

**DRAFT**  
**CHELAN WILDLIFE AREA MANAGEMENT PLAN**  
Washington Department of Fish and Wildlife



Prepared by Wildlife Area Manager, Marc Hallet



**2006**

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## **CHAPTER I. INTRODUCTION**

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

### **1.1 Agency Mission Statement**

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

### **1.2 Agency Goals and Objectives**

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

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

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

#### Goal II: Sustainable fish and wildlife-related opportunities

- Objective 6: Provide sustainable fish and wildlife-related recreational and commercial opportunities compatible with maintaining healthy fish and wildlife populations and habitats.
- Objective 7: Improve the economic well being of Washington by providing diverse, high quality recreational and commercial opportunities.

#### Goal III: Operational Excellence and Professional Service

- Objective 11: Provide sound operational management of WDFW lands, facilities and access sites.

### **1.3 Agency Policies**

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

- Commission Policy 6003: Domestic Livestock Grazing on Department Lands
- Policy 6010: Acquiring and disposing of real property
- Policy 5211: Protecting and Restoring Wetlands:
- Policy 5001: Fish Protection At Water Diversions/Flow Control Structures And Fish Passage Structures
- Policy: Recreation Management on WDFW Lands
- Policy: Commercial Use of WDFW Lands
- Policy: Forest Management on WDFW Lands
- Policy: Weed Management on WDFW Lands
- Policy: Fire Management on WDFW Lands
- Other Policies/Contractual Obligations/Responsibilities

### **1.4 Chelan Wildlife Area Goals**

The primary management goal for the Chelan Wildlife Area initially was to enhance and manage big game and upland game habitat. This goal has broadened to include the preservation of habitat and species diversity for both fish and wildlife resources, the maintenance of healthy populations of game and non-game species, and the protection and restoration of native plant communities. It also

includes providing diverse opportunities for the public to encounter, utilize, and appreciate wildlife and wild areas. Specific management goals and objectives for the Chelan Wildlife Area can be found in Chapter 3. Public participation, in the form of a Citizens Advisory Group (CAG), will be encouraged as a means to identify social, cultural, and economic issues important to the people of North-Central Washington. The White River was purchased primarily to protect wetlands and riparian habitat along the White River for the benefit of the fish resource.

### **1.5 Planning Process**

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

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

#### Chelan Wildlife Area Citizens Advisory Group

Jim McGee	Public Utilities District No. 1 of Douglas County
Paul Fielder	Public Utilities District No. 1 of Chelan County
Bill Stageman	Wenatchee Sportsmen's Association
Bob Fischer	US Army Corp of Engineers – Chief Joseph Dam/ Adjacent landowner /Recreationist
Tim Behne	Adjacent Land Owner/Cattleman/wheat grower/Foster Creek Conservation District
John Musser	Wildlife biologist and recreationist
Steve Wetzel	Washington Department of Natural Resources
Mary Hunt	Douglas County Commissioner
Terry Nouka	Chelan County Weed Board
Jon Soest	North Central Washington Audubon Society
Nancy Warner	The Nature Conservancy
Gordon Congdon	Chelan-Douglas Land Trust
Mallory Lenz	U.S. Forest Service
Bob Stoll	Adjacent Land Owner and Member of Lands Management Advisory Council
Neal Hedges	US Bureau of Land Management

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

The Chelan Wildlife Area plan will be reviewed annually with additional input from the CAG and district team to monitor performance and desired results. Strategies and activities will be adapted where necessary to accomplish management objectives.

## **CHAPTER II. AREA DESCRIPTION AND MAP**

### **2.1 Purchase History**

The WDFW entered into a wildlife mitigation agreement with the Chelan County Public Utilities District (PUD) in 1963 as part of the Rocky Reach Dam federal license. The PUD, as a result of this agreement, provided the WDFW with funding to acquire 20,211 acres of land. In 1983, the Department of Transportation provided WDFW with another 1,046 acres of land in the western part of Chelan Butte as a result of a land exchange. The Pateros and White River Units were added to the Chelan Wildlife Area in the late 1990's.

The Wildlife Area includes five land units, with some dispersed parcels: 1) the Swakane Unit (11,273 acres) is located about 3 miles north of Wenatchee, 2) the Entiat Unit (9,851 acres) includes lands west and northwest of the town of Entiat and in Oklahoma Gulch, Navarre coulee and Knapps Coulee, 3) the Chelan Butte Unit (9,097 acres), the most contiguous of the three and is located between Lake Chelan and the Columbia River 4) the White River Unit (415 acres), located near Lake Wenatchee, and 5) the Pateros Unit (1,900 acres) north of the town of Pateros.

### **2.2 Ownership and Use of Adjacent Lands**

Most of the land adjacent to the wildlife area is publicly owned. Chelan Butte and the low elevation portions of other units are, in some areas, located adjacent to orchards and low-density residential developments. More remote parts of the wildlife area lie adjacent to other public lands, primarily Forest Service with some Bureau of Land Management and State Department of Natural Resources land.

### **2.3 Property Locations and Legal Description**

The wildlife area is located primarily in southern Chelan County just north of the Columbia River (Lake Entiat) in distinct land units between Wenatchee and Chelan (Figures 1, 2, 3 and 4). It ranges in elevation from about 710 feet along the Columbia River to 4,280 feet. The topography of the area is mostly steep with some cliffs and rocky areas. The Pateros unit is located just north of the town of Pateros (Figure 6) and the White River Unit (Figure 5) lies near and to the west of Lake Wenatchee.

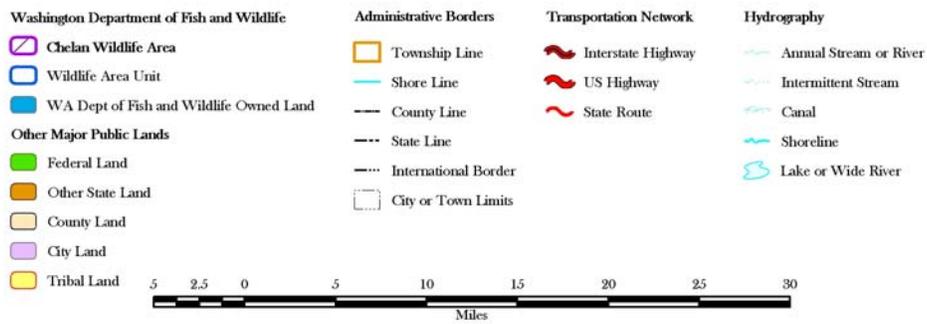
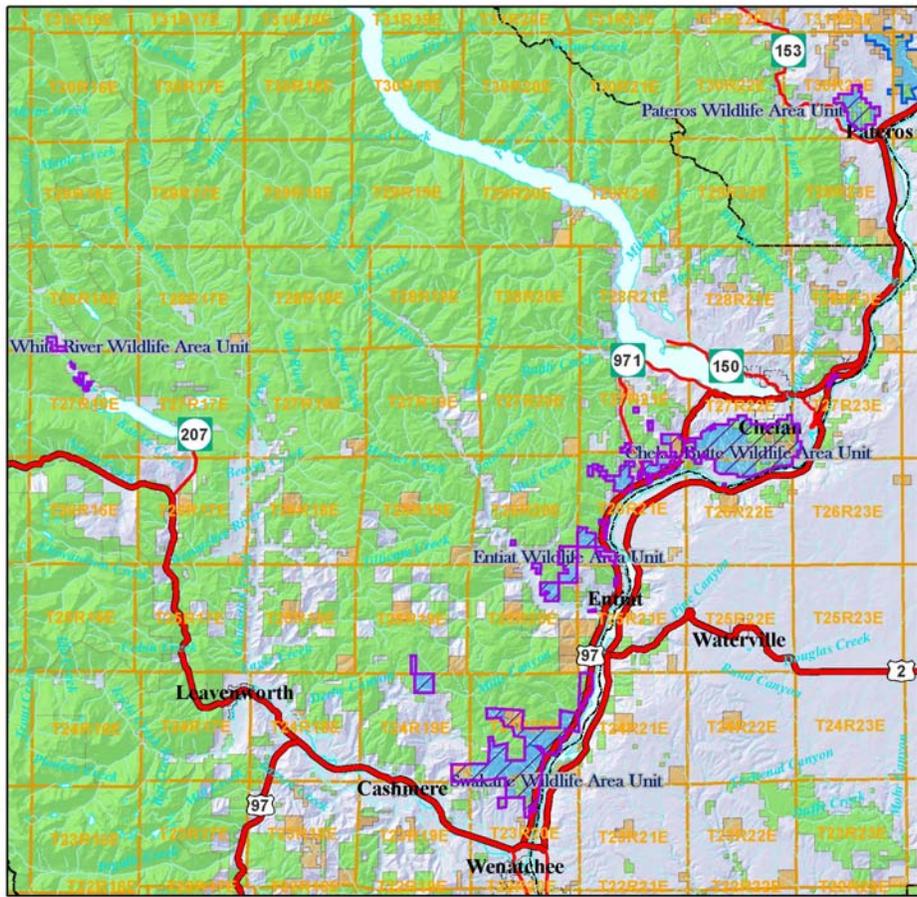
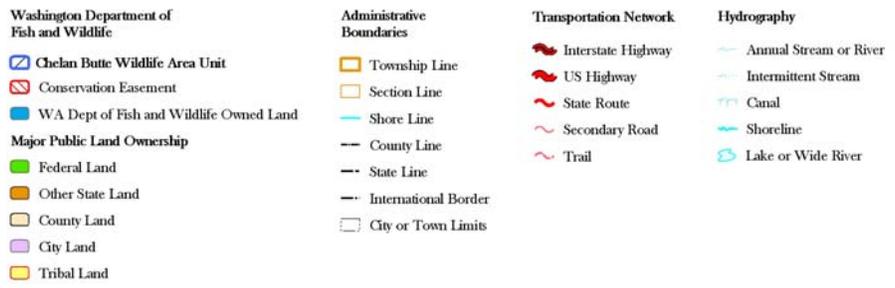
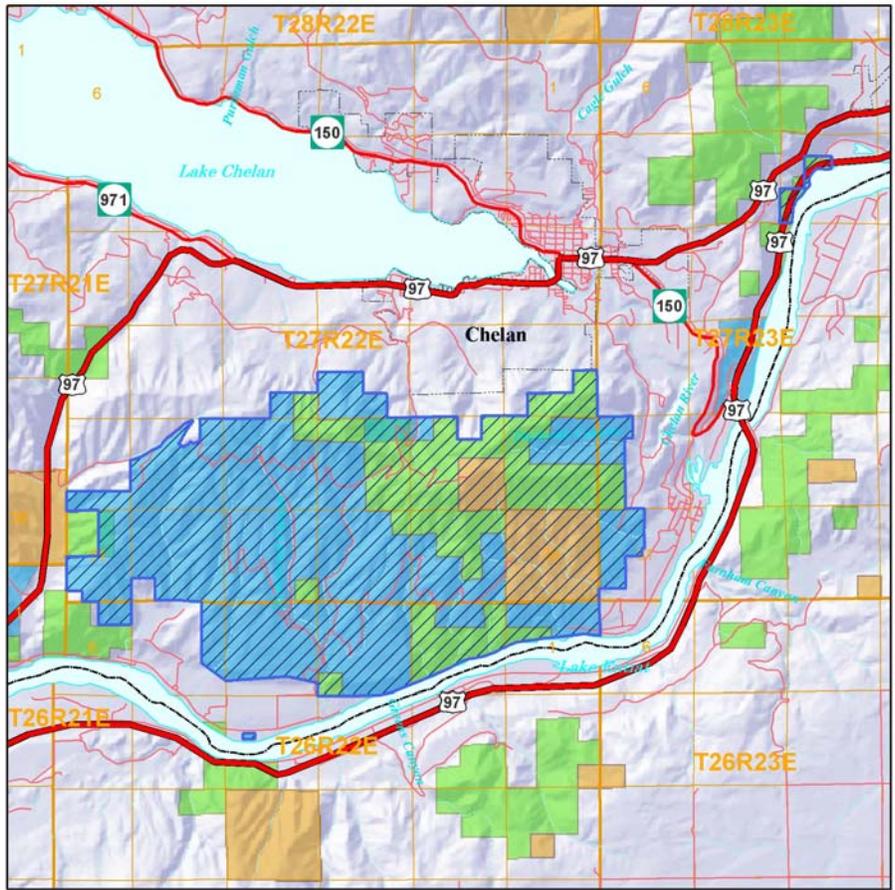
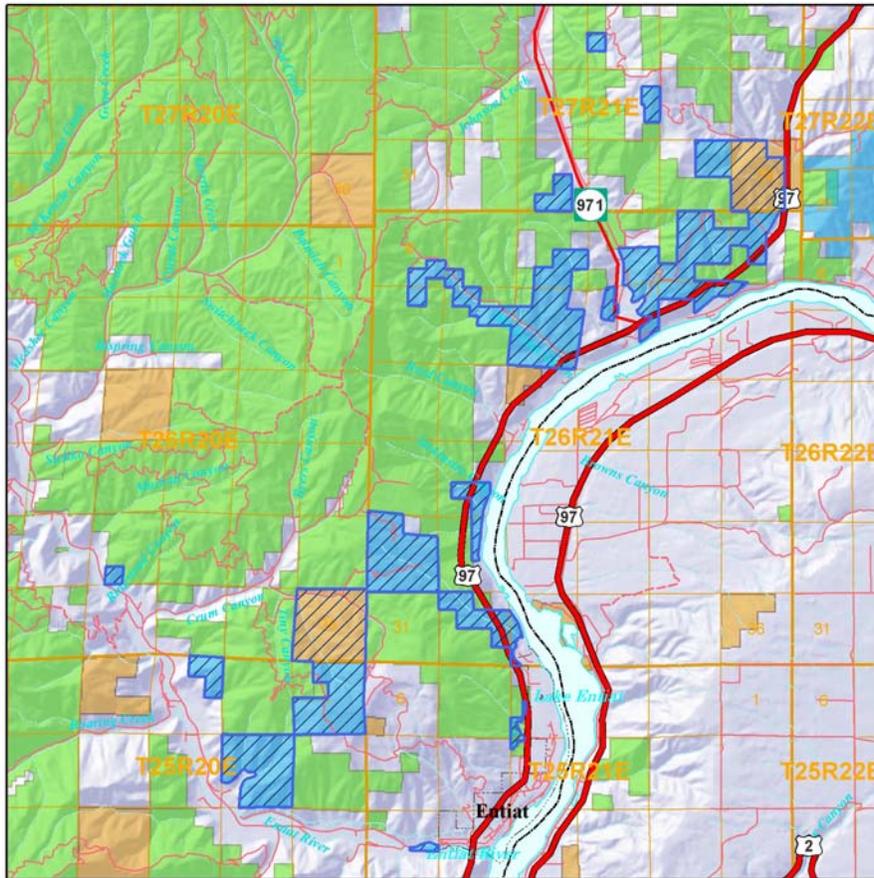


Figure 1: Chelan Wildlife Area Complex



1:100,000  
1 inch equals 1.6 miles

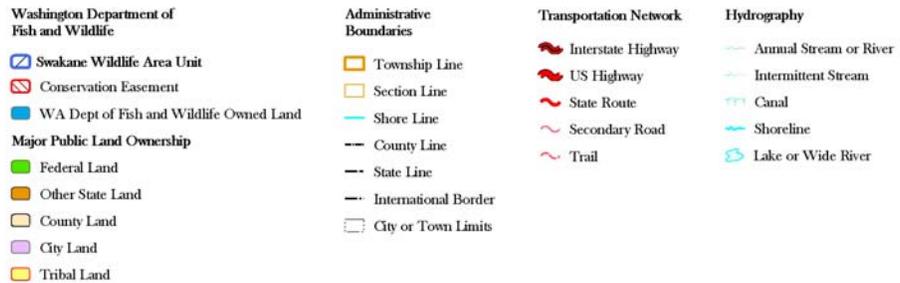
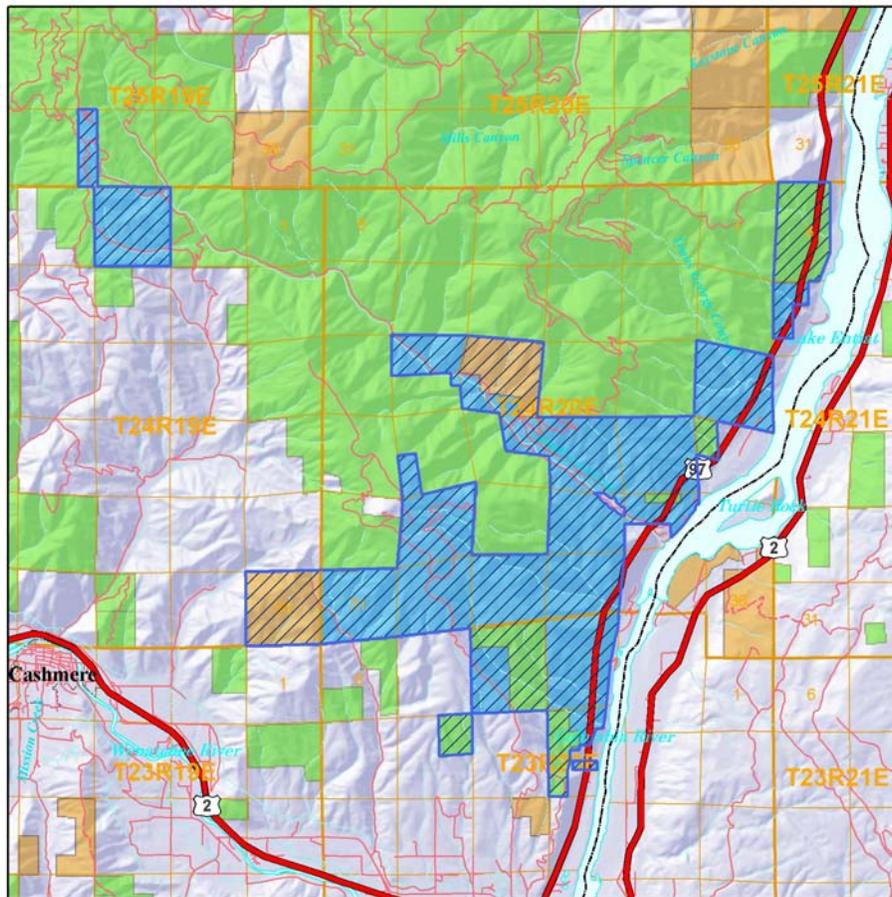
*Figure 2: Chelan Butte Unit*



