

# **Washington State Elk Herd Plan**

## **NORTH CASCADES ELK HERD**

November 2017

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

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2017

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Director, Washington Department of Fish and Wildlife

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Date

# TABLE OF CONTENTS

<b>ACKNOWLEDGEMENTS .....</b>	<b>vi</b>
<b>ABBREVIATIONS USED IN THIS PLAN.....</b>	<b>vi</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>vii</b>
<b>HERD AREA DESCRIPTION .....</b>	<b>1</b>
<i>Location.....</i>	<i>1</i>
<i>Ownership .....</i>	<i>1</i>
<i>Topography .....</i>	<i>5</i>
<i>Vegetation.....</i>	<i>5</i>
<i>Human Influences.....</i>	<i>5</i>
<i>Predation.....</i>	<i>6</i>
<i>Other Related Species .....</i>	<i>7</i>
<b>HERD DISTRIBUTION .....</b>	<b>8</b>
<i>Historical Information.....</i>	<i>8</i>
<i>Current Distribution.....</i>	<i>9</i>
<i>Proposed Distribution.....</i>	<i>10</i>
<b>HERD MANAGEMENT.....</b>	<b>10</b>
<i>History.....</i>	<i>10</i>
<i>Population Modeling.....</i>	<i>10</i>
<i>Estimated Population Size.....</i>	<i>10</i>
<i>Herd Composition .....</i>	<i>11</i>
<i>Management Activities .....</i>	<i>12</i>
<b>SOCIAL AND ECONOMIC VALUES.....</b>	<b>13</b>
<i>Elk Hunting .....</i>	<i>13</i>
<i>Elk Related Agricultural Conflicts .....</i>	<i>13</i>
<i>Public Safety.....</i>	<i>16</i>
<i>Tribal Values .....</i>	<i>16</i>
<i>Other Recreational Uses .....</i>	<i>16</i>
<b>HABITAT MANAGEMENT .....</b>	<b>16</b>
<i>Limitations and Losses.....</i>	<i>17</i>
<i>Enhancement and Improvement Projects.....</i>	<i>17</i>

<b>HERD MANAGEMENT GOALS.....</b>	<b>19</b>
<b>MANAGEMENT OBJECTIVES AND STRATEGIES.....</b>	<b>19</b>
<i>Population, Population Monitoring and Harvest Management.....</i>	<i>19</i>
<i>Hunter Access.....</i>	<i>20</i>
<i>Public Safety.....</i>	<i>20</i>
<i>Elk/Human Conflicts .....</i>	<i>21</i>
<i>Intergovernmental Coordination.....</i>	<i>22</i>
<b>SPENDING PRIORITIES .....</b>	<b>22</b>
<b>HERD PLAN REVIEW AND AMENDMENT .....</b>	<b>23</b>
<b>LITERATURE CITED .....</b>	<b>24</b>
<b>APPENDICES.....</b>	<b>26</b>

**LIST OF FIGURES**

Figure 1. Game management units comprising the North Cascades elk herd area.....	2
Figure 2. Public ownership of the North Cascades elk herd area. ....	3
Figure 3. Land use in the North cascades elk herd area.....	4
Figure 4. Comparison of human population for five counties in the Puget Sound, 1980 to 2012.....	6
Figure 5. Mark-resight estimates of total elk, cow elk, and bull elk population size in GMU 418 (Nooksack), 2006–2016. ....	11

**LIST OF TABLES**

Table 1. Public ownership in the North Cascades elk herd area.....	1
Table 2. History of elk releases in the North Cascades elk herd area. ....	8
Table 3. North Cascades elk herd annual Tribal, state recreational and damage harvest <b>.Error! Bookmark not defined.</b>	
Table 4. Elk related agricultural damage claims and payments from 2002-2016.....	15
Table 5. Habitat enhancement projects in the North Cascades elk herd area. ....	18

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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

- 45 3. Increase the geographical area available for hunting on public and private lands by at least 100  
46 square miles by 2021  
47 4. Minimize public safety risk by reducing the average annual number of elk-vehicle collisions  
48 along the State Route 20 corridor between Sedro Woolley and Marblemount by 50% over the  
49 next five years  
50 5. While attempting to achieve the population objective, reduce the number of elk caused damage  
51 complaints on private lands in the North Cascades elk herd area over the next five years.  
52 6. Annually cooperate and collaborate with the Tribes to implement the North Cascades Elk Herd  
53 Plan and to coordinate season setting and herd management in traditional hunting areas.  
54

DRAFT



## 55 **2002 NORTH CASCADES ELK HERD PLAN ACCOMPLISHMENTS**

56  
57 WDFW, the Tribes, Washington State Department of Natural Resources (DNR), U.S. Forest Service  
58 (USFS), and non-governmental partners have worked closely for more than a decade to implement  
59 management objectives and strategies identified in the 2002 North Cascades Elk Herd Plan. It is of  
60 paramount importance to acknowledge these accomplishments as they have contributed to the recovery of  
61 the North Cascades elk herd.

### 62 **Summary of Accomplishments**

#### 63 **Herd Augmentation**

64 Between October 2003 and October 2005, WDFW and the Tribes, with assistance from the Rocky  
65 Mountain Elk Foundation (RMEF) and Mount Saint Helens Preservation Society volunteers, captured and  
66 translocated 98 elk (mostly cows and calves) from the Mount Saint Helens Wildlife Area to the North  
67 Cascades elk herd area. These translocations were successful and contributed to the growth and expansion  
68 of the North Cascades elk herd. Body condition indices were collected on translocated elk (Cook et al.  
69 2010).

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

71 Beginning in 1997, WDFW and the Tribes eliminated all elk hunting opportunities in GMU 418 in an  
72 effort to prevent further declines in the North Cascades elk herd. Since that time, the herd has increased  
73 substantially, which prompted managers to re-establish limited opportunities to harvest bull elk in GMU  
74 418, beginning in 2007. Managers offer harvest opportunities through a limited permit system and  
75 allocate permits between state and Tribal hunters.

