

# North Cascades Elk Herd Management Plan



Photo taken by Jon Timmer



Washington  
Department of  
**FISH** and  
**WILDLIFE**

# **Washington State Elk Herd Plan**

## **NORTH CASCADES ELK HERD**

September 2018

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

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Wildlife Program  
600 Capitol Way North  
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2018

  
\_\_\_\_\_  
Director, Washington Department of Fish and Wildlife

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## **ABBREVIATIONS USED IN THIS PLAN**

BLM	Bureau of Land Management
CITES	Convention in International Trade of Endangered Species
DNR	Washington State Department of Natural Resources
DOD	Department of Defense
GPS	Geographic Positioning System
GMU	Game Management Unit
MSH	Mount St. Helens
NPS	National Park Service
RMEF	Rocky Mountain Elk Foundation
SLT	Skagit Land Trust
WDFW	Washington Department of Fish and Wildlife
WSDOT	Washington State Department of Transportation
USFS	United States Forest Service

## EXECUTIVE SUMMARY

The North Cascades elk (*Cervus elaphus*) herd (commonly referred to as the Nooksack elk herd) is the smallest of ten herds formally recognized and managed by the Washington Department of Fish and Wildlife (WDFW) and is the northernmost herd in western Washington. Despite the herd's size, it is an important resource providing recreational, aesthetic, and economic benefit to Washington citizens. This includes Native American people of the area who value elk as a cultural, subsistence, and ceremonial resource.

The current population stems from successful augmentations in 1946 and 1948 that included elk from eastern and western Washington. WDFW believes the elk population peaked in the mid-1980s, at which time there were between 1,400 and 2,000 elk. A dramatic population decline occurred during the late 1980s and early 1990s, when WDFW believed the herd reached a low of a few hundred elk. Translocations of 98 additional elk from Mount St. Helens (MSH) between 2003 and 2005 appear to have contributed to recent increases of the North Cascades herd.

At this time, annual composition surveys suggest that the current population within the Game Management Unit (GMU) 418 (Nooksack) and that portion of GMU 437 (Sauk) north of the Skagit River between Lyman and Concrete is 1,269 (95% C.I. = 1,170-1,379) animals. Additionally, biologists' observations and other anecdotal information suggest that an additional 200-400 elk occur elsewhere in GMU 437, primarily south of the Skagit River between Sedro Woolley and Marblemount, and at least 100 more within the Sauk River Valley south of Rockport.

Factors that managers believe contributed to declines in the North Cascades elk herd in the 1980s and 1990s include timber management practices, increased elk vulnerability associated with an expanded road network and over harvest. Since the late 1990s, WDFW and cooperators have implemented several projects to address access management, coordinate timber harvest activities on state lands, and enhance elk habitat. Coupled with a hunting moratorium in GMUs 418 and 437, these projects appear to have contributed to recent population increases.

The primary purpose of this plan is to provide direction for future management of the North Cascades elk herd. The plan will also serve as a valuable reference document and guideline for WDFW, the Point Elliott Treaty Tribes (hereafter referred to as "Tribes"), agency cooperators, private landowners, and the public. As management priorities change, it is WDFW's intent to update this plan as needed. The primary goals of the North Cascades Elk Herd Plan are:

1. Preserve, protect, perpetuate, and manage elk and their habitat to ensure sustainable populations
2. Manage elk for a variety of recreational, educational, and aesthetic purposes including hunting, wildlife viewing, photography, scientific study, and cultural and ceremonial uses by Native Americans
3. Manage elk populations for a sustainable annual harvest
4. Minimize property damage and public safety risks associated with elk

The plan identifies specific objectives and strategies that address specific challenges in managing the North Cascades elk herd. WDFW has identified the following objectives:

1. The population objective for the North Cascades elk herd is 1,700 – 2,000. The population objective includes the elk within Skagit River Valley, the Acme Valley, and areas where WDFW's intent is to minimize elk/human conflicts and ensure public safety (see Objective 5).
2. By 2018, implement a monitoring strategy that will provide a sound basis for herd size estimation using acceptable, cost-effective methodologies.

3. Increase the geographical area available for hunting on public and private lands by at least 100 square miles by 2021.
4. Minimize public safety risk by reducing the average annual number of elk-vehicle collisions along the State Route 20 corridor between Sedro Woolley and Marblemount by 50% over the next five years.
5. While attempting to achieve the population objective, reduce the number of elk caused damage complaints on private lands in the North Cascades elk herd area over the next five years.
6. Annually cooperate and collaborate with the Tribes to implement the North Cascades Elk Herd Plan and to coordinate season setting and herd management in traditional hunting areas.

## **2002 NORTH CASCADES ELK HERD PLAN ACCOMPLISHMENTS**

WDFW, the Tribes, Washington State Department of Natural Resources (DNR), U.S. Forest Service (USFS), and non-governmental partners have worked closely for more than a decade to implement management objectives and strategies identified in the 2002 North Cascades Elk Herd Plan. It is of paramount importance to acknowledge these accomplishments as they have contributed to the recovery of the North Cascades elk herd.

### **Summary of Accomplishments**

#### **Herd Augmentation**

Between October 2003 and October 2005, WDFW and the Tribes, with assistance from the Rocky Mountain Elk Foundation (RMEF) and Mount Saint Helens Preservation Society volunteers, captured and translocated 98 elk (mostly cows and calves) from the Mount Saint Helens Wildlife Area to the North Cascades elk herd area. These translocations were successful and contributed to the growth and expansion of the North Cascades elk herd. Body condition indices were collected on translocated elk (Cook et al. 2010).

#### **Re-establishment of Coordinated Hunting Seasons**

Beginning in 1997, WDFW and the Tribes eliminated all elk hunting opportunities in GMU 418 in an effort to prevent further declines in the North Cascades elk herd. Since that time, the herd has increased substantially, which prompted managers to re-establish limited opportunities to harvest bull elk in GMU 418, beginning in 2007. Managers offer harvest opportunities through a limited permit system and allocate permits between state and Tribal hunters.

#### **WDFW-Point Elliott Tribes Hunting Co-Management Agreement**

This hunting co-management agreement acknowledges the need for WDFW and the Tribes to cooperate in the discharge of their respective authorities and to insure that healthy populations of elk continue to be available to state and Tribal hunters. The purpose of this agreement is to:

- Provide a cooperative and coordinated science-based approach to resource and harvest management
- Promote joint efforts to increase access to private industrial timberlands
- Promote communication between the parties on policy, enforcement, and technical issues

#### **Manage the North Cascades Elk Herd Using Sound Objective Science**

WDFW and the Tribes collaborated on numerous projects aimed at improved management of the North Cascades elk herd including:

- Collected and shared elk harvest information from GMUs 418 and 437 since 2007
- Developed and compared sightability modeling and mark-resight methodologies and analyses for estimating population size, composition, and trends
- Captured and collared 68 cow elk and 22 bull elk to support population monitoring work
- Collected and submitted genetic samples from elk mortalities
- Deployed geographic positioning systems (GPS) collars as part of a habitat assessment study as well as other studies
- Developed the North Cascades Elk Herd Harvest Plan, which is approved annually by the North Cascades Elk Technical Group consisting of WDFW and Tribal biologists
- Implemented non-lethal measures for effective damage control

## Increase Public Awareness of Elk and Promote Non-hunting Uses of Elk, Including Viewing and Photographic Opportunities

WDFW collaborated with Skagit Land Trust (SLT) to establish public viewing on SLT's Hurn Field property just west of Concrete. Watchable Wildlife funding paid for the necessary roadside enhancements that allow the public to access a new parking area and an informational sign. Members of the public, local school districts and the business community of Concrete have utilized this elk viewing opportunity.

## Cooperative Elk Forage Enhancement Projects

Between 2002 and 2015, WDFW, the Tribes, DNR, Puget Sound Energy (PSE), Seattle City Light (SCL), and other project partners collectively created elk forage enhancement plots in GMUs 418 and 437. The majority of these projects occurred on state and commercial timberlands. The RMEF, DNR and the Tribes funded these projects.

## Work Cooperatively to Implement the North Cascades Elk Herd Plan

WDFW and the Tribes have developed a strong working relationship over the past twelve years. As a result, WDFW and the Tribes have accomplished the following:

- Developed a framework of cooperation by meeting frequently and using open dialog to discuss management concerns for the North Cascades elk herd
- Established and maintained an atmosphere of mutual respect, trust, cooperation, and exchange of information
- Formed partnerships for funding mutually acceptable projects to improve elk habitat, or advance research

# NORTH CASCADES ELK HERD PLAN

## HERD AREA DESCRIPTION

### Location

The North Cascades elk herd area includes portions of Whatcom, Skagit, Snohomish, and King counties (Figure 1). The eastern boundary begins at the United States (U.S.)/Canada border and follows the western border of the North Cascades National Park until it reaches the Pacific Crest National Scenic Trail, which it follows until it intersects U.S. Highway 2. The southern boundary follows U.S. 2 westerly to Monroe. The western boundary begins at Monroe and follows the Woods Creek-Menzle Lake Road to Granite Falls, the Jordan Road to the power line and Mainline Road and 242<sup>nd</sup> St. NE to Trafton. It continues along State Route 530 to Arlington, and then along State Route 9 to Acme, then along the Mosquito Lake Road and State Route 542 to Maple Falls and finally the Silver Lake Road to the U.S./Canada border, which is the northern boundary. Radio-collared animal data has shown that some elk move east into the North Cascades National Park.

### Ownership

Approximately 58% of all land within the North Cascades elk herd area is in public ownership (Table 1, Figure 2). The USFS is the largest public landowner, controlling a total of 5,227 square kilometers (2,019 sq. mi), which is approximately 74% of all public lands. Lands managed by DNR total 1,571 square kilometers (607 sq. mi), which equals approximately 22% of all public lands. Commercial timber companies manage most of the privately owned forestland, while there are substantial areas of agricultural lands in the main river valleys (Figure 3).

Table 1. Public ownership in the North Cascades elk herd area. We derive values using ArcMap (GeoLib.DBO.Public\_Tribal\_Lands: Major Public Lands with DNR Lands - DNR\_MPL 2016).

GMU	GMU 407 <sup>a</sup> (sq. km.)	GMU 418 (sq. km.)	GMU 437 (sq. km.)	GMU 448 (sq. km.)	GMU 450 (sq. km.)	Total
<b>Total GMU</b>	3,402	2,168	2,306	2,926	1,240	12,042
<b>Total Public</b>	392	1,553	1,405	2,463	1,238	7,051
<b>% Public</b>	11.5%	71.6%	60.9%	84.2%	99.8%	58.5
<b>USFS</b>	0	1,194	971	1,825	1,237	5,227
<b>DNR</b>	250	347	415	559	0	1,571
<b>County</b>	29	10	1	24	0	64
<b>State Parks</b>	21	0	4	19	0	44
<b>City</b>	30	0	0	17	0	47
<b>DOD</b>	0	0	0	17	0	17
<b>WDFW</b>	58	0	7	1	0	66
<b>Other State</b>	4	0	7	0	0	11
<b>NPS</b>	0	2	0	0	1	3
<b>BLM</b>	0	0	0	1	0	1

<sup>a</sup> Total area for GMU 407 includes only the land area.

