A	Claim L		ST		CFS			40	Kittitas	17.0N 22.0E 14
S4-099325CL	A	Claim L		ST		CFS			40	Kittitas	17.0N 22.0E 15
S4-099330CL	A	Claim L		ST		CFS			40	Kittitas	17.0N 22.0E 15
G4-098537CL	A	Claim L		ST		GPM			40	Kittitas	17.0N 22.0E 18
S4-099324CL	A	Claim L		ST		CFS			40	Kittitas	18.0N 21.0E 25
S4-099323CL	A	Claim L		ST		CFS			40	Kittitas	18.0N 21.0E 35
S4-099328CL	A	Claim L		ST		CFS			40	Kittitas	18.0N 22.0E 23
S4-099333CL	A	Claim L		ST		CFS			40	Kittitas	18.0N 22.0E 29
S4-099335CL	A	Claim L		ST		CFS			40	Kittitas	18.0N 22.0E 29
S4-099332CL	A	Claim L		ST		CFS			40	Kittitas	18.0N 22.0E 30
S4-099331CL	A	Claim L		ST		CFS			40	Kittitas	18.0N 22.0E 31
S4-099326CL	A	Claim L		ST		CFS			40	Kittitas	18.0N 22.0E 33
S4-099327CL	A	Claim L		ST		CFS			40	Kittitas	18.0N 22.0E 35

Appendix E: Draft Management Plan Comments and Responses

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

Comment Author	Organization	Location
Bill White	Cattleman	Ellensburg
Norm Peck	Citizen	unknown
Mark Eyler	Kittitas County Weed Board	Ellensburg
Chris Sato/Dave Hays	WDFW	Olympia

Comments received on the L.T. Murray, Quilomene, Whiskey Dick Wildlife Areas Plan are presented below. A response for each comment is included. Where appropriate, changes were incorporated into the management plan to address public comments.

Commenter	Comment	Agency Response
Bill White:	It appears that all of the recommendations from the CAG suggesting using cattle grazing as a tool were completely ignored in preparing this plan. In fact the plan even plans to remove some cattle fencing and cross fencing. I'm questioning the purpose of having a Citizens Advisory Committee if the managers are not at least open minded on suggestions. Cattle grazing is an excellent management tool to improve elk habitat. Two recent reports written by Doug Warnock cited some good science to prove it. (<i>Capital Press, June 2, 2006 and Capital Press Nov 10, 2006</i>). I also question the purpose of re-establishing native plants in some areas when the adjoining private lands have many non-native species that the elk seem to prefer. If we eliminate the desirable plants elk prefer and eliminate cattle to eat the tough stemmy grasses in the fall, then we are actually pushing the elk to the private land. Hopefully, these issues can be rethought.	<p>The use of grazing, along with other options to manipulate habitat, will be scientifically evaluated as a management tool. It may be used, if it is the best tool available to accomplish desired objectives.</p> <p>Old fencing often poses an entanglement hazard to wildlife, and those fences not necessary for management objectives may be removed.</p> <p>Wildlife areas are managed for healthy ecosystems, not just single species (such as elk). All native species – fish & wildlife, as well as the vegetation types that make up their habitat – must be considered in management practices.</p>
Norm Peck:	Are Burrowing Owls likely to inhabit this area?	Burrowing owls are known to occur on private lands directly adjacent to the Whiskey Dick WA. WDFW is unaware of any populations within the wildlife area boundaries.

<p>In the past 2-3 years, I've observed white-tail deer in the Quilomene, near the Columbia. This potential issue is not addressed in the plan, but seems to have the potential to affect both riparian habitat and mule deer habitat quality.</p>	<p>White-tailed deer occur rarely, but their population is unlikely to grow substantially due to local habitat limitations.</p>
<p>Noxious weeds: I've noticed a LOT more poison ivy in lower Skookumchuck and Whiskey Dick canyons, increasing over the last 10-15 years. I'm allergic (not merely sensitive), so it's a concern for me.</p>	<p>Thank you for your comment.</p>
<p>Consider marshalling and organizing volunteers, Ecology Youth Corps Teams, etc. to construct open-bottom culverts or bridges on selected access roads within the management area (e.g. creek crossings low on Quilomene/Whiskey Dick creeks, N. Fork Manastash Rd., etc.) to avoid unnecessary road closures. Particularly for an aging population, maintenance of access roads to reasonable proximity of hunting areas improves hunting and non-hunting (hiking, camping, wildlife viewing, etc.).</p>	<p>No roads are currently being considered for closure due to creek crossings.</p>
<p>I concur with the need for seasonal closures, especially in the late winter and spring, both to avoid disturbance of wintering wildlife, and to minimize road damage during the time between snow-melt and drying sufficiently to support traffic with minimal rutting/erosion/siltation.</p>	<p>Thank you for your comment.</p>
<p>Riparian Habitat protection: consideration should be given to provide minimally developed primitive camping locations to replace those that have recently been occurring in larger numbers near stream corridors; this is a “carrot” approach that would offer an alternative to hunters to replace “lost” campsites due to riparian protection needs. Quality of the hunting experience may suggest more diffuse, smaller sites vs. larger “consolidated” camping areas.</p>	<p>Riparian areas are Priority Habitats and where necessary WDFW will establish no-entry buffers to protect streamside vegetation. Camping is currently allowed throughout the L.T. Murray Complex Wildlife Area within 100 feet of open Green Dot roads, which allows the public to camp at will without creating riparian disturbance.</p>