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

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

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

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

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

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

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

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

103 **Cooperative Elk Forage Enhancement Projects**

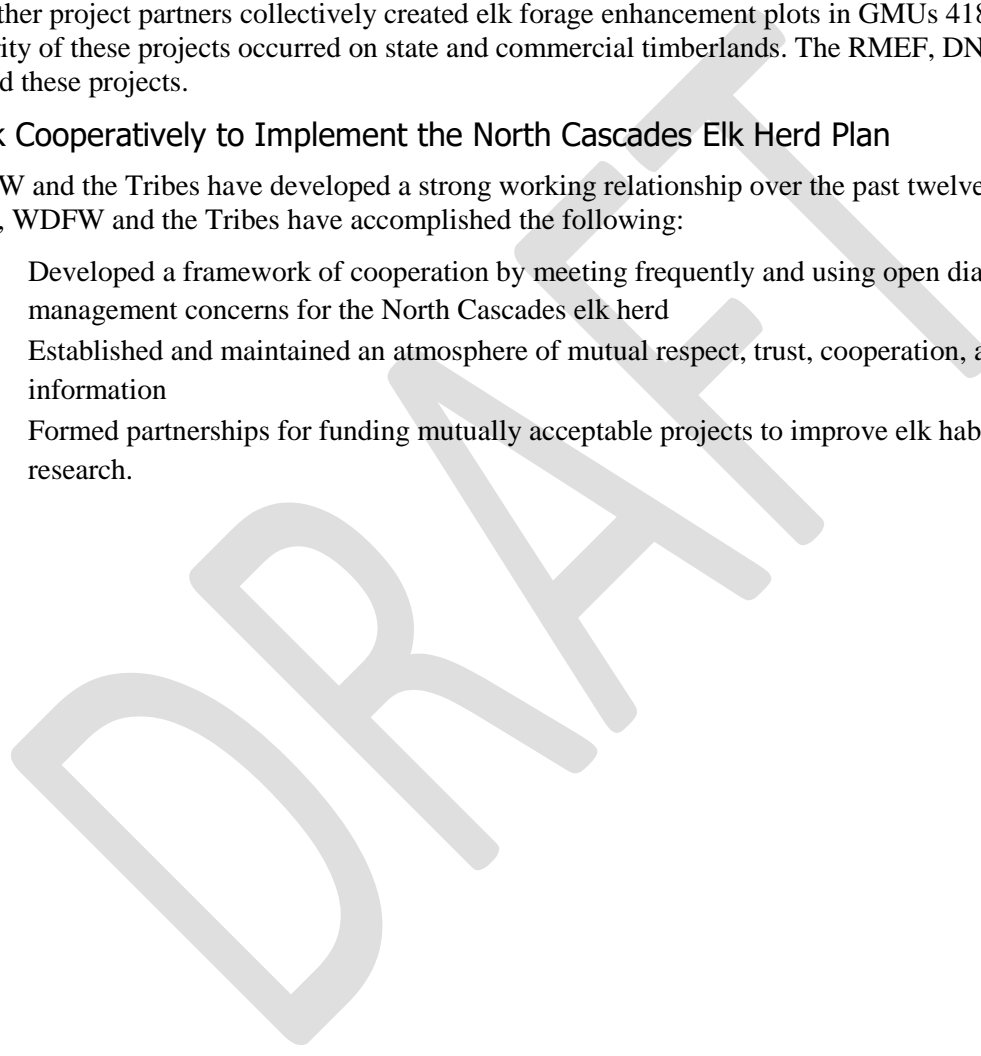
104 Between 2002 and 2015, WDFW, the Tribes, DNR, Puget Sound Energy (PSE), Seattle City Light (SCL),  
105 and other project partners collectively created elk forage enhancement plots in GMUs 418 and 437. The  
106 majority of these projects occurred on state and commercial timberlands. The RMEF, DNR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