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| <p><b>Washington Department of Fish and Wildlife</b></p> <ul style="list-style-type: none"> <li> Entiat Wildlife Area Unit</li> <li> Conservation Easement</li> <li> WA Dept of Fish and Wildlife Owned Land</li> </ul> <p><b>Major Public Land Ownership</b></p> <ul style="list-style-type: none"> <li> Federal Land</li> <li> Other State Land</li> <li> County Land</li> <li> City Land</li> <li> Tribal Land</li> </ul> | <p><b>Administrative Boundaries</b></p> <ul style="list-style-type: none"> <li> Township Line</li> <li> Section Line</li> <li> Shore Line</li> <li> County Line</li> <li> State Line</li> <li> International Border</li> <li> City or Town Limits</li> </ul> | <p><b>Transportation Network</b></p> <ul style="list-style-type: none"> <li> Interstate Highway</li> <li> US Highway</li> <li> State Route</li> <li> Secondary Road</li> <li> Trail</li> </ul> | <p><b>Hydrography</b></p> <ul style="list-style-type: none"> <li> Annual Stream or River</li> <li> Intermittent Stream</li> <li> Canal</li> <li> Shoreline</li> <li> Lake or Wide River</li> </ul> |
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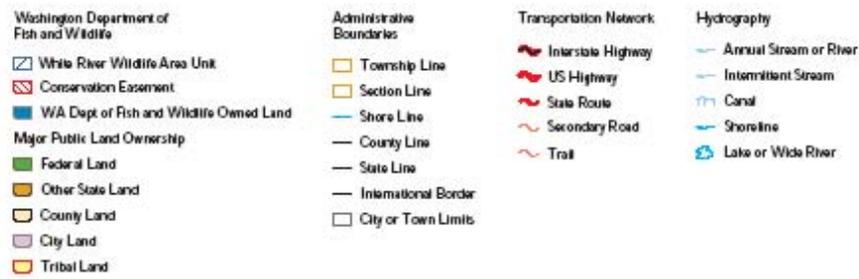
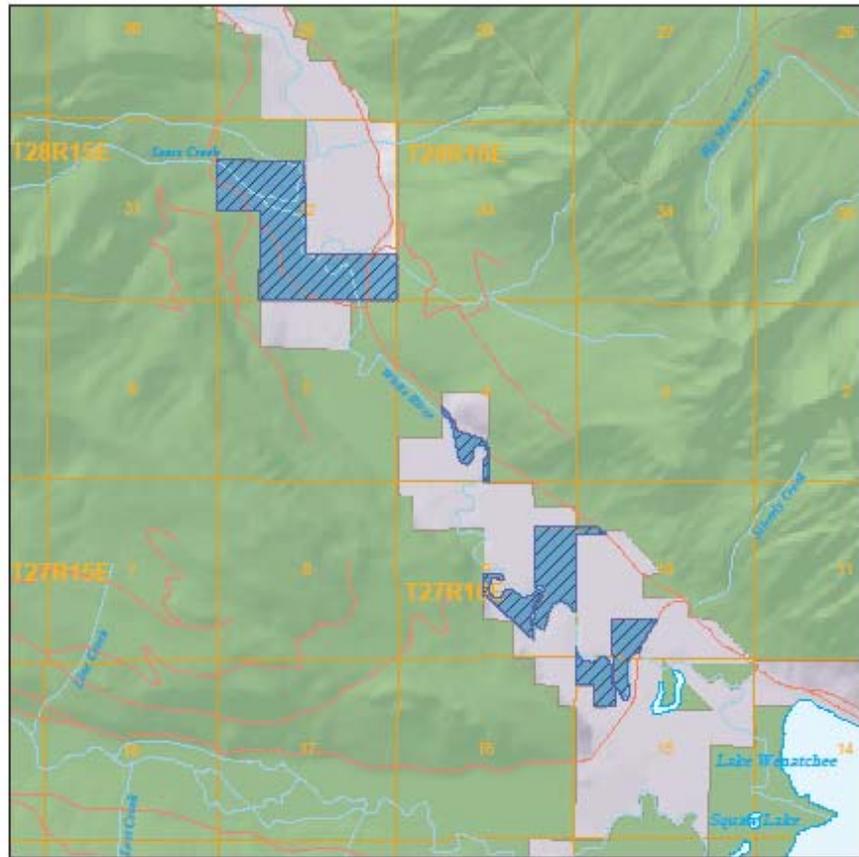
1:130,000  
1 inch equals 2.1 miles

Figure 3: Entiat Unit



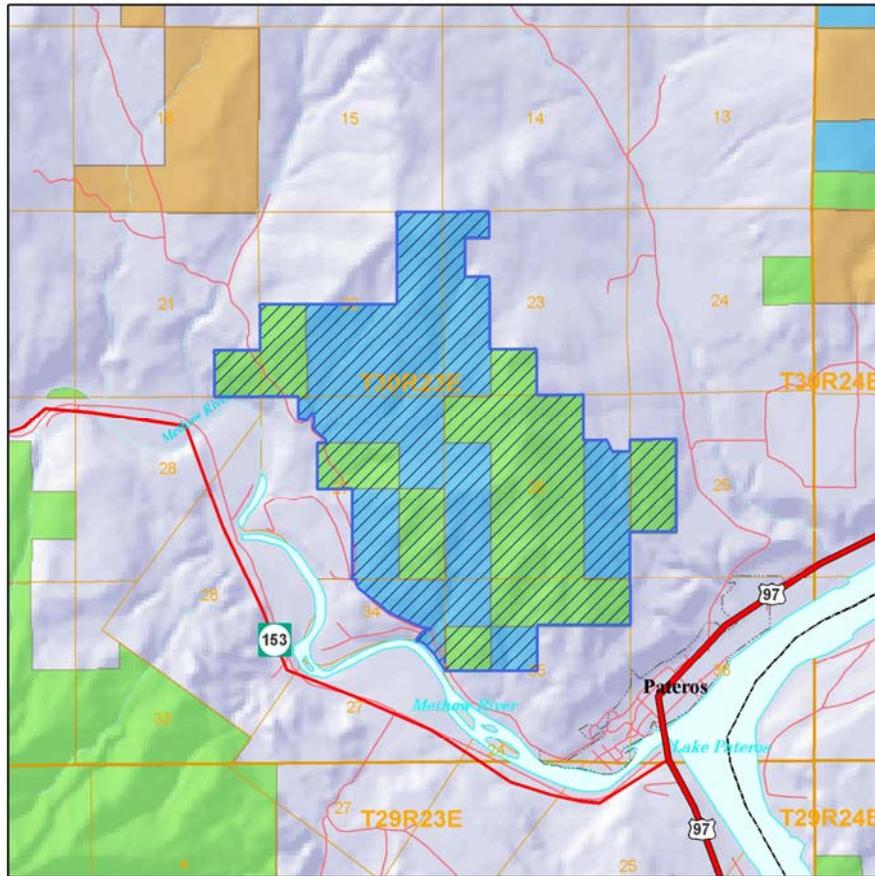
1:125,000  
1 inch equals 2 miles

Figure 4: Swakane Unit



1:50,000  
1 inch equals 0.79 miles

Figure 5: White River Unit



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

1:50,000  
1 inch equals 0.79 miles

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*Figure 6: Pateros Unit*

## **2.4 Funding**

Federal Aid in Wildlife Restoration currently provides 75% of the wildlife area's funding. State General Funds provide a 25% match for Federal Aid dollars. The budget for the area totaled about \$50,000 per year since 1997. The Chelan County PUD is currently negotiating a wildlife mitigation agreement with the WDFW related to the re-licensing of Rocky Reach Dam. When approved, the agreement may provide additional operational funding for the wildlife area. As a result of a settlement for the construction of the Monitor Power Line on the Swakane Unit, the PUD may also be providing additional funding for the operation and maintenance on the Chelan Wildlife Area. Among volunteer organizations, the Wenatchee Sportsmen's Association in particular, has been extremely active in assisting with the management of the wildlife area, including the construction and maintenance of water developments and wildlife feeders. This valuable assistance frees up funds for other activities on the wildlife area and accomplishes tasks that would never get done.

## **2.5 Climate**

Most of the area lies in the rain shadow of the Cascade Mountains and has a semi-arid climate, hot and dry in the summer and cold in the winter. The average high temperature in the summer is 83 degrees while the daily minimum temperature in the winter averages about 20 degrees. Precipitation averages about 10 inches with 65% from snow accumulation. Snow depth ranges from a few inches to several feet depending on the elevation, proximity to the river and severity of the winter. The climate of the White River Unit differs drastically from the rest of the Wildlife Area. This unit receives approximately 40" of precipitation per year, with an average of 3 to 6 feet of snow.

## **2.6 Soils and Geology**

The wildlife area is located on the west edge of the northern portion of Columbia Plateau, a vast area underlain by a series of basalt layers. Approximately fifteen million years ago, lava flows spread westward from distant sources to the southwest until they reached the ancestral Cascade Range, not yet uplifted to its present heights. Most recently, during the last million years, the entire area was glaciated several times by advances of large ice sheets that spread south from central British Columbia.

During these glaciations, sediments accumulated in lakes dammed by glacial ice forming extensive terraces. Many terraces are graded to the level of saddles, which were lake spillways. Knapps Coulee, north of the Chelan tunnel and west of Chelan Butte was such a spillway, formed when part of the Okanogan ice lobe extended against the eastern part of Chelan Butte damming Lake Chelan.

On a large scale, ice lobes in Eastern Washington dammed portions of the Columbia River, forming large lakes. The largest of these extended from Montana to Eastern Washington. Repeated washouts of the ice dams caused catastrophic floods that gouged out channeled scablands. These and other floods deposited coarse gravel on terraces along the Columbia and heaped sediment into giant ripples of gravel. The Washington State University Soil Type web site describes the primary general soil type in the area (*Uf*, Nard-Dinkelman-Ampad soil series) as "loess-influenced, but primarily derived from weathered granitic rocks, andesite, sandstone or schist; soils have dark colored, humus rich topsoils; many have clay enriched subsoils". This soil type is located in the upper elevation areas that were not glaciated. The second most prevalent general soil type is

located at lower elevations (O2, Pogue-Cashmere-Aeneas soil series) and was “derived from glacial outwash on river terraces; most soils are strongly loess-influenced in the upper part, gravelly or sandy in the lower part, and have low water-holding capacity; some are influenced by volcanic ash in the upper part” (<http://remotesens.css.wsu.edu/washingtonsoil/default.htm>).

## **2.7 Hydrology and Watersheds**

Several springs, intermittent and seasonal streams and seeps occur on the upland units. Beavers have created a series of ponds in Swakane Canyon, affecting the hydrology in their vicinity. The high water table through most of the White River Unit promotes wetland and meadow habitat.

Management of the wildlife area will consider and apply information from local watershed plans. The Washington State Watershed Management Act (WMA) of 1998 allows for local government, interest groups and citizens to identify and solve water related issues in each of the 62 Water Resource Inventory Areas (WRIAs) of the state. The wildlife area lies in three of these areas: WRIA 46: Entiat (includes the Entiat Unit from the Entiat River to and including Oklahoma Gulch and part of the west portion of the Swakane Unit), WRIA 45: Wenatchee (the White River and Swakane Units) and WRIA 47: Lake Chelan (the Entiat Unit east of Oklahoma Gulch and the Chelan Butte Unit). Information and watershed plans for the WRIA’s are available on the Department of Ecology web site: <http://www.ecy.wa.gov/programs/eap/wrias/index.html>.

The wildlife area is also located in four Northwest Power and Conservation Council (NWPPCC) Subbasins, which are delineated by WRIA boundaries: The Upper Middle Mainstem, Wenatchee, Entiat and the Lake Chelan Subbasins. Access to Subbasin plans is available on the NWPPCC WEB page at: <http://www.nwppc.org/fw/subbasinplanning/admin/level2/wa/default.htm>.

## **2.8 Fire History**

Several fires have occurred on the wildlife area since its inception. The Dinkleman and the Tyeer fires burned most of the WA in 1988 and 1994 respectively. These fires removed thousands of acres of deer winter browse. John Musser, WDFW district biologist, reported in 1994 that the “the Chiwawa and Entiat game management units ability to support deer that winter has probably been reduced by 70% or 3,500 deer”. The wildlife area’s carrying capacity for wintering deer during periodic severe winters is still extremely low since most of low elevation areas still lack bitterbrush and other suitable browse species. During moderate winters however, mule deer are able to utilize higher elevation forage, which has increased after the 1994 fire.

Wildfire intervals in the shrub-steppe ecosystem are estimated to be between 60 and 110 years. Daubenmire believed that fire had little influence on the distribution and species composition of eastern Washington shrub-steppe. Unlike shrub steppe habitat to the east, lightning has been a major cause of fire in Chelan County. Lightning caused fires burned parts of Chelan Butte in 1994 and in 2003. The increase in fire frequency due to human activity and the encroachment of weedy plant species (especially cheatgrass), however, negatively affects some plant communities. Fires eliminate sagebrush and bitterbrush for an extended period of time. Bunch grasses for the most part survive even the most intense fire. Weedy species out-compete stressed native species and can readily invade burns. Weeds can exclude shrub establishment and may be a greater threat to shrubs than fire. Fire has a detrimental impact to shrub steppe obligates and other species that use this habitat type.

Fire can be beneficial in some cases. It can rejuvenate decadent plants if fire size is limited, seed sources are maintained, and/or fire intensities are low enough to maintain crown sprouting of shrubs. Prescribed fires can take advantage of these conditions, which rarely occur during natural or accidental fires.

Fire in the White River valley bottom are likely to have occurred much less frequently than on the rest of the Wildlife Area (approximately 100-300 years).

## **2.9 Vegetation Characterization**

Due to low precipitation, the predominant upland habitat types on the Chelan Wildlife Area are shrub-steppe and steppe. Soil disturbance promotes the former and fire promotes the latter. At higher elevations, these habitat types yield to an open ponderosa habitat type and eventually to a denser mixed coniferous forest type. Riparian vegetation is dispersed throughout the Wildlife Area along creek bottoms and springs. Riparian woody species include black cottonwood, aspen, water birch, chokecherry, willow species, serviceberry, big-leaf maple and black hawthorn. The major weedy species occurring on the area include yellow starthistle, diffuse knapweed, Russian knapweed, Canada thistle, whitetop, houndstongue, cheatgrass and Dalmatian toadflax. Native habitat is resistant to weed invasion unless it is disturbed. Past agricultural and grazing activities have greatly aggravated the weed problem on the area and resulted in the degradation of all habitat types.



*Typical shrub-steppe habitat on the Chelan Butte Unit*

Higher precipitation and cooler temperatures associated with the White River Unit result in vegetative types very different than those of the rest of the wildlife area. These are more typical of what is found west of the Cascade Mountains.

## **2.10 Important Habitats**

Shrub-steppe: Shrub-steppe habitat occurs to various extents on most of the units of the wildlife area. Two major fires occurring on the area in 1988 and 1994 drastically reduced the acreage of shrub-steppe on the area. Shrub-steppe obligate species, which occur on the area, include sage thrasher, sage sparrow and Brewer's sparrow. Big game use shrubsteppe habitat extensively. Forty-three other wildlife species are closely associated with shrub-steppe habitat while 103 species are generally associated with shrub-steppe.

Riparian: Riparian habitat is quite scarce on the Chelan wildlife area compared to other habitat types, and disproportionately valuable as fish and wildlife habitat. Riparian habitats are diverse, highly productive and provide vital resources to many fish and wildlife species.

Riparian habitat forms natural corridors that are important travel routes between foraging areas, breeding areas and seasonal ranges, and provides protected dispersal routes for young. Protected access to water is also an essential attribute of intact riparian habitat. Approximately 85% of Washington's terrestrial vertebrate species use riparian habitat for essential life activities.

Additionally riparian habitat is important in stabilizing stream banks, thus reducing sedimentation and maintaining water quality.

Talus/rock: Rocky outcrops and talus slopes provide habitat for many species including rattlesnakes, bats, yellow-bellied marmots, cottontail rabbit, bobcat and weasels. Dispersed rocky outcrops particularly on steep hillsides provide an important habitat component for chukar partridge and California bighorn sheep. Talus and rocky areas can serve as "water collection aprons", which promotes the growth of shrub and trees and thus vegetative diversity even in the driest sites. Talus and rocky areas protect shrubs and trees from fire, which can provide important "islands" of habitat over an extended period of time – e.g. bald eagle perches and roosts.

Meadow/Wetland: Several meadows occur on the area. The largest wetland system occurs on the White River Unit. Minor wetlands occur in the Swakane Canyon bottom and are associated with beaver activity and springs.

## 2.11 Fish and Wildlife

A great diversity of wildlife species uses the area. These include Neotropical birds, many raptor species, several upland game birds, mule deer, and bighorn sheep. Lake Entiat attracts thousands of waterfowls and other water birds. During the winter months, Bald eagles primarily feed on carrion and prey on waterfowl using lake Entiat. Bald and golden eagle nesting territories occur on the wildlife area.



