August 2018

Chelan Wildlife Area Management Plan

Washington Department of FISH and WILDLIFE

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Cover Photos: Chelan Butte Unit by Justin Haug, bighorn sheep rams by Beau Patterson, Beebe Springs western meadowlark by Alan Bauer and Bighorns in the Swakane by Justin Haug




Chelan Wildlife Area

Kelly Susewind, Director, Washington Department of Fish and Wildlife

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Table of Contents

List of Acronyms & Abbreviations

BLM	Bureau of Land Management
DAHP	Washington State Department of Archaeology & Historic Preservation
DNR	Washington State Department of Natural Resources
DPS	Distinct Population Segment
EIA	Ecological Integrity Assessment
EIM	Ecological Integrity Monitoring
ESA	Endangered Species Act
ESU	Evolutionary Significant Unit
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
IPM	Integrated Pest Management
NRCS	National Resources Conservation Service
PHS	Priority Habitats and Species
PUD	Chelan County Public Utility District
RCW	Revised Code of Washington
RCO	Washington State Recreation and Conservation Office
SEPA	State Environmental Policy Act
SGCN	Species of Greatest Conservation Need
SRFB	Salmon Recovery Funding Board
SWAP	State Wildlife Action Plan
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
WAC	Washington Administrative Code
WAAC	Wildlife Area Advisory Committee
WDFW	Washington State Department of Fish and Wildlife
WLA	Wildlife Area
WHCWG	Washington Wildlife Habitat Connectivity Working Group
WSDOT	Washington State Department of Transportation
WWRP	Washington Wildlife and Recreation Program

Chelan Butte Unit
Photo by Justin Haug

Wildlife Area Management Planning Overview

Introduction

Under state law, the Washington State Department of Fish and Wildlife (WDFW) is charged with "preserving, protecting, and perpetuating" the state's fish and wildlife species, while also providing sustainable recreational opportunities that are compatible with fish and wildlife stewardship. Today, WDFW owns and manages just over one million acres on 33 wildlife areas across Washington, whose diversity includes nearly all species and habitats present in the state. With the loss of natural habitat posing the single greatest threat to native fish and wildlife, these areas play a critical conservation role. The wildlife area management plan addresses all aspects of resource management and aligns with statewide conservation goals.

The Chelan Wildlife Area Management Plan was developed by an interdisciplinary team of WDFW staff with significant public involvement. This included input from the local stakeholder-based Chelan Wildlife Area Advisory Committee (WAAC), input from other public agencies, and input from other interested citizens gathered from two public meetings.

Wildlife Area Management Planning Framework

Management of these areas is directed by WDFW's mission and strategic plan, as well as by state and federal laws. Each new plan is guided by the Wildlife Area Management Planning Framework (Framework), which summarizes the agency's mission, laws, policies and approaches to management of fish and wildlife, as well as public use and recreation. The framework summarizes priorities and guidance developed in each of the agency's programs – Fish, Wildlife, Habitat, and Enforcement. Readers are encouraged to review the framework in advance, or as a companion document to this wildlife area plan (http://wdfw.wa.gov/ lands/wildlife_areas/ management_plans/). The framework provides context for the organization and content of wildlife area plans across the state. The WDFW's planning framework is a living document, and is updated periodically to reflect new agency initiatives, guidance or directives.

Purpose of the Plan

The purpose of this management plan is to guide all management activities occurring on the Chelan Wildlife Area for the next 10 years. Management goals, objectives and performance measures are defined in the plan. All were developed to be consistent with WDFW's mission, strategic plan, and requirements associated with the funds used to purchase the wildlife areas. The plan provides a clear vision of how these lands are managed to a variety of audiences, including WDFW staff and the public.

Statewide Planning Goals

A complete list of goals, objectives, and performance measures specific to this wildlife area are found in on page 9.

Statewide Wildlife Area Vision

Wildlife areas inspire and engage the citizens of Washington to care for our rich diversity of fish, wildlife and habitat.

Management of these lands:

- Contributes to fish and wildlife conservation;
- Provides opportunities for fishing, hunting, wildlife viewing, and other outdoor recreation; and
- Supports public values of open space, health and well-being, economic vitality and community character.

Public Outreach and Stakeholder Involvement Process

The agency is committed to a transparent and inclusive public outreach process for all wildlife area management plans. Under the umbrella of the statewide goals listed above, a customized outreach strategy was developed for this area, one tailored to local and regional stakeholders, as well as local and out of the area visitors and user groups. For this plan, the public process included three elements: 1) public and advisory committee meetings; 2) development and distribution of fact sheets, meeting announcements, and news releases; and 3) solicitation of public comments through phone, email, and the WDFW website. A complete summary of the public outreach activities is included in Appendix H, Public Response Summary, located on the WDFW website at https://wdfw.wa.gov/lands/wildlife_areas/management_plans/chelan/.

Statewide Planning Goals

Goal 1	**Restore and protect the integrity of priority ecological systems and sites.** This goal originates from the WDFW Strategic Plan, Goal #1. "Conserve and protect native fish and wildlife". Ecological integrity monitoring on priority sites will be developed as part of implementation of the management plan for each individual wildlife area plan discussed on page 52.
Goal 2	**Sustain individual species through habitat and population management actions, where consistent with site purpose and funding.** This goal relates to WDFW Strategic Plan, Goal #1. Each individual wildlife area plan will provide a summary of species associated with the wildlife area and will focus on target species for habitat management actions.
Goal 3	**Provide fishing, hunting, and wildlife-related recreational opportunities where consistent with Goals 1 and 2.** This goal is consistent with the WDFW Strategic Plan, Goal #2. Each plan will provide a summary of recreation activities associated with the wildlife area, aiming toward balancing recreational activities with species and habitat protection.
Goal 4	**Engage stakeholders in consistent, timely and transparent communication regarding wildlife area management activities.** This goal relates to Strategic Plan Goal #3, "Promote a healthy economy, protect community character, maintain an overall high quality of life, and deliver high-quality customer service". As described under the public outreach section of this document, public input and involvement is a key component in the development of the management plan through the advisory committee efforts and public meetings. After the plan is adopted, the management plan updates will be reviewed by the wildlife area advisory committee on a biannual basis.
Goal 5	**Maintain productive and positive working relationships with local community neighbors, lessee partners and permittees.** As part of day-to-day business, wildlife area staff strives to maintain positive working relationships with grazing and agricultural lessees and the local community.
Goal 6	**Hire, train, equip, and license, as necessary, wildlife area staff to meet the operation and management needs of wildlife areas.** This goal is consistent with Goal #4 of the Strategic Plan. Build an effective and efficient organization by supporting the workforce, improving business processes, and investing in technology. Specific activities on wildlife areas include attending training and hiring qualified staff.
Goal 7	**Maintain safe, highly functional, and cost-effective administration and operational facilities and equipment.** This goal is consistent with WDFW Strategic Plan Goal #4. Maintenance of facilities and equipment is a key activity on wildlife areas. Annual reporting is required by WDFW and agencies that provide operations and maintenance funding (e.g. U.S. Fish and Wildlife Service, Pittman Robertson).

Welcome to the Chelan Wildlife Area

Introduction to the Chelan Wildlife Area

The Chelan Wildlife Area is located in Chelan and Okanogan counties with the majority of the 30,874-acre wildlife area located between Wenatchee and Chelan along the Columbia River. The predominant community type is shrubsteppe, including ponderosa pine and mixed coniferous forest at higher elevations, and riparian vegetation dispersed along creek bottoms and springs. WDFW acquired most of the wildlife area property as a result of a 1963 agreement with the Chelan County Public Utility District (PUD) for mitigation from the construction of the Rocky Reach Hydroelectric Dam. The wildlife area supports a wide variety of wildlife, including: Rocky Mountain mule deer, bighorn sheep, golden eagle, northern goshawk, sagebrush lizard, and sharp tail snake. The wildlife area has two documented species of reptiles, one amphibian, and seven mollusks of significant conservation concern. Gray wolf and Upper Columbia River Spring-run Chinook salmon are federally listed as endangered, while bull trout, Upper Columbia River steelhead and Ute ladies-tresses are federally threatened. The Chelan Wildlife Area offers a wide variety of recreational opportunities including: hunting, fishing, wildlife viewing, kayaking, canoeing, photography, target shooting, hiking, mountain biking, geocaching, birding, cross-country skiing, and horseback riding.

Wildlife Area Vision

The vision of the Chelan Wildlife Area is to maintain and enhance native habitats, support and recover fish and wildlife species on the wildlife area now and in the future, and provide hunting, fishing and other compatible recreational experiences.

Success Stories

Bighorn Sheep Recovery

WDFW's work to identify quality sites for establishing new bighorn sheep populations turned to the Chelan Wildlife Area in 2004, when 32 sheep were translocated from the Oak Creek Wildlife Area in Yakima County to the Chelan Butte Unit. Prior to acquisition, Chelan Butte was identified as having "good potential" for future reintroduction of California bighorn sheep based on topography, vegetation, and successful reintroduction efforts in 1968 and 1969. The goal of expanding the range of bighorn herds in Washington and providing increased hunting and wildlife viewing recreational opportunities, has been a great success. The herd on Chelan Butte has done exceptionally well, growing from the original 32 sheep to a herd of over 200 animals between 2004 and 2017. The quality and productivity of the wildlife area's habitat is producing exceptional hunting opportunities for large rams under WDFW's limited entry permit system. Chelan Butte is known nationally for its bighorn rams, and opportunities on the wildlife area generate funds for the department that support bighorn management activities across the state. The Chelan Butte Unit was purchased to mitigate the loss of the wildlife habitat inundated by the Rocky Reach reservoir. The lands are recognized as important mule deer winter range that also provide additional benefits to wildlife resources (e.g. bighorn sheep). In addition, the configuration of sheep habitat on Chelan Butte makes observing bighorns a likely event. Each year people travel to the area to observe bighorn males in their famous horn clashing behavior in preparation for the mating season. The location of drivable county roads on the wildlife area, and non-motorized access, provides opportunities for a wide variety of wildlife viewers.

Wildlife Viewing

Its proximity to several of central Washington's major travel corridors makes wildlife viewing on the Chelan Wildlife Area easily accessible. A network of roads allowing motorized and non-motorized access across the wildlife area places viewers in position to see exceptional seasonal concentrations of multiple species. Each fall, the Chelan mule deer herd migrates from high elevation summer ranges along the crest of the Cascades downward to the low elevation breaks above the Columbia River. Fifteen to 18,000 mule deer overwinter on these ranges each year, and the Swakane, Entiat, Chelan Butte, and Pateros units of the wildlife area provide important habitats supporting the population. During the fall breeding season, male mule deer abandon their normally

Chelan Butte bighorn sheep rams
Photo by Ron Fox

secretive habits and actively pursue females, making them easily viewable. Within each of the wildlife units, it is possible to observe during the rut and their breeding behaviors, often seeing multiple groups of females and males. As breeding subsides, these habitats remain important to the survival of the herd, providing important refuge during winter when deer expend energy reserves waiting for the arrival of spring. Once winter arrives, viewers need to use optics to watch deer from a distance to avoid disturbing them.

Bighorn sheep are another species on the wildlife area that provide exceptional opportunities for viewing. Because bighorns are resident on the wildlife area and they do not make long distance seasonal migrations, it's possible to view rams, ewes, and lambs throughout the year. The famous horn clashing battles of bighorn rams are on display on the Swakane and Chelan Butte units each fall. With persistent searching, it's not unreasonable to expect to see 50 to 100 bighorns during the peak of the breeding season. While sheep are less concentrated at other times, bighorns are viewable on the wildlife area throughout the year. With the arrival of spring, newborn lambs are one of the most enjoyable viewing opportunities.

Raptors are common on the Chelan Wildlife Area, with concentrations of bald eagles wintering along the Columbia River, and the arrival of golden eagles each February when the males and females establish territories. Peregrine falcons, once rare on the wildlife area, are now commonly observed hunting and raising young. With their increasing numbers due to range wide recovery and their expansion along the Columbia River continuing. Restoration of native habitats, especially shrubsteppe, occurring on the wildlife area over the past 20 years has increased foraging opportunities for these birds of prey. The variety of habitats on the wildlife area provide for endless birding opportunities in vegetation communities, ranging from shrubsteppe to riparian to mesic forest, and the different units are annual destinations for the state's birders.

Two birding and wildlife viewing routes, focused on opportunities in north central Washington, incorporate the Chelan Wildlife Area as a primary destination. Maps of the routes are found at the sites listed below.

North Central Washington Wildlife Viewing Map for Highway 97 (https://wdfw.wa.gov/publications/00979/wdfw00979.pdf)

The Great Washington State Birding Trail, Cascade Loop (http://wa.audubon.org/node4211/cascade-loop)

Frank's Pond at Beebe Springs

The Beebe Springs Unit was acquired in 2003 with funding from a Washington State Legislative appropriation. A stakeholder group with participation from 16 organizations and many individuals developed a master plan to restore upland, riparian, and wetland habitats, enhance and create anadromous fish habitat in Beebe Creek and along the Columbia River shoreline, and build a trail system with interpretive and educational elements. Over a ten-year period, the master plan was implemented to restore and enhance habitat and provide public access with a parking lot, vault toilet, interpretive signing, and miles of trails. These trails provide access to the Columbia River shoreline and restored upland

Opening day at Frank's Pond.
Photo by Michael De La Cruz

habitats. Implementation of the project was completed with a combination of Recreation Conservation Office (RCO) grant and capital budget funding. Development of a youth fishing pond, Frank's Pond, was a priority component for the project. In April 2016, the pond was opened to the public. The pond provides rainbow trout fishing opportunities for youth under 15 years of age during the spring, summer, and early fall months. Please check the Washington Sport Fishing Rules for current seasons and limits (https://wdfw.wa.gov/fishing/regulations/). The pond was named in honor of long-time Beebe Springs supporter and ardent supporter of youth fishing opportunities, Frank Clark.

Swakane Canyon Restoration

Since the first homesteader arrived in Swakane Canyon in the late 1890s, the canyon was farmed with irrigated and dryland crops, and in many places the creek was impacted by straightening and removal of riparian habitat. The agency purchased the Swakane Canyon Unit in 1967, sharecrop leases continued, and the dryland fields provided forage for wildlife. After over 40 years, the sharecrop leases were discontinued due to unreliable water sources, rocky soils, and difficulty maintaining the irrigation pipeline. In 2011, after receiving additional funding from Chelan County Public Utilities District 1 (PUD), the agency began restoring the agricultural fields to native vegetation, including planting riparian trees and shrubs along Swakane Creek. In fall of 2012, the fields were seeded with native grasses, and in 2013 native forbs and shrubs were seeded on portions of each field. Since 2013, six acres of riparian plantings have been completed at seven sites along Swakane Creek. An additional 400 ponderosa pines, blue elderberry, and golden current were planted to increase diversity. Additional ponderosa pine and riparian plantings are planned for the future. This restoration project will benefit quail populations and improve pheasant hunting opportunities. Pheasant releases fulfill one of the original intents for purchasing the property. Besides quail and pheasant, Monarch butterflies will benefit from increased presence of milkweed, cedar waxwings from increased berry production, and birds of prey, such as golden eagles, from increased foraging opportunities.

Swakane Canyon restoration
Photo by Ron Fox

White River Salmon Restoration

The Cascade Columbia Fisheries Enhancement Group completed the White River Large Wood Atonement Project in 2015. The objective of the project was to accelerate floodplain connectivity and enhance instream function in the lower White River Unit to benefit Chinook salmon, bull trout, steelhead, sockeye salmon, Pacific lamprey, and westslope cutthroat trout. This was accomplished by installing large woody debris in river locations to collect and retain additional wood, and creating logjams to provide extensive and complex instream habitat. Partners in this process included WDFW, Chelan/Douglas Land Trust, and the U.S. Fish & Wildlife Service (USFWS). Funding was provided by the Salmon Recovery Funding Board (SRFB), Washington State Department of Natural Resources (DNR), and USFWS.

Chelan Butte Agricultural Fields Restoration

Farming in Chelan Butte began in the late 1890s, and by the time Chelan Butte Unit came under WDFW ownership in 1965, over 1,000 acres of cropland were producing dryland wheat. For over 30 years, sharecrop lease agreements were in place. The grain provided winter feed for upland game birds, and a portion of the harvested crop was used as feed for the department's pheasant game farms. Farming remote and steep areas with limited productivity led to seeding with native grasses. Competition with weeds thwarted attempts to establish perennial vegetation and as a result, all sharecrop lease agreements ended. Attempts were made to maintain fallow (weed free) conditions until they could be seeded to perennial native plants. In 2010, the Chelan County PUD provided funding to restore the remaining fields, and over the past eight years, WDFW has been successful in transforming 27 fields to native habitat with grasses, forbs, and shrubs. By the end of 2017, all the fields had been seeded with native grass. During the tenure of this

Large woody debris (standing logs) installed on Lower White River
Photo by Ron Fox

management plan, the restoration process will continue with additional weed control and seeding of forbs and shrubs. Restoration of the fields has provided visible benefits to Chelan Butte's California bighorn sheep herd and the rare giant Palouse earthworm that also inhabits the Butte.

Wenatchee Sportsmen's Association Volunteers

Over the past 20 years, the Wenatchee Sportsmen's Association has provided thousands of hours of service to the Chelan Wildlife Area, including building and maintaining water developments; building, maintaining, and filling upland game bird feeders; building fences; tearing down derelict fences; completing wildlife surveys; maintaining kiosks; posting signs; picking up litter; and assisting with bighorn sheep translocations. This relationship demonstrates the value of volunteerism on the wildlife area.

One Chelan Butte project demonstrates the lasting effect their work will have on the wildlife area for years to come. During the early 1900s homesteading era, barbed wire fences were constructed around homesteads to contain farm stock and protect crops. In the late 1930s and 40s, multiple abandoned homesteads were consolidated into one large ranch that farmed dryland wheat and grazed cattle. This operation necessitated additional fencing,

Bighorn sheep in a restoration field on Chelan Butte
Photo by Ron Fox

including a perimeter fence around the entire ranch and mile upon mile of interior fence to create rotating pastures for the cattle and crops. When WDFW purchased the Chelan Butte Unit in 1970, leases for grazing cattle continued to be maintained. Although records are somewhat incomplete, it appears grazing occurred until the mid-1990s and was discontinued after fences were damaged or destroyed during the 1994 Tyee Fire. The Wenatchee Sportsmen's Association volunteers, over the course of several years, removed approximately twelve miles of barbed wire fence that crisscrossed the interior of the Chelan Butte Unit, removing an unnecessary wildlife hazard.

Wenatchee Sportsmen's Association volunteer, Bill Stegeman, assessing the potential for development of a spring in Swakane Canyon

Photo by Ron Fox

Wildlife Area Description

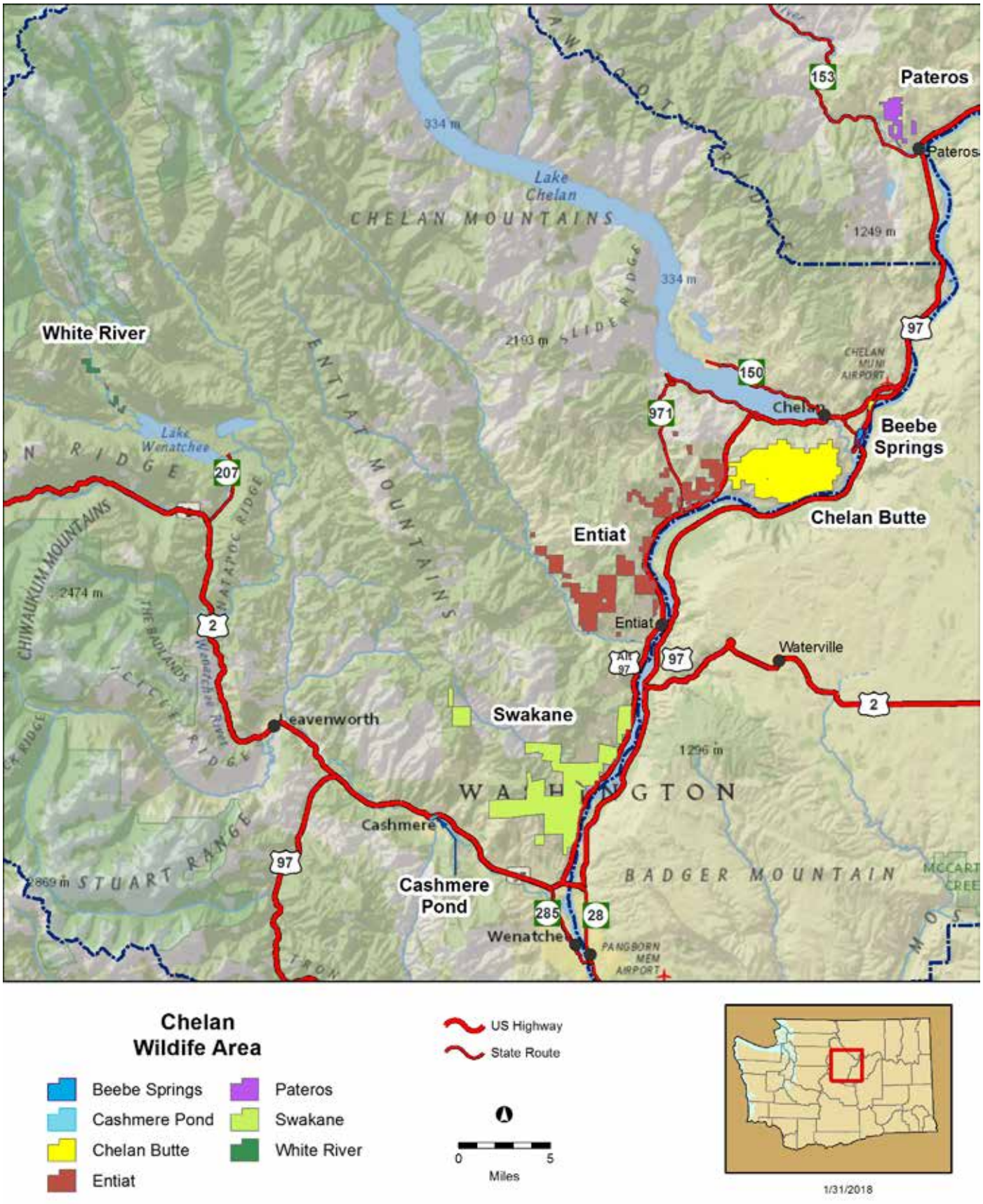
This section describes each of the seven units of the Chelan Wildlife Area, including Beebe Springs, Cashmere Pond, Chelan Butte, Entiat, Pateros, Swakane, and White River. Information includes an overview of property locations and acreage, resource management, recreation and public use, and landownership and management.

Location and General Description

The Chelan Wildlife Area is located in Chelan and Okanogan counties in north central Washington (see Map 1). The majority of the 30,874-acre wildlife area is located between Wenatchee and Chelan along the Columbia River. The predominant upland habitat type is shrubsteppe. At higher elevations, ponderosa pine and mixed coniferous forest occur, while riparian vegetation is dispersed throughout the wildlife area along creek bottoms and springs. WDFW acquired most of the wildlife area property as a result of a 1963 agreement with the Chelan County Public Utility District (PUD) for mitigation from the construction and operations of the Rocky Reach Hydroelectric Dam. The agency manages the area primarily for big game and upland game birds.

GENERAL WILDLIFE AREA INFORMATION		
Size	-	30,874 acres
Acquisition Dates	-	1965 - 2013
Acquisition Funding		Chelan County PUD, Wildlife Fund, Washington State Legislative Appropriation, Washington Department of Transportation, Washington Recreation Conservation Office – WWRP, SRFB; U.S. Fish and Wildlife Service – Pittman Robertson
Recreational Opportunities		Hunting, wildlife viewing, fishing, hiking, kayaking, canoeing, photography, geocaching, earthcaching, snowshoeing and x-country skiing, mountain biking, target shooting, hang gliding, shed antler hunting, horseback riding, camping, photography, butterfly observation
Counties	-	Chelan, Okanogan

Map 1. Chelan Wildlife Area Vicinity Map



Chelan Butte Unit
Photo by Justin Haug

Beebe Springs Unit

Beebe Springs Unit
Photo by Alan Bauer

GENERAL WILDLIFE AREA INFORMATION		
Size	-	162 acres
Acquisition Date	-	2003
Acquisition Funding	-	Washington State Legislative Appropriation
Elevation	-	707 – 1,183 feet
Recreational Opportunities	-	Watchable wildlife, fishing, hiking, kayaking, canoeing, photography, geocaching, earthcaching, snowshoeing and x-country skiing
Access	-	The unit is accessed from parking areas on State Highway 97 and State Highway 150.

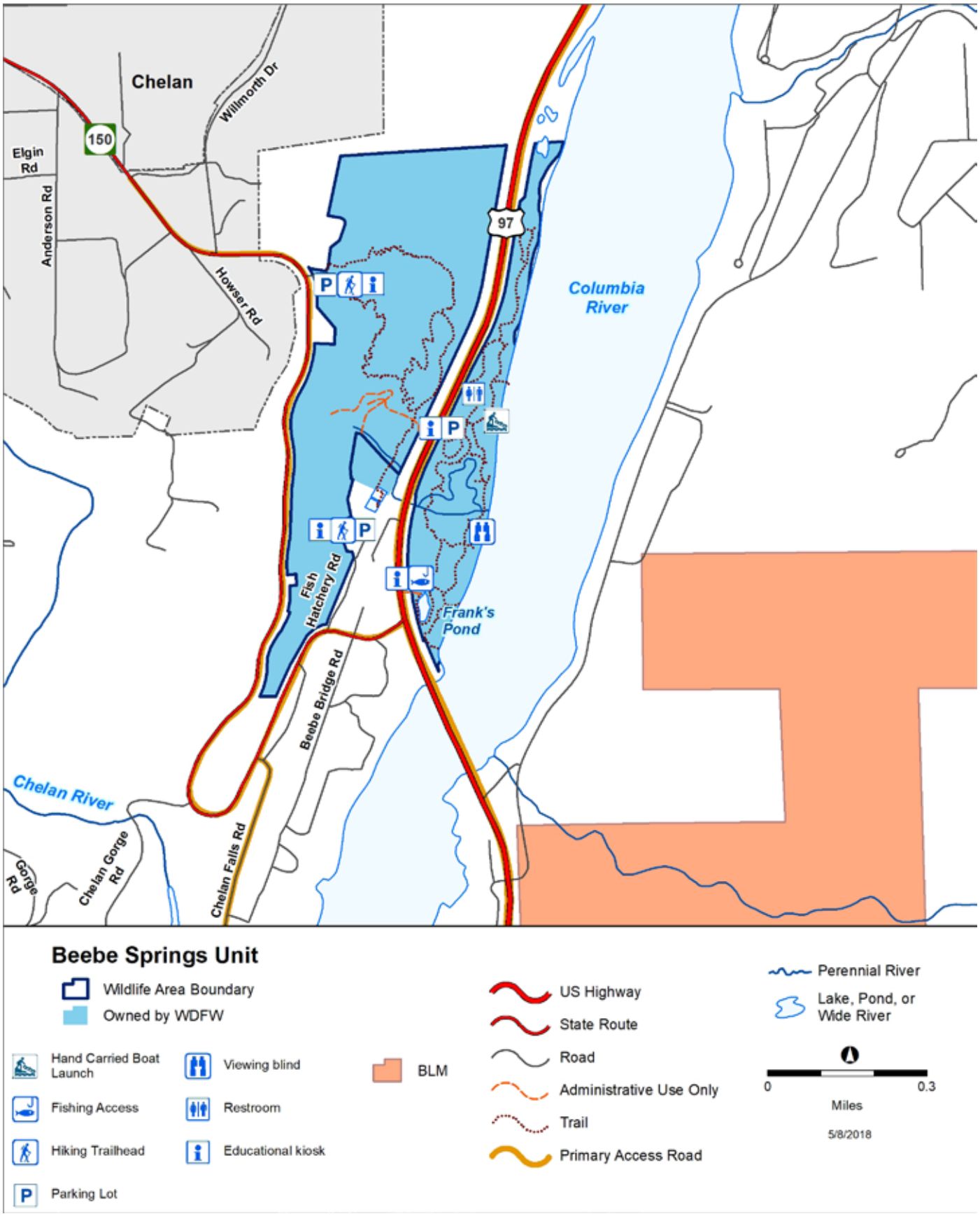
In 2003, WDFW acquired 162 acres surrounding the Chelan Hatchery that became the **Beebe Springs Unit.** This unit is located along the Columbia River east of the City of Chelan in Chelan County. Recreation and agriculture (tree fruit and wine grapes) are the primary land uses in the surrounding area. The acquisition provided the opportunity to secure water rights for the Chelan Hatchery and preserve one-mile of Columbia River shoreline, riparian/wetland, and shrubsteppe habitat. There was also potential to restore habitat on the portion of the property that was once an orchard. A stakeholder group developed a master plan to restore upland, riparian, and wetland habitats, enhance and create anadromous fish habitat in Beebe Creek and along the Columbia River shoreline, and build a trail system with interpretive and educational elements. Over a ten-year period, the master plan was implemented. In addition to restoration projects, the area was developed with parking, vault toilet, interpretive signage, and miles of trails. These trails provide access to the Columbia River shoreline, restored upland habitats and Frank's Pond, which provides exclusive fishing opportunities to juvenile anglers. Birding is a popular activity on the unit, with over 120 species observed. Adult steelhead can be observed spawning in Beebe Creek during April and May, while adult Chinook and coho salmon can be observed in October and November. Unfortunately, easy access from the Highway 97 has resulted in the wildlife area becoming a popular restroom stop, which creates overuse problems in spring and summer; and litter and waste problems during the winter season when the vault toilet cannot be maintained.

Primary management objectives for this unit include:

- Include mast producing plants in riparian plantings for western gray squirrel (4D).
- Protect tiger salamander habitat by evaluating fish plantings and preventing the drying of wetlands, ponds, lakes, and streams. (4G).
- Protect and restore native vegetation in riparian corridors to benefit California quail and increase potential habitat for sharp-tailed grouse and other wildlife species (5B).
- Explore options for improving spawning in the new Beebe Creek channel by 2023 (8B).
- Maintain fishing opportunities at Chelan Wildlife Area (9K).
- Develop and implement a plan to address overuse of the vault toilet at Beebe Springs (9M).

Beebe Springs Unit
Photo by Alan Bauer

Map 2. Beebe Springs Unit



Cashmere Pond Unit

Cashmere Pond side channel
Photo by Graham Simon

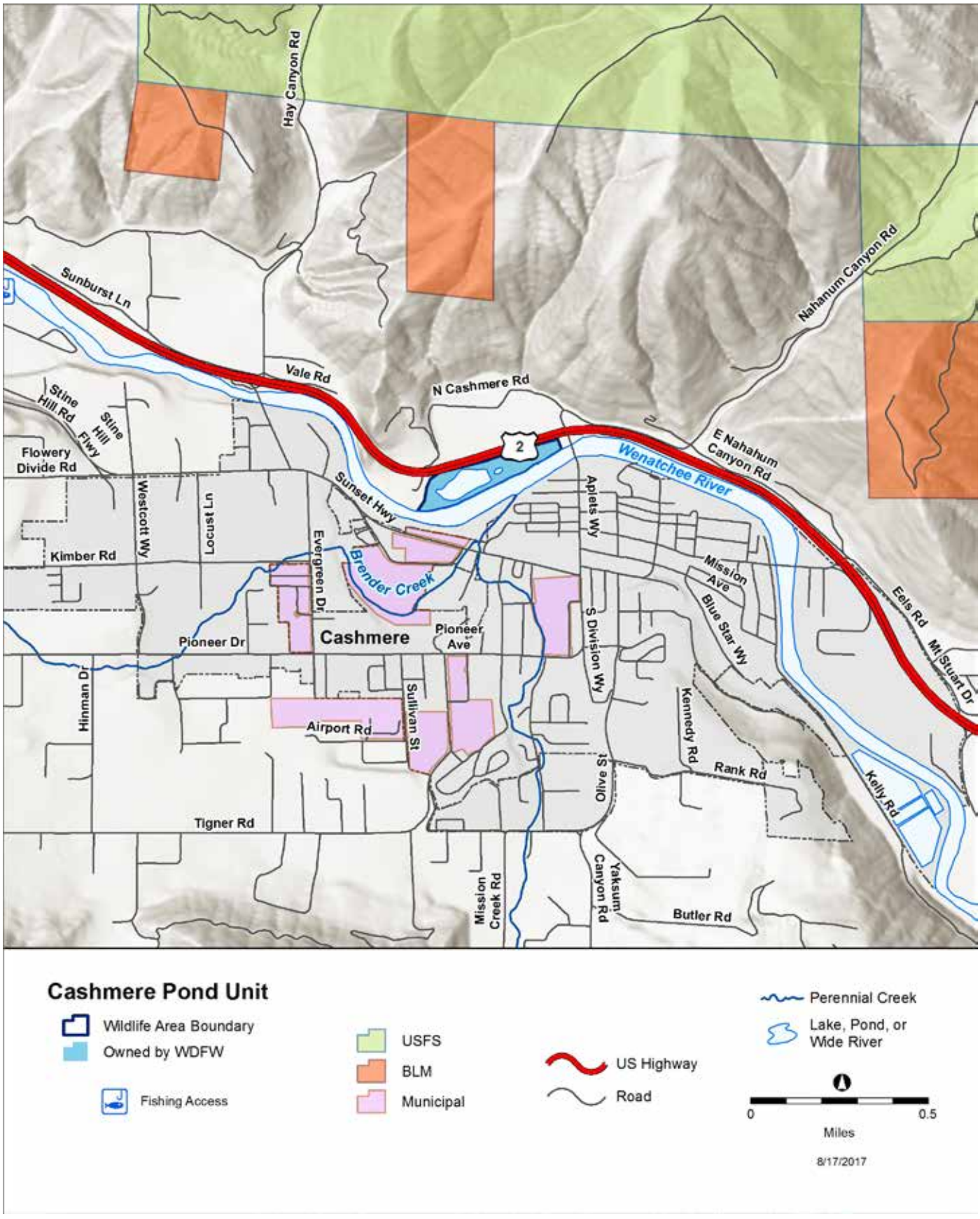
GENERAL WILDLIFE AREA INFORMATION		
Size	-	21 acres
Acquisition Dates	-	2010
Acquisition Funding	-	Washington Department of Transportation
Elevation	-	780 feet
Recreational Opportunities	-	Fishing, birding
Access	-	There is no access to the Unit from Highway 2/97. Access via boat only.

The **Cashmere Pond Unit** is a 21-acre parcel adjacent to the Wenatchee River immediately north of Cashmere in Chelan County. The unit is dominated by riparian habitat and contains a small pond that developed from an old borrow pit used during highway construction. The area is sandwiched between State Highway 2/97 and the Wenatchee River. The City of Cashmere is adjacent to the unit on the other side of the river. The unit was purchased as a Washington State Department of Transportation mitigation site from a culvert repair project on State Route 36. This unit has been the site of multiple salmon restoration projects, including a constructed channel connecting the pond to the Wenatchee River (see page 108). This work prevents entrapment of fish after high flows, provides off-channel refuge (aquatic habitat adjacent to the main channel having connections to the main river channel), and additional rearing habitat for federally listed Upper Columbia spring Chinook salmon and steelhead. In spite of the limited access to the unit, birders have documented 87 species in this small area.

Primary management objectives for this unit includes:

- Protect tiger salamander habitat by evaluating fish plantings and preventing the drying of wetlands, ponds, lakes, and streams (4G)
- Coordinate with tribes, Regional Fisheries Enhancement Group, and other partners to identify and implement fish habitat restoration projects (8A).

Map 3. Cashmere Pond Unit



Chelan Butte Unit

Chelan Butte
Photo by Justin Haug

GENERAL WILDLIFE AREA INFORMATION		
Size	-	10,116 acres
Acquisition Date	-	1970 - 1982
Acquisition Funding	-	Chelan County PUD, State Wildlife Fund
Elevation	-	705 - 3,835 feet
Recreational Opportunities	-	Hunting, wildlife viewing, hiking, mountain biking, snowshoeing, x-country skiing, target shooting, hang gliding, geocaching, parasailing
Access	-	From Highway 97 A in Chelan, turn south on Millard Street/Chelan Butte Road for 2 miles to the wildlife area.

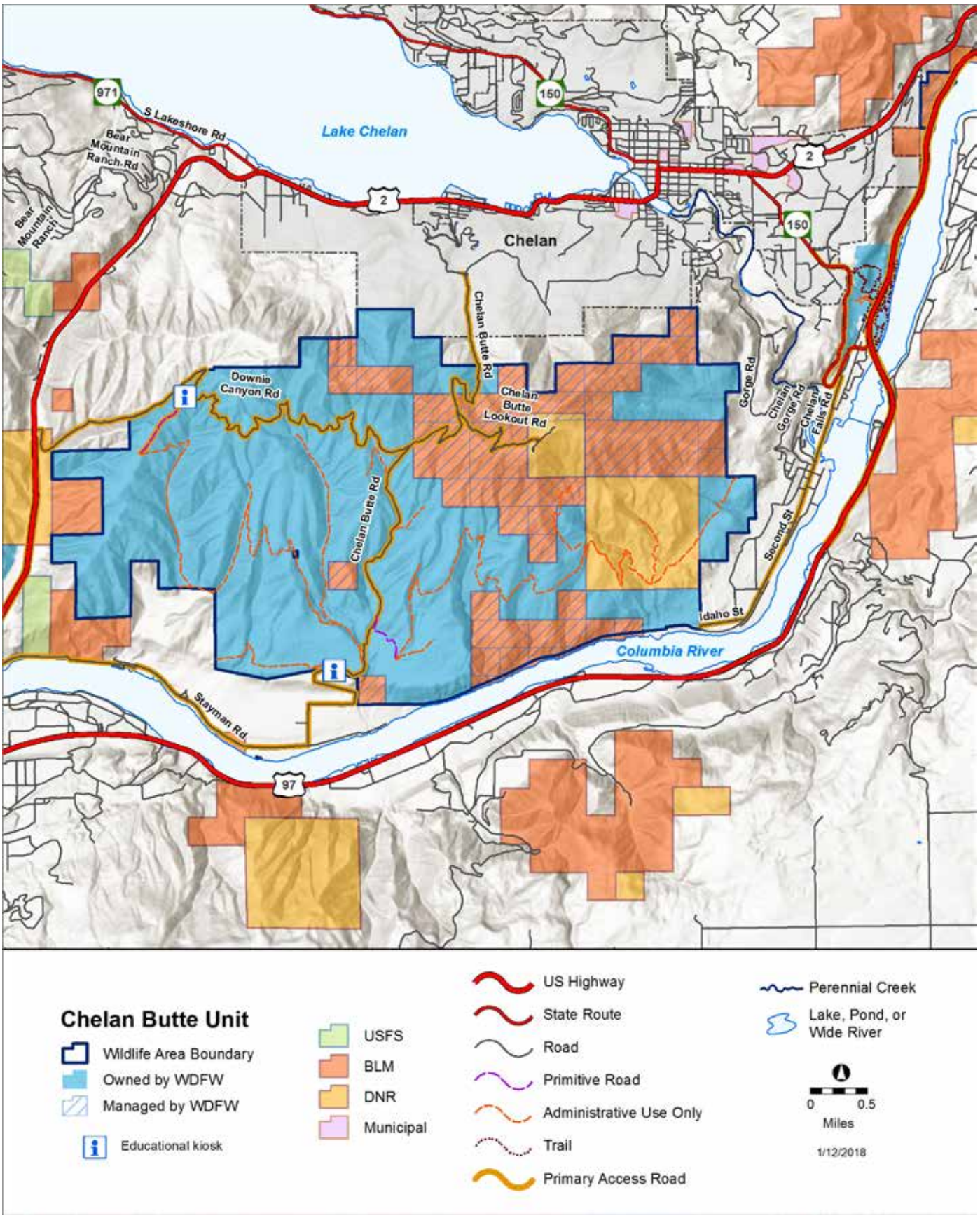
The **Chelan Butte Unit** includes 10,116 acres of land located between Lake Chelan and the Columbia River in Chelan County. The unit is located immediately southwest of Chelan and is accessed by Chelan Butte Road from the north, Downie Canyon Road from the west, and Stayman Flats Road from the south. The area adjacent to Chelan Butte is primarily privately owned and is dominated by rural properties and agriculture (tree fruit and wine grapes). WDFW also leases and manages lands from DNR and BLM on this unit. Bighorn sheep released in 2004 are now well established in the area and provide a world class hunting opportunity. Opportunities for viewing are relatively easy to find on the south side of the Butte, especially in the area east of Chelan Butte Road. Golden eagles, mule deer, peregrine falcon, and bald eagles also can be seen. Upland game birds include chukar, gray partridge, blue grouse, and California quail. Pheasant releases are conducted each fall to provide additional hunting opportunities.