108 **Work Cooperatively to Implement the North Cascades Elk Herd Plan**

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

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

117



# 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.

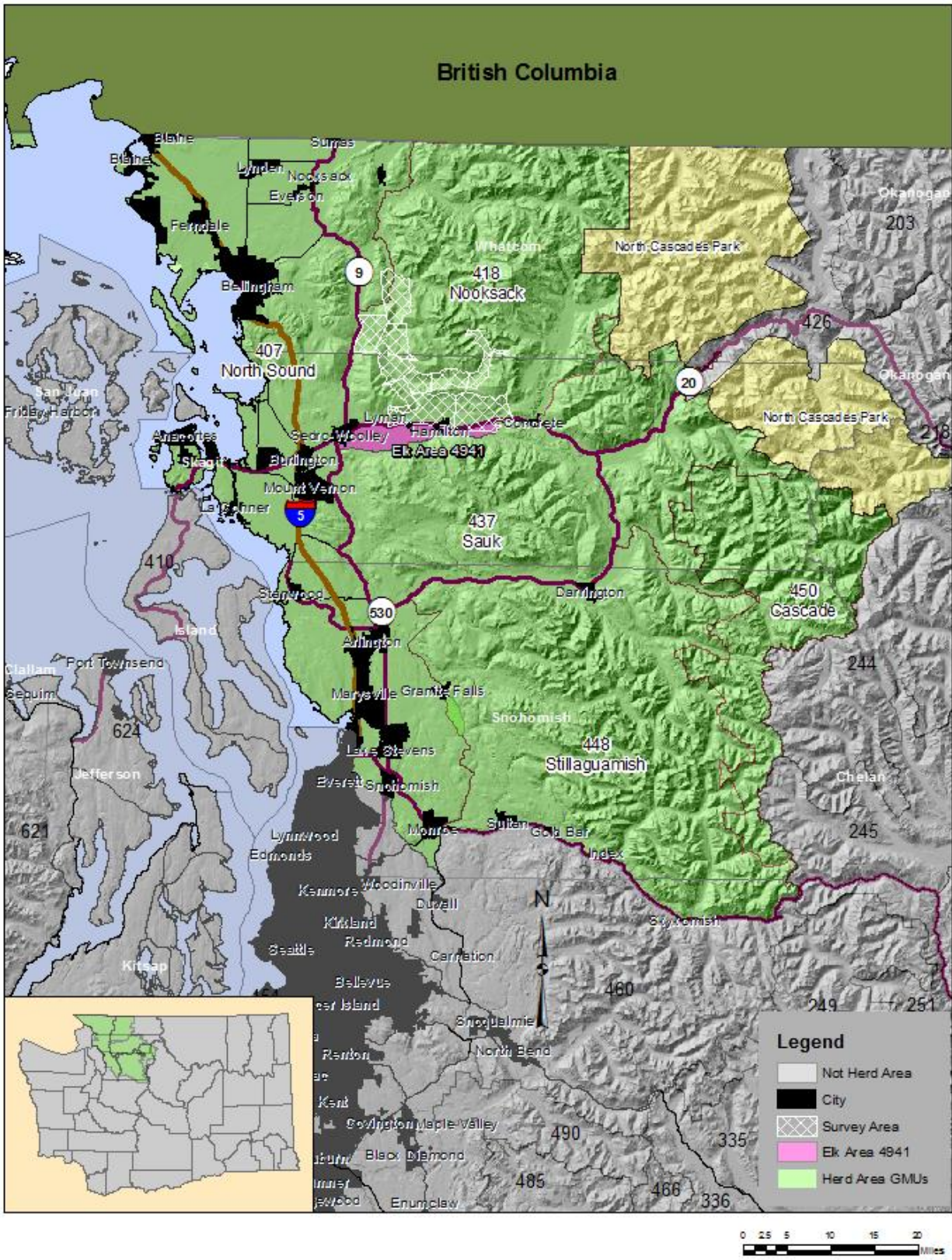
### Ownership

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

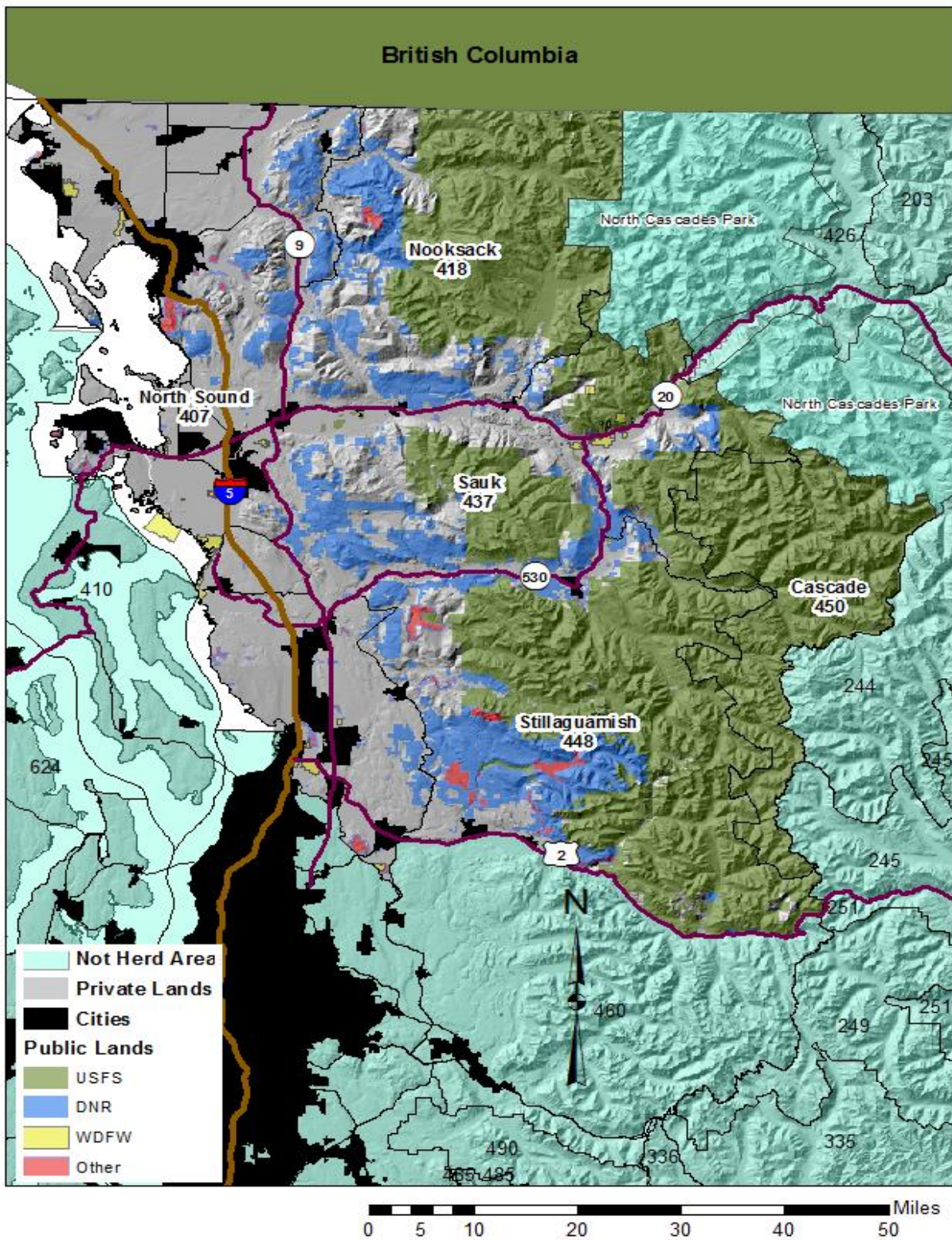
<sup>a</sup>Total area for GMU 407 includes only the land area.