*Mule deer winter-feeding on the Swakane Unit*

Priority species, which are found on the wildlife area include; bald eagle, golden eagle, merlin, peregrine falcon, prairie falcon, northern goshawk, blue grouse, California quail, Lewis woodpecker, loggerhead shrike, California bighorn sheep and Rocky Mountain mule deer.

(Priority Habitats and Species list are available on the WEB at

<http://wdfw.wa.gov/hab/phsvert.htm#birds>)

Listed species that occur, or have the potential to use the wildlife area include:

Greater Sage grouse	ST, FC
Columbian Sharp-tailed grouse	ST, FSC
Loggerhead shrike	SC, FSC
Sage thrasher	SC
Sage sparrow	SC
Sandhill crane	SE
Northern goshawk	SC, FSC
Ferruginous hawk	ST, FSC

Golden eagle	SC
Bald Eagle	ST, FT
Merlin	SC
Peregrine falcon	SE, FSC
Burrowing owl	SC, FSC
White-tailed jackrabbit	SC
Black-tailed jackrabbit	SC
Sagebrush lizard	SC
Western Grey Squirrel	SC

State endangered (SE), State threatened (ST), State candidate for listing (SC), Federal endangered (FE), Federal candidate (FC), Federal species of concern (FSC)

## CHAPTER III. MANAGEMENT OBJECTIVES, ISSUES & STRATEGIES

Statewide goals and objectives listed in chapter one shape management priorities on wildlife areas. Specific wildlife area information including why the area was purchased, habitat conditions, species present, and public issues and concerns are evaluated to identify wildlife area activities or tasks. *Public issues Citizens Advisory Group are noted in italics and are listed in Appendix 2.*

Objectives and associated tasks specific to the Chelan Wildlife Area are listed where appropriate under applicable agency objectives. Unfunded and under-funded needs are underlined. Strategies derived partially or entirely from the CAG's input are italicized.

Most strategies are ongoing. Time lines will be included when appropriate.

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

#### **1. Upland bird management**

The Chelan Wildlife Area was purchased primarily to mitigate for the loss of upland game caused by the construction of Rocky Reach Dam.

Upland game will be managed on the Chelan Wildlife Area in accord with the WDFW Game Management Plan (2003-2006) which includes to 1) preserve, protect, perpetuate, and manage upland game birds and their habitats to ensure healthy, productive populations, 2) Manage upland game birds for a variety of recreational, educational and aesthetic purposes including hunting, scientific study, wildlife viewing cultural and ceremonial uses by Native Americans, and photography, 3) Manage statewide upland game bird populations for a sustained harvest.

**A. Strategy:** Protect, maintain and restore upland game habitat (See agency objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-object 6-8. Time frame: Ongoing, throughout the year

**B. Strategy:** Protect upland game habitat from fire, disturbance and weed invasion (See Agency Objective: Ensure that WDFW Activities, Programs, Facilities and Lands are Consistent With Local, State and Federal Regulations that Protect and Recover Fish, Wildlife and Their Habitats. Sub-objective 1 & 3. Time frame: Ongoing, growing and fire season.

**C. Strategy:** Construct and maintain fences to protect habitat from trespass livestock. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**D. Strategy:** Monitor, assess and control insect infestations. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**E. Strategy:** Restore shrub-steppe habitat. Establish dense herbaceous cover for nesting. Restore Chelan Butte and Swakane fields to permanent cover (about 1,400 acres). Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**F. Strategy:** Re-introduce sharp-tailed grouse. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**G. Strategy:** Protect and enhance sharp-tailed grouse wintering and nesting habitat to ensure successful re-introduction. Funding will be sought (when

possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**H.** Strategy: Develop and maintain springs and guzzlers to provide water for upland birds and other species. Time frame: Spring development: as funding allows, Maintenance: Ongoing, April through November.

**I.** Strategy: Fill upland birds feeders and maintain through the winter. Time frame: Ongoing, throughout the year.

**J.** Strategy: Cultivate about 100 acres of food plots. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**K.** Strategy: Provide brush piles in areas where planting woody cover is not practical. Where feasible, plant Clematis along brush piles. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**L.** Strategy: Conduct upland bird surveys. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**M.** See Agency Objective: Provide sound operational management of WDFW lands, facilities and access sites. Sub-objective 2. See also Agency Objective: Ensure that WDFW Activities, Programs, Facilities and Lands are Consistent With Local, State and Federal Regulations that Protect and Recover Fish, Wildlife and Their Habitats. Sub-objective 2.

## **2. Waterfowl management**

Most of the Chelan Wildlife Area is not conducive to waterfowl management. The White River Unit, lying in a flood plain, has some potential for waterfowl management *if compatible with fisheries protection and enhancement goals.*

Waterfowl will be managed on the Chelan Wildlife Area in accord with the WDFW Game Management Plan which includes: 1) Managing statewide populations of waterfowl for a sustained yield consistent with Pacific Flyway management goals, 2) managing waterfowl for a variety of recreational, educational and aesthetic purposes including hunting, scientific study, cultural and ceremonial uses by Native Americans, wildlife viewing and photography and 3) preserving, protecting, perpetuating, and managing waterfowl and their habitats to ensure healthy, productive populations. Objective 108 under waterfowl management is to provide funding through state migratory bird stamp/print revenues and the Washington Wildlife and Recreation Program to protect/enhance 1000 acres of new habitat annually for all migratory birds. This acreage target was selected based on past annual accomplishments of the migratory bird stamp/print program. The strategies under Objective 108 are:

**a.** Determine habitat protection and enhancement needs considering Joint Venture plans, literature, and regional expertise

**b.** Solicit project proposals from regional staff and external organizations.

**c.** Develop a stamp/print expenditure plan before the start of each new biennium, using an evaluation team from a statewide cross-section of Department experts.

**d.** Provide emphasis on projects to increase waterfowl recruitment in eastern Washington, wintering habitat and access in western Washington.

e. When allocating migratory bird stamp funds, consider fund allocation goals presented to the Legislature when the program was established (habitat acquisition 48%, enhancement of wildlife areas 25%, project administration 18%, food plots on private lands 9%) and f. monitor effectiveness of habitat projects through focused evaluation projects before and after implementation.

**A. Strategy:** Protect, maintain and restore wetlands and other waterfowl habitat (See Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 6-8). Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**B. Strategy:** Protect waterfowl habitat from fire, disturbance and weed invasion (See Agency Objective: Ensure that WDFW Activities, Programs, Facilities and Lands are Consistent With Local, State and Federal Regulations that Protect and Recover Fish, Wildlife and Their Habitats. Sub-objective 1 & 3). Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**C. Strategy:** Explore pond and wetland construction if consistent with fisheries and hydrologic goals. (See Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 1). Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**D. Strategy:** Erect and maintain approximately 20 artificial waterfowl nesting structures for cavity nesting ducks. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**E. Strategy:** See Agency Objective: Provide sound operational management of WDFW lands, facilities and access sites. Sub-objective 2. See also Agency Objective: Ensure that WDFW Activities, Programs, Facilities and Lands are Consistent With Local, State and Federal Regulations that Protect and Recover Fish, Wildlife and Their Habitats. Sub-objective 2.

### **3. Big Game management:**

Management for other wildlife and plant species benefits mule deer and California bighorn sheep using the wildlife area. *Management will have to balance the individual needs of these two species.*

Big game will be managed on the Chelan Wildlife Area in accord with the WDFW Game Management Plan (2003). The Game Management Plan Statewide Goals include

1) Preserving, protecting, perpetuating, and managing deer and bighorn sheep and their habitat to ensure healthy, productive populations,

2) Managing deer and bighorn sheep for a variety of recreational, educational, and aesthetic purposes including hunting, scientific study, cultural, subsistence, and ceremonial uses by Native Americans, wildlife viewing, and photography, and

3) Managing statewide deer populations for a sustainable annual harvest. Additionally, Objective 57 under Mule deer management is to try to maintain or enhance mule deer habitat including forage and security cover. Strategies under Objective 57 are:

**a.** Acquire critical mule deer habitat or conservation easements on critical mule deer habitat,

- b.** Work with state, federal, and private land managers to conduct prescribed burns that will benefit mule deer,
- c.** Work with county government growth management planners to limit the expansion of human development on mule deer range and
- d.** Work with the Mule Deer Foundation to conduct projects that improve winter range for mule deer.

Objective 62 under Bighorn Sheep management states: Conduct habitat improvement projects on >10% of the habitat in bighorn ranges in Vulcan Mountain, Swakane, and the Blue Mountains. The Strategies under Objective 62 are listed as: a. Inventory and map habitat conditions,

- a.** Conduct controlled burns to improve habitat quality,
- b.** If not detrimental to other habitat or wildlife objectives, consider distributing fertilizer and herbicides to improve forage quality,
- c.** Distribute mineral blocks to supplement forage quality,
- d.** Distribute water sources to improve habitat quality and
- e.** Pursue other activities that enhance desirable native plant communities.

**A.** Strategy: Protect, maintain and restore mule deer and California bighorn sheep habitat (See Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 6-8).

**B.** Strategy: Restore mule deer wintering habitat. Seed or plant bitterbrush in burned and/or disturbed areas. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**C.** Strategy: Protect big game habitat from fire, disturbance and weed invasion (see Agency Objective: Ensure that WDFW Activities, Programs, Facilities and Lands are Consistent With Local, State and Federal Regulations that Protect and Recover Fish, Wildlife and Their Habitats. Sub-objective 1 & 3). Time frame: Ongoing, throughout the year

**D.** Strategy: Control public access and use of wintering areas. Time frame: Depends on WDFW policy. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**E.** Strategy: Continue management for other species, which is also beneficial to deer and California bighorn sheep. Time frame: Ongoing, throughout the year and as funding allows.

**F.** Strategy: Develop habitat and improvements to discourage big game crossing of highway 97A. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**G.** Strategy: Conduct annual big game surveys including those conducted in cooperation with the Chelan PUD and other department wildlife biologists. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**H.** See Agency Objective: Provide sound operational management of WDFW lands, facilities and access sites. Sub-objective 2. See also Agency Objective: Ensure that WDFW Activities, Programs, Facilities and Lands are Consistent With Local, State

and Federal Regulations that Protect and Recover Fish, Wildlife and Their Habitats.  
Sub-objective 2.

#### **4. Improvement and maintenance of fish populations**

Protection of riparian and wetland habitat for the benefit of the fisheries resource is a priority for the White River Unit. Although this is not as high a priority for the rest of the wildlife area since streams located on the area do not support fish, habitat enhancements for terrestrial species also benefit fish. The Upper Columbia Salmon Recovery Board (UCSRB), established by the [Salmon Recovery Planning Act](#) in 1998 is responsible for developing Salmon Recovery Plans for the Wenatchee, Entiat, Okanogan, and Methow rivers as well as Moses Coulee and Foster Creek. Management of the area will be consistent with these plans.

**A.** Strategy: Manage the portion of watershed under our control in a manner, which minimizes erosion and stream sedimentation. Manage and control livestock grazing and minimize other mechanical disturbances and seed disturbed areas to permanent cover (see Other Issues and Concerns. Sub-objective 1). Time frame: Ongoing

**B.** Strategy: Protect, restore and maintain habitat affecting the fish resource (See Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 6-8.)

**C.** Restore riparian zones along streams with shrubs and trees, particularly on the White River Unit. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**D.** Strategy: Protect fish habitat from fire, disturbance and weed invasion (See Agency Objective: Ensure that WDFW Activities, Programs, Facilities and Lands are Consistent With Local, State and Federal Regulations that Protect and Recover Fish, Wildlife and Their Habitats. Sub-objective 1 & 3). Time frame: Ongoing, through the growing season.

**E.** Strategy: Manage the wildlife area and the White River Unit in particular in a manner consistent with Salmon Recovery Plans. Time frame: As funding allows.

**F.** Strategy: See Agency Objective: Provide sound operational management of WDFW lands, facilities and access sites. Sub-objective 2. See also Agency Objective: Ensure that WDFW Activities, Programs, Facilities and Lands are Consistent With Local, State and Federal Regulations that Protect and Recover Fish, Wildlife and Their Habitats. Sub-objective 2.

#### **5. Management for species diversity**

Develop and maintain quality habitat that will provide life requisites for a diversity of species. Nearly all activities on the wildlife area benefit a diversity of species. (Refer to section 2.11 for listed species associated with the wildlife area)

**A.** Strategy: As a priority, protect, maintain and enhance habitat for state and federally listed species (see Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 6-8.sections.) Where management conflicts with a listed species, proceed to

preserve and protect the listed species. Time frame: Ongoing, throughout the year

**B. Strategy:** Identify, protect and restore all native plant associations.

Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**C. Strategy:** Protect and preserve sensitive wildlife sites such as snake dens (especially during spring emergence), active bald and golden eagle nests, bald eagle communal roosts, state and federal listed plant species, big game wintering areas, etc. from human disturbance. Time frame: Ongoing, throughout the year.

**D. Strategy:** Protect, restore and maintain habitat affecting a diversity of wildlife species (see Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 6-8.). Time frame: Ongoing, throughout the year.

**E. Strategy:** Protect diversity species habitat from fire, disturbance and weed invasion (see Agency Objective: Ensure that WDFW Activities, Programs, Facilities and Lands are Consistent With Local, State and Federal Regulations that Protect and Recover Fish, Wildlife and Their Habitats. Sub-objective 1 & 3). Time frame: Ongoing, throughout the year.

**F. Strategy:** *Protect continuous habitat from fragmentation.*

**G. Strategy:** Increase habitat “edge” and plant multiple species of plants to promote use of the area by a greater diversity of wildlife species *while avoiding increase in habitat fragmentation.* Time frame: Ongoing, throughout the year.

**H. Strategy:** Determine species use by conducting and/or facilitating surveys of various bird, reptile, amphibian and mammal, vascular plant, moss, lichen and selected insect species. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**I. Strategy:** *Cooperate with agencies and private groups to acquire information on wildlife use of the area.* Time Frame: Dependent on availability of help. Funding can be sought from the Chelan PUD, re-prioritization of other tasks and through grants in cooperation with the US Forest Service and other parties.

**J. Strategy:** See Agency Objective: Ensure that WDFW Activities, Programs, Facilities and Lands are Consistent With Local, State and Federal Regulations that Protect and Recover Fish, Wildlife and Their Habitats. Sub-objective 2.

## **6. Protection and restoration of riparian habitat**

The agency has prioritized riparian habitat management and protection. Riparian areas provide habitat for a large diversity of fish and wildlife species, for high densities of animals, for important breeding areas and movement corridors.

**A. Strategy:** Protect all riparian areas from fire, disturbance and weed encroachment (See Agency Objective: Ensure that WDFW Activities, Programs, Facilities and Lands are Consistent With Local, State and

Federal Regulations that Protect and Recover Fish, Wildlife and Their Habitats. Sub-objective 1 & 3). Time frame: Ongoing, throughout the year.

**B. Strategy:** Control beaver activity to ensure protection of key trees and shrubs. Install protective wire cages around trees and relocate beavers as needed. Time frame: As funding allows.

**C. Strategy:** Construct and maintain big game fences to protect shrub and tree seedlings when practical. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**D. Strategy:** Restore riparian habitat in all units. Focus on areas with adequate soil moisture and irrigated areas. Maintain and protect new plantings. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**E. Strategy:** Collect seeds of locally adapted native riparian species for propagation of stock to be used on the area. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**F. Strategy:** Install and operate irrigation system to water riparian habitat where possible such as in the Swakane Valley bottom to establish and/or maintain shrub and tree plantings. Time frame: Ongoing, April through October and as funding allows.

**G. Strategy:** Assess insect infestations and release bio control agents. Coordinate treatment with Washington State University Extension Office. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**H. Strategy:** See Agency Objective: Provide sound operational management of WDFW lands, facilities and access sites. Sub-objective 2. See also Agency Objective: Other Issues and Concerns. Sub-objective 2. See also Agency Objective: Ensure that WDFW Activities, Programs, Facilities and Lands are Consistent With Local, State and Federal Regulations that Protect and Recover Fish, Wildlife and Their Habitats. Sub-objective 2.

## **7. Protect and restore shrubsteppe habitat**

Shrubsteppe habitat management and protection is a WDFW priority. Shrubsteppe is the dominant habitat type on the wildlife area and provides habitat for a diversity of fish and wildlife species and for comparatively high densities of animals. Shrubsteppe is also very vulnerable to fire, weed invasion and habitat conversion and alteration practices.

**A. Strategy:** Protect shrubsteppe habitat from fire, disturbance and weed encroachment (See Agency Objective: Ensure that WDFW Activities, Programs, Facilities and Lands are Consistent With Local, State and Federal Regulations that Protect and Recover Fish, Wildlife and Their Habitats. Sub-objective 1 & 3). Time frame: Ongoing, throughout the year.

**B. Strategy:** Restore old agricultural fields and other disturbed areas to native shrubsteppe habitat. Funding will be sought (when possible) from

the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**C. Strategy:** See Other Issues and Concerns. Sub-objective 2.

**D. Strategy:** Conduct shrubsteppe condition surveys to assess habitat quality issues. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**E. Strategy:** Evaluate and use prescribed fires to rejuvenate and improve shrubsteppe habitat and reduce the risk of catastrophic fires. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**F. Strategy:** Collect seeds of native species, especially forbs, from the Chelan WA or vicinity to provide a source of locally adapted seed for restoration uses. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**G. Strategy:** See Agency Objective: Ensure that WDFW Activities, Programs, Facilities and Lands are Consistent With Local, State and Federal Regulations that Protect and Recover Fish, Wildlife and Their Habitats. Sub-objective 2.