WDFW has restored 100 acres of abandoned agricultural fields to native vegetation and is in the process of restoring an additional 1,000 acres by 2021. While there are no designated trails on Chelan Butte, old roads closed to motorized use, offer great hiking and mountain biking, skiing, and snowshoeing opportunities. With the increasing demand for recreational opportunities, our ongoing challenge will be to balance public access with agency's mission of sustaining healthy fish and wildlife populations. The Chelan Butte Unit offers great views of Lake Chelan and the Columbia River. One of the most popular hang gliding and parasailing sites in the world is located on the unit. The Lucas Homestead, located in Brick House Canyon, is on the National Register of Historical Places, due to its unique brick construction, using clay from a nearby hillside and kiln built behind the house. Over a period of six years, Frank Lucas and his family, built a two-story house on the homestead, completing it in 1922 and residing there until 1932.

Primary management objectives for this unit includes:

- Develop a strategy/plan for shrubsteppe and grassland restoration on the wildlife area by 2022 (1B).
- Restore 1,000 acres of abandoned agriculture fields by 2025 (1C).
- Remove/replace fence posts and wire in Homestead Canyon and Little Butte Ridge by 2020 (1I).
- Identify planned areas for forest treatment for the wildlife area for the next 10 years (2A).
- Reduce human disturbance of golden eagle near active nest sites (4B).
- Conduct additional giant Palouse earthworm inventories by 2023 (4F).
- Reestablish upland bird food plots in restored ridgetop agricultural fields to benefit chukar and mourning dove (5E).
- Manage bighorn sheep on the wildlife area to reduce the risk of disease (7D).
- Continue to support bighorn sheep hunting opportunities on the wildlife area (7F).
- Develop and implement a public outreach process for considering recreational development on the wildlife area by 2018 (9D).
- Identify funding sources for preserving/restoring culturally significant sites (e.g. Lucas Homestead and Depner Cabin) (12E.)

Map 4. Chelan Butte Unit



Entiat Unit

Entiat Unit
Photo by Alan Bauer

GENERAL WILDLIFE AREA INFORMATION		
Size	-	7,989 acres
Acquisition Date	-	1965 - 1983
Acquisition Funding	-	Chelan County PUD, Wildlife Fund
Elevation	-	727 – 3,290 feet
Recreational Opportunities	-	Hunting, wildlife viewing, hiking, mountain biking, snowshoeing, x-country skiing, target shooting, shed antler hunting, geocaching, horseback riding, camping
Access	-	From State Highway 97A and 971 on unnamed primitive roads, Oklahoma Gulch Road, pullouts along State Highway 97A, and Crum Canyon Road.

The **Entiat Unit** includes several small to medium sized parcels west and north of the town of Entiat extending north to Knapp Coulee, for a total of 7,989 acres located in Chelan County. Access points include Crum Canyon Road, Oklahoma Gulch Road, State Highway 917 in Navarre Coulee, and State Highway 97A in Knapp Coulee. The surrounding landownership is primarily U.S. Forest Service (USFS), U.S. Bureau of Land Management (BLM), and Washington Department of Natural Resources (DNR) lands. WDFW leases and manages lands from DNR and BLM on this unit. Closer to the Columbia River, rural home sites and agriculture (tree fruit and wine grapes) surround the parcels. The Entiat Unit provides critical winter range for the Chelan County mule deer herd, in addition to supporting many other wildlife species. On cliffs overlooking the Columbia River, golden eagle and peregrine falcons nest and forage. Lewis' woodpecker exists on dry ponderosa pine sites and the forested areas of the unit are within the historic range of western gray squirrel. Upland game birds using the area include chukar, gray partridge, blue grouse, and California quail. Bighorn sheep are a new addition to the Entiat Unit, with documented movement from the Chelan Butte Unit onto the area between Navarre and Knapp coulees. Hunting is the primary recreation activity on this unit, with mule deer and upland game birds being the most popular species. Hiking, cross country skiing, and snowshoeing are also popular. Shed antler hunting is growing in popularity, however, it has the potential to disturb mule deer during their critical time period of late winter and early spring.

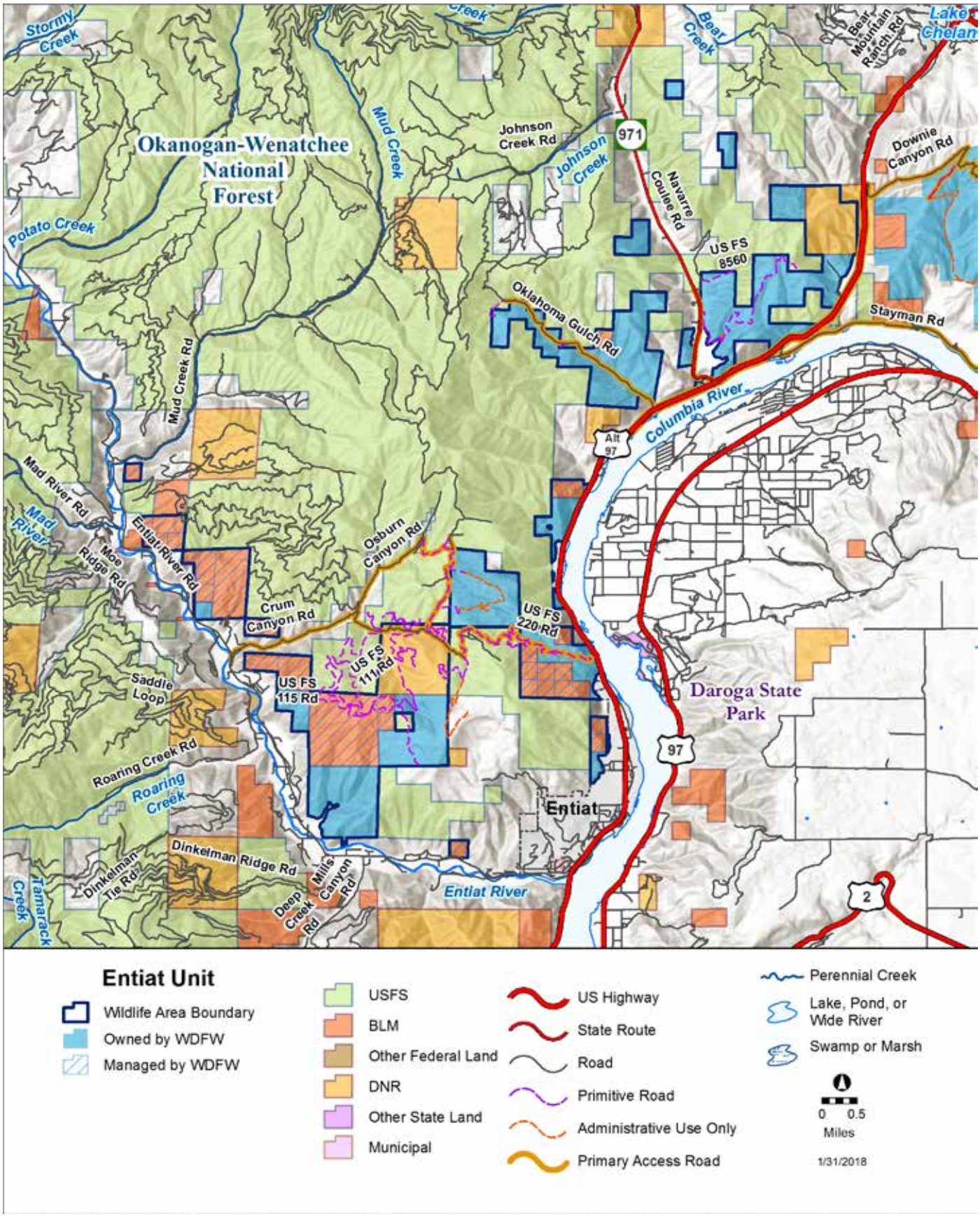
In 2014, WDFW worked with stakeholders including Chelan County, Cascadia Conservation District, Bureau of Reclamation, National Resources Conservation Service, and U.S. Fish and Wildlife Service to successfully complete two salmon recovery projects on the Entiat Unit. These projects included the Harrison Side Channel and the Keystone Project. Both restoration projects benefit Chinook salmon, steelhead, bull trout, westslope cutthroat trout, and lamprey.

The Knowles area of the Entiat Unit contains the challenging invasive weed yellow starthistle which was likely introduced to the area in the 1970s. Yellow starthistle is a Class B Designated weed, and is required by law to be controlled. The weed is found on very steep slopes below the old farm fields, and occurs over a 260-acre area.

Primary management objectives for this unit include:

- Develop a strategy/plan for shrubsteppe and grassland restoration on the wildlife area by 2022 (1B).
- Identify planned areas for forest treatment for the wildlife area for the next 10 years (2A).
- Coordinate with USFS and Chelan County to address road management on the wildlife area including maintenance, weed control, and potential road closures to reduce impacts to habitat and species (3A).
- Conduct additional giant Palouse earthworm inventories by 2023 (4F).
- Protect and restore native vegetation in riparian corridors to benefit California quail and increase potential habitat for sharp-tailed grouse and other wildlife species (5B).
- Develop options to increase security for migratory mule deer winter range including seasonal closures (signs, kiosks, public education) (7A).
- Identify bighorn sheep and deer viewing opportunities along Highway 97A and the Chelan Butte Unit within three years (9A).

Map 5. Entiat Unit



Pateros Unit

Pateros Unit
Photo by Alan Bauer

GENERAL WILDLIFE AREA INFORMATION		
Size	-	1,218 acres
Acquisition Date	-	1998 - 2010
Acquisition Funding	-	Chelan County PUD, Washington Recreation Conservation Office – Washington Wildlife and Recreation Program; U.S. Fish and Wildlife Service – Pittman Robertson
Elevation	-	780 – 2,491 feet
Recreational Opportunities	-	Hunting, wildlife viewing, hiking, mountain biking, photography, snowshoeing, x-country skiing, shed antler hunting, horseback riding
Access	-	Access to the area is from Bill Shaw Road.

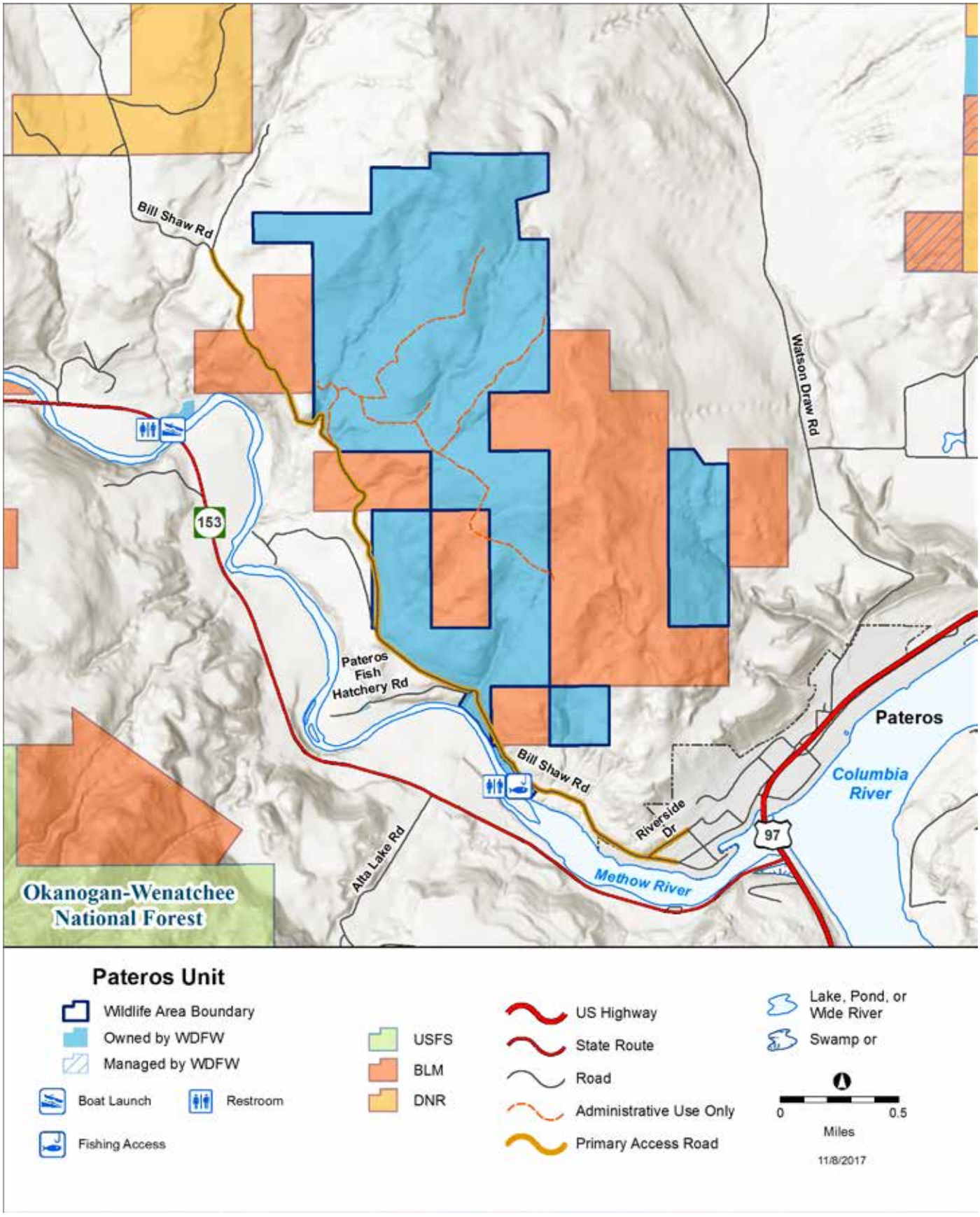
The **Pateros Unit** is located northwest of the town of Pateros in Okanogan County and includes 1,218 acres of WDFW land. The Bureau of Land Management owns 900 acres adjacent to the unit. Access to the unit is via Bill Shaw Road, which travels along the southern end of the property. Surrounding land use includes agriculture (fruit orchards), cattle grazing, and rural home sites. The south aspect and shrubsteppe habitat that dominate the area supports a large number of wintering mule deer, a driving factor in the agency's desire to acquire the area. Several draws, vegetated with aspen and other riparian species are distributed throughout the area. In 2014, the entire Pateros Unit burned during the Carlton Complex Fire. Fences, upland bird feeders, spring developments, signs, and bluebird nest boxes were destroyed in the fire, along with the loss of shrub cover and riparian habitat. Infrastructure replacement was accomplished with funding provided by the Federal Emergency Management Agency (FEMA), and state funds were used for reseeding select areas with bitterbrush. Recovery continues.

The area supports a diverse array of wildlife species, including northern shrike, western bluebird, rock wren, wintering golden eagles, chukar, gray partridge, blue grouse, and California quail. Mule deer and upland bird hunting are very popular during the fall. At other times of the year, mountain bikers, horseback riders, and cross country skiers use the area. A water access site is located on the Methow River and provides fishing and watchable wildlife opportunities.

Primary management objectives for this unit include:

- Develop a strategy/plan for shrubsteppe and grassland restoration on the wildlife area by 2022 (1B).
- Reduce human disturbance of golden eagle near active nest sites (4B).
- Consider exploring future translocations of sharp-tailed grouse (4E).
- Protect and restore native vegetation in riparian corridors to benefit California quail and increase potential habitat for sharp-tailed grouse and other wildlife species (5B).
- Collaborate with adjoining public land managers and volunteers to maintain water developments on public land (5D).
- Develop options to increase security for migratory mule deer winter range including seasonal closures (signs, kiosks, public education) (7A).
- Work with North Cascade Washington Audubon volunteers to explore potential for birding trails development on Swakane and Pateros units within five years (9B).

Map 6. Pateros Unit



Swakane Unit

Swakane Unit
Photo by Ron Fox

GENERAL WILDLIFE AREA INFORMATION		
Size	-	10,939 acres
Acquisition Date	-	1966 - 1973
Acquisition Funding	-	Chelan County PUD, State Wildlife Fund
Elevation	-	800 – 4,500 feet
Recreational Opportunities	-	Hunting, wildlife viewing, hiking, mountain biking, snowshoeing, x-country skiing, shed antler hunting, geocaching, horseback riding, camping, butterfly observation, target shooting
Access	-	North from Wenatchee on Highway 97A about 1.4 miles past Rocky Reach Dam, turn west on Swakane Canyon Road west approximately 1.2 miles to a parking area with informational kiosk. Forest Service Road 7415 continues west through the unit.

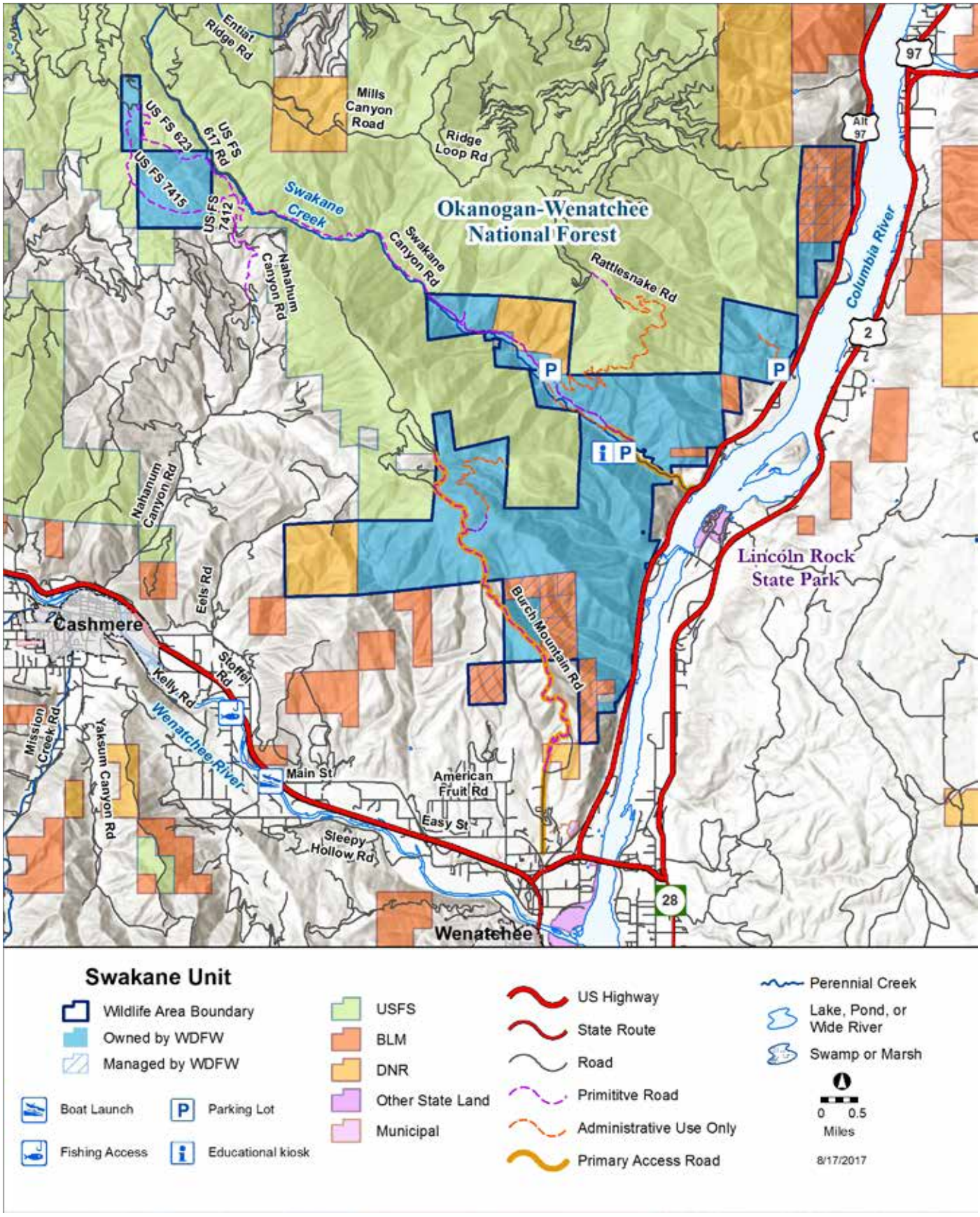
The **Swakane Unit** located in Chelan County covers 10,939 acres of land located just north of Wenatchee and includes Burch Mountain, Swakane Canyon, and Tenas George Canyon. Primary access to the unit is via Burch Mountain Road and Swakane Canyon Road. The surrounding landownership is primarily USFS, BLM, and DNR. WDFW leases lands from DNR and BLM on this unit. Closer to the Columbia River, rural home sites and agriculture (tree fruit and wine grapes) occur. Small wetlands can be found in Swakane Canyon and are associated with beaver activity and springs. Important mule deer wintering habitat occurs in the area and the Swakane bighorn sheep herd uses the unit year round. Upland game birds using the unit include chukar, gray partridge, blue grouse, ruffed grouse, and California quail. Pheasant releases are conducted each fall to provide additional hunting opportunities. In 2011, WDFW began work to restore 100 acres of abandoned fields in the Swakane Canyon to native grasses, forbs, and shrubs. Additional habitat restoration and maintenance activities, funded by Chelan PUD, will continue on these fields until 2021.

The Swakane Unit topography varies greatly in elevation and aspect, and as a result harbors diverse numbers of wildlife and plant species, including state threatened Thompson's clover. Birding is a popular activity on the unit, with 107 species and 133 species observed on Burch Mountain and Swakane Canyon, respectively. Bighorn sheep can also be viewed on the area and provide world class hunting opportunities. Target shooting is very popular in early spring, to such an extent that it is impacting wintering mule deer and precluding use of the canyon bottom for other recreation activities such as birding, hiking, and horseback riding.

Primary management objectives for this unit include:

- Develop a strategy/plan for shrubsteppe and grassland restoration on the wildlife area by 2022 (1B).
- Restore 103 acres of abandoned fields on the Swakane Unit by 2025 (1C).
- Identify planned areas for forest treatment for the wildlife area for the next 10 years (2A).
- Coordinate with USFS and Chelan County to address road management on the wildlife area including maintenance, weed control, and potential road closures to reduce impacts to habitat and species (3A).
- Include mast producing plants in riparian plantings for western gray squirrel (4D).
- Protect tiger salamander habitat by evaluating fish plantings and preventing the drying of wetlands, ponds, lakes, and streams. (4G)
- Develop options to increase security for migratory mule deer winter range including seasonal closures (signs, kiosks, public education) (7A).
- Collaborate with USFS and BLM to develop criteria for seasonal closures on the wildlife area (7B).
- Continue to support bighorn sheep hunting opportunities on the wildlife area (7F).
- Work with North Cascade Washington Audubon volunteers to explore potential for birding trails development on Swakane and Pateros units within five years (9B).
- Develop options to lessen the conflicts among target shooters and other recreation user groups in the Swakane Canyon within five years (9C).

Map 7. Swakane Unit



White River Unit

White River Unit
Photo by Alan Bauer

GENERAL WILDLIFE AREA INFORMATION		
Size	-	429 acres
Acquisition Date	-	2002 - 2003
Acquisition Funding	-	Washington Conservation Office – Washington Wildlife and Recreation Program, Salmon Recovery Funding Board
Elevation	-	1,876 – 2,203 feet
Recreational Opportunities	-	Hunting, wildlife viewing, canoeing, kayaking, hiking, snowshoeing, cross-country skiing, photography
Access	-	Travel west from Leavenworth on Highway 2 about 13 miles to Coles Corner, then right on Highway 207 for 4.4 miles and turn left on Lake Wenatchee Highway for 6.1 miles to the junction of White River Road and Little Wenatchee Road. The unit is made up of several parcels along White River Road and Little Wenatchee Road.

The **White River Unit** includes several small parcels, totaling 429 acres. The unit is located 24 miles northwest of Leavenworth, situated on a tributary to Lake Wenatchee in Chelan County. Surrounding ownership is a mix of USFS lands, Chelan-Douglas Land Trust conservation lands, and private rural and recreational properties. This unit was acquired primarily for the protection of riparian, riverine, and wetland habitats critical to federally listed Upper Columbia steelhead and spring Chinook salmon (Wenatchee River populations). Forest types on the White River Unit, located farther west at higher elevations and with more moisture, are unique compared to forests on other units of the wildlife area. Forests on the upland slopes consist of mixed-conifer forest and woodland. River bottom and floodplain forests consist of riparian woodland and shrubland. Riparian forests are considered WDFW priority habitat. The White River Unit contains the North Pacific Montane Riparian Woodland and Shrublands forest type, a rare ecological system on WDFW owned or managed lands.

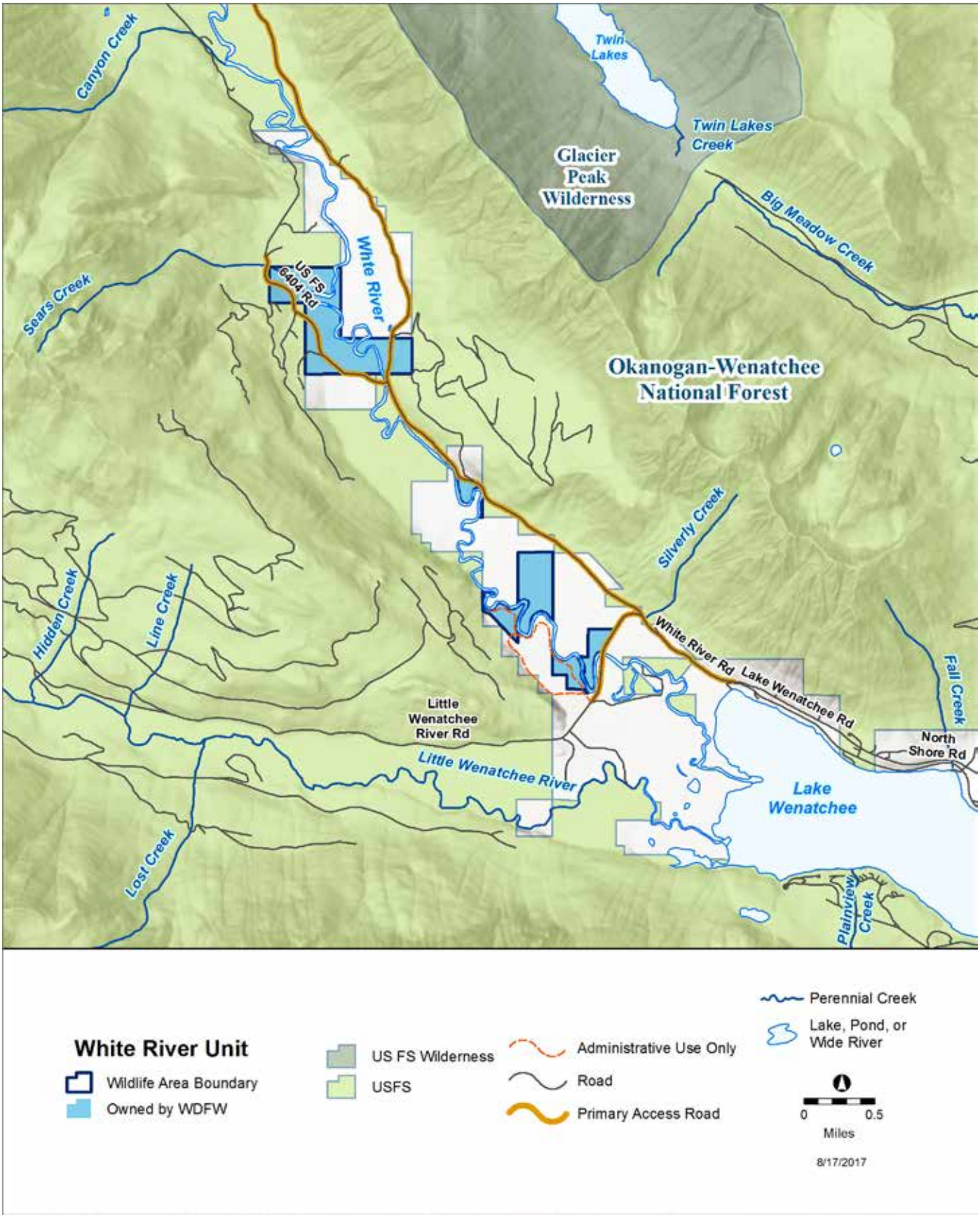
Mule deer, bear, cougar, and ruffed grouse are the primary game species found on the area. Birders have documented 75 species, including band-tailed pigeon, red crossbill, red-breasted sapsucker, MacGillivray's warbler, and Vaux's swift. Hunting, canoeing, kayaking, and birding are popular recreation activities occurring on the site.

Primary management objectives for this unit include:

- Protect tiger salamander habitat by evaluating fish plantings and preventing the drying of wetlands, ponds, lakes, and streams (4G).
- Coordinate with tribes, Regional Fisheries Enhancement Group, and other partners to identify and implement fish habitat restoration projects (8A).

White River Unit
Photo by Alan Bauer

Map 8. White River Unit



Wildlife Area Management and Planning

Land Ownership and Management

Acquisition History, Funding and Purpose

In 1963, WDFW received funding for acquisition and development (20,397 acres) of public fishing and hunting areas, and fishery and hunting improvement projects in Chelan County adjacent to the Rocky Reach reservoir as part of the original settlement agreement with the Chelan Public Utilities District (PUD). The agreement provides mitigation for the loss of wildlife habitat by the construction and operation of the Rocky Reach Hydroelectric Project on the Columbia River. A new settlement agreement and new Federal Energy Regulatory Commission (FERC) license was issued in 2009 (FERC 2009), which requires wildlife habitat management plans. The plans provide a summary of habitat improvement measures implemented during the first five years of the new license and measures proposed for the next five years. Management plans are updated every five years under the terms of the license agreement. The current plan is entitled Wildlife Habitat Management Plan, 2016-2020, License Article 403, prepared by the Chelan County PUD. The Chelan Wildlife Area Management Plan is consistent with the PUD management plan.

From 2010 – 2015, Chelan County PUD provided $1,557,499 in funding for habitat enhancement, restoration, and protection projects. The majority of the funds were used for restoration of agricultural fields at Chelan Butte (1,100 acres) and Swakane Canyon (103 acres) units. Native grasses have been established, with varying degrees of success, on approximately 600 acres. Cereal rye and cheatgrass infestations still plague portions of some fields, and mechanical and chemical treatments will continue for these problem areas. Nearly 400 acres were seeded with native forbs and bitterbrush. Funds were also used for smaller enhancement projects, including water developments, pond construction, upland bird feeders, and riparian shrub plantings.

For the current funding cycle (2016-2020), the PUD has provided $1,103,472 for agricultural field restoration at Chelan Butte and Swakane Canyon units, along with several smaller habitat projects. Restoration of fields in Swakane Canyon is nearing completion, and only tree and shrub planting in select locations remains. Chelan Butte will see the final native grass seeding in 2017 followed by treatments for weed control and seeding native forbs and bitterbrush. By 2022, the agriculture field restoration is expected to be completed.

Between 2005 and 2013, five grants were received from the Recreation Conservation Office (RCO), including funds from the State Lands Development, State Lands Restoration, Salmon Recovery Funding Board, and Aquatic Lands Enhancement Accounts. Totaling $1,290,500, and used in conjunction with the State of Washington Capital Budget, this funding was used to develop phases of the Beebe Springs Unit. The first grant was used to restore Beebe Creek to a complex meandering channel and replace the straightened creek that was created to accommodate orchard development by previous landowners. The subsequent four grants were used to enhance and restore wetland, riparian, and shrubsteppe habitats, and create side channels on the Columbia River shoreline. In addition, grant funding was used to construct a parking area, vault toilets, trails, viewpoints, informational kiosks, and interpretive signs. The last phase of construction at Beebe Springs produced Frank's Pond, a fishing pond dedicated for youth fishing.

In 1999, WDFW received $2,000,000 in funding from RCO to acquire critical salmon habitat along the White River above Lake Wenatchee. Over the next four years, six properties totaling 417 acres were purchased.

Leases

WDFW manages property owned by other government entities such as the Washington State Department of Natural Resources (DNR) and Bureau of Land Management (BLM) as part of the Chelan Wildlife Area. WDFW leases 3,000 acres of DNR lands on the Chelan Butte, Entiat, and Swakane units for conservation of wildlife habitat and public hunting. WDFW performs weed control and maintenance for roads and signage on DNR leased lands. The department also manages 6,306 acres of land owned by BLM on Chelan Butte, Entitat, and Swakane units under three memorandum of understandings (MOU). WDFW provides road and sign maintenance and upland restoration on BLM lands. The original MOUs were approved in 1968, and amended in 1971 for the primary purpose of fish

and game management. The MOU language specifies the protection and continued production of mule deer, waterfowl, mourning dove, and upland game species (chukar, California quail), and preservation and protection of habitat as the key goals of the lands management agreement.

Easements

Easements are a right, held by an entity other than WDFW on wildlife areas, to cross or otherwise use a portion of the land for a specified purpose. There are 30 easements associated with the wildlife area, including several power line easement agreements with the PUD; easements that provide public access for fishing; and administrative use only easements, including 15 specifically developed for maintenance of the bighorn fence protection fence along Highway 97A.

Water rights

On the Chelan Wildlife Area, the agency owns several water rights and has filed many water right claims for springs or other surface water to preserve and provide water for wildlife, domestic water, and irrigation. WDFW became party to other water right claims that were made by previous landowners. For example, when WDFW purchased the Beebe Springs Unit, it became part of the Beebe Orchards Water Agreement, which divided shares of irrigation water and responsibility for maintaining the infrastructure of the system. Water from this system irrigates tree and shrub plantings, and is the source of water for Frank's Pond. The long-term costs of maintaining WDFW's portion of this system have not been fully analyzed and likely could pose a long-term funding liability.

Management Setting

Administration and Staffing

The Chelan Wildlife Area is administered within WDFW's Region 2, headquartered in Ephrata. All wildlife areas and access sites are operated under WDFW's Lands Division. Supervision at the regional level is provided by the regional wildlife program manager and lands complex manager. The Chelan Wildlife Area has one full-time staff member, the wildlife area manager, and one ten-month and one eight-month permanent seasonal natural resource technician who each provide assistance during the peak field season.

Facilities and Maintenance

Up until 1997, the Chelan Wildlife Area was part of the Colockum Wildlife Area. As a result, it has never had a designated office or headquarters. In 1997, regional boundaries were adjusted and the wildlife area responsibility was assigned to the Wells Wildlife Area. In 2011, the Chelan Wildlife Area was split from the Wells Wildlife Area and for the first time assigned a dedicated manager and seasonal staff. Currently, the wildlife area manager is stationed in Wenatchee, while technicians are stationed at the Wells Wildlife Area in Brewster. This situation creates some efficiencies in sharing equipment and staff, but those are far outweighed by the inefficiencies of increased travel time to work sites, lack of centralized storage of supplies and equipment, difficulty of long distance supervision, and maintaining a cohesive work unit. A centralized headquarters for staff and storage of equipment is needed, as well as permanent full time assistant staff.

A collection of buildings are scattered around various units of the wildlife area. On the Swakane Unit a rental house and old barn/shop are present. The house provides program income while the barn/shop is in need of demolition and replacement. At Beebe Springs, two small sheds store equipment and supplies. On the Chelan Butte Unit a grain bin has been converted into a small storage shed.

Fences are an important asset on the wildlife area, serving to define property boundaries and control livestock

Grain silo converted into a storage shed on Chelan Butte Unit.
Photo by Alan Bauer

trespass and wildlife movements. On the Swakane Unit, very few property boundary fences exist except possibly on a portion of the unit on Burch Mountain. Lack of staff and funding have precluded any inventory of these areas. Within Swakane Canyon itself nearly all of the fencing has been removed since it was burned multiple times in the past. Portions of the property boundary of the Swakane Unit adjacent to State Highway 97A have deer/bighorn sheep fence constructed by Washington Department of Transportation (WSDOT) to reduce wildlife-vehicle collisions on the highway. Maintenance of this fence is a joint effort between WDFW and WSDOT, but it's not the responsibility of wildlife area staff. The Entiat Unit has many miles of boundary and interior barbed wire stock fence. The fence condition is mostly unknown due to a lack of staffing resources to accomplish the task. A number of miles of mule deer fence, constructed in the 1960s, exists on or near the boundary adjacent to orchards along Highway 97A. The intent of the fence was to prevent wintering mule deer from damaging orchards, and to a lesser extent, prevent deer from accessing Highway 97A. In general, the entire fence is in disrepair except where it adjoins an orchard and the orchardist maintains the fence. Outside of the areas with orchards, the fence is beyond repair and needs to be removed. Only a small portion of the deer fence on the wildlife area has been removed, and the removal occurred after the 2012 Byrd Canyon Fire (Wenatchee Complex) in the Oklahoma Gulch-Navarre Coulee area.

The Chelan Butte Unit has miles of barbed wire boundary and interior fence, most of which has not been inventoried for condition or maintained due to staff limitations. Since the 1994 Tyee fire, and the widespread damage to fences on Chelan Butte, no grazing leases have been in effect. It appears, but no record exists, that boundary fences on the north side of the unit were rebuilt. Many miles of interior fences, some dating back to the early 1900s, were removed by Wenatchee Sportsmen's Association volunteers between 1997 and the present (see Success Story, page 15). Many more miles of useless interior fence need to be removed. The 2015 Chelan Complex Fire burned several miles of boundary fence, and replacement or repair of the fence is awaiting FEMA funding. The east boundary of Chelan Butte has an old, unstable deer fence constructed in the late 1960s to prevent deer damage to the orchards on Stayman Flat. This two-mile-long fence is in serious need of replacement, with increasing complaints from neighboring orchardists as bighorn sheep and mule deer can now easily move off the wildlife area into the orchards. The Pateros Unit lost all of the boundary and interior barbwire fencing and deer fencing on the northeast side of the unit during the 2014 Carlton Complex Fire. The boundary fences were replaced and interior fence removed using FEMA funds in 2015.

The Swakane, Entiat, Chelan Butte, and Pateros units have many small developments to benefit wildlife, including spring developments, guzzlers, upland bird feeders, ponds, and bird nest boxes. These items are maintained by volunteers and wildlife area staff. The Swakane Unit also has a gravity fed irrigation system that was used in the past to support share-crop agricultural leases and wildlife food plots. Currently, the irrigation system is used to irrigate riparian restoration efforts along Swakane Creek and fill small catch basins that provide a water source for wildlife.

The Beebe Springs Unit has the most facility development, and consequently has the greatest maintenance and operations need. On the unit, there are 3.75 miles of crushed rock trail, 1.1 miles of hiking trails, 12 viewpoints with split rail fences and benches, one vault toilet, 14 interpretive signs, three kiosks, 24 trail direction signs, three parking lots (one paved, two gravel), one wildlife viewing blind, seven bridges, six culverts, two Clemson beaver pond levelers (control water level), one hand-carry boat launch (kayak, canoe), four pieces of artwork, two tables, one bike rack, one youth fishing pond with three benches and 360 feet of split rail fence, and two drip irrigation systems for trees and shrubs in the main parking area and near the youth fishing pond. The habitat restoration project also requires maintenance on eight acres of riparian wetland along the Columbia River that entails a long-term control invasive plant program on Himalayan blackberry, St. John's wort, purple loosestrife, and yellow flag iris. On 48 acres of uplands, shrubsteppe restoration was impacted by the continuous disturbance from five construction phases of the project and challenging soil types east of Highway 97. Restoration of this upland site is included under the objective 1.B., which is to develop a strategy for shrubsteppe and grassland restoration on the wildlife area.

Road Management

A network of federal, state, county and agency-owned roads provide access to the Chelan Wildlife Area. Each agency maintains their respective roads differently, whether it be annually, seasonally, or on an as needed basis. WDFW road management activities are performed on an as needed basis, with the highest priority being roads that provide public and agency staff access. Staff access is for all management activities, including wildlife area operations and maintenance activities. Associated culverts, cattle guards, and gates on these access roads need regular inspection and maintenance. There are approximately 38 miles of WDFW-owned and maintained roads on the wildlife area. Routine maintenance activities include clearing blockages in culverts, checking for road surface erosion, performing weed control on and adjacent to the roads, collecting litter, maintaining cattle guards, and minor road grading. Major repairs require the assistance of WDFW's Capital Assets Management Program.