143

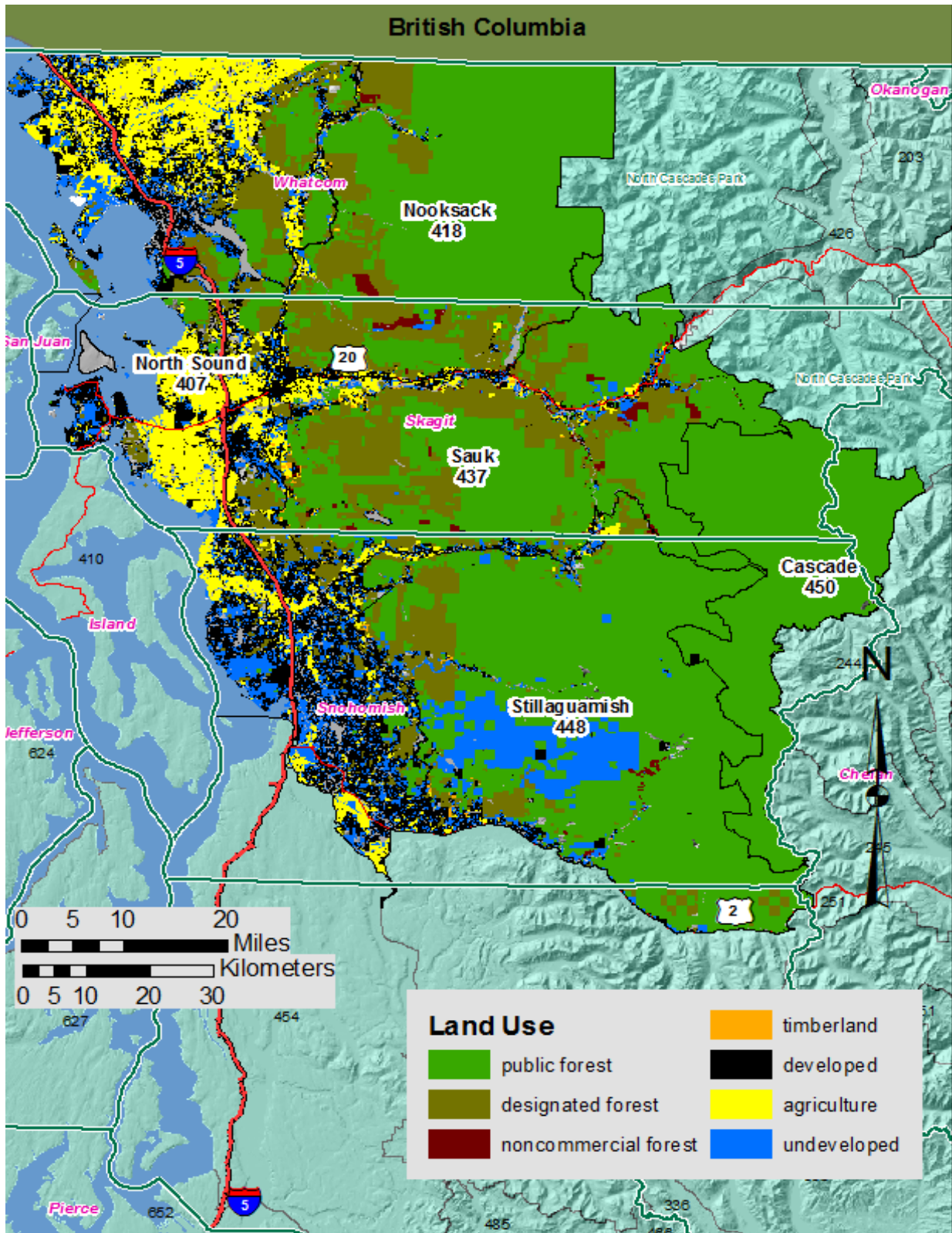
144

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



145

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



149  
150 Figure 3. Land use in the North cascades elk herd area. Agriculture, open space, and timberland are defined  
151 in RCW 84.34.020. Designated forest is defined in RCW 84.33.035.

## 152 Topography

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

## 160 Vegetation

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

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

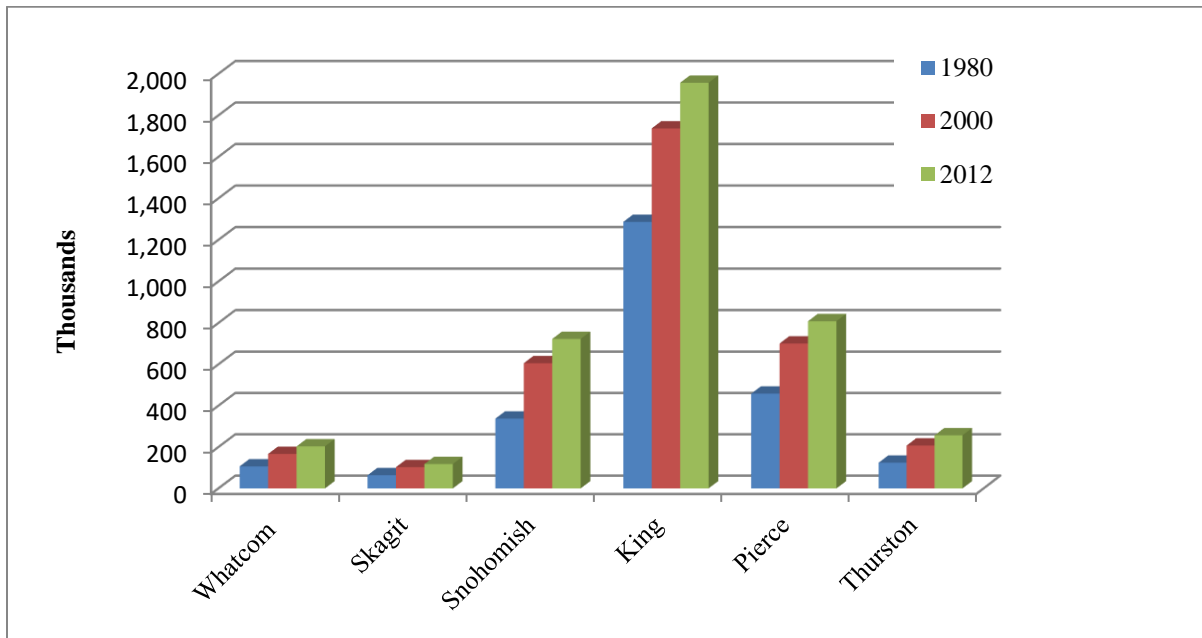
172 The Pacific silver fir zone occurs from about 600 to 1,300 meters (1,980-4,290 feet). Wetter and cooler  
173 than the lower western hemlock zone, it receives more winter snowfall and has a shorter growing season.  
174 Typical understory plants are often herbaceous, such as huckleberry (*Vaccinium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

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

## 180 Human Influences

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

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



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

195  
196  
197 **Predation**

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

202 **Cougar**

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

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

213 **Black Bear**

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

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



220 **Bobcat**

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

223 The bobcat hunting season runs from 1 September to 15 March, and trapping season extends from 1  
224 November to 31 March. A small game license is required to hunt bobcat. WDFW assesses the bobcat  
225 harvest via trapper catch reports and during pelt sealing required by the Convention in International Trade  
226 of Endangered Species (CITES). Reported bobcat harvest has declined since 2000 when Voter Initiative  
227 713 made trapping more restrictive.