## **8. Protect and restore wetland and meadow habitat**

The agency has prioritized wetland habitat management and protection. This habitat type has comparatively high fish and wildlife density and high fish and wildlife species diversity. It also has important fish and wildlife breeding habitat and important fish and wildlife seasonal ranges. The availability of these habitat types is limited and they are highly vulnerable to alteration.

**A. Strategy:** Protect, maintain and/or restore wetland and meadow habitat from disturbance, fire and weed encroachment (See Agency Objective: Ensure that WDFW Activities, Programs, Facilities and Lands are Consistent With Local, State and Federal Regulations that Protect and Recover Fish, Wildlife and Their Habitats. Sub-objective 1 & 3). Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**B. Strategy:** Control beaver activity to ensure the protection of key habitat and/or to ensure that pond development occurs in suitable areas. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**C. Strategy:** Remove drainage ditches and restore floodplain functions in the White River valley bottom. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**D. Strategy:** Create ponds to increase wetland habitat beneficial to waterfowl and a multitude of other species. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**E. Strategy:** See Agency Objective: Ensure that WDFW Activities, Programs, Facilities and Lands are Consistent With Local, State and

Federal Regulations that Protect and Recover Fish, Wildlife and Their Habitats. Sub-objective 2.

**9. Protection and management of other species including Threatened and Endangered Species (T, E and S)**

Listed species will be managed according to the department's [Management Recommendations for Washington's Priority Habitats and Species](#). These detailed documents identify the needs of fish and wildlife based on the best available science and includes guidelines for their incorporation in management decisions.

**A. Strategy:** As a priority and consistent with PHS listing, protect, maintain and enhance habitat for state and federally listed species and other species (see Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 6-8). Time frame: Ongoing, throughout the year, and as funding allows.

**B. Strategy:** Assess conflicts between the management of listed species and other wildlife. Manage for listed species when a conflict exists. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**C. Strategy:** Protect nesting and foraging habitat for several woodpecker species. Protect and create snags. Time frame: Ongoing, throughout the year.

**D. Strategy:** Determine presence or role of the more cryptic species such as mollusks and the presence/role of rare or unique plants. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**E. Strategy:** *Protect and preserve Cryptogrammic soils. These were greatly disrupted by grazing and may have a role in noxious weed prevention.* Time frame: Ongoing, throughout the year.

**F. Strategy:** Protect and plant large roost trees that may be used by bald eagles. Plant large trees near the Columbia River annually to provide eagle roosting and nesting habitat. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**G. Strategy:** Evaluate the area for western gray squirrel and sharp-tailed grouse re-introduction. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**H. Strategy:** Maintain and replace, as needed about 30 nest boxes (kestrel, bluebird, owl etc.). Erect additional nesting boxes. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**I. Strategy:** See 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. Sub-objective 2. See also

Agency Objective: Provide sound operational management of WDFW lands, facilities and access sites. Sub-objective 2.

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

**1. Manage weeds consistent with state and county rules and to protect and recover fish and wildlife and their habitats (Weed Management Plan: Appendix 2).**

State law requires weed control to protect public, economic and natural resources. Invasive weeds are one of the greatest threats to fish and wildlife habitat quality. Cooperative weed control efforts are encouraged to improve efficacy and to minimize impacts on adjacent landowners as part of the agencies good-neighbor policy.

**A. Strategy:** Preventing weed establishment, as the most cost-effective part of a weed management program, is a priority. This includes restoring disturbed sites, closing roads and minimizing soil disturbance. Time frame: Ongoing, throughout the year, as funding allows. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**B. Strategy:** *Produce and implement an integrated weed management plan to include weed identification and inventory, risk/threat, control priorities, and monitoring. Time frame: 2006.*

**C. Strategy:** *Coordinate weed prevention and control efforts with federal, state and local entities to improve efficacy and minimize costs. Time frame: Ongoing, throughout the year.*

**D. Strategy:** Control weeds along 75 miles of road and on about 100 acres annually. Time frame: Annual.

**E. Strategy:** See 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. Sub-objective 2.

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

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

**A. Strategy:** Comply with federal and state regulations. Time frame: Ongoing, throughout the year.

**B. Strategy:** Protect buffers adjacent to wetlands and riparian habitat. Time frame: Ongoing, throughout the year.

**C. Strategy:** Consider specific strategies associated with Washington State listed and ESA species present or potentially present. Time frame: Ongoing, throughout the year.

**D. Strategy:** Complete a forest Road Management and Abandonment Plan. Time frame: 2006-2007, as time allows.

**E. Strategy:** See 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. Sub-objective 2.

### **3. Provide fire control on agency lands (Appendix 3):**

Fire suppression agreements must exist for all agency lands to protect the people of Washington and to protect natural and economic resources of the agency and adjacent landowners.

**A. Strategy:** Maintain annual contracts with local, state or federal entities to provide fire suppression support on the Chelan Wildlife Area. Time frame: Ongoing, throughout the year.

**B. Strategy:** Construct/develop and maintain firebreaks and green strips to prevent the spread of fire onto critical habitat and facilitate fire fighting. Use native species in green strips if possible. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**C. Strategy:** Limit vehicular travel and access during the fire season. Post the area “No Fires or Fireworks” as needed. Time frame: Ongoing during the fire season.

**D. Strategy:** Maintain roads to facilitate fire fighting. Time frame: Ongoing, April through October.

**E. Strategy:** Provide fire fighting water sources including ponds and reservoir. Time frame: As funding allows.

**F. Strategy:** Use prescribed fires to reduce fuel load. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**G. Strategy:** Provide fire training for wildlife area personnel. Time frame: Annual.

**H. Strategy:** *Develop a fire plan, to include a list of fire responsible individuals.* Time frame: Completed in 2005.

**I. Strategy:** Cooperate with local fire districts in educating the public about fire prevention. Time frame: As needed.

**J. Strategy:** See 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. Sub-objective 2.

### **4. Protect cultural resources consistent with state and federal law**

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

**A. Strategy:** Assess cultural resource value (historic and archaeological) of all structures before renovation or removal. Time frame: As needed.

**B. Strategy:** Protect the Lucas Family Homestead, listed on the National Register of Historical Places in Brickhouse Canyon on the Chelan Butte Unit. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

C. Strategy: Perform cultural resource survey and assessment as required. Protect American Indian and other artifacts. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

## 5. Pay county Payment in Lieu Tax (PILT) and assessment obligations

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

A. Strategy: Pay PILT and assessments to Chelan County. Time frame: Annual.

**Agency Objective: Provide sustainable fish and wildlife-related recreational and commercial opportunities compatible with maintaining healthy fish and wildlife populations and habitats. Improve the economic well being of Washington by providing diverse, high quality recreational and commercial opportunities**

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

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

A. Strategy: Manage roads including closures, reclamation, signing, etc.

Provide roads open to vehicular travel where consistent with resource goals for the area and when there are sufficient resources to maintain them.

Address requirements in Road Management and Abandonment Plans.

Consider posting only roads that are open (such as the green dot program).

Close road access where road conditions are not safe or where conditions have a negative impact on fish and wildlife. Consider creating hiking trails on old abandoned roads in areas where it will adversely impact wildlife.

Evaluate the demand for hiking trails on the area considering their impact on the fish and wildlife resource. Time frame: Ongoing, throughout the year.

B. Strategy: *Evaluate the demand and need for hiking trails on Chelan Butte and other areas* considering their potential impact on the fish and wildlife resource.

Time frame: Ongoing, throughout the year.

C. Strategy: Work with the enforcement program and provide input on specific regulations enforcing public behavior on WDFW property – camping length of stay, removal of property, noise etc. Ensure that the ATV use on wildlife areas policy is consistent agency wide. Time frame: Ongoing, throughout the year.

D. Strategy: Improve and manage wildlife viewing opportunities in a manner that is not detrimental to the wildlife resource. Time frame: Ongoing, as funding allows.

E. Strategy: Provide limited camping if compatible with resource and recreational goals of the area. *Establish time limits for camping on the area.* Time frame: Ongoing, throughout the year.

F. Strategy: Provide hunting opportunities for persons with disabilities. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

G. Strategy: Monitor public use of the area. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

## **2. Provide information about the area and educational opportunity to the public**

**A. Strategy:** Provide informational kiosks and signs. Cooperate with other agencies in developing and implementing educational and informational programs. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**B. Strategy:** Develop brochure and map of Chelan WA units for public distribution. Develop a map of the area like that of the Sinlahekin Wildlife Area. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**C. Strategy:** Develop GIS layers of all resources, roads, trails, parking and camping areas and other facilities available to the public. This project is currently underway for all WDFW lands and will be completed in 3-5 years.

**D. Strategy:** Develop better recreational user information on WDFW's website. Planned for 2007 but will require assistance from IT Program in Olympia.

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

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

**A. Strategy:** Maintain headquarter to provide a safe and effective workplace. Time frame: Ongoing, throughout the year.

**B. Strategy:** Maintain all fences to prevent trespass livestock. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**C. Strategy:** Remove and dispose of useless fences. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**D. Strategy:** Maintain roads to prevent resource damage and provide access. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**E. Strategy:** Maintain roads, campgrounds and parking areas. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**F. Strategy:** Dispose of buildings/structures, which cause safety or other concerns. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**G. Strategy:** Plan and construct developments as needed. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

#### **2. Maintain other structures and physical improvements**

**A. Strategy:** Maintain all roads, signs, gates, culverts, water developments, wells, feeders, guzzlers, nesting structures, parking areas, ponds and irrigation systems. *Maintain roads to prevent resource damage and provide access.* Time frame: Ongoing, throughout the year, as funding allows.

**B. Strategy:** Consider replacing some developments (guzzlers, feeders, nest structures etc.) with low maintenance alternatives, or through self-maintaining

ecosystem restoration approach. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**C. Strategy:** Replace/install and maintain fences to control livestock trespass and deer damage to shrub and tree seedlings. Remove useless fences. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**D. Strategy:** Replace or install physical improvements as needed. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

### **3. Maintain equipment**

**A. Strategy:** Service all equipment including trucks, tractor and implements, weed sprayers, trailers, etc. Time frame: Ongoing, throughout the year.

**B. Strategy:** Replace equipment as needed. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

### **4. Pursue funding opportunities**

**A. Strategy:** Apply for grants and other funding opportunities. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**B. Strategy:** Enroll in federal programs to generate revenue and accomplish desired habitat conditions. Renew CRP contracts. Apply for new CRP contracts. Consider impact on private CRP contractors. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**C. Strategy:** Pursue PUD funding through the re-licensing of Rocky Reach Dam and power line construction on the area. Time frame: Ongoing.

**D. Strategy:** Consider sharecropping agreements with neighbors to address agricultural and operational needs. Time frame: Ongoing, throughout the year.

**E. Strategy:** Pursue grants cooperatively with the Douglas/Chelan Land Trust, Chelan County and the Forest Service in the White River Valley. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

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

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

**A. Strategy:** Assess timber-thinning project to reduce potential insect and fire danger and create conditions more suitable to a diversity of species. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**B. Strategy:** Thin forest stands as needed. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

## 6. Perform administrative duties

- A.** Strategy: Work with staff to ensure high morale and job satisfaction. Promote self-motivation and good work ethics. *Evaluate and optimize staff deployment. Maintain staff flexibility.* Time frame: Ongoing, throughout the year.
- B.** Strategy: Develop monitor and implement budgets. Time frame: Ongoing, throughout the year.
- C.** Strategy: Interview, hire, train, evaluate, equip and supervise wildlife area staff. Provide Ongoing training opportunity for staff. Time frame: Ongoing, throughout the year.
- D.** Strategy: Supervise contractors, lessees, permittees, volunteers, Washington Conservation Corps employees, other WDFW personnel, public and private organizations and fire crews on the area. Time frame: Ongoing, throughout the year
- E.** Strategy: Negotiate, write and monitor leases and permits. Time frame: Ongoing, throughout the year.
- F.** Strategy: *Evaluate the benefit of centrally vs. individually managed wildlife areas or both, with teams of volunteers.* Time frame: Ongoing.
- G.** Strategy: *Consider including neighbors and volunteers who might serve as stewards helping to manage and monitor individual sites.* Time frame: Ongoing.
- H.** Strategy: Monitor and evaluate habitat management programs. Time frame: Ongoing, throughout the year, as funding allows.
- I.** Strategy: Write, update and implement a wildlife area management plan, weed control plan and fire control plan. Time frame: Ongoing.
- J.** Strategy: Conduct wildlife and habitat surveys. Identify and prioritize information and survey needs. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.
- K.** Strategy: Apply for grants and implement grant funded projects. Apply for stewardship decal program funding. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.
- L.** Strategy: Manage an extensive equipment inventory used for habitat maintenance, enhancement, restoration and preservation. Time frame: Ongoing, throughout the year.
- M.** Strategy: Plan for and purchase supplies, tools and equipment. *Whenever possible, use and support local contractors and vendors.* Time frame: Ongoing, throughout the year.
- N.** Strategy: Attend meetings and meet with private individuals and agency representatives as needed. Time frame: Ongoing, throughout the year.
- O.** Strategy: Work with the Chelan PUD regarding budgets, cooperative projects and PUD project land management. Time frame: Ongoing, throughout the year.

## 7. Protect and apply water rights for best use

Water rights can impact wildlife area operations including food plots, restoration projects, etc. Water use can also reduce instream flow, impacting fish and other animals.

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

**B. Strategy:** Use water rights efficiently and effectively. Time frame: Ongoing during the irrigation season.

**C. Strategy:** Move all unneeded water rights permanently or temporarily into the State Trust Water Rights Program. Time frame: As needed.

### Other Issues and Concerns

#### 1. Preserve, protect and improve the watershed in which the area is located

The quality of the watershed in which the wildlife area is located influences all aspect of the wildlife area. Degradation of the watershed will increase erosion and consequently the loss of soil that supports wildlife habitat.

**A. Strategy:** Cooperate with private and public landowners to maintain and improve watershed quality. Time frame: Ongoing, as funding allows.

**B. Strategy:** Ensure that management of the wildlife area considers watershed plan recommendations. Time frame: Ongoing, throughout the year.

**C. Strategy:** Work with the Natural Resources Conservation Service (NRCS) to ensure the continuation of the Conservation Reserve Program, the Wetland Reserve Program and other conservation programs. Time frame: As needed.

**D. Strategy:** Enroll in NRCS conservation programs. Funding will be sought (when possible) from the Chelan County PUD and through grants and/or re-prioritization of other tasks.

**E. Strategy:** *Coordinate and cooperate with Conservation Districts and consider Habitat Conservation Plans (HCP).* Time frame: Ongoing, throughout the year.

**F. Strategy:** See Agency Objective: Protect, Restore & Enhance Fish and Wildlife and Their Habitats. Sub-objective 1-4.

#### 2. Acquire and trade land to improve wildlife area management efficiency.

Some of the wildlife area ownership is fragmented in small parcels. An isolated section is located west of Swakane Canyon. Consolidation of the area would increase management efficiency.

**A. Strategy:** Cooperate with other agencies and private individuals to acquire and/or trade lands to consolidate the WDFW ownership. Acquire in-holdings and adjacent properties that if converted to non-compatible uses would seriously compromise the integrity of existing wildlife area lands. Funding: Apply for land acquisition grants as they become available including WWRP program grants.

**B. Strategy:** Acquire good quality habitat. Focus land acquisition efforts on areas adjacent or close to existing wildlife area units. Funding: Apply for land acquisition grants as they become available including WWRP program grants.

**C. Strategy:** Pursue IAC and Salmon Recovery funding for habitat acquisition. Timeframe: Ongoing

**D. Strategy:** Work on cooperative acquisition projects in the White River Valley and elsewhere (Forest Service, Chelan/Douglas Land Trust, Chelan County etc). Timeframe: Ongoing

**E. Strategy:** Resume discussions relating to land trades with the US Forest Service to consolidate ownership. Time frame: 2006-2007.

## **CHAPTER IV. PERFORMANCE MEASURES, EVALUATION AND UPDATES TO THE CHELAN WILDLIFE AREA PLAN**

Performance measures for the Chelan Wildlife Area Plan are listed below. Accomplishments and progress toward desired outcomes will be evaluated to produce an annual performance report each calendar year. The plan will be considered a working document that will evolve as habitat and species conditions change, as new regulations are enacted, and as public issues and concerns change. Updates will be considered annually and added to the plan as needed.

### **1. The Chelan Wildlife Area Performance Measures in 2006 includes:**

- Maintain Swakane irrigation pond and outlet
- Maintain up to 100 acres of food plots annually as funding allows  
Coordinate the maintenance of 30+ winter wildlife feeders, 35+ water structures (guzzlers and springs) and 25+ nest boxes.
- Inspect and maintain about 90 miles of road to include routine inspection, weed control and repairs to road surface as necessary.
- Maintain three informational kiosks as funding allows
- Replace 50 to 75 signs, as needed based on routine inspections.
- Maintain Swakane irrigation system, shop, residence and office.
- Control weedy species mechanically, with chemical and bioagents. Extent of weed control will be based on funding but will at least include roadside spraying, control of perennial weeds in the Chelan Butte fields and yellowstar thistle spraying and hand pulling in the Knowles area.
- Inspect, maintain and repair about 20 miles of fence
- Service, repair and maintain equipment and vehicles (estimated 5 pieces)
- Maintain (apply herbicide and/or mow) 100 acres of newly seeded shrub/steppe and steppe habitat. Reseed where seeding failed.
- Place brush piles in areas needing wildlife escape cover when material is available.