Seasonal road closures are implemented annually to limit disturbance to priority species, and to protect road surfaces from damage while soils are soft. Strategic vehicle access restrictions protect areas from motor vehicle disturbance without limiting walk-in access. Unfortunately, no such restrictions are available to limit mountain bike use to roads closed to motorized vehicles, and away from off-road travel. On the Swakane and Entiat units, cooperative agreements to provide additional protection by WDFW enforcement are being pursued on Chelan County roads with seasonal closures. Roads closed to the public within the wildlife area are gated or posted with signs saying "No Unauthorized Vehicles Beyond This Point." In most cases, these roads still provide access for agency operations and maintenance personnel.

Trails

The Beebe Springs Unit has over three miles of trails meeting American with Disabilities Act (ADA) standards, and an additional mile of hiking trails require ongoing maintenance. The Swakane, Entiat, Chelan Butte, and Pateros units have numerous primitive and abandoned roads that date back to the homestead era of the early 1900s and could be designated and used for

White River Unit forest scene
Photo by Alan Bauer

trails. These roads are not maintained, now overgrown with native grasses and shrubs or weeds, have washouts, and in places are very narrow from soil sloughing off road cuts. On the Chelan Butte Unit, many miles of this type of road exist, and given appropriate resources, should be decommissioned (obliterated and seeded with native vegetation). Public demand from user groups to develop the roads into a trail system for hiking and biking is increasing. In the past, WDFW declined offers for development of these roads into trails based on potential impacts to habitat, wildlife, and existing recreation. An examination of non-traditional recreation uses and development is planned in the near future for the Chelan Wildlife Area.

Chelan County has designated primitive "county roads" within the Swakane, Entiat, and Chelan Butte units as open to off-road vehicle (ORV) and all-terrain vehicle (ATV) use, with the exception of Downie Canyon Road on Chelan Butte Unit. On the entire Chelan Wildlife Area, off-road travel by motorized vehicles is prohibited.

Local Land Use Compliance

The Chelan Wildlife Area falls under the jurisdiction of Chelan and Okanogan counties, and land use must be consistent with the county's Comprehensive Plan, Critical Areas Ordinance, and Shoreline Management Plan. Chelan County updated the Critical Areas Ordinance in 2007, and a draft Shoreline Master Plan in 2017 (see Table 1). The following table describes the relationship of the land use regulations to the wildlife area lands, which are consistent with the current uses on WDFW lands.

Cultural Resources

State and federal law requires the protection of cultural, geological, and other non-renewable resources. Such resources may not be removed unless determined to be beneficial to wildlife, habitat, scientific, or educational purposes. WDFW coordinates with appropriate agencies and tribes for the protection of such resources if any activity affects cultural, archaeological, or historic resources. This includes the removal of various rock

Table 1. Regulatory Land Use per Unit.

Wildlife Area Unit	Comprehensive Plan Land Use Designation and Zoning*	Shoreline Management Plan Designation
Beebe Springs	Rural Public	Rural
Cashmere Pond	Rural Residential/Resource 5	Conservancy
Chelan Butte	Rural Residential /Resource 20	Rural & Conservancy
Entiat	Rural Residential /Resource 20	Rural & Conservancy
Pateros	Rural 20	Rural
Swakane	Rural Residential /Resource 20	Rural & Conservancy
White River	Rural Residential /Resource 20	Natural

* Land use definitions and Zoning can be found at the Chelan County and Okanogan County websites: Chelan County - http://www.co.chelan.wa.us/community-development/codes?parent=Codes Okanogan County - http://www.okanogancounty.org/planning/

Lucas Homestead on Chelan Butte Unit.
Photo by Lauri Vigue

formations, Native American artifacts, plants, seeds, and other items. Wildlife area staff have received training in the importance of protecting the cultural resources on the wildlife area. Prehistoric or historic archaeological resources are present on the entire Chelan Wildlife Area. Archaeologists have determined that prehistoric occupation on part of the wildlife area goes back 6,800 years. Historic archaeological materials are primarily associated with the numerous homesteads that occurred on the area beginning in the late 1800s. One of these homesteads, located on the Chelan Butte Unit, is the Lucas Homestead, listed on the National List of Historic Places, significant for its type of construction and use of bricks made and fired on-site. A summary of cultural resources information for the Chelan Wildlife Area is located in Appendix D.

Enforcement

Enforcement on the wildlife areas is provided by WDFW enforcement officers. The mission for WDFW enforcement officers is, "To protect our natural resources and the public we serve." WDFW's enforcement officers perform a wide range of duties that protect natural resources, the communities and economies that rely on them, and those who recreate outdoors. WDFW officers approach enforcement in four ways: enforcement, education, partnerships, and community involvement.

The highest enforcement priority is all fish, wildlife, and habitat laws under Title 77 RCW. Officers have demanding jobs and deal with issues related to poaching, threatened and endangered species protection, habitat protection, and destruction of habitat. A core duty for WDFW officers is protecting public safety in the outdoors, and they participate in a variety of enforcement activities related to this, including enforcing boating,

off-road vehicle, and snowmobile laws, and eradicating illegal drug growing and manufacturing. Officers work closely with emergency management agencies and play an important role in emergency management statewide.

Primary enforcement at the Chelan Wildlife Area includes regular contact with wildlife area visitors, many of whom are engaged in recreation activities. Officers regularly check compliance with rules, answer questions and provide information about appropriate use. Constituents have provided feedback that they appreciate the presence of the WDFW officers on the wildlife area. With increased use, officers are spending more time addressing things like malicious activities, target shooting public safety, off-road travel, litter, unattended campfires, land use rule violations, and poaching. As these types of situations are reported or detected, WDFW officers handle them appropriately to hopefully deter this type of behavior from the Chelan Wildlife Area.

Stewardship and Volunteerism

The Chelan Wildlife Area offers a wide variety of volunteer activities for the public, including scientific data collection, facility maintenance, and mentor programs (see Table 2). The work provided by these volunteers is much appreciated and essential to the ability of the wildlife area to provide critical services. Please contact the wildlife area manager directly for more information about how you can become involved.

Recreation

WDFW wildlife areas provide fishing, hunting, and other recreation opportunities consistent with the agency's mission, statewide wildlife area planning goals, and the funding sources for each property. Public use is influenced by the character of the landscape, access, wildlife and fish species present, seasonal considerations, and engagement with interested and affected stakeholders from the local community. WDFW has the authority to and does limit

Table 2. Summary of Volunteer Activities.

Activity	Units	Time of Year
Butterfly, bird, herptile, and rare plant surveys.	All	Spring/Summer
Trail maintenance	Beebe Springs	Spring - Fall
Youth fishing mentors at Frank's Pond	Beebe Springs	Spring - Fall
Weekly checks of conditions and litter cleanup at Frank's Pond	Beebe Springs	Spring - Fall
Routine maintenance and checks of water developments.	All	Spring
Fence condition inventories	Chelan Butte, Pateros, Swakane, Entiat	Spring - Fall
Fence repair and maintenance	Chelan Butte, Pateros, Swakane, and Entiat	Spring
Maintenance of riparian plantings	Swakane	Spring/Summer
Cleanup of target shooting debris at several locations in Swakane Canyon	Swakane	Spring - Fall
Tree/shrub plantings	Beebe Springs, Swakane	Spring

some activities in order to protect resources, preserve quality of experiences and infrastructure, and address the safety of personnel and the public. The agency seeks to promote public enjoyment of fish, wildlife, and agency managed lands while managing and perpetuating these resources for future generations.

Washington State's population is growing, putting more pressure on wildlife areas across the state, including the Chelan Wildlife Area. With more people comes a more diverse range of recreation interests, which can lead to conflicts between different users (e.g. target shooters and bird watchers). Recreational use can impact natural resources, which in turn, can affect the opportunity for and quality of recreational experiences. WDFW is developing a Statewide Recreation Strategy to address these issues, which may lead to more detailed guidance on how to balance recreational use and wildlife and habitat protections. In addition, regional staff intend to work with the trail community to address specific trail issues on the Chelan Wildlife Area.

The Chelan Wildlife Area, with units spread from Pateros to Lake Wenatchee, offers a wide variety of recreational opportunities, as seen in Table 3. The Chelan Butte, Cashmere Pond, White River, Pateros, Swakane, and Entiat units have minimal developed recreation amenities aside from primitive parking areas, kiosks, and regulatory signage. These areas provide opportunities for dispersed recreation in an uncrowded natural setting. These areas are in contrast to the Beebe Springs Unit, which has a high level of developed recreation amenities and has more visitors in a relatively small area. Refer to Table 18 Appendix H for additional WDFW fishing and boating access sites in the surrounding area (Chelan County and southern Okanogan County).

The Chelan Butte Unit is a large contiguous unit near the recreation hub of the city of Chelan and offers a wide variety of recreational opportunities. Upland game bird and big game hunting, including bighorn sheep, are very popular activities in the fall and early winter. Besides hunting, the unit supports birding, hiking, snowshoeing, cross-country skiing, and dispersed target shooting. The many miles of closed roads on the butte provide opportunities for hiking and mountain biking. Due to seasonal periods of high fire danger, open camp fires are

Swakane Canyon Unit hikers
Photo by Alan Bauer

prohibited and snowmobiles are forbidden to protect big game winter range. Informal parking areas are scattered around the unit, including parking pullouts along Downie Canyon and Chelan Butte roads. Two informational kiosks provide information about the area.

The Swakane Unit is the largest unit on the wildlife area, ranging in elevation from 800 feet near the Columbia River to 4,500 feet on Burch Mountain. Much of the area is steep shrubsteppe habitat, with dry forest types occurring on Burch Mountain. Upland bird and big game hunting, especially bighorn sheep, are popular activities in the fall and early winter. Besides hunting, the unit supports, hiking, snowshoeing, mountain biking, shed antler hunting, horseback riding, camping, butterfly observation, and dispersed target shooting. Birding is popular on Burch Mountain and in Swakane Canyon. A birding trail is planned for the bottom of Swakane Canyon in the future. A popular early spring outing begins in Swakane Canyon and travels up Rattlesnake Road (FS Road 5215). This road is closed to motorized vehicles but makes a scenic two mile hiking or biking trip to the top of the ridge on the north side of the canyon. Due to seasonal periods of high fire danger, open camp fires are not allowed. Snowmobiles are prohibited in order to protect big game winter range. There is one informational kiosk, two designated parking areas, and numerous pullouts and informal areas for parking scattered about the unit.

The Cashmere Pond Unit has limited access (boat in only) and provides opportunities for fishing and birding.

The Pateros Unit topography varies from shrubsteppe on flat benches and steep slopes to dense riparian and aspen stands in the deep draws, and is amenable to a variety of recreation opportunities. Upland bird and big game hunting are popular activities in the fall and early winter. Besides hunting, the unit supports hiking, snowshoeing, mountain biking, shed antler hunting, and horseback riding. Interior roads, while closed to motorized vehicles, provide foot and bike access to much of the unit. A birding trail is planned for this area, possibly using some of these existing roads. Due to seasonal periods of high fire danger, open camp fires are not allowed and snowmobiles are forbidden to protect big game winter range. There are no developed parking areas on the unit. Pullouts along Bill Shaw Road provide limited parking. The Pateros Water Access is located at the south end of the unit along the Methow River. This site provides access to the river with a small parking lot and vault toilet. Steelhead fishing is the primary activity that occurs on this site.

The Beebe Springs Unit is the second smallest unit on the wildlife area (162 acres), yet it has the greatest amount of developed recreation amenities. From the time of acquisition, it was envisioned to host a wide variety of wildlife oriented recreation and interpretive functions. Recreational opportunities include watchable wildlife, hiking, geocaching, earthcaching, kayaking, and photography. The unit is a popular birding area, and recently opened Frank's Pond, which provides juvenile anglers with fishing opportunity for rainbow trout (https://wdfw.wa.gov/fishing/regulations/). Nearly five miles of trails are available for pedestrian use only; no bikes are allowed and pets need to be on a leash. Kiosks at parking areas along State Highway 97 and State Highway 150 provide more information about the area.

The Entiat Unit is composed of small to medium sized parcels interspersed with U. S. Forest Service and U. S. Bureau of Land Management properties. Recreational developments or amenities do not exist on the Entiat Unit. Upland bird and big game hunting are popular activities in the fall and early winter. Besides hunting, the unit supports birding, hiking, snowshoeing, cross-country skiing, camping, and dispersed target shooting. An activity growing in popularity is shed antler collecting from high numbers of wintering mule deer. Due to high seasonal fire danger, open camp fires are prohibited and snowmobiles are forbidden to protect big game winter range. Informal parking areas are scattered around the unit, and many pullouts exist along the roads.

The White River Unit is adjacent to Chelan-Douglas Land Trust and USFS lands and provides continuous public land along the White River floodplain. The ownership preserves important salmonid habitat and provides unique recreational opportunities along the river. Perhaps the most popular activity is kayaking and canoeing the low gradient river, but care must be taken to avoid logjams and other river obstacles. There are no WDFW maintained canoe/kayak launches or take-outs on the unit, but several

user created launch points are present. A good supply of mosquito repellant is recommended. During the fall, black bear hunting is also popular in the densely forested areas along the river. During winter, snowshoeing and cross-country skiing occur on the area, but there are no maintained trails or parking areas.

Research and Other Studies

Consistent with WDFW's mission to preserve, protect, and perpetuate fish, wildlife, and habitat, WDFW supports independent studies to achieve wildlife area objectives. Table 16 (Appendix F) describes past studies which have occurred on the wildlife area, including studies for mule deer, bighorn sheep, restoration monitoring, and surveys for giant Palouse earthworms and rare plants such as Ute Ladies' Tresses orchid.

Table 3. Recreation use on Chelan Wildlife Area.

Wildlife Area Unit	Primary Hunting Focus	Secondary Hunting Focus	Primary Fishing Focus	Other Recreation	Restrictions	Education/ Interpretation	Parking and other facilities
Chelan Butte	Big game-bighorn sheep, mule deer	Upland game birds-chukar, quail, gray partridge, released pheasants	None	Hiking, snowshoeing, cross-country skiing, mountain biking, photography, hang gliding, geocaching, target shooting, birding	No snowmobiles No open fires	Kiosks on Downy Canyon Rd and Chelan Butte Rd (south side of the Butte)	None
Swakane	Upland game birds-chukar, quail, released pheasants	Big game-bighorn sheep, mule deer	None	Hiking, snowshoeing, cross-country skiing, mountain biking, photography, geocaching, target shooting, birding, shed antler hunting, horseback riding, camping, butterfly observation	No snowmobiles No open fires	Kiosk on Swakane Canyon Road	None
Cashmere Pond			Steelhead, whitefish	Birding			None

Wildlife Area Unit	Primary Hunting Focus	Secondary Hunting Focus	Primary Fishing Focus	Other Recreation	Restrictions	Education/ Interpretation	Parking and other facilities
Pateros	Mule deer	Upland game birds-chukar, quail, gray partridge	None	Wildlife viewing, hiking, mountain biking, photography, snowshoeing, cross-country skiing, shed antler hunting, horseback riding	No snowmobiles No open fires		None
Pateros Water Access			Steelhead	Wildlife viewing			Small parking lot with public restroom
Beebe Springs		Chukar, quail, waterfowl	Steelhead and summer Chinook (Columbia River) Rainbow trout (Frank's Pond)	Watchable wildlife, hiking, kayaking, canoeing, photography, geocaching, earthcaching, snowshoeing and cross-country skiing	No mountain biking Dogs on leash Day use only Frank's Pond open to juvenile anglers only No winter maintenance Winter closure expected 2-3 years	Multiple kiosks and interpretive signs.	Trailhead parking with 13 stalls on Hwy 150, and main parking for 46 vehicles on Hwy 97 w/ vault toilet Hand launch ramp available for small watercraft
Entiat	Big game- mule deer	Upland game birds-chukar, quail, Forest grouse	Steelhead and summer Chinook (Entiat River)	Hiking, snowshoeing, cross-country skiing, mountain biking, photography, geocaching, target shooting, birding, shed antler hunting, horseback riding, camping	No snowmobiles		None
White River	Black bear	Forest grouse		Hiking, snowshoeing, cross-country skiing, photography, birding, canoeing, kayaking			None

Wildlife Area Goals, Objectives, and Monitoring

Goals, Objectives and Performance Measures

This plan sets management priorities for the Chelan Wildlife Area for the next 10 years. The goals, objectives, and performance measures in this plan were developed by an interdisciplinary team of regional and headquarters staff, with input from the Chelan Wildlife Area Advisory Committee, the public, and other agency personnel. They are consistent with WDFW's mission and strategic plan. The objectives listed in this plan may or may not be fully funded. In many cases successful outcomes will be dependent on additional funding.

Monitoring and Adaptive Management

Wildlife area objectives are to be measured annually based on the associated performance measures and through staff annual evaluations. On a biennial basis, the Chelan Wildlife Area manager will lead the review, reporting, and revision, as appropriate, of objectives and performance measures for the next two-year cycle. Staff will engage and develop recommendations for the two-year update with the wildlife area advisory committee and regional district team. Such reporting will allow the manager, the staff, and the regional office to modify tasks and timelines as necessary to meet the associated objective. Further, over the term of the plan (10 years), performance will illustrate the adequacy or inadequacy of funding and capacity to successfully manage the wildlife area, potentially influencing goals and objectives in the next planning term.

Table 4. Chelan Wildlife Area Goals, Objectives and Performance Measures.

Goal		Draft Objective	Unit	Performance Measure	Lead	Tasks
1.	**Maintain or improve the ecological integrity of priority sites.**	A. Establish an ecological integrity baseline and associated goals for ecological systems of concern/priority systems by 2022.	All	1. Baseline established (y/n); 2. EI goals established (y/n)	Ecological integrity Monitoring Team	- Work with WLA manager to design monitoring plan to achieve objective A over 10-year planning term. - Conduct data collection to determine baseline within 10-year planning term. - Provide EI baseline report to WLA manager prior to start of subsequent 10-year planning term. - Work with WLA manager to establish EI goals. Actions to address climate change impacts: The ecological integrity baseline should include parameters that can provide a baseline for assessing climate change impacts.
		B. Develop a strategy/ plan for shrubsteppe and grassland restoration on the wildlife area by 2022, emphasizing benefits to big game, post fire restoration.	Pateros, Entiat, Chelan Butte, Swakane, Beebe Springs	1. Shrubsteppe summary document complete (y/n); 2. Shrubsteppe plan developed (y/n); 3. Shrubsteppe plan implemented (y/n)	WLA Manager/Wells WLA Manager/WL District Biologist	- Wildlife area manager completes shrubsteppe restoration summary document. - Prioritize areas for restoration based on historic and current use by key wildlife species and areas with potential for reintroductions - Identify funding sources - Coordinate with adjoining landowners when potential restoration areas cross property boundaries. - Develop strategy for bitterbrush and sagebrush restoration following wildfires. Actions to address climate change impacts. The restoration plan should include projected changes in temperature and precipitation important for restoration activities. Depending on the specific projections, consult the WDFW Vegetation Ecologist to ensure the seed mix is diverse and appropriate to changing conditions.

Goal		Draft Objective	Unit	Performance Measure	Lead	Tasks
1.		C. Restore 1,000 acres of abandoned agriculture fields on Chelan Butte Unit by 2025.	Chelan Butte	1. # of acres restored	WLA Manager	- Consistent with the PUD Wildlife Management Plan (2016-2020) and the plan to be developed for 2021-2025.
		D. Restore 103 acres of abandoned fields on the Swakane Unit by 2025.	Swakane	1. # of acres restored	WLA Manager	- Consistent with the PUD Wildlife Management Plan (2016-2020) and the plan to be developed for 2021-2025.
		E. Implement weed management plan annually.	All	1. 8,000 acres inspected (y/n); 2. 200 acres treated (y/n); 3. Produce annual weed control report.	WLA Manager	- Annually develop work plan using principles of Integrated Pest Management. - Complete annual reporting requirements. - Respond to weed control needs after fires or other largescale disturbances. Actions to address climate change impacts. Consider and plan for possibility of new weeds.
		F. Develop weed identification and reporting educational materials for posting on kiosks.	All	1. Educational materials posted on kiosks (y/n).	WLA Manager	- Coordinate with Chelan County Noxious Weed Board - Develop informational/educational signage - Sign production - Post signs
		G. Coordinate with the PUD on development and implementation of the Rocky Reach Wildlife Forum Integrated Terrestrial Invasive Plant Control Plan.	Chelan Butte, Entiat, Swakane	1. Participate in Rocky Reach Wildlife Forum annually (y/n).	WLA Manager	- Establish goals and objectives of control plan annually. Actions to address climate change impacts. Consider and plan for possibility of new weeds.
		H. Annually inspect 5 % of fencing and gates; repair and replace as needed and as funding allows.	All	1. 10 miles of fencing inspected or repaired (y/n); 2. 15 of gates inspected and repaired (y/n); 3. # miles of new fence or replaced (y/n).	WLA Manager	- Inspect fence annually. - Prioritize replacement of old fence. - Complete repairs as needed. - Submit Capital Funding requests for replacement of old fence.

	Goal	Draft Objective	Unit	Performance Measure	Lead	Tasks
1.		I. Remove/replace fence posts and wire in Homestead Canyon and Little Butte Ridge by 2020.	Chelan Butte	1. 5 gates installed (y/n); 2. 2 miles of fence removed (y/n).	WLA Manager	- Consistent with the PUD Wildlife Management Plan (2016-2020).
		J. Install 2 barriers and 2 gates in Swakane Canyon, 2 barriers and 1 gate on Burch Mountain. Remove unnecessary fence posts and wire in Swakane Canyon.	Swakane	1. 4 barriers installed (y/n); 2. 3 gates installed (y/n); 3. ½ mile fence posts/wire removed (y/n).	WLA Manager	- Consistent with the PUD Wildlife Management Plan (2016-2020).
		K. Install 2 gates to manage access and remove unnecessary fence posts and wire in the Roundy area.	Entiat	1. 2 gates installed (y/n); 2. 2 miles of fence posts/wire removed (y/n).	WLA Manager	- Consistent with the PUD Wildlife Management Plan (2016-2020).
		L. Develop a strategy for prioritizing future land acquisitions on inholdings and adjacent lands, especially the checkerboard ownership of the Entiat Unit.	All	1. Identify priority properties (inholdings); 2. 1 grant application completed (y/n)	WLA Manager/Fish and Habitat/DT	- Coordinate with partners, Regional Director and Regional Lands Agent to identify project areas. - Seek grant funding for acquisitions. - Assist with implementation of awarded grants. Actions to address climate change impacts. Consider focusing on providing habitat for high vulnerability and high confidence species and habitats and/or considering habitat connectivity needs.
		M. Conduct a rare plant survey on the wildfire area by 2023, and develop a plan for management and protection of rare plants after the survey is completed.	All	1. Plant inventory conducted (y/n); 2. Management plan completed (y/n)	WLA Manager	- Coordinate with volunteers to conduct surveys. - Create data base/maps documenting species and locations. - Submit species and location information to Natural Heritage Program. - Write management and protection plan.

	Goal	Draft Objective	Unit	Performance Measure	Lead	Tasks
2.	**Improve ecological integrity of forests while maintaining and/or improving habitat for wildlife.**	A. Identify planned areas for forest treatment for the wildlife area for the next 10 years, consistent with Goal 1A.	Swakane, Entiat, Chelan Butte	1. 175 acres of non-commercial treatment completed (y/n); 2. 400 of acres of commercial treatment completed (y/n);	Forester/WLA Manager/District Team	- Layout, permitting, implementation, and oversight of contract and WDFW crews for planned projects. - Draft and submit grant applications to fund projects. - Submit requests for other state funding as available to fund projects. -Develop base line EI goals for forested areas -Include tree species and stocking level strategies for impacts of climate change. Actions to address climate change impacts. Use this opportunity to increase resilience of forested lands, an issue today which only becomes more urgent with climate. Climate change data could help with prioritizing treatments.
3.	**Manage roads to minimize unacceptable impacts to fish and wildlife.**	A. Coordinate with USFS and Chelan County to address road management on the wildlife area including maintenance, weed control, and potential road closures to reduce impacts to habitat and species.	Entiat, Chelan Butte, Swakane	1. # of meetings; 2. # of roads closed; 3. # of trails closed.	WLA manager	- In coordination with USFS and County identify impacts and benefits for permanent or seasonal closures to reduce impacts. - Coordinate response to emergency and seasonal road closures. - Develop joint signage Actions to address climate change impacts. Any culvert replacements or construction should use the WDFW Climate adapted culvert tool. This tool will provide future bankfull widths for any stream crossing in Washington and will help to ensure that culverts design accommodates changes in future flows.
4.	**Achieve species diversity at levels consistent with healthy ecosystems.**	A. Conduct survey for Species of Greatest Conservation Need in coordination with the Diversity Division.	All	Species surveys completed every 5 years (y/n).	WL District Biologist	- Coordinate district priorities with Olympia Diversity staff annually. - Survey for silver-bordered fritillary in areas of emergent marsh
		B. Reduce human disturbance of golden eagle near active nest sites.	Chelan Butte, Entiat, Swakane, Pateros	1. # of nest sites; 2. # of seasonal closures implemented around active nest sites.	WL District Biologist/Diversity Division	- Monitor golden eagle habitat use - Implement closures around nests as needed to reduce human disturbance.

	Goal	Draft Objective	Unit	Performance Measure	Lead	Tasks
4.		C. Consider butterflies and other pollinators' species in habitat management.	All	1. Survey for milkweed and phragmites on the wildlife area conducted (y/n); 2. Control invasive vegetation in emergent marsh locations conducted (y/n); 3. # of projects developed and implemented.	WL District Biologist/WLA Manager	**Monarch:** - Collect information on the location of milkweed within the WLA. - Allow milkweed to grow in areas where it will not be not disturbed during the time period it supports Monarchs (late-May – early-September). During this time, milkweed should be allowed to grow undisturbed. - In areas where milkweed disturbance cannot be reduced or eliminated, control milkweed prior to and outside of the Monarch occurrence period (mid-September – mid-May). Cut the top 4-5 inches off milkweed plants in small patches (5 x 5 to 10 x 10m) located within large milkweed patches, just prior to flowering (typically mid-June – mid-July). This can be done with mowing or hand-cutting. The result is an increase in vigorous flowering plants later in the summer, which attracts Monarchs and other pollinators and provides nectar and foliage for pollinators during the season when both are still required but scarce. Silver-bordered fritillary - Conduct surveys for this SGCN in area of emergent marsh. - Control invasive vegetation that threatens low-stature vegetation in area of emergent marsh. - Maintain local hydrology patterns – to be considered with nearby or hydrologically associated road or culvert construction, etc. Yuma skipper: YS depends on one host plant Phragmites *australis americanus* (native Phragmites); females lay eggs and larvae feed only on this plant. Native Phragmites, like its non-native relative occurs in areas with higher soil moisture; however, unlike the non-native, native Phragmites is not an invasive or weedy plant. - Determine if native Phragmites occurs within WLA - Do not control native Phragmites - Before controlling Phragmites, determine if it is native or non-native

	Goal	Draft Objective	Unit	Performance Measure	Lead	Tasks
4.						(native Phragmites); females lay eggs and larvae feed only on this plant. Native Phragmites, like its non-native relative occurs in areas with higher soil moisture; however, unlike the non-native, native Phragmites is not an invasive or weedy plant. - Determine if native Phragmites occurs within WLA - Do not control native Phragmites - Before controlling Phragmites, determine if it is native or non-native
		D. Include mast producing plants in riparian plantings for western gray squirrel.	Swakane, Beebe Springs, Chelan Butte	Mast producing plants planted (y/n).	WLA Manager	- Include in restoration planning activities for riparian habitat. - Include native beaked hazelnut in restoration projects. - Ponderosa pine in Swakane Canyon. Actions to address climate change impacts. A longer term issue we should consider is the likelihood of continued persistence of WSG. Shorter term is to consider mast plantings appropriate for both current and future conditions.
		E. Consider exploring future translocations of sharp-tailed grouse.	Pateros, Chelan Butte	Translocations conducted (y/n).	Diversity/WL District Biologist	- Determine limiting habitat - Assess landscape suitability - Identify movement corridors/connectivity depends on success of restoration efforts Actions to address climate change impacts. Consider if/how future conditions might change habitat suitability for sharp-tailed grouse. Consider including more individuals to increase genetic diversity and opportunities for adaptation.
		F. Conduct additional giant Palouse earthworm inventories by 2023.	Chelan Butte, Entiat, Swakane	Inventory completed (y/n)	WLA Manager /WL District Biologist	- Develop inventory protocol - Recruit and train volunteers - Create data base/maps documenting species and locations. - Submit location information to Natural Heritage Program.

	Goal	Draft Objective	Unit	Performance Measure	Lead	Tasks
4.		G. Protect tiger salamander habitat by evaluating fish plantings and preventing the drying of wetlands, ponds, lakes, and streams.	Beebe Springs, Cashmere Pond, White River, Swakane	# of water sources protected	WLA Manager/WL District Biologist / Fish Program	- Work to maintain water levels in ponds and stream habitat. - Work with the Fish Program to evaluate the impact of any proposed fish plantings on tiger salamander occupied lakes/ponds. Strongly consider introduction of beaver in appropriate locations to retain water longer on the landscape.
5.	**Maintain and enhance upland bird habitat**	A. Ensure that game farm pheasants released on the WLA are being transported with certified weed free straw by 2019.	Chelan Butte	Weed free hay is included in pheasant transported from game farms (y/n).	Upland Game Bird Manager	- Work to maintain water levels in ponds and stream habitat. - Coordinate with upland game bird manager. - Work with new Olympia staff on developing a weed free hay requirement for pheasant contracts. - Continue to bag hay until contract changes have been made.
		B. Protect and restore native vegetation in riparian corridors to benefit California quail and increase potential habitat for sharp-tailed grouse and other wildlife species.	Swakane, Beebe Springs, Chelan Butte, Entiat, Pateros	1. # of riparian corridors monitored/ inventoried for noxious weeds and invasive plants; 2. # of acres of riparian habitat treated for invasive plants. 3. 1 acre of riparian vegetation planted (Chelan Butte) (y/n) 4. 4 acres of riparian vegetation planted (Swakane) (y/n)	WLA Manager	- Monitor riparian corridors for invasive plants and control/contain as needed. <u>Actions to address climate change impacts</u>. Consider future climate in restoration design and implementation – include changes in stream flows, wetlands, and riparian vegetation. Consistent with the PUD Wildlife Management Plan (2016-2020).
		C. Provide winter food source for wildlife by installing 3 upland bird feeders by 2020.	Chelan Butte, Entiat	Feeders installed (y/n)	WLA Manager	- Consistent with the PUD Wildlife Management Plan (2016-2020).

	Goal	Draft Objective	Unit	Performance Measure	Lead	Tasks
5.		D. Collaborate with adjoining public land managers and volunteers to maintain water developments on public land.	Chelan Butte, Swakane, Pateros	# of water developments maintained by volunteers	WLA Manager	- Document location of water developments on adjoining public land - Coordination with public land managers and volunteers.
		E. Reestablish upland bird food plots in restored ridgetop agricultural fields to benefit chukar and mourning dove.	Chelan Butte	# of acres of annual food plots	WLA Manager	- Assess potential locations based on accessibility and capabilities of existing farming equipment. - Plant and maintain food plots as funding allows.
6.	**If needed, manage wolf-livestock conflicts to minimize livestock losses, while not impacting the recovery of a sustainable wolf population.**	A. Follow statewide guidelines for wolf management.	All	1. Document sightings (y/n); 2. Conduct follow-ups as needed.	Conflict specialist/ WL District Biologist	- Work with Conflict Staff to document viable wolf sightings as per public and WDFW reports. - Set cameras as needed to verify individuals and wolf pack presence based on sightings/reports.
7.	**Maintain and enhance big game habitat**	A. Develop options to increase security for migratory mule deer winter range including seasonal closures (signs, kiosks, public education).	Chelan Butte, Entiat, Swakane, Pateros	# of seasonal closures implemented	WL District bio/ Game Division	- Work to educate shed hunters on the impacts to mule deer when disturbed on winter range. - Start discussions with Game and Lands Divisions on seasonal entry closures on significant winter range.
		B. Collaborate with USFS and BLM to develop criteria for seasonal closures on the wildlife area.	Swakane, Entiat	Criteria developed (y/n)	WL District Biologist/ WLA Manager/ Enforcement	- Criteria includes impacts to habitat from severe winter weather, drought, fire, wet conditions, and/or data to support that recreation is having an impact on species of concern.
		C. Initiate shooting closures and/or modifications on the wildlife area due to fire hazards.	All	Closures and/ or modifications implemented (y/n)	WLA Manager	- Guidance from Recreation Strategy
		D. Manage bighorn sheep on the wildlife area to reduce the risk of disease.	Chelan Butte, Swakane, Beebe Springs	Translocations conducted (y/n)	WL District Biologist	- When necessary, trap, and relocate sheep on Chelan Butte. - Conduct a moderate level of winter baiting across years when captures and translocations are anticipated.

Goal		Draft Objective	Unit	Performance Measure	Lead	Tasks
7.		E. Continue to provide logistical support to Game Division with management of Chelan Butte bighorn sheep.	Chelan Butte	Logistical support provided (y/n)	WL District Biologist	- Provide logistic support for management efforts.
		F. Continue to support bighorn sheep hunting opportunities on the wildlife area.	Chelan Butte, Swakane, Beebe Springs	Road management conducted annually (y/n)	WLA Manager/WL District Biologist	- Provide access for hunters with disabilities
		G. Continue working with Chelan Butte neighbors on maintaining deer/bighorn sheep drift fence (50-year-old fence).	Chelan Butte	Fence replaced (y/n)	WLA Manager	- Repair and maintain fence as funding and staffing allow. - Include on capital funding list
		H. Develop 4 springs to provide additional water sources for wildlife on the Chelan Butte Unit and 2 springs on the Swakane Unit.	Chelan Butte, Swakane	# of springs developed;	WLA Manager	- Consistent with the PUD Wildlife Management Plan (2010-2020). - Plan additional water sources as needed Actions to address climate change impacts. Select springs that are not likely to dry in summer drought. Consider substrate and topography of springs, and consult Climate Impacts Group for information on likely persistence of existing water sources.
		I. Conduct maintenance and repairs on 25% of existing water developments on Pateros, Chelan Butte, Entiat, and Swakane Units on an annual basis.	Chelan Butte, Entiat, Swakane, Pateros	# of water sources maintained and monitored	WLA Manager	- Coordination with volunteers for maintenance projects.

	Goal	Draft Objective	Unit	Performance Measure	Lead	Tasks
8.	**Maintain and restore floodplains for fish habitat.**	A. Coordinate with tribes, Regional Fisheries Enhancement Group and other partners to identify and implement fish and wildlife habitat restoration projects.	White River, Entiat, Cashmere Pond, Pateros	# of projects developed and implemented	Habitat Program/ WLA Manager/Fish Program	- Implement Restoration Pathway Process - Coordinate with project sponsors - Adaptively manage implantation - Monitoring and complete performance measures - Seek climate-relevant funding. - Select fish & wildlife habitat projects likely to be resilient. - Monitor results. - Prescribe adaptive management needs.
		B. Explore options for improving spawning in new Beebe Creek channel by 2023.	Beebe Springs	1. Project implemented (y/n); 2. Project monitored (y/n)	Fish Program/WLA Manager	District Fish Biologist and WLA manager will coordinate to develop plans of action and monitoring (i.e. spawning ground surveys) in order to improve spawning habitat and to determine if improvement efforts have been successful as well as how often these efforts should occur. Actions to address climate change impacts. Consider future flow changes when exploring options.
9.	**Support and maintain appropriate recreation opportunities.**	A. Identify bighorn sheep and deer viewing opportunities along Hwy 97A and Chelan Butte unit within 3 years.	Chelan Butte, Entiat	1. Viewing opportunities identified (y/n) 2. Update website with viewing opportunities (y/n)	WLA Manager/WL District Biologist	- Coordination with WSDOT on potential sites along Hwy 97A in the Entiat Unit. Actions to address climate change impacts. Consider potential for altered animal distribution in any long-term planning efforts.
		B. Work with North Cascade Washington Audubon volunteers to explore potential for birding trails development on Swakane and Pateros units within 5 years.	Swakane, Pateros	# of trails developed	WLA Manager	- Identify specific locations during planning process - Secure grant funding

	Goal	Draft Objective	Unit	Performance Measure	Lead	Tasks
9.		C. Develop options to lessen the conflicts among target shooters and other recreation user groups in the Swakane Canyon within five years.	Swakane	1. Develop new signage for use at current target shooting sites (y/n); 2. Options developed and implemented (y/n).	WLA Manager	- Work with stakeholders to develop options - Apply to other sites - Target shooting WAC guidance/statewide guidance needed
		D. Develop and implement a public outreach process for considering recreational development on the wildlife area by 2018.	All	1. Outreach process developed (y/n); 2. Public process conducted (y/n).	WLA Complex Manager	- See External Recreation Proposal Process outline for details
		E. Provide information and enforce laws regarding restrictions on off-road and closed road vehicular travel within the wildlife area.	All	1. # regulatory signs posted; 2. # of informational signs posted; 3. Posting Public Conduct Rules for WDFW Lands on kiosks (y/n)	WLA manager/ Enforcement	- Post signage as needed - Develop other communication materials to communicate about rules and acceptable recreation on the wildlife area. (similar to E)
		F. Reduce recreational user conflicts by providing hunting season information at kiosks; including purpose, benefits and appropriate use of seasonal area closures.	All	1. # signs installed; 2. # kiosks improvements; 3. Develop outreach handout (FAQs)	WLA Manager/PAO/ Enforcement	- Construct kiosks and informational signs for all access points, trailheads and parking areas on the wildlife area as staff time and funding allows. - Install signs as staff time and funding allows. - Increase outreach to users by installing shrubsteppe, winter range education signage, interpretive - Add wildlife area entry signage, including kiosk at key entry and high traffic areas (include watchable wildlife signs, outreach on appropriate use).

	Goal	Draft Objective	Unit	Performance Measure	Lead	Tasks
9.		G. Partner with recreation groups to help disseminate messages about the wildlife area including partnering at local community events.	All	1. Outreach materials developed (y/n); 2. # of events attended.	WLA Manager	- Recreation Strategy will inform this process.
		H. Develop a "wear orange" campaign for non-hunters on the wildlife area during hunting season to improve safety.	All	Campaign implemented (y/n).	PAO/ Enforcement	Statewide issue
		I. Seek out willing landowners to provide easements to access wildlife area lands for recreation purposes.	--	1. # of locations identified; 2. # of landowners contacted; 3. # of easements secured.	WLA Manager/RES	- Identify areas where easements would be beneficial - Negotiate with landowners
		J. Maintain fishing opportunities at Chelan WLA.	Beebe Springs	1,500 catchable size of rainbow trout released annually, but not all at once, forth Saturday in April through October 31st.	Fish Program	- District Fish Biologist will coordinate with Chelan Fish Hatchery staff to develop annual stocking allotment plans. This would in part include frequency of stocking and the number of fish to be stocked during each stocking event. This can certainly be variable depending on angler participation, angler success and water temperatures, particularly during the summer months. Fish species other than rainbow trout may be stocked when available, depending on need and environmental conditions (i.e. water temps).
		K. Assess the potential impacts of geocaching on the wildlife area by 2019.	Beebe Springs, Swakane, Chelan Butte	Guidelines developed (y/n)	WLA Manager	- Check with the pilot project in Region 6 (Brian MItchell – Access manager) - Consider sites based on interest from users. - Check State Parks guidance approval prior - Recreation Strategy to inform

	Goal	Draft Objective	Unit	Performance Measure	Lead	Tasks
9.		L. Develop and implement a plan to address overuse of vault toilet at Beebe Springs.	Beebe Springs	1. Vault toilet appropriately placed to serve fish and wildlife oriented user groups (y/n); 2. Wildlife area unit open year round (y/n).	Access Manager/ WLA Manager	- Explore alternate locations for the vault toilet. - RCO State Lands Development grant application to be submitted summer 2018. - Assess potential for private security company to close gate during hours of darkness.
		M. Improve signage throughout each wildlife area unit to better communicate various regulations, restrictions and general information.	All	1. Funding secured (y/n); 2. # of signs installed.	WLA Manager/ Enforcement	- Lands Showcase may inform.
		N. Evaluate unmanaged agency controlled lands on the Wenatchee and Entiat Rivers to actively manage for public recreation. Emphasis is on lands owned by the agency.		1. # sites evaluated; 2. # sites actively managed.	Water Access Manager/ Lands Operations Manager/Lands Division	- Categorize access (via land vs water). - Place appropriate signs at sites with land access. - Evaluate need for signs at sites with only water access. If applicable, support any statewide efforts to evaluate public fishing easements. - Coordinate with Lands Division on approach. - Support the effort with available staff.
10.	**Maintain productive and positive working relationships with neighbors, partners, and permittees.**	A. Address encroachment issues.	Swakane, Entiat, Beebe Springs	Land survey conducted (y/n)	CAMP/Lands Division Olympia	- Make sure projects are included on Lisa Nelson's list. - Swakane the highest priority.
		B. Implementation of Chelan PUD management plan until 2020.	Chelan Butte, Entiat, Swakane	Plan implemented (y/n)	WLA Manager	- In collaboration with the PUD, develop a new plan every 5 years. - WLA manager makes sure plan activities lines up with funding – wish list of products. Actions to address climate change impacts. Plan includes restoration, which needs to consider future climate conditions/impacts.