228 **Coyote**

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

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

238 **Gray Wolf**

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

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

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

250 **Other Related Species**

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

256 **Disease**

257 Since 2008, reports of elk with deformed, broken, or missing hooves have increased dramatically in  
258 southwest Washington, with sporadic observations in other areas west of the Cascade Range, including  
259 within the North Cascades elk herd area. While elk are susceptible to many conditions which result in  
260 limping or hoof deformities, the prevalence and severity of this new affliction suggested something  
261 altogether different. Scientific tests commissioned by WDFW found that these abnormalities were

262 strongly associated with treponeme bacteria, known to cause digital dermatitis in cattle, sheep and goats.  
 263 Although this disease has plagued the dairy industry for decades, the treponeme bacteria have never  
 264 before been documented in elk or any other wildlife species. WDFW has continued to work with  
 265 scientists, veterinarians, outdoor organizations and others to develop management strategies for elk  
 266 infected by treponeme-associated hoof disease (TAHD).

267

## 268 **HERD DISTRIBUTION**

### 269 **Historical Information**

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

280

281 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
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

282

283

## 284 Current Distribution

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

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

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

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

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

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

322 Within GMU 437, WDFW personnel regularly observe elk both north and south of the South Skagit  
323 Highway, between Day Creek and Rockport and within a handful of tributary drainages that confluence  
324 with the Skagit River from the south. Some of these elk have been observed during spring surveys north  
325 of the river, and consequently may have contributed to the annual population estimate, but the proportion  
326 is unknown. In addition, within GMU 437 elk are frequently observed at several locations between  
327 Concrete and State Route 530 and upstream of Marblemount. Finally, there have been reports of small  
328 bands of elk along the Sauk River Valley crossing the boundary between GMUs 437 and 448 near

329 Darrington. WDFW has not documented elk within GMU 450 in recent time, and historically they have  
330 utilized this unit little, if at all.

## 331 Proposed Distribution

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

335  
336

## 337 HERD MANAGEMENT

### 338 History

339 WDFW believes that the North Cascades elk herd declined from a high of 1,400-2,000 elk in 1984 to only  
340 a few hundred by the late 1990s (M. Davison, WDFW, unpublished data). However, biologists did not  
341 generate population estimates using formal sampling protocols so the true rate of decline is unknown.  
342 Nonetheless, this decline was readily apparent, which prompted WDFW, the Tribes, and other  
343 cooperators to implement several strategies in the 1990s and early 2000s in an effort to promote growth  
344 and expansion of the North Cascades elk herd. These strategies included restricting vehicle access,  
345 implementing a harvest moratorium (1997-2006), and augmenting the population with 98 elk from MSH  
346 (2003-2005). These actions have reversed the decline and the surveyed population has grown to an  
347 estimated 1,170 to 1,375 elk. Recent observations suggest the elk population is expanding out into  
348 peripheral portions of their historic range.

### 349 Population Modeling

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

### 358 Estimated Population Size

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

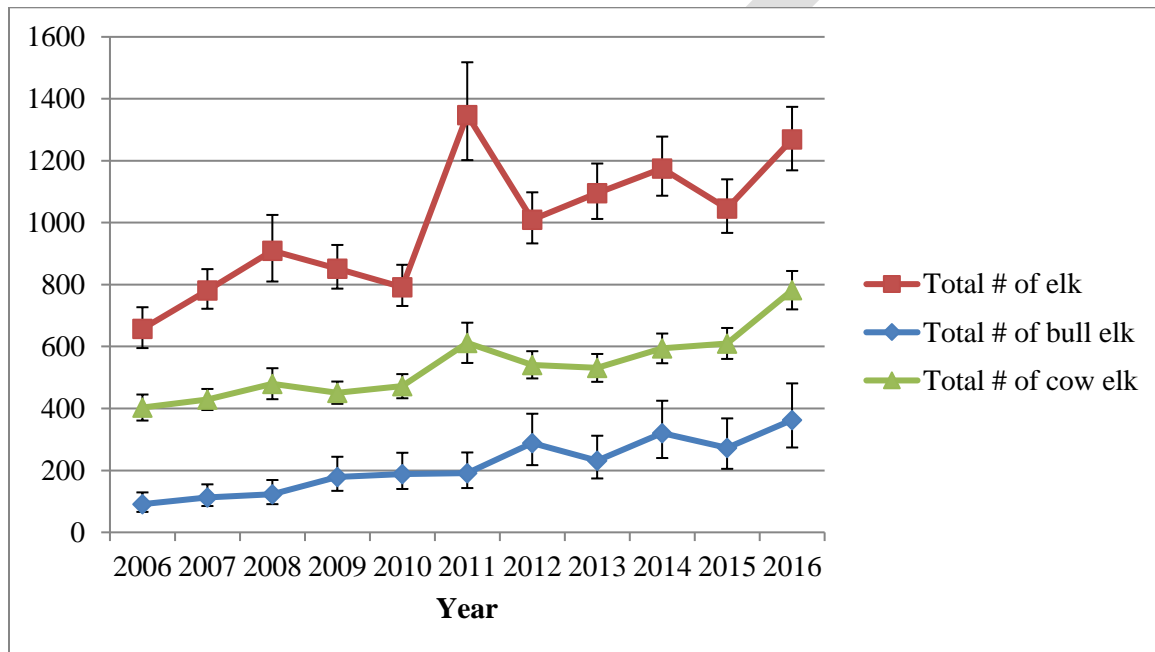
365 From 2006 to 2016, estimates of population size within the survey areas in GMUs 418 and 437 indicate  
366 that the North Cascades elk herd has increased, at a rate of 5-7%, annually. Additionally, biologists'  
367 observations and other anecdotal information suggest that an additional 200-400 elk occur elsewhere in  
368 GMU 437, primarily south of the Skagit River between Sedro Woolley and Marblemount, and at least  
369 100 more within the Sauk River Valley south of Rockport.

370 **Herd Composition**

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

378

379



380

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

383

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

391

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

## 396 Management Activities

### 397 Harvest Implementation

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

### 409 Harvest Restrictions

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

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

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

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

430 The bull harvest will continue to be conservative for this elk herd due to the vulnerability of the small  
431 herd to over harvest. Maintaining branch-antlered bull survival above 60% would be desirable, but  
432 monitoring this would require the presence of radio-collared bulls. In the absence of direct measures of  
433 survival, WDFW and the Tribes will incorporate any available survey data and population modeling into  
434 bull harvest planning, with age data from harvested bulls serving as confirmation. Currently bull:cow  
435 ratios and branch-antlered bull proportions are exceeding the guidelines listed for elk in the Game  
436 Management Plan (WDFW 2014).