## APPENDIX 1. PUBLIC ISSUES

Citizens Advisory Group (CAG) and District Team (DT) Issues and Concerns  
Wells, Sagebrush Flat and Chelan Wildlife Areas  
June 5, 2005

The Wildlife Area Manager Marc Hallet and Dan Peterson, Wildlife Area Assistant Manager, met with the CAG on February 15, 2005 and the Wenatchee District Team on February 17. Marc Hallet met with the Okanogan District Team on March 9, 2005 (part of the Wells Wildlife Area lies in the Okanogan District). The purpose of meeting with the CAG and DT was to obtain input to help guide management actions on the wildlife areas. Drafts of the wildlife area management plans 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 indicate DT input. Issues that are not underlined originated from the CAG.

### Issue A. Access/Recreation

- Regulate public access in big game wintering areas. Seasonally close road, control antler hunting, snowmobile use etc.
- Regulate camping (maximum number of days).
- Provide and/or maintain opportunities for ATV users to recreate on DFW roads.
- Improve and manage wildlife viewing opportunities in a manner that is not detrimental to the wildlife resource.
- Trails: balance recreation opportunities with wildlife concerns (winter range, raptor nest, etc.). Active involvement in placement and management by WDFW staff.
- Define recreational uses and timing.
- Need to provide access to publicly held lands.
- USFS trying to close all areas to ATV use unless designated open – WDFW should do the same.
- It seems that any road management and abandonment plan should really be an access management plan that incorporates the need for hiking trails that can be accommodated without adversely impacting wildlife. It is a great opportunity to increase public appreciation and understanding of wildlife and the wildlife area mission.
- Ensure that access and recreational uses of the wildlife areas are consistent with the wildlife and habitat goals and objectives.

### Issue B. Wildlife Area Management

- Evaluate benefit of centrally vs. individually managed wildlife areas or both, with teams of volunteers.
- The wildlife area needs to manage for big game (deer and elk), waterfowl, and non-game such as threatened, endangered and sensitive species.
- Prepare an integrated weed management plan.
- Cooperate and coordinate with adjacent landowners, weed boards and county governments to improve and expand weed control efforts.
- Make prevention of weed establishment a priority.
- 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.

- A fire plan is a great idea – it should include appropriate fuel reduction activities and not just rely on prevention because, eventually, wildfires WILL occur. Prescribed burning could be tricky in some of these areas but should be considered where appropriate.
- Include watershed planning and Multiple Species Habitat Conservation Plan (HCP) information in all management plans. Cooperate with Planning Units.
- Develop habitat and improvements on the Swakane Unit to discourage big game crossing of highway 97.
- Assess the need for livestock fencing and remove all un-needed fences, particularly where they are a hazard and/or barrier for humans and wildlife.
- Fire can rejuvenate decadent plants, and be quite beneficial if fire size is limited, seed sources are maintained, and/or fire intensities are low enough to maintain crown sprouting of shrubs. Bitterbrush and sagebrush respond quite differently and it is important to recognize which is the dominant type and manage accordingly
- Consider replacing some developments (guzzlers, feeders, nest structures etc.) with low maintenance alternatives, or through self-maintaining ecosystem restoration approach
- Consider prescribed fire as appropriate.
- Overall – the largest issue I see with the draft plan is the somewhat agricultural approach to habitat improvement (structures such as guzzlers, bird feeders, fences, nest boxes) that are expensive to maintain and prone to being damaged by fire, and the need to recognize that fire is a part of the ecosystem – need to work with it, not always fight it.
- The White River should be primarily managed for fisheries, wetlands and riparian species, while restoring the native plant species
- Improve riparian and forest conditions in the White River flood plain by reconnecting wetlands to river channels, planting native genetic stock of riparian vegetation, removal of noxious weeds (oxeye daisy, knapweed, mullein).
- Pothole blasting and pond construction may not be best for restoration ecology in the White River. The White River is becoming a showcase in wetlands restoration, and perhaps a different approach should be considered.
- When initiating or renewing leases and permits, consider the impact of creating co-dependence between the lessee/permittee and WDFW, which limits our management flexibility particularly in the long term.
- When making management decisions, evaluate and consider short term and long term impacts on:
  - Watershed functions, water quality, wildlife (particularly impact on T&E species).
  - Critical/sensitive sites, which can be disproportionately severe.
  - Plant and wildlife diversity. This includes potential introduction of new weedy species and aggravation of current weed problems.
  - Habitat important to wildlife currently and potentially present on the area (such as in sharp-tailed grouse, bighorn sheep and sage grouse historical range).

### **Issue C. Habitat**

- Prevent the introduction of non-native wildlife into the White River watershed when inconsistent with fish and native wildlife goals.
- Use restoration dollars to acquire key habitat, especially wetlands.
- We should manage for cliff, emergent wetlands, forested wetlands, and riparian.

- Protect and preserve sensitive wildlife sites such as active Sharp-tailed and Sage grouse lek sites, all snake dens (during spring emergence), active Bald and Golden eagle nests, state and federal listed plant species, big game wintering areas, etc. from human disturbance.
- As a priority, protect and enhance any state and federal listed species and associated habitat found on the Wildlife Area.
- Where management conflicts with a listed species preserve and protect the listed species.
- Manage for native habitats and the processes that sustain them.
- Broaden wildlife area management to include multiple species management.
- If bigleaf maple is present, these could be important habitat for Western Gray Squirrels.
- Any management distinction between Native and non-Native Species?
- What species would be used for green strips? It would be nice to restore the native bunch grasses that stay green longer in the spring and then occur in bunches that don't spread fire as easily or contiguously as annuals such as cheatgrass or even some of the commonly used rehab grasses.
- When restoring big game habitat, balance bighorn needs with mule deer needs.
- Determine presence or role of the more cryptic species such as mollusks and the presence/role of rare or unique plants. Cryptogammic soils were greatly disrupted by grazing on Chelan Butte, and may have a role in noxious weed prevention – need to ID and protect any remaining patches, or attempt to recover in other areas.
- Ensure that habitat is not fragmented for some species in the process of creating edge habitat – that is, make sure the edge is truly ecotonal and provides more resources for wildlife and avoid fragmentation which is happening all around units such as Chelan Butte due to potential golf course, condo, and residential development.
- Protect/develop large roost trees that may be used by Bald Eagles, particularly on the Columbia River side of the wildlife areas.
- Rehab the High School class year markers on Chelan Butte – by now, I think there are 3 areas that have been affected by senior class members putting their “year” up on the Chelan side of the Butte – fairly visible, probable sites of weed invasion.

#### **Issue D. Roads**

- Manage roads: closures, reclamation, signing etc.
- Acquire a list of the roads that could be affected by the RMAP program on WDFW lands in the Swakane and Chelan Butte areas and maps of the same?

#### **Issue E. Enforcement**

- Completely review of WDFW codes for lands.
- Need to get regulations on the books to standardize camping limits to be the same as other public agencies.
- Law enforcement action can be taken regarding trespass livestock.
- Law enforcement needs specific regulations to enforce social behavior on WDFW property – camping length of stay, removal of property, noise etc.
- Need a better picture on the “No ATV Allowed” signs.
- ATV use policy needs to be consistent agency wide.

## **Issue F. Public Information, Education and Involvement**

- Increase public awareness of the area with maps, kiosks, signs, more information on the web, etc.
- Educate the public regarding public access and other regulations.
- Install informational signs and provide brochures for each wildlife area stating reason for purchase, funding source, funding resources, management funding, in lieu of taxes, etc.
- All wildlife areas should have maps like the Sinlahekin map.
- Need informational boards at each end of wildlife areas stating what is allowed and not allowed, to get away from signing each individual site. Consider using “Vehicular Travel Limited to County Roads” signs when appropriate.
- Include wildlife area (Chelan Wildlife Area) information in the interpretive center being developed at Beebe Springs.

## **Issue G. Monitor, Survey and Inventory**

- Develop a centralized inventory of wildlife developments (springs, guzzlers, feeders etc.) with neighboring landowners.
- Inventory public use of the area.
- Recognize and inventory smaller ecosystem - cryptogammic soil crusts, etc.
- Include volunteers and neighbors who might serve as stewards helping to manage and monitor particular sites.
- Identify and prioritize information gaps and the identify priority survey needs.
- Monitor and evaluate the effectiveness of management treatments for success and longevity.

## **Issue H. Other**

- Evaluate and optimize staff deployment.
- Maintain staff flexibility. Assign staff to specific areas, facilitating communications with neighboring landowners. Assign staff to live on site. Create shared positions between WDFW with other agencies.
- Whenever possible use and support local contractors and vendors.
- IAC acquired property – need to be aware that some uses may not be compatible on property purchased for critical habitat with IAC dollars. On the other hand, micromanagement by the IAC can be counterproductive.
- Develop “GO LOOK” on the web site for non-hunting wildlife recreation
- Review Montana Fish, Wildlife and Parks interactive hunt planner and wildlife management area web site section.
- Work with DOT to use de-icing base on Highway 97 less attractive to big game.
- When possible, plant county road sides to permanent cover
- Extend access stewardship decal program to the wildlife areas with funds generated coming back to the wildlife areas
- The Knowles and Oklahoma Gulch units are shown on the Chelan Area map as separate units, and they are distinct in their own ways. It seems like it would be good to list and describe them separately
- Protect the National Historic Register property on the Butte, which was damaged in the Tyee fire (The Lucas homestead).

- Protect American Indian artifacts.

## **APPENDIX 2. CHELAN WILDLIFE AREA WEED MANAGEMENT PLAN**

### **Weed Control Goals on WDFW Lands**

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

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

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

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

### **Weed Management Approach**

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

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

- Preventing weed establishment and aggravation of existing weed problems is the most cost effective part of a weed management program and therefore a priority. This includes:
  - Restoring disturbed sites.
  - Minimizing soil disturbance.
  - Controlling livestock use on the area.
  - Controlling public use.
  - Coordinating weed prevention and control efforts with federal, state and local entities to improve efficacy and minimize costs.

Livestock grazing is a dominant soil disturbance factor, which effectively prepares the grazed site for weed infestation. Livestock can also transport weed seeds to the wildlife area and weaken native and/or desirable non-native plants that could compete with weeds. It will likely initiate new or aggravate existing weed infestations. Although some grazing systems can lessen weed promotion by livestock, all grazing disturbs the soil and includes more intensively affected sites that are ideal

for weed “pioneering”. The environmental, administrative and weed control costs (especially long term costs) associated with grazing can be very high and needs to be thoughtfully considered before initiating or continuing grazing an area.

Monitoring- Monitoring is necessary to implement prevention and to document the weed species, the distribution and the relative density on the management area. Monitoring will include mapping weed infestation and recording treatment success.

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.

Herbicide can be an effective tool for controlling weeds in many instances. Applicators should refer to the Pacific Northwest West (PNW) Weed Management Handbook, or other reputable resources, for product recommendations and timing. Herbicide applications are often not selective enough to not affect desirable habitat. Biological control will be the preferred control method when effective especially in remote inaccessible areas and where other methods pose a threat to the habitat.

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

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

**Weed Species of Concern on the Chelan WA**

Weeds of concern on the Chelan WA include those listed in Table 1. This list is based on species that have been documented on the wildlife area.

Table 1. Chelan Wildlife Area weeds including the state and county weed class listing and acres treated.

Weed Species	2005 State Weed Class	2005 Chelan County Weed Class	Wildlife Unit(s)	2005 Treated Acres
Dalmatian Toadflax	B-Designate	B-Designate	All	
Houndstongue	B		Entiat Unit (Roundy)	<1
Diffuse Knapweed	B	R & S	All	57

Whitetop	C			0
General Weeds			All	71+
Canadian Thistle	C		All	0
Russian Knapweed	B	R & S	All	0
Field Bindweed	C		All	25
Purple Loosestrife	B		White River?	0
Yellowstar Thistle	B	B		300 (Spot treated)

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

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

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

Management for individual weed species can be found in the following “Weed Species Control Plan” (WSCP) sections. We acquired description and management information from the Washington State Weed Board web site ([http://www.nwcb.wa.gov/weed\\_list/weed\\_listhome.html](http://www.nwcb.wa.gov/weed_list/weed_listhome.html)) and the TNC Invasive Species Initiative web site (<http://tncweeds.ucdavis.edu/>). Additional information is available on these and other web sites.

## DALMATIAN TOADFLAX

**Scientific name:** *Linaria dalmatica ssp. dalmatica*  
**Updated:** 2006

**Common name:** Dalmatian toadflax

**DESCRIPTION:** Dalmatian toadflax is an erect, short-lived, perennial herb, 0.8 to 1.5 m tall. It 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. Its 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).

This weed appears to be spread by cars, deer, and birds. Individual plants and small groups of plants are found throughout much of the wildlife area and its vicinity.

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

### MANAGEMENT INFORMATION:

Herbicide can be an effective tool for controlling Dalmatian toadflax. Applicators should refer to the Pacific Northwest West (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.

Although not practical in most situations, 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).

**CURRENT DISTRIBUTION ON THE SITE:** Primarily on the Swakane Unit with some patches on the Entiat Unit.

**ACRES AFFECTED BY WEED:** ~400    **WEED DENSITY:** Low (Most Widely Scattered)

### **GOAL**

Prevent new weed infestations and control existing weed infestations through an integrated pest management program.

### **OBJECTIVES**

- Prevent new and aggravation of existing infestations
- Treat infestations with biological agents when effective and/or when weeds locations are inaccessible or within sensitive habitat.
- Aggressively control weeds in high use areas
- Survey and map existing populations
- More accurately calculate acreage affected by weeds
- Treat all plants that can be reached with equipment before they produce seed
- Survey all units for infestations

### **ACTIONS PLANNED**

Continue using prevention methods as discussed above. High use and other accessible areas will be treated with herbicide. The biological agents, *Mecinus janthinus*, will be released in the spring or early summer in areas where the terrain is too difficult to survey, or implement control. Other biological agents will be released as they become available.

Monitoring will continue on an annual basis.

### **CONTROL SUMMARY AND TREND**

2002- Released 3,500 *Mecinus janthinus*,

2003- Released 1,000 *Mecinus janthinus*

2004- Released 500 *Mecinus janthinus*, Cut Dalmatian toadflax heads (<1 ac.)

2005-

Dalmatian toadflax is very prolific and unlike most weeds appears to be able to invade even good condition shrubsteppe habitat. We have made little progress in controlling this weed. Biological control has had sporadic success and for the most part cannot keep up with the steady increase in weed density. Much of the infestations are hard to reach and occur where herbicide application would threaten important habitat components. Effective control of this weed will require the availability and use of more effective biological control agents.

## HOUNDSTONGUE

**Scientific name:** *Cynoglossum officinale*  
**Updated:** 2006

**Common name:** Houndstongue

**DESCRIPTION:** Houndstongue is a biennial or short-lived perennial that grows 1-4 ft tall. Houndstongue is a very strong competitor that competes with desirable forage. Its thick, deep taproot enables it to be a strong competitor for soil resources. The seeds have the ability to attach to people, the coats of livestock and vehicles, enabling the plant to spread great distances. Houndstongue is poisonous. It contains pyrrolizidine alkaloids that stop the reproduction of liver cells. Considered non-palatable under range conditions, livestock will avoid it. However, houndstongue is eaten when dried plants are found in hay, and the toxic properties are still capable of poisoning livestock.

Seeds germinate from February to May. Seeds remaining on the soil surface can remain viable up to two years. At 1-6 inch soil depth the seeds germinate within one year. The highest germination percentage occurred in seeds buried at 1/2inch. A rosette forms the first year and is able to resist mowing and grazing and also able to withstand severe drought. Flowering occurs the following year around June and seeds are formed and dropped at the end of the summer. The seeds overwinter in about the top 1cm of soil.

### 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.

Cultivation of young rosettes in the autumn or early spring gives effective control. Mow flowering stems close to ground to reduce seed set. Clipping during the second year flowering can greatly reduce seed production. Reseed problem areas with fast growing grasses. Do not overgraze. Biocontrols for houndstongue include *Mogulones cruciger* (approved and released in Canada) is a root-feeding weevil. Another, *Longitarsus quadriguttatus*, has good results but may have an effect on native North American Boraginaceae (Lamming).

### CURRENT DISTRIBUTION ON THE SITE

The only known infestation of Houndstongue was found at the Wildlife Area Headquarters'. The plants were hand-pulled and destroyed. The site is being monitored closely.

**ACRES AFFECTED BY WEED:** > 1 acre

**WEED DENSITY:** Low

### GOAL

Prevent new weed infestations and control existing weed infestations through an integrated pest management program.

### OBJECTIVES

- Prevent new and aggravation of existing infestations
- Treat infestations with biological agents when effective and/or when weeds locations are inaccessible or within sensitive habitat.
- Aggressively control weeds in high use areas

- Survey and map existing populations
- More accurately calculate acreage affected by weeds
- Treat all plants that can be reached with equipment before they produce seed
- Survey all units for infestations

### **ACTIONS PLANNED**

Continue using prevention methods as discussed above. In 2006, the known infestations site on the Entiat Unit (Roundy area) will be closely monitored. It will be surveyed in early July and mature plants pulled.

Monitoring will continue on an annual basis on all units.

### **CONTROL SUMMARY AND TREND**

2002- Hand pulled and sprayed. No new infestations. Continue prevention methods.

2003- No new infestations. Continue prevention methods.

2004- No new infestations. Continue prevention methods.

2005- No new infestations. Continue prevention methods.