<p>Shrub-steppe burn regimen: a graduate theses (Brown, ca. 1982) indicated that average fire frequency (utilizing Ponderosa Pine tree cores) in the sage-scrub-Ponderosa Pine transition zone suggested an average “natural” burn frequency of 30-60 years. Restoring conditions that naturally occurred prior to European encroachment would seem a reasonable approach to maintaining the ecotype.</p>	<p>Thank you for your comment.</p>
<p>Protect and restore mature forest stands: while prescribed burns and thinning may be part of the answer, replacing lost bioavailable carbon (lost to logging and slash burning for 2-3 cuttings) and restoring native plant communities (including critical mychorhizal relationships and historic under-story species) will likely be necessary to accelerate recovery of selected stands to historic climax, mature forest communities. There are a few pockets of near-climax condition which should be managed as “nurseries” for restoring lost diversity to areas designated for enhanced recovery. There are also a few peat bog areas that should be protected both for their unique biological communities, and for their value in groundwater recharge (L.T. Murray, Taenum and possibly Manashtash drainages). Consider other enhancements (“silva-grow”, compost volunteer project, etc.) to enhance nutrients on over-harvested forest lands. Selective burning should be used with caution, as the volume of organic carbon lost is relatively high in areas that are probably already impoverished due to past practices. Shredding small slash, for example, should be considered as an alternative where practicable.</p>	<p>Thank you for your comment.</p>
<p>Protect and manage other species: maintaining established foot-paths will allow access to these areas, while minimizing disruption; that which cannot be appreciated will not be valued. People must be able to see and appreciate these areas to sustain sufficient public interest to justify the programs’ ongoing funding. Recognize that restrictions protecting these areas may be seasonal, and not necessarily year-round.</p>	<p>Thank you for your comment.</p>

Impact of target shooting: The way I engage in this practice minimizes impact, and the way many engage it does not. About 5 years ago or so, there was a volunteer effort to clean up two Durr Road “informal shooting areas” by a local Ellensburg group. I think there is sufficient interest to support regular cleanup-days. That said, I don’t like to see glass targets, old computers and abandoned vehicles, drinking while shooting, etc. that are (too) often occurring, not to mention unsafe practices such as shooting over backstops (or without), etc. Nonetheless, my ability as a hunter is enhanced by the ability to chronograph loads, target ranges to 400 yds. (with a safe backstop) and generally practice as needed to maintain proficiency; these are important to me, and are part of being an ethical hunter, i.e. knowing the abilities and limitation of myself and my equipment. Note that it is unsafe practices, not necessarily target shooting per se, over which control is sought. The actual issue is controlling irresponsible target shooting, if possible, short of an absolute prohibition (virtually unenforceable in areas where hunting is allowed, within resource limitations). The combination of quality backstops (with parking areas and level spots for benches) and possible local volunteers/groups to aid in upkeep might be worth considering. Consider longer range opportunities as well (i.e. 25-50 yds. For pistols and the uninitiated w/new AK’s, 100 yd. for general use, up to 300 or 400 yds. for the specialized user) I’d be willing to put some time into this aspect. Of at least as much concern to me is the incidence of drinking while shooting.

Thank you for your comment. Your conservation and hunting ethic is appreciated.

<p>ESA Compliance: it should be recognized that road abandonment is not the only viable approach to controlling sediment in streams; it is merely the cheapest and easiest. Properly placed bridges, open-bottom culverts or hard-bottom crossings, coupled with quarry-spall or paved access to crossings are (with use of drain-ways upgradient) are also proven to reduce or eliminate sedimentation rates above natural rates. Where resources are limited, the selected strategy for protecting and enhancing ESA Species should prioritize: 1.) known present habitat; 2.) documented or known historic habitat and, last, and if the first two have not resulted in population rebound, 3.) potential habitat with no known history or knowledge of species use.</p>	<p>Thank you for your comment.</p> <p>Roads are abandoned for numerous reasons, only one of which is sediment delivery. Current road abandonment plans are being implemented due to extensive past logging on the L.T. Murray, where road density above what current literature recommends for quality wildlife habitat. Many roads with issues are being repaired and kept open.</p>
<p>Provide fire management strategies: Incident Command Structure (and if possible drills) should be agreed to prior to an incident, as part of the contract negotiations of follow-up.</p>	<p>Thank you for your comment.</p>
<p>Reconnect with those interested in Washington’s Fish and Wildlife: those same visitors you seek to educate (a valuable function) also have knowledge of the areas you manage that can enhance your own: tapping into that, as well as carrying “bad news” to them about closures and restrictions (perceived or real) should be emphasized; could even turn some of them into volunteers.</p>	<p>Citizen Advisory Group meetings provide a means of allowing information sharing between wildlife area managers and citizens who have local knowledge.</p>
<p>J Structures and Physical Improvements: consider, as possible and resources permit, replacing barbed-wire fence gates with cattle guards for all-around improved relations with users and adjacent owners.</p>	<p>Thank you for your comment.</p>

<p>Weed Management: use of non-native species as step in restoring disturbed areas should be carefully evaluated, and priority should be given to non-fertile, annual species where practicable to enhance opportunities for native species to take over as easily/soon as possible. (Note: While fire is one disturbance, logging is another, and one that may affect more acreage most years. Native vegetation restoration should be a consideration in any logging/thinning contracts let on WDFW lands.)</p>	<p>Thank you for your comment. Re-seeding is a common component of thinning projects on the wildlife area.</p>
<p>Winter Range Protection: Kansas Dept. of Parks and Wildlife has established “ORV” use areas specifically to provide ATV (and even mudders) opportunities to ply their hobby...in a limited area (in the case I’m aware of, in a closed drainage basin), and aggressively enforces violations in other areas.</p>	<p>Thank you for your comment.</p>
<p>Road Management: I concur that road hunting should be stopped. It galls me to see guys with rifles (probably loaded) riding up and down Shell Rock road in lawn chairs in the backs of pickups when I’ve been working hard all day to walk to areas away from the road. On the other hand, as I reach my mid-50’s, not being a horse-owner, I simply can’t walk as far, nor pack game out as far. So I advocate for a balance of road-access and road-limited areas. Penalizing the aged is not the answer, either. Many are strong advocates of hunting and your agency’s mission (and funding levels).</p>	<p>Thank you for your comment.</p>
<p>Charge for Green Dot maps: hard copy only, downloads are free, and reference copies should be available in libraries as well as USFS and WDFW offices.</p>	<p>Thank you for your comment.</p>
<p>Land Acquisition: Kansas has a “Walk-In Hunting Area” program, wherein landowners are either paid a fee, or volunteer a portion of their land, for hunting access for a period of 1-? Years. This program is not limited to “Master Hunters”, but available to all hunters. Has this approach been considered?</p>	<p>WDFW does utilize a private lands hunting program.</p>