### 437 Recreational Harvest

438 Historically WDFW managed the North Cascades elk herd with a variety of recreational hunting  
439 regulations and seasons (WDFW 2002). More recently, but prior to the conservation closure that WDFW

440 implemented in 1997, WDFW regulated the general season bull harvest in GMU 418 under a 3-point  
441 antler restriction. From 1980 to 1996, the mean annual antlered bull harvest by licensed hunters across the  
442 North Cascades elk herd GMUs was 42 bulls (WDFW 2002). During the same period, the mean antlerless  
443 elk harvest was 23 cows. Since 1990, antlerless elk general season harvest opportunity has been limited  
444 throughout the North Cascades elk herd area. No general season hunting for antlerless elk has occurred in  
445 GMU 418 since 1991.

446 During 1997-2006, the North Cascades elk herd area was under a conservation closure for state-licensed  
447 elk hunters. Most Tribes also implemented a conservation closure during this time, but some limited  
448 ceremonial hunting may have occurred during the closure. By spring 2006, survey data and population  
449 modeling suggested that the North Cascades elk herd had increased sufficiently to meet previously  
450 defined criteria necessary for reinstating bull harvest (WDFW 2002). In 2007, WDFW and the Tribes  
451 agreed to reinstate limited permit-controlled bull elk hunting in GMU 418. In 2007 and 2008, state and  
452 Tribal elk hunters equally shared 30 bull elk permits allocated each year. In the fall of 2009, WDFW and  
453 the Tribes increased total permit allocation to 40 permits, shared equally between state-licensed and  
454 Tribal hunters, half of the permits for each group were designated as spike-only permits in 2009. This  
455 approach and the total permit allocation remained the same for the 2010 and 2011 hunting seasons. In  
456 2012, the permits then increased to 50 to be shared equally. In 2015 the permits increased to 100 shared  
457 equally. The State permits were distributed between GMU 418 and Elk Area 4941, with 22 in GMU 418,  
458 and 28 in Elk Area 4941. Since 1997, GMU 437 has been closed to state hunters.

## 459 Poaching

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

465

## 466 **SOCIAL AND ECONOMIC VALUES**

### 467 Elk Hunting

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

471 Revenue generated by elk hunters provides significant economic benefits to Washington State. Myers  
472 (1999) estimated the value of an elk to the state and local economy was as high as \$1,945 per harvested  
473 elk in the Blue Mountains. The *2011 National Survey of Fishing, Hunting, and Wildlife-Associated  
474 Recreation* reported that annual trip and equipment expenditures for big game hunting in Washington  
475 averaged \$973 per hunter (U.S. Department of Interior et al. 2014). With the drop in hunter numbers  
476 (Table 3), it is clear that the economic contribution of elk hunting in the North Cascades elk herd area is  
477 now less than it once was. The mean number of hunters for the years 2005 to 2014 was only 166 hunters.

### 478 Elk Related Agricultural Conflicts

479 Preventing and mitigating elk damage on private lands has been an ongoing management challenge in  
480 Washington. Problems associated with elk include damage to tree farms and conifer plantations, hay,  
481 alfalfa fields, orchards, vineyards, potatoes, and other agricultural crops. When frightened, elk may  
482 damage wire fences by running through them. WDFW is the primary source for property owners seeking  
483 to determine legal and effective remedies for addressing wildlife interactions (WDFW 2016). From 2002

484 to 2014, 17 elk damage claims were filed in GMUs 407, 418, 437, 448, and 450 (Table 4). WDFW paid a  
 485 total of \$78,555 to landowners for damage claims. WDFW has used many control alternatives designed to  
 486 mitigate elk/human conflicts. Elk managers often prefer non-lethal methods because they maintain elk  
 487 numbers and recreational hunting opportunity, but when non-lethal methods fail, lethal methods are used  
 488 to target specific elk groups.

489  
 490 Table 3. North Cascades elk herd annual Tribal, state recreational and damage harvest, 2001–2015. These  
 491 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

492  
 493  
 494 Elk/human conflict within agricultural areas of the North Cascades elk herd area has increased since  
 495 2006. Agricultural damage here mostly involves foraging and trampling of commercial agricultural and  
 496 horticultural crops (Table 4). In residential areas, elk cause damage to gardens and landscaping, pastures,  
 497 and fencing. Chronic elk damage in the North Cascades elk herd area is concentrated in the Acme-  
 498 Saxon area in the Nooksack River Valley and along the lower Skagit River Valley from Bacus Hill to the  
 499 town of Marblemount. In the Acme-Saxon area more than 100 elk are causing damage on agricultural  
 500 lands.

501 However, the situation in the lower Skagit River Valley area is more complex. Elk/human conflicts occur  
 502 over a larger geographic area and include multiple groups of elk that regularly move across State Route  
 503 20 between Sedro Woolley and Marblemount. A wide variety of agricultural and horticultural crops and  
 504 infrastructure are involved including commercial apple orchards, vineyards, pasture, hay crops, green  
 505 chop, feed corn, silage, blueberries, tree farms, and damage to fencing. The damage to fencing  
 506 occasionally results in escaped livestock and resulting damage to neighboring properties and increased  
 507 liability to livestock owners. Landowners in residential areas also routinely report elk caused damage to  
 508 lawns, gardens, and associated landscaping. These conflicts are likely to increase as forestland conversion  
 509 leads to residential and commercial development throughout the lower Skagit River Valley.



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

515

516 Table 4. Elk-related agricultural damage claims and payments from 2002-2016 in GMUs 407, 418, 437,  
 517 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

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

519

520 In 2003, Elk Area 941 was renamed Elk Area 4941 (Figure 1) with boundary changes that extended the  
 521 eastern boundary further east on the north side of the Skagit River (Appendix C, D). In Elk Area 4941 in  
 522 2003 general hunting seasons were implemented for both archery and muzzleloader hunters; in 2009, a  
 523 permit only hunt for muzzleloaders was added, as well as some master hunter permits. Archery remained  
 524 as it was. For the 2010-2014 seasons, this area was limited entirely to master hunter antlerless only  
 525 permits. In 2015 and 2016, Elk Area 4941 became limited entry permits for master hunters, youth, hunters  
 526 with disabilities, and seniors.