	Goal	Draft Objective	Unit	Performance Measure	Lead	Tasks
10.		C. Clarify role of WDFW in joint management agreement with Bureau of Land Management pertaining to BLM lands by 2028.	Swakane, Entiat, Chelan Butte, Pateros	1. Invite BLM staff to WAAC meetings (y/n); 2. Revise MOU by December 31, 2028.	Lands Division Mgr/Wildlife RPM/ Lands Operations Manager/WLA Manager	- Discuss management roles with regional BLM staff. - Document progress in management plan update. - Wildlife area manager, lands operation manager and wildlife regional program manager, Lands Division Manager meet with BLM staff to negotiate MOU. - Pateros does not have an MOU Actions to address climate change impacts. Joint management agreement is a long-term planning document and where appropriate it should consider and/or build in opportunities for adaptation.
		D. Address long-term operations and maintenance of irrigation water system with Beebe Orchard Water Association.	Beebe Springs	Operations and maintenance agreement developed (y/n).	WLA Manager	- Meetings with Beebe Orchard Water Association
11.	**Offer multiple and varied opportunities for stakeholder participation and engagement.**	A. Coordinate and maintain a Wildlife Area Advisory Committee.	--	# of meeting(s) per year.	WLA Manager	- Setup meeting time and place based on group members' availability. - Draft agenda with attention to group interest and time constraints. - Hold meeting and collect group comments and recommendations for consideration relative to future management actions (proposed or ongoing). - Include meeting notes in wildlife area management plan updates and website.
		B. Coordinate communication with community groups about current wildlife area management activities.	--	# of group/ constituents contacted	WLA Manager	- Key user groups include Wenatchee Sportsman Association, mt bike community and local county government. - Provide WLA information to local organizations, through email, telephone calls, community group meeting attendance and presentations, and written notices and newsletters.
		C. Develop public outreach and information materials for interested and affected stakeholders.	All	Materials developed and distributed (y/n)	WLA Manager/PAO/ Lands Planner	- Work with HQ and regional staff to free up budget for public information and education about purpose and use of wildlife area.

	Goal	Draft Objective	Unit	Performance Measure	Lead	Tasks
12.	**Properly train, equip, and license WLA staff to meet operational and management needs of the WLA.**	A. Hire an assistant manager by July 1, 2019.	All	Assistant manager hired (y/n)	WLA Manager/WLA Complex Manager/ WLP RPM	- WLA Manager writes a position description. - WLA Manager develops a work plan for the position. - WLA Manager and Complex Manager will develop a proposal for office location and, if necessary, funding sources to establish it. - WLA Manager, Complex Manager, and Lands Division will evaluate funding sources. - WLA Manager will recruit.
		B. Identify resources for additional O&M funding – investigate sources of funding	All	# of grants applied for O&M	WLA Complex Manager/Lands Division Manager	- Explore grant opportunities. - Apply for grants, if available.
		C. Identify reliable funding pool for restoration and operations and maintenance funding. For example, explore Wallace Funds for upland game bird habitat improvements.	All	1. Sources identified (y/n); 2. Annual allocation distributed to proposals (y/n)	Lands Division Manager /WLA Complex Manager/ Contracts	- Consider endowments, revolving funds/pool agreements. Legislative directive North Central WA counties. - Involve Private lands. Actions to address climate change impacts. Explore opportunities for climate relevant funding sources.
		D. Obtain headquarters for WLA staff.	All	Add to capital budget request (y/n)	WLA Manager/WLA Complex Manager	- Develop a list of options - Evaluate feasibility of options - Select preferred option and submit Capital Budget request.
		E. Identify funding sources for preserving/restoring culturally significant sites (e.g. Lucas Homestead and Depner Cabin).	Entiat and Chelan Butte	# of structures restored	WLA Manager/ Archeologist	- Contact local historical societies that may have capacity volunteers to contribute. - Obtain local community support for projects.

Physical Characteristics

Geology and Soils

Bedrock comprises much of the exposed surficial geologic units on the steeper slopes above terraces and hills of the lower basin, and forms the slopes and ridges of the upper basin above 1,600 feet in Chelan Watershed (WRIA 47). Glacial episodes deposited relatively broad layers of fine to coarse-grained sediment in the valley floors and partially on the valley sidewalls or in patches on ridges. Lakeshore, river, and landslide deposits are found primarily along river and creek bottoms and at the base of slopes. The glacial and post-glacial deposits contain most of the available groundwater in WRIA 47, and nearly all developed and irrigated lands are underlain by unconsolidated geologic units. The unconsolidated deposits are found primarily as discontinuous layers of sediment in the Wapato Main Stem and Manson Lakes sub-basins, as terrace and flood deposits in the Antoine Creek and Howard Flats sub-basins, and locally as alluvial fill in the valley bottoms of other sub-basins (Lake Chelan Watershed Plan 2012).

The rocks and deposits within the Wenatchee quadrangle can be grouped into six generalized units: (1) Precambrian, Swakane Biotite Gneiss in the northeastern part of the quadrangle and the probable Jurassic low-grade metamorphic suite, mostly composed of the Easton Schist, in the southwestern part; (2) the Mesozoic Ingalls Tectonic Complex; (3) the Mesozoic Mount Stuart batholith; (4) lower and middle Tertiary nonmarine sedimentary and volcanic rocks; (5) Miocene basalt flows and interbedded epiclastic rocks constituting part of the Columbia River Basalt Group and interbedded silicic volcaniclastic rocks of the Ellensburg Formation; and (6) Pliocene to Holocene alluvium, glacial, flood, and mass-wastage deposits.

An old terrane of eroded metamorphic and igneous rocks forms the basement for the Tertiary sedimentary and volcanic rocks. The Swakane Biotite Gneiss may be the oldest rock in the area (see below). The low-

Chelan Butte sunrise
Photo by Alan Bauer

grade metamorphic suite of phyllite and greenschist was metamorphosed at least as long ago as the Early Cretaceous (Armstrong, 1980). The Ingalls Tectonic Complex is mostly serpentine and serpentinized peridotite but includes tectonic slices of Upper Jurassic metasedimentary and metavolcanic rocks, gabbro, and diabase. The Ingalls was thermally metamorphosed to varying degrees by the intrusion of the Mount Stuart batholith in the Late Cretaceous, about 93 million years ago (Engels and Crowder, 1971).

In the early Tertiary, differential uplift and erosion of the older rocks produced basins and graben rapidly filled with fluvial arkose, shale, and conglomerate of the Swauk and Manastash Formations, Chumstick Formation (Whetten in Gresens et al 1977), and basaltic to rhyolitic volcanic rocks. These include the Silver Pass volcanic rocks of Foster (1960), the Teanaway Basalt, the Taneum Andesite, and the basalt of Frost Mountain. The Wenatchee Formation (Gresens et al 1981) and possible correlatives lies with angular unconformity on the deformed earlier Tertiary rocks.

Deformation and erosion continued prior to, and perhaps during, eruption of the Miocene Grande Ronde Basalt. The continental tholeiitic basalt flows erupted southeast of the Wenatchee area and lapped up onto the higher Cascade Range. Dacitic debris spread southward and eastward from contemporaneous volcanoes in the southern Cascade Range, and feldspathic sand washed down from the northern Cascades and Okanogan Highlands to combine with the growing pile of basalt and form the Ellensburg Formation. The Grande Ronde Basalt and interbedded and overlying sedimentary rocks were tilted southeastward and were folded and faulted as the modern Cascade Range rose and the Columbia Plateau differentially subsided. The basalt pile displays south- to southeast-trending anticlines and synclines conspicuously shown by the topography, the larger anticlines forming ridges, the synclines, and valleys (USGS 2017).

Hydrology and Watersheds

Precipitation that is not lost to evapotranspiration runs off steep slopes into stream channels, minor tributaries, and primary tributaries of the Stehekin River and Railroad Creek, where they ultimately discharge out of Lake Chelan into the Chelan River and finally into the Columbia River. Smaller tributaries include 25-Mile, First, Fish, Prince, Gold, and Safety Harbor creeks. Minor amounts (less than 5 percent of total WRIA 47 discharge) of stream flow discharges from sub-basins adjacent to the Columbia River (Lake Chelan Watershed Plan 2012).

Hydrology in the Upper Middle Mainstem Sub-basin primarily reflects a snowmelt system. Generally, snow accumulates in the surrounding mountain areas from November to March, then melts and produces peak runoff during May and June. During late summer and fall, instream flows in tributary streams often decline substantially and remain relatively low through April. Heavy rainfall in late fall or early winter can also lead to increased runoff, and in the past, these rain-on-snow events in the eastern Cascades have caused some of the most significant flooding events in the sub-basin (Peven 2002).

Average flow contributions from the four largest tributaries in the Columbia Cascade Province (Okanogan, Methow, Entiat, and Wenatchee rivers) provide 7,860 cubic feet per second (cfs) to the Columbia River, while the upriver contribution from the Columbia Basin above Chief Joseph is 188,000 cfs. The Canadian portion provides 99,200 cfs of average flow.

Within the Upper-Middle Methow River (UMM) Sub-basin, Wanapum, Rock Island, Rocky Reach, and Wells dams impound the Columbia River. Instream flows within the UMM Sub-basin are considered "run-of-river" with little storage capacity present in the reservoirs above the four hydroelectric projects. Wells Dam, which began operating in 1967, is the most recent hydroelectric project completed on the Columbia River in the sub-basin (Peven 2002). Hydroelectric operations at Grand Coulee Dam greatly influence river flows for downstream hydroelectric operations (Peven 2002). Changes in storage reservoir operations for fish passage flow augmentation, flood control, and power production have resulted in reduced flows from January through April and increased flow from May through August (Upper Middle Columbia Sub-basin Plan 2004).

Climate

Average annual precipitation over this drainage area varies from 150 inches at the Cascade Crest to 8 inches in Wenatchee. The climate in the watershed is hot and dry in the summer, especially in the lower elevations. The higher elevations receive, on average, between 10-20 feet of snow in the winter. Snowmelt is a primary source of late summer and fall streamflow (Wenatchee Watershed Plan 2006).

The climate of WRIA 47 is moist to semi-arid and characterized by mild to hot dry summers and mild to severe winters. The average summer maximum temperature for July in Chelan is 85 degrees F, and the average winter minimum in Holden Village is 15 degrees F (WRCC, 2009). Precipitation and temperature vary widely depending on the elevation and proximity to the Cascade Crest. Winds typically are funneled down the lake valley in a southeasterly and easterly direction towards the Columbia River Basin, where warm air masses are rising. This pattern causes increased wind speeds in the evenings, especially on the north shore of the Lake Chelan. Average annual precipitation in the area ranges from a high of 150 inches near the crest of the Cascade Mountains to a low of 11 inches in the City of Chelan, near the Columbia River (Beck, 1991). Total annual precipitation at Stehekin, at the head of the lake, averages 34 inches, the majority of which falls as snow from November through March. The climate in WRIA 47 ranges from semi-arid in the lower elevations to sub-alpine in the higher elevations. Prevailing westerly winds bring moisture across the Cascade Mountains, and higher elevations and west-facing slopes intercept most of the precipitation falling in the watershed. Most precipitation falls as snow above 3,000 feet during the months of October through April. Average winter and summer temperatures range from 22 to 53 F at Rainy Pass to 30 to 70 F at Chelan (Lake Chelan Watershed Management Plan 2012).

Ecological Values

Ecological Systems and Ecological Integrity

WDFW's strategic objectives include protecting and restoring the ecological integrity of critical habitats consistent with DNR's Natural Heritage Program's Ecological Integrity Monitoring (EIM). The agency's statewide goal is to restore and protect the integrity of priority ecological systems and sites. We use Ecological Integrity Assessments (EIA) and EIM to direct and measure achievements towards that goal. Ecological integrity is defined as the ability of a system to support and maintain a community of organisms that has species composition, diversity, and functional organization comparable to those of natural habitats. EIM is a tool to evaluate ecological integrity, and changes to integrity over time, within priority systems and sites on the wildlife areas. Similar to species classifications grouped according to level of threat and potential inability to support sustained populations, habitats are grouped by type, including those that are priorities for preservation and conservation. The complete classification system, including descriptions of all ecological systems, can be found online at https://www.dnr.wa.gov/NHP-EIA and summarized in the framework.

The planning process for Chelan Wildlife Area identified 10 National Ecological Systems of Concern to manage for ecological integrity. Table 5 summarizes the National Ecological Systems of Concern for the wildlife area, taken from DNR's Natural Heritage Program website, listed above.

Additionally, Table 12 in Appendix A contains the list of Species of Greatest Conservation Need (SGCN) believed to be present on the wildlife area and their relationships with ecological systems of concern. Actions associated with ecological integrity are included in the goals and objectives section (page 52), and include determining a baseline for ecological integrity and devising a monitoring plan to evaluate progress over time for each of these systems.

Habitat Connectivity

The bulk of the Chelan Wildlife Area is situated along the west bank of the Columbia River. It is comprised of discreet wildlife area units scattered across an area that extends north to south for more than 40 miles. Additionally, the White River Unit of the Chelan Wildlife Area is geographically distant. It is located more than 30 miles to the west of the Columbia River, upstream of Lake Wenatchee.

This large landscape within which the Chelan Wildlife Area units are embedded spans habitat types and crosses precipitation zones. The Chelan Wildlife Area is a biologically diverse location. Differences in elevation and precipitation result in the formation of very different habitats across the wildlife area. Generally, dry shrubsteppe habitat occurs at the lower elevations near the Columbia River. Shrubsteppe gives way to ponderosa pine forest stands in the mid-elevations, with mixed conifer forest stands present on the Entiat Unit. In contrast to the majority of the Chelan Wildlife Area acreage, moist coniferous forest characterizes the small White River Unit which lies furthest west.

Fish and wildlife survival depends in part on the ability to move through the environment to find food and reproduce. The degree to which land protection and condition supports these necessary movements is called habitat connectivity.

WDFW is a member of the Washington Wildlife Habitat Connectivity Working Group (WHCWG) (http://waconnected.org/), which represents a science-based collaboration of land and resource management agencies, non-governmental organizations, universities and Washington Treaty Tribes. Key wildlife habitat connectivity linkage networks at the statewide level were identified by the WHCWG (2010). The Statewide Analysis looked at 16 focal species. A second examination of wildlife habitat connectivity linkages within the Columbia Plateau occurred two years later and looked at 11 species, WHCWG (2013). These two connectivity efforts have some species in common. However, the Columbia Plateau Connectivity Analysis was performed at a finer scale since it was focusing on a subset of Washington not the entire state. We default to the Columbia Plateau Analysis when there is species overlap between the two studies.

The linkage networks, comprised of suitable habitats and the linkages connecting them, were derived from two modeling approaches: focal species and landscape integrity. The focal species approach identified important habitat areas for the species. The landscape integrity approach was used to help define the best linkages between habitat areas for each wildlife focal species found on or near the Chelan

Table 5. Ecological Systems of Concern on the Chelan Wildlife Area.

Ecological System of Concern	Units	Acres	Description
Columbia Basin Foothill and Canyon Dry Grassland	Beebe Springs, Chelan Butte, Entiat, Pateros, Swakane	5,848	Foothill herbaceous vegetation found on steep open slopes, in the canyons and valleys of the Columbia Basin, particularly along the Snake River canyon, the lower foothill slopes of the Blue Mountains, and along the main stem of the Columbia River. Settings are primarily long, steep slopes of 328 feet to well over 1,300 feet, and slope failure is a common process.
Columbia Basin Foothill Riparian Woodland and Shrubland	Beebe Springs, Cashmere Pond, Chelan Butte, Entiat, Pateros, Swakane	320	Low-elevation riparian system found along the mainstem of the Columbia River and associated major tributaries on the periphery of the mountains surrounding the Columbia River Basin at and below lower tree line. Found in low-elevation canyons and draws, on floodplains, or in steep-sided canyons, in narrow V-shaped valleys with rocky substrates.
Columbia Plateau Low Sagebrush Steppe	Chelan Butte, Entiat, Swakane	70	Dwarf sagebrush shrubsteppe typically found on mountain ridges, flanks and broad terraces.
Columbia Plateau Steppe and Grassland	Beebe Springs, Chelan Butte, Entiat, Pateros, Swakane	873	Extensive grasslands, not grass-dominated patches within sagebrush shrubsteppe ecological system, dominated by perennial bunch grasses and forbs, sometimes with a sparse shrub layer. Often forms a landscape mosaic with the Columbia Plateau Shrubland ecological system. Very little exposed bare ground due to mosses and lichens carpeting the area between plants, comprising a biological soil crust that is a very important characteristic in this ecological system.
Inter-Mountain Basins Big Sagebrush Steppe	Beebe Springs, Cashmere Pond, Chelan Butte, Entiat, Pateros, Swakane	17,525	This system is grassland with shrubs. Shrubs are dominated by *Artemisia* spp., and/or *Purshia tridentata* in an open to moderately dense shrub layer and with at least 25 percent total perennial herbaceous cover. The natural fire regime of this ecological system maintains a patchy distribution of shrubs, so the general aspect is that of grassland. *P. tridentata* is present almost always in association with tree cover, not out in the open.

Ecological System of Concern	Units	Acres	Description
Inter-Mountain Basins Semi-Desert Shrub Steppe	Beebe Springs, Chelan Butte, Entiat, Swakane	10	This semi-arid shrubsteppe is typically an open shrub to moderately dense woody layer and a strong graminoid layer (>25% cover but rarely closed). The woody layer is often a mixture of shrubs and dwarf-shrubs, although it may be dominated by a single shrub species. Characteristic species include *Grayia spinose* or *Krascheninnikovia lanata* with *Ericameria nauseosa*. *Artemisia tridentata* may be present but typically does not dominate although it will increase with disturbance.
North American Arid West Emergent Marsh	Beebe Springs, Chelan Butte, Entiat	10	Marshes occurring below lower treelines. Typically surrounded by savanna, shrubsteppe, steppe, or desert vegetation.
North Pacific Lowland Riparian Forest and Shrubland	Cashmere Pond	5	Forests and tall shrublands that are linear in character, occurring on low-elevation, alluvial floodplains. Confined by valleys and inlets or lower terraces of rivers and streams.
Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland	Chelan Butte, Entiat, Swakane	46	Riparian woodland and shrubland consists of deciduous, coniferous, and mixed conifer-deciduous forests that occur on streambanks and river floodplains of the lower montane and foothill zones.
Northern Rocky Mountain Ponderosa Pine Woodland and Savanna	Beebe Springs, Chelan Butte, Entiat, Swakane	2,569	These woodlands and savannas are, or at least historically were, fire-maintained and occurring at the lower treeline/ ecotone between grasslands or shrublands at lower elevations and more mesic coniferous forests at higher elevations. This is the predominant ponderosa pine system of eastern Washington.

Wildlife Area. See this link for the summary: http://wdfw.wa.gov/lands/wildlife_areas/management_plans/Chelan/.

Focal species were carefully selected to represent the connectivity needs of a broader assemblage of wildlife (WHCWG 2012). The best linkages provided the least resistance to movement between habitat areas for that animal in that area. This means that some of the linkages may not be comprised of ideal habitat, but provide opportunities for movement through a human-modified landscape. The landscape integrity approach identified core habitat areas that were relatively free from human modification and the least human-modified linkages between them (WHCWG 2012).

Habitat connectivity information will be used to inform management decisions on the wildlife area. Habitat restoration and management projects will seek to maintain or improve linkages between habitat blocks on the Chelan Wildlife Area for bighorn sheep, mule deer, western gray squirrel, western rattlesnake, tiger salamander, and sharp-tailed grouse. Habitat concentration areas and linkages for these species can be found online (see link above).

The connectivity findings are a useful tool to assess important locations for the movement or migration of animals so they can reach the wildlife areas and move between wildlife area units. It is recognized that the fencing that was constructed along sections of Highway 97 to reduce vehicle wildlife collisions does function as a movement barrier for some species. The fence has the benefit of reducing bighorn sheep and mule deer mortality, but the fence does prevent mule deer and bighorn sheep from accessing the shoreline of the Columbia River.

Species Management

WDFW's mission is to preserve, protect, and perpetuate fish, wildlife, and ecosystems while providing sustainable fish and wildlife recreational and commercial opportunities. The agency carries out this mission according to state and federal laws (including the Endangered Species Act or ESA) and funding requirements (from property acquisition and/or funds used for ongoing operations and maintenance), which direct many management activities on WDFW's wildlife areas. Other guidance comes from statewide plans for species and/or habitats, and other scientific approaches recommended by internal and external parties (e.g. The Washington State National Heritage Program's Ecological Integrity Assessments). Management actions may also be influenced by collaborative work undertaken with tribal governments and other conservation organizations, land trusts, other land management organizations, academic research programs, and even the specific interests of volunteers if they fit within WDFW's mission, budget, and wildlife area goals.

Species Management

Consistent with WDFW's mission, the agency manages species on wildlife areas for two primary purposes: 1) conservation and protection to manage sustainable populations; and 2) provision of recreational and commercial opportunities.

The Wildlife Area Management Planning Framework describes how species are classified – including species listed at the state or federal level as threatened or endangered, and other species of conservation concern that are included in WDFW's designation of Species of Greatest Conservation Need (SGCN). SGCN species are described in the 2015 State Wildlife Action Plan (https://wdfw.wa.gov/conservation/cwcs/). The framework also incorporates goals from WDFW's Game Management Plan, which includes protecting, sustaining, and managing hunted wildlife, providing stable, regulated recreational hunting to all citizens, protecting and enhancing wildlife habitat, and minimizing adverse impacts to residents, other wildlife, and the environment. The wildlife area plan integrates these plans and priorities, and, in the goal and objectives section (page 52), defines specific actions to achieve them.

The Chelan Wildlife Area supports a wide variety of game and nongame species known as diversity species. Rocky Mountain mule deer are a priority big game species, along with bighorn sheep, black bear and cougar. Other priority species include golden eagle, western gray squirrel, and peregrine falcon (see Appendix A for a complete list of species). The wildlife area has two documented species of reptiles, and one amphibian that are federal species of concern, and seven mollusks classified as SGCN (Table 6). Gray wolf and Upper Columbia River spring-run Chinook salmon are federally listed as endangered; bull trout and Upper Columbia River steelhead are federally threatened, and another four species, including northern goshawk, sharp-tailed grouse, western gray squirrel, and Pacific lamprey, are federal species of concern. Five state listed species and 14 state candidate species are present. All seven units combined provide habitat for 24 Species of Greatest Conservation Need. There are also 34 Priority Habitats and Species (PHS). PHS are habitats and species determined by WDFW to be priorities for conservation and management (Table 6). The Chelan County Priority Habitat list is available in Appendix A.

Table 6. State and Federal Conservation Status, SGCN inclusion, WDFW Priority Habitats and Species (PHS) Criteria and priority areas for species that may occur on the Wildlife Area Units.

Common Name	Scientific Name	Federal/ State Status/ SGCN	PHS Criteria	PHS Priority Area	Wildife Area Unit
Birds					
Bald eagle	*Haliaetus leucocephalus*	SS	1	Breeding Areas, communal roosts, regular concentrations	Beebe Springs, Cashmere Ponds, Chelan Butte, Entiat, Swakane
Chukar	*Alectoris chukar*		3	Regular concentrations	Chelan Butte, Entiat, Pateros, Swakane
Dusky grouse	*Dendragapus obscurus*		3	Breeding areas, regular concentrations	Chelan Butte, Entiat, Pateros, Swakane
Golden eagle	*Aquila chrysaetos*	SC	1	Breeding areas, foraging areas	Chelan Butte, Swakane
Harlequin duck	*Histrionicus histrionicus*	SGCN	2,3	Breeding areas, regular concentrations	White River
Lewis' woodpecker	*Melanerpes lewis*	SC	1	Breeding areas	Chelan Butte, Entiat, Swakane
Merriam's wild turkey	*Meleagris gallopavo merriami*		3	Regular concentrations	Entiat
Merlin	*Falco columbarius*	SC	1	Breeding sites	Chelan Butte, Swakane, Entiat
Northern goshawk	*Accipter gentilis*	SC, FSC	1	Breeding areas	Swakane
Peregrine falcon	*Falco peregrinus*	SS	1	Breeding areas, regular occurrences	Chelan Butte, Swakane, Entiat
Pileated woodpecker	*Dryocopus pileatus*	SC	1	Breeding areas	White River
Prairie falcon	*Falco mexicanus*		3	Breeding areas	Chelan Butte, Swakane, Entiat, Pateros
Pygmy nuthatch	*Sitta pygmaea*	SGCN			Swakane, Entiat, White River
Sharp-tailed grouse	*Tympanuchus phasianellus*	ST, FSC	1,3	Breeding areas, regular concentrations, critical wintering habitat	Pateros
White-headed woodpecker	*Picoides albolarvatus*	SC	1	Breeding areas, foraging areas	Chelan Butte, Entiat, Swakane
Mammals					
Bighorn sheep	*Ovis canadensis*	SGCN	3	Breeding areas, regular concentrations	Chelan Butte, Entiat, Swakane
Gray wolf	*Canis lupus*	SE, FE	1	Any occurrence	White River
Mountain goat	*Oreamnos americanus*		3	Breeding areas, regular concentrations	White River
Mule deer	*Odocoileus hemionus*		3	Breeding areas, migration corridors, regular winter concentrations	Chelan Butte, Swakane, Entiat, Pateros
Western gray squirrel	*Sciurus griseus*	ST, FSC	1	Any occurrence	Chelan Butte

Common Name	Scientific Name	Federal/ State Status/ SGCN	PHS Criteria	PHS Priority Area	Wildife Area Unit
Amphibians					
Tiger salamander	*Ambystoma tigrinum*	SGCN	-	-	Beebe Springs, Cashmere Ponds, Pateros, Swakane, White River
Reptiles					
Sagebrush lizard	*Sceloporous gracious*	SC, FSC	1	Any occurrence	Chelan Butte, Pateros
Sharp-tail snake	*Contia tenuis*	SC, FSC	1	Any occurrence	Swakane
Insects					
Monarch butterfly	*Danaus plexipus*	SGCN	-	-	Beebe Springs, Swakane
Silver-bordered fritillary	*Bolaria selene myrina*	SGCN	-	-	Observations not confirmed. Located in low-mid elevation emergent marsh habitat.
Yuma skipper	*Ochlodes yuma*	SGCN	-	-	Observations not confirmed. Located in *Phragmites australis americanus (native phragmites*).
Mollusks					
California floater	*Anodonta californiensis*	SGCN	-	-	Cashmere Pond, Entiat
Chelan mountainsnail	*Oreohelix spp.*	SGCN	-	-	Chelan Butte, Entiat
Hoder's mountainsnail	*Oreohelix n. sp*	SGCN	-	-	Entiat
Ranne's mountainsnail	*Oreohelix n. sp*	SGCN	-	-	Entiat
Unnamed Oregonian	*Cryptomastix mullani hemphilli*	SGCN	-	-	Swakane
Western pearlshell	*Margaritifera falcata*	SGCN	-	-	Pateros, White River
Winged floater	*Anodonta nuttaliana*	SGCN	-	-	Chelan Butte, Pateros
Earthworms					
Giant Palouse earthworm	*Drioleirus americanus*	SC	1	Any occurrence	Chelan Butte
Fish					
Bull trout – coterminous U.S. DPS	*Salvelinus confluentus*	FT, SC, SGCN	1,2,3	Any Occurrence	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
Upper Columbia River Spring-run Chinook salmon ESU	*Oncorhynchus tshawytscha*	FE, SC, SGCN	1,2,3	Any Occurrence	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
Upper Columbia River Summer/fall-run Chinook salmon ESU	*Oncorhynchus tshawytscha*		1,2,3	Any Occurrence	Cashmere Pond, Entiat, Pateros, Beebe Springs

Common Name	Scientific Name	Federal/ State Status/ SGCN	PHS Criteria	PHS Priority Area	Wildife Area Unit
Coho salmon	*Oncorhynchus kisutch*		2,3	Any Occurrence	Beebe Springs, Cashmere Pond, Pateros
Kokanee	*Oncorhynchus nerka*		3	Any Occurrence	Beebe Springs
Leopard dace	*Rhinichthys falcatus*	SC, SGCN	1	Any Occurrence	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
Mountain sucker	*Catostomus platyrhynchus*	SC, SGCN	1	Any Occurrence	White River, Cashmere Pond, Entiat
Pacific lamprey	*Entosphenus tridentatus*	FSC, SGCN	1,3	Any Occurrence	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
Rainbow trout, native	*Oncorhynchus mykiss (resident)*	SGCN	1, 3	Any Occurrence	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
Sockeye salmon (2 ESUs)	*Oncorhynchus nerka*		1,2,3	Any Occurrence	White River, Cashmere Pond, Beebe Springs
Upper Columbia River Steelhead DPS	*Oncorhynchus mykiss (anadromous)*	FT, SC, SGCN	1,3	Any Occurrence	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
Umatilla dace	*Rhinichthys umatilla*	SC, SGCN	1	Any Occurrence	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
Westslope cutthroat trout	*Oncorhynchus clarkii lewisi*	SGCN	3	Any Occurrence	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
White sturgeon	*Acipenser transmontanus*	SGCN	2,3	Any Occurrence	Beebe Springs
Plants					
Ute ladies tresses	*Spiranthes diluvialis*	FT	-	-	Beebe Springs

Abbreviations:

State endangered (SE), State threatened (ST), State Candidate for listing (SC), State Sensitive (SS), Species of Greatest Conservation Need (SGCN), Priority Habitats and Species (PHS), Evolutionarily Significant Unit (ESU), Distinct Population Segment (DPS)

Federal endangered (FE), Federal threatened (FT), Federal candidate (FC), Federal species of concern (FSC)

PHS Criteria: 1: State listed candidate species; 2: Vulnerable aggregations; 3: Species of recreational, commercial, or tribal importance.

Game Species Overview and Management

Game Species

The Chelan Wildlife Area supports a range of game species, providing varied recreational opportunities. Rocky Mountain Mule deer are a priority big game species along with bighorn sheep, black bear, and cougar. Small game species include chukar partridge, California quail, gray partridge, dusky and ruffed grouse, coyotes, and bobcats. Summaries of their distribution and management are included below. WDFW's 2015-2021 Game Management Plan (https://wdfw.wa.gov/publications/01676/) details management objectives and goals for Washington's game species. The overall goals support sustaining populations and provide recreation opportunities.

Hunting is an important recreational focus on the Chelan Wildlife Area and each unit offers a different set of hunting opportunities. Hunting seasons (dates and harvest restrictions) are species specific within the state and across regions, with seasons and regulations evaluated and updated each year. Species populations receiving higher hunting pressure are monitored more intensely than those with lower participation rates, therefore season changes may occur more frequently. The specific regulations pertaining to individual species and hunting seasons are found on WDFW's website (http://wdfw.wa.gov/hunting/regulations/). Additional information on harvest history and population status are located in WDFW Game Harvest Reports (https://wdfw.wa.gov/hunting/harvest/) and WDFW Game Status and Trend Reports (https://wdfw.wa.gov/publications/).

The Game Management Units (GMUs) associated with the Chelan Wildlife Area are:

- GMU 251 (Mission): Cashmere Pond Unit
- GMU 250 (Swakane): Swakane Unit
- GMU 247 (Entiat): Entiat Unit, Chelan Butte Unit, and Beebe Springs
- GMU 246 (Chiwawa): White River Unit
- GMU 239 (Chiliwist): Pateros Unit

Across the varied wildlife area units, a range of management activities promote stable populations of game species. Primary to that objective is the protection of core wildlife habitat created with the establishment of the wildlife area. Ongoing efforts include weed management, habitat restoration, road management, forest restoration, and fencing.

Mule deer on the Chelan Butte Unit
Photo by Ron Fox

Rocky Mountain Mule Deer
(Odocoileus hemionus)

Largest of the four deer species in Washington, mule deer are associated with dry open expanses of eastern Washington. Along the east slope of the Cascade Range, mule deer display strong seasonal movements between summer and winter ranges, and the health and status of the herds are tied directly to the advantages of this behavior. Mule deer move into productive high elevation alpine habitat each spring, with females following the annual recession of snow on their spring migration to traditional fawning areas. The productive nature of these summer ranges allow females to develop nutritional stores while recovering from winter and while raising young. Males follow the same seasonal routine, only at a much more relaxed pace. Each fall, with the decline in the nutrition of the alpine vegetation, deer start to migrate toward traditional low elevation winter ranges where they wait out harsh conditions. The quality of summer forage will dictate the reserves deer carry into winter. Generally, mule deer do not gain weight over winter, but the quality of winter forage can be significant to sustaining herds. Snow depth, condition, and duration are important factors, along with temperature and disturbance, in determining winter's impact on herds. Secure winter ranges are important in mitigating seasonal impacts to the populations each year, and these same are often targeted for urban development.

The Swakane, Entiat, Chelan Butte, and Pateros units of the Chelan Wildlife Area are an important winter range in the central portion of the east slope of the Cascades. A portion of the herd remains on the wildlife area throughout the year, but the primary function of these habitats are in supporting the 15,000–18,000 migrating deer during winter. This area includes the foothills above the Columbia River, from its shoreline to roughly 4,000 feet in elevation. The variability in winter conditions each year determines the concentration of deer, but the wildlife area units are the core of their wintering areas and vitally important to sustaining the herd. Diverse landscapes on the wildlife area provide the quality forage associated with complex plant communities and provide protection and temperature regulation. The four wildlife area units provide habitat structure necessary for minimizing disturbance when deer are relying on depleted reserves. Access management of Chelan Wildlife Area is an important component of system supporting mule deer.

Access management of Chelan Wildlife Area is an important component of a system supporting mule deer. Mule deer are susceptible to disturbance across their winter range in Chelan County and having areas of refuge from human activity decreases energy losses. WDFW policy restricts motorized vehicle use off county roads, protecting deer and decreasing overall levels of disturbance. Areas farthest from roads, often in more rugged habitats, buffer animals from even non-motorized recreation. Activities like shed hunting are particularly disruptive because people target areas where deer are active in hopes of discovering recently shed antlers. Public education can play an important role in protecting deer, as most recreationists will alter their behavior when given information on protecting species.

The statewide management goals for deer are:

1. Preserve, protect, perpetuate, and manage deer and their habitat to ensure sustainable populations.
2. Manage deer 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.
3. Manage statewide deer populations for a sustainable annual harvest.

Detailed information on the status and management of mule deer across Washington's seven mule deer management zones are found in Washington State Mule Deer Management Plan (https://wdfw.wa.gov/publications/01755/wdfw01755.pdf).

White-tailed Deer
(Odocoileus virginianus)

While the range and numbers of white-tailed are increasing in portions of the east cascades, only small numbers of white-tailed deer occupy the wildlife area. Concentrations of white-tailed deer occur north of the Chelan Butte Unit, yet numbers across the Chelan Wildlife Area are not significant. White-tailed deer, when observed, are often seen on the Swakane, Entiat, and Chelan Butte units. The Washington State White-tailed Deer Management Plan has detailed information on the species and its management (https://wdfw.wa.gov/conservation/white-tailed_deer/).

Bighorn Sheep
(Ovis canadensis)

The distribution of bighorns across their range is normally fragmented due to the patchy nature of the preferred habitats. Like other ungulates, they occupy different seasonal home ranges, with winter habitats being restricted due to the low quality and limited availability of forage. Bighorns are normally a species of open habitats of grassland and rock outcrops and cliffs. While they will use communities of deciduous and confer forest, on the Chelan Wildlife Area, sheep are almost always associated with open grass and shrub habitats. The open nature of their preferred habitats is considered to be associated with sight distance and the ability to detect predators, however, bighorn sheep have evolved as roughage foragers and are constrained to these forage types. The importance of escape terrain (rocky and steep cliff formations) during lambing concentrates ewes on traditional lambing areas that are used generationally by herds. These areas are often on or near winter ranges.

The breeding season, usually occurring late October through November, spurs on the widely popularized head butting behaviors of adult males. While these behaviors are not restricted solely to the breeding seasons, it's at this time of year when the activity becomes most pronounced and aggressive. Bighorns offer a memorable viewing opportunity during their rut when a variety of formalized breeding behaviors are put on display. During this time of year, sexual segregation breaks down and entire herds can occupy the same areas. Males searching for mates, move between sheep groups instigating battles with other males. This behavior is often intense, in some cases driving females to move into dangerous situations while trying to avoid pursuit. Each year, sheep from the wildlife areas are struck by vehicles when they bolt onto roadways.

Respiratory disease plays an important role in the management of bighorn sheep, as sheep are highly susceptible to outbreaks of pneumonia. The history of bighorn sheep populations in Washington show that disease contributed to the extinction of native populations, and continues to be a threat for reintroduced herds. In western North America, respiratory disease outbreaks are often associated with contact between domestic sheep or goats and bighorns. The separation of bighorns from domestic sheep and goats is a management priority, which is achieved by maintaining the exclusion of domestic sheep and goat grazing within wildlife area units, and by restoring and protecting quality habitat.

The Swakane and Chelan Butte units support two bighorn herds, each with over 150 sheep. The herds were established from the translocation of bighorns from other Washington herds by WDFW. Populations in the Swakane and Chelan Butte units continue to increase and represent a significant success. Opportunities to harvest mature rams are highly prized and the competition for limited entry hunting permits each year is significant. Rams harvested from the Swakane and Chelan Butte units are often some of the largest recorded each year across the western United States. Funds received from a small number of auction and raffle permits generate the monies used for bighorn management activities within the state each year. These robust herds provide both consumptive and non-consumptive wildlife recreation and are a result of the quality habitat and protections the Chelan Wildlife Area provides.

The statewide goals for bighorn sheep are:

1. Preserve, protect, perpetuate, and manage bighorn sheep and their habitats to ensure healthy, productive populations.
2. Manage bighorn sheep for a variety of recreational, educational, and aesthetic purposes, including hunting, scientific study, cultural and ceremonial uses by Native Americans, wildlife viewing, and photography.
3. Manage statewide bighorn sheep populations for a sustained yield.

WDFW's 2015-2021 Game Management Plan (https://wdfw.wa.gov/publications/01676/) details management objectives and goals for bighorn sheep in Washington.

Cougar
(Puma concolor)

Cougars share their distribution with a wide array of carnivores, which on the wildlife area include black bears, coyote, bobcat, badger, and possibly wolves. Cougars are incredibly versatile in their occupancy of different habitats. Once the focus of eradication as an "undesirable species", the cougar now holds a positon as one of the most important big game species in Washington. The social

structure of a cougar population is such that a limited number of adult males hold and defend formal territories, which contain multiple overlapping female territories. Females may share adjoining territories with their adult female offspring, or with their mothers, and across these territories, with little conflict occurring between them. Males, on the other hand, aggressively defend their territories against other males where access to mates is thought to be the primary driver. Amidst these territorial female coalitions and male battles are the young transients in search of a location to become their own. Cougars breed throughout the year, but the peak birth season is usually mid-late summer in northern latitudes. Litter size appears to be linked directly with nutrition and available prey, and significant declines of primary ungulate prey species are often reflected in litter size reductions or failures. Adult female cougars hold smaller home ranges (21-115 sq. miles) than adult males (58-270 sq. miles) and travel less daily, reflecting a female's focus on producing and raising young. Males search more widely for mates and focus on defending against other males.

A versatile predator, cougars will adapt to availability of prey, with mule deer and bighorn sheep being the primary prey species on the Chelan Wildlife Area. It's reasonable to expect cougars to claim and use portions of all the wildlife area units as territories. Their densities on individual units are low given their home range sizes, but areas with available prey will likely attract cougar use. Seasonal changes in ungulate densities and concentrations can aid in a cougar's hunting success. Being an ambush predator, cougars will be more successful in habitats of broken cover and when prey is concentrated. With mule deer in higher concentration, and bighorn sheep utilizing more restricted ranges, winter gives cougars much greater opportunity.