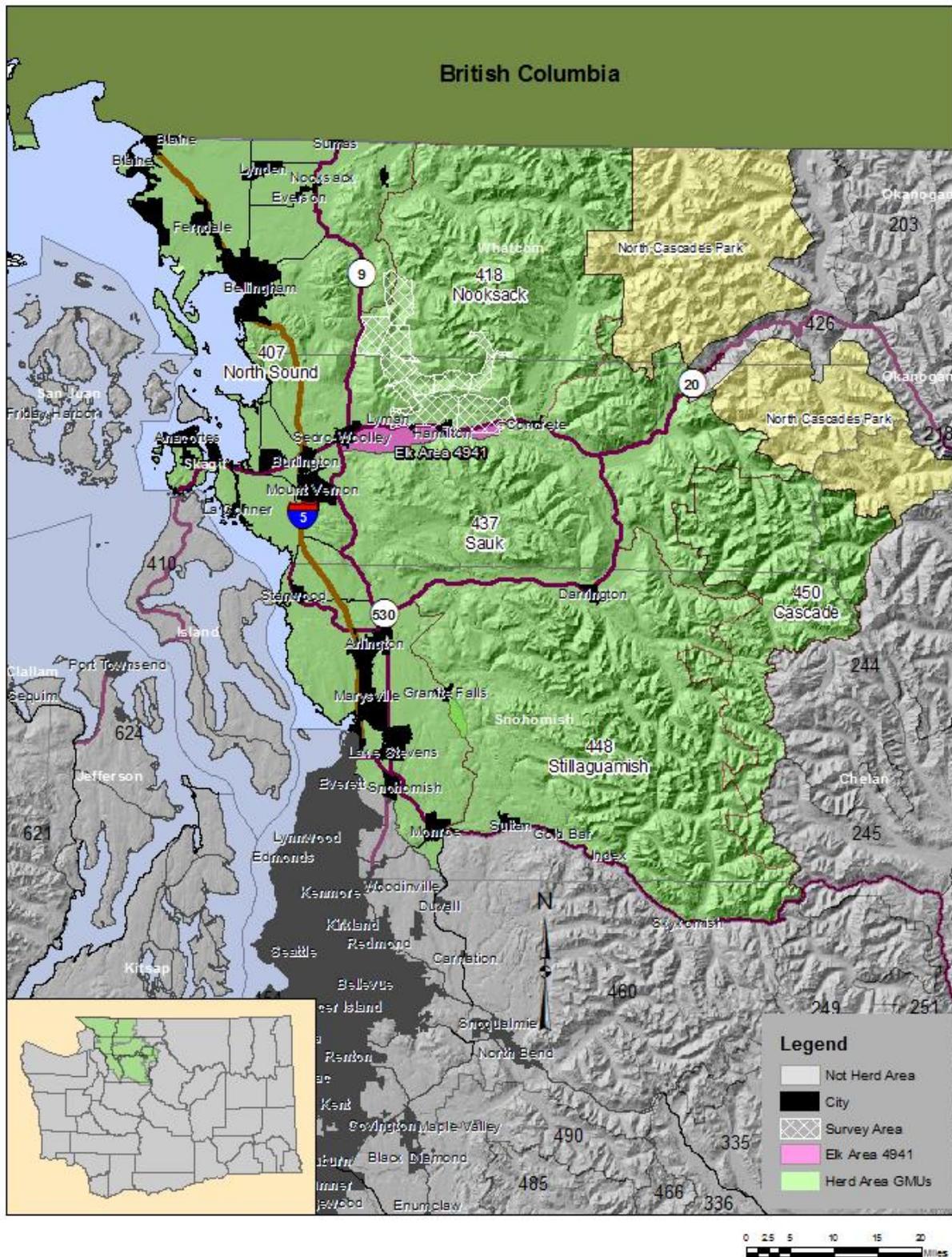
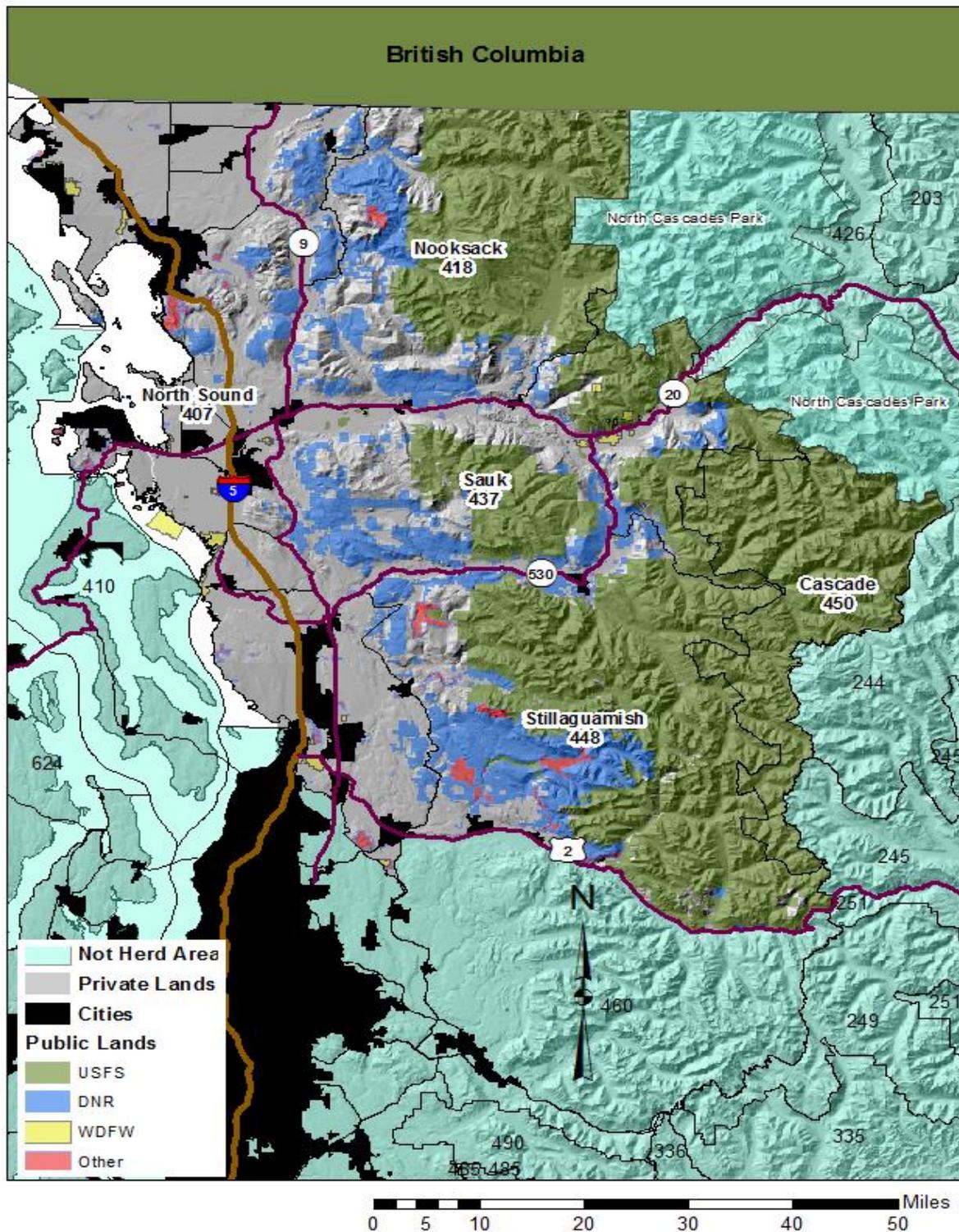


Figure 1. Game management units comprising the North Cascades elk herd area are shaded green.



**Figure 2. Public ownership of the North Cascades elk herd area. Other includes City or Municipality, County, National Park Service, State University, BLM, U.S. Dept. of Defense, and U.S. Fish and Wildlife Service.**

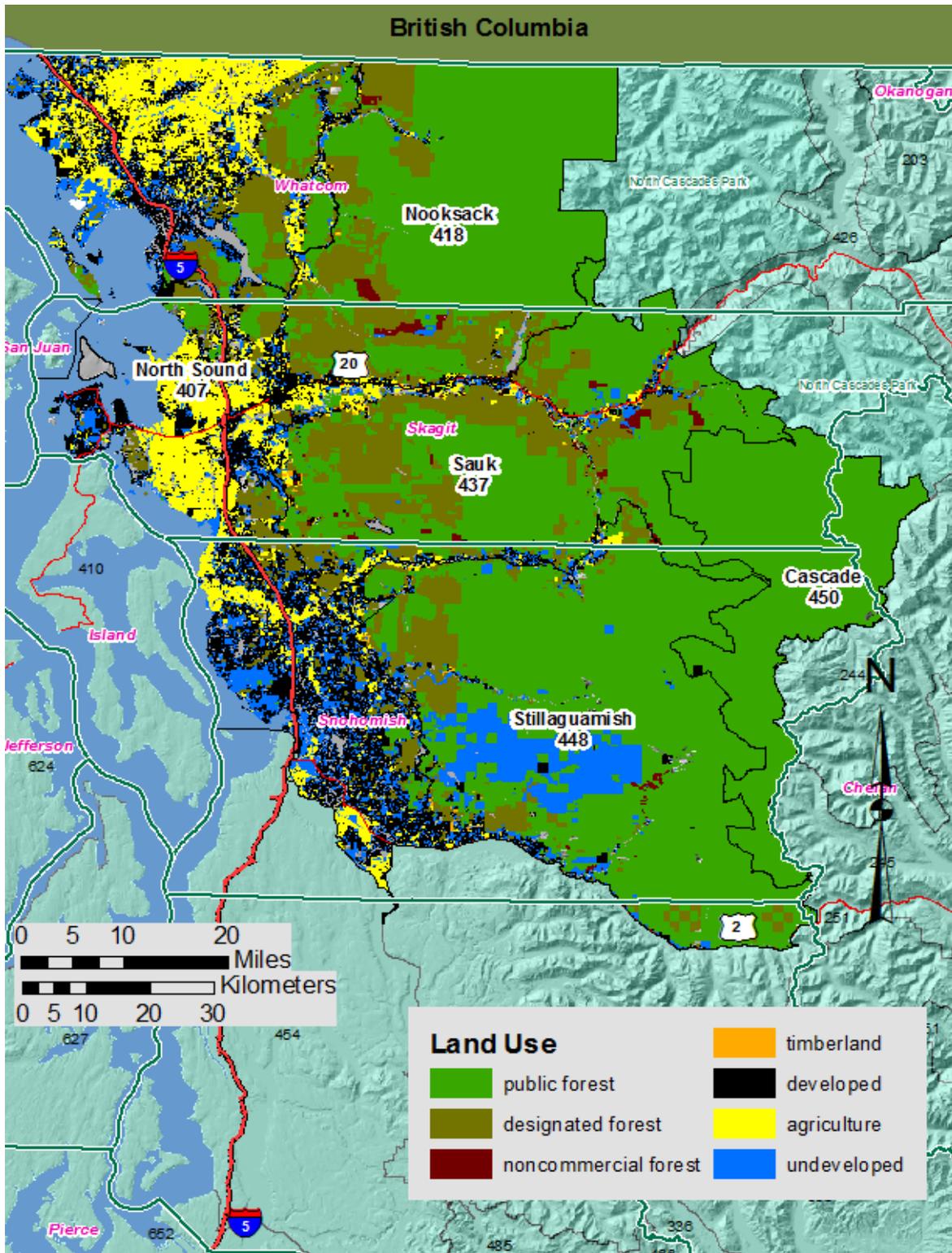


Figure 3. Land use in the North cascades elk herd area. Agriculture, open space, and timberland are defined in RCW 84.34.020. Designated forest is defined in RCW 84.33.035.

## Topography

The entire North Cascades elk herd area is within the Northern Cascades physiographic province described by Franklin and Dyrness (1973). Elevations vary from lower than 10 meters (30 feet) along portions of the western boundary formed by State Route 9, to nearly 3,300 meters (10,781 feet) at the summit of Mount Baker. Most of this area consists of low to mid-elevation mountainous terrain with agricultural lands in the lowlands to the west and within river valley bottoms. The steepest and least accessible areas include the montane environment associated with Mount Baker and the North Cascades mountains at the eastern extent of GMUs 418, 437, and 450.

## Vegetation

Three major forest zones occur along elevational and moisture gradients (Franklin and Dyrness 1973). In order of increasing elevation, they are the western hemlock (*Tsuga heterophylla*), Pacific silver fir (*Abies amabilis*), and mountain hemlock (*Tsuga mertensiana*) zones.

The western hemlock zone is the most important timber production zone. In the northern Cascades, it generally reaches its upper limit at 600 meters (1,980 feet) elevation. Major tree species are Douglas fir (*Pseudotsuga menziesii*), western hemlock, and on moist sites, western red cedar (*Thuja plicata*). Hardwood species, such as red alder (*Alnus rubra*) and bigleaf maple (*Acer macrophyllum*) occur mainly as pioneers on recently disturbed sites or in streamside habitats. Understory plant composition varies, depending on site moisture and soil class. Moist sites with better soils tend to be dominated by sword fern (*Polystichum munitum*) and its associates, while poorer, drier soils often support the evergreen shrub salal (*Gaultheria shallon*). Elk winter range is mostly within the western hemlock zone.

The Pacific silver fir zone occurs from about 600 to 1,300 meters (1,980-4,290 feet). Wetter and cooler than the lower western hemlock zone, it receives more winter snowfall and has a shorter growing season. Typical understory plants are often herbaceous, such as huckleberry (*Vaccinium spp.*) and mock azalia (*Menziesia spp.*).

The mountain hemlock zone is the highest elevation forest zone in this herd area, generally occurring between 1,300 and 1,700 meters (4,290-5,610 feet). Heavy winter snow can often persist for six to eight months. The zone gradually changes in structure from dense forests at its lower limit to open subalpine parklands near its upper limit.

## Human Influences

Human activities within the primary use area of the North Cascades elk herd likely caused the population declines that occurred during the 1980s and 1990s. Factors that managers believe contributed include timber management practices, increased elk vulnerability associated with an expanded road network, and over harvest. WDFW and the Tribes, with support from sister agencies and other project partners, addressed these issues by reducing the number of areas open to vehicle access, implementing a harvest moratorium from 1997-2006, and providing limited harvest opportunities from 2007 to 2016. In addition, changes in silvicultural practices have produced a more complex mosaic of habitats and stand age classes.

In Whatcom and Skagit counties human population increase between 1980 and 2000 was 3.41% and 2.2% respectively, and a similar population increase is predicted for 2000 to 2030 (WSDOT 2015). Higher traffic volumes accompany increased human population. While the human population within Washington and within the North Cascades elk herd area has increased (Figure 4), so has the size and distribution of the elk population. An increase in vehicle traffic can result in a rise in elk-vehicle collisions (Gagnon et al. 2006).