527 **Public Safety**

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

536 **Tribal Values**

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

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

547 **Other Recreational Uses**

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

557 For many enjoying nature includes watching wildlife, and the 2013 survey estimated that 40% of  
558 Washington residents participated in viewing/photographing animals in the previous year (Washington  
559 State Recreation and Conservation Office, 2013). While sightings of large animals like elk are especially  
560 valued and even sought after, public viewing opportunities of elk in the North Cascades elk herd area are  
561 rather limited. The public often see elk along State Route 20 and State Route 9, most often in agricultural  
562 fields. A newly established public viewing area at Hurn Field adjacent to State Route 20 near Concrete  
563 currently affords quality opportunities to view and photograph elk. Other opportunities to create public  
564 viewing sites do exist but will require cooperative agreements and site development with private timber  
565 companies, DNR, USFS and other land managers.

566

567 **HABITAT MANAGEMENT**

568 Human activities have affected the North Cascades elk herd in many ways. While the herd has rebounded  
569 from population declines experienced in the 1980s and 1990s, ongoing land management practices  
570 continue to influence the distribution and size of the North Cascades elk herd. The combined cooperative

571 efforts of the public and private land managers will be necessary to develop suitable elk habitat in a  
572 spatial and temporal manner that supports plan objectives.

### 573 Limitations and Losses

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

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

### 584 Enhancement and Improvement Projects

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

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**A forage enhancement project in the North Cascades elk herd area being completed by the Point Elliott Tribes.**

613 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.

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## 617 **HERD MANAGEMENT GOALS**

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

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

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## 627 **MANAGEMENT OBJECTIVES AND STRATEGIES**

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

#### 629 **Background**

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

634 Maintaining a healthy elk population requires adequate bull:cow ratios. Harvest monitoring and collection  
635 of biological samples associated with age and sex class identification are a part of our annual surveys. The  
636 Game Management Plan (WDFW 2014) currently recommends a post-hunt range of 12 to 20 bulls per  
637 100 cows, or when survival is estimated, an overall bull mortality rate of less than or equal to 50%.

#### 638 **Objective 1**

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

#### 642 **Strategies**

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

#### 649 **Background**

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

657 **Objective 2**

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

660 **Strategies**

- 661 1. Work with the Tribal/State technical team to investigate survey methodologies or population  
662 estimation techniques that have been successful in similar habitats  
663 2. Explore options that may provide supplemental funding that would allow continuation of the  
664 mark-resight methods currently used on the herd survey area  
665

666 **Hunter Access**

667 **Background**

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

671 **Objective 3**

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

673 **Strategies**

- 674 1. Work with private landowners to increase hunter access to land ownerships along and adjacent to  
675 the Skagit River throughout Elk Area 4941 and GMUs 407, 418, 448, 450  
676 2. Increase hunting opportunities in the Skagit River Valley by establishing a minimum of five  
677 public access sites on privately owned lands by using the WDFW Private Lands Hunter Access  
678 Program  
679

680 **Public Safety**

681 **Background**

682 Elk-vehicle collisions are a concern throughout Washington State where elk populations are in close  
683 proximity to major transportation corridors. Several factors including elk densities and movement  
684 patterns, posted speed limits, and vehicle sight distances are linked to elk-vehicle collisions. Within the  
685 North Cascades elk herd area, elk-vehicle collisions mostly occur along the State Route 20 corridor  
686 between Sedro Woolley and Marblemount. While some efforts have been made along State Route 20,  
687 more can be done. Elk-vehicle collision data are far from precise; however, from available road kill  
688 mortality data it appears that the number of elk-vehicle collisions is on an upward trajectory. These data  
689 suggest that the average number of elk-vehicle collisions more than doubled between the periods 2001-  
690 2006 and 2007-2016. Currently the annual number of elk-vehicle collisions is likely in the range of 20-30.

691 **Objective 4**

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

## 694 Strategies

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

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## 713 Elk/Human Conflicts

### 714 Background

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

### 730 Objective 5

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

### 733 Strategies

- 734 1. Develop a program to track the number of elk/human conflict complaints requiring WDFW  
735 response

- 736 2. Limit elk numbers in the Skagit River Valley, Acme Valley, and areas that experience chronic
- 737 elk/human conflicts by applying consistent hunting pressure on identified private properties from
- 738 July 1st to March 31st
- 739 3. Continue to use non-lethal preventative measures (e.g., hazing, fencing, etc.) to mitigate
- 740 elk/human conflicts
- 741 4. Continue to use cooperative agreements between landowners and WDFW (e.g., Damage
- 742 Prevention Cooperative Agreements, fencing agreements, etc.) to promote resolution of
- 743 elk/human conflicts
- 744 5. Continue to inform landowners of useful tools and techniques to minimize potential elk/human
- 745 conflicts
- 746 6. Continue to implement master hunter or other special permit hunts when appropriate and
- 747 encourage private land hunting access to provide added hunting pressure and opportunity
- 748 7. The Tribes and WDFW will develop a formal survey protocol to accurately monitor elk numbers
- 749 in areas experiencing chronic elk/human conflicts
- 750 8. Continue to work with the Tribes on elk damage mitigation efforts
- 751 9. Include county governments in discussion of problems and solutions associated with elk damage
- 752 and conflict
- 753 10. Work with public land management agencies to develop habitat enhancement projects to attract
- 754 and hold elk away from private agricultural lands
- 755 11. Discuss with local colleges options for designing a public survey for landowners in the Skagit and
- 756 Acme Valley related to elk damage
- 757

## 758 Intergovernmental Coordination

### 759 Background

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

### 763 Objective 6

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

### 766 Strategies

- 767 1. Collaborate with the Tribes to update an annual Elk Harvest Agreement
- 768 2. Include the Tribes in development, review, and implementation of elk management within the
- 769 herd area. Identify areas of high, moderate, and low elk/human conflict risk so that staff can take
- 770 educational and preventative efforts to minimize potential conflict
- 771 3. Provide opportunity for discussion of elk management at the North Cascades Technical Group
- 772 meetings
- 773 4. Share harvest, monitoring and survey data, and promote joint enforcement efforts with the Tribes
- 774 to achieve management objectives
- 775
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## 777 **SPENDING PRIORITIES**

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

779 Time Line: Annually

780 Cost: \$15,000 Annually



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782 *Increase Hunter Access and Opportunity on Public and Private Timberlands- Medium Priority*  
783 *Timeline: 2016*  
784 *Cost: \$5,000 Annually (payments to secure private lands access)*  
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787 **HERD PLAN REVIEW AND AMENDMENT**

788  
789 WDFW will update and amend the North Cascades Elk Herd Plan as necessary. The plan will remain in  
790 effect until revised. As new information is gathered and conditions change, it will be necessary to  
791 maintain a free exchange of communication among WDFW, cooperators, and the Tribes. Meetings with  
792 affected Tribes, the Northwest Indian Fisheries Commission and WDFW will occur when proposed  
793 changes in elk harvest or habitat management strategies deviate substantially from the objectives and  
794 strategies outlined in this document. The managers will address issues as needed, either at the technical or  
795 policy level through regular meetings.  
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DRAFT

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861 **APPENDICES**

862 **Appendix A. North Cascades elk herd aerial pre-season composition survey data (1984-2003). Pre-**  
 863 **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

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865 **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.