<p>Marc Eylar:</p>	<p>In regards to the possible road closures/alternate routes that are being considered for the Quilomene (and other areas), as a staff of the Kittitas County Noxious Weed Control Board, I would encourage that these closures are implemented with gates rather than tank traps or other permanent measures. The reason for this is that most, if not all, these areas will have continued weed control issues that will need to be addressed and access needs to still be available. The Quilomene Bay road, for example, has many weed issues below where WDFW would likely close the road. Both WDFW and KCNWCB staff have worked hard the last few years to rehabilitate this area and if access were not available from the top, then necessary weed control efforts would likely not be implemented. It has been suggested that access would still be available from a boat, however, if this is the only access, weed control efforts will not likely be sufficient. If gates are installed properly they perform as well as anything else in preventing private motorized access, while still allowing authorized access for any necessary work such as weed management or fire control. Marc Eylar KCNWCB</p>	<p>Due to the presence of endangered steelhead, barrier rock has been placed at the bottom of the Quilomene Bay road to deter vehicle traffic through Quilomene Creek. If this measure is effective, no other road barriers are planned at this time.</p> <p>WDFW greatly appreciates KCNWCB's weed control efforts, and will maintain as much access as possible to aid future cooperative weed management.</p>
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<p>Chris Sato and Dave Hays:</p>	<p>The following recommendations concerning state-listed and candidate species are suggested for the L.T. Murray Wildlife Area Plan. We recommend that you discuss each SOC (or at least T & E species), its needs, and specific objectives and actions for conservation and/or recovery on the wildlife area. Refer to recovery plans for actions. Species without plans should also be addressed. Construct paragraphs for these species in the same detail as used for big game, fish, etc. When discussing actions relating to surveys, habitat and site protection, please specifically list SOC (minimum T &E species) that would be benefited by these actions, rather than general taxa. The Columbia Basin Wildlife Action Plan provides a good example of how state species of concern and their issues should be addressed. Thank you for the opportunity to comment on the state Wildlife Area Plans.</p>	<p>The document has been expanded to more thoroughly discuss the Priority Habitats and Species (PHS) with potential to occur on the wildlife area. The PHS list includes all state and federally listed T & E species.</p>
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Appendix F: Influential Documents and Species Plans

Status Reports

Burrowing owl, draft 2004	Bald eagle, 2001	Northern leopard frog, 1999
Oregon spotted frog, 1997	Sage grouse, 1998	Streaked horned lark, draft 2004
Washington ground squirrel, draft 2004		

Recovery / Management Plans

Bald eagle, 1990, federal 1986	Cougar, 1997	Deer, 1997
Elk, 1997	Oregon spotted frog, 1998	Ferruginous hawk, 1996
Sage grouse, 2004	Furbearers, 1987-93	Upland birds, 1997

Game Management Plans

Volume III – Amphibians and Reptiles, 1997

Columbia spotted frog	Striped whipsnake
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Volume IV – Birds, 2003

Bald eagle	Loggerhead shrike	White-headed woodpecker
Northern goshawk	Blue grouse	Peregrine falcon
Black-backed woodpecker	Pileated woodpecker	Burrowing owl
Prairie falcon	Cavity-nesting ducks	Ring-necked pheasant
Chukar	Sage sparrow	Sage thrasher
Sharp-tailed grouse	Flammulated owl	Golden eagle
Shorebirds	Great blue heron	Vaux's swift
Harlequin duck	Wild turkey	Lewis' woodpecker

Volume V – Mammals

(Currently in development)

Appendix G: Flora and Fauna of the Wildlife Areas

The following lists are not exhaustive, but provide the majority of species found on the L.T. Murray Complex Wildlife Area. Species listed may either occur currently, historically, or just have potential to occur in small, disjunct populations.

Fish

Table 8. Listing Status for Fish Species That May Occur on the L.T. Murray Complex Wildlife Area

Common Name	Scientific Name	State Status	Federal Status	PHS Species
Rainbow trout	<i>Oncorhynchus mykiss</i>	none	none	X
Steelhead trout	<i>Oncorhynchus mykiss</i>	SoC	E	X
Cutthroat trout	<i>Oncorhynchus clarki lewisi</i>	none	none	X
Redband trout	<i>Oncorhynchus mykiss gairdneri</i>	none	none	X
Brook trout	<i>Salvelinus fontinalis</i>	none	none	
Bull trout	<i>Salvelinus confluentus</i>	C	T	X
Mountain whitefish	<i>Prosopium williamsoni</i>	none	none	
Coho salmon	<i>Oncorhynchus kisutch</i>	C	T	X
Spring Chinook salmon - upper Columbia	<i>Oncorhynchus tshawytscha</i>	C	E	X
Spring Chinook salmon - mid Columbia	<i>Oncorhynchus tshawytscha</i>	C	T	X
Speckled dace	<i>Rhinichthys osculus</i>	none	none	
Long-nosed dace	<i>Rhinichthys cataractae</i>	none	none	
Brook lamprey	<i>Lampetra richardsoni</i>	none	none	
Pacific lamprey	<i>Lampetra tridentate</i>	none	SoC	X
Sculpin spp.	<i>Cottus spp.</i>	none	none	
Northern pikeminnow	<i>Ptychocheilus oregonensis</i>	none	none	
Redside shiner	<i>Richardsonius balteatus</i>	none	none	
Chislemouth	<i>Acrocheilus alutaceus</i>	none	none	
Peamouth	<i>Mylocheilus caurinus</i>	none	none	
White sturgeon	<i>Acipenser transmontanus</i>			X
Bridge-lipped sucker	<i>Catostomus columbianus</i>	none	none	
Large-scale sucker	<i>Catostomus macrocheilus</i>	none	none	
Mountain sucker	<i>Catostomus platyrhynchus</i>	C	none	X
Three-spined stickleback	<i>Gasterosteus aculeatus</i>	none	none	