Seeing a cougar in the wild is a rare and highly prized event for anyone, but it is not uncommon to find recent sign of cougar activity. Cougar tracks can be found during winter when cats traverse deer and bighorn sheep areas while hunting. By driving or hiking routes following fresh snow, wildlife viewers, with some perseverance, can find fresh tracks and possibly increase their chance to seeing a cat. Most cougar harvest occurs during open deer and elk seasons when hunters spend the most time in habitats where cougars are found. During winter, dedicated hunters can find success tracking cats on foot, although it takes determination and a little luck. Cougar hunting seasons are structured to reduce over harvest of cougars in easily hunted areas and to distribute harvest more uniformly across multiple units in an area.

WDFW's 2015-2021 Game Management Plan (https://wdfw.wa.gov/publications/01676/) details management objectives and goals for cougars in Washington. For more information on cougar harvest trends and population status, see WDFW's Game Harvest Reports (https://wdfw.wa.gov/hunting/harvest/) and Game Status and Trend Reports (https://wdfw.wa.gov/publications/).

Coyote ***(Canis latrans)***
and **Bobcat** ***(Lynx rufus)***

These two species are significant both as mesopredators (medium predators) on the wildlife areas and for the recreational opportunity and interest they provide. While bobcats are secretive and not often seen, it is relatively common to see coyotes in a variety of habitats. These two carnivores fill a similar role, but in different ways. Bobcats are active mostly at night, pursuing prey that coyotes chase during the day or night. Coyotes, being much more visible are assumed to be more numerous, and they can be, but we know little about actual bobcat numbers, and work in the west has shown that they can reach similar densities to coyotes.

Bobcats, being similar to cougars, are solely carnivores, and depending on the prey can either catch or scavenge. Coyotes on the other hand, are supremely versatile in the selection of foods and will take advantage of fruits and crops when available or when times are hard. Both rely on small mammals and birds as primary prey, but reptiles and other animals help support these versatile carnivores.

Viewing opportunities are much more realistic for coyotes, and watching them move through different habitats in their search for food is usually very entertaining. Coyotes, like other small predators, can hear and detect mice and voles under the snow and can often be seen leaping into the air in an attempt to trap a meal. Bobcats, again like cougars, will leave tracks in snow detailing their movements, and that in themselves can be the focus of a wildlife viewing trip. These carnivores use all upland habitats across the wildlife area and are some of the most widely distributed species. Expect to see sign of both from the cool fir and

cedar forests of the White River Unit to the dry grasslands and shrubsteppe of the Chelan Butte and Pateros units.

Both coyotes and bobcat are the focus of a significant amount of hunting recreation. Hunters will make pursuing these two species the focus of their activity throughout winter when other opportunities decline. For more information on harvest seasons, see WDFW's 2015-2021 Game Management Plan (https://wdfw.wa.gov/publications/01676/) which details management for small game in Washington. In addition, visit WDFW's Living with Wildlife, webpages for coyotes (https://wdfw.wa.gov/living/coyotes.html) and bobcats (https://wdfw.wa.gov/living/bobcats.html).

American Black Bear
(Ursus americanus)

Black bears are the most common large omnivore in Washington, present in all habitats across the state outside the Columbia Basin. Differing from cougars and wolves, which are solely predators, black bears are tied closely to quality habitat and rely primarily on plants to meet their nutritional need. Black bears evolved a life history strategy of winter dormancy to ensure survival during winter's low food availability, and time their activity with peak seasonal food production and availability. Under this strategy, bears depend on acquiring large amounts of food prior to entering their dens each fall, and will commonly increase their weight by 35 percent before denning. These weight gains require intense foraging and bears can be active over 20 hours a day in preparation. Their nutrition needs can drive them to travel long distances in their search for food. Their movements will often place them in conflict with humans when they occupy inhabited areas, taking advantage of foods made available by people.

Black bears, while able to produce multiple cubs, have relatively low population growth rates. Unlike ungulates, where females breed yearly throughout their life, black bear females first breed at 3.5 to 5.5 years of age. Cub production can vary based on the availability of food resources, and malnourished females may not give birth during periods of reduced resources. In regions where seasonal mast crops are dependable, litter sizes are consistently higher than in the variable environments of the Pacific Northwest. Their delayed age at first breeding, alternate year litter production, variable litter sizes, and variable rates of cub survival result in black bear populations recovering slowly following declines.

Black bears are common across the Chelan Wildlife Area and have the potential to occupy all units. Bears are at low density in the drier habitats of the east slope of the Cascades. The wetter, more productive habitats of the White River Unit allow for higher bear densities, and the unit's close association with anadromous fish runs make these areas seasonal destinations for bears. On the wildlife area units with drier habitat, bears are normally associated with forest communities and well established riparian zones. It is not uncommon to find bears utilizing very dry habitats where they have access to secluded canyons dominated by riparian communities. Bears are normally secretive and not easily observed, though it is possible to increase viewing opportunities by understanding seasonal food availability and searching out those areas where bears may concentrate. Males and females are often seen together in June when mating seasons bring them together.

WDFW's 2015-2021 Game Management Plan details management objectives and goals for black bears in Washington (https://wdfw.wa.gov/publications/01676/).

Upland Game Birds

Upland game birds are common on all units of the Chelan Wildlife Area. Chukar partridge, California quail, and gray partridge are the most common and widely distributed species across the wildlife area's units. These three game birds inhabit shrubsteppe and grass dominated vegetation communities on the Swakane, Entiat, Chelan Butte and Pateros units. Chukar partridge are species hunters have to earn, as they prefer steep rocky slopes. Gray partridges are less numerous, seeking out grass-dominated habitat and are often found on gentle slopes. California quail frequent riparian communities and brushy draws with taller and more complex shrub habitat, using it as cover from the various raptor species they attract. The Chelan Butte and Swakane units are sites where ring-necked pheasants are released each fall. The releases provide increased recreation and visitation on the two units and focus on youth oriented hunting opportunities.

Dusky grouse and ruffed grouse are the unit's game birds of the forest. Ruffed grouse are most common across the wildlife area, preferring forest edge habitat and aspen. Males are frequently heard in the spring when they make distinct drumming sounds, while perched atop downed logs. Dusky grouse are the third largest grouse species in North America and are associated with forested habitat on the wildlife area. Male dusky grouse are commonly herd along forest edges and adjacent grass/shrub comminutes in the spring when they display with deep hooting calls to attract females.

More information on upland game birds and hunting can be found at (http://wdfw.wa.gov/hunting/upland_birds).

California quail – Swakane Unit
Photo by Alan Bauer

Chukar partridge – Swakane Unit
Photo by Alan Bauer

Diversity Species Overview & Management

The Chelan Wildlife Area supports a unique variety of diversity species – species that are not hunted (non-game) – associated with the habitats found there. These diversity species and their population status range from common to endangered. Diversity species may be identified as a species of concern under either a state or federal designation, or both, and may have Species of Greatest Conservation Need (SGCN) and Priority Habitats and Species (PHS) designations, see Table 6. See Table 13 in Appendix A for a more comprehensive list of all species that may occur on the wildlife area. Wildlife areas function as core habitat for many diversity species, and on the Chelan Wildlife Area, the state-threatened western gray squirrels persist, while state and federally endangered gray wolves may reestablish themselves soon, and state candidate giant Palouse earthworms lead a cryptic existence. The following section characterizes conservation and recovery efforts for diversity focal species on the wildlife area.

Monarch butterfly
Photo by Ann Potter

Gray Wolf
(Canis lupus)

Historically, the gray wolf was the most widely distributed mammal across the world, and once occupied almost all of Washington state. Their distribution emphasizes how successful wolves are in adapting to varying environmental conditions, prey species and densities, and almost any available habitat. The gray wolf's adaptive strategy is that of forming social packs composed primarily of related individuals, led by a socially dominate male and female. It's likely that the formation and maintenance of social packs give wolves the adaptability to successfully survive across wide ranges of environmental conditions. The current numbers and distribution of wolves in Washington is the result of natural recolonization following decades of persecution, focused reintroductions in the northern Rocky Mountains, and changes in attitude and acceptance regarding wolves. The adaptability of wolves, weighted against human social tolerance, will determine the wolf's distribution in Washington moving forward.

The largest canid in North America, wolves overlap cougars in size, but are significantly smaller than the larger black bear. Our next largest canid, the coyote, is normally 1/4 - 1/3 the size of a wolf, and while sometimes misidentified as wolves, is significantly smaller and occupies a subordinate position to wolves in any interaction. The social pack structure allows wolves to exploit large prey species and take advantage of the presence of elk and moose across their range. Packs vary in size from a few animals to as high as 15 or more, but the core of any pack is a mated pair and their offspring. Acceptance of outsiders into packs does occur, but there does not seem to be a predictable pattern to these adoptions, and wolves are mostly defensive against other wolves outside immediate pack members. In most cases, it is the dispersal of young pack members into new areas outside family territories resulting in the formation of new packs. Being that packs are territorial, and aggressively defend against outside packs, dispersing wolves will travel large distances searching for mates and unoccupied landscapes before paring. The distribution, numbers, and sizes of packs on a landscape varies based on the productivity of the area. The persistence of a pack within its territory is often changed due to aggression from other packs. Disease and starvation are significant factors in wolf populations, but minus human caused deaths, other wolves are the major source of mortality amongst wolves.

Across the Chelan Wildlife Area, mule deer are the primary prey species that will support wolves with recolonization. While elk and moose occur, they are at low densities and represent only an occasional prey source for wolves on and around the wildlife area. At this time, there are no documented wolf packs on the wildlife area, or in Chelan County. Established packs border the county to the north and the south, but the wildlife area has only had incidental observations, mostly unconfirmed, and likely of single transitory individuals. It is anticipated that the wildlife area will eventually be a part of an established pack's territory. Objectives in the management plan that support wolves include activities that maintain and enhance mule deer habitat and limit road access. Currently there are no grazing permits on the wildlife area; however, that could change in the future and wolf/livestock conflicts will need to be addressed.

Gray wolves are state endangered across the entirety of Washington, and federally endangered in the western two thirds of the state. In the eastern portion of Washington, wolves are federally delisted as a part of the Northern Rocky Mountain Population Distinct Population Segment (DPS). A more detailed discussion of the status of wolves is found in the WDFW Wolf Conservation and Management Plan (https://wdfw.wa.gov/conservation/gray_wolf/), and in Washington's State Wildlife Action Plan (https://wdfw.wa.gov/publications/01742/10_A1_Mammals.pdf).

Golden eagle
(Aquila chrysaetos)

The golden eagle is a large diurnal (active during the day) raptor, with a wingspan up to seven feet, and the only "booted" eagle in North America, meaning it has feathered tarsi (ankles). The 2014 nationwide population estimate for golden eagles was 39,000, and their populations are considered stable (USFWS 2016). In the Pacific Northwest nest initiation typically begins in February, incubation lasts 40-45 days, and chicks fledge after about 9-11 weeks. Golden eagles will defend territories that may contain multiple alternate nests, and they have high nest fidelity. Nests are primarily associated with open shrubsteppe and cliffs, though eagles will nest in low-density conifer and mountainous outcrops (WDFW 2013). In 2014, WDFW completed the most recent inventory of known golden eagle territories, at which time 275 territories were documented and of those, 186 (68 percent) were active (Hayes 2015). In Washington, most breeding territories are found east of the Cascades and associated with the open shrubsteppe habitat of the Columbia and Snake river basins (WDFW 2013). Within the Chelan Wildlife Area, there are ten known golden eagle territories.

Golden eagles in Washington have been listed as a state candidate species since 1991 due to their small population size and relatively low productivity compared to neighboring states (Hayes 2015). They also face numerous threats. Golden eagles are dependent on a range of mammals for prey, including ground squirrels, jackrabbits, marmots, cottontail rabbits, and, to a lesser degree, game birds and carrion. In Washington, small mammal populations have been depleted by hunting, habitat loss and agricultural practices. Golden eagles do not sexually mature until 4 years of age and typically lay only one or two eggs annually. This low reproduction rate, coupled with competition for prey resources, can depress populations. Golden eagles are also susceptible to lead poisoning from lead fragments left behind in animal carcasses or the discarded organs of harvested animals. Lead is a neurotoxin that bioaccumulates in large raptors, and if left untreated, it can be fatal. Other threats within the wildlife area include recreation disturbance. Target practice, ATV activities, climbing, mountain biking and hiking during the breeding season may cause undue disturbance to golden eagles. One recent study suggested golden eagles may be less sensitive to motorized activity than to hikers and that eagles were less likely to flush later in the breeding season (Spaul & Heath 2017). Management of recreation activities through spatial or temporal closures can be effective in protecting golden eagle nests (J. Watson pers. comm., Spaul & Heath 2017).

Golden eagle
Photo by Justin Haug

Western Gray Squirrel
(Sciurus griseus)

Western gray squirrels are arboreal (living in trees) and are never found far from tree cover. They are ground foragers, as are eastern gray and eastern fox squirrels, and the species compete for food and possibly nest sites where ranges overlap. Being diurnal, western gray squirrels are active most of the day depending on season. During the hottest parts of the summer season, squirrel activity declines mid to late afternoon as temperatures rise. Seasonally, their greatest activity occurs in fall when foraging and creating food caches. The squirrels are associated with mid to low elevation transitional forest types of ponderosa pine and Douglas-fir, and use the riparian communities within, both for foraging and travel routes. In general, squirrels are secretive and avoid areas close to people and with higher levels of disturbance, but they do habituate to areas of plentiful food resources such as orchards.

Three western gray squirrel population concentrations define their current range in Washington. These populations occur in northern Chelan and Okanogan counties and in southern Yakima and Klickitat counties on the eastside, and in western Washington in Pierce and Thurston counties. Historically, western gray squirrels were more widely distributed in the state, but with the same patchy distribution characteristic of squirrel populations today. By 1940-1950, the species was considered in decline and the few hunting seasons for squirrels ended (Linders et al. 2007). Disease, habitat loss, and localized overhunting all combined to push numbers down and contract their range. Their small population sizes and isolated distribution are significant factors affecting populations today.

Disease is a major factor driving population numbers at local scales. The most prevalent is Neoteric mange, which has the potential to drive squirrel numbers down at alarmingly high rates and is thought to have been a significant force acting on western gray squirrels in Washington since the 1930s. Little is known of historic impacts of disease within the Chelan and Okanogan, but populations in Klickitat County suffered outbreaks from which that squirrel population may not have recovered, and disease events from the 1940s and 1950s near the Oak Creek Wildlife Area in Yakima County may have caused localized extinctions (Stream 1993). The extreme effect of these disease outbreaks may be partly the result of food stressed populations with reduced resiliency, highlighting the importance of adequate amounts and distribution of high quality habitat in western gray squirrel recovery.

The western gray squirrel is a state threatened species, and is classified as SCGN in Washington. The current known distribution of western gray squirrels on the wildlife area is limited to the Chelan Butte and Beebe Springs units. Historically, squirrels were distributed across appropriate habitat in Chelan County and strong numbers occurred in the Wenatchee River Valley. Forest types on the White River Unit do not function as habitat for squirrels, and the Pateros Unit is dominated by shrubsteppe communities with little squirrel habitat other than limited riparian area. The Swakane and Entiat units offer the greatest opportunity for discovering local concentrations and for the expanded recovery of western gray squirrels. There is a potential for undiscovered local squirrel concentrations on the Entiat Unit closest to Chelan Butte. Similar habitats are present on the two units and distances between are relatively small. In 2013, a western gray squirrel vehicle mortality was recovered at the intersection of the SR 971 (Navarre Coulee) and Highway 97A, an area near the center of the Entiat Unit.

Survey projects are being conducted to understand the distribution of squirrels in eastern Washington and develop methods to assess squirrel numbers using a cost effective methodology. The status of the project is ongoing and to date no squirrels have been discovered outside the limited understanding of their distribution in Chelan County. Loss of habitat is thought to be the greatest threat to squirrels on the wildlife areas and is occurring in the form of major stand replacing fires. The fire return interval appears to have increased on the wildlife area and intensity of fires over the past 10 years more severe. These events may prove a limiting factor to increases in the number and distribution of squirrels, as there are not large extant concentrations of squirrels on or near the wildlife area buffered from these events.

Tiger salamander
Photo by Lisa Hallock

Pygmy nuthatch
(Sitta pygmaea)

The pygmy nuthatch is one of four nuthatches found in North America, and the smallest species, weighing in at just 9-11 grams. These gregarious little birds are often found in large family groups, flitting from tree to tree. They are one of the only cooperatively breeding passerines, with breeding pairs being assisted by other non-breeding male relatives in feeding the brood and defending the nest. In the winter, multiple family groups may collect in communal roosts in cavities for warmth. One record, from Colorado, found 150 nuthatches in one roost (Knorr 1957). Pygmy nuthatches are closely associated with mature pine stands, where they nest in cavities and forage on a variety of insects and seeds. They are generally non-migratory and are found throughout ponderosa pine forests in eastern Washington. Pygmy nuthatches are classified as SGCN in Washington, and a species of "Least Concern" across their range. In Washington their status is not well understood and populations are likely to have declined and stabilized at low levels.

Population estimates from breeding bird surveys puts the statewide population at approximately 50,000 (Partners In Flight 2013). However, logging practices and large-scale stand replacing wildfires, which burn at high intensity, can pose a threat to pygmy nuthatch habitat.

On the wildlife area, Douglas-fir and ponderosa pine forest types are habitat for the pygmy nuthatch. Units such as Chelan Butte, Entiat, and Swakane are comprised of these dry forest types at the interface with shrubsteppe communities, on north facing aspects, along the margins of riparian zones, and at higher elevations. The fire return intervals and fire intensities experienced over the past decade have reduced the amount of forest habitat preferred by nuthatches on the wildlife area. Coordinated forest management plans and goals on the wildlife area will benefit the species and ensure their continued presence.

Tiger Salamander
(Ambystoma tigrinum)

Having the widest distribution of any North American salamanders, tiger salamanders' core range in eastern Washington encompasses all of the Chelan Wildlife Area units, except the White River. These stocky salamanders are one of the largest known, reaching up to 14 inches in length. Some tiger salamanders will mimic their namesake and have bright yellow vertical banding, while others might be a mottled gray/green, and others still a uniform color with no markings. The shrubsteppe, Douglas-fir, and ponderosa pine zones are primary habitat in eastern Washington for tiger salamanders. Soil conditions that allow salamanders to burrow deep under the surface are critical to their life history. Well adapted to uplands, they will use old mammal burrows for underground access. During their breeding season, tiger salamanders attach eggs to substrates at the bottoms of ponds. The perennial nature of these ponds are important as they provide breeding habitat consistently across years. Ephemeral

ponds will provide adequate breeding habitat during wet years, allowing numbers to increase, but a cycle of early drying will lead to high mortality. Tiger salamanders are rarely found where predatory fish persist, normally breeding only in shallow ponds that go dry in late summer, which excludes fish. Tiger salamander are known to be voracious in their eating habits, not focusing on any specific foods/prey, but consuming insects, worms, slugs, fish or other amphibians. Their large size assists in them obtaining a wide range of prey.

The tiger salamander is classified as SGCN, and its conservation status in Washington is based on the small number of populations, a range that is restricted to a region that has been heavily altered, and a lack of information about this species. Of greatest concern is the drastic decline in stream flows and water body volume. Tiger salamanders are susceptible to declines with changes in environmental conditions and hydrology, making them a species sensitive to climate change effects. For more information, see the WDFW website at https://wdfw.wa.gov/publications/01742/12_A3_Reptiles_and_Amphibians.pdf

Giant Palouse Earthworm

(*Driloleirus americanus*)

Little is understood about the distribution or life history of the giant Palouse earthworm (Driloleirus americanus). Once thought to be restricted to areas bordering the Palouse Prairie in Washington and Idaho, recent work has recorded observations of the species in eastern Washington along the slopes of the Cascades. The Chelan Butte Unit of the wildlife area supports a population of undetermined size of giant Palouse earthworms, and the species may be on other units within similar soils types. The giant Palouse earthworm is listed as a state candidate species. Habitat loss is thought to be the primary threat to the species, along with alteration of soil structure from tillage, soil compaction, and pesticides (USFWS 2011). Restoration efforts on the wildlife area can benefit from the presence of the species, as earthworms have an important role in soil formation and health. Restoration of native vegetation communities restores altered soil structures over time and aids giant Palouse earthworm populations pressured by increases of non-native species (Hendrix and Bohlen 2002, Hendrix 2006).

Giant Palouse earthworm
Photo by Kelly Weaver, University of Idaho

Fish Species Overview

The Chelan Wildlife Area units are located within three river basins, including Wenatchee, Entiat and Methow, and several border the Columbia River mainstem. The narrative below describes ESA-listed and SGCN anadromous and resident species present in each unit by river system. ESA-listed species on the wildlife area include Upper Columbia River steelhead distinct population segment (DPS), Upper Columbia River spring-run Chinook salmon evolutionary significant unit (ESU) and the coterminous United States bull trout DPS (hereafter, bull trout). Five units have salmonids, and they include White River, Cashmere Pond, Entiat, Pateros and Beebe Springs. Table 7 describes all native and non-native fish present on the wildlife area.

White River and Cashmere Pond Units

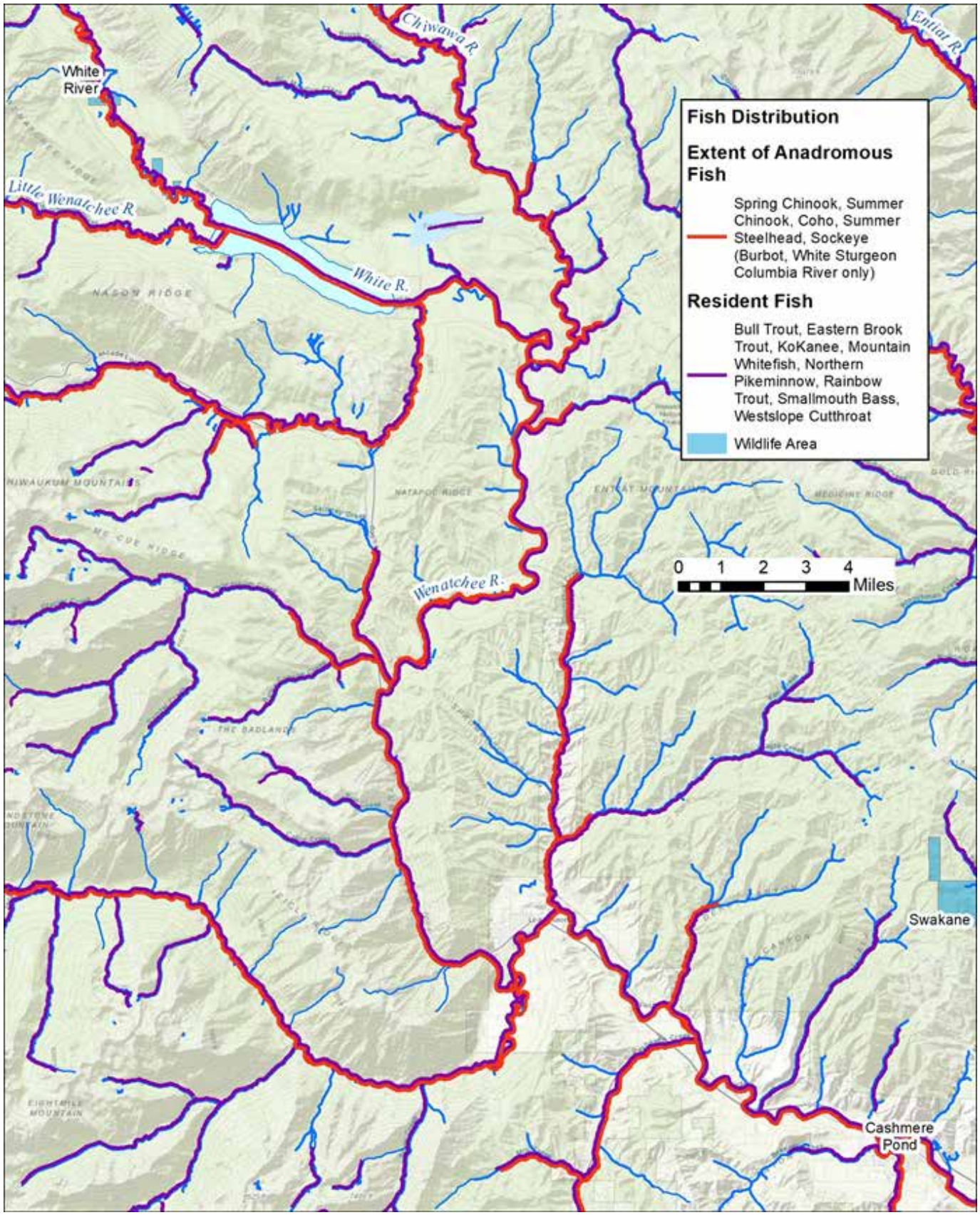
Anadromous (sea-going) salmonids supported by the Wenatchee River system include steelhead (*Oncorhynchus mykiss*), Chinook salmon (*O. tshawytscha)*, sockeye salmon (*O. nerka*) and coho salmon (*O. kisutch*) (see Map 9). The Wenatchee steelhead population is ESA-listed (threatened) and a member of the Upper Columbia River steelhead DPS. All adult steelhead in this DPS have a summer-run return timing, reside in freshwater through winter months and spawn the following spring. The Wenatchee spring-run Chinook salmon population is ESA-listed (endangered) and a member of the Upper Columbia River spring-run Chinook salmon ESU. The Wenatchee summer-run Chinook salmon population is not ESA-listed and is a member of the Upper Columbia River summer/fall-run Chinook salmon ESU. Lake Wenatchee Sockeye is an ESU on its own and not ESA-listed. Present coho salmon are a result of a reintroduction program to restore the species to mid- and upper Columbia Basin tributaries. The Cashmere Pond Unit is associated with the steelhead, spring-run and summer-run Chinook salmon, sockeye salmon, and coho salmon populations. The White River Unit has steelhead, spring-run Chinook salmon, and sockeye salmon. The White River is a core spawning area for the spring-run Chinook salmon population and is a major spawning area for the sockeye salmon ESU.

Pacific lamprey (*Entosphenus tridentatus*) is another anadromous species present in the Wenatchee River. This lamprey is classified as a federal species of concern. Although historically found throughout the watershed, distribution has been reduced and disrupted by dams and other passage barriers, and most lamprey are present below Wenatchee River's Tumwater Dam. The Yakama Nation began a reintroduction program for the upper river in 2016. Currently, Pacific lamprey are associated with the Cashmere Pond Unit.

Bull trout (*Salvelinus confluentus)*, a trout-like member of the char family, occur throughout the Wenatchee River system. They exhibit multiple life history strategies, including year-round residency and adfluvial (a life history strategy in which adult fish spawn and juveniles subsequently rear in streams but migrate to lakes for feeding as subadults and adults) migration, in which adults over-winter in downstream locations such as the Columbia River or Lake Wenatchee and migrate upstream for foraging and spawning. Adfluvial juveniles rear in natal streams and migrate to lakes to forage as adults. Wenatchee River bull trout are a core area population of the DPS, which is ESA-listed as threatened. Bull trout are associated with the Cashmere and White River units.

Native, resident salmonids present in the Wenatchee River system include rainbow trout (*O. mykiss)*, westslope cutthroat trout (*O. clarkii lewisi*), and mountain whitefish (*Prosopium williamsoni*), and are present in the Cashmere and White River units. Non-native brook trout (*Salvelinus fontinalis*), another member of the char family, were introduced into the Wenatchee during the early 20th century. These fish may continue to pose negative impacts upon native westslope cutthroat trout, rainbow trout, and bull trout until feasible means of controlling or eradicating them can be developed. They particularly pose threats to bull trout due to interbreeding as bull trout-brook trout hybrids have been genetically detected in the Wenatchee system. A variety of native, resident non-salmonid species are present in the Wenatchee system, including northern pike minnow (*Ptychocheilus oregonensis)*, sculpins (*Cottidae)*, daces (*Rhinichthidae*) and suckers (*Catostomidae*). The SGCN-classified leopard dace, Umatilla dace and mountain sucker are associated with the Cashmere and White River units. See Map 9 for a distribution of resident fish.

Map 9. Fish Distribution for Cashmere Pond and White River units.



Many high lakes within and that have direct drainage connections to the Wenatchee River system are stocked with Twin Lakes hatchery strain westslope cutthroat trout, which are native to the basin. Some high lakes not known to have direct connections and therefore do not permit emigration from the lake are occasionally stocked with non-native golden trout (*O. aguabonita*) and non-native hatchery rainbow trout. Fish Lake is the only low-elevation lake within the system that is actively stocked on an annual basis with trout species such as non-native rainbow and brown trout (*Salmo trutta*). Fish Lake also harbors non-native warm water game species such as largemouth bass (*Micropterus salmoides)* and yellow perch (*Perca flavescens)*. Fish Lake has an outlet that drains or seeps indirectly to the Wenatchee River and therefore is thought not to permit emigration of these species.

Entiat Unit

Anadromous salmonids supported by the Entiat River system include steelhead, Chinook salmon, sockeye salmon, and coho salmon (see Map 10). The Entiat steelhead population is ESA-listed (threatened) and a member of the Upper Columbia River steelhead DPS. The Entiat spring-run Chinook salmon population is ESA-listed (endangered) and a member of the Upper Columbia River spring-run Chinook salmon ESU. The present summer-run Chinook salmon are members of the non-ESA-listed Upper Columbia River summer/fall-run Chinook salmon ESU. Any sockeye salmon present are likely derived from Lake Wenatchee and/or Okanogan River ESUs, which are not ESA-listed. Coho salmon present are a result of a reintroduction program to restore the species to mid- and upper Columbia Basin tributaries. Note that the Entiat Unit includes lands adjacent to the Columbia River mainstem and thus all anadromous salmonid populations upstream of the Entiat confluence, such as those in Methow and Okanogan rivers, are associated with the unit.

Pacific lamprey, also anadromous, is federally classified as a species of concern, and occurs in the Entiat River system. It is associated with all Entiat Unit lands. The Yakama Nation is working to determine the distribution and status of this lamprey in the Entiat watershed and other upper Columbia Basin areas.

Bull trout are present in the Entiat River system and exhibit multiple life history strategies as described above. Entiat River bull trout are a core area population of the DPS, which is ESA-listed as threatened. Entiat bull trout that are adfluvial migrants use Columbia River mainstem areas for foraging and over-wintering, and thus would be associated with Entiat Unit lands that border the mainstem.

Native, resident salmonids present in the Entiat system include rainbow trout, westslope cutthroat trout, and mountain whitefish. Non-native brook trout are present and pose negative impacts to native fishes as described above. Native, non-salmonid fishes present include sculpins, daces, and suckers, and specifically the SGCN-classified leopard dace, Umatilla dace, and mountain sucker.

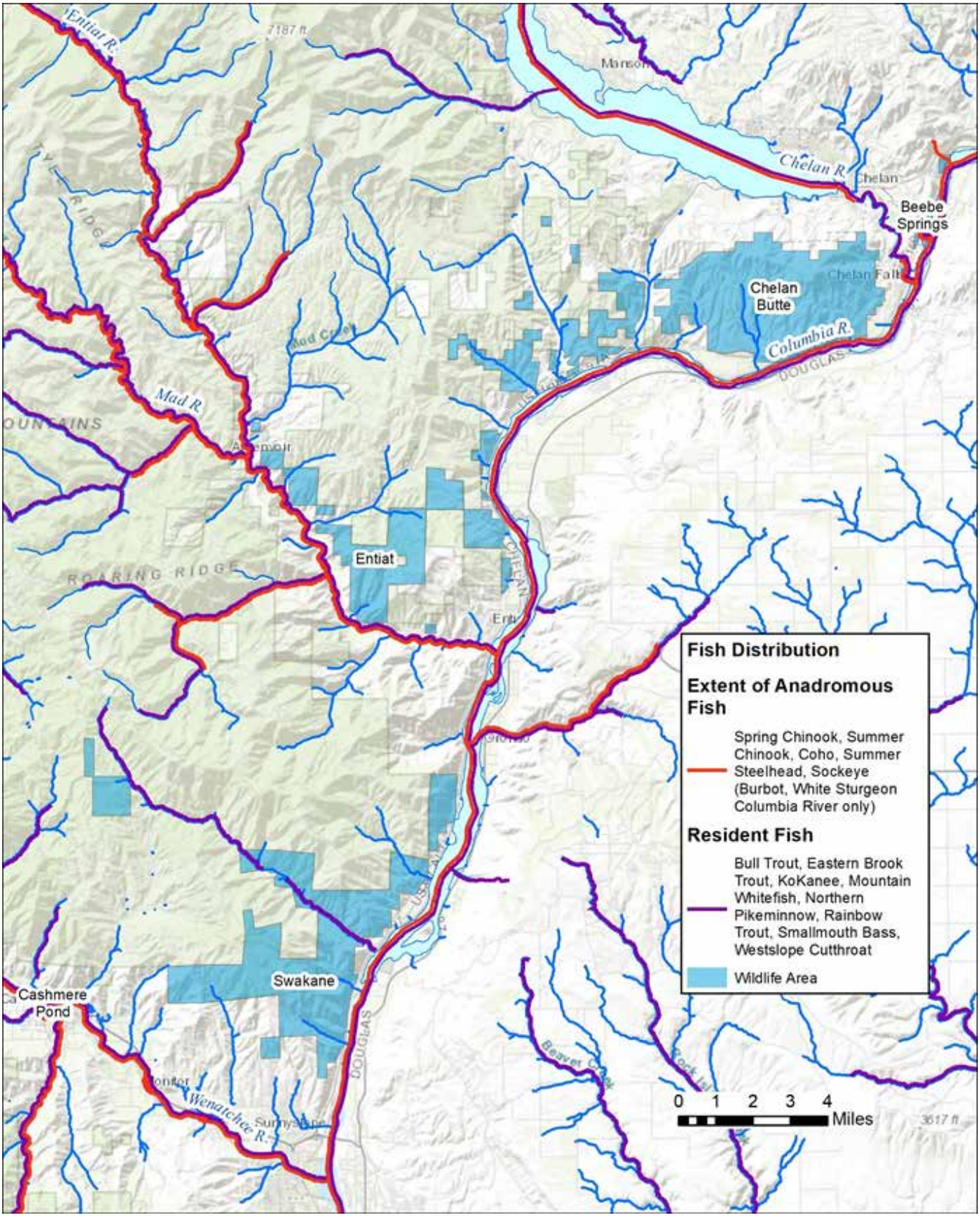
Many high lakes within and that have direct connection to the Entiat River are stocked with the native-origin Twin Lakes strain of westslope cutthroat trout. Some high lakes that are not known to have direct connection to the Entiat River system and therefore do not permit emigration are occasionally stocked with non-native golden trout and rainbow trout. See Map 10 for the distribution of resident fish.

Paterous Unit

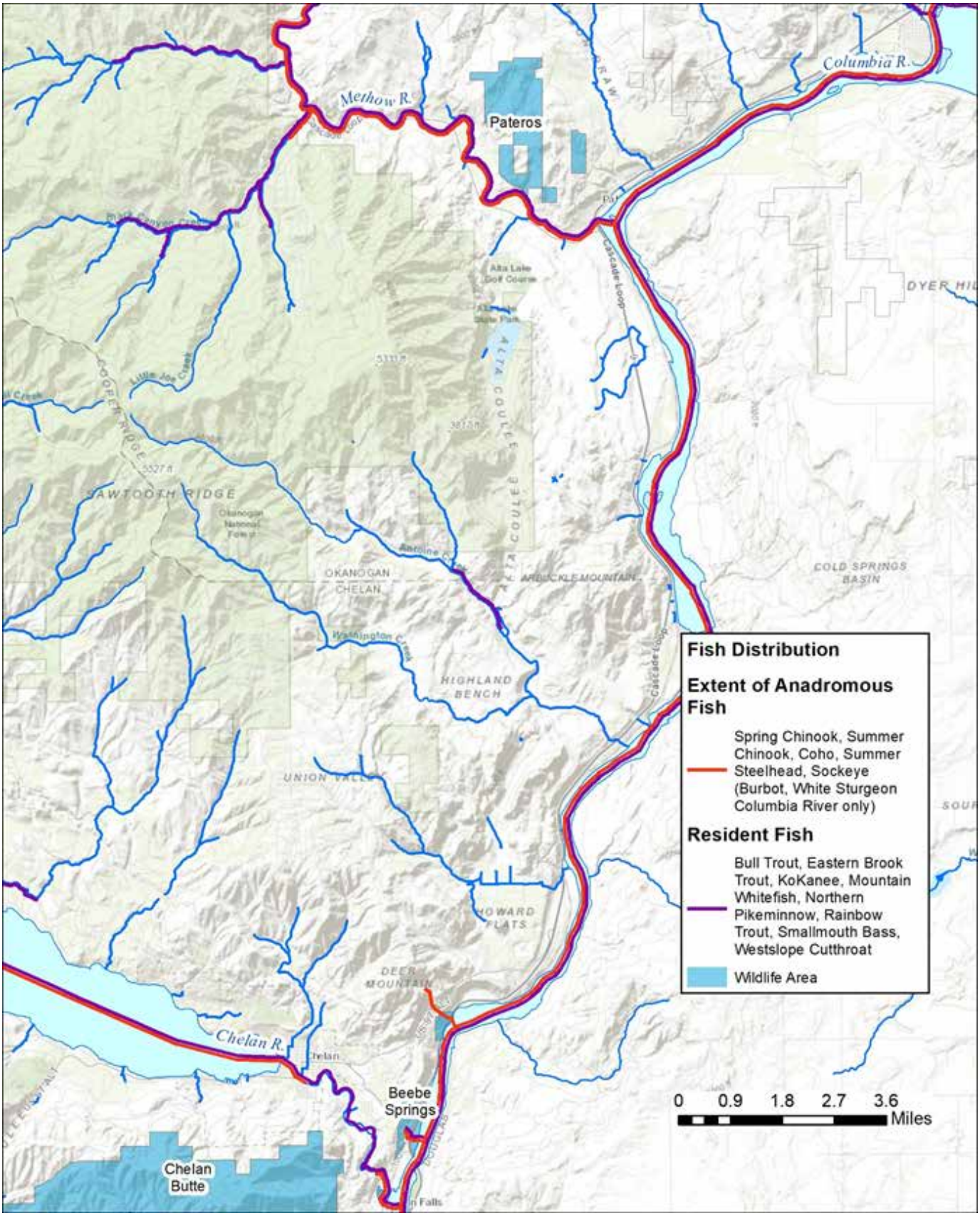
Anadromous salmonids supported by the Methow River system include steelhead, Chinook salmon, and coho salmon (see Map 11). The Methow steelhead population is ESA-listed (threatened) and a member of the Upper Columbia River steelhead DPS. The Methow spring-run Chinook salmon population is ESA-listed (endangered) and a member of the Upper Columbia River spring-run Chinook salmon ESU. The Methow summer-run Chinook salmon population is part of the non-ESA-listed Upper Columbia River summer/fall-run Chinook salmon ESU. Coho salmon present are a result of a reintroduction program to restore the species to mid- and upper Columbia Basin tributaries.

Pacific lamprey, also anadromous, is federally classified as a species of concern, and is present in the Methow River system. The Yakama Nation is working to determine the distribution and status of this lamprey in the Methow watershed.

Map 10. Fish Distribution for Entiat Unit.



Map 11. Fish Distribution for Pateros and Beebe Springs units.



Bull trout are present in the Methow River system and exhibit multiple life history strategies as described above. Methow River bull trout are a core area population of the DPS, which is ESA-listed as threatened.

Native, resident salmonids present in the Methow River system include rainbow trout, westslope cutthroat trout, kokanee (*Oncorhynchus nerka*), and mountain whitefish. Non-native brook trout are also present and pose negative impacts to native fishes as described above. Native, non-salmonid fishes present include northern pike minnow, sculpins, daces, and suckers, and specifically the SGCN-classified leopard dace and Umatilla dace.

Sterile tiger trout (Salmo trutta x Salmo fontinalis hybrids), triploid (sterile) brook trout, and non-native brown trout are stocked in Methow Basin lowland lakes without the potential for emigration to other waters. Non-native warm water game species are found in select lakes and include species such as yellow perch, largemouth bass, smallmouth bass (*Micropterus dolomieui*), black crappie (*Pomoxis nigromaculatus*), and bluegill *(Lepomis machrochirus*). Many high lakes within and that have direct connection to the Methow River system are stocked with native strain westslope cutthroat trout. High lakes not known to have direct connection permitting fish passage to the Methow River system are occasionally stocked with non-native golden trout and rainbow trout. See Map 11 for the distribution of resident fish.

Beebe Springs Unit

Beebe Spring Creek supports steelhead of the ESA-listed Upper Columbia River steelhead DPS, non-ESA-listed summer-run Chinook salmon, and coho salmon (see Map 11). Also within the Beebe Springs Unit is Frank's Pond, which is currently stocked with non-native rainbow trout and managed by WDFW to provide an exclusive angling opportunity for juvenile anglers (under 15 years of age).