## DIFFUSE KNAPWEED

**Scientific name:** *Centaurea diffusa*

**Common Name:** Diffuse knapweed

**Updated:** 2006

**DESCRIPTION:** The genus name *Centaurea* commemorates the centaur, the mythical creature of Hippocrates, half horse and half man (Allred and Lee 1996). The specific epithet *diffusa* refers to the open branching pattern of mature plants (Allred and Lee 1996). *Centaurea diffusa* is a highly competitive herb of the aster (sunflower) family (*Asteraceae*). The plants first form low rosettes and may remain in this form for one to several years. After they reach a threshold size they will bolt, flower, set seed, and then die. Thus they may behave as annuals, biennials or short-lived perennials, bolting in their first, second, third, or later summer, respectively. Plants of this type are often called semelparous perennials or short-lived monocarpic perennials. Stems are upright, 10-60 cm (4-24 in) tall from a deep taproot, highly branched, angled, with short stiff hairs on the angles (Allred and Lee 1996). There are two types of leaves. The long, deciduous basal leaves, which form the rosette, are stalked and divided into narrow, hairy segments, 3-8 cm (1-3 in) long, and 1-3 cm (0.4-1 in) wide (Zimmerman 1997, Allred and Lee 1996). The stem, or cauline, leaves, which are alternately arranged on the stems, are smaller, less divided, stalkless, and become bract-like near the flower clusters (Zimmerman 1997, Allred and Lee 1996). Flower heads are broadly urn-shaped, 1.5-2.0 cm (0.6-0.8 in) tall, solitary or in clusters of 2-3 at the ends of the branches (Allred and Lee 1996, Watson and Renney 1974). The heads contain two types of flowers, ray flowers around the edges surrounding tubular disk flowers. The petals are white, rose-purple, to lavender (Allred and Lee 1996, Watson and Renney 1974). Mature seeds are formed by mid-August (Watson and Renney 1974). A single diffuse knapweed plant can produce up to 18,000 seeds (Harris and Cranston 1979) and a stand of diffuse knapweed can produce up to 40,000 seeds per square meter (Watson and Renney 1974). In one study, open-pollinated, purple-flowered plants set significantly more seed than white-flowered plants (Harrod and Taylor 1995). Schirman (1981) determined that diffuse knapweed seed production was 1,000 fold that necessary to maintain observed levels of infestation. Laboratory germination tests showed up to and sometimes greater than 95% seed viability (Zimmerman 1997, Schirman 1981). These two observations indicate that an extreme reduction of seed production would be needed to control diffuse knapweed.

*Centaurea diffusa* is a native of Asia Minor, the Balkans, and the southern portion of the former Soviet Union, especially the Ukraine and Crimea (Zimmerman 1997). Diffuse knapweed is also common in Romania, the former Yugoslavia, northern Italy, Turkey, Greece, Bulgaria, Syria, and the eastern shore of the Mediterranean (Zimmerman 1997). Diffuse knapweed is found on plains, rangelands, and forested benchlands, particularly on rugged terrain that is not well suited for cultivation. In the United States, *Centaurea diffusa* is generally found on light, dry, porous soils (6). Diffuse knapweed has a northern limit of 53°N Latitude (Watson and Renney 1974), and has been observed at elevations up to 7,000 feet (Zimmerman 1997).

Diffuse knapweed can thrive in semi-arid and arid conditions, which allows it to be a serious problem in the western United States and the arid southwestern interior of Canada, especially British Columbia (Zimmerman 1997). The density of a diffuse knapweed stand is often correlated with the level of soil disturbance. Additionally, diffuse knapweed prefers open habitats to shaded areas (Watson and Renney 1974). *Centaurea diffusa* is not common on cultivated lands or irrigated pasture because it cannot tolerate cultivation or excessive moisture (Watson and Renney 1974).

## MANAGEMENT INFORMATION:

An effective management program needs to first control existing infestations, and then develop a land management plan to deter re-infestation. Since diffuse knapweed reproduces entirely by seed, the key to controlling existing infestations is to eliminate new seed production and deplete the existing seed bank. Since diffuse knapweed tends to grow in dense patches, it is relatively easy to locate and conduct spot treatments. If adequate labor is available, and the infested area is relatively small, hand pulling before seed set may be an effective method of control. Tordon (picloram) is the most widely recommended herbicide for treatment of diffuse knapweed (Harris and Cranston 1979, Watson and Renney 1974). 2,4-D, dicamba, and glyphosate are also considered effective (Muller-Scharer and Shroeder 1993, Watson and Renney 1974). Effective, long-term control will be extremely difficult without development of effective biocontrols for diffuse knapweed (Harris and Cranston 1979). Once the existing infestation has been controlled, steps should be taken to deter any new infestations of diffuse knapweed. Walk through hand pulling or spot herbicide treatment programs should be conducted three times annually for several years to eliminate any seedlings that germinate from seeds that break out of dormancy. In the fall, the number of rosettes can indicate the quantity of diffuse knapweed plants that will bolt the following spring and help determine what type of management effort will be required. A successful management program should set a goal of < 5% knapweed cover. This is the assumed density of the weed in its native range (Muller-Scharer and Shroeder 1993). Lasting control will require a combination of proper land management, biological control, physical control, chemical control, and suppression by desirable vegetation. This “cumulative stress” method will keep the plant constantly under stress, reducing its ability to flourish and spread. Also, a cumulative stress approach provides a level of redundancy in case one type of control treatment is missed or ineffective. Additionally, since diffuse knapweed has the ability to travel and spread seeds over relatively long distances as a tumble weed, an effort should be made to analyze prevailing winds and infestations on neighboring lands to identify any populations that may pose a threat. Finally, public awareness should be included in any management program. Diffuse knapweed does not respect boundaries and maintaining a high level of public awareness is important for successful control (Muller-Scharer and Shroeder 1993). Several herbicides are relatively effective at controlling diffuse knapweed. Tordon (picloram) is the most widely recommended (Harris and Cranston 1979, Watson and Renney 1974). Other effective herbicides include dicamba, 2,4-D, and glyphosate (Beck 1997, Youtie 1997, Watson and Renney 1974). To save money and reduce grass injury resulting from higher use rates of a single herbicide, several of these herbicides can be combined (Beck 1997). Tank-mixes of picloram and dicamba (0.25 to 0.5 lb./acre + 0.125 to 0.25 lb./acre), picloram plus 2,4-D (0.188 lb./acre + 1.0 lb./acre), and dicamba plus 2,4-D (0.5 lb./acre + 1.0 lb./acre) all control diffuse knapweed (Beck 1997). A backpack sprayer or a wick is highly recommended in small areas to minimize damage to non-target plants. Herbicides should be applied before the mature plants set seed to maximize effectiveness.

Currently, there is no single biological control agent that effectively controls diffuse knapweed populations. The biological control of weeds is based on the premise that insect feeding kills and/or stresses plants, or reduces seed production, and eventually causes a reduction in weed density (Berube and Myers 1982). Biological controls, which lower the competitive ability of weeds, could also enhance the effectiveness of other control methods. Biological agents rarely completely eliminate the target pest from an area. Complete elimination of the pest would be self-defeating to long-term control as it would lead to the starvation of the agent and leave the area wide open to re-invasion. WDFW has had some success releasing *Larinus minutus*, a seed-eating weevil

native to Greece, and now established in Montana, Oregon, and Washington. Adult weevils are 4 to 5 mm (0.16 to 0.2 in) long, black, and have a large snout. They deposit eggs in the unopened seed-heads between the pappus hairs from June to September. The larvae feed on pappus hairs and move downward to the seeds. Each larva constructs a cocoon and pupates within it. Adults are active in the field from May until August and will feed on leaves and flowers prior to laying eggs. Adults generally live up to fourteen weeks.

**CURRENT DISTRIBUTION ON THE SITE:** Diffuse knapweed is present to various degrees in all units.

**ACRES AFFECTED BY WEED:** ~ 200

**WEED DENSITY:** Low, scattered sites

### **GOAL**

Prevent new weed infestations and control existing weed infestations through an integrated pest management program.

### **OBJECTIVES**

- Prevent new and aggravation of existing infestations
- Treat infestations with biological agents when effective and/or when weeds locations are inaccessible or within sensitive habitat.
- Aggressively control weeds in high use areas
- Survey and map existing populations
- More accurately calculate acreage affected by weeds
- Treat all plants that can be reached with equipment before they produce seed
- Survey all units for infestations

**ACTIONS PLANNED:** Continue using prevention methods as discussed above. Apply chemicals to roadsides and other high use areas. Release effective bio control agents such as Larinus minutus.

### **CONTROL SUMMARY AND TREND**

2002- Sprayed 97 acres, released 1,000 *Larinus minutus*

2003- Released 2250 *Larinus minutus*

2004- Sprayed 20 miles of roadside

2005- Sprayed 57 acres

Diffuse knapweed increased over the years to a state where it infested hundreds of acres and many miles of road through much of the 1990's. Abandoned fields on the Entiat and Chelan Units were especially badly infested. The availability of additional funds to control weeds and Conservation Reserve Program assistance to restore about 300 acres of abandoned fields reduced the infestations by about 400 acres. Roadsides were also treated with herbicides and reseeded to competitive grass cover. The use of the biocontrol agent *Larinus minutus* further reduced the density and distribution of this weed on the wildlife area. We presently monitor and spot spray roads and other disturbed areas.

## CANADIAN THISTLE

**Scientific Name:** *Cirsium arvense*

**Common Name:** Canada thistle

**Updated:** 2006

**DESCRIPTION:** *Cirsium arvense* is an erect perennial rhizomatous thistle, usually 0.5 - 1.0 m tall, distinguished from all other thistles by 1) creeping horizontal lateral roots; 2) dense clonal growth; and 3) small dioecious (male and female flowers on separate plants) flowerheads. Four varieties are recognized: var. *vestitum* Wimm. & Grab. (leaves gray-tomentose below); var. *integrifolium* Wimm. & Grab. (leaves glabrous below, thin, flat, and entire or shallowly pinnatifid); var. *arvense* (leaves glabrous below, thin, flat, and shallowly to deeply pinnatifid); var. *horridum* Wimm. And Grab. (Leaves glabrous below, thick and wavy, with many marginal spines) (Moore 1975). The most common variety of the species in North America is *horridum*. All varieties are interfertile, and one plant of var. *integrifolium* produced seedlings of all four varieties (Detmers 1927). Within each variety there are numerous genotypes, which vary in appearance and in response to management activities. Additionally, *Cirsium arvense* changes morphology in response to environmental conditions (Nadeau and Vanden Born 1989).

Phenology of *Cirsium arvense* varies with ecotype, but follows a general pattern. In Washington State, overwintering Canada thistle roots develop new underground roots and shoots in January and begin to elongate in February (Rogers 1928). Shoots emerge March - May when mean weekly temperatures reach 5° C. Rosette formation follows, with a period of active vertical growth (about 3 cm/day) in mid-to-late June. Flowering is from June to August in the U.S., and June to September in Canada, when days are 14 to 18 hours long (Hodgson 1968, Van Bruggan 1976, Moore 1975): *Cirsium arvense* is a long-day plant (Linck and Kommedal 1958, Hunter and Smith 1972). Natural areas invaded by *Cirsium arvense* include prairies and other grasslands in the midwest and Great Plains and riparian areas in the intermountain west. *Cirsium arvense* threatens natural communities by directly competing with and displacing native vegetation, decreasing species diversity, and changing the structure and composition of some habitats. Canada thistle invades natural communities primarily through vegetative expansion, and secondarily through seedling establishment. *Cirsium arvense* spreads primarily by vegetative growth of its roots. The root system can be extensive, growing horizontally as much as 6 m in one season (Rogers 1928). Most patches spread at the rate of 1-2 m/year (Amor and Harris 1975). Most *Cirsium arvense* roots can be found directly below the aboveground shoots, with little extension beyond the border of a patch (Donald 1994). Apparently, the horizontal roots give rise to shoots frequently as they expand the range of a patch. Horizontal roots grow within 15-30 cm of the soil surface, and typically grow in a straight line for 60-90 cm, then bend down and grow vertically. Another horizontal root system is usually initiated at the downward bend (Rogers 1928). Vertical roots can grow as deep as 6.8 m (Rogers 1928) but most roots are in the upper 60 cm of soil (Haderlie et al. 1987). *Cirsium arvense* roots commonly reach a depth of 1.5 m in one-year old plants, and 2 m in 2-10 year old plants (Nadeau 1988). *Cirsium arvense* spreads vegetatively through horizontal growth of the root system, which can extend 4-5 m radially in one season (Bakker 1960). Individual clones can reach 35 m in diameter (Donald 1994).

*Cirsium arvense* readily propagates from stem and root fragments and thus plowing or other soil disturbance can increase thistle densities (Nadeau and Vanden Born 1989). Small root fragments (2 cm) can survive and produce clones up to 2.8 m across within one year (Rogers 1928). Hayden (1934) reported plants developing from root fragments as small as 0.5 cm, and 95% establishment from 1 cm

long root fragments. Root fragments are able to produce new shoots, independent of the presence of root buds (Nadeau 1988). Rogers (1928) stated that a six-week-old root fragment can still regenerate a plant. Partially buried stem fragments have much higher survival than fully buried fragments, as the cut stems remain photosynthetically active (Magnusson *et al.* 1987). Regrowth from stem fragments is highest in mid-June (>70%) and lower thereafter (0-55%) (Magnusson *et al.* 1987). *Cirsium arvense* is native to southeastern Europe and the eastern Mediterranean (Moore 1975) and possibly to northern Europe, western Asia and northern Africa (Detmers 1927, Amor and Harris 1974). It now has a near global distribution between 37 and 58-59 degrees N in the northern hemisphere (Moore 1975), and at latitudes greater than 37 degrees S in the southern hemisphere exclusive of Antarctica (Amor and Harris 1974). *Cirsium arvense* occurs throughout Europe, northern Africa, western and central Asia, northern India, Japan, China, and northern North America, South Africa, New Zealand, Tasmania, and southeastern Australia (Dewey 1901, Rogers 1928, Hayden 1934, Amor and Harris 1974).

### **MANAGEMENT INFORMATION:**

Where possible it is best to kill all *Cirsium arvense* plants within a site. Where resources are limited two strategies are recommended: 1) Target *Cirsium arvense* clones based on location, controlling plants in high quality areas first, then in low quality areas. Treat entire clones to prevent resprouting from undamaged roots: 2) Target female clones to reduce seed production and additional spread of *Cirsium arvense*. However, some apparently "male" clones are self-fertile. Control techniques for natural areas are constrained by the need to minimize damage to native species. The best option in prairies and other grasslands is to first enhance growth of native herbaceous species by spring burning, and then cut or spot treat Canada thistle with glyphosate when it is in late bud or early bloom (usually June). It is necessary to prevent shoot growth for at least two years to deplete roots and kill Canada thistle. *Cirsium arvense* management programs should be designed to kill established clones since the species spreads primarily by vegetative expansion of the root system. Prevention of seed production is a secondary consideration since spread by seeds is relatively rare. On the other hand, seedlings are the most susceptible growth stage (Bakker 1960). In areas that are susceptible to thistle invasion but which have not yet been invaded, management programs should be implemented to prevent the species from becoming established. It is important to understand the biology of *Cirsium arvense* as control is greatly influenced by clonal structure (Donald 1994), growth stage (Tworkoski 1992), season of treatment, weather conditions, ecotype (Hodgson 1964), soil type, and control method(s) used. A single control method is rarely effective and it is often necessary to use two or more methods at any given site (Lee 1952, Donald 1992, Diamond 1993). In addition, treatments or combinations that are effective at one site may be ineffective at others (Frank and Tworkoski 1994). Canada thistle's deep, well-developed root systems make it resilient to most control methods including herbicides. However, *Cirsium arvense* undergoes several growth stages during the growing season and during certain stages root carbohydrates are depleted. Root carbohydrate depletion is related to growth stage and is greatest when flowering occurs, but replenishment is related only to environmental conditions, and generally occurs in late summer and fall. Younger growth stages (spring) are likely more susceptible to herbicide, but the root system is larger and more difficult to kill in spring before the flower stalk emerges; older growth stages (fall) are somewhat less susceptible, but the root system is depleted and smaller, and assimilates are naturally moving from the leaf tissues to the root system (Tworkoski 1992). More assimilate (and hence herbicide) moves into the roots under short days and low temperatures (fall) than long days and warm temperatures (summer; McAllister 1982).

Herbicide effect is enhanced when 1) *Cirsium arvense* roots are weakened during the growing season by herbicide treatment, crop competition, or frequent mowing or tilling; and 2) new shoots are

stimulated to grow. Suitable herbicides (e.g. glyphosate) should be applied to new growth when leaves are green (September or October). Avoid applying herbicide to old leaves (thick cuticle limits absorption) or to drought-stressed leaves. Hunter (1996) found that control is improved if thistles are cut in late July and the resprouts treated with glyphosate about 4 weeks later in late August (the 'August rosette stage'). Second best treatment time is at flower-bud stage, when root reserves are lowest, particularly under droughty conditions (Haderlie *et al.* 1987). However, growing season herbicide application can damage native species. Mowing temporarily reduces aboveground biomass, but does not kill *Cirsium arvense* unless repeated at 7-28 day intervals for up to 4 years. This intensity of mowing is not recommended in natural areas, where it would likely damage native vegetation. Mowing just twice a year, in mid-June and September may reduce or contain Canada thistle. When mowing, cut high enough to leave > 9 leaves/stem, or >20 cm of bare stem tissue, as mature Canada thistle leaves and stems independently inhibit development of shoots from root buds. When the primary stem is removed, root buds are stimulated to produce new shoots that might otherwise be suppressed, especially under low humidity.

Early studies recommended mowing at frequent intervals to starve Canada thistle's root systems and remove it from farm fields and pastures (Cox 1913, Johnson 1912, Hansen 1918, Detmers 1929). Mowing monthly for a four-year period eliminated practically all thistles (Welton *et al.* 1929) and mowing at 21-day intervals weakened roots and prevented seed production (Seely 1952). Hodgson (1968) found that mowing alfalfa fields twice annually, at Canada thistle's early-bud to pre-flowering stage (early to mid-June in Montana) and early fall (September) reduced Canada thistle to 1% of its initial value in four years. Mowing two to three times a year can prevent seed set (Hansen 1913, Rogers 1928) but mowing once a year is ineffective (Donald 1990). In order to prevent production of viable seeds, stems must be mown before the flowers open when they have been open for only a few days. Stems with flowers that have been open 8-10 days can develop viable seeds (Derscheid and Schultz 1960).