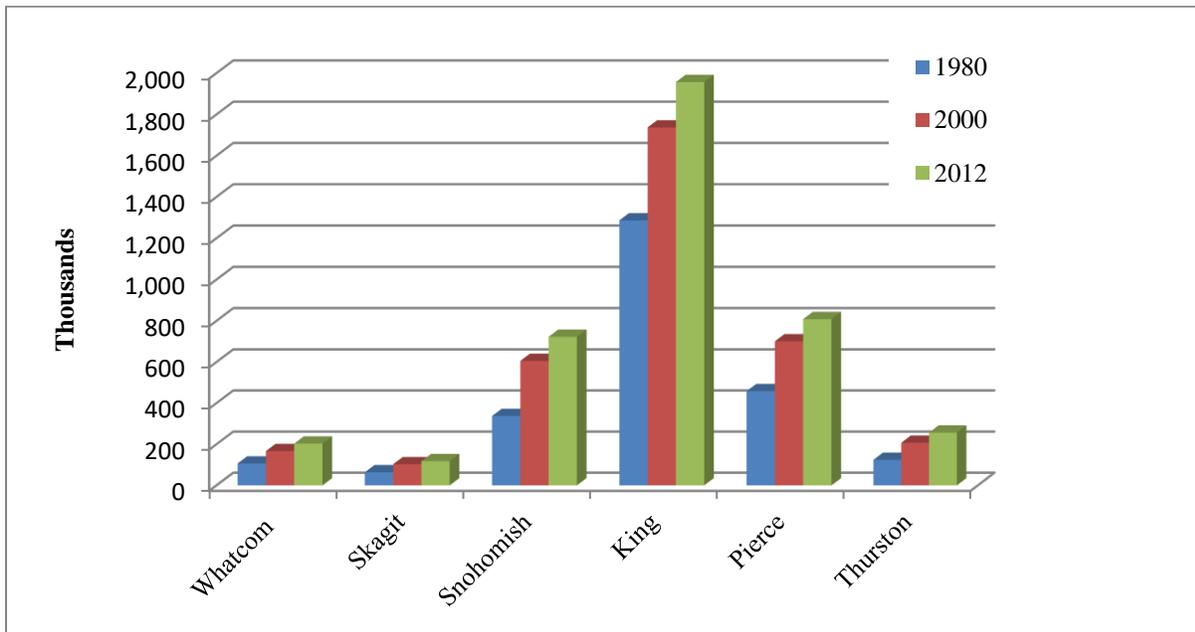


Figure 4. Comparison of human population for five counties in the Puget Sound, 1980-2012 (WSDOT 2015).

## Predation

Predators that occur throughout the North Cascades elk herd area that are known to prey on elk include cougar (*Puma concolor*), black bear (*Ursus americanus*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), and gray wolf (*Canis lupus*). In recent years, WDFW has confirmed the presence of gray wolves within the range of some Washington elk herds. In rural counties, domestic dogs can also be a source of predation.

### *Cougar*

Cougar are capable of preying on both juvenile and adult elk. WDFW and the Tribes have documented cougar mortality in elk. The statewide cougar management goal is to maintain healthy, self-sustaining cougar populations while minimizing the number of negative human-cougar interactions and providing recreational hunting opportunities.

WDFW manages recreational harvest opportunity at a 12-16% annual harvest rate of the cougar population, excluding kittens in each Population Monitoring Unit (PMU) (WDFW 2014). The general season hunt lasts from September through March, with a bag limit of one cougar per year; WDFW prohibits the use of hounds except during public safety cougar removals. For the North Cascades units, the guideline for the female harvest quota is seven. Between 2012 and 2014, the average annual harvest rate for females was one, well within the quota.

### *Black Bear*

The black bear population in the North Cascades elk herd area appears to be stable and abundant. Black bear predation on elk is likely limited to calves during the first few weeks of life.

The Game Management Plan 2015-2021 (WDFW 2014) specifies black bear harvest guidelines. Currently, the black bear hunting season guidelines are designed to maintain black bear populations at their current level, which is not expected to result in increased impacts to the North Cascades elk herd.

### ***Bobcat***

Bobcats are distributed throughout the North Cascades elk herd area. Although not typically thought of as an elk predator, bobcats are capable of preying on young calves.

The bobcat hunting season runs from 1 September to 15 March, and trapping season extends from 1 November to 31 March. A small game license is required to hunt bobcat. WDFW assesses the bobcat harvest via trapper catch reports and during pelt sealing required by the Convention in International Trade of Endangered Species (CITES). Reported bobcat harvest has declined since 2000 when Voter Initiative 713 made trapping more restrictive.

### ***Coyote***

Coyotes occur throughout the North Cascades elk herd area. They rarely cause adult elk mortality, and coyote predation is mostly limited to calves that are only a few weeks old.

There are currently no closed seasons or bag limits for coyotes in Washington, however hunters must possess either a small or big game license to hunt them. Coyote harvest is often opportunistic and ancillary to other hunting activities. Hunters that specifically target coyotes are most active during winter months, but those numbers are likely small. Additionally, coyote hunters tend to favor open areas with long-range visibility, which is not common in the North Cascades elk herd area. WDFW assesses coyote harvest via the small game harvest survey and trapper catch reports. Reported coyote harvest has declined since 2000 when voter Initiative 713 made trapping more restrictive.

### ***Gray Wolf***

The primary prey species of gray wolves in the North Cascades elk herd area are elk and deer. Secondary prey would include rabbits, rodents, and birds.

Populations of gray wolves in adjacent states and British Columbia have expanded their range into Washington, establishing packs in several areas. Since the early 1990s WDFW has documented the presence of wolves in the upper Skagit River system near the U.S./Canada border, but without evidence of an active den site.

Currently, there are no confirmed or suspected gray wolf packs (WDFW et al. 2017) in western Washington. In western Washington gray wolves are currently listed as endangered under the federal Endangered Species Act and remain listed by Washington as an endangered species throughout the state. The U.S. Fish and Wildlife Service is the lead management authority over wolves where they remain federally listed in the state.

## **Other Related Species**

Black-tailed deer (*Odocoileus hemionus columbianus*) are found throughout most of the North Cascades elk herd area. While formal surveys for black-tailed deer are not conducted in this area, they are observed infrequently during aerial composition surveys for elk during spring. Although elk occupy the same habitat in some areas, no work has been done to determine the level of overlap and whether there is potential for competitive exclusion.

## **Disease**

Since 2008, reports of elk with deformed, broken, or missing hooves have increased dramatically in southwest Washington, with sporadic observations in other areas west of the Cascade Range, including within the North Cascades elk herd area. While elk are susceptible to many conditions that result in

limping or hoof deformities, the prevalence and severity of this new affliction – now known as treponeme-associated hoof disease (TAHD) – suggested something altogether different. Diagnostic research conducted by the Washington Department of Fish and Wildlife (WDFW) in conjunction with a panel of scientific advisors found that these hoof abnormalities were strongly associated with treponeme bacteria, known to cause a hoof disease of cattle, sheep, and goats called digital dermatitis. Although digital dermatitis has affected the livestock industry for decades, TAHD is the first known instance of digital dermatitis in a wild ungulate. The disease is currently concentrated in southwestern Washington where prevalence is highest in Cowlitz, Wahkiakum and western Lewis County. The disease is also present at lower prevalence in elk herds that are distant and discrete from the core area, and WDFW confirmed TAHD in the North Cascades elk herd in 2015. WDFW is working with scientists, veterinarians, outdoor organizations, tribal governments and others to better understand and manage TAHD. For more information about TAHD, see WDFW’s website at [https://wdfw.wa.gov/conservation/health/hoof\\_disease/](https://wdfw.wa.gov/conservation/health/hoof_disease/).

## HERD DISTRIBUTION

### Historical Information

WDFW considers the North Cascades elk herd a mixture of the Rocky Mountain subspecies (*C. e. nelsoni*) and Roosevelt elk genomes. The first attempt at reintroducing elk into the area occurred in 1912 when Skagit County released 46 elk from Yellowstone National Park into the central Skagit River drainage near Birdsvew (Table 2). Reportedly, poachers later eliminated these animals. In 1946, WDFW released 15 elk, which increased in number and began to move throughout the drainages of the Middle Fork Nooksack River, South Fork Nooksack River and the north Skagit River. In 1948, WDFW released eight additional elk from the Yakima herd into the same general area (Adkins 1978). Five successful augmentations by WDFW and the Tribes (2003-2005) added an additional 98 animals to the North Cascades herd. All adult animals from these recent releases were radio-collared and monitored to assess survival and distribution.

Table 2. History of elk releases in the North Cascades elk herd area.

Date	Release site	Elk	Origin	Results	By
1912	Birdsvew, Skagit County	46	Gardiner, Montana (Yellowstone National Park)	Failed after 10 years	Skagit County
1946	S. Fork Nooksack River	15	9 from King County (6 believed to be Roosevelt elk from the Olympic Peninsula)/6 from Yakima County	Successful	Washington Game Department
1948	S. Fork Nooksack River	8	Yakima County	Successful	Washington Game Department
Oct. 2003	S. Fork Nooksack River	43	Mt. St. Helens	Successful	WDFW and the Tribes
Sept. 2004	S. Fork Nooksack River	4	Mt. St. Helens	Successful	The Tribes
March 2005	S. Fork Nooksack River	10	Mt. St. Helens	Successful	The Tribes

Date	Release site	Elk	Origin	Results	By
Sept. 2005	S. Fork Nooksack River	2	Mt. St. Helens	Successful	The Tribes
Oct. 2005	S. Fork Nooksack River	39	Mt. St. Helens	Successful	WDFW and the Tribes

## Current Distribution

The North Cascades elk herd predominantly occupies forested landscapes. Most of the elk are found in the South Fork of the Nooksack River on either side of the Skagit-Whatcom County line and the middle Skagit River Valley between Sedro Woolley and Marblemount. Historically, WDFW has referred to this as the “core area” because it has the highest elk density. It is predominantly within GMU 418 (Figure 1), but includes the northern portion of GMU 437 associated with the Skagit River floodplain. The lower elevation forest-agriculture interface tends to be fragmented elk habitat. It is here that elk groups regularly utilize agricultural and rural residential areas.

Elk fitted with radio collars (some of which have a GPS feature) have contributed to the current understanding of elk movements in the North Cascades herd area. While not comprehensive, these data revealed that most of the marked elk did not undertake long-distance migrations. Rather, with few exceptions, they tended to maintain relatively small home ranges, which were generally closely associated with river/riparian habitats throughout the year. However, some did show seasonal migratory patterns, exploiting higher elevation habitats during the snow free summer months, and lower elevations during the winter. The upper elevation limit of their distribution, about 600 m (2,000 feet), corresponds with the lowest elevation of the snow pack during years with normal winter conditions. In most years, this constriction of habitat by the snowpack typically occurs November to April. The majority of all elk observed during annual population surveys (essentially winter conditions) are below 300 meters (1,000 feet). Alternatively, during the summer months, elk venture to higher elevation habitats including creek drainages and headwaters within the Baker River watershed and on the south and west facing slopes of Mount Baker.

Elk regularly cross State Route 20, which is the boundary between GMU 418 and 437. This occurs more frequently during winter when food availability is limited in higher elevation habitats. In addition, elk regularly traverse between the Skagit and Nooksack watersheds via Lyman Pass and other locations north of Hamilton and Birdview. On the south side of the Skagit River, elk are increasingly common along the main river valley, but also occasionally observed in tributaries such as Finney and Pressentin creeks.

Elk enter the Baker River watershed from the Nooksack Watershed via Wanlick, Bell, and Bear creeks, and other drainages and passes in this area. Within the Baker River watershed, WDFW has observed elk within most of the tributary basins that drain into Baker Lake. Radio-collared elk have been routinely located near Concrete during winter months, but found 10-15 miles north in the Baker River watershed during summer months.

While the distribution of elk has expanded west over the past decade to the Helmick and Fruitdale Road areas, elk are rarely seen west of Sedro Woolley. Elk are more common along the lower floodplain of the South Fork Nooksack east of the town of Acme, both north and south of Mosquito Lake Road. The elk population in this area has more than doubled over the past 10 years.

Except for a small portion of GMU 437 north of the Skagit River, comprehensive elk surveys are not conducted in GMUs 437, 448, or 450. However, observations and data from state and Tribal biologists and other individuals provide some anecdotal information regarding elk distribution within these areas.

Within GMU 437, WDFW personnel regularly observe elk both north and south of the South Skagit Highway, between Day Creek and Rockport and within a handful of tributary drainages that confluence with the Skagit River from the south. Some of these elk have been observed during spring surveys north of the river, and consequently may have contributed to the annual population estimate, but the proportion is unknown. In addition, within GMU 437 elk are frequently observed at several locations between Concrete and State Route 530 and upstream of Marblemount. Finally, there have been reports of small bands of elk along the Sauk River Valley crossing the boundary between GMUs 437 and 448 near Darrington. WDFW has not documented elk within GMU 450 in recent time, and historically they have utilized this unit little, if at all.