Mammals

Table 9. Mammal Species That May Occur on the L.T. Murray Complex Wildlife Area

Common Name	Scientific Name	Common Name	Scientific Name
Rocky Mountain elk	<i>Cervus elaphus nelsoni</i>	Raccoon	<i>Procyon lotor</i>
Mule deer	<i>Odocoileus hemionus</i>	Long-tailed weasel	<i>Mustella frenata</i>
Northwest white-tailed deer	<i>Odocoileus virginianus</i>	Short-tailed weasel	<i>Mustella erminea</i>
Bighorn sheep	<i>Ovis canadensis</i>	Mink	<i>Mustella vison</i>
Fisher	<i>Martes pennanti</i>	Northern river otter	<i>Lutra canadensis</i>
Gray wolf	<i>Canis lupus</i>	Beaver	<i>Castor canadensis</i>
Grizzly bear	<i>Ursus arctos</i>	Spotted skunk	<i>Spilogale gracilis</i>
Black bear	<i>Ursus americanus</i>	Striped skunk	<i>Mephitis mephitis</i>
American marten	<i>Martes americana</i>	American badger	<i>Taxidea taxus</i>
Wolverine	<i>Gulo gulo</i>	Muskrat	<i>Ondatra zibethicus</i>
Lynx	<i>Lynx canadensis</i>	Nutria	<i>Myocaster coypus</i>
Black-tailed jackrabbit	<i>Lepus californicus</i>	Porcupine	<i>Erethizon dorsatum</i>
White-tailed jackrabbit	<i>Lepus townsendii</i>	Least chipmunk	<i>Tamias minimus</i>
Townsend's ground squirrel	<i>Uroditellus townsendii</i>	Townsend's chipmunk	<i>Eutamias townsendii</i>
Western gray squirrel	<i>Sciurus griseus</i>	Yellow pine chipmunk	<i>Tamias amoenus</i>
Merriam's shrew	<i>Sorex merriami</i>	Ground squirrel spp.	<i>Spermophilus spp.</i>
Preble's shrew	<i>Sorex preblei</i>	Yellow bellied marmot	<i>Marmota flaviventris</i>
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	Douglas squirrel	<i>Tamiascirus douglasii</i>
Big brown bat	<i>Eptesicus fuscus</i>	Northern flying squirrel	<i>Glaucomys sabrinus</i>
Pallid bat	<i>Antrozous pallidus</i>	Northern pocket gopher	<i>Thomomys talpoides</i>
Myotis bat spp.	<i>Myotis spp.</i>	Mole spp.	<i>Scapanus spp.</i>
Cougar	<i>Puma concolor</i>	Shrew spp.	<i>Sorex spp.</i>
Coyote	<i>Canis latrans</i>	Northern grasshopper mouse	<i>Onychomys leucogaster</i>
Fox	<i>Vulpes vulpes</i>	Western harvest mouse	<i>Reithrodontomys megalotis</i>
Bobcat	<i>Lynx rufus</i>	Vole spp.	<i>Microtus spp.</i>
Pika	<i>Ochotona princeps</i>	Deer mouse	<i>Peromyscus maniculatus</i>
Nuttall's cottontail rabbit	<i>Sylvilagus nuttallii</i>	Bushy-tailed wood rat	<i>Neotoma cinerea</i>
Snowshoe hare	<i>Lepus americanus</i>		