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

Year	GMU/Area & (Permit #)	Dates	Days	Legal Animal	Hunt Description and Tag Type
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) <b>2816</b>	10/10 – 11/17	41	Spike only	Modern Firearm Bull Elk Special Permit (WF)
	418 Nooksack (3) <b>2094</b>	9/23 – 10/04 11/21 – 11/29	21	Any bull	Muzzleloader Quality Elk Special Permit (WM)
	418 Nooksack (3) <b>2839</b>	9/23 – 10/04 11/21 – 11/29	21	Spike only	Muzzleloader Bull Elk Special Permit (WM)
	418 Nooksack (3) <b>2070</b>	8/31 – 9/20 12/01 – 12/31	54	Any bull	Archery Quality Elk Special Permit (WA)
	418 Nooksack (3) <b>2827</b>	8/031 – 9/20 12/01 – 12/31	54	Any bull	Archery Bull Elk Special Permit (WA)
	Elk Area 4941 (10) <b>2708</b>	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) <b>2516</b>	9/21-9-23 10/5-10-9 10/18-10/31	16	Any bull	Senior
Elk Area 4941 (5) <b>2424</b>	9/21-9-23 10/5-10-9 10/18-10/31	16	Any bull	Youth	
Elk Area 4941 (5) <b>2617</b>	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)
	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 (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)
	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.

Year	GMU/Area & (Permit #)	Dates	Days	Legal Animal	Hunt Description and Tag Type
	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)
	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)



Year	GMU/Area & (Permit #)	Dates	Days	Legal Animal	Hunt Description and Tag Type
	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)
	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)

Year	GMU/Area & (Permit #)	Dates	Days	Legal Animal	Hunt Description and Tag Type
	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)

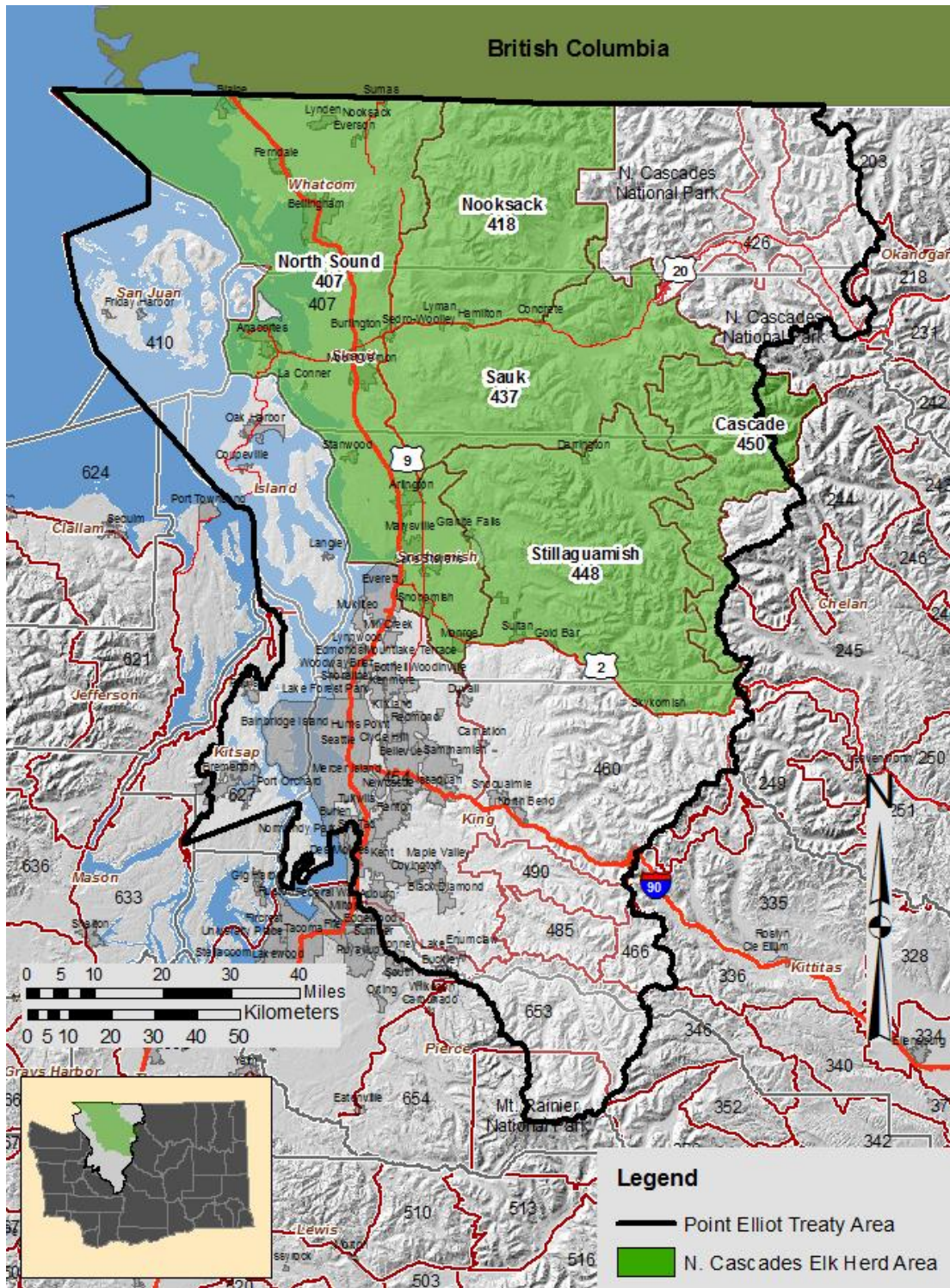
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874 **Appendix D. North Cascades elk herd area boundary changes since 2002. (For changes from 1980**  
 875 **to 2001 see WDFW 2002).**

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.

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