## Proposed Distribution

The proposed distribution is the current distribution, for the life of this plan. As the herd continues to grow in numbers, WDFW expects elk to fill vacant habitat within the current distribution. This may include portions of GMUs 407, 437, 448, and 450.

## HERD MANAGEMENT

### History

WDFW believes that the North Cascades elk herd declined from a high of 1,400-2,000 elk in 1984 to only a few hundred by the late 1990s (M. Davison, WDFW, unpublished data). However, biologists did not generate population estimates using formal sampling protocols so the true rate of decline is unknown. Nonetheless, this decline was readily apparent, which prompted WDFW, the Tribes, and other cooperators to implement several strategies in the 1990s and early 2000s in an effort to promote growth and expansion of the North Cascades elk herd. These strategies included restricting vehicle access, implementing a harvest moratorium (1997-2006), and augmenting the population with 98 elk from MSH (2003-2005). These actions have reversed the decline and the surveyed population has grown to an estimated 1,170 to 1,375 elk. Recent observations suggest the elk population is expanding out into peripheral portions of their historic range.

### Population Modeling

WDFW began a research study in the fall of 2005 to explore approaches to population monitoring and generate a rigorous population assessment for the North Cascades elk herd (McCorquodale et al. 2011). The four-year effort had three primary goals: 1) to explore the development of an elk sightability model, 2) to compare a mark-resight technique to a sightability modeling technique as alternative approaches for monitoring the North Cascades elk herd, and 3) to estimate the size and composition of the current North Cascades elk herd. The effort found that a mark-resight survey approach was appropriate to population modeling in the North Cascades elk herd area (McCorquodale et al. 2013). Translocated elk from MSH still carrying collars and elk radio-collared in past research on the resident herd facilitated this effort.

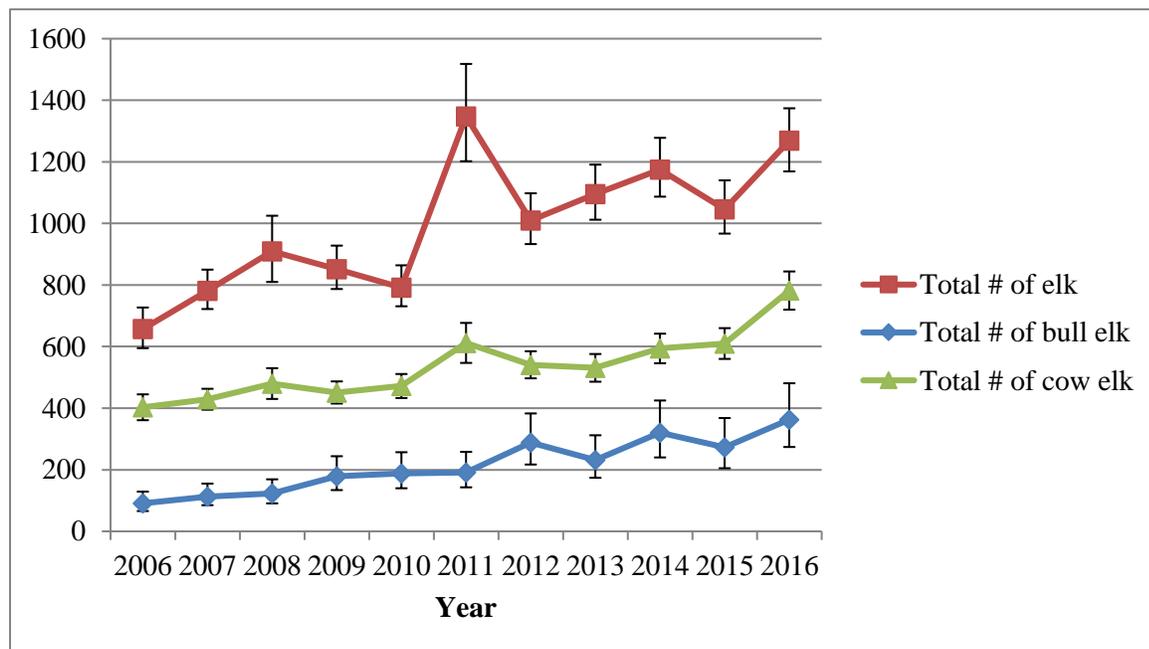
### Estimated Population Size

Surveys conducted in spring 2016 using mark-resight methodologies estimated there were 1,269 (95% C.I. = 1,170-1,379) elk within the portions of GMUs 418 and 437 surveyed (Figures 1 and 5). Figure 1 shows the approximate area covered by the surveys. These surveys were a joint effort by WDFW and the Tribes. Mark-resight estimates of the cow and bull subpopulations (Figure 5) in spring 2016 were 778 (95% CI = 717-845) cows and 363 (95% C.I. = 274-481) bulls. These surveys underestimate the number of calves in the surveyed population.

From 2006 to 2016, estimates of population size within the survey areas in GMUs 418 and 437 indicate that the North Cascades elk herd has increased, at a rate of 5-7%, annually. Additionally, biologists' observations and other anecdotal information suggest that an additional 200-400 elk occur elsewhere in GMU 437, primarily south of the Skagit River between Sedro Woolley and Marblemount, and at least 100 more within the Sauk River Valley south of Rockport.

## Herd Composition

WDFW typically conducts pre-season (August-September) or post-season (March-April) aerial composition surveys to assess herd composition and status. Pre-season surveys are used to index herd productivity (calf:cow ratios), herd sex ratios (bull:cow ratios), and age structure of the bull subpopulation prior to hunting seasons; while post-season surveys index calf recruitment and bull escapement subsequent to harvest. The management guidelines in the Game Management Plan direct WDFW to maintain a range of 15-35 bulls:100 cows in the pre-season population and 12-20 bulls:100 cows in the post-season population (WDFW 2014).



**Figure 5. Mark-resight estimates of total elk, cow elk, and bull elk population size in GMU 418 (Nooksack) and the northern portion of GMU 437 north of the Skagit River between Lyman and Concrete, 2006 – 2016.**

WDFW conducted pre-season surveys in the North Cascades elk herd area during most years from 1984 to 2003, and on average would classify 167 elk (Appendix A). Resulting bull:cow ratios averaged 33:100, but were highly variable ranging from 15 to 78 bulls:100 cows. Age ratios were much more stable and averaged 49 calves:100 cows. WDFW also conducted post-season surveys during this same period, but less consistently (Appendix B). Post-season bull:cow ratios during this period were highly variable and ranged from 13 to 61 bulls:100 cows. Variations in sex ratios were likely due to small sample sizes rather than actual changes in the cow and bull subpopulations.

Since implementing a standardized mark-resight survey protocol in 2006, calf:cow ratios have ranged from 26-47 calves:100 cows and bull:cow ratios have steadily increased to  $\geq 50:100$ , which are well above the objective of 12-20 bulls:100 cows. Spring calf:cow ratios  $\geq 35:100$  generally represent good recruitment and excellent recruitment occurs when ratios are  $\geq 40:100$ .

## Management Activities

### Harvest Implementation

The three-year hunting package serves as WDFW's basic harvest plan. Major changes to guidelines and season structures are generally set on a three-year cycle with minor adjustments made during the off years. WDFW establishes hunting seasons guided by goals, objectives, and strategies contained in the Game Management Plan (WDFW 2014). The process for developing a three-year hunting season package is an expanded version of the annual season-setting process; WDFW can make permit level adjustments annually to respond to population changes and other factors. All members of the public have the opportunity to provide input through the review and adoption process. For the North Cascades elk herd, a technical team made up of WDFW and Tribal biologists develop specific harvest recommendations each spring using data from aerial surveys. A policy group meets at least annually to coordinate harvest management and other elk management activities. Decisions of this group reflect the annual hunting co-management agreement between WDFW and the Tribes.

### Harvest Restrictions

Managing elk populations for a sustainable annual harvest is one of three goals defined in the Game Management Plan (WDFW 2014). A key component of this herd plan is to provide harvest opportunities for state and Tribal hunters within the North Cascades elk herd area into the future.

In the past, WDFW managed hunting in the North Cascades elk herd using a variety of hunting season restrictions (Appendix C). Season formats have included any elk, any bull elk, a 3-point minimum antler restriction, and permit only. WDFW designed all hunting seasons to limit or prevent this elk herd from expanding into areas south of the Skagit River where the potential for elk/human conflict is high. This has led to various changes to GMU boundaries over time (Appendix D).

Currently, WDFW and the Tribes have closed GMUs 418 and 437 to general season hunting, although some Tribes continue to allow subsistence and ceremonial harvest. WDFW originally put this closure into effect in 1997, following severe population declines. The geographic area of the closure started out as GMU 417 (Bald Mt.) created from a portion of GMU 418. Since then several modifications have followed, and now the general season closure includes all of GMUs 418 and 437. Within the closure area, antlerless elk harvest does occur through agricultural damage-related kill permits issued by WDFW, especially in the lowlands along the Skagit River Valley, the Acme-Saxon area, and the northern portion of GMU 448 near Darrington.

Currently, the season restrictions in GMU 418 limit elk harvest to bull elk, and limit hunter numbers through a permit-only system. There is no recreational or Tribal subsistence or ceremonial cow harvest in GMU 418. WDFW and the Tribes expect that as the population increases harvest opportunity will increase.

The bull harvest will continue to be conservative for this elk herd due to the vulnerability of the small herd to over harvest. Maintaining branch-antlered bull survival above 60% would be desirable, but monitoring this would require the presence of radio-collared bulls. In the absence of direct measures of survival, WDFW and the Tribes will incorporate any available survey data and population modeling into bull harvest planning, with age data from harvested bulls serving as confirmation. Currently bull:cow

ratios and branch-antlered bull proportions are exceeding the guidelines listed for elk in the Game Management Plan (WDFW 2014).

## Recreational Harvest

Historically WDFW managed the North Cascades elk herd with a variety of recreational hunting regulations and seasons (WDFW 2002). More recently, but prior to the conservation closure that WDFW implemented in 1997, WDFW regulated the general season bull harvest in GMU 418 under a 3-point antler restriction. From 1980 to 1996, the mean annual antlered bull harvest by licensed hunters across the North Cascades elk herd GMUs was 42 bulls (WDFW 2002). During the same period, the mean antlerless elk harvest was 23 cows. Since 1990, antlerless elk general season harvest opportunity has been limited throughout the North Cascades elk herd area. No general season hunting for antlerless elk has occurred in GMU 418 since 1991.

During 1997-2006, the North Cascades elk herd area was under a conservation closure for state-licensed elk hunters. Most Tribes also implemented a conservation closure during this time, but some limited ceremonial hunting may have occurred during the closure. By spring 2006, survey data and population modeling suggested that the North Cascades elk herd had increased sufficiently to meet previously defined criteria necessary for reinstating bull harvest (WDFW 2002). In 2007, WDFW and the Tribes agreed to reinstate limited permit-controlled bull elk hunting in GMU 418. In 2007 and 2008, state and Tribal elk hunters equally shared 30 bull elk permits allocated each year. In the fall of 2009, WDFW and the Tribes increased total permit allocation to 40 permits, shared equally between state-licensed and Tribal hunters, half of the permits for each group were designated as spike-only permits in 2009. This approach and the total permit allocation remained the same for the 2010 and 2011 hunting seasons. In 2012, the permits then increased to 50 to be shared equally. In 2015 the permits increased to 100 shared equally. The State permits were distributed between GMU 418 and Elk Area 4941, with 22 in GMU 418, and 28 in Elk Area 4941. Since 1997, GMU 437 has been closed to state hunters.

## Poaching

Like other ungulate populations in Washington State, poaching has occurred in the North Cascades elk herd area. Poaching has been observed both during and outside of open hunting seasons. Elsewhere in Washington, the proportion of elk mortalities attributed to poaching harvest ranged from 5.1 to 15% (Smith et al. 1994, Myers 1999, McCorquodale et al. 2011). Poaching rates in the North Cascades elk herd area may be similar.

# **SOCIAL AND ECONOMIC VALUES**

## Elk Hunting

The number of hunters hunting in the North Cascades elk herd area declined precipitously from a high of over 3,000 in 1986 to less than a hundred in 2003-2004 (Table 3) as general season opportunities decreased and WDFW eliminated all non-damage related hunting opportunities.

Revenue generated by elk hunters provides significant economic benefits to Washington State. Myers (1999) estimated the value of an elk to the state and local economy was as high as \$1,945 per harvested elk in the Blue Mountains. The *2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation* reported that annual trip and equipment expenditures for big game hunting in Washington averaged \$973 per hunter (U.S. Department of Interior et al. 2014). With the drop in hunter numbers (Table 3), it is clear that the economic contribution of elk hunting in the North Cascades elk herd area is now less than it once was. The mean number of hunters for the years 2005 to 2014 was only 166 hunters.