Birds

Table 10. Birds Species that May Occur on the L.T. Murray Complex Wildlife Area

Information based on Washington Birder, at wabirder.com

COMMON NAME	SCIENTIFIC NAME	COMMON NAME	SCIENTIFIC NAME
Greater White-fronted Goose	<i>Anser albifrons</i>	Ruffed Grouse	<i>Bonasa umbellus</i>
Snow Goose	<i>Chen caerulescens</i>	Greater Sage-Grouse	<i>Centrocercus urophasianus</i>
Cackling Goose	<i>Branta hutchinsii</i>	Spruce Grouse	<i>Falcapennis canadensis</i>
Canada Goose	<i>Branta canadensis</i>	White-tailed Ptarmigan	<i>Lagopus leucura</i>
Mute Swan	<i>Cygnus olor</i>	Dusky Grouse	<i>Dendragapus obscurus</i>
Trumpeter Swan	<i>Cygnus buccinator</i>	Sooty Grouse	<i>Dendragapus fuliginosus</i>
Tundra Swan	<i>Cygnus columbianus</i>	Wild Turkey	<i>Meleagris gallopavo</i>
Wood Duck	<i>Aix sponsa</i>	Red-throated Loon	<i>Gavia stellata</i>
Gadwall	<i>Anas strepera</i>	Pacific Loon	<i>Gavia pacifica</i>
Eurasian Wigeon	<i>Anas penelope</i>	Common Loon	<i>Gavia immer</i>
American Wigeon	<i>Anas americana</i>	Yellow-billed Loon	<i>Gavia adamsii</i>
Mallard	<i>Anas platyrhynchos</i>	Pied-billed Grebe	<i>Podilymbus podiceps</i>
Blue-winged Teal	<i>Anas discors</i>	Horned Grebe	<i>Podiceps auritus</i>
Cinnamon Teal	<i>Anas cyanoptera</i>	Red-necked Grebe	<i>Podiceps grisegena</i>
Northern Shoveler	<i>Anas clypeata</i>	Eared Grebe	<i>Podiceps nigricollis</i>
Northern Pintail	<i>Anas acuta</i>	Western Grebe	<i>Aechmophorus occidentalis</i>
Green-winged Teal	<i>Anas crecca</i>	Clark's Grebe	<i>Aechmophorus clarkii</i>
Canvasback	<i>Aythya valisineria</i>	American White Pelican	<i>Pelecanus erythrorhynchos</i>
Redhead	<i>Aythya americana</i>	Double-crested Cormorant	<i>Phalacrocorax auritus</i>
Ring-necked Duck	<i>Aythya collaris</i>	American Bittern	<i>Botaurus lentiginosus</i>
Tufted Duck	<i>Aythya fuligula</i>	Great Blue Heron	<i>Ardea herodias</i>
Greater Scaup	<i>Aythya marila</i>	Great Egret	<i>Ardea alba</i>
Lesser Scaup	<i>Aythya affinis</i>	Little Blue Heron	<i>Egretta caerulea</i>
Harlequin Duck	<i>Histrionicus histrionicus</i>	Cattle Egret	<i>Bubulcus ibis</i>
Surf Scoter	<i>Melanitta perspicillata</i>	Green Heron	<i>Butorides virescens</i>
White-winged Scoter	<i>Melanitta fusca</i>	Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>
Black Scoter	<i>Melanitta nigra</i>	Turkey Vulture	<i>Cathartes aura</i>
Long-tailed Duck	<i>Clangula hyemalis</i>	Osprey	<i>Pandion haliaetus</i>
Bufflehead	<i>Bucephala albeola</i>	Bald Eagle	<i>Haliaeetus leucocephalus</i>
Common Goldeneye	<i>Bucephala clangula</i>	Northern Harrier	<i>Circus cyaneus</i>
Barrow's Goldeneye	<i>Bucephala islandica</i>	Sharp-shinned Hawk	<i>Accipiter striatus</i>
Hooded Merganser	<i>Lophodytes cucullatus</i>	Cooper's Hawk	<i>Accipiter cooperii</i>
Common Merganser	<i>Mergus merganser</i>	Northern Goshawk	<i>Accipiter gentilis</i>
Red-breasted Merganser	<i>Mergus serrator</i>	Broad-winged Hawk	<i>Buteo platypterus</i>
Ruddy Duck	<i>Oxyura jamaicensis</i>	Swainson's Hawk	<i>Buteo swainsoni</i>
California Quail	<i>Callipepla californica</i>	Red-tailed Hawk	<i>Buteo jamaicensis</i>
Chukar	<i>Alectoris chukar</i>	Ferruginous Hawk	<i>Buteo regalis</i>
Gray Partridge	<i>Perdix perdix</i>	Rough-legged Hawk	<i>Buteo lagopus</i>
Ring-necked Pheasant	<i>Phasianus colchicus</i>	Golden Eagle	<i>Aquila chrysaetos</i>

COMMON NAME	SCIENTIFIC NAME	COMMON NAME	SCIENTIFIC NAME
American Kestrel	<i>Falco sparverius</i>	Herring Gull	<i>Larus argentatus</i>
Merlin	<i>Falco columbarius</i>	Glaucous-winged Gull	<i>Larus glaucescens</i>
Gyrfalcon	<i>Falco rusticolus</i>	Glaucous Gull	<i>Larus hyperboreus</i>
Peregrine Falcon	<i>Falco peregrinus</i>	Caspian Tern	<i>Hydroprogne caspia</i>
Prairie Falcon	<i>Falco mexicanus</i>	Black Tern	<i>Chlidonias niger</i>
Virginia Rail	<i>Rallus limicola</i>	Common Tern	<i>Sterna hirundo</i>
Sora	<i>Porzana carolina</i>	Arctic Tern	<i>Sterna paradisaea</i>
American Coot	<i>Fulica americana</i>	Forster's Tern	<i>Sterna forsteri</i>
Sandhill Crane	<i>Grus canadensis</i>	Parasitic Jaeger	<i>Stercorarius parasiticus</i>
Black-bellied Plover	<i>Pluvialis squatarola</i>	Long-tailed Jaeger	<i>Stercorarius longicaudus</i>
American Golden-Plover	<i>Pluvialis dominica</i>	Marbled Murrelet	<i>Brachyramphus marmoratus</i>
Semipalmated Plover	<i>Charadrius semipalmatus</i>	Ancient Murrelet	<i>Synthliboramphus antiquus</i>
Killdeer	<i>Charadrius vociferus</i>	Rock Pigeon	<i>Columba livia</i>
Black-necked Stilt	<i>Himantopus mexicanus</i>	Band-tailed Pigeon	<i>Patagioenas fasciata</i>
American Avocet	<i>Recurvirostra americana</i>	Eurasian Collared-Dove	<i>Streptopelia decaocto</i>
Spotted Sandpiper	<i>Actitis macularius</i>	White-winged Dove	<i>Zenaida asiatica</i>
Solitary Sandpiper	<i>Tringa solitaria</i>	Mourning Dove	<i>Zenaida macroura</i>
Greater Yellowlegs	<i>Tringa melanoleuca</i>	Barn Owl	<i>Tyto alba</i>
Lesser Yellowlegs	<i>Tringa flavipes</i>	Flammulated Owl	<i>Otus flammeolus</i>
Upland Sandpiper	<i>Bartramia longicauda</i>	Western Screech-Owl	<i>Megascops kennicottii</i>
Whimbrel	<i>Numenius phaeopus</i>	Great Horned Owl	<i>Bubo virginianus</i>
Long-billed Curlew	<i>Numenius americanus</i>	Snowy Owl	<i>Bubo scandiacus</i>
Sanderling	<i>Calidris alba</i>	Northern Hawk Owl	<i>Surnia ulula</i>
Western Sandpiper	<i>Calidris mauri</i>	Northern Pygmy-Owl	<i>Glaucidium gnoma</i>
Least Sandpiper	<i>Calidris minutilla</i>	Burrowing Owl	<i>Athene cunicularia</i>
Baird's Sandpiper	<i>Calidris bairdii</i>	Spotted Owl	<i>Strix occidentalis</i>
Pectoral Sandpiper	<i>Calidris melanotos</i>	Barred Owl	<i>Strix varia</i>
Dunlin	<i>Calidris alpina</i>	Great Gray Owl	<i>Strix nebulosa</i>
Short-billed Dowitcher	<i>Limnodromus griseus</i>	Long-eared Owl	<i>Asio otus</i>
Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>	Short-eared Owl	<i>Asio flammeus</i>
Wilson's Snipe	<i>Gallinago delicata</i>	Boreal Owl	<i>Aegolius funereus</i>
Wilson's Phalarope	<i>Steganopus tricolor</i>	Northern Saw-whet Owl	<i>Aegolius acadicus</i>
Red-necked Phalarope	<i>Phalaropus lobatus</i>	Common Nighthawk	<i>Chordeiles minor</i>
Sabine's Gull	<i>Xema sabini</i>	Common Poorwill	<i>Phalaenoptilus nuttallii</i>
Bonaparte's Gull	<i>Chroicocephalus philadelphia</i>	Black Swift	<i>Cypseloides niger</i>
Mew Gull	<i>Larus canus</i>	Vaux's Swift	<i>Chaetura vauxi</i>
Ring-billed Gull	<i>Larus delawarensis</i>	White-throated Swift	<i>Aeronautes saxatalis</i>
Western Gull	<i>Larus occidentalis</i>	Ruby-throated Hummingbird	<i>Archilochus colubris</i>
California Gull	<i>Larus californicus</i>	Black-chinned Hummingbird	<i>Archilochus alexandri</i>