A variety of native resident fishes are naturally found in Beebe Spring Creek, including sculpins, daces, and three-spine stickleback (*Gasterosteus aculeatus*) (see Map 10). The Beebe Springs Unit borders the Columbia River and fishes present in this mainstem area (but not in Beebe Springs Creek) are shown as associated with the unit in Table 7.

Juvenile chinook
Photo by David Price

Table 7. Fish Species on the Chelan Wildlife Area.

Common Name	Scientific Name	Origin	Federal/State Status/SGCN	Wildlife Area Unit
Black Crappie	*Pomoxis nigromaculatus*	Nonnative	--	Beebe Springs
Bluegill	*Lepomis macrochirus*	Nonnative	--	Beebe Springs, Entiat
Brown Bullhead	*Ictalurus nebulosis*	Nonnative	--	Beebe Springs
Bull Trout	*Salvelinus confluentus*	Native	FT, SC, SGCN	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
Burbot	*Lota lota*	Native	--	Beebe Springs
Bridgelip Sucker	*Catostomus columbianus*	Native	--	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
Upper Columbia River summer/ fall Chinook Salmon ESU	*Oncorhynchus tshawytscha*	Native	--	Beebe Springs, Cashmere Pond, Entiat, Pateros
Upper Columbia River spring-run Chinook Salmon (ESU)	*Oncorhynchus tshawytscha*	Native	FE, SC, SGCN	White River, Cashmere Pond, Entiat, Pateros
Chiselmouth	*Acrocheilus alutaceus*	Native	--	Beebe Springs, Cashmere Pond
Coho Salmon	*Oncorhynchus kisutch*	Native	--	Beebe Springs, Cashmere Pond, Pateros
Common Carp	*Cyprinus carpio*	Nonnative	--	Beebe Springs
Eastern Brook Trout	*Salvelinus fontinalis*	Nonnative	--	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
Fathead Minnow	*Pimephales promelas*	Nonnative	--	Cashmere Pond, Beebe Springs
Kokanee	*Oncorhynchus nerka*	Native	--	Beebe Springs
Lake Whitefish	*Coregonus clupeaformis*	Nonnative	--	Beebe Springs
Largemouth Bass	*Micropterus salmoides*	Nonnative	--	Beebe Springs
Largescale Sucker	*Catostomus macrocheilus*	Native	--	Beebe Springs
Leopard Dace	*Rhinichthys falcatus*	Native	SC, SGCN	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
Longnose Dace	*Rhinichthys cataractae*	Native	--	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
Longnose Sucker	*Catostomus catostomus*	Native	--	Beebe Springs
Mountain Sucker	*Catostomus platyrhynchus*	Native	SC, SGCN	White River, Cashmere Pond, Entiat
Mountain Whitefish	*Prosopium williamsoni*	Native	--	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
Northern Pikeminnow	*Ptychocheilus oregonensis*	Native	--	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
Pacific Lamprey	*Entosphenus tridentatus*	Native	FSC, SGCN	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
Peamouth	*Mylocheilus caurinus*	Native	--	Beebe Springs

Common Name	Scientific Name	Origin	Federal/State Status/SGCN	Wildlife Area Unit
Pumpkinseed	*Lepomis gibbosus*	Nonnative	--	Beebe Springs
Rainbow Trout	*Oncorhynchus mykiss (resident)*	Native	--	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
Redside Shiner	*Richardsonius balteatus*	Native	--	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
Sculpin (various species)	*Cottus*	Native	--	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
Smallmouth Bass	*Micropterus dolomieu*	Nonnative	--	Beebe Springs
Sockeye Salmon (2 ESUs)	*Oncorhynchus nerka*	Native	--	White River, Cashmere Pond, Beebe Springs
Speckled Dace	*Rhinichthys osculus*	Native	--	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
Upper Columbia River Steelhead DPS	*Oncorhynchus mykiss*	Native	FT, SC, SGCN	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
Tench	*Tinca tinca*	Nonnative	--	Beebe Springs
Threespine Stickleback	*Gasterosteus aculeatus*	Native	--	Beebe Springs, Cashmere Pond, Entiat, Pateros
Umatilla Dace	*Rhinichthys umatilla*	Native	SC, SGCN	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
Walleye	*Sander vitreus*	Nonnative	--	Beebe Springs
Westslope Cutthroat	*Oncorhynchus clarkii lewisi*	Native	SGCN	White River, Cashmere Pond, Entiat, Pateros, Beebe Springs
White Sturgeon	*Acipenser transmontanus*	Native	SGCN	Beebe Springs
Yellow Bullhead	*Ictalurus nebulosis*	Nonnative	--	Beebe Springs, Entiat
Yellow Perch	*Perca flavescens*	Nonnative	--	Beebe Springs

Fish Species Management

Fisheries management surrounding the wildlife area consists of protecting wild fish, recovery efforts towards species listed under the ESA, and continuing the production of hatchery fish for sport angler and tribal harvest. The Wenatchee, Methow, and Entiat rivers, as well as Beebe Springs Creek, are home to many different types of native and non-native fishes, as shown in Table 7. Fish production comes from both natural and hatchery production. Hatchery stocks may be native or introduced.

Many native salmonids in the upper Columbia River, such as steelhead and spring-run Chinook salmon, are listed under the ESA because their abundance was so low at the time of listing they warranted federal protection. State, federal, tribal, and county agencies are working to recover these fish species in the various watersheds through habitat restoration and protection, and fisheries management. Restoration activities in the Wenatchee, Entiat, and Methow systems are focused on restoring natural connectivity, off-channel rearing, and floodplain functions. See page 106 for a description of salmon restoration efforts. Hatchery production of trout, sturgeon, salmon, and steelhead is done to augment harvest and natural production.

Upper Columbia River summer-run Chinook salmon, coho salmon, and Wenatchee and Okanogan sockeye salmon are not ESA-listed in any watersheds within the Chelan Wildlife Area. Natural summer-run Chinook salmon production in the Wenatchee and Methow watersheds is augmented by annual acclimation pond releases each spring. The fish are raised at Eastbank (for Wenatchee River releases) and Wells hatcheries (for Methow River releases). Both hatcheries are located on the mainstem Columbia River. When sport fisheries occur, anglers can currently only harvest hatchery summer-run Chinook salmon (marked by a clipped adipose fin) during those fisheries. Summer-run Chinook salmon within the Entiat Watershed are not known to have occurred historically as a self-sustaining population. However, they now occur there as a direct result of their production at the Entiat National Fish Hatchery, and their sole purpose is purely for harvest augmentation. Anglers are currently able to harvest all summer-run Chinook salmon in the Entiat during posted fishing seasons regardless of being fin-marked or not. Beebe Springs Creek harbors small numbers of summer-run Chinook salmon, coho salmon and steelhead, but these fish are not actively stocked in the creek and are most likely strays from natural or hatchery production elsewhere. Since the creek supports relatively few of these native species, sport fisheries are not allowed. Natural production of sockeye salmon occurs within the Wenatchee system, where major spawning areas include the White and Little Wenatchee rivers. Juveniles rear in Lake Wenatchee. The annual spawner escapement goal for this population is currently set at 23,000. If it is determined that the annual run size is to exceed this goal, sport fisheries can be considered and implemented on Lake Wenatchee.

In addition to natural production, steelhead and spring-run Chinook salmon hatchery production occurs in the Wenatchee and Methow River systems for the purpose of supplementing these ESA-listed natural populations, as well as providing a sport fishery on returning adult fish during years in which naturally and hatchery produced adult numbers are large enough to warrant sport fisheries. When these fisheries occur, anglers can only harvest hatchery steelhead marked with a clipped adipose fin. A variety of fishing seasons are implemented in the Wenatchee, Entiat, and Methow systems when a harvestable surplus is identified or for genetic management of the ESA-listed species. These fishing seasons may include spring-run and summer-run Chinook salmon, coho salmon, steelhead, and sockeye salmon. Season dates and locations vary annually and are subject to fishery-specific restrictions (https://wdfw.wa.gov/fishing/regulations/).

The relatively new, man-made, Frank's Pond, within the Beebe Springs Unit, is stocked periodically with catchable and jumbo sized non-native rainbow trout for the purpose of providing juvenile anglers' fishing opportunity. Since the pond is relatively new (built in 2014) permanent fishing rules have not been established as of yet, but the anticipated season will run from the fourth Saturday in April through October 31.

Habitat Management

This section provides a description of habitat management activities that occur on the Chelan Wildlife Area, including forest management, weed management, fire history and habitat restoration.

Forest Management

Forest Overview

The Chelan Wildlife Area forests contain a range of five ecological systems scattered across all units of the wildlife area. Forest ecosystem distributions can be seen in Map 14, page 143 (see Forest Plan Appendix G.). Lower elevations to the east transition from shrubsteppe communities to dry coniferous forests dominated by ponderosa pine and Douglas-fir. Forest types on the White River Unit are more mesic, with Douglas-fir, western larch, grand fir, and western red cedar as predominant tree species. The range of forest types identified in maps 14 and 15 are described in greater detail in the WDFW Statewide Forest Management Plan (http://wdfw.wa.gov/publications/01616/).

The majority of the forested areas are defined by the dry pine and dry mixed conifer systems common to the central Washington East Cascade lowlands that include the Northern Rocky Mountain Ponderosa Pine Woodland and Savanna and Northern Rocky Mountain Dry - Mesic Montane Mixed Conifer Forest. The ponderosa pine forest type is listed as an Ecological System of Concern (Page 72) and priority habitat by the Priority Habitats and Species program. Ponderosa pine-dominated systems are found on south-facing slopes and in transition from forest to open shrub or grass dominated ecological systems. Douglas fir, western larch, and grand fir are more abundant on north-facing slopes, higher elevations, and relatively cooler and/or wetter sites.

The White River Unit is located on the east slopes of the Cascade Mountains with substantially more available moisture. Much of the unit is also within the White River floodplain. With the increased moisture, diversity of tree species increases with Douglas-fir, ponderosa pine, western larch, Engelmann spruce, grand fir, and western red cedar.

In general, fires were common in most of the forests below 4,000 feet in elevation on the wildlife area, with fire return intervals typically ranging between 16 and 40 years (see Fire History section below). Frequent, low intensity fires were important for maintaining the open, late-seral stand structure and low fuel loads in upland forests. On the mesic forests of the White River Unit, fires were less frequent and have occurred every 200 to 300 years or more.

Harvesting of large trees prior to acquisition and prolonged fire suppression has changed the forests on the wildlife area. Removal of large trees and the change from a fire-dependent landscape to a logging/fire suppression maintained landscape has degraded the ecological integrity of forests. This in turn makes them more susceptible to large scale insect and/or disease outbreaks and the potential for more severe wildfires. These unnatural disturbance patterns further reduce ecological integrity by killing large trees that historically would have survived frequent, low intensity fires more typically associated with fire-dependent ecological systems.

Future forest management activities on the wildlife area will be focused on improving ecological integrity and wildlife habitat. However, aggressive wildfire suppression policy will continue to be a threat to fire-dependent forests. Without frequent fire or active forest management, forests gradually progress towards densely overstocked, unhealthy stands. These stands are then more susceptible to large insect/disease outbreaks and unnaturally large "mega fires."

Management Approach

WDFW will manage the forest landscape on the wildlife area using an approach that balances concern about forest health and fire risk while maintaining or improving habitat conditions that occur outside the historical range of variability. This approach will entail identifying component areas on the landscape by forest type, habitat type, associated wildlife species, whether or not the patch in question is within or beyond the historical range of variability, the spatial context of the area of forest (from patch to landscape), ecological risks, other types of risks (e.g. wildland/urban interface), and spatial factors related to animal movement (including home range requirements). In general, managing for high ecological integrity is expected to provide the greatest benefit to multiple wildlife species.

WDFW will actively manage forested areas on the Chelan Wildlife Area to improve forest conditions on degraded stands. Commercial thinning, pre-commercial thinning, prescribed fire, tree planting, and other forestry practices will be used to improve habitat conditions and ecological

integrity ratings. High ecological integrity over the entire landscape may not be appropriate since targeted species may require forest conditions that do not completely align with high ecological integrity ratings. Forest management projects can help to reduce the risk of intense "mega-fires" that threaten WDFW lands and local communities.

Suitable Management Areas and Potential Projects

WDFW has identified approximately 575 acres of forest that may be suitable for forest management activities on the wildlife area. The remaining areas will be passively managed for the current 10 year planning cycle, since they do not currently need treatment or cannot currently be treated due to a variety of constraints, such as the lack of road access, steep slopes, erodible soils, riparian protection concerns, and regulatory constraints.

Planned Forest Treatment Projects

These projects have been proposed in the next 10-year cycle to meet forest management goals of stand restoration, improving wildlife habitat, increasing ecological resiliency, and reducing risk from catastrophic wildfire. Planning and implementation for each of the project listed below will be dependent on funding, markets, timing, and workloads.

Post-restoration treatment projects may include slashing of small diameter suppressed trees and/or prescribed fire depending upon funding and available resources.

Entiat Unit, access by Crum Canyon Road
Photo by Alan Bauer

Table 8. Proposed projects for the 10-year cycle.

Goal	Objective	Treatment Units	Performance Measure	Lead	Task	Anticipated Completion
Improve ecological integrity of forests while maintaining and/or improving habitat for wildlife	Reduce tree density favoring fire resistant trees	Swakane	Approximately 350 Acres	WDFW Forester	Commercial and Pre-Commercial Thinning	2020
	Reduce tree density favoring fire resistant trees	Entiat	Approximately 225 Acres	WDFW Forester	Commercial and Pre-Commercial Thinning	2021

Fire History

Historically, fire was an important, natural process in creating and maintaining the various plant communities on the Chelan Wildlife Area. Table 9 identifies the diversity of historic fire return intervals on the wildlife area (LANDFIRE 2008). Presumably, historic fire return intervals were predominantly as follows:

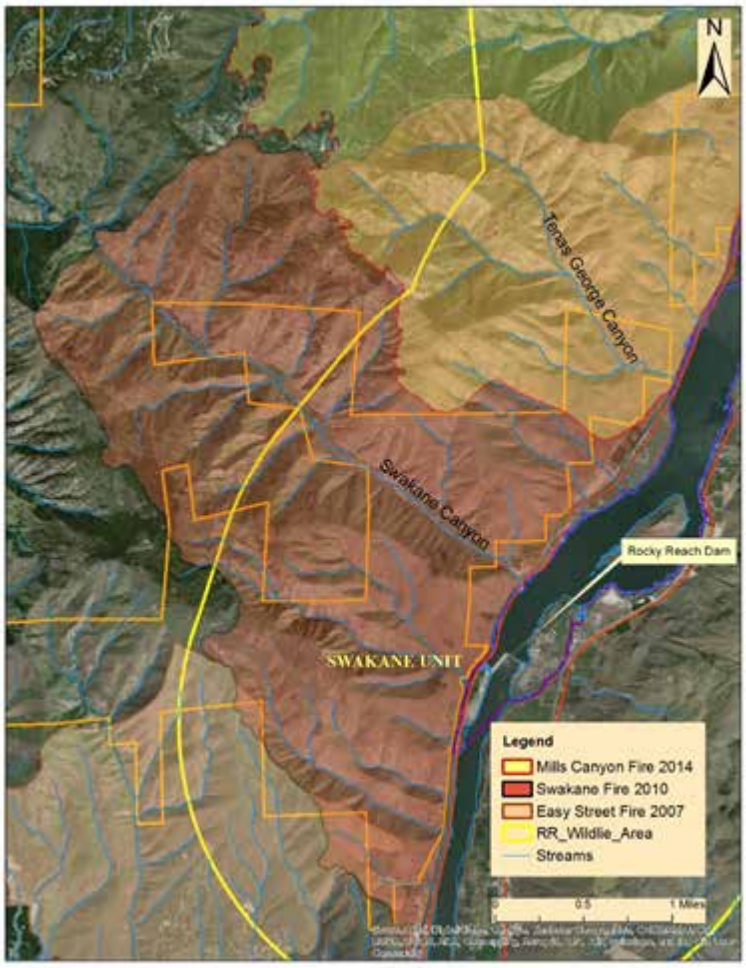
- Ponderosa pine forest: 16-20 years
- Grassland and steppe habitats: 21-60 years
- Riparian areas: 61-70 years
- Sparsely vegetated areas: 201-300 years
- Cool mid-elevation forests (White River Unit):
  - 501-1,000 years in the floodplain
  - 71-80 years on hillsides

Fire regimes on the wildlife area and adjacent lands have been altered in modern times due to fire suppression, silvicultural, and grazing practices, as well as increased human-caused ignitions. In general, the lower elevation shrubsteppe and grassland habitat fires, encompassing the majority of the wildlife area, are increasing in frequency, and are primarily human caused. As a result, vegetation is being altered by reduction of the shrub component and increased invasive annual grasses and weeds. This has been the scenario on the Swakane Unit, with successive human caused fires in 2007, 2009, 2010, and 2012. The higher elevation forested areas are burning less often due to effective fire suppression. Fire exclusion has allowed historically open Ponderosa pine forests to develop an accumulation of fuels, overstocking, insect outbreaks and increased vulnerability to unnaturally large and intense crown fires. On the White River Unit, the forests historically burn infrequently and fire suppression has had minimal impact on stand condition.

Multiple fires have occurred on the wildlife area over the past 50 years, with the Dinkelman, Tyee, and Carlton Complex the largest and consequently producing the most dramatic effect on habitat and damage to infrastructure.

Entiat Unit - Knowles area 2017 fire damage
Photo by Alan Bauer

Map 12. Fires that have occurred on the Swakane Unit from 2007 until 2014. Source – Chelan PUD 2015



The influence of fire on the landscape can occur years after a fire event. Both Tenas George Canyon (2010) and Oklahoma Gulch (1997) experienced mud and debris flows induced by high intensity rain storms after fires. As shown in Table 9, for the past five years every unit of the wildlife area, with the exception of White River and Cashmere Pond, has been impacted by fire, and in some cases the entire unit burned.

WDFW fire management practices for the Chelan Wildlife Area include agreements with other fire-fighting organizations, including local fire districts, BLM, USFS, and DNR. See Appendix C for the wildlife area fire response information.

Weed Management

Managing weeds is a significant part of the Chelan Wildlife Area staff's restoration efforts to establish and maintain diverse native plant communities that support fish and wildlife populations. Invasive plants and noxious weeds can infest high quality native plant communities and convert them to low quality monocultures that reduce wildlife value. The weed management plan (see Appendix B) identifies species, and management practices to control weeds. See Table 10 for a list of weeds of primary concern on the wildlife area. The goal of a weed control plan is to maintain or improve the habitat for fish and wildlife, meet legal obligations, and reduce spread to adjacent private lands.

Table 9. Fire History on the Chelan Wildlife Area.

Wildfire Name	Year	Units Impacted	# of WDFW Acres Burned	Total Acres Burned
Crum Canyon	1976	Entiat	Unknown; between Entiat River and Oklahoma Gulch	9,000
Dinkelman	1988	Swakane	Unknown, likely all of the Swakane Unit	46,000
Chelan Butte	1991	Chelan Butte	Estimated 200	Estimated 2,400
Tyee	1994	Entiat and Chelan Butte	15,263	135,170
Easy Street	2007	Swakane	2,068	6,717
Lake Entiat	2009	Swakane	129	182
Swakane	2010	Swakane	8,001	19,790
Wenatchee Complex (Byrd Fire)	2012	Entiat	3,374	14,164
Chelan Butte	2012	Chelan Butte	35	107
Mills Canyon	2014	Swakane	9,394	22,006
Carlton Complex	2014	Pateros	1,900, consumed entire unit	255,900
Chelan Complex	2015	Chelan Butte and Beebe Springs	1,051 acres Chelan Butte, 93 acres Beebe Springs	60,669, west of Columbia River
Stayman	2015	Chelan Butte	70	193

Washington State Law provides the legal obligations for weed control by landowners:

> **RCW 17.10.140 Owner's duty to control spread of noxious weeds.**
> (1) Except as is provided under subsection (2) of this section, every owner shall perform or cause to be performed those acts as may be necessary to: (a) Eradicate all class A noxious weeds; (b) Control and prevent the spread of all class B noxious weeds designated for control in that region within and from the owner's property; and (c) Control and prevent the spread of all class B and class C noxious weeds listed on the county weed list as locally mandated control priorities within and from the owner's property.

Over the past eight years a significant focus of weed control has been on the Chelan Butte and Swakane units. An active restoration project has been converting agricultural fields to native grasses, forbs, and shrubs. The key to the success of this effort is reducing the competition from weedy species while the native plants are establishing. A combination of mechanical and herbicide treatments (Integrated Pest Management) was used to control weeds prior to and after seeding native plants, followed by additional mechanical and herbicide treatments (2-4 years) while native plants are establishing. On some fields, biological control of diffuse knapweed and Dalmatian toadflax has also been used.

On the Entiat Unit, on an annual basis, extra staff days are devoted to control yellow starthistle. This level of effort leaves gaps in the control effort on other portions of the wildlife area, including the Roundy area where whitetop and hounds tongue have not had control efforts for over 10 years.

Table 10. Weeds of primary concern on the Chelan Wildlife Area.

State Designation	Weed
Class B designate	Houndstongue (*Cynoglossum officinale*), purple loosestrife (*Lythrum salicaria*), yellow starthistle (*Centaurea solstitialis*)
Class B and C select	Dalmatian toadflax (*Linaria dalmatica*), kochia (*Kochia scoparia*), puncture vine (*Tribulus terrestris*)
Class C	Cereal rye (*Secale cereale*), field bindweed (*Convolusus avensis*), Himalayan blackberry, yellow flag iris (*Iris pseudacorus*)

Table 11. Summary of Shrubsteppe Restoration Activities on Chelan Wildlife Area.

Date	Unit	Acres	Description
2010-2015	Chelan Butte	600	Restoration of ag fields
	Swakane	103	Restoration of ag fields
2016-2020	Chelan Butte	500	Restoration of ag fields
	Swakane	15	Riparian and upland tree/shrub plantings

Habitat Restoration

Restoration efforts on the Chelan Wildlife Area are focused on shrubsteppe restoration, forest management, and salmon restoration activities. Forest restoration activities are discussed in more detail in the Forest Management Section (page 100). The following section will provide an overview of shrubsteppe restoration projects and salmon restoration projects.

Shrubsteppe Restoration

The Chelan Wildlife Area received funding from the Chelan County PUD for habitat enhancement, restoration, and protection projects. Please see Table 11 for details. Approximately 600 acres, to varying degrees of success, have native grasses established, and an additional 400 acres were seeded with native grasses in fall 2017. Cereal rye and cheatgrass infestations still plague portions of some fields, and mechanical and chemical treatments will continue for these problem areas. Nearly 500 acres had additional seeding of native forbs and bitterbrush.

The Chelan Butte will see the final native grass seeding in 2017 followed by treatments for weed control and seeding native forbs and bitterbrush. By 2022 the agriculture field restoration is expected to be completed. On the Entiat Unit approximately 300 acres of old agricultural fields were seeded with both native and non-native grasses beginning in the early 1970s and ending in the mid-1990s. These fields need to be evaluated to determine if restoration with all native grasses, forbs and shrubs would increase their value for wildlife.

Chelan Butte Unit - Fall field work
Photo by Alan Bauer

Entiat Unit – Harrison Side Channel Project
Photo by Graham Simon

Salmon Restoration

For the past 14 years, WDFW has partnered with several stakeholders on salmon restoration projects on the Entitat River, White River, Cashmere Pond (Wenatchee River), and Beebe Springs (Columbia River) units.

Entiat Unit – Harrison Side Channel Project

Two successful salmon recovery projects completed in 2014 occurred on the Entiat Unit: the Harrison Side Channel Project and the Keystone Project. Species that benefit from the completion of the projects included ESA-list spring-run Chinook salmon, steelhead, and bull trout, along with westslope cutthroat trout and Pacific lamprey. The Harrison Side Channel Project included breaching a levee and enhancing an existing side channel inlet, enabling perennial flow access to a historic oxbow on the Entiat River. Large woody material and wildlife snags were installed in the inlet channel to increase stream channel diversity and provide cover. A grade control structure was installed at the mouth of the inlet channel to safeguard against the possibility of excessive scour and potential channel avulsion. Stakeholders included the Chelan County Natural Resources, Cascadia Conservation District, and the Bureau of Reclamation. Funding was provided by the Salmon Recovery Funding Board.

Entiat Unit – Keystone Project

The Keystone Project, completed in 2014, installed instream habitat structures in the form of multiple boulder clusters along approximately 450 feet of the left bank of the Entiat River for habitat complexity and hydraulic diversity. It also consisted of connecting an existing side channel by excavating a 78-foot-long channel from the main-stem to the disconnected channel. Species that benefitted from this restoration project included: ESA-listed spring-run Chinook salmon, steelhead, and bull trout, as well as westslope cutthroat trout and Pacific lamprey. Partners included Cascadia Conservation District, Chelan County Natural Resources, Natural Resource Conservation Service, and U.S. Fish & Wildlife Service. Funding was provided by the Bonneville Power Administration.

White River Connection Project

The White River Connection Project was completed in 2017 and removed a culvert that limited floodplain connectivity along the lower White River. The project improved fish access to a side channel and a large wetland complex along the White River Unit. Stakeholders included the Cascade Columbia Fisheries Enhancement Group, and the Chelan Douglas Land Trust. Funding was provided by the Habitat Conservation Plan Tributary Committee.

White River Large Wood Atonement Project.
Photo by Cascade Columbia Fisheries Enhancement Group.

White River Large Wood Atonement Project.
Photo by USFWS.

Cashmere Pond Off-channel Habitat Project
Photo by Chelan County Natural Resources

Cashmere Pond Off-channel Habitat Project

Completed in 2009, the Cashmere Pond Off-channel Habitat Project excavated a 200-foot inlet channel to an existing pond, and a 1,200-foot-long outlet channel from the pond to the Wenatchee River. The pond provides deep-water refuge and overwintering habitat for ESA-listed spring-run Chinook salmon and steelhead. Large wood structures were incorporated in the pond and outlet channel to provide habitat complexity. The inlet channel is active during spring runoff flows and the outlet channel is accessible to salmonids year-round because it is fed by groundwater flows and backwater flows from the Wenatchee River. Partners included Chelan County Natural Resources, the Chelan Douglas Land Trust, and Washington State Department of Transportation (WSDOT). Funding was provided by the Salmon Recovery Funding Board (SRFB).

White River Large Wood Atonement Project

The White River Large Wood Atonement Project was completed in 2015. Species that benefit from this restoration project include ESA-listed spring-run Chinook salmon, steelhead, and bull trout, and non-listed Lake Wenatchee sockeye salmon. The project installed engineered wood pilings that accumulate natural woody material. It aims to accelerate floodplain recovery and enhance instream function in the river by retaining woody material that will improve habitat complexity and stability which results in increased floodplain connectivity. Stakeholders in this process include the Cascade Columbia Fisheries Enhancement Group, Chelan/Douglas Land Trust, and USFWS. Funding was provided by the Salmon Recovery Funding Board, DNR, and USFWS.

Beebe Springs Creek Realignment and Columbia River Shoreline Enhancements

The Beebe Springs Creek Realignment project was implemented in four phases, beginning with realignment of Beebe Springs Creek in 2006. Beebe Springs Creek transformed from an 800-foot channelized ditch infested with Himalayan blackberry to a meandering 1,800-foot naturalized channel with pool and ripple habitat suitable for salmonid spawning and rearing. After the new channel was constructed, native grasses and riparian shrubs and trees were planted along the creek. Students from Chelan Public Schools completed most of the plantings along the creek. Between 2009 and 2013, Columbia River shoreline enhancements were completed, including the removal of Himalayan blackberry, elm, and Lombardy poplar, construction of three side channels with connection to

the Columbia River, three islands, and two wetlands/ ponds along the shoreline. The placement of logs, root wads, and boulders within the side channels increased the complexity of the newly created habitat. After construction, wetland obligate plants, native riparian trees, and shrubs were planted around the side channels and along the one mile of shoreline, side channels, and islands. In upland areas that previously supported an orchard, native grasses and shrubs were established to create shrubsteppe-like habitat. One measure of success of this restoration effort is the colonization of the side channels and wetlands by the federally listed Ute Ladies' Tresses orchid.

Columbia River side channel on Beebe Springs Unit, 2017
Photo by Ron Fox

Columbia River side channel on Beebe Springs Unit, 2010.
Photo by Ron Fox

Climate Change Approach

Purpose

The primary purpose of this section is to evaluate how projected changes in climate will impact the resources of the Chelan Wildlife Area and highlight opportunities that may help to mitigate or prepare for those impacts. This section also summarizes work by the wildlife are planning team to review the management objectives (see Goals and Objectives section), and make changes as appropriate to ensure that objectives are robust to future changes.

This work is consistent with the directives of a 2017 WDFW policy titled "Addressing the Risks of Climate Change," which states that WDFW will "manage its operations and assets so as to better understand, mitigate, and adapt to impacts of climate change."

Projected Climate Change Impacts

Increasing greenhouse gases will lead to warmer temperatures throughout this century for the Pacific Northwest. The most direct impacts of climate change to this area will be in the form of warmer winters (3 to 6 degrees within 15 years) and dryer summers (Climate Impacts Group 2013). For summer months, a majority of models projected decreases in precipitation, with the average declining 16 percent by the 2080s. A majority of models projected increases in winter precipitation, with an average value reaching +9 percent by 2080 (Mote and Salathé 2009). Other key impacts are highlighted below.

Forests in the northwest also will likely be affected by climate-driven changes in disturbance regimes, such as wildfire (Littell et al. 2010), insect outbreaks (e.g., mountain pine beetle; Logan et al. 2003), disease (e.g., Swiss needle cast; Black et al. 2010), and drought (Van Mantgem et al. 2009; Knutson and Pyke 2008). Areas burned by fire in the Columbia River Basin are projected to triple by the 2040s relative to the median for 1916-2006 (Littell et al. 2010, 2012). Wildfire suppression costs have increased as fire seasons have grown longer and the frequency, size, and severity of wildfires has increased due to changing climatic conditions, drought, hazardous fuel buildups, insect and disease infestations, nonnative invasive species, and other factors. Funding has not kept pace with the cost of fighting fire. Over the last 10 years, adjusting for inflation, the USFS has spent an average of almost $1.13 billion on suppression operations annually.

Vegetation models of sagebrush-steppe systems in eastern Washington and Oregon simulate large declines in current distributions of shrublands under future climate conditions (Neilson et al. 2005; Rogers et al. 2011), with shrubs largely replaced by woodland and forest vegetation. The response to climate change of grassland and shrubland systems throughout the northwest will be influenced by invasive species that are currently present in these systems or may be able to expand into these systems as climate changes (Dennehy et al. 2011).

Impacts to Wildlife Area Resources

Species and Ecological Systems of Concern with High Vulnerability to Climate Change

The following table shows the Species of Greatest Conservation Need (SGCN) on the Chelan Wildlife Area that have been ranked by the climate vulnerability assessment to have a moderate-high vulnerability to climate change, and with high confidence in the data. Note that only SGCN were considered in this assessment and it does not include climate sensitivities for other species that may be associated with the wildlife area.

Table 11. Species on Chelan Wildlife Area with Moderate-High Overall Vulnerability* and High Confidence (WDFW 2015).

SGCN	Overall Vulnerability Rank	Description of Climate Sensitivity	Important Climate Variables
Tiger salamander	Moderate – High	- This species likely exhibits sensitivity to warmer and drier conditions that reduce aquatic breeding habitat, lead to desiccation, and/or result in an inability to move. - Timing of reproduction may also be affected by increasing temperatures.	- Increased temperatures - Changes in precipitation and/or reduced snowpack - Drought
Upper Columbia River Spring Chinook salmon ESU	Moderate – High	- Sensitive to warmer water temperatures, low flows, and high flows. - Lower stream flows have been linked to mass mortality events. - High flows can reduce the likelihood of egg survival during incubation - Both high and low flows can impact adult migration	- Increased freshwater temperatures - Lower summer flows - Increased winter/spring flood events
Upper Columbia River Steelhead DPS	Moderate – High	- Sensitive to warmer water temperatures, low flows, and high flows - Lower stream flows (summer and early fall) can reduce the probability of survival in rearing juveniles. - Extreme high flows can reduce the likelihood of egg survival during incubation - Both low and high flows can affect adult migration.	- Altered spring runoff timing and amount/magnitude - Increased water temperatures
Bull Trout	Moderate – High	- Higher sensitivity to warmer water temperatures. - Sensitivity to altered runoff timing and magnitude on emerging fry in late winter/spring; and 2) indirect effects of low summer flows on all life phases.	- Increased water temperatures - Altered runoff timing - Increased winter/spring flood events - Lower summer flows

* Vulnerability to climate change was determined by an evaluation of inherent sensitivity to climatic variables, as well as an assessment of the likelihood of change in key climate variables important for each species. Confidence in each ranking was also assessed, based on the extent and quality of reference material and information.

Making the Goal and Objectives of the Wildlife Area Plan Climate Resilient

The information listed below is a list of Chelan Wildlife Area goals and objectives potentially affected by climate change, or those with a "climate nexus." Actions and considerations are listed to ensure climate impacts are addressed in implementation of the wildlife area management plan. Opportunities are summarized below, and are also integrated into the final list of objectives available on page 52.

Objectives with a climate nexus	Opportunities to increase resilience
Goal 1: Maintain or improve the ecological integrity of priority sites.	
Establish an ecological integrity baseline and associated goals for ecological systems of concern/ priority systems.	The ecological integrity baseline should include parameters for assessing climate change impacts.
Develop a strategy/plan for shrubsteppe and grassland restoration on the wildlife area by 2022.	The restoration plan should include projected changes in temperature and precipitation important for restoration activities. Depending on the specific projections, consult the WDFW Vegetation Ecologist to ensure the seed mix is diverse and appropriate to changing conditions.
Implement the PUD weed management plan annually.	Consider and plan for possibility of new weeds.
Develop a strategy for prioritizing future land acquisitions on inholdings and adjacent lands.	Consider focusing on providing habitat for high vulnerability and high confidence species; and habitats and/or considering habitat connectivity needs.
Goal 2: Improve ecological integrity of forests while maintaining and/or improving habitat for wildlife	
Identify planned areas for forest treatment for the Entiat, Swakane, Chelan Butte for the next 10 years.	Use this opportunity to increase resilience of forested lands. Promoting xeric site species management (e.g. western gray squirrel). Climate change data could help with prioritizing treatments.
Goal 3: Manage roads to minimize unacceptable impacts to fish and wildlife.	
Coordinate with USFS and Chelan County to address road management on the wildlife area including maintenance, weed control, and potential road closures to reduce impacts to habitat and species.	Culvert replacements or construction should use the WDFW Climate adapted culvert tool. This tool will provide future bankfull widths for any stream crossing in Washington and will help to ensure that culverts design accommodates changes in future flows.
Goal 4: Achieve species diversity at levels consistent with healthy ecosystems	
Include mast producing plants in riparian plantings for western gray squirrel.	A longer term issue we should consider is the likelihood of continued persistence of western gray squirrel. Shorter term is to consider mast plantings appropriate for both current and future conditions.
Consider exploring future translocations of sharp-tailed grouse.	Consider if/how future conditions might change habitat suitability for sharp-tailed grouse.

Objectives with a climate nexus	Opportunities to increase resilience
Goal 5: Maintain and enhance upland bird habitat	
Protect and restore native vegetation in riparian corridors to benefit California quail and increase potential habitat for sharp-tailed grouse and other wildlife species.	Consider future climate in restoration design and implementation – include changes in stream flows, wetlands, and riparian vegetation.
Goal 7: Maintain and enhance big game habitat	
Develop 4 springs to provide additional water sources for wildlife on the Chelan Butte Unit and 2 springs on the Swakane Unit.	Select springs that are not likely to dry in summer drought. Consider substrate and topography of springs, and consult Climate Impacts Group for information on likely persistence of existing water sources.
Goal 8: Maintaining and restoring floodplains for fish habitat.	
Coordinate with tribes, Regional Fisheries Enhancement Group and other partners to leverage funding to identify and implement ongoing fish habitat restoration efforts.	Tap into climate-relevant funding. Select fish habitat projects likely to be resilient. Consider climate impacts when prioritizing projects. Consider future flow changes when exploring options.
Goal 10: Maintain productive and positive working relationships with neighbors, partners, and permittees.	
Implementation of Chelan PUD management plan until 2020.	Plan includes restoration, which needs to consider future climate conditions/impacts.
Clarify role of WDFW in joint management agreement with Bureau of Land Management pertaining to BLM lands.	Joint management agreement is a long term planning document and where appropriate it should consider and/or build in opportunities for adaptation.
Goal 12: Property train, equip, and license WLA staff to meet operational and management needs of the WLA.	
Identify reliable funding pool for restoration and operations and maintenance funding. For example, explore Wallace Funds for upland game bird habitat improvements.	Explore opportunities for climate relevant funding sources.

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Appendices

A. Species and Habitat Information

B. Weed Management Plan

C. Fire Response Information

D. Cultural Resources Summary

E. Public Response Summary

F. Research and Other Studies

G. Forest Management Plan

H. Water Access Summary

Appendix A. Species and Habitat Information

Table 12. Chelan Wildlife Area Species List.

A list of species that: 1.) have been documented on the Chelan Wildlife Area, 2.) Are predicted to occur on the wildlife area based on their distribution, their known association with ecological systems and vegetation communities on the wildlife area, 3.) Expert opinion and local knowledge.