**CURRENT DISTRIBUTION ON THE SITE:** All units in moist soil sites such as riparian bottoms. It occurs primarily on the Chelan Butte and Swakane Units.

**ACRES AFFECTED BY WEED:** ~50    **WEED DENSITY:** High but localized  
**GOAL**

Prevent new weed infestations and control existing weed infestations through an integrated pest management program.

#### **OBJECTIVES**

- Prevent new and aggravation of existing infestations
- Treat infestations with biological agents when effective and/or when weeds locations are inaccessible or within sensitive habitat.
- Aggressively control weeds in high use areas
- Survey and map existing populations
- More accurately calculate acreage affected by weeds
- Treat all plants that can be reached with equipment before they produce seed
- Survey all units for infestations

**ACTIONS PLANNED:** Continue using prevention methods as discussed above. Use mowing and spraying and monitor developments in biological control.

**CONTROL SUMMARY AND TREND**

2002- IPM and prevention methods has kept the infestation localized. Continue efforts.

2003- IPM and prevention methods has kept the infestation localized. Continue efforts

2004- IPM and prevention methods has kept the infestation localized. Continue efforts

2005- IPM and prevention methods has kept the infestation localized. Continue efforts

## RUSSIAN KNAPWEED

**Scientific Name:** *Acroptilon repens*  
**Updated:** 2006

**Common Name:** Russian knapweed

**DESCRIPTION:** *Acroptilon repens* is a perennial herbaceous plant of the aster (sunflower) family (Asteraceae). It is characterized by its extensive root system, low seed production, and persistence. Russian knapweed spreads through creeping horizontal roots and seed.

The stems of *Acroptilon repens* are erect, thin, stiff, corymbosely branched, 45-90 cm (18 to 36 in) tall, and when young are covered with soft, short, gray hair. Lower stem leaves are narrowly oblong to linear-lanceolate, and deeply lobed. The upper leaves are oblong, toothed, and become progressively smaller. Rosette leaves are oblanceolate, irregularly pinnately lobed or almost entire, 5-10 cm long, and 1-2.5 cm broad. The flower heads of Russian knapweed are urn-shaped, solitary, 15-17 mm high, and composed of disk flowers only (Zimmerman 1996). Involucres are 12-14 mm high, 5-7 mm broad, ovoid, entire, and greenish at the base with a papery, finely hairy tip. Flowers are numerous, all tubular. The petals are 12.5-13 mm, pink or purple, turning straw colored at maturity. Anthers are 4.5-5.5 mm long, tails absent. The stigma is 3.5 mm long. The pollen diameter is 48-51  $\mu\text{m}$ , spherical, 3-pored, thin-walled, about 2  $\mu\text{m}$  thick and finely granular.

Achenes (seeds) are 2-3 mm long, oval and compressed, 2 mm broad and 1 mm thick (Watson 1980). Achenes are grayish or ivory, with long white bristles (pappus); 6-11 mm long at the tip when young, but these fall from the seed as it matures (Allred and Lee 1996). Achenes are slightly ridged longitudinally with a sub-basal scar immediately lateral to the tip of the base of the seed (Watson 1980). *Acroptilon repens* has a well-developed root system, which functions as the major means of propagation and spreading. The roots of *Acroptilon repens* can extend more than 7 meters below the soil surface with 2-2.5 meters of growth occurring the first year and 5-7 meters in the second year (Zimmerman 1996). The roots are easily recognizable by their black or dark brown color and presence of small alternately arranged, scale leaves which support buds in their axils (Zimmerman 1996). These buds develop into adventitious shoots, enabling the plant to spread rapidly, and form dense colonies. The plant extends radially in all directions and can cover an area of 12 m<sup>2</sup> within two years (Watson 1980).

### MANAGEMENT INFORMATION:

Lasting control requires an integration of mechanical control, chemical control, biological control, proper land management, and vegetative suppression. An effective management program must first control existing infestations, and then promote repopulation by native plants. Continued monitoring and follow-up treatments should be conducted annually to eliminate any re-infestation of knapweed.

The keys to controlling Russian knapweed are to 1) stress the weed and cause it to expend nutrient reserves in its root system, 2) eliminate new seed production, and 3) control its vegetative spread. If sufficient human resources are available, mechanical control is good place to start. Pulling Russian knapweed plants two to three times annually contained, but did not eliminate, an infestation in Washington (Youtie 1998). Cutting, mowing or discing several times annually will also control the existing top growth. Often, the plants that do re-emerge are smaller in size and

lower in vigor. This is a good indication that the plants are under stress and that their nutrient reserves are declining.

If an infestation is too large to be treated mechanically, herbicides can be applied for effective control. Tordon™ (picloram), Transline™ (clopyralid), Curtail™ (clopyralid + 2,4-D), and Roundup® (glyphosate) are herbicides that have been shown to be effective (Beck 1996, Duncan 1994). Timing the application of herbicides can be critical and their effectiveness depends upon the particular herbicide and surrounding environmental conditions.

Biological control agents can place additional stress on Russian knapweed plants. Two biological agents for Russian knapweed have been released in the United States; *Subanguina picridis*, a gall forming nematode, and *Aceria acroptiloni*, a seed gall mite.

Once the initial infestation has been controlled, native species should be replanted to act as a vegetative suppressant. Suppressor species must remove a significant amount of moisture from the soil during the seedling stage, when knapweeds are most vulnerable. Early emergence, rapid dense growth, and maintenance of high vigor until frost are attributes required by plant species to suppress Russian knapweed.

**CURRENT DISTRIBUTION ON THE SITE:** Moister soil sites and old fields in all units but primarily on the Chelan Butte Unit.

**ACRES AFFECTED BY WEED:** ~ 100

**WEED DENSITY:** High but localized.

## **GOAL**

Prevent new weed infestations and control existing weed infestations through an integrated pest management program.

## **OBJECTIVES**

- Prevent new and aggravation of existing infestations
- Treat infestations with biological agents when effective and/or when weeds locations are inaccessible or within sensitive habitat.
- Aggressively control weeds in high use areas
- Survey and map existing populations
- More accurately calculate acreage affected by weeds
- Treat all plants that can be reached with equipment before they produce seed
- Survey all units for infestations

**ACTIONS PLANNED:** Continue using prevention methods as discussed above. Apply chemicals to Russian knapweed sites while protecting critical habitat. Contain infestations located in riparian or wetland habitat susceptible to herbicide damage. Explore biological control.

## **CONTROL SUMMARY AND TREND**

2002-

2003- Hand pulled in about 5 acres

2004-

2005-

Russian knapweed occurs in moist soil sites and often co-exists with valuable riparian species, limiting control options. Herbicide use has been limited to more upland sites in areas where valuable habitat is lacking. No known effective biocontrol agents are available for this weed.

Treatment has been limited to small isolated patches. Success has been modest and greater control emphasis will be placed in abandoned fields, which need to be restored.

## FIELD BINDWEED

**Scientific Name:** *Convolvulus avensis*    **Common Name:** Field bindweed, Morning glory  
**Updated:** 2006

**DESCRIPTION:** Field bindweed is a persistent, perennial vine of the morning-glory family (Convolvulaceae), which spreads by rhizome and seed (Wiese & Phillips, 1976). It is a weak-stemmed, prostrate plant that can twine and may form dense tangled mats (Gleason & Cronquist, 1963). Stems can grow to 1.5 m or longer, and its underground rhizomes may range from 5cm to 2.6m long. The extensive roots can measure 6.6m long and penetrate deeply into the soil (Wiese & Phillips, 1976). Field bindweed roots that store carbohydrates and proteins. They help field bindweed spread vegetatively and allow it to resprout repeatedly following removal of aboveground growth.

The number of seed per plant varies from 25 to 300 (Brown & Porter, Weaver & Riley, 1982). Estimates of the number of seeds in a pure stand of field bindweed range from 50,000 to 20 million per hectare (Weaver & Riley, 1982).

Field bindweed may be mildly toxic to some grazing animals. However, grazing has been used in the past as an attempt to control the weed (see below). The amount of field bindweed that can be safely eaten by sheep, cattle, and goats is not known. It is reported to cause distress in hogs that eat it (Callihan *et al.*, 1990).

### MANAGEMENT INFORMATION:

Field bindweed must be managed for several years to bring it under control. Field bindweed control entails chemical applications, discing or hand-pulling on a regular basis (perhaps only once per year), plus yearly monitoring. The herbicide 2, 4-D is generally the most effective against field bindweed, but glyphosate can provide some control. Alcock *et al.* (1974) suggest the following as general goals in the control of field bindweed: 1. Reduce seed in soil, 2. Prevent seedling growth, 3. Deplete food reserves in the root system, 4. Prevent spread of the weed. With diligence the roots can be removed leaving only the seedlings, however, even with intensive management field bindweed will persist as seed for several years. Three to five growing seasons are required in agricultural settings to eliminate all seedlings (Callihan *et al.*, 1990).

A long-term perspective is important for a noxious perennial weed where total eradication is not a realistic short-term goal. When the aboveground biomass of field bindweed is destroyed, the massive root system forms a new shoot and reserves are thus depleted. If the aboveground portion of the weed is continually destroyed, the root eventually starves and dies. However, if the aboveground portion is allowed to regenerate and feed the root system, the plant can continue to flourish. The key to implementing a successful control program is to continue treatment even after it appears the infestations are significantly reduced.

Tilling may be useful for ridding infestations at sites previously used for agriculture, or which are otherwise very disturbed. For small areas this may be done using hand-held tools, but for large areas machinery is required. Mowing is unsuccessful because plants can be missed and it encourages ground-hugging growth (Callihan *et al.*, 1990). Repeated cultivation is required for field bindweed control because plants can regenerate from roots as deep as 1.5m (Bakke &

Gaessler, 1945). According to Bakke *et al.* (1939), concentrations of food reserves in field bindweed roots were substantially higher at soil depths of 1.8-2.4m.

In the last decade, intensive use of tillage has been discouraged because it erodes soil and in some cases encourages weed proliferation (Cousen & Mortimer, 1995). It has long been known that field bindweed may proliferate if broken into small parts (Cox, 1915), and Frazier (1943b) attributes resprouting to undamaged plant parts left underground. Discing may aid field bindweed control when tilling is infrequent (Cousen & Mortimer, 1995). Timmons (1949) found that the number of bindweed seedlings increased with the number of tillage operations in a cropping system. It is not clear, however, if these were actually seedlings or sprouts from severed roots.

Burning alone is not an effective control method (Callihan *et al.*, 1990). It may be useful in combination with other methods, however.

It may be difficult to find native species that can out compete field bindweed. The outcome of competition between species can be complicated and unpredictable, but it appears the competitive balance between field bindweed and other species may depend mostly on soil water status (Seely *et al.*, 1944; Wiese & Rea, 1955; Bakke, 1939). Swarz (pers. comm.) found that field bindweed is more competitive where there are leaks in the irrigation system. Callihan *et al.* (1990) suggest that competitive crops may need to be fortified with an early season nitrogen application, and reseeded/planted where needed. Furthermore, early and mid-spring grazing should be avoided. Beidleman and Knight (1995) (Phantom Canyon Preserve) were unable to establish native species to compete with field bindweed, while Chris O'Brien (see "TNC Case Study" above) at Thousand Springs Preserve successfully established perennial grasses.

Some TNC preserve managers report success controlling field bindweed with herbicides. Youtie (1994) used glyphosate applied from backpack sprayers to control field bindweed, and while her infestations persist, they are not spreading. Meanwhile, O'Brien and O'Brien (1994) found that a very late fall application of Roundup and 2,4-D from a commercial spray rig did little to control field bindweed.

Timing is important when applying herbicides, whether you wish to kill the aboveground growth or translocate herbicides to the root system. The time of year, developmental stage of the plants, and rainfall/soil moisture conditions are all-important factors to consider (Westra & Barton, 1992).

Herbicides should be applied when they will be most effectively absorbed and translocated to the roots, but before the plants produce seed and new buds. Most researchers suggest that herbicides be applied to field bindweed when the plant is most vigorous.

Many parasitic organisms have been under investigation for control of field bindweed and one has been approved, but none have yet proven useful. Several insect and mite species in North America and Eurasia attack field bindweed but are not effective control agents. The prospective biocontrol agents themselves are heavily parasitized, do not feed exclusively one species, or simply do not cause sufficient damage to field bindweed (Callihan *et al.*, 1990). Many other species have been collected from field bindweed in Canada and the U.S. and a list of these may be found in Weaver and Riley (1982). Species that may be useful in the future are listed below.

**CURRENT DISTRIBUTION ON THE SITE;** Primarily on the Chelan Butte Unit (about 200 acres)

**ACRES AFFECTED BY WEED:** ~ 300 acres

**WEED DENSITY:** High but localized

### **GOAL**

Prevent new weed infestations and control existing weed infestations through an integrated pest management program.

### **OBJECTIVES**

- Prevent new and aggravation of existing infestations
- Treat infestations with biological agents when effective and/or when weeds locations are inaccessible or within sensitive habitat.
- Aggressively control weeds in high use areas
- Survey and map existing populations
- More accurately calculate acreage affected by weeds
- Treat all plants that can be reached with equipment before they produce seed
- Survey all units for infestations

**ACTIONS PLANNED:** Continue using prevention methods as discussed above and avoid using cultural practices, which spread this weed. Apply herbicide to patches where possible.

### **CONTROL SUMMARY AND TREND**

2002-

2003-

2004-

2005- 25 acres

Almost all field bindweed infestations are located in old agricultural fields. In the late 1990's and early 2000's, we aggressively controlled field bindweed with herbicide in conjunction with restoring the Deppner and Roundy fields in the Entiat Unit. This successfully reduced the presence of bindweed there while native grasses reestablished the site. Bindweed is now limited to scattered patches on the Entiat Unit but it is still very prominent in most of the Chelan Butte fields. Successful control of this weed will require much additional funding and intensive management of the fields.

## YELLOW STAR THISTLE

**Scientific Name:** *Centaurea solstitialis*

**Common Names:** Yellow starthistle, Geeldissel, Golden star thistle, St. Barnaby's thistle, Yellow centaury, Yellow cockbur

**Updated:** 2006

**DESCRIPTION:** Yellow starthistle is a member of the sunflower or daisy family, Asteraceae (Compositae). As its name indicates, it is characterized by a yellow thistle-like flower with 3/8- 3/4 inch yellowish spines in star-like arrangement at the base of the flower head. The flower heads occur singly at the ends of branched stems 18-36 inches high which arise from a basal rosette of leaves. The stem and leaves are a dull green color and covered with fine woolly hairs. The basal rosette leaves are pinnately lobed with the distal portion more rounded and larger. As leaves ascend the stem they become shorter and narrower with pointed tips. Their arrangement is alternate and the leaf bases extended down the stem producing a winged effect. The yellow starthistle flower heads consist of tubular yellow florets in a discoid head about one inch in diameter. The marginal flowers produce nonplumed seeds and the central flowers plumed seeds. The root is a taproot extending deeper than the annuals it may compete with for moisture and nutrients.

Yellow starthistle was introduced to the western United States from the Mediterranean. It was first found growing in ballast grounds of our west coast seaports. It has spread extensively throughout California and to the Pacific Northwest. Approximately 800 million acres are involved in California, 1,130,000 acres in Idaho, 4,000 acres in Oregon, and 134,000 acres in Washington. Cattle feeding on yellow starthistle may be poorly nourished and can be damaged by the spiny heads. Seeds for crops and feed become contaminated. Removal of yellow starthistle seeds increases the expense of certified seed. Recreation lands are becoming infested.

Horses may be poisoned and develop "chewing disease" or E.N.E. (Equine nigropallidal encephalomalacia) if they ingest large quantities (86 - 200 percent body weight) over one to two months. The disease is characterized by acute inability to eat or drink and the horses may die from dehydration and starvation. Only horses are affected. Chemical substances in yellow starthistle are somehow altered in the processes of digestion and metabolism producing a toxin, which causes death of nerve centers in the brain controlling normal eating and drinking mechanisms. There is no cure.

Yellow starthistle is a winter annual that begins its growth in the fall from seeds that germinate when moisture conditions improve and temperature is in the sixties. Oblong tongue shaped cotyledons or seed leaves emerge in the early spring. Secondary leaves develop forming a rosette of leaves that increase in size and number (from 5 - 25 leaves in a rosette). In late May to June, the plant begins to bolt, sending up a stalk to about 30 inches in height and whose top is a firm bud. The stalks branch and flower buds form at the end of each. In mid-July to early August bright dandelion-yellow flower heads appear. Plants begin to dry in August and become easily identifiable skeletons that are silvery gray with a white cottony flower head. More than 150,000 seeds per plant may be produced in a single season, and these may remain viable in the soil for several years. Seeds are of two types: plumed and plumeless. Plumed seeds are subject to dispersal by gusts of wind and may be carried for considerable distance. Plumeless seeds tend to remain in the head until it falls apart. The seeds germinate near the base of the mother plant. With the onset of late fall rains,

yellow starthistle seeds begin to germinate and the cycle is repeated. However, because of varying conditions, distribution and maturation rates, and long viability, some may germinate at any time of the year.

Reproduction is through seed. A winter annual, yellow starthistle has an abundant seed production - 150,000 per plant per season. The seed is spread by wind, as a contaminant of commercial seeds, alfalfa, clover, hay, straw, vehicles, construction and maintenance equipment, farming equipment, motor rail vehicles, animals, man, and birds, especially finches. The seeds remain viable for years. The seeds are plumed and plumeless.