COMMON NAME	SCIENTIFIC NAME	COMMON NAME	SCIENTIFIC NAME
Anna's Hummingbird	<i>Calypte anna</i>	Clark's Nutcracker	<i>Nucifraga columbiana</i>
Calliope Hummingbird	<i>Stellula calliope</i>	Black-billed Magpie	<i>Pica hudsonia</i>
Rufous Hummingbird	<i>Selasphorus rufus</i>	American Crow	<i>Corvus brachyrhynchos</i>
Belted Kingfisher	<i>Megaceryle alcyon</i>	Common Raven	<i>Corvus corax</i>
Lewis's Woodpecker	<i>Melanerpes lewis</i>	Horned Lark	<i>Eremophila alpestris</i>
Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>	Purple Martin	<i>Progne subis</i>
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	Tree Swallow	<i>Tachycineta bicolor</i>
Red-naped Sapsucker	<i>Sphyrapicus nuchalis</i>	Violet-green Swallow	<i>Tachycineta thalassina</i>
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	N. Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>
Downy Woodpecker	<i>Picoides pubescens</i>	Bank Swallow	<i>Riparia riparia</i>
Hairy Woodpecker	<i>Picoides villosus</i>	Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
White-headed Woodpecker	<i>Picoides albolarvatus</i>	Barn Swallow	<i>Hirundo rustica</i>
Am. Three-toed Woodpecker	<i>Picoides dorsalis</i>	Black-capped Chickadee	<i>Poecile atricapillus</i>
Black-backed Woodpecker	<i>Picoides arcticus</i>	Mountain Chickadee	<i>Poecile gambeli</i>
Northern Flicker	<i>Colaptes auratus</i>	Chestnut-backed Chickadee	<i>Poecile rufescens</i>
Pileated Woodpecker	<i>Dryocopus pileatus</i>	Bushtit	<i>Psaltriparus minimus</i>
Olive-sided Flycatcher	<i>Contopus cooperi</i>	Red-breasted Nuthatch	<i>Sitta canadensis</i>
Western Wood-Pewee	<i>Contopus sordidulus</i>	White-breasted Nuthatch	<i>Sitta carolinensis</i>
Willow Flycatcher	<i>Empidonax traillii</i>	Pygmy Nuthatch	<i>Sitta pygmaea</i>
Least Flycatcher	<i>Empidonax minimus</i>	Brown Creeper	<i>Certhia americana</i>
Hammond's Flycatcher	<i>Empidonax hammondi</i>	Rock Wren	<i>Salpinctes obsoletus</i>
Gray Flycatcher	<i>Empidonax wrightii</i>	Canyon Wren	<i>Catherpes mexicanus</i>
Dusky Flycatcher	<i>Empidonax oberholseri</i>	Bewick's Wren	<i>Thryomanes bewickii</i>
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	House Wren	<i>Troglodytes aedon</i>
Say's Phoebe	<i>Sayornis saya</i>	Winter Wren	<i>Troglodytes troglodytes</i>
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	Marsh Wren	<i>Cistothorus palustris</i>
Western Kingbird	<i>Tyrannus verticalis</i>	American Dipper	<i>Cinclus mexicanus</i>
Eastern Kingbird	<i>Tyrannus tyrannus</i>	Golden-crowned Kinglet	<i>Regulus satrapa</i>
Loggerhead Shrike	<i>Lanius ludovicianus</i>	Ruby-crowned Kinglet	<i>Regulus calendula</i>
Northern Shrike	<i>Lanius excubitor</i>	Western Bluebird	<i>Sialia mexicana</i>
Cassin's Vireo	<i>Vireo cassinii</i>	Mountain Bluebird	<i>Sialia currucoides</i>
Hutton's Vireo	<i>Vireo huttoni</i>	Townsend's Solitaire	<i>Myadestes townsendi</i>
Warbling Vireo	<i>Vireo gilvus</i>	Veery	<i>Catharus fuscescens</i>
Philadelphia Vireo	<i>Vireo philadelphicus</i>	Swainson's Thrush	<i>Catharus ustulatus</i>
Red-eyed Vireo	<i>Vireo olivaceus</i>	Hermit Thrush	<i>Catharus guttatus</i>
Gray Jay	<i>Perisoreus canadensis</i>	American Robin	<i>Turdus migratorius</i>
Steller's Jay	<i>Cyanocitta stelleri</i>	Varied Thrush	<i>Ixoreus naevius</i>
Blue Jay	<i>Cyanocitta cristata</i>	Gray Catbird	<i>Dumetella carolinensis</i>
Western Scrub-Jay	<i>Aphelocoma californica</i>	Northern Mockingbird	<i>Mimus polyglottos</i>