## Elk Related Agricultural Conflicts

Preventing and mitigating elk damage on private lands has been an ongoing management challenge in Washington. Problems associated with elk include damage to tree farms and conifer plantations, hay, alfalfa fields, orchards, vineyards, potatoes, and other agricultural crops. When frightened, elk may damage wire fences by running through them. WDFW is the primary source for property owners seeking to determine legal and effective remedies for addressing wildlife interactions (WDFW 2016). From 2002 to 2014, 17 elk damage claims were filed in GMUs 407, 418, 437, 448, and 450 (Table 4). WDFW paid a total of \$78,555 to landowners for damage claims. WDFW has used many control alternatives designed to mitigate elk/human conflicts. Elk managers often prefer non-lethal methods because they maintain elk numbers and recreational hunting opportunity, but when non-lethal methods fail, lethal methods are used to target specific elk groups.

Table 3. North Cascades elk herd annual Tribal, state recreational and damage harvest, 2001–2015. These data are derived from reports from GMUs 407,418,437,448, and 450.

Year	Total kill	State Hunters					Tribal Hunters		
		Antlered Elk	Antlerless Elk	Total Kill	Total Hunters	Total Days	Antlered Elk	Antlerless Elk	Total Kill (unk sex)
2001	14	2	4	6	155	1,038	7	1	8
2002	4	2	1	3	119	649	1	0	1
2003	6	1	0	1	40	1,590	3	2	5
2004	18	6	3	9	85	362	8	1	9
2005	15	6	2	8	102	488	5	2	7
2006	19	2	5	7	121	737	10	2	12
2007	53	24	3	27	127	714	20	6	26
2008	74	34	17	51	204	1,619	20	3	23
2009	64	29	14	43	229	1,631	18	3	21
2010	36	18	1	19	94	419	16	1	17
2011	68	15	24	39	102	486	24	5	29
2012	117	25	57	82	134	666	29	6	35
2013	220	34	132	166	273	1,478	40	14	54
2014	99	34	23	57	271	1,640	30	12	42
2015	147	57	15	72	322	1,496	66	9	75
Total	954	289	301	590	2,378	15,013	297	67	364
Avg.	34	19	20	39	159	1,001	20	4	24

Elk/human conflict within agricultural areas of the North Cascades elk herd area has increased since 2006. Agricultural damage here mostly involves foraging and trampling of commercial agricultural and horticultural crops (Table 4). In residential areas, elk cause damage to gardens and landscaping, pastures, and fencing. Chronic elk damage in the North Cascades elk herd area is concentrated in the Acme-Saxon area in the Nooksack River Valley and along the lower Skagit River Valley from Bacus Hill to the town of Marblemount. In the Acme-Saxon area more than 100 elk are causing damage on agricultural lands.

However, the situation in the lower Skagit River Valley area is more complex. Elk/human conflicts occur over a larger geographic area and include multiple groups of elk that regularly move across State Route

20 between Sedro Woolley and Marblemount. A wide variety of agricultural and horticultural crops and infrastructure are involved including commercial apple orchards, vineyards, pasture, hay crops, green chop, feed corn, silage, blueberries, tree farms, and damage to fencing. The damage to fencing occasionally results in escaped livestock and resulting damage to neighboring properties and increased liability to livestock owners. Landowners in residential areas also routinely report elk caused damage to lawns, gardens, and associated landscaping. These conflicts are likely to increase as forestland conversion leads to residential and commercial development throughout the lower Skagit River Valley.

In 1999, WDFW created Elk Area 941 to address elk damage issues on private property in the Skagit River Valley south of State Route 20. State licensed hunters in the elk area were limited to primitive weapons (muzzleloader and archery), but the season was liberal (generally from Oct 1- Jan 31). This elk area and the associated primitive weapon seasons provided extended hunting pressure with limited harvest, to discourage elk from using these lands.

Table 4. Elk-related agricultural damage claims and payments from 2002-2016 in GMUs 407, 418, 437, and 448.

Year	County	GMU	Location	Crop	Claims	Payment
2002	Skagit			Pasture grass	\$5,000	\$486
2003	Whatcom			Organic berries	\$2,500	\$2,500
2004	Skagit			Apples, pears, garlic	\$12,454	\$10,000
2005	Skagit			Fruit trees, garlic	\$4,560	\$4,560
	Skagit			Pasture grass	\$1,220	\$1,100
2006	Whatcom			Strawberries	\$1,830	\$1,830
	Skagit			Pasture grass	\$1,575	\$1,219
2007	Skagit	418	T35N R07E S11	Hay	\$7,305	\$3,492
2008	Skagit	418	T35N R07E S11	Hay	\$4,700	\$4,680
2009	Skagit	437	T35N R05E S15	Clover and pasture grass	\$2,660	\$525
2010	Skagit	418	T35N R07E S11	Hay	\$5,690	\$5,690
	Skagit	448	T33N,R10W, Sec.33	Corn silage	\$2,278	\$1,678
2011				No claims paid*	\$0	\$0
2012				No claims paid*	\$0	\$0
2013	Skagit	418	T35N, R06E, SEC 19	Potatoes	\$15,706	\$15,706
2014	Skagit	437	T35N, R05E, SEC 16	Potatoes	\$13,946	\$13,946
2015				No claims completed	\$0	\$0
2016				No claims completed	\$0	\$0
Total					\$81,424	\$67,412
Mean Claim					\$5,816	\$4,815
Annual Average					\$5,428	\$4,494

\* The Washington legislature suspended elk agricultural damage payments in 2011 and 2012

In 2003, Elk Area 941 was renamed Elk Area 4941 (Figure 1) with boundary changes that extended the eastern boundary further east on the north side of the Skagit River (Appendix C, D). In Elk Area 4941 in 2003 general hunting seasons were implemented for both archery and muzzleloader hunters; in 2009, a permit only hunt for muzzleloaders was added, as well as some master hunter permits. Archery remained as it was. For the 2010-2014 seasons, this area was limited entirely to master hunter antlerless only permits. In 2015 and 2016, Elk Area 4941 became limited entry permits for master hunters, youth, hunters with disabilities, and seniors.

## Public Safety

The primary elk related public safety issue in the North Cascades elk herd area is the growing number of elk-vehicle collisions along State Route 20 between Sedro Woolley and Concrete. Elk-vehicle collision data are not precise, however available road kill mortality reports suggest that the average number of elk-vehicle collisions more than doubled between the periods 2001-2006 and 2007-2011. Currently, the annual number of elk-vehicle collisions is likely in the range of 20-30 (WDFW unpublished data). This presents an important public safety issue to motorists and requires attention. In addition, landowners have expressed concern about vehicle collisions with livestock when they escape from elk-damaged fencing, suggesting that elk damaged fences could result in loss of property and a substantial threat to motorists.

## Tribal Values

Elk have been an intrinsic part of Tribal culture for thousands of years and have helped Northwest Indian people survive throughout the centuries by providing a continual source of meat and marrow for sustenance and vitamins. The Tribes use elk for religious purposes, clothing, and drum making. To this day, elk remain an integral part of traditional ceremonies and are essential for maintaining Tribal culture. Elk hunting meets many ceremonial and subsistence needs. The Tribes have a treaty right to hunt and gather, and practicing this right preserves Tribal culture by protecting and upholding traditions that have been passed down through generations.

The Tribes have a treaty right to manage their own natural and cultural resources within their ceded area. Therefore, the Tribes are actively involved in wildlife monitoring, conservation, and harvest management activities along with WDFW.

## Other Recreational Uses

Outdoor recreation, such as day hiking, backpacking, birding, and viewing and photographing elk, has become an important pastime for people in Washington. Hiking is one of the most popular outdoor activities in the United States (Outdoor Foundation 2013). While exercise is often given as the primary motivation for participating in outdoor activities, enjoying nature is close behind. A 2013 survey estimated that in the previous year 36.4% of all Washington residents over the age of 18 participated in hiking mountain and forest trails (Washington State Recreation and Conservation Office, 2013). Twenty-nine percent of the participants who reported hiking spent time in a National Forest and 13% spent time in a State Forest. The survey also reported that 8% of the state's residents rode bicycles on mountain and forest trails, 2.7% rode horses and 1.8% rode motorcycles.

For many enjoying nature includes watching wildlife, and the 2013 survey estimated that 40% of Washington residents participated in viewing/photographing animals in the previous year (Washington State Recreation and Conservation Office, 2013). While sightings of large animals like elk are especially valued and even sought after, public viewing opportunities of elk in the North Cascades elk herd area are rather limited. The public often see elk along State Route 20 and State Route 9, most often in agricultural fields. A newly established public viewing area at Hurn Field adjacent to State Route 20 near Concrete currently affords quality opportunities to view and photograph elk. Other opportunities to create public

viewing sites do exist but will require cooperative agreements and site development with private timber companies, DNR, USFS and other land managers.

## **HABITAT MANAGEMENT**

Human activities have affected the North Cascades elk herd in many ways. While the herd has rebounded from population declines experienced in the 1980s and 1990s, ongoing land management practices continue to influence the distribution and size of the North Cascades elk herd. The combined cooperative efforts of the public and private land managers will be necessary to develop suitable elk habitat in a spatial and temporal manner that supports plan objectives.

### **Limitations and Losses**

Overharvest of mature timber in GMU 418 was of great concern in the late 1990s and early 2000s. While protection of old growth is an important element of good forest management, it is well known that forests managed for timber harvest provide habitat benefits for elk. Nutritional studies of elk throughout Washington and Oregon suggested that at the time of the studies the North Cascades elk herd was one of the healthiest, in terms of body size, fat content, pregnancy rates, and other indicators of fitness (Cook et al. 1998, Bender et al. 2007, Cook et al. 2013).

Within landscapes managed for timber production, elk benefit from timber harvest activities when new plantations with low canopy cover (e.g., 0-30 percent) allow early successional vegetation to become established (Cook et al. 1998). Many early successional plant species that occur in low canopy cover environments provide high quality forage during summer and autumn.

### **Enhancement and Improvement Projects**

Studies by Merrill (1991), Cole et al. (1997) and Cook et al. (1998) suggest that thermal cover is less important on winter ranges when disturbance is low and high-energy food is present. Many groups have attempted to mitigate the loss of critical winter range with a number of cooperative enhancement projects involving WDFW, the Tribes, RMEF, DNR, USFS, PSE, SCL, SLT and private timber companies (Table 5). Projects have included: 1) establishing habitat forage enhancement sites involving clearing, seeding, and fertilizing key areas; 2) roadside seeding and fertilization; and 3) vehicle access management.

Table 5. Habitat enhancement projects in the North Cascades elk herd area.

Year	Project	Cost	Acres	Cooperators
1994	Larsen Flat forage enhancement	\$31,718	11	WDFW, Crown Pacific, RMEF, Nielsen Bros. Timber Co.
1994	South Fork Nooksack River forage seeding, fertilization	\$15,101	10	WDFW, Crown Pacific, RMEF, Nielsen Bros. Timber Co.
1997	DNR Edfro Block (Yawl Unit)	NA <sup>®</sup>	1.1	Department of Natural Resources
1998	Bear Creek forage enhancement	\$3,800	45	Crown Pacific, RMEF.
1998	Skookum Creek II forage enhancement	\$2,170	25	RMEF and Campbell Group
1999	S. Fork Nooksack River plot grooming	\$800	11	RMEF and Crown Pacific
1999	Elk Meadows forage enhancement	\$2,900	15	RMEF and Crown Pacific
2003	DNR Edfro Block (Monkey's Fist)	NA	7.6	DNR
2004	DNR Edfro Block (Brigantine)	NA	2.8	DNR
2004	DNR Edfro Block (Slip Knot)	NA	5.4	DNR
2004	DNR Edfro Block (Windjammer)	NA	6.4	DNR
2005	DNR Edfro Block (Frigate Units 2 & 3)	NA	8.5	DNR
2005	DNR S. Cavanaugh Block (Quark Units 1 & 2)	NA	5.7	DNR
2007-08	Larsen's Bridge	\$10,000	6.0	Tulalip Tribes, Sierra Pacific
2008	DNR S. Cavanaugh Block (Red Star)		3.0	DNR
2009	Bear Creek	\$15,000	5.7	Tulalip Tribes, Stillaguamish Tribe, Sierra Pacific
2009-10	Upper Skagit Powerline	NA	11.6	Upper Skagit Tribe
2010	Larsen's Bridge	\$10,000	6	Tulalip Tribes, Stillaguamish Tribe, Sierra Pacific
2010	Johnson's Field	\$4,000	1.5	SCL, Sauk-Suiattle Tribe
2012	Alder Creek	NA	6	PSE
2014	Burpee Hill	NA	25	PSE
2014	Alder Creek	NA	4	PSE
2014	Sauk-Suiattle Reservation	\$5,000	10.5	
2015	Burpee Hill	NA	5	PSE
2015	Alder Creek	NA	5	PSE
2015	Salvage Slough	NA	50	SCL
2015	300 Road	NA	15	Upper Skagit
2016	Upper South Fork Nooksack	\$140,000	14	SCL, Upper Skagit Indian Tribe

<sup>®</sup> NA indicates the cost is not known to the author at this time.