The plumed seeds, upon maturity, are thrust upward into the opening at the top of the bracts. In that position, they are subject to dispersal by gusts of wind or other disturbance, which results in movement of the stem. Those seeds may germinate as soon as moisture conditions are favorable. The outer circle of florets associated with the bracts produces plumeless seeds. Consequently they tend to remain in the head until it falls apart. This provides a second period and method of seed dispersal.

#### **MANAGEMENT INFORMATION:**

Yellow starthistle in the rosette stage is not difficult to kill with herbicides such as 2-4-D. Plants in the flowering and seed production phase are resistant. Seeds are also resistant. Picloram not only kills the rosette stage but, due to residual action, is effective on seedlings developing in the next season. However, skipped or missed areas of herbicide application may occur. Seeds may survive beyond residual action of picloram. Resistance to picloram has been reported. Refer to Pacific Northwest Weed Control Handbook for detailed management.

The primary site of yellow starthistle infestation is rangeland. Mechanical removal is economically unsound for dense infestations. However, initial infestations, such as occurred from contaminated seed mix in Okanogan County, have been lessened by hand pulling, flagging, and a herbicide pellet application. Proper grazing management, including rest and deferment to allow grasses to regain vigor, will both limit yellow starthistle invasions and improve the range's condition. In California, frequent cultivation slows or inhibits the plant, preventing it from fully exploiting cultivated grassland steppes.

Larson and McInnis (1989) report that a combination of "Tualatin" tall oatgrass or "Paiute" orchard grass with picloram application effectively controlled yellow starthistle and improved forage production.

Washington State initiated a yellow starthistle biological control program in 1985 with the release of a beetle *Bangosternus orientalis*. The beetles feed on small buds and lay eggs in medium sized buds. Larvae hatch and feed on developing seed destroying all of them within the head. Pupation occurs in the damaged heads and the emerged adults overwinter in the soil. This beetle has reduced yellow starthistle seed production by about 60 percent. Two other beetles, which destroy yellow starthistle seed in affected heads, are *Eustenopsis villosus* - released and successfully colonized at a site in Whitman County in 1990 - and *Larinus curtus*.

A yellow starthistle seed eating fly, *Chaetorelia australis* was released in 1988. Another fly with inhibiting effects on yellow starthistle is *Urophora sirunaseua*. Several thousand pupae of

starthistle-specific gall-producing wasps have been released in Umatilla County, where they may help limit starthistle spread at base of the Blue Mountains.

**CURRENT DISTRIBUTION ON THE SITE;** Primarily on the Entiat Unit (Knowles/Navarre Coulee)

**ACRES AFFECTED BY WEED:** ~ 30 acres

**WEED DENSITY:** Low, Scattered

### **GOAL**

Prevent new weed infestations and control existing weed infestations through an integrated pest management program.

### **OBJECTIVES**

- Prevent new and aggravation of existing infestations
- Treat infestations with biological agents when effective and/or when weeds locations are inaccessible or within sensitive habitat.
- Aggressively control weeds in high use areas
- Survey and map existing populations
- More accurately calculate acreage affected by weeds
- Treat all plants that can be reached with equipment before they produce seed
- Survey all units for infestations

**ACTIONS PLANNED:** Continue using prevention methods as discussed above and avoid using cultural practices, which spread this weed. Apply herbicide to patches where possible.

### **CONTROL SUMMARY AND TREND**

2002- Treated 6 acres (sprayed and hand pulled) in 150 infested acres.

2003- Data not available, similar to 2002

2004- Sprayed 6+ acres and pulled ~ 1 acre in 80 acres

2005- Spot sprayed and hand pulled in about 300 acres.

The infestation of Yellow starthistle is limited to the Knowles area of the Entiat Unit. Few plants found in the Roundy fields around 2001, were hand pulled and no plants were found on the site subsequently. In 1998, the weed infested over 300 acres primarily in the Knowles fields and their vicinity. Herbicide applications (primarily Tordon) and restoration of these fields drastically reduced the area affected. Yellowstar thistle now is located in small sparse patches on the area, which are spot treated with herbicide annually. The treated areas are inspected while the thistle is flowering and plants missed during the herbicide application are pulled and destroyed.

Trend: The occurrence of yellow starthistle on the area has decreased substantially on the area. The affected area is similar in size but plants are sparser in the individual patches smaller.

## **GENERAL WEEDS**

**Scientific name:** *Many*

**Common name:** General Weeds

**Updated:** 2006

**DESCRIPTION:** General weeds describe mixed vegetation that interferes with maintenance, agricultural, or restoration activities, where keying plants to individual species is not appropriate or practical. Examples of general weeds include vegetation occurring along roadsides, parking areas, trails, agricultural fields and structures and species like cheatgrass, sandbur, puncturevine, kochia, Russian thistle, cheatgrass, Russian knapweed, Jim Hill mustard, reed canarygrass, quackgrass, bindweed, thistle, goatgrass, etc.

### **MANAGEMENT INFORMATION:**

Herbicide can be an effective tool for control of these weeds 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, to the plowing and disking entire fields.

### **CURRENT DISTRIBUTION ON THE SITE**

All public accesses, roadsides and agricultural fields on the wildlife area contain miscellaneous weeds to varying degrees.

**ACRES AFFECTED BY WEED:** ~ 500

**WEED DENSITY:** Low - High

### **GOAL**

Prevent new weed infestations and control existing weed infestations through an integrated pest management program.

### **OBJECTIVES**

- Prevent new and aggravation of existing infestations
- Treat infestations with biological agents when effective and/or when weeds locations are inaccessible or within sensitive habitat.
- Aggressively control weeds in high use areas
- Survey and map existing populations
- More accurately calculate acreage affected by weeds
- Treat all plants that can be reached with equipment before they produce seed
- Survey all units for infestations

### **ACTIONS PLANNED**

Continue using prevention methods as discussed above. Annually, treat affected portions of roadsides, parking lots, access sites, and trailheads with a residual herbicide to eliminate the production and spread of weed seeds and improve appearance and public access for the entire season.

Cultivate firebreaks to eliminate weeds and fuel.

### **CONTROL SUMMARY AND TREND**

2002-

2003-

2004- Mowed 185 acres restored fields and sprayed 15 acres of wild rye

2005- Mowed 60 acres, sprayed 11 acres

### APPENDIX 3. CHELAN WILDLIFE AREA FIRE CONTROL PLAN

The Department of Natural Resources (DNR) provides fire protection on WDFW lands located in Chelan County in its Fire Protection District. Recently (2005), DNR entered into a Memorandum of Agreement with WDFW to service the Chelan Butte Unit, which is not within the jurisdictional boundaries of the local fire districts. A small portion of the wildlife area lies in three different Chelan County Fire Districts; the Chelan Falls district # 7 (north of the Chelan Butte Unit), Entiat district # 8 (south of Chelan Butte and east and south the Entiat unit) and the Wenatchee district #1 (south and east of the Swakane Unit). WDFW will also coordinate fire-fighting efforts with the US Forest Service.

By policy, WDFW directs its employees to not fight fires. Wildlife Area staff are trained in fire fighting and fire behavior (blue and red card), however, in order to provide support and information regarding critical habitat values to the fire Incident commander.

Wildlife Habitat Concerns: The Chelan Wildlife Area contains fire sensitive habitat that is critical to several species of wildlife including mule deer winter range. Therefore, when a fire occurs in or near the wildlife area, WDFW requests that the Incident Commander or other fire fighting personnel on site to notify WDFW personnel immediately in the order listed below. A WDFW Advisor will provide information to the Incident Commander regarding habitat concerns.

Aerial Support: The WDFW recommends that fire-fighting entities suppress fires on the wildlife area as rapidly as possible. WDFW requests the incident commander to seek aerial support if needed to extinguish a fire on its land promptly. If, in the professional judgment of the Incident Commander, a fire on lands adjacent to the Chelan Wildlife Area poses an immediate threat to the area, WDFW requests that he/she seek aerial support as outlined above. It is absolutely critical that any fire on the Chelan Wildlife Area is fought as aggressively as possible during the initial attack. The importance of aerial support cannot be overstated.

Reporting: Report any fire on or adjacent to all units of the Chelan Wildlife Area by contacting the local fire district and the Department of Natural Resources Dispatch Office in Wenatchee (See tables below). Contact the numbers listed below IN THE ORDER listed and request the Operations or Staff Coordinator.

**Fire Districts-DIAL 911**

Name	TELEPHONE OFFICE	PRIVATE	CELL
Wenatchee District #1 Fire Chief: Randy Johnson Deputy Chief: Phil Mosher	<b>911, 509-662-4734</b>		
Chelan Falls District #7 Fire Chief: Kurt Blanchard	<b>911, 509- 682-4476</b>		
Entiat District #8 Fire Chief: Mike Asher	<b>911, 509-784-1366</b>		

**DNR** contact in order listed, and request Operations or Staff Coordinator

<b>Name</b>	<b>TELEPHONE OFFICE</b>	<b>PRIVATE</b>	<b>CELL</b>
Interagency Dispatch Office	509-663-8575		
Wenatchee	800-826-3383		

**Department of Fish and Wildlife (WDFW) Contacts – Contact in order listed**

<b>Name</b>	<b>TELEPHONE OFFICE</b>	<b>PRIVATE</b>	<b>CELL</b>
<b>Marc Hallet, Chelan WA Manager</b>	<b>509-686-4305</b>		<b>509-679-4780</b> <b>509-449-0386</b>
<b>Dan Peterson, Chelan WA Assistant</b>	509-686-4305		<b>509-670-1284</b> <b>509-449-0016</b>
<b>Fidel Rios, Chelan WA</b>	509-686-4305		<b>509-670-2485</b>
<b>Regional Office - Ephrata</b>	<b>509-754-4624</b>		
<b>Regional Program Manager</b> <b>Matt Monda</b>	<b>509-754-4624</b>		<b>509-750-3555</b>
<b>Doug Ward, Sergeant</b>	<b>509-664-3192</b>		
<b>Beau Patterson, District Biologist</b>	<b>509-663-9764</b>		<b>509-670-9089</b>
<b>Tom McCall, Field Biologist</b>	<b>509-886-5287</b>		<b>509-670-2199</b>
<b>State Patrol Dispatch</b>	<b>911</b>		
<b>Steve Dauma, Enforcement Cpt.,</b>	<b>509-754-4624</b>		<b>509-989-4984</b>
<b>Fred Wiltse, Wildlife Agent,</b> <b>Brewster</b>			<b>509-733-0079</b>

**Private Aerial Support Services**

Johnson Air Service, Waterville	509-745-8983		
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## APPENDIX 4. CHELAN WILDLIFE AREA – WATER RIGHTS

### Swakane Unit

File #	Stat	Doc	Purpose	WRIA	TRS	QQ/Q	Type		Reviewer comments
S4-064670CL	A	Claim L	WL, IR	46	24.0N 20.0E 07		SWAKANE CREEK		
S4-064669CL	A	Claim L	WL	46	24.0N 20.0E 16		MEYERS SPRING	*	
S4-064668CL	A	Claim L	WL	46	24.0N 20.0E 17		SPRING	*	
S4-064808CL	A	Claim L	WL	46	24.0N 20.0E 21		SPRING		
S4-064671CL	A	Claim L	DG	46	24.0N 20.0E 22	SESW	SPRING		
4026-A			IR, WL				WELL	*	
<b>Entiat Unit</b>									
File #	Stat	Doc	Purpose	WRIA	TRS	QQ/Q	Type		Reviewer comments
S4-048129CL	A	Claim S	WL	46	25.0N 20.0E 11	NESW	SPRING	*	
S4-048130CL	A	Claim S	WL	46	25.0N 20.0E 11		SPRING		Applied for water right on an intermittent stream
S4-048132CL	A	Claim S	WL	46	26.0N 21.0E 20	NESW	SPRING	*	
S4-048135CL	A	Claim S	WL	46	26.0N 21.0E 30	NWSE	SPRING		
S4-048134CL	A	Claim S	WL	46	26.0N 21.0E 32	NESE	SPRING	*	
S4-048131CL	A	Claim S	WL	47	26.0N 21.0E 01	SESW	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-048133CL	A	Claim S	WL	47	26.0N 21.0E 10	NENE	SPRING	*	Application was for .02 CFS and 2 AF/Year

## Chelan Butte Unit

File #	Stat	Doc	Purpose	WRIA	TRS	QQ/Q	Type		Reviewer comments
S4-046032CL	A	Claim L	WL	47	27.0N 22.0E 25	NE	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046022CL	A	Claim L	WL	47	27.0N 22.0E 27	SWSW	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046023CL	A	Claim L	WL	47	27.0N 22.0E 27	NESW	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046014CL	A	Claim L	WL	47	27.0N 22.0E 28	SENE	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046015CL	A	Claim L	WL	47	27.0N 22.0E 28	NESE	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046016CL	A	Claim L	WL	47	27.0N 22.0E 28	NWSE	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046017CL	A	Claim L	WL	47	27.0N 22.0E 28	NENW	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046018CL	A	Claim L	WL	47	27.0N 22.0E 28	SENE	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046019CL	A	Claim L	WL	47	27.0N 22.0E 28	NESW	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046020CL	A	Claim L	WL	47	27.0N 22.0E 28	SW	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046021CL	A	Claim L	WL	47	27.0N 22.0E 28	SWSW	SPRING	*	Application was for .02 CFS and 2 AF/Year
G4-046013CL	A	Claim L	WL	47	27.0N 22.0E 29	NESE	SPRING/WELL	*	Application was for .02 CFS and 2 AF/Year
S4-046011CL	A	Claim L	WL	47	27.0N 22.0E 29	SESW	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046012CL	A	Claim L	WL	47	27.0N 22.0E 29	SESE	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-045997CL	A	Claim L	WL	47	27.0N 22.0E 32	NESW	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-045999CL	A	Claim L	WL	47	27.0N 22.0E 32	NESE	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046000CL	A	Claim L	WL	47	27.0N 22.0E 32	SESE	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046002CL	A	Claim L	WL	47	27.0N 22.0E 33	SWNE	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046003CL	A	Claim L	WL	47	27.0N 22.0E 33	SWSE	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046004CL	A	Claim L	WL	47	27.0N 22.0E 34	NENW	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046005CL	A	Claim L	WL	47	27.0N 22.0E 34	NENW	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046006CL	A	Claim L	WL	47	27.0N 22.0E 34	NWNE	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046006CL	A	Claim L	WL	47	27.0N 22.0E 34	SENE	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046008CL	A	Claim L	WL	47	27.0N 22.0E 34	SENE	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046009CL	A	Claim L	WL	47	27.0N 22.0E 34	NENW	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046010CL	A	Claim L	WL	47	27.0N 22.0E 35	SESE	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046024CL	A	Claim L	WL	47	27.0N 22.0E 35	SWNW	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046025CL	A	Claim L	WL	47	27.0N 22.0E 35	NWSW	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046027CL	A	Claim L	WL	47	27.0N 22.0E 35		SPRING		Application was for .02 CFS and 2 AF/Year
S4-046026CL	A	Claim L	WL	47	26.0N 22.0E 03	NWNW	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046031CL	A	Claim L	WL	47	26.0N 22.0E 03	SENE	SPRING	*	Application was for .02 CFS and 2 AF/Year
S4-046001CL	A	Claim L	WL	47	26.0N 22.0E 04	SWNW	SPRING	*	Application was for .02 CFS and 2 AF/Year

## **REFERENCES AND RELATED LINKS**

WDFW Strategic Plan ([http://wdfw.wa.gov/depinfo/strat\\_goals\\_obj.htm](http://wdfw.wa.gov/depinfo/strat_goals_obj.htm))  
Wildlife Area Statewide Plan (<http://wdfw.wa.gov/lands/lands2020/>)  
WDFW policies and procedures ([http://wdfw.wa.gov/depinfo/strat\\_goals\\_obj.htm](http://wdfw.wa.gov/depinfo/strat_goals_obj.htm))  
Priority Habitat and Species List (<http://wdfw.wa.gov/hab/phslist.htm>)  
Priority Habitat and Species Recommendations (<http://wdfw.wa.gov/hab/phsrecs.htm>)  
WDFW Sage grouse Recovery Plan, 2004  
WDFW Sharp-Tailed Grouse Recovery Plan, 1997  
WDFW Bald Eagle Status Report, 2001  
Paige & Ritter, 1999. Birds in a Sagebrush Sea, Managing Sagebrush Habitats for Bird Communities.  
Daubenmire, 1970. Steppe Vegetation of Washington.  
Northwest Power Planning Council (NWPPC), Upper Middle Mainstem Subbasin Plan, 2004(<http://www.nwcouncil.org/fw/subbasinplanning/uppermidcolumbia/plan/>)  
Wenatchee Subbasin Plan (<http://www.nwppc.org/fw/subbasinplanning/wenatchee/plan/>)  
Entiat Subbasin Plan (<http://www.nwppc.org/fw/subbasinplanning/entiat/plan/>)  
Lake Chelan Subbasin Plan (<http://www.nwppc.org/fw/subbasinplanning/lakechelan/plan/>)  
Northwest Power Planning Council (NWPPC), Upper Middle Mainstem Subbasin Plan, 2004(<http://www.nwcouncil.org/fw/subbasinplanning/uppermidcolumbia/plan/>)  
WRIA 46 – Entiat Watershed Plan ([http://www.chelancd.org/WRIA46\\_Plan.htm](http://www.chelancd.org/WRIA46_Plan.htm))  
WRIA 45 - Wenatchee Watershed Plan (<http://www.co.chelan.wa.us/nr/nr3.htm>)  
WRIA 47 – Lake Chelan Watershed Plan (not completed)  
White and Little Wenatchee Rivers Watershed Assessment – Wenatchee National Forest Lake Wenatchee Ranger District