Common name	Scientific Name
MAMMALS	
Vagrant shrew	*Sorex vagrans*
Merriam's shrew	*Sorex merriami*
Little Brown Bat	*Myotis lucifugus*
Yuma Myotis	*Myotis yumanensis*
Long-eared Myotis	*Myotis evotis*
Big Brown Bat	*Eptesicus fuscus*
Townsend's Big-eared Bat	*Corynorhinus townsendii*
Pallid Bat	*Antrozous pallidus*
Mountain Cottontail	*Sylvilagus nuttallii*
Least Chipmunk	*Neotamias minimus*
Yellow-bellied Marmot	*Marmota flaviventris*
Golden-mantled Ground Squirrel	*Spermophilus lateralis*
Western Gray Squirrel	*Sciurus griseus*
Douglas' Squirrel	*Tamiasciurus douglasii*
Northern Pocket Gopher	*Thomomys talpoides*
Ord's Kangaroo Rat	*Dipodomys ordii*
American Beaver	*Castor canadensis*
Western Harvest Mouse	*Reithrodontomys megalotis*
Deer Mouse	*Peromyscus maniculatus*
Bushy-tailed Woodrat	*Neotoma cinerea*
Meadow Vole	*Microtus pennsylvanicus*
Sagebrush Vole	*Lemmiscus curtatus*
Muskrat	*Ondatra zibethicus*
North American Porcupine	*Erethizon dorsatum*
Nutria	*Myocastor coypus*
Coyote	*Canis latrans*
Gray Wolf	*Canis lupus*
Red Fox	*Vulpes vulpes*
American Black Bear	*Ursus americanus*
American Marten	*Martes americana*
Common Raccoon	*Procyon lotor*
Long-tailed Weasel	*Mustela frenata*
American Mink	*Mustela vison*
American Badger	*Taxidea taxus*
Striped Skunk	*Mephitis mephitis*
Northern River Otter	*Lontra canadensis*
Bobcat	*Lynx rufus*
Mountain Lion	*Puma concolor*
Elk	*Cervus canadensis*
Mule Deer	*Odocoileus hemionus*
White-tailed deer	*Odocoileus virginianus*
Moose	*Alces alces*
Bighorn Sheep	*Ovis canadensis*
BIRDS	
Pied-billed grebe	*Podilymbus podiceps*
Horned grebe	*Podiceps aurtius*
Eared grebe	*Podiceps nigricollis*
Western grebe	*Aechmorphus occidentalis*
Double-crested cormorant	*Phalacorcorax auritus*
Great blue heron	*Ardea herodias*
Trumpeter swan	*Cygnus buccinator*
Canada goose	*Branta canadensis*
Gadwall	*Anas strepera*
Wigeon	*Anas americana*
Mallard	*Anas platyrhynchos*
Northern shoveler	*Anas clypeata*
Harlequin duck	*Histrionicus histrionicus*
Bufflehead	*Bucephala albeola*

Common name	Scientific Name
Common goldeneye	*Bucephala clangula*
Hooded merganser	*Lophodytes cucullatus*
Common merganser	*Mergus merganser*
California quail	*Callipepla gambelii*
Chukar	*Alectoris chukar*
Ring-necked pheasant	*Phasianus colchicus*
Gray partridge	*Perdix perdix*
Ruffed grouse	*Bonasa umbellus*
Dusky grouse	*Dendragapus obscurus*
Merriam's wild turkey	*Meleagris gallopavo*
Sora	*Porzana carolina*
American coot	*Fulica americana*
Turkey vulture	*Cathartes aura*
Osprey	*Pandion haliaetus*
Bald eagle	*Halieatus leucocephalus*
Golden eagle	*Aquila chrysaetos*
Northern harrier	*Circus cyaneus*
Sharp-shinned hawk	*Accipiter striatus*
Cooper's hawk	*Accipiter cooperii*
Northern goshawk	*Accipiter gentilis*
Red-tailed hawk	*Buteo jamaicensis*
Rough-legged hawk	*Buteo lagopus*
American kestrel	*Falco sparverius*
Merlin	*Falco columbarius*
Gyrfalcon	*Falco rusticolus*
Peregrine falcon	*Falco peregrinus*
Prairie falcon	*Falco mexicanus*
Killdeer	*Chadrius vociferus*
Spotted sandpiper	*Actitis macularia*
California gull	*Larus californicus*
Ring-billed gull	*Larus delawarensis*
Herring gull	*Larus argentatus*
Caspian tern	*Sterna caspia*
Rock pigeon	*Columba livia*
Eurasian collared dove	*Streptopelia decaocto*

Common name	Scientific Name
Mourning dove	*Zenaida macroura*
Barn owl	*Tyto alba*
Great horned owl	*Bubo virgianus*
Northern pygmy owl	*Glaucidium gnoma*
Northern spotted owl	*Strix occidentalis*
Barred owl	*Strix varia*
Long eared owl	*Asio otus*
Western screech owl	*Otus kennicotti*
Northern saw-whet owl	*Aegolius acadicus*
Flammulated owl	*Otus flammeolus*
Common nighthawk	*Chordeiles minor*
Common poorwill	*Phalaenoptilus nuttalii*
Vaux's swifts	*Chaetura vauxi*
White-throated swifts	*Aeronautes saxatalis*
Anna's hummingbird	*Calypte anna*
Rufous hummingbird	*Selasphorus rufus*
Calliope hummingbird	*Stellula calliope*
Belted kingfisher	*Ceryle alcyon*
Lewis' woodpecker	*Melanerpes lewis*
Red-naped sapsucker	*Sphyrapicus nuchalis*
Red-breasted sapsucker	*Sphyrapicus ruber*
Downy woodpecker	*Picoides pubescens*
Hairy woodpecker	*Picoides villosus*
White-headed woodpecker	*Picoides albolarvatus*
Northern flicker	*Colaptes auratus*
Pileated woodpecker	*Dryocopus pileatus*
Olive-sided flycatcher	*Contopus cooperi*
Western wood peewee	*Contopus sordidulus*
Willow flycatcher	*Empidonax traillii*
Hammond's flycatcher	*Empidonax hammondii*
Dusky flycatcher	*Empidonax oberholseri*
Say's phoebe	*Sayornis saya*
Western kingbird	*Tyrannus verticalis*
Eastern kingbird	*Tyrannus tyrannus*
Loggerhead shrike	*Lanius ludovicianus*

Common name	Scientific Name
Cassin's vireo	*Vireo cassinii*
Warbling vireo	*Vireo gilvus*
Gray jay	*Perosoreus candadensis*
Steller's jay	*Cyanocitta stelleri*
Black-billed magpie	*Pica hudsonia*
American crow	*Corvus brachyrhynchos*
Common raven	*Corvus corax*
Horned lark	*Ermophila alpestris*
Tree swallow	*Tachycineta bicolr*
Violet-green swallow	*Tachycineta thalassina*
Bank swallow	*Riparia riparia*
Barn swallow	*Hirundo rustica*
Cliff swallow	*Petrochelidon pyrrhonota*
Black-capped chickadee	*Poecile atricapilla*
Mountain chickadee	*Poecile gambelli*
Brown creeper	*Certhia americana*
Red-breasted nuthatch	*Sitta canadensis*
White-breasted nuthatch	*Sitta carolinensis*
Pygmy nuthatch	*Sitta pygmaea*
Rock wren	*Salpinctes obsoletus*
Canyon wren	*Catherpes mexicanus*
House wren	*Troglodytes aedon*
Pacific wren	*Troglodytes pacificus*
Bewick's wren	*Thyromanes bewickii*
Marsh wren	*Cistothorus palustris*
American Dipper	*Cinclus mexicanus*
Golden-crowned kinglet	*Regulus satrapa*
Ruby-crowned kinglet	*Regulus calendula*
Western bluebird	*Sialia mexicana*
Mountain bluebird	*Sialia currucoides*
Townsend's solitaire	*Myadestes townsendi*
Veery	*Catharus fuscescens*
Swainson's thrush	*Catharus ustulatus*
Hermit thrush	*Catharus guttatus*
American robin	*Turdus migratorius*

Common name	Scientific Name
Varied thrush	*Ixoreus naevius*
Gray catbird	*Dumetella carolinensis*
European starling	*Sturnus vulgaris*
Cedar waxwing	*Bombycilla cedrorum*
Orange-crowned warbler	*Vermivora celata*
Nashville warbler	*Vermivora ruficapilla*
Macgillvray's warbler	*Oporornis tolmiei*
Common yellowthroat	*Geothlypis trichas*
Yellow warbler	*Dendroica petechia*
Yellow-rumped warbler	*Dendroica coronata*
Black-throated gray warbler	*Dendroica nigrescens*
Townsend's warbler	*Dendroica townsendi*
Hermit warbler	*Dendroica occidentalis*
Wilson's warbler	*Wilsonia pusillla*
Yellow-breasted chat	*Icteria virens*
Chipping sparrow	*Spizella passerina*
Brewer's sparrow	*Spizella breweri*
Lark sparrow	*Chondestes grammacus*
Fox sparrow	*Passerell iliaca*
Dark-eyed junco	*Junco hyemalis*
White-crowned sparrow	*Zonotrichia albicollis*
Golden-crowned sparrow	*Zonotrichia atricapilla*
Vesper sparrow	*Pooecetes gramineus*
Song sparrow	*Melospiza melodia*
Lincoln's sparrow	*Melospiza lincolnii*
Spotted towhee	*Pipilo maculatus*
Western tanager	*Piranga ludoviciana*
Black-headed grosbeak	*Pheucticus melanocephalus*
Lazuli bunting	*Passerina amoena*
Red-winged black bird	*Agelaius phoeniceus*
Western meadowlark	*Sturnella neglecta*
Brewer's blackbird	*Euphagus cyanocephalus*
Brown-headed cowbird	*Molothrus aster*
Bullock's oriole	*Icterus bullockii*
House finch	*Haemorhous mexicanus*

Common name	Scientific Name
Purple finch	*Haemorhous purpureus*
Cassin's finch	*Haemorhous cassinnii*
Red crossbill	*Loxia curvirostra*
Pine siskin	*Carduelis pinus*
Pine grosbeak	*Pinicola enucleator*
American goldfinch	*Carduelis tristis*
Evening grosbeak	*Coccothraustes vespertinus*
House sparrow	*Passer domesticus*
REPTILES	
Western fence lizard	*Sceloporus occidentalis*
Sagebrush lizard	*Sceloporous gracious*
Northern Alligator Lizard	*Elgaria coerulea*
Western Skink	*Eumeces skiltonianus*
Rubber boa	*Charina bottae*
Pygmy short-horned lizard	*Phrynosoma douglasii*
Sharptail snake	*Contia tenuis*
Gophersnake	*Pituophis catenifer*
Terrestrial Gartersnake	*Thamnophis elegans*
Common Garter Snake	*Thamnophis elegans*
Western Rattlesnake	*Crotalus oreganus*
Racer (East Slope)	*Coluber constrictor*

Common name	Scientific Name
AMPHIBIANS	
Northwestern Salamander	*Ambystoma gracile*
Tiger Salamander	*Ambystoma tigrinum*
Bullfrog	*Rana catesbeiana*
Pacific tree frog	*Pseudacris regilla*
Western toad	*Anaxyrus boreas*
Roughskin Newt	*Taricha granulosa*
INVERTEBRATES *	
Yellow-face bumblebee	*Bombus vosnesenskii*
Red-Belted bumblebee	*Bombus rufocinctus*
Brown-belted bumblebee	*Bombus griseocollis*
Central bumblebee	*Bombus centralis*
Chelan mountainsnail	*Oreohelix spp.*
Monarch butterfly	*Danaus plexipus*
Giant Palouse earthworm	*Drioleirus americanus*

* List of invertebrates includes significant species either known to or likely to occur on the wildlife area.

Priority Habitats in Chelan County

Shrubsteppe
Aspen stands
Wetlands
Biodiversity Areas and Corridor
Cliffs and bluffs

Table 13. Species of Greatest Conservation Need Relationship with Ecological Systems of Concern for Chelan Wildlife Area.

Species of Greatest Conservation Need Relationship with Ecological Systems of Concern for the Chelan WLA	Columbia Basin Foothill and Canyon Dry Grassland	Columbia Basin Foothill Riparian Woodland and Shrubland	Columbia Plateau Low Sagebrush Steppe	Columbia Plateau Steppe and Grassland	East Cascades Oak-Ponderosa Pine Forest and Woodland	Inter-Mountain Basins Big Sagebrush Steppe	Inter-Mountain Basins Semi-Desert Shrub Steppe	North American Arid West Emergent Marsh	North Pacific Lowland Riparian Forest and Shrubland	Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland	Northern Rocky Mountain Ponderosa Pine Woodland and Savanna
Bald eagle	x	x			x			x	x	x	x
Golden eagle	x	x	x	x	x	x	x			x	x
Harlequin duck										x	x
Lewis' woodpecker		x			x					x	x
Pygmy nuthatch		x			x						x
Sharp-tailed grouse	x	x		x		x				x	
White-headed woodpecker					x						x
Bighorn sheep											
Gray wolf					x				x	x	x
Western gray squirrel					x				x	x	x
Tiger salamander	x			x		x		x		x	x
Sagebrush lizard						x					
Sharp-tail snake		x			x						x
Monarch butterfly											
Silver-bordered fritillary								x			
Yuma skipper											
California floater									x		
Chelan mountainsnail											x

Species of Greatest Conservation Need Relationship with Ecological Systems of Concern for the Chelan WLA	Columbia Basin Foothill and Canyon Dry Grassland	Columbia Basin Foothill Riparian Woodland and Shrubland	Columbia Plateau Low Sagebrush Steppe	Columbia Plateau Steppe and Grassland	East Cascades Oak-Ponderosa Pine Forest and Woodland	Inter-Mountain Basins Big Sagebrush Steppe	Inter-Mountain Basins Semi-Desert Shrub Steppe	North American Arid West Emergent Marsh	North Pacific Lowland Riparian Forest and Shrubland	Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland	Northern Rocky Mountain Ponderosa Pine Woodland and Savanna
Hoder's mountainsnail	x			x		x					x
Ranne's mountainsnail	x			x		x					
Unnamed Oregonian											
Western pearlshell											
Winged floater											
Bull trout	x	x			x	x		x		x	x
UCR spring-run Chinook salmon ESU	x	x			x	x		x		x	x
UCR Steelhead DPS	x	x			x	x		x		x	x
Westslope cutthroat trout	x	x			x	x		x		x	x
Pacific Lamprey	x	x			x	x		x		x	x
Leopard Dace	x	x			x	x		x		x	x
Umatilla Dace	x	x			x	x		x		x	x
Mountain Sucker		x				x				x	
White sturgeon	x	x			x	x		x			x

UCR = Upper Columbia River

Fish species assocations with ecological systems were made based on systems present within approx. 100m of land adjacent to river/stream where fish presence has been documented within WLA units

Appendix B. Weed Management Plan

Weed Control Goals at the Chelan Wildlife Area

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

Weed control activities and restoration projects that protect and enhance fish and wildlife populations and their habitats on WDFW managed lands are a high priority. When managing for specific wildlife species on WDFW lands the weed densities that trigger control are sometimes different than on lands managed for other purposes (e.g. agricultural). 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 weed species, regardless of extent, is mandated by state law (RCW 17.10 and 17.26) and enforced by the County Noxious Weed Board. WDFW will strive to meet its legal obligation to control noxious weeds listed according to state law (Class A, B-Designate, and county listed weeds).

Importantly, WDFW will continue to be a good neighbor and partner regarding weed control issues on adjacent lands since weeds do no 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 are known to be pests elsewhere in the area. 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:

- Minimizing soil disturbance.
- Restoring disturbed sites.
- Minimizing risk of new weed infestations by encouraging "weed free" equipment, vehicles, people, and domestic animals.
- Managing public use.
- Coordinating weed prevention and control efforts with federal, state, county, and local entities to improve efficacy and minimize costs.

Monitoring – Monitoring is necessary to locate new infestations, determine effectiveness of control efforts, implement prevention, and document the weed species, the distribution and the relative density on the wildlife area. Monitoring will include mapping weed infestations using ArcGIS and documenting treatment effectiveness.

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. WDFW participates in Coordinated Weed Management Areas (CWMA) with other agencies and partners to facilitate joint control across the ownerships. Weed management priority areas on the Chelan Wildlife Area include:

1. **Mandatory control weeds** – Significant attention is paid to yellow starthistle at the Knowles Area, Entiat Unit. Annually, this area is treated with backpack sprayers targeting individual plants and small patches on 260 acres of extremely steep slopes adjacent to restored agricultural fields. Broadcast or spot spray treatments, using ATV mounted sprayer, on 112 acres of restored agricultural fields. This has been an ongoing control effort for over 20 years with a reduction of area infested and weed density but eradication is elusive. Since this weed is also found on adjacent US Forest Service lands, this control effort is usually a joint effort with USFS personnel.
2. **Restoration fields at Chelan Butte and Swakane Canyon units**- Survey up to 500 acres annually at

Chelan Butte and Swakane Canyon units to determine weed control requirements during restoration of fields to native vegetation. Primary weed concerns after seeding are annual weeds, especially Russian thistle and cereal rye. Some fields have difficult to control perennial weeds such as Russian knapweed, Dalmatian toadflax, and field bindweed. In this restoration project, all control methods are used – cultural, mechanical, chemical, and biological.

3. **Roads and parking areas** - Annually, monitor and control weeds on 30 miles of WDFW roads and four miles of trails to treat problematic weeds like Russian thistle, diffuse knapweed, kochia, and puncture vine that are associated with disturbed areas.
4. **Beebe Springs Unit** - Maintain current high level of weed control efforts at this high public use area concentrating on general weed control in parking areas and along trails. Riparian, wetland and shoreline areas require control of Himalayan blackberry, yellow flag iris, and purple loosestrife. Control efforts are complicated in these areas by the presence of the federally listed plant Ute Ladies' Tresses (*Spiranthes divuvialis*); however, assistance with weed control from Chelan Public Utility District is available in areas with this plant. Upland areas with poor soils still present a challenge establishing native grasses and controlling annual broadleaf weeds and cheatgrass.
5. **Biological control agents** – In priority habitats biological control agents, primarily insects, are an effective means to control weeds that occur at low density over vast acreages. In shrubsteppe habitat on the Swakane and Pateros units the only effective control method for diffuse knapweed and Dalmatian toadflax on the steep slopes is release of beetles and weevils that specifically attack these plants. Release of the control agents is especially critical after fires when these weeds a have a competitive advantage over the native plants. In riparian and wetland habitats on the Beebe Springs Unit a variety of beetles are used to control purple loosestrife, Russian knapweed, and St. John's wort where herbicides kill or injure desirable plants or are restricted because of proximity to water.
6. **Unmet Needs** – Several problematic weeds (e.g. Scotch thistle, houndstongue, hairy whitetop) occur on the Swakane, Entiat, and Pateros units. These small infestations are found at remote or difficult to access sites and appear to be not spreading. With current staffing and funding levels, these sites are not receiving any control efforts.

Weed Species of Concern on Chelan Wildlife Area:

Weed species of concern on the wildlife area include but are not limited to:

Baby's breath (*Gysophila paniculata*), bouncing-bet (*Saponaria officinalis*) Canada thistle (*Cirsium arvense*), cereal rye (*Secale cereale*), Dalmatian toadflax (*Linaria dalmatica*), diffuse knapweed (*Centaurea diffusa*), hairy whitetop (*Lepidium appelianum*), Himalayan blackberry (*Rubus armeniacus*), hoary cress (*Lepidium draba*), houndstongue (*Cynoglossum officinale*), kochia (*Kochia scoparia*), longspine sandbur (*Cenchrus longispinus*), field bindweed (*Convolusus avensis*), puncturevine (*Tribulus terrestris*), purple loosestrife (*Lythrum salicaria*), Russian knapweed (*Acroptilon repens*), Russian olive (*Elaeagnus angustifolia*), Russian thistle (*Salsola tragus*), Scotch thistle (*Onopordum acanthium*), St. John's wort (*Hypericum perforatum*), yellow flag iris (*Iris pseudacorus*), and yellow starthistle (*Centaurea solstitialis*).

Weeds occurring on the Chelan Wildlife Area and associated units are listed in Table 14. The table also describes the weed's classification, an estimate of the acreage affected by the weed, how many acres were treated, the relative density of infestation, the general trend the weed infestation has been exhibiting, the control objective and/or strategy for the weed and finally, which wildlife units have the weed present.

Detailed descriptions and natural history information for each of the above state-listed weed species listed above can be found at the Washington State Noxious Weed Control Board web site https://www.nwcb.wa.gov/. Information on other species contained in the list can be found at the University of California's IPM Online web site: http://www2.ipm.ucanr.edu/WhatIsIPM/.

Weed management information for individual weed species can be found at the PNW Weed Management Handbook link at: http://pnwhandbooks.org/weed/control-problem-weeds

Table 14. Chelan Wildlife Area Weed Table Including the Weed Class and Unit Location.

Weed Species	2017 Chelan County Weed Listing	2017 Estimated Affected Acres	2017 Treated Acres	Qualitative Density	Annual Trend	Control Objective/Strategy	Wildlife Area Unit Weed Distribution
Baby's breath	Class C	<1	<1		Decreasing	Eradicate/treat with spot herbicide treatments	Beebe Springs
Bouncing-bet	Not Listed	<1	<1	Low	Stable	Eradicate/treat with spot herbicide treatments	Beebe Springs
Canada thistle	Class C Select	20	3	High	Stable	Monitor, control high value areas, reduce on Beebe Springs	Beebe Springs, Cashmere Pond, Chelan Butte, Entiat, Pateros, Swakane
Cereal rye	Class C	700	575	Medium-High	Stable/ Decreasing	Control in restoration fields at Swakane Canyon and Chelan Butte with herbicide and mechanical treatments	Beebe Springs, Chelan Butte, Entiat, Swakane
Curlyleaf pondweed	Class C	5	0	Medium	Stable	None	Beebe Springs
Dalmatian toadflax	Class B Select	4000		Low	Decreasing	Reduce and contain with introduction and augmentation of biocontrol agents	Beebe Springs, Cashmere Pond, Chelan Butte, Entiat, Pateros, Swakane, White River
Diffuse knapweed	Class B	3000	20	Low	Stable/ Decreasing	Reduce and contain with introduction and augmentation of biocontrol agents, treat with herbicide along roads.	Beebe Springs, Cashmere Pond, Chelan Butte, Entiat, Pateros, Swakane, White River
Eurasian watermilfoil	Class B Designate	5	0	Medium	Stable	None	Beebe Springs
Himalayan blackberry	Class C	20	2	High	Increasing	Control with herbicide in high public use areas.	Beebe Springs
Hoary cress	Class C	2	1	Medium	Stable/ Decreasing	Spot treatment with herbicide	Beebe Springs
Houndstongue	Class B Designate	10	0	Low	Unknown	None	Entiat
Kochia	Class B Select	10	1	Low	Decreasing	Reduce with spot treatments on all areas.	Beebe Springs, Chelan Butte, Entiat, Swakane
Field bindweed	Class C	50	50	Medium-High	Decreasing	Control in restoration fields at Chelan Butte with herbicide	Chelan Butte, Swakane
Puncturevine	Class B Select	2	2	Medium	Stable	Control along roads and trails	Swakane, Beebe Springs
Purple loosestrife	Class B Designate	5	5	Medium	Stable	Reduce and contain with introduction and augmentation of biocontrol agents. Limited spot treatment with herbicide.	Beebe Springs
Russian knapweed	Class B Select	5	5	High	Stable	Reduce and contain with introduction and of biocontrol agents, treat with herbicide along roads and in restoration fields at Chelan Butte.	Beebe Springs, Chelan Butte, Entiat, Pateros, Swakane
Russian olive	Class C	<1	<1	Low	Decreasing	Eradicate/treat with spot herbicide treatments	Swakane, Beebe Springs

Weed Species	2017 Chelan County Weed Listing	2017 Estimated Affected Acres	2017 Treated Acres	Qualitative Density	Annual Trend	Control Objective/Strategy	Wildlife Area Unit Weed Distribution
Russian thistle	Not Listed	130	130	Medium to High	Decreasing	Control along trails at Beebe Springs and in restoration fields at Chelan Butte with herbicide	Beebe Springs, Chelan Butte
Lonspine sandbur	Class C	<1	<1	Low	Decreasing	Control along trails at Beebe Springs with herbicide	Beebe Springs
Scotch thistle	Class B Designate	40	0	Low	Stable	None	Pateros
St John's wort	Class C Select	3	0	Low	Stable	Reduce and contain with introduction of biocontrol agents and spot treatment with herbicide	Beebe Springs
Tree of heaven	Class C	<1	0	Low	Decreasing	Spot treatment with herbicide	Beebe Springs
Hairy whitetop	Class C	15	2	Medium	Stable/ Decreasing	Spot treatment with herbicide at Swakane Canyon, none at Entiat	Entiat, Swakane
Yellow flag iris	Class C	2	<1	Medium	Increasing	Spot treatment with herbicide	Beebe Springs
Yellow starthistle	Class B Designate	370	370	Low	Decreasing	Spot treatment with herbicide	Entiat

Weeds listed with a Designate or Select after the Class require control per RCW 17.10.

Appendix C. Fire Response

Agency	Units Covered	Contact number
Central Washington Interagency Communications Center (CWICC) Dispatch	All	(800) 826-3383
Douglas-Okanogan Co. District 15	Pateros -all	(509) 689-0216
Chelan Co. District 7	Beebe Springs - all Chelan Butte - Chelan Falls area	(509) 682-4476
Chelan Co. District 8 (Entiat Unit)	Chelan Butte - Stayman Flats area Entiat – Entiat Valley and Navarre Coulee area	(509) 784-1366
Chelan Co. District 1	Swakane – Burch Mountain area	(509) 662-4734
Cashmere Fire Department	Cashmere Pond - all	(509) 782-1144
Lake Wenatchee Fire and Rescue	White River	(509) 763-3034
Department of Natural Resources, Southeast Region	Chelan Butte, Entiat, Swakane - areas not within Fire Protection Districts	(509) 925-8510
US Forest Service, Chelan Ranger District		(509) 682-2576
US Forest Service, Entiat Ranger District		(509) 784-1511
US Forest Service, Wenatchee River Ranger District		(509) 548-2550

Department of Fish and Wildlife Contacts. Contact in order listed.

Contact	Phone Number
Ron Fox, Wildlife Area Manager	Office: (509) 665-3383
Wildlife Area Assistant Manager	Office: none
Kevin Vallance, Natural Resource Technician	Office: (509) 679-1449
Rich Finger, Regional Lands Operations Manager	Office: (509) 754-4624 ext. 229
Matt Monda, Regional Wildlife Program Manager	Office: (509) 754-4624 ext. 270

Fire District

Information

Portions of Chelan Wildlife Area are covered by or adjacent to six County Fire Districts (See Map 13). When a wildland fire is reported, the county fire districts are usually the first to respond, because most people call 911, and fire districts are the closest resource. If the fire is within the district, county resources will engage in suppression. If the fire is threatening the district, then the county resources will provide suppression efforts until DNR fire resources arrive. Fire District personnel are trained in wildland fire suppression through DNR and have fire engines and equipment to suppress wildland fires.

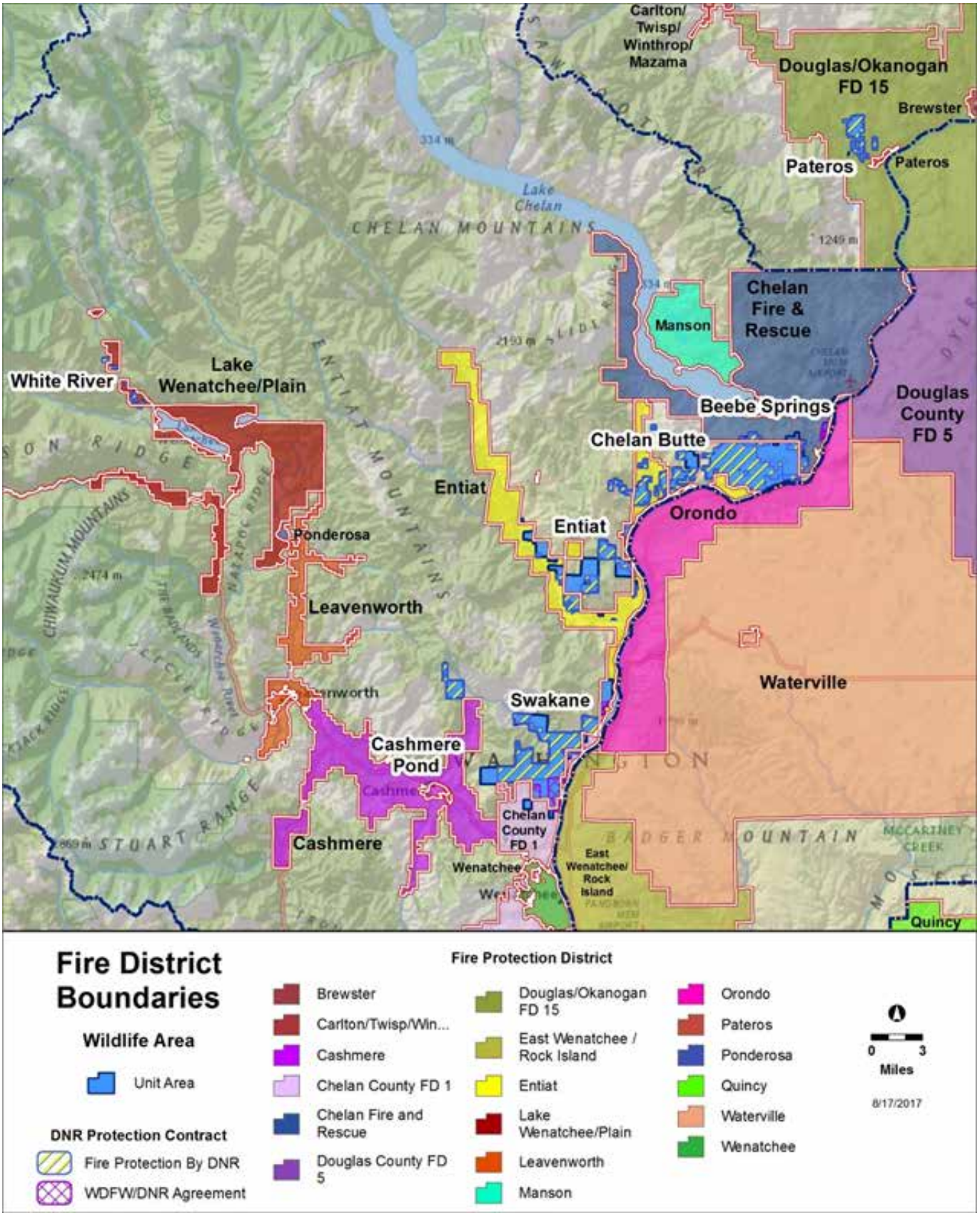
Washington Department of Natural Resources

The Chelan Wildlife Area is located within DNR Southeast Region. The DNR has the primary protection responsibility for state and private forest land. Roughly, a third of the wildlife area is within the forest fire protection area and DNR will take lead on any wildland fire suppression efforts. The DNR will also assist local fire districts with suppression efforts outside of forest protection if those fires are threatening adjacent forest protection lands. For wildlife area lands not located within the forest fire protection area, WDFW has an interagency agreement with DNR to provide suppression efforts. The agreement spells out resources provided by DNR for suppression efforts and what WDFW will do to assist. Under the agreement, WDFW will reimburse DNR for costs associated with suppression efforts.

U.S. Forest Service

Portions of the White River, Swakane, and Entiat units abut or are intermingled with US Forest Service lands on the Okanogan-Wenatchee National Forest, Naches Ranger District. While the DNR is responsible for wildland fire protection on state land, the USFS is responsible for protection of the adjacent federal land. WDFW and DNR work closely with the USFS and they may be the first to respond to a wildland fire on or adjacent to the wildlife area.

Map 13. Chelan Wildlife Area Fire District Boundaries.



Appendix D Cultural Resource Summary

Appendix E Public Response Summary

Table 15. WDFW response to public comments received during public review of the Chelan Wildlife Area Management Plan draft under the State Environmental Policy Act (SEPA) from March 30, 2018 until April 30, 2018.

	Comment	WDFW Response
1.	I would like to bring to the attention of WDFW planning that 600 acres of Weyerhauser land is up for sale on Mud Creek Rd. both sides of the road from the private property boundaries in the valley bottom all the way up to the entrance to Bisping Canyon. This is prime mule deer winter range and would be best kept as public land. The ad and description in Redfin is as follows. https://www.redfin.com/WA/Entiat/10383-Mud-Creek-Rd-98822/home/145235374?utm_source=myredfin&utm_medium=email&utm_campaign=recommendations_update&riftinfo=ZXY9ZW1haWwmbD0xMTkwNjcxNyZwPWxpc3RpbmdfdXBkYXRlc19yZWNvbW1lbmRhdGlvbnMmdHM9MTUyMjE5MjY3Mzc1MiZhPWNsaWNrJnM9cmVjb21tZW5kYXRpb25zJnQ9YWRkcmVzcyZlbWFpbF9pZD0xMTkwNjcxN18xNTIyMTkyNjczXzYmdXBkYXRlX3R5cGU9MTQmbGlscl9zY29yZT0wLjAwOSZsaXN0aW5nX2lkPTgxMTE5NDczJnByb3BlcnR5X2lkPTE0NTIzNTM3NCZwb3NpdGlvbl9udW1iZXI9Mw== I hope that WDFW can collaborate with other conservation buyers like the Chelan Douglas Land Trust to purchase this 600 acres. Thank you. Joe Kelly	WDFW has a formal annual land acquisition evaluation process called Lands 20/20. Using this process, potential acquisitions, such as this parcel, are evaluated, ranked, and are prioritized in each WDFW region. This is a competitive process and there are often only a few projects that receive project support through WDFW statewide. Priority for property acquisitions for the Chelan Wildlife Area will include inholdings and parcels adjacent to existing WDFW ownership.
2.	Thank you for the several mentions in the draft report of the upcoming work with trail groups like the Lake Chelan Trails Alliance. We look forward to this process. Rich - the BLM recently downloaded data from their counter on Elephant's Head. It provides the first annual snapshot of user numbers going up that trail. (see attached) I'm not sure if this data would be relevant to include in an appendices of the Management Plan report, but it certainly informs the upcoming conversations about how to best achieve win-win-win with habitat and traditional / non-traditional user groups. Note - the counter divides total number of hits by 2 before recording this data (since it is assumed that travelers to Elephant's Head use same trail up and down). There are some users who just go one way (and so are just counted as a half-user), so if anything the data may be slightly conservative. Thanks again for the notice. Best, Guy Evans	Thanks for your comment. The data gathered by BLM will be useful during the evaluation process for external recreation development proposals. WDFW recommends that sponsors of recreational development proposals coordinate through the Wildlife Area Manager, who will gather relevant information about the potential compatibility of the development proposal and recommend modifications as needed. We then suggest that the project sponsor present the development proposal to the Wildlife Area Advisory Committee (WAAC) as a first step in the public evaluation process. The next step would likely be a public meeting if the project sponsor chooses to continue. When you are ready, please work with the Wildlife Area Manager to arrange a date for a WAAC meeting to consider this proposal. These data will certainly be helpful in demonstrating the recreational value of Elephant Head at that time.

	Comment	WDFW Response
3.	Thank you for the opportunity to review each plan, great job of inclusion. I would like to add to the education portion, written information and pictures of class A and B designates and C selects weeds found or close to the wildlife boundary's plus phone numbers or smart phone App download information that could be used to report new noxious weeds to the State Noxious weed board and or the invasive species council. If pictures are taken of the plants we can identify them and take the proper action. You should include the aquatic noxious weeds found in the ponds at Roses Lake and the ponds at Beebe Springs. Eurasian Watermilfoil a class B designate and Curlyleaf pondweed a class C. also a message to boaters and watercraft to Clean Drain Dry a message the state has coined to encourage boater and watercraft to clean their equipment when pulling out of the water. To be added to the Weed Management Section: RCW 17.10.140 Owner's duty to control spread of noxious weeds. (1) Except as is provided under subsection (2) of this section, every owner shall perform or cause to be performed those acts as may be necessary to: (a) Eradicate all class A noxious weeds; (b) Control and prevent the spread of all class B noxious weeds designated for control in that region within and from the owner's property; and (c) Control and prevent the spread of all class B and class C noxious weeds listed on the county weed list as locally mandated control priorities within and from the owner's property. If you would like some educational materials please contact our office we have many good publications that would be helpful and easy to put on your Kiosk's and many hand out for your employees hand out give to the public. Respectfully Mike Mackey Chelan County Noxious Weed Manager	A goal and objective for developing educational materials suitable for posting at kiosks with information on weed identification and ways to report weed species locations has been added to the plan. Eurasian Watermilfoil and Curlyleaf pond weed are now included in the Weed Management Section and Appendix. Water Access Area staff will include signage at boat launches to increase watercraft users awareness of aquatic weeds and methods to reduce their spread. RCW17.10.140 was added to the Weed Management section.
4.	It has come to my attention that a proposal for development of a mountain biking trail within the Chelan Wildlife Area has been created. I would like to voice my concern for any further development of the area. The Chelan Butte provides critical habitat for California bighorn sheep, as well as many other wildlife species. The state is lacking in good sheep habitat, while areas for trail riding are not. There are many other areas in close proximity to the Chelan Butte that offer excellent mountain biking opportunities without conflicting with incredibly important bighorn sheep habitat. Please reject any current and future proposals for further development occurring within the Chelan Wildlife Area. The potential negative impacts of further recreation on the sheep, mule deer in their winter range, upland bird habitat and ecosystem functions are too great. Shane Vander Giessen	Thank you for expressing your concerns and support for conservation. WDFW received a proposal from a trails advocacy group in December 2016 for a trail development on Chelan Butte. Vetting of the proposal will occur during a public process involving the Wildlife Area Advisory Committee and likely a Public Meeting where the project sponsor will be invited to present their proposal. Your comment and comments received during these events will be included in the evaluation process for this proposal and you will receive an invitation to these meetings which are likely to occur in Fall 2018. Balancing conservation and recreation is becoming increasingly challenging for managers. Public input is a critical driver in our decision making process and your comment is appreciated.

	Comment	WDFW Response
5.	The population of doves on both Chelan Butte and Swakane Canyon have drastically declined over the past few years. There needs to be an emphasis in both areas in recovering the dove population through feed plots and or other means of providing food for them during the summer months. Ronald Balzer	A major focus on the Chelan Wildlife Area is the restoration of agricultural fields to a grassland or shrubsteppe community. The decline of mourning doves is primarily a result of this ongoing restoration effort. Without grain production and associated annual weeds, dove populations will likely never be has high as in the past. On Chelan Butte, there is potential for developing small annual grain food plots to benefit mourning dove; however, necessary funding and equipment is currently lacking.
6.	There should be plans for protecting and enhancing the numerous birds of prey such as eagles, ospreys, turkey vultures, red tail hawks, and great horned owls and the song birds such as mountain blue birds, lazuli buntings, rufous towhees, flickers, and meadow larks that inhabit both Chelan Butte and Swakane Canyon. Ronald Balzer	All of the species mentioned are currently protected by State and Federal laws. Objectives in the plan speak to protection of these species. Habitat enhancement for these species is ongoing with restoration of agricultural fields to establish native grassland or shrubsteppe habitat. Ongoing and future riparian plantings, especially in Swakane Canyon, along with fence removal, will also enhance habitat for these species.
7.	I was told that in the 1950s and 1960s there was a large population of sage grouse on Chelan Butte. Today, there are no known sage grouse. Reintroducing them should be a priority item. Ronald Balzer	There is no doubt that a small population of sage grouse existed in the past in the area around Chelan Butte. It is also very likely that sharp-tailed grouse and dusky grouse were the most abundant grouse species in the area due to the steepness of the terrain and grass dominated plant communities. Sage grouse regularly travel across the Columbia River from Douglas County to the Colville Reservation and the vicinity of Pateros in Okanogan County. If suitable habitat exists, now or in the future, on Chelan Butte, sage grouse have demonstrated the ability to disperse to the area.
8.	There is no mention of the historic wooden barn on Chelan Butte that is the only complete building existing there from the early pioneers. Along with the Lucas home, it should also be listed on the National Register of Historical Places. Ronald Balzer	The plan will include a Cultural Resources Appendix at some point in the future, which will provide context and direction for preservation of historical and prehistoric resources on the Chelan Wildlife Area.
9.	Target shooting in Swakane Canyon should be constrained to the first canyon on the right. Random target shooting farther up Swakane is extremely dangerous. People hike, horseback ride, and hunt beyond the first canyon. These activities occur in both the valley and on the hill sides. Constraining the target shooting to the first canyon should be an immediate priority and not something to be achieved in five years. Ronald Balzer	WDFW is currently assessing existing areas where target shooting occurs, such as the one described here. To improve safety and reduce conflicts between users, agency staff is reviewing the statewide target shooting rule and considering changes that could be implemented where both concentrated sites and dispersed shooting currently exists.
10.	I am whole heartedly against putting a mountain bike trail on Chelan Butte. Time to leave this spot alone. Keith Peter	Thank you for expressing your concerns and support for conservation. WDFW received a proposal from a trails advocacy group in December 2016 for a trail development on Chelan Butte. Vetting of the proposal will occur during a public process involving the Wildlife Area Advisory Committee and likely a Public Meeting where the project sponsor will be invited to present their proposal. Your comment and comments received during these events will be included in the evaluation process for this proposal and you will receive an invitation to these meetings which are likely to occur in Fall 2018. Balancing conservation and recreation is becoming increasingly challenging for managers. Public input is a critical driver in our decision making process and your comment is appreciated.

	Comment	WDFW Response
11.	It has come to my attention that a proposal for development of a mountain biking trail within the Chelan Wildlife Area has been created. I would like to voice my concern for any further development of the area. The Chelan Butte provides critical habitat for California bighorn sheep, as well as many other wildlife species. This state is lacking in good sheep habitat, while areas for trail riding are not in low availability. There are many other areas in close proximity to the Chelan Butte that offer excellent mountain biking opportunities without conflicting with incredibly important bighorn sheep habitat. Please reject any current and future proposals for further development occurring within the Chelan Wildlife Area. The potential negative impacts of further recreation on the sheep, mule deer in their winter range, upland bird habitat and ecosystem functions are too great. The wildlife of Washington state is truly a gift and one worthy of protection. Loss of habitat will result in further damage to our dwindling populations already struggling with predation, disease, and encroachment by development in other critical areas. Respectfully, Chris Martin	Thank you for expressing your concerns and support for conservation. WDFW received a proposal from a trails advocacy group in December 2016 for a trail development on Chelan Butte. Vetting of the proposal will occur during a public process involving the Wildlife Area Advisory Committee and likely a Public Meeting where the project sponsor will be invited to present their proposal. Your comment and comments received during these events will be included in the evaluation process for this proposal and you will receive an invitation to these meetings which are likely to occur in Fall 2018. Balancing conservation and recreation is becoming increasingly challenging for managers. Public input is a critical driver in our decision making process and your comment is appreciated.
12.	I write to you today to comment on the Chelan Wildlife Area Management Plan. As a Sportswoman, avid outdoors-woman, and contributor to the preservation of wildlife area's in Washington, I would like to express my feelings with preserving the Chelan Wildlife Area. As a tax payer, and purchaser of hunting and fishing licenses (which include a Discover Pass) I strongly appose any development in the Chelan Wildlife Area. Any development such as a mountain bike trail interferes with the goals and objectives of the mission statement of WDFW. I adamantly appose any development that infringes on the habitat of the California Bighorn Sheep which live in the Chelan Wildlife Area. The California Bighorn Sheep is a very sensitive species, and allowing any development that interferes with the propagation of this herd is doing a disservice to the species and all of the hard work to re-establish this herd. Thank you for taking the time to accept public input on this matter. In closing, I oppose any development such as a mountain biking trail in the Chelan Wildife Area that has a negative impact on native plants and wildlife species such as the California Bighorn Sheep. Sincerely, Washington Wild Sheep Advocate, Cecelia Grant	Thank you for expressing your concerns and support for conservation. WDFW received a proposal from a trails advocacy group in December 2016 for a trail development on Chelan Butte. Vetting of the proposal will occur during a public process involving the Wildlife Area Advisory Committee and likely a Public Meeting where the project sponsor will be invited to present their proposal. Your comment and comments received during these events will be included in the evaluation process for this proposal and you will receive an invitation to these meetings which are likely to occur in Fall 2018. Balancing conservation and recreation is becoming increasingly challenging for managers. Public input is a critical driver in our decision making process and your comment is appreciated.