## **HERD MANAGEMENT GOALS**

The management goals for the North Cascades elk herd are to:

1. Preserve, protect, perpetuate, and manage elk and their habitat to ensure sustainable populations
2. Manage elk for a variety of recreational, educational, and aesthetic purposes including hunting, scientific study, subsistence, cultural and ceremonial uses by Native Americans, wildlife viewing, and photography
3. Manage elk populations for a sustainable annual harvest
4. Minimize property damage and public safety risks associated with elk

## **MANAGEMENT OBJECTIVES AND STRATEGIES**

### **Population, Population Monitoring and Harvest Management**

#### **Background**

The North Cascades elk herd is nearing the population objective of 1,700 – 2,000 elk. This includes the elk sampled in the survey area (Figure 1) and other elk scattered throughout the herd area. There are limitations placed upon local population size by landowner tolerance and public safety; in particular, elk numbers are to be reduced in areas of known elk/human conflict.

Maintaining a healthy elk population requires adequate bull:cow ratios. Harvest monitoring and collection of biological samples associated with age and sex class identification are a part of our annual surveys. The Game Management Plan (WDFW 2014) currently recommends a post-hunt range of 12 to 20 bulls per 100 cows, or when survival is estimated, an overall bull mortality rate of less than or equal to 50%.

#### **Objective 1**

The population objective for the North Cascades elk herd is 1,700 – 2,000 elk. The population objective includes the elk within Skagit River Valley, the Acme Valley, and areas where WDFW's intent is to minimize elk-human conflicts and ensure public safety (see Objective 5).

#### **Strategies**

1. Promote population growth in areas where the potential for elk/human conflict is low, with special emphasis on state and federal lands
2. Maintain the recommended post-hunt bull:cow ratio in areas where the potential for elk/human conflict is low while still providing opportunities for state and Tribal hunters to harvest elk
3. Adjust harvest recommendations based upon results of Tribal and state survey and harvest data
4. Use survey data to evaluate population trends at a minimum three-year interval

#### **Background**

Due to high costs associated with aerial surveys, current surveys of the North Cascades elk herd are limited to areas where elk population densities are the highest. As a result, annual surveys have not included many geographical areas considered historical elk range in 1984 within GMU 418 (Middle Fork Nooksack River, North Fork Nooksack River) or other areas known to be currently occupied by elk (GMU 407 and 437). While the current survey effort provides perspective on herd size, gender and age composition, and other elements of population dynamics, it does not provide a comprehensive assessment of whether population objectives across the entire range of the elk herd are being met.

## Objective 2

By 2019, implement a monitoring strategy that will provide a sound basis for herd size estimation using acceptable, cost effective methodologies.

### Strategies

1. Work with the Tribal/State technical team to investigate survey methodologies or population estimation techniques that have been successful in similar habitats
2. Explore options that may provide supplemental funding that would allow continuation of the mark-resight methods currently used on the herd survey area

## Hunter Access

### Background

In forested landscapes throughout the managed range of the North Cascades elk herd, landowners have increasingly restricted vehicle access in the interest of protecting their property against theft, vandalism, and dumping. As a result, hunter access on private land has become increasingly limited.

## Objective 3

Increase the geographical area available for hunting on private lands by at least 100 square miles by 2021.

### Strategies

1. Work with private landowners to increase hunter access to land ownerships along and adjacent to the Skagit River throughout Elk Area 4941 and GMUs 407, 418, 448, 450
2. Increase hunting opportunities in the Skagit River Valley by establishing a minimum of five public access sites on privately owned lands by using the WDFW Private Lands Hunter Access Program

## Public Safety

### Background

Elk-vehicle collisions are a concern throughout Washington State where elk populations are in close proximity to major transportation corridors. Several factors including elk densities and movement patterns, posted speed limits, and vehicle sight distances are linked to elk-vehicle collisions. Within the North Cascades elk herd area elk-vehicle collisions mostly occur along the State Route 20 corridor between Sedro Woolley and Marblemount. While some efforts have been made along State Route 20, more can be done. Elk-vehicle collision data are far from precise; however, from available road kill mortality data it appears that the number of elk-vehicle collisions is on an upward trajectory. These data suggest that the average number of elk-vehicle collisions more than doubled between the periods 2001-2006 and 2007-2016. Currently the annual number of elk-vehicle collisions is likely in the range of 20-30.

## Objective 4

Minimize public safety risk by reducing the average annual number of elk-vehicle collisions along the State Route 20 corridor between Sedro Woolley and Marblemount by 50% over the next five years.

## Strategies

1. Coordinate with WSDOT, Washington State Patrol, the Tribes, Skagit County Sheriff's Department and others to develop a comprehensive database of elk-vehicle collisions throughout the North Cascades elk herd area and identify areas where elk cross frequently, have minimal sight distances, and high collision potential
2. Use an elk-vehicle collision database, GPS collar data, and other information (Strategy 1, above) to implement increased signage, reduced speed limits, installation of warning lights, and other transportation safety techniques in chronic problem areas
3. Use an elk-vehicle collision database, GPS collar data, and other information (Strategy 1, above) to evaluate whether fencing projects could be implemented to funnel elk into discrete crossing areas with long sight distances
4. Increase public awareness of potential elk/vehicle collisions via periodic news releases, automated radio warning system, and public service announcements (local radio and newspapers)
5. Work with WSDOT to explore long term planning regarding SR 20 that would include wildlife crossings and fencing
6. Limit elk numbers in the Skagit River Valley, Acme Valley, and areas that experience chronic elk-vehicle collisions by applying consistent hunting pressure on identified private properties from July 1st to March 31st

## Elk/Human Conflicts

### Background

As the North Cascades elk herd has increased, elk distribution has expanded into agricultural areas in the valleys where elk/human conflicts have arisen. In particular, in the Skagit River Valley and the Acme Valley areas complaints have increased to 49 and 65 in 2015 and 2016, respectively. At this time, complaints are defined as an event that would lead to a site-visit by a Conflict Specialist. As part of completing the objective below, the program will decide upon a final definition of complaint. WDFW is the primary source for property owners seeking to determine legal and effective remedies for addressing wildlife interactions (WDFW 2016). By reducing the number of complaints that come to WDFW, the number of claims will be kept to a minimum. The low number of claims indicates that the Department successfully resolves many conflicts without a formal landowner complaint. It may also indicate that many landowners experiencing damage from elk simply do not file claims. Since 2013, WDFW has had staff stationed in the Skagit/Acme areas entirely dedicated to addressing wildlife/human conflict complaints. WDFW takes its role in resolving elk/human conflicts seriously and recognizes that Washington State law (RCW 77.04.012) states that nothing in the mandate of the department and the commission shall be construed to infringe on the right of a private property owner to control the owner's private property.

### Objective 5

While attempting to achieve the population objective, reduce the number of elk-caused damage complaints on private lands in the North Cascades elk herd area over the next five years.

## Strategies

1. Develop a program to track the number of elk/human conflict complaints requiring WDFW response
2. Limit elk numbers in the Skagit River Valley, Acme Valley, and areas that experience chronic elk/human conflicts by applying consistent hunting pressure on identified private properties from July 1st to March 31st
3. Continue to use non-lethal preventative measures (e.g., hazing, fencing, etc.) to mitigate elk/human conflicts
4. Continue to use cooperative agreements between landowners and WDFW (e.g., Damage Prevention Cooperative Agreements, fencing agreements, etc.) to promote resolution of elk/human conflicts
5. Continue to inform landowners of useful tools and techniques to minimize potential elk/human conflicts
6. Continue to implement master hunter or other special permit hunts when appropriate and encourage private land hunting access to provide added hunting pressure and opportunity
7. The Tribes and WDFW will develop a formal survey protocol to accurately monitor elk numbers in areas experiencing chronic elk/human conflicts
8. Continue to work with the Tribes on elk damage mitigation efforts
9. Include county governments in discussion of problems and solutions associated with elk damage and conflict
10. Work with public land management agencies to develop habitat enhancement projects to attract and hold elk away from private agricultural lands
11. Discuss with local colleges options for designing a public survey for landowners in the Skagit and Acme Valley related to elk damage

## Intergovernmental Coordination

### Background

WDFW acknowledges the right of the Tribes to hunt on open and unclaimed lands within their ceded areas (Appendix E), which includes nearly the entire North Cascades elk herd area. WDFW recognizes the hunting co-management agreement and adjusts state harvest target levels to account for Tribal harvest.

### Objective 6

Annually cooperate and collaborate with the Tribes to implement the North Cascades Elk Herd Plan and to coordinate harvest management in traditional hunting areas.

### Strategies

1. Collaborate with the Tribes to update an annual Elk Harvest Agreement
2. Include the Tribes in development, review, and implementation of elk management within the herd area. Identify areas of high, moderate, and low elk/human conflict risk so that staff can take educational and preventative efforts to minimize potential conflict
3. Provide opportunity for discussion of elk management at the North Cascades Technical Group meetings
4. Share harvest, monitoring and survey data, and promote joint enforcement efforts with the Tribes to achieve management objectives

## **SPENDING PRIORITIES**

*Continue Annual Late Winter Aerial Population Surveys - High Priority*

Time Line: Annually

Cost: \$15,000 Annually

*Increase Hunter Access and Opportunity on Public and Private Timberlands- Medium Priority*

Timeline: 2016

Cost: \$5,000 Annually (payments to secure private lands access)

## **HERD PLAN REVIEW AND AMENDMENT**

WDFW will update and amend the North Cascades Elk Herd Plan as necessary. The plan will remain in effect until revised. As new information is gathered and conditions change, it will be necessary to maintain a free exchange of communication among WDFW, cooperators, and the Tribes. Meetings with affected Tribes, the Northwest Indian Fisheries Commission and WDFW will occur when proposed changes in elk harvest or habitat management strategies deviate substantially from the objectives and strategies outlined in this document. The managers will address issues as needed, either at the technical or policy level through regular meetings.

## LITERATURE CITED

- Adkins, J. 1978. Letter in District Biologist files, Washington Department of Fish and Wildlife, Region 4. La Conner, WA.
- Bender, L.C., Cook, J.G., Cook, R.C., and Hall, P.B. 2007. Relations between nutritional condition and survival of North American elk (*Cervus elaphus*). *Wildlife Biology* 14:70-80.
- Cole, E. K., M. D. Pope, and R. G. Anthony. 1997. Effects of road management on the movement and survival of Roosevelt elk. *Journal of Wildlife Management* 61:1115-1126.
- Cook, R. C., J. G. Cook, D. J. Vales, B. K. Johnson, S. M. McCorquodale, L. A. Shipley, R. A. Riggs, L. L. Irwin, S. L. Murphie, B. L. Murphie, K. A. Schoenecker, F. Geyer, P. B. Hall, R. D. Spencer, D. A. Immell, D. H. Jackson, B. L. Tiller, P. J. Miller, and L. Schmitz. 2013. Regional and seasonal patterns of nutritional condition and reproduction in elk. *Wildlife Monographs* No. 184.
- Cook, J. G., L. L. Irwin, L. D. Bryant, R. A. Riggs, and J. W. Thomas. 1998. Relations of forest cover and condition of elk: a test of the thermal cover hypothesis in summer and winter. *Wildlife Monograph* 141:1-61.
- Cook, R. C., J. G. Cook, T. R. Stephenson, W. L. Myers, S. M. McCorquodale, D. J. Vales, L. L. Irwin, P. B. Hall, R. D. Spencer, S. L. Murphy, K. A. Schoenecker, P. J. Miller. 2010. Revisions of Rump Fat and Body Scoring Indices for Deer, Elk, and Moose. *Journal of Wildlife Management* 74:880-896.
- Franklin, J. F. and C. T. Dyrness. 1973. Natural vegetation of Oregon and Washington. United States Department of Agriculture, Forest Service, General Technical Report PNW-8.
- Gagnon, J.W., T.C. Theimer, N.L. Dodd, S. Boe, and R.E. Schweinsburg. 2006. Traffic volume alters elk distribution and highway crossings in Arizona. *Journal of Wildlife Management* 71:2318-2323.
- Merrill, E. 1991. Thermal constraints on use of cover types and activity time of elk. *Applied Animal Behavior* 29:251-267.
- McCorquodale, S. M., M. Davison, J. Bohannon, C. Danilson, and C. Madsen. 2011. A population assessment for the North Cascades Elk Herd: 2006-2011. Department of Fish and Wildlife, Olympia, Washington.
- McCorquodale, S.M., S.M. Knapp, M. A. Davison, J.S. Bohannon, C.D. Danilson, and W.C. Madsen. 2013. Mark-resight and sightability modeling of a western Washington elk population. *Journal of Wildlife Management* 77(2):359-371.
- Myers, W. L. 1999. An assessment of elk population trends and habitat use with special reference to agricultural damage zones in the northern Blue Mountains of Washington. Pittman-Robertson Project W-96-R, Washington Department of Fish and Wildlife, Spokane, Washington.
- Outdoor Foundation, 2013. Outdoor Participation Report 2013. The Outdoor Foundation 4909 Pearl East Circle, Suite 200 | Boulder, CO. 64pp
- Smith, J. L., W. A. Michaelis, K. Sloan, J. Musser, and D. J. Pierce. 1994. An analysis of elk poaching losses in Washington using biotelemetry. Federal Aid to Wildlife Restoration Project Report, Washington Department of Fish and Wildlife, Olympia, Washington.
- U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2014. 2011 National Survey of fishing, hunting, and wildlife-associated recreation: Washington. 161 pp.