COMMON NAME	SCIENTIFIC NAME	COMMON NAME	SCIENTIFIC NAME
Sage Thrasher	<i>Oreoscoptes montanus</i>	Song Sparrow	<i>Melospiza melodia</i>
European Starling	<i>Sturnus vulgaris</i>	Lincoln's Sparrow	<i>Melospiza lincolnii</i>
American Pipit	<i>Anthus rubescens</i>	Swamp Sparrow	<i>Melospiza georgiana</i>
Bohemian Waxwing	<i>Bombycilla garrulus</i>	White-throated Sparrow	<i>Zonotrichia albicollis</i>
Cedar Waxwing	<i>Bombycilla cedrorum</i>	Harris's Sparrow	<i>Zonotrichia querula</i>
Orange-crowned Warbler	<i>Vermivora celata</i>	White-crowned Sparrow	<i>Zonotrichia leucophrys</i>
Nashville Warbler	<i>Vermivora ruficapilla</i>	Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>
Northern Parula	<i>Parula americana</i>	Dark-eyed Junco	<i>Junco hyemalis</i>
Yellow Warbler	<i>Dendroica petechia</i>	Lapland Longspur	<i>Calcarius lapponicus</i>
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	Snow Bunting	<i>Plectrophenax nivalis</i>
Magnolia Warbler	<i>Dendroica magnolia</i>	Western Tanager	<i>Piranga ludoviciana</i>
Cape May Warbler	<i>Dendroica tigrina</i>	Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>
Yellow-rumped Warbler	<i>Dendroica coronata</i>	Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>
Black-throated Gray Warbler	<i>Dendroica nigrescens</i>	Lazuli Bunting	<i>Passerina amoena</i>
Black-throated Green Warbler	<i>Dendroica virens</i>	Bobolink	<i>Dolichonyx oryzivorus</i>
Townsend's Warbler	<i>Dendroica townsendi</i>	Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Hermit Warbler	<i>Dendroica occidentalis</i>	Western Meadowlark	<i>Sturnella neglecta</i>
Blackpoll Warbler	<i>Dendroica striata</i>	Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>
Black-and-white Warbler	<i>Mniotilta varia</i>	Rusty Blackbird	<i>Euphagus carolinus</i>
American Redstart	<i>Setophaga ruticilla</i>	Brewer's Blackbird	<i>Euphagus cyanocephalus</i>
Ovenbird	<i>Seiurus aurocapillus</i>	Great-tailed Grackle	<i>Quiscalus mexicanus</i>
Northern Waterthrush	<i>Seiurus noveboracensis</i>	Brown-headed Cowbird	<i>Molothrus ater</i>
MacGillivray's Warbler	<i>Oporornis tolmiei</i>	Bullock's Oriole	<i>Icterus bullockii</i>
Common Yellowthroat	<i>Geothlypis trichas</i>	Baltimore Oriole	<i>Icterus galbula</i>
Wilson's Warbler	<i>Wilsonia pusilla</i>	Gray-crowned Rosy-Finch	<i>Leucosticte tephrocotis</i>
Yellow-breasted Chat	<i>Icteria virens</i>	Pine Grosbeak	<i>Pinicola enucleator</i>
Spotted Towhee	<i>Pipilo maculatus</i>	Purple Finch	<i>Carpodacus purpureus</i>
American Tree Sparrow	<i>Spizella arborea</i>	Cassin's Finch	<i>Carpodacus cassinii</i>
Chipping Sparrow	<i>Spizella passerina</i>	House Finch	<i>Carpodacus mexicanus</i>
Clay-colored Sparrow	<i>Spizella pallida</i>	Red Crossbill	<i>Loxia curvirostra</i>
Brewer's Sparrow	<i>Spizella breweri</i>	White-winged Crossbill	<i>Loxia leucoptera</i>
Vesper Sparrow	<i>Poocetes gramineus</i>	Common Redpoll	<i>Acanthis flammea</i>
Lark Sparrow	<i>Chondestes grammacus</i>	Hoary Redpoll	<i>Acanthis hornemanni</i>
Black-throated Sparrow	<i>Amphispiza bilineata</i>	Pine Siskin	<i>Spinus pinus</i>
Sage Sparrow	<i>Amphispiza belli</i>	Lesser Goldfinch	<i>Spinus psaltria</i>
Lark Bunting	<i>Calamospiza melanocorys</i>	American Goldfinch	<i>Spinus tristis</i>
Savannah Sparrow	<i>Passerculus sandwichensis</i>	Evening Grosbeak	<i>Coccothraustes vespertinus</i>
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	House Sparrow	<i>Passer domesticus</i>
Fox Sparrow	<i>Passerella iliaca</i>		

Amphibians and Reptiles

Table 11. Amphibian and Reptile Species that May Occur on the L.T. Murray Complex Wildlife Area