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14.	It has come to my attention that a proposal for development of a mountain biking trail within the Chelan Wildlife Area has been created. I would like to voice my concern for any further development of the area. The Chelan Butte provides critical habitat for California bighorn sheep, as well as many other wildlife species. This state is lacking in good sheep habitat, while areas for trail riding are not. There are many other areas in close proximity to the Chelan Butte that offer excellent mountain biking opportunities without conflicting with incredibly important bighorn sheep habitat. Please reject any current and future proposals for further development occurring within the Chelan Wildlife Area. The potential negative impacts of further recreation on the sheep, mule deer in their winter range, upland bird habitat and ecosystem functions are too great. Respectfully, Matt Pierce	Thank you for expressing your concerns and support for conservation. WDFW received a proposal from a trails advocacy group in December 2016 for a trail development on Chelan Butte. Vetting of the proposal will occur during a public process involving the Wildlife Area Advisory Committee and likely a Public Meeting where the project sponsor will be invited to present their proposal. Your comment and comments received during these events will be included in the evaluation process for this proposal and you will receive an invitation to these meetings which are likely to occur in Fall 2018. Balancing conservation and recreation is becoming increasingly challenging for managers. Public input is a critical driver in our decision making process and your comment is appreciated.
15.	I just wanted to submit a brief comment on the Chelan Wildlife Area draft plan. I know that the plan seems to place an emphasis on maintaining wildlife, however, I have also heard that there may be plans to try to develop a mountain biking trail in the Chelan Butte area. This area is known for its bighorn sheep population (as mentioned in the Draft), and given that bighorn habitat in the state is so limited, I feel like there must be better places for mountain bike trails. The plan also mentions that old roads already provide mountain biking access in the Chelan Butte area, so it's not clear that further development of a trail is necessary. If such a trail is needed, I would strongly support placing the trail in an area that is not inhabited by bighorn sheep. The area's primary concern should be conservation of wildlife. Thank you! Allan Scruggs	Thank you for expressing your concerns and support for conservation. WDFW received a proposal from a trails advocacy group in December 2016 for a trail development on Chelan Butte. Vetting of the proposal will occur during a public process involving the Wildlife Area Advisory Committee and likely a Public Meeting where the project sponsor will be invited to present their proposal. Your comment and comments received during these events will be included in the evaluation process for this proposal and you will receive an invitation to these meetings which are likely to occur in Fall 2018. Balancing conservation and recreation is becoming increasingly challenging for managers. Public input is a critical driver in our decision making process and your comment is appreciated.

	Comment	WDFW Response
16.	Comments from Department of Ecology, Gwen Clear, April 25, 2018, see attached letter.	Thank you for clarifying the requirement of having a water right permit for water used for dust control. Every effort will be made to adhere to Chapter 90.03 RCW Surface Water Code ad Chapter 90.44 RCW Regulation of Public Ground Waters.
17.	I am writing to comment on the Chelan Wildlife Area Management Plan. I would like to compliment WDFW on the WAMP process, it is much improved over the past 15-20 years. I have particular concerns for habitat preservation and enhancement for California bighorn sheep, Ovis canadensis nelsoni. Although classified as a big game animal, this formerly extirpated species must be managed more like a threatened or endangered species to avoid re-extirpation. There are only a handful of mostly isolated herds that have been reintroduced in Washington, and they are still very vulnerable to a multitude of threats, some of which are unique to the species. These include: – nonmigratory residents of low elevation foothills habitat; there is no season without potential conflicts with population viability – vulnerability to epizootic events caused by a single individual having contact with domestic sheep and goats – parturition dates as early as March make the species vulnerable to recruitment loss months before other ungulate species – diurnal activity limits them compared to other ungulates in avoiding human disturbances – environmental resistance greatly limits natural genetic flow between relatively isolated populations – documented population level declines from human disturbance even when limited to nonmotorized recreation Bighorns occur primarily in the Swakane and Chelan Butte units. Swakane bighorns are more secure for a variety of reasons, so I am primarily commenting on the Chelan Butte unit, however, the same concerns and considerations may apply there also. A statewide evaluation 2001-2003 identified very limited additional potential reintroduction sites, of which Chelan Butte presented the greatest opportunity to establish a new California bighorn herd. In 2004, the Butte was repopulated with transplanted bighorns from Region 3. Since then, the herd has flourished, however reintroduced bighorn herds often go through an initial pulse of productivity that is not maintained long-term. The current good status of this population should not assumed to indicate they will be robust in the future. Opportunities for genetic flow are greatly limited as the herd is largely bounded by Lake Chelan and the Columbia River; bighorns rarely disperse across large water bodies. Between Lake Chelan Dam and the Columbia River limited dispersal occurs and there is likely some interchange with the Chelan north herd, however, this linkage is jeopardized by the continued development from Chelan east to highway 97. To the west, limited dispersal opportunities exist for sheep that cross Highways 97A and 971, and there is likely very little interchange with the Swakane herd. For these reasons, it is imperative that the Chelan Butte Unit be managed to the greatest extent possible to provide all bighorn life history needs within the Chelan Butte unit.	Thank you for expressing your concerns and support for conservation. WDFW received a proposal from a trails advocacy group in December 2016 for a trail development on Chelan Butte. Vetting of the proposal will occur during a public process involving the Wildlife Area Advisory Committee and likely a Public Meeting where the project sponsor will be invited to present their proposal. Your comment and comments received during these events will be included in the evaluation process for this proposal and you will receive an invitation to these meetings which are likely to occur in Fall 2018. Balancing conservation and recreation is becoming increasingly challenging for managers. Public input is a critical driver in our decision making process and your comment is appreciated.

	Comment	WDFW Response
17.	Chelan Butte is often targeted for recreation development. Shortly after the bighorns were reintroduced, the WDFW Wenatchee District Team rejected a proposal to develop a system of mountain biking trails as an incompatible use with bighorn sheep conservation. That incompatibility remains, and for this reason any new and additional trail or other recreation development proposals on the Chelan Butte unit should be rejected. Further, bighorn sheep habitat should be the priority use of the Chelan Butte unit, given the species' extremely limited numbers and distribution in Washington, analogous to the shrubsteppe species' emphasis for which the Sagebrush Flats wildlife area units are managed. Like the pygmy rabbit, sage grouse, sharp-tailed grouse, Washington ground squirrel, white-tailed jackrabbit and other shrubsteppe obligates, California bighorns are similarly limited (and realistically of similar status) by range and demographic reductions, habitat fragmentation and degradation, introduced disease, and increasing environmental resistance as real and formidable barriers to the longterm viability and persistence of the species. If needed, I would be happy to provide numerous literature citations documenting population level impacts of recreation on bighorn herds, but I am confident your own bighorn specialists are well aware of these cases. One in the news just this week are the dual threats faced by the nonmigratory Teton bighorn herd in Wyoming, the decline of which is linked to backcountry skiing. Numerous studies document the impacts of human activity on bighorns, including chronically elevated heart rates, fecal corticoids, and reduced recruitment, and have been linked to population-level declines and in at least one case extirpation, even when motorized uses are restricted. I implore WDFW to be eternally vigilant against the impacts of what may be perceived as benign and apparently subtle impacts of additional human uses within WDFW lands occupied by bighorn sheep; these lands are critical to the continued existence of bighorns in Washington. It would be no less incongruous a use to develop mountain bike and hiking trails on the Chelan Butte unit, as it would be to locate those same uses on the Sagebrush Flat unit, and for the same reasons. Sincerely, Beau Patterson	
18.	I am writing to protest any type of mountain bike trail in the chelan Butte wildlife area. This is already has plenty of trails and other available for people. This is a wild life area that supports many types of wildlife including bighorn sheep. Please keep this a limited use area and deny access for the proposed bike trail. Brian Flintoff	Thank you for expressing your concerns and support for conservation. WDFW received a proposal from a trails advocacy group in December 2016 for a trail development on Chelan Butte. Vetting of the proposal will occur during a public process involving the Wildlife Area Advisory Committee and likely a Public Meeting where the project sponsor will be invited to present their proposal. Your comment and comments received during these events will be included in the evaluation process for this proposal and you will receive an invitation to these meetings which are likely to occur in Fall 2018. Balancing conservation and recreation is becoming increasingly challenging for managers. Public input is a critical driver in our decision making process and your comment is appreciated.

	Comment	WDFW Response
19.	There are enough areas for other recreators (bikers) throughout other areas of the state. Why must a recreation area be developed to allow for certain hobbies at the expense of our wildlife habitat? WDFW has proved time and again that managing wildlife is not a priority, instead you would rather spend time and money on building predator populatiins and on non-sportsmen that don't even pay into the wildlife budget. I'm asking that you don't make yet another grave mistake by allowing a recreation area to be developed and precious habitat removed from the wildlife. Regards, Clint Myers	Thank you for expressing your concerns and support for conservation. WDFW received a proposal from a trails advocacy group in December 2016 for a trail development on Chelan Butte. Vetting of the proposal will occur during a public process involving the Wildlife Area Advisory Committee and likely a Public Meeting where the project sponsor will be invited to present their proposal. Your comment and comments received during these events will be included in the evaluation process for this proposal and you will receive an invitation to these meetings which are likely to occur in Fall 2018. Balancing conservation and recreation is becoming increasingly challenging for managers. Public input is a critical driver in our decision making process and your comment is appreciated.

Appendix F. Research and Other Studies

Table 16. Research and Other Studies Conducted on the Chelan Wildlife Area.

Researcher	Date	Description
Galen Burrell	1982	Winter Diets of Mule Deer in Relation to Bitterbrush Abundance
Randy Hein	1996	Historical, Health, Ecological, and Management Aspects of the Swakane Canyon Bighorn Sheep.
Woody Meyers	2002	Observations of Mule Deer Habitat Use, Movements, and Survival in Chelan County, Washington
Robert Moore	2003	Mule Deer Winter Range Use and Potential Habitat Enhancements in Chelan County, Washington.
Joseph Arnette	2012	Review of Endemic Plants of the Wenatchee Mountains and Adjacent Areas.
J. Johnson-Maynard and C. Bauger	2015	*Drioleius americanus* Surveys in Washington State

Appendix G. Forest Management Plan

Chelan Wildlife Area Forest Management Plan

Introduction

This document accompanies the agency-wide Management Strategy for the Washington State Department of Fish and Wildlife's Forests with specific plan details for the Chelan Wildlife Area including the Chelan Butte, Entiat, Swakane and White River Units. The statewide strategy includes information that is common to all wildlife areas like the agency mission, policies and priorities. Also included in the statewide plan are general descriptions of forest types, management issues associated with them, and directions for identifying suitable management areas and potential projects. As such, this document focuses on site specific information related to identifying and addressing forest management needs in the Chelan Wildlife Area.

I. Forest Description

The Chelan Wildlife Area forests are composed of several ecological systems described by the Department of Natural Resources Field Guide to Washington's Ecological Systems (Rocchio, J. and R. Crawford 2008). Most forested acres lying along the Columbia River fall within one of two forested ecological systems called the Northern Rocky Mountain Ponderosa Pine Woodland and Savanna and the Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest. The White River Unit is comprised of the Northern Pacific Montane Riparian Woodland and Shrubland, the East Cascades Mesic Montane Mixed-Conifer Forest and Woodland, and the Northern Rocky Mountain Dry Mesic Mixed Conifer Forest. Map 17 in this document of this document shows the distribution of these forests in the Chelan Wildlife Area.

Disturbance Processes

Prior to modern settlement, wildfire and Native American-managed fire was one of the important ecosystem drivers in the Chelan Wildlife Area. Frequent low intensity fires maintained more open, late-seral forests, savannahs and woodlands. It kept fuel loads low in ponderosa pine and dry mixed conifer forests and stimulated fire-adapted plants including native perennial grasses. Fire intervals in the wildlife areas likely ranged between 16 and 20 years on the driest pine sites; 36 and 40 years on the dry mixed conifer sites; and 200 years or more years on the wetter forest types of the White River Unit. LANDFIRE data suggest most forested areas on the Chelan Wildlife Area had average fire return intervals of 36 to 40 years (see Map 14).

Other pre-European settlement disturbance to forested ecosystems included grazing of understory grasses and shrubs by large ungulates and occasional outbreaks of native forest insects and disease. Frequent fire likely kept insects and disease issues to lower levels by keeping forest stocking levels lower. These fires helped to maintain forest health by increasing spacing between trees that in turn kept the spread of mistletoe and root disease in check. Low- and moderate-intensity, low-severity fires help to remove weak and disease-susceptible trees. Reduced tree competition helps to maintain a healthier stand that is more equipped to fight insect attack. Riparian forests were likely maintained by flooding, channel migration and occasional mixed severity fire.

Current Conditions and Threat Assessment

Ecological Integrity

Fire and fuels

In the period of modern settlement, it is likely that some of the ponderosa pine or mixed conifer forests on the Chelan Wildlife Area were logged. Prior to WDFW ownership, the largest, most valuable trees were typically harvested. This management, combined with prolonged fire suppression, altered what the typical pattern of forest succession on the wildlife area. In general, the largest most valuable trees are thought to be more capable of withstanding low and medium intensity fires.

Over the last several decades, frequent fire or thinning activities have been excluded from the wildlife area. These undisturbed stands have changed from historically open grown forests to unnaturally dense forests of small diameter trees and shrubs. Shade tolerant species benefited, filling in openings to create even more dense conditions. Fuel loads are high with small trees and brush providing fuel ladders that allow fire to reach the forest canopy.

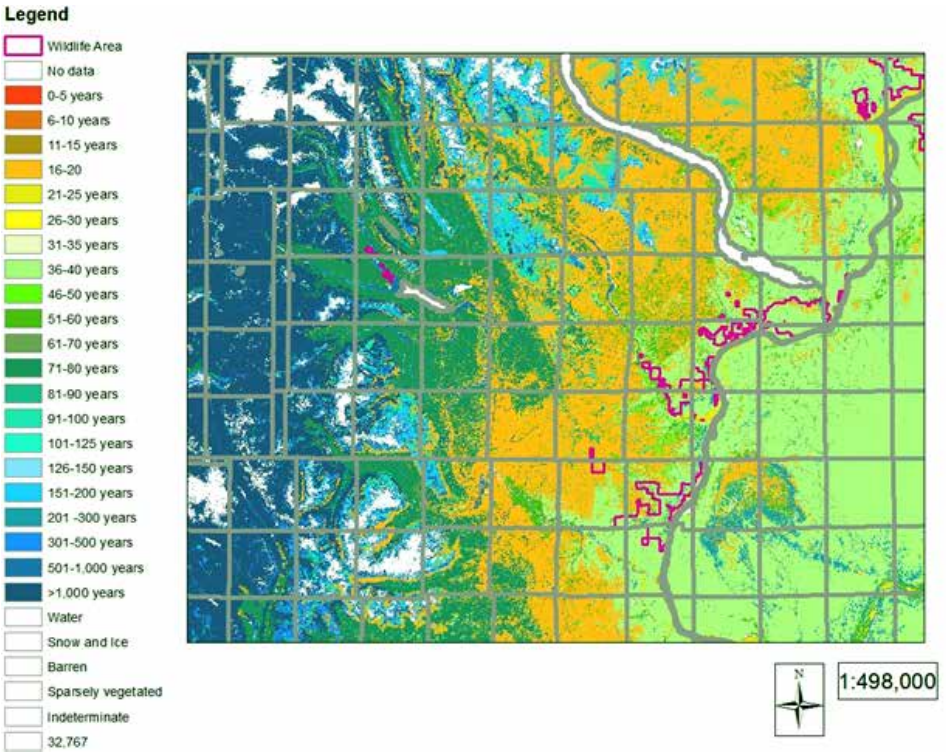
Overall the dense forest conditions of the wildlife area have departed from the historic range of variability, particularly

in areas with frequent fire return intervals. Planned commercial and pre-commercial thinning operations should decrease future risk of stand replacement fires by removing small stems and fuel ladders while favoring fire-resilient species as leave trees. However, the dense forests on have significantly departed from historic reference conditions and would likely experience high-intensity, high-severity crown fire.

Large scale stand replacement fires have been more frequent in the last decade. These include the Swakane Fire in 2010, the Byrd Fire in 2012 and the Chelan Complex Fire in 2015. As is the case with most wildfires, the severity and impact to large overstory trees was mixed. But large portions of the wildlife area experienced stand replacement events and will be slow to recover naturally.

Insects and disease

Forest insects and diseases present on the Chelan Wildlife Area are all native. At endemic levels, insects and pathogens can provide habitat features such as a food source from beetle larvae; dwarf mistletoe brooms acting as nesting platforms; snags providing habitat for cavity nesting birds and small mammals; and structural diversity. Bark beetles attack trees weakened by drought, physical damage, disease or overcrowding resulting in the potential for epidemic outbreaks. Dwarf mistletoe infests trees of the same species and spreads and can quickly spread to other trees in the stand. Root disease attacks weakened trees primarily through root-to-root contact underground. Pine engraver beetle (Ips pini), western pine beetle (*Dendroctonus brevicomis*), mountain pine beetle (*Dendrochtonus*



Map 14. Fire return interval for Chelan Wildlife Area. Based on LANDFIRE data. Note entire wildlife areas are mapped here, not just forested portions. See Appendix A to compare maps of forest ecological systems.

ponderosae), and western spruce budworm (*Choristoneura occidentalis*) are some of the more common insects that can result in mortality of host tress. The most common root diseases are laminated root rot, Annosum and Armillaria root rot.

Much of the forested area of the wildlife area that has not burned is overstocked. This has resulted in trees that are stressed and predisposed to epidemic levels of insect and/or disease attack. Dwarf mistletoe and root rot are probably the most common disease problems. Localized bark beetle infestations are also found throughout the forested areas. Climate change effects, including extended summer droughts could potentially exacerbate impacts from insects and disease, particularly in trees unable less likely to adapt to climate change such as grand fir and Douglas-fir (Kolb et al. 2016, Kliejunas et al. 2009, Klopfenstein et al 2009).

Priority Species

Priority habitats and species have been identified in the Chelan Management plan and will not be re-visited here. However, thinning prescriptions in areas with priority habitats and species will be modified to provide for protection and enhancement of those areas.

Social and Economic Conditions

Recreation

The Chelan Wildlife Area forests greatly add to the scenic beauty of the land and are highly valued as places for public recreation including hunting, hiking, biking, horse-back riding, wildlife viewing and camping. Nevertheless, current conditions are less than ideal. Overstocked forests contribute to elevated wildfire threats which are expensive to suppress and may reduce recreational opportunities due to falling trees. Dense plantation tree growth stagnates without treatment, reducing economic value in timber harvest. Overstocked stands may provide desirable habitat for species such as flammulated owls or goshawks, however they provide less than ideal foraging habitat for hunted big game species such as deer or sheep.

Wildlife Urban Interface (WUI)

The wildlife areas are adjoined by private and public lands that are connected by an uninterrupted forest canopy. This forest plan outlines the management approach and planned activities designed to improve forest health and put wildlife area forests on a trajectory towards high ecological integrity, improved forest health, and reduced risks of catastrophic wildfire. This can be accomplished by thinning, prescribed burning, planting, and other silvicultural management practices.

Local Economic Opportunities

There exists potential for wildlife area forests to provide support to local economies by providing forestry jobs and logs to local sawmills. The commercial thinning projects proposed in this plan will not only directly stimulate the local economy, but may also result in revenue for the agency that could include prescribed fire, pre-commercial thinning, tree planting or future thinning projects.

II. Management Approach

WDFW will actively manage suitable forests on the Chelan Wildlife Area. Commercial thinning, pre-commercial thinning, prescribed fire, and planting will be used to restore and maintain fire-dependent forests. The forest management approach on the wildlife area focuses on resiliency to disturbance (including wildfire, insects and disease outbreaks), improvements of degraded stands, and improved habitat quality for multiple wildlife species. Management decisions will consider both site–specific and landscape-wide, cross-ownership needs. Continued forest management activities on a periodic basis will be necessary to maintain stands with high ecological integrity.

Desired Future Conditions

Ecological Integrity

Wildlife area forests will be managed and maintained to meet the priorities and expectations of WDFW's mission to preserve, protect and perpetuate fish, wildlife and ecosystems while providing sustainable fish and wildlife recreational and commercial opportunities.

In general, desired conditions would move forests closer to the historic ranges of variability for the landscape, as directed in the 2015 Management Strategy for the Washington State Department of Fish and Wildlife's Forests. It is assumed that managing forests within the historic ranges of variability, (including species composition, structure, fuel levels and disturbance regimes) provides the ecological sustainability and therefore the greatest overall benefits to multiple wildlife species.

If possible, it would be desirable to consider the expected future range of variability resulting from the impacts of climate change. Temperatures are expected to increase, resulting in decreased snow packs and earlier spring snow melt. It is also anticipated that hot, dry summer conditions will persist longer. This could result in an increase the frequency of large fires, increase stress on trees, and further predispose forests to disease and insect infestation. Future forests in Washington State should be managed to withstand these anticipated conditions.

Desirable conditions of the ponderosa pine and mixed conifer forests would include a system able to withstand fire return intervals averaging from 16 to 20 years up to 200 years or more on moist sites and north facing slopes. Most stands would be more open and fire-resilient than they are today. However, at a course and fine scale there would be some heterogeneity to provide a diversity of habitat. For example, most stands would be more open, favoring pine and possibly western larch. However, north facing slopes or riparian areas may be more densely stocked and leave more Douglas-fir and grand fir. Within a stand, there should be a mix of openings, well-spaced individuals and clumps of trees.

The primary risks to WDFW forests are fire, insects and disease. Desired conditions would be to have a lowered risk of catastrophic wildfire using pre-commercial thinning, commercial thinning and prescribed fire techniques to reduce those risks. These actions cannot prevent wildfire and remove all risk, but they may reduce fire intensity and severity. Ideally, both wildfire and prescribed fire would remain on the ground and maintain healthy forests. If high severity crowning fires did occur due to unusually severe fire conditions, fires would hopefully drop to manageable levels on managed WDFW land that may help suppression efforts.

Forests would not be converted to shrubs and grass at large scales, unless that can be shown to be within the historic range of variability for that particular site. Desirable species better adapted to survive low intensity fire, including ponderosa pine, would should be the predominate Northern Rocky Mountain Ponderosa Pine Woodland and Savanna and the Northern Rocky Mountain Dry and Mesic Montane Mixed Conifer Forest types, where proposed forest management activities would occur. Allowing trees to be healthier and grow faster by decreasing competition would be preferred. Leaving large diameter trees with thicker bark are more likely to survive low intensity forest fire.

Priority Species

Where Priority Species and Habitats are known to occur, as outlined in the Wildlife Area Management Plan, strategies designed to protect these resources will be an integral part of the management prescription for the thinning project. Balancing the needs of the landscape and providing for high ecological integrity, while also increasing the viability of at-risk species and habitats, will guide the management decisions and provisions. Details on how we will address priority species considerations at the project level will be developed in individual project designs coordinated with wildlife biologists, habitat biologists and wildlife area managers.

Social and Economic Conditions

Washington Department of Fish and Wildlife's mission is to "preserve, protect and perpetuate fish, wildlife and ecosystems while providing sustainable fish and wildlife recreational and commercial opportunities". Desired socio-economic conditions for forest management on the Chelan Wildlife Area will provide for maintaining quality

recreational experiences and commercial opportunities while providing quality habitat for multiple species.

Recreation

Forest projects may temporarily affect recreational use due to short-term closures for safety. If closures were necessary, every attempt will be made to reduce the impacts during periods of high recreational use (hunting seasons, shed hunting season, etc.). Any project where falling trees or using of heavy equipment is necessary will be signed to notify and protect the safety of potential recreational users. Long term recreational use opportunities may be improved by improving public forest access roads and improved habitat conditions.

Local Economic Opportunities

While economic stimulus is not the purpose of WDFW forest management projects, it is recognized that forest management would stimulate the economy by employing foresters, local loggers, mill workers, and forestry contractors. As much as possible, any revenue from the sale of harvested logs would go directly back into local forest, grassland and shrubsteppe improvement projects. These new projects would then further stimulate the rural economy of the area.

Suitable Management Areas and Potential Projects

The Chelan Wildlife Area forests located adjacent to the Columbia River have evolved with regular fire intervals and therefore active management should be an option for much of the forested area. However, emphasis for the current 10 year planning cycle will be placed on degraded stands with declining ecological integrity that require frequent fire return intervals. Those stands that are currently on trajectory to desired future conditions, with little or no benefit to be achieved from active management, are low priorities for the current planning cycle. Also, those stands with feasibility issues may be excluded from consideration in the current planning cycle. Issues that may preclude active management include, but are not limited to, poor access, operability concerns, habitat concerns, economic constraints and regulatory restrictions.

Where active management is appropriate, the primary goals for those management activities will be to:

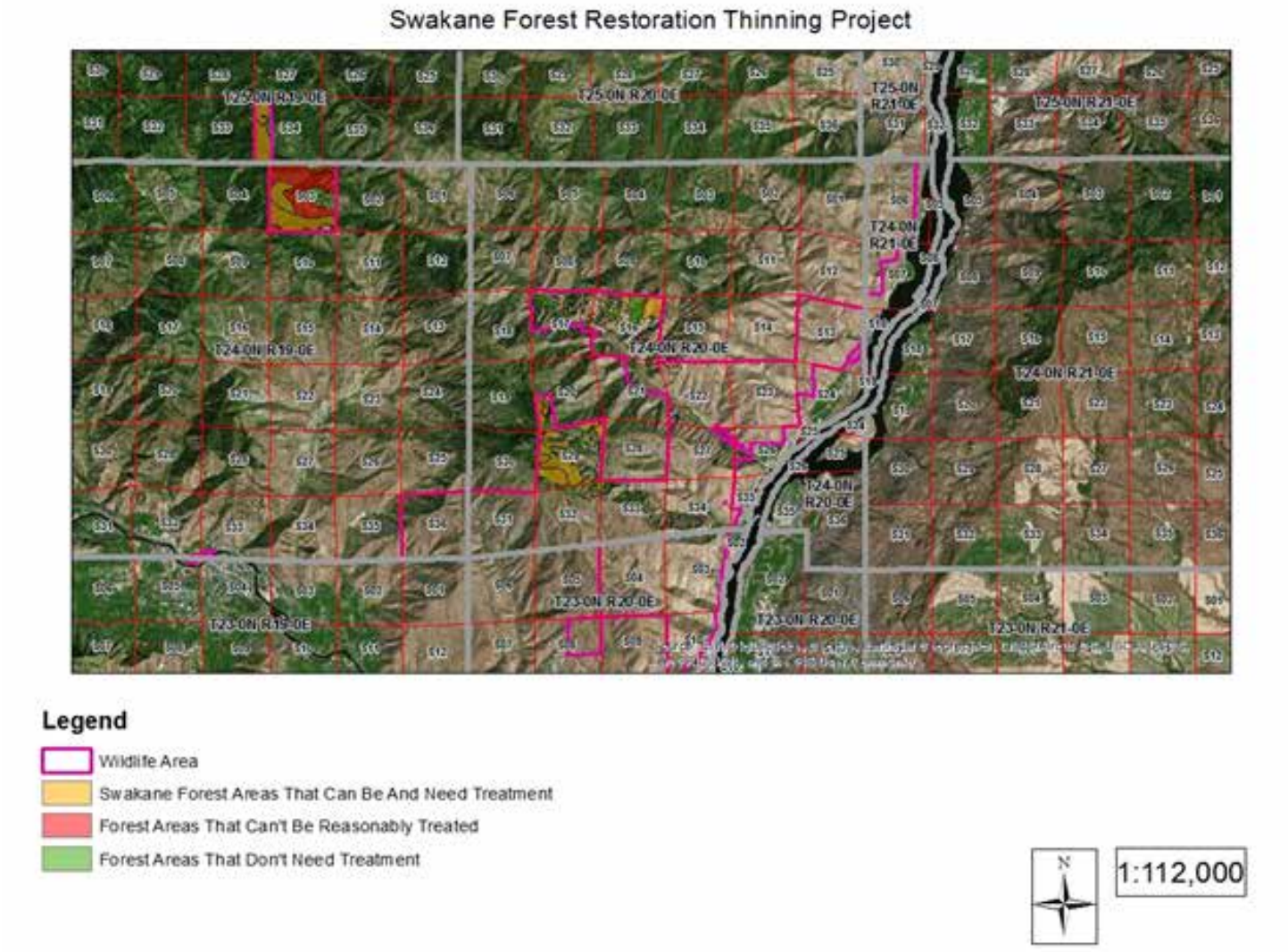
1. Restore the project area to stand conditions more closely resembling the historic and potential future range of variability for species composition, stand densities and size classes.
2. Improve habitat conditions for multiple wildlife species, with emphasis placed on priority habitats and species.
3. Improve forest health to create healthy, resilient stands.
4. Reduce the catastrophic wildfire risk on the wildlife area and surrounding ownerships.

Commercial thinning will be used where appropriate to maintain healthy, fire resilient forests. Forest management will also include pre-commercial work. Pre-commercial treatments may include controlling fuel loads and reducing the in-growth of trees and shrubs through prescribed fire; thinning small diameter trees (thinning from below), and hand thinning to reduce tree competition. As funding is available, trees may be planted to restore areas impacted by wildfire. Degraded riparian forests may also be identified for small scale reforestation projects.

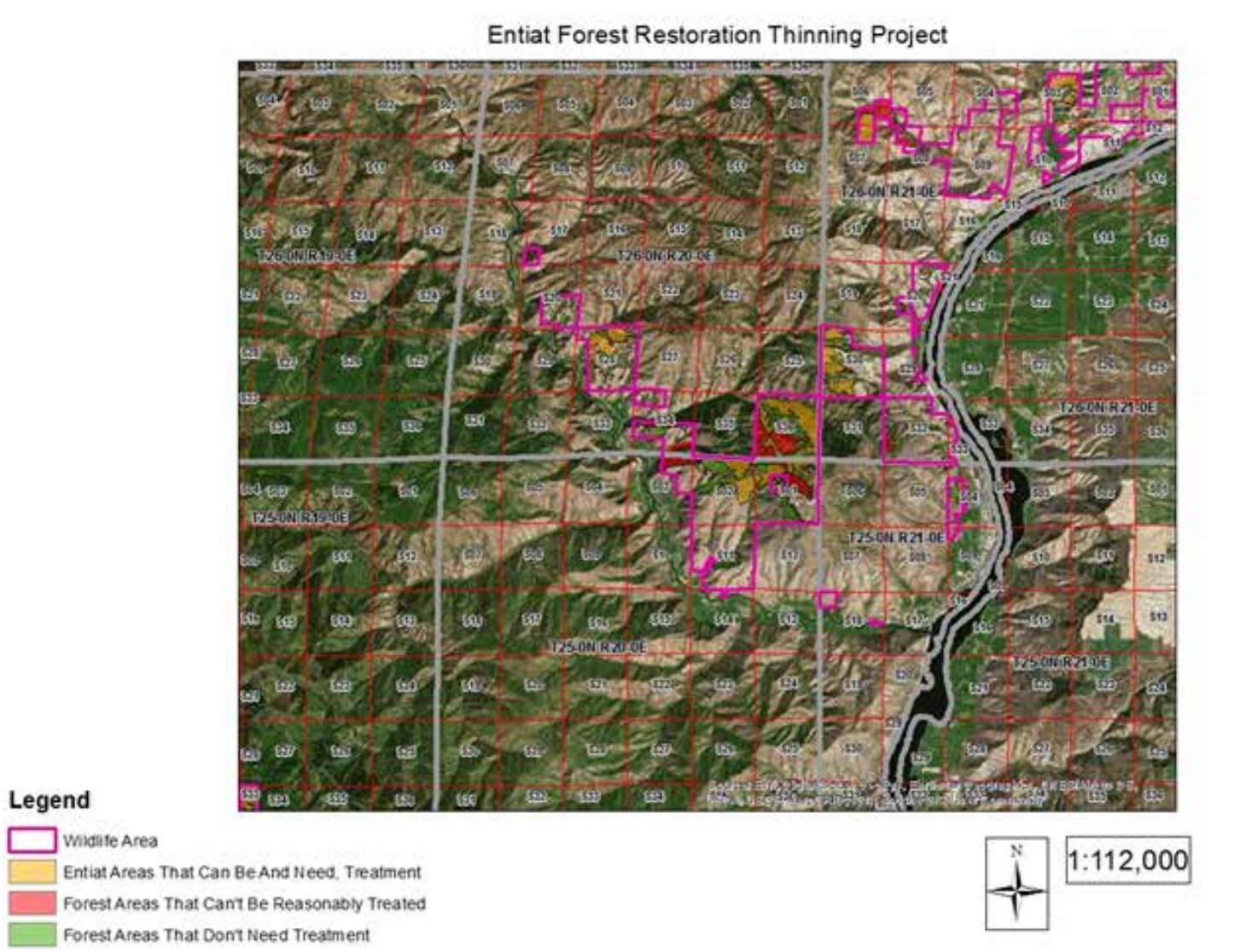
Potential Projects

Approximately 572 acres will be considered for forest management restoration projects over the next 10 years. These acreage figures are tentative and will require field verification before final project acreages can be determined. Map 15 shows the proposed commercial thinning project referred to as the Swakane Forest Restoration Thinning Project, comprising approximately 347 acres. Map 16 shows the proposed Entiat Forest Restoration Thinning Project, comprising approximately 225 acres. Specific treatment plans and potential projects for the next 10 years are listed in Table 17.

Follow up treatments may be necessary after commercial operations have been completed. This may include pre-commercial thinning/slashing of small diameter thickets and/or prescribed fire. WDFW would like to use prescribed fire, wherever possible, to stimulate forage species and reduce small tree stocking. However, the use of prescribed fire is limited due to air quality regulations, lack of funding and fuel conditions.



Map 15. Map of potential forest management units proposed for the Swakane Forest Restoration Project. The proposed treatment for this planning cycle is commercial thinning and possibly follow-up with pre-commercial thinning and/or prescribed fire. Areas that cannot be reasonably treated include inaccessible lands, lands with management restrictions, and areas with operational constraints. Areas that do not need treatment are presumed to be self-maintaining through natural processes.



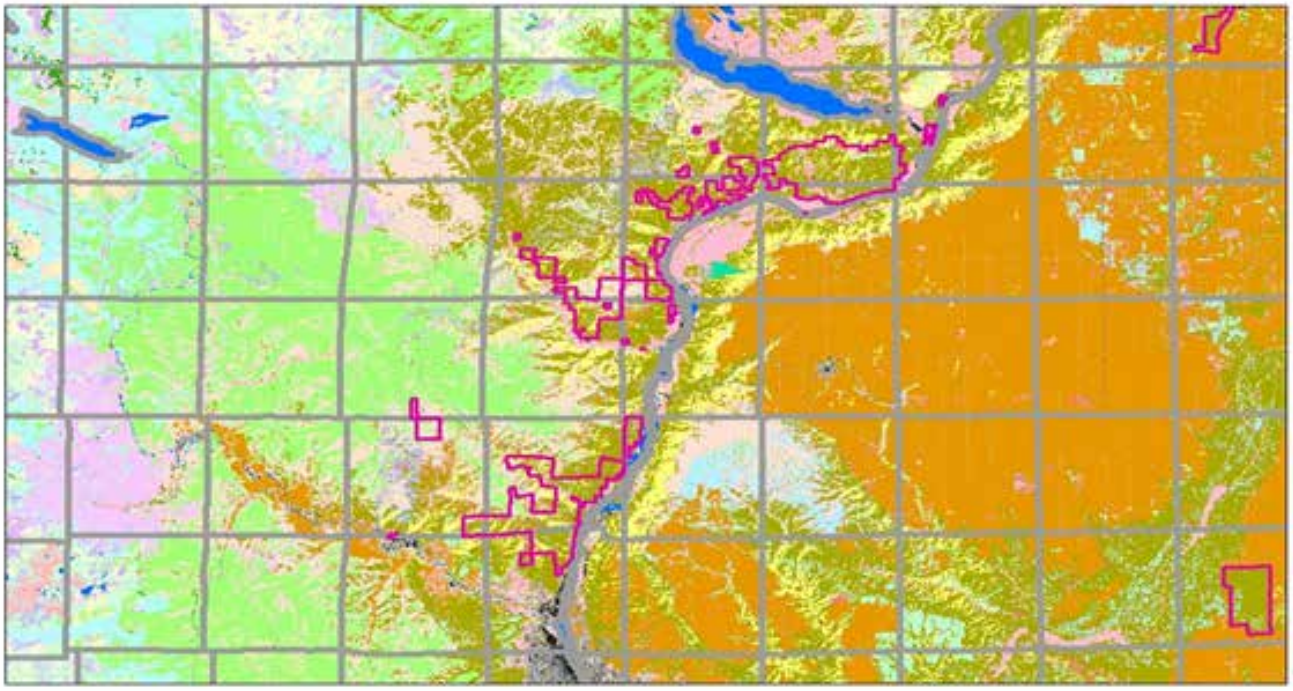
Map 16. Map of potential forest management units proposed for the Butch Mountain Forest Restoration Project. The proposed treatment for this planning cycle is commercial thinning and possibly follow up with pre-commercial thinning and/or prescribed fire. Areas that cannot be reasonably treated include inaccessible lands, lands with management restrictions, and areas with operational constraints. Areas that do not need treatment are presumed to be self-maintaining through natural processes.

Table 17: Planned Forest Treatment Projects. Projects proposed in the next 10-year cycle to meet forest management goals of stand restoration, improving wildlife habitat, increasing ecological resiliency and reducing risk from catastrophic wildfire. Projects listed are goals only. Planning and implementation will be dependent on funding, markets, timing, and workloads.

Goal	Objective	Treatment Units	Performance Measure	Lead	Task	Anticipated Completion
Forest Restoration	Reduce tree density favoring fire resistant trees	Swakane	Approximately 350 Acres	WDFW Forester	Commercial and Pre-Commercial Thinning	2020
		Entiat	Approximately 225 Acres	WDFW Forester	Commercial and Pre-Commercial Thinning	2021

Map 17. -- Distribution of forest types based on ecological systems described by the Department of Natural Resources Field Guide to Washington's Ecological Systems (Rocchio, J. and R. Crawford 2008) and satellite imagery (Sayre et. al. 2009). Maps show satellite imagery data over the Chelan Wildlife Area.

Columbia River Forested Ecosystems



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Legend

Wildlife Area

PLSS Sections

Ecological Systems

Northern Rocky Mountain Ponderosa Pine Woodland and Savanna

Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Fores*

North Pacific Montane Riparian Woodland and Shrubland

East Cascades Mesic Montane Mixed-Conifer Forest and Woodland

White River Forested Ecosystems

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Appendix H. Water Access Summary

Table 18. Water Access Summary.

			Fishing and Boating Opportunities			Facilities		
County	**Waterbody**	**Access**	**Fishing***	**Hand Launch**	**Trailored Boat Launch**	**Ramp Surface**	**Toilet (^ = ADA)**	**ADA Parking**
Okanogan	Methow River	Bridge One			•	Concrete	•^	•
		Pateros	•				•	
		Rice	•	•			• ^	
Chelan	Columbia River	Beebe Springs	•	•			• ^	•
	Icicle Creek	Icicle Creek	•					
	Roses Lake	Roses Lake			•	Concrete	•	
	Wenatchee River	Dryden Dam			•	Unimproved		
		Dryden, Lower	•				•	
		Dryden. Upper	•					
		Fox Miller	•				•	
		Monitor, Lower			•	Unimproved		
		Monitor, Upper	•					
		Peshastin			•	Unimproved		
		Turkey Shoot	•				•	

* Access provides fishing opportunities on WDFW property. Refer to current WDFW sport sighing rules, as fishing seasons change and may not occur at all site.