- Washington Department of Fish and Wildlife. 2002. North Cascades (Nooksack) Elk Herd Plan. Wildlife Program, Washington Department of Fish and Wildlife, Olympia. 54 pp.
- Washington Department of Fish and Wildlife. 2014. 2015-2021 Game Management Plan. Wildlife Program, Washington Department of Fish and Wildlife, Olympia, Washington, USA.
- Washington Department of Fish and Wildlife. 2016. Important WACs and RCWs pertaining to Commercial Agricultural Producers and Crop Damage Claims. Web page accessed Feb. 22, 2016: [http://wdfw.wa.gov/living/damage/documents/damage\\_rcws\\_wacs\\_2016.pdf](http://wdfw.wa.gov/living/damage/documents/damage_rcws_wacs_2016.pdf)
- Washington Department of Fish and Wildlife, Confederated Colville Tribes, Spokane Tribe of Indians, USDA-APHIS Wildlife Services, and U.S. Fish and Wildlife Service. 2017. Washington Gray Wolf Conservation and Management 2016 Annual Report. Washington Department of Fish and Wildlife, Colville, WA, USA.
- Washington Department of Transportation. 2015. Population Growth in Relation to the State's Counties. Web page accessed January 28, 2015.  
<http://www.wsdot.wa.gov/planning/wtp/datalibrary/population/PopGrowthCounty.htm>
- Washington State Recreation and Conservation Office, 2013. Outdoor Recreation in Washington: The 2013 State Comprehensive Outdoor Recreation Plan. Washington State Recreation and Conservation Office, Olympia. WA. 176pp.

## APPENDICES

**Appendix A. North Cascades elk herd aerial pre-season composition survey data (1984-2003). Pre-season surveys were not completed after 2003.**

Year	Month	Total classified	Adult bulls	Spike bulls	Total bulls	Cows	Calves	Ratio Bull/cow/calf
1984	August	490	22	59	81	289	120	28/100/41
1985	August	233	22	25	47	116	70	40/100/60
1986	August	296	29	28	57	147	92	39/100/62
1987	July	150	8	10	18	84	42	21/100/57
1988	August	357	24	30	54	195	108	28/100/55
1989	September	57	5	7	12	32	13	37/100/41
1990	July	241	21	18	39	139	63	28/100/45
1991	September	82	24	4	28	36	18	78/100/50
1992	August	123	9	8	17	74	32	23/100/43
1993	No survey	-	-	-	-	-	-	-
1994	August	148	11	17	28	84	35	33/100/41
1995	September	83	7	8	15	50	18	15/100/36
1996	June	92	11	13	24	49	19	49/100/39
1997	August	112	17	4	21	66	25	32/100/38
1998	September	45	10	4	14	24	7	58/100/29
1999	August	86	14	3	17	43	26	40/100/61
2000	August	136	15	6	21	68	47	31/100/69
2001	No survey	-	-	-	-	-	-	-
2002	September	166	23	12	35	82	49	43/100/60
2003	September	100	12	9	21	56	23	38/100/41
Average 1984-2003		167	16	15	31	91	45	33/100/49

**Appendix B. North Cascades elk herd aerial post-season composition survey data (1991-2016)**

Year*	Month	Total classified	Adult bulls	Spike bulls	Total bulls	Cows	Calves	Ratio Bull/Cow/Calf
1991	February	285	9	28	37	183	65	20/100/36
1992	February	116	11	2	13	86	17	15/100/20
1993	March	139	6	12	18	88	33	21/100/38
1994	March	203	5	11	16	126	29	13/100/23
1995-96	No survey							
1997	March	27	2	1	3	14	10	21/100/72
1998-99	No survey							
2000	March	57	13	4	17	28	12	61/100/43
2001-05	No survey							
2006	February	274	11	20	31	188	55	36/100/34
2006	March	276	35	23	58	159	59	
2007	March	374	25	24	49	226	99	26/100/38
2007	April	395	35	23	58	252	85	
2008	March	306	39	24	63	172	71	31/100/42
2008	March	391	23	33	56	235	100	
2009	March	507	50	38	88	294	125	30/100/36
2009	April	324	37	27	64	206	54	
2010	March	340	34	21	55	222	59	24/100/26
2010	April	456	59	9	68	302	76	
2011	March	535	43	34	77	239	118	30/100/47
2011	April	503	52	26	78	284	127	
2012	March	490	72	30	102	299	89	34/100/30
2012	April	504	70	21	91	322	91	
2013	March	595	52	26	78	344	119	33/100/40
2013	April	476	61	26	87	260	105	
2014	March	610	72	37	119	353	113	32/100/31
2014	April	544	72	28	100	322	101	
2015	March	440	52	30	82	387	80	25/100/23
2015	April	572	78	28	106	255	82	
2016	March	662	96	20	116	439	105	26/100/24
2016	April	584	81	14	95	405	84	

\* Beginning in 2006, two surveys per year were conducted.

**Appendix C. State hunting seasons in the North Cascades elk herd area from 2002 to 2015. (For seasons 1980 to 2001 see WDFW 2002).**

<b>Year</b>	<b>GMU/Area &amp; (Permit #)</b>	<b>Dates</b>	<b>Days</b>	<b>Legal Animal</b>	<b>Hunt Description and Tag Type</b>
2015	407, 448	9/12 – 9/24	13	Any elk	Early Archery General (WA)
	407, 448	11/25 – 12/15	25	Any elk	Late Archery General (WA)
	407, 448	10/03-09	7	Any elk	Early Muzzleloader General
	407, 448	11/25-12/15	7	Any elk	Late Muzzleloader General
	407, 448	11/07 – 11/18	12	Any elk	Modern Firearm General (WF)
	418 Nooksack (5) 2030	10/10 – 11/15	40	Any bull	Modern Firearm Quality Elk Special Permit (WF)
	418 Nooksack (6) 2816	10/10 – 11/17	41	Spike only	Modern Firearm Bull Elk Special Permit (WF)
	418 Nooksack (3) 2094	9/23 – 10/04 11/21 – 11/29	21	Any bull	Muzzleloader Quality Elk Special Permit (WM)
	418 Nooksack (3) 2839	9/23 – 10/04 11/21 – 11/29	21	Spike only	Muzzleloader Bull Elk Special Permit (WM)
	418 Nooksack (3) 2070	8/31 – 9/20 12/01 – 12/31	54	Any bull	Archery Quality Elk Special Permit (WA)
	418 Nooksack (3) 2827	8/031 – 9/20 12/01 – 12/31	54	Any bull	Archery Bull Elk Special Permit (WA)
	Elk Area 4941 (10) 2708	8/1 – 3/31	229	Antlerless	Master Hunter Special Permit. Designated areas in Elk Area 4941. Damage hunt administered by WDFW designated Hunt Coordinator.
	Elk Area 4941 (5) 2516	9/21-9-23 10/5-10-9 10/18-10/31	16	Any bull	Senior
	Elk Area 4941 (5) 2424	9/21-9-23 10/5-10-9 10/18-10/31	16	Any bull	Youth
Elk Area 4941 (5) 2617	9/21-9-23 10/5-10-9 10/18-10/31	16	Any bull	Disabled	
2014	407, 448	9/04 – 9/16	13	3-Pt. min. or antlerless	Early Archery General (WA)
	407	11/21 – 12/15	25	3-Pt. min. or antlerless	Late Archery General (WA)
	407, 448	11/03 – 11/14	12	3-Pt. minimum	Modern Firearm General (WF)
	418 Nooksack (4)	10/08 – 11/16	40	Any bull	Modern Firearm Quality Elk Special Permit (WF)
	418 Nooksack (6)	10/08 – 11/18	42	Spike only	Modern Firearm Bull Elk Special Permit (WF)
	418 Nooksack (2)	9/24 – 10/07 11/24 – 11/30	21	Any bull	Muzzleloader Quality Elk Special Permit (WM)
	418 Nooksack (2)	9/24 – 10/07 11/24 – 11/30	21	Spike only	Muzzleloader Bull Elk Special Permit (WM)
	418 Nooksack (2)	9/01 – 9/23 12/01 – 12/31	54	Any bull	Archery Quality Elk Special Permit (WA)

Year	GMU/Area & (Permit #)	Dates	Days	Legal Animal	Hunt Description and Tag Type
	418 Nooksack (2)	9/01 – 9/23 12/01 – 12/31	54	Spike only	Archery Bull Elk Special Permit (WA)
	Elk Area 4941 (25)	8/15 – 3/31	229	Antlerless	Master Hunter Special Permit. Designated areas in Elk Area 4941. Damage hunt administered by WDFW designated Hunt Coordinator.
2013	407, 448	9/04 – 9/16	13	3-Pt. min. or antlerless	Early Archery General (WA)
	407	11/21 – 12/15	25	3-Pt. min. or antlerless	Late Archery General (WA)
	407, 448	11/03 – 11/14	12	3-Pt. minimum	Modern Firearm General (WF)
	418 Nooksack (4)	10/08 – 11/16	40	Any bull	Modern Firearm Quality Elk Special Permit (WF)
	418 Nooksack (6)	10/08 – 11/18	42	Spike only	Modern Firearm Bull Elk Special Permit (WF)
	418 Nooksack (2)	9/24 – 10/07 11/24 – 11/30	21	Any bull	Muzzleloader Quality Elk Special Permit (WM)
	418 Nooksack (2)	9/24 – 10/07 11/24 – 11/30	21	Spike only	Muzzleloader Bull Elk Special Permit (WM)
	418 Nooksack (2)	9/01 – 9/23 12/01 – 12/31	54	Any bull	Archery Quality Elk Special Permit (WA)
	418 Nooksack (2)	9/01 – 9/23 12/01 – 12/31	54	Spike only	Archery Bull Elk Special Permit (WA)
	Elk Area 4941 (15)	8/15 – 3/31	229	Antlerless	Master Hunter Special Permit. Designated areas in Elk Area 4941. Damage hunt administered by WDFW designated Hunt Coordinator.
	Region 4 North (20)	8/1 – 3/31	243	Antlerless	Master Hunter Special Permit. Designated areas in Whatcom and Skagit Counties. Damage hunt administered by WDFW designated Hunt Coordinator.
2012	407, 448	9/04 – 9/16	13	3-Pt. min. or antlerless	Early Archery General (WA)
	407	11/21 – 12/15	25	3-Pt. min. or antlerless	Late Archery General (WA)
	407, 448	11/03 – 11/14	12	3-Pt. minimum	Modern Firearm General (WF)
	418 Nooksack (4)	10/08 – 11/16	40	Any bull	Modern Firearm Quality Elk Special Permit (WF)
	418 Nooksack (6)	10/08 – 11/18	42	Spike only	Modern Firearm Bull Elk Special Permit (WF)
	418 Nooksack (2)	9/24 – 10/07 11/24 – 11/30	21	Any bull	Muzzleloader Quality Elk Special Permit (WM)
	418 Nooksack (2)	9/24 – 10/07 11/24 – 11/30	21	Spike only	Muzzleloader Bull Elk Special Permit (WM)
	418 Nooksack (2)	9/01 – 9/23 12/01 – 12/31	54	Any bull	Archery Quality Elk Special Permit (WA)
	418 Nooksack (2)	9/01 – 9/23 12/01 – 12/31	54	Spike only	Archery Bull Elk Special Permit (WA)