Common Name	Scientific Name
Columbia spotted frog	<i>Rana luteiventris</i>
Great basin spadefoot	<i>Spea intermontana</i>
Long-toed salamander	<i>Ambystoma macrodactylum</i>
Pacific tree frog	<i>Pseudacris regilla</i>
Western toad	<i>Bufo boreas</i>
Rough-skinned newt	<i>Taricha granulosa</i>
Common garter snake	<i>Thamnophis sirtalis</i>
Western terrestrial garter snake	<i>Thamnophis elegans</i>
Night snake	<i>Hypsiglena torquata</i>
Gopher snake	<i>Pituophis catenifer</i>
Pygmy short-horned lizard	<i>Phrynosoma douglasii</i>
Ring-necked snake	<i>Diadophis punctatus</i>
Rubber boa	<i>Charina bottae</i>
Sagebrush lizard	<i>Sceloporus graciosus</i>
Sharptail snake	<i>Contia tenuis</i>
Side-blotched lizard	<i>Uta stansburiana</i>
Southern alligator lizard	<i>Elgaria multicarinata</i>
Striped whipsnake	<i>Masticophis taeniatus</i>
Western rattlesnake	<i>Crotalus viridis</i>
Western skink	<i>Eumeces skiltonianus</i>

Plants

Table 12. Plant Species that May Occur on the L.T. Murray Complex Wildlife Area

Common Name	Scientific Name	Common Name	Scientific Name
Russian knapweed	<i>Acroptilon repens</i>	Basin wildrye	<i>Leymus cinereus</i>
Scilla-like onion	<i>Allium scilloides</i>	Dalmatian toadflax	<i>Linaria dalmatica</i>
Wild onion	<i>Allium</i> spp.	Canby's lomatium	<i>Lomatium canbyi</i>
Alder	<i>Alnus</i> spp.	Large seeded biscuitroot	<i>Lomatium macrocarpum</i>
Serviceberry	<i>Amelanchier alnifolia</i>	Biscuit root	<i>Lomatium</i> spp.
Low sagebrush	<i>Artemisia arbuscula</i>	Purple loosestrife	<i>Lythrum salicaria</i>
Stiff sagebrush	<i>Artemisia rigida</i>	Mock goldenweed	<i>Nestotus stenophyllus</i>
Big sagebrush	<i>Artemisia tridentata</i>	Hedgehog cactus	<i>Pediocactus simpsonii</i>
Wyoming big sagebrush	<i>Artemisia wyomingensis</i>	Rock penstemon	<i>Penstemon gairdneri</i>
Threetip sagebrush	<i>Artemisia tripartita</i>	Reed canarygrass	<i>Phalaris arundinacea</i>
Pauper milk-vetch	<i>Astragalus misellus</i> r	Mock orange	<i>Philadelphus lewisii</i>
Carey's balsamroot	<i>Balsamorhiza careyana</i>	Hood's phlox	<i>Phlox hoodii</i>
Hooker's balsamroot	<i>Balsamorhiza hookeri</i>	Common reed	<i>Phragmites australis</i>
Balsamroot	<i>Balsamorhiza</i> spp.	Ponderosa pine	<i>Pinus ponderosa</i>
Cheatgrass	<i>Bromus tectorum</i>	Bulbous bluegrass	<i>Poa bulbosa</i>
Mariposa lily	<i>Calochortus macrocarpus</i>	Cusick's bluegrass	<i>Poa cusickii</i>
Whitetop	<i>Cardaria pubescens</i>	Kentucky bluegrass	<i>Poa pratensis</i>
Musk thistle	<i>Carduus nutans</i>	Sandberg's bluegrass	<i>Poa secunda</i>
Sedges	<i>Carex</i> spp.	Black cottonwood	<i>Populus trichocarpa</i>
Diffuse knapweed	<i>Centaurea diffusa</i>	Aspen	<i>Populus tremuloides</i>
Canada thistle	<i>Cirsium arvense</i>	Chokecherry	<i>Prunus virginiana</i>
Red-osier dogwood	<i>Cornus sericea</i>	Bluebunch wheatgrass	<i>Pseudoroegneria spicata</i>
Black hawthorn	<i>Crataegus douglasii</i>	Bitterbrush	<i>Purshia tridentata</i>
Western hawksbeard	<i>Crepis occidentalis</i>	Wax currant	<i>Ribes cereum</i>
Smooth scouring rush	<i>Equisetum laevigatum</i>	Watercress	<i>Rorippa nasturtium-aquaticus</i>
Rabbitbrush	<i>Ericameria nauseosa</i>	Wood's rose	<i>Rosa woodsii</i>
Line-leaf fleabane	<i>Erigeron linearis</i>	Coyote willow	<i>Salix exigua</i>
Cushion fleabane	<i>Erigeron poliospermus</i>	Russian thistle	<i>Salsola iberica</i>
Rock buckwheat	<i>Eriogonum sphaerocephalum</i>	Elderberry	<i>Sambucus nigra</i>
Buckwheat	<i>Eriogonum</i> spp.	Ute's ladies tresses	<i>Spiranthes diluvialis</i>
Thyme-leaf wild buckwheat	<i>Eriogonum thymoides</i>	Western needlegrass	<i>Stipa occidentalis</i>
Idaho fescue	<i>Festuca idahoensis</i>	Spinescent fameflower	<i>Talinum spinescens</i>
Yellow bells	<i>Fritillaria pudica</i>	Hoover's tauschia	<i>Tauschia hooveri</i>
Needle-and-thread grass	<i>Hesperostipa comata</i>	Thick-leaved thelypody	<i>Thelypodium laciniatum</i>
Foxtail barley	<i>Hordeum jubatum</i>	Poison ivy	<i>Toxicodendron rydbergii</i>
Rushes	<i>Juncus</i> spp.	Brodiaea	<i>Triteleia grandiflora</i>
Kochia	<i>Kochia scoparia</i>	Cattail	<i>Typha latifolia</i>
Perennial pepperweed	<i>Lepidium latifolium</i>	Ventenata	<i>Ventenata dubia</i>
Bitterroot	<i>Lewisia rediviva</i>	Sagebrush violet	<i>Viola trinervata</i>

Appendix H: Literature Cited

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