Year	GMU/Area & (Permit #)	Dates	Days	Legal Animal	Hunt Description and Tag Type
	Elk Area 4941 (15)	8/15 – 3/31	229	Antlerless	Master Hunter Special Permit. Designated areas in Elk Area 4941. Damage hunt administered by WDFW designated Hunt Coordinator.
	Region 4 North (20)	8/1 – 3/31	243	Antlerless	Master Hunter Special Permit. Designated areas in Whatcom and Skagit Counties. Damage hunt administered by WDFW designated Hunt Coordinator.
2011	407, 448	9/06 – 9/18	13	3-Pt. min. or antlerless	Early Archery General (WA)
	407	11/23 – 12/15	23	3-Pt. min. or antlerless	Late Archery General (WA)
	407, 448	11/05 – 11/15	11	3-Pt. minimum	Modern Firearm General (WF)
	418 Nooksack (4)	10/08 – 11/16	40	Any bull	Modern Firearm Quality Elk Special Permit (WF)
	418 Nooksack (6)	10/08 – 11/18	42	Spike only	Modern Firearm Bull Elk Special Permit (WF)
	418 Nooksack (2)	9/24 – 10/07 11/24 – 11/30	21	Any bull	Muzzleloader Quality Elk Special Permit (WM)
	418 Nooksack (2)	9/24 – 10/07 11/24 – 11/30	21	Spike only	Muzzleloader Bull Elk Special Permit (WM)
	418 Nooksack (2)	9/01 – 9/23 12/01 – 12/31	54	Any bull	Archery Quality Elk Special Permit (WA)
	418 Nooksack (2)	9/01 – 9/23 12/01 – 12/31	54	Spike only	Archery Bull Elk Special Permit (WA)
	Elk Area 4941 (15)	8/15 – 3/31	229	Antlerless	Master Hunter Special Permit. Designated areas in Elk Area 4941. Damage hunt administered by WDFW designated Hunt Coordinator.
2010	407, 448	9/07 – 9/19	13	3-Pt. min. or antlerless	Early Archery General (WA)
	407	11/24 – 12/15	22	3-Pt. min. or antlerless	Late Archery General (WA)
	407, 448	11/06 – 11/16	11	3-Pt. minimum	Modern Firearm General (WF)
	418 Nooksack (4)	10/09 – 11/17	40	Any bull	Modern Firearm Quality Elk Special Permit (WF)
	418 Nooksack (6)	10/09 – 11/17	40	Spike only	Modern Firearm Bull Elk Special Permit (WF)
	418 Nooksack (2)	9/25 – 10/08 11/25 – 11/30	20	Any bull	Muzzleloader Quality Elk Special Permit (WM)
	418 Nooksack (2)	9/25 – 10/08 11/25 – 11/30	20	Spike only	Muzzleloader Bull Elk Special Permit (WM)
	418 Nooksack (2)	9/01 – 9/24 12/01 – 12/31	55	Any bull	Archery Quality Elk Special Permit (WA)
	418 Nooksack (2)	9/01 – 9/24 12/01 – 12/31	55	Spike only	Archery Bull Elk Special Permit (WA)

Year	GMU/Area & (Permit #)	Dates	Days	Legal Animal	Hunt Description and Tag Type
	Elk Area 4941 (15)	12/01 – 02/28	90	Antlerless	Master Hunter Special Permit. Designated areas in Elk Area 4941. Damage hunt administered by WDFW designated Hunt Coordinator.
2009	407, 448	9/08 – 9/20	13	3-Pt. min. or antlerless	Early Archery General (WA)
	407	11/25 – 12/15	21	3-Pt. min. or antlerless	Late Archery General (WA)
	407, 448	11/07 – 11/17	11	3-Pt. minimum	Modern Firearm General (WF)
	418 Nooksack A (4)	10/12 – 11/17	37	Any bull	Modern Firearm Special Permit (WF)
	418 Nooksack B (6)	10/10 – 11/17	39	Spike only	Modern Firearm Special Permit (WF)
	418 Nooksack C (2)	9/26 – 10/11 11/18 – 11/30	29	Any bull	Muzzleloader Special Permit (WM)
	418 Nooksack D (2)	9/26 – 10/11 11/18 – 11/30	29	Spike only	Muzzleloader Special Permit (WM)
	418 Nooksack E (2)	9/01 – 9/25 12/01 – 12/31	56	Any bull	Archery Special Permit (WA)
	418 Nooksack F (2)	9/01 – 9/25 12/01 – 12/31	56	Spike only	Archery Special Permit (WA)
	Elk Area 4941 (damage hunt) Skagit River A (15)	12/01 – 01/20	51	Any elk	Muzzleloader Special Permit (WM)
	Elk Area 4941 (damage hunt) Skagit River B (15HM)	11/01 – 01/20	81	Any elk	Master Hunter Second Elk Tag Hunt (WA, WM)
Elk Area 4941 (damage hunt)	11/01 – 01/20	81	Any elk	Late Archery General (WA)	
2008	407, 448	9/08 – 9/21	14	3-Pt. min. or antlerless	Early Archery General (WA)
	407	11/19 – 12/15	27	3-Pt. min. or antlerless	Late Archery General (WA)
	407, 448	11/01 – 11/10	10	3-Pt. minimum	Modern Firearm General (WF)
	418 Nooksack A (7)	10/11 – 11/10	31	Any bull	Modern Firearm Special Permit (WF)
	418 Nooksack B (3)	9/29 – 10/10, 11/11 – 11/30	32	Any bull	Muzzleloader Special Permit (WM)
	418 Nooksack C (3)	9/01 – 9/28 12/01 – 12/31	59	Any bull	Archery Special Permit (WA)
	Elk Area 4941 (damage hunt)	10/01 – 10/31 11/01 – 01/20	31 81	Any elk Any elk	Early Archery General (WA) Late Muzzleloader General (WM)
2007	407, 448	9/08 – 9/21	14	3-Pt. min. or antlerless	Early Archery General (WA)
	407	11/21 – 12/15	25	3-Pt. min. or antlerless	Late Archery General (WA)
	407, 448	11/03 – 11/12	10	3-Pt. minimum	Modern Firearm General (WF)
	418 Nooksack A (6)	10/13 – 11/11	30	Any bull	Modern Firearm Special Permit (WF)
	418 Nooksack B (3)	9/29 – 10/12, 11/12 – 11/30	33	Any bull	Muzzleloader Special Permit (WM)
	418 Nooksack C (3)	9/01 – 9/28 12/01 – 12/31	59	Any bull	Archery Special Permit (WA)

Year	GMU/Area & (Permit #)	Dates	Days	Legal Animal	Hunt Description and Tag Type
	Elk Area 4941 (damage hunt)	10/01 – 10/31 11/01 – 01/30	31 91	Any elk Any elk	Early Archery General (WA) Late Muzzleloader General (WM)
2006	407, 448	09/08 – 09/21	14	3-Pt. min. or antlerless	Early Archery General (WA)
	407	11/22 - 12/15	24	3-Pt. min. or antlerless	Late Archery General (WA)
	407, 448	11/04 - 11/13	10	3-Pt. minimum	Modern Firearm General (WF)
	Elk Area 4941 (damage hunt)	11/01 - 01/30 10/01 - 10/31	91 31	Any elk Any elk	Late Muzzleloader General (WM) Early Archery General (WA)
2005	407, 448	09/08 – 09/21	14	3-Pt. min. or antlerless	Early Archery General (WA)
	407	11/23 - 12/15	23	3-Pt. min. or antlerless	Late Archery General (WA)
	407, 448	11/05 - 11/13	9	3-Pt. minimum	Modern Firearm General (WF)
	Elk Area 4941 damage hunt (Muzzleloader only ) Elk Area 4941 (Archery only)	11/01 - 01/31 10/01 - 10/31	92 31	Any elk Any elk	Elk Hunts Open to Specified Tag Holders (WM) Elk Hunts Open to Specified Tag Holders (WA)
2004	407, 448	09/08 – 09/21	14	3-Pt. min. or antlerless	Early Archery General (WA)
	407	11/24 - 12/15	22	3-Pt. min. or antlerless	Late Archery General (WA)
	407, 448	11/06 - 11/14	9	3-Pt. minimum	Modern Firearm General (WF)
	Elk Area 4941 damage hunt (Muzzleloader only ) Elk Area 4941 (Archery only)	11/04 - 01/31 10/01 - 10/31	89 31	Any elk Any elk	Elk Hunts Open to Specified Tag Holders (WM) Elk Hunts Open to Specified Tag Holders (WA)
2003	407, 448	09/08 – 09/21	14	3-Pt. min. or antlerless	Early Archery General (WA)
	407	11/19 - 12/15	27	3-Pt. min. or antlerless	Late Archery General (WA)
	407, 448	11/01 - 11/09	9	3-Pt. minimum	Modern Firearm General (WF)
	Elk Area 4941 damage hunt (Muzzleloader only ) Elk Area 4941 (Archery only)	11/01 - 01/31 10/01 - 10/31	92 31	Any elk Any elk	Elk Hunts Open to Specified Tag Holders (WM) Elk Hunts Open to Specified Tag Holders (WA)
2002	407, 448	09/01 – 09/14	14	3-Pt. min. or antlerless	Early Archery General (WA)
	407	11/20 - 12/15	26	3-Pt. min. or antlerless	Late Archery General (WA)
	407, 448	11/02 - 11/10	9	3-Pt. minimum	Modern Firearm General (WF)
	ML Area 941 damage hunt (Muzzleloader only ) ML Area 941 (Archery only)	11/01 - 01/31 10/01 - 10/31	92 31	Any elk Any elk	Elk Hunts Open to Specified Tag Holders (WM) Elk Hunts Open to Specified Tag Holders (WA)

**Appendix D. North Cascades elk herd area boundary changes since 2002. (For changes from 1980 to 2001 see WDFW 2002).**

Year	Game Management Units and Elk Areas	Adjustments
2002	GMU 407, 448 GMU 418, 437 (closed) Muzzleloader Area 941	No changes made.
2003-2007	GMU 407, 448 GMU 418, 437 (closed) Elk Area 4941	Muzzleloader Area 941 became Elk Area 4941.
2008	GMU 407, 418, 448 GMU 437 (closed) Elk Area 4941	Boundary of Elk Area 4941 extended to include Birdsvew area.
2009-2016	GMU 407, 418, 448 GMU 437 (closed) Elk Area 4941	No changes made.

Appendix E. Point Elliott Treaty area

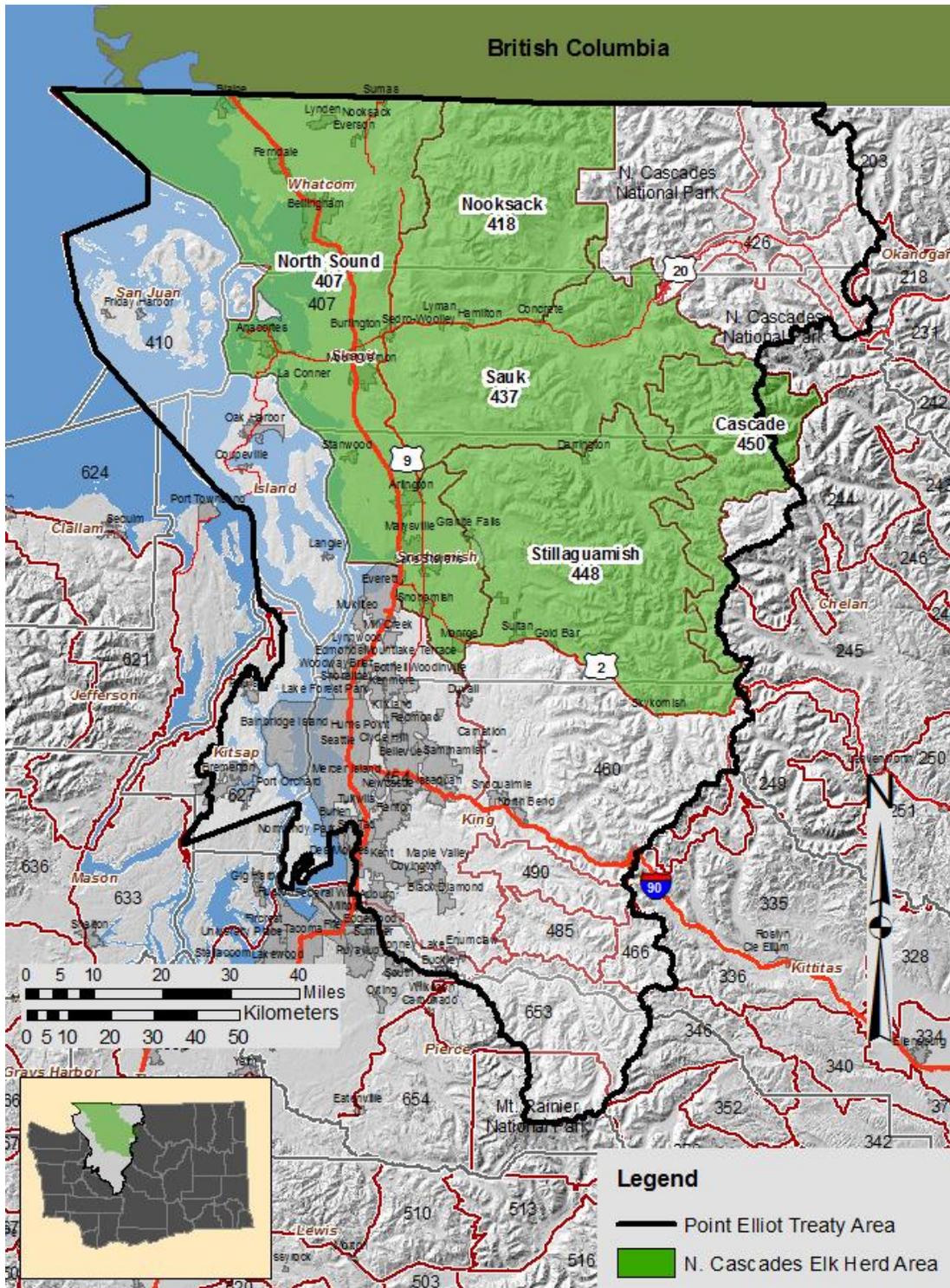




Photo taken by Jon Timmer