

Washington State Elk Herd Plan

NORTH CASCADES ELK HERD

June 2017

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

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Director, Washington Department of Fish and Wildlife

Date

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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
GIS	Geographic Information 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 1,950 elk ($\pm 10\%$). 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 Rockport by 50% over the next
49 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, Tribes, Washington State Department of Natural Resources (DNR), U.S. Forest Service (USFS),
58 and non-governmental partners have worked closely for more than a decade to implement management
59 objectives and strategies identified in the 2002 North Cascades Elk Herd Plan. It is of paramount
60 importance to acknowledge these accomplishments as they have contributed to the recovery of the North
61 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 Co-Management Agreement

77 This co-management hunting 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 management and
- 81 management of harvest opportunities for all parties
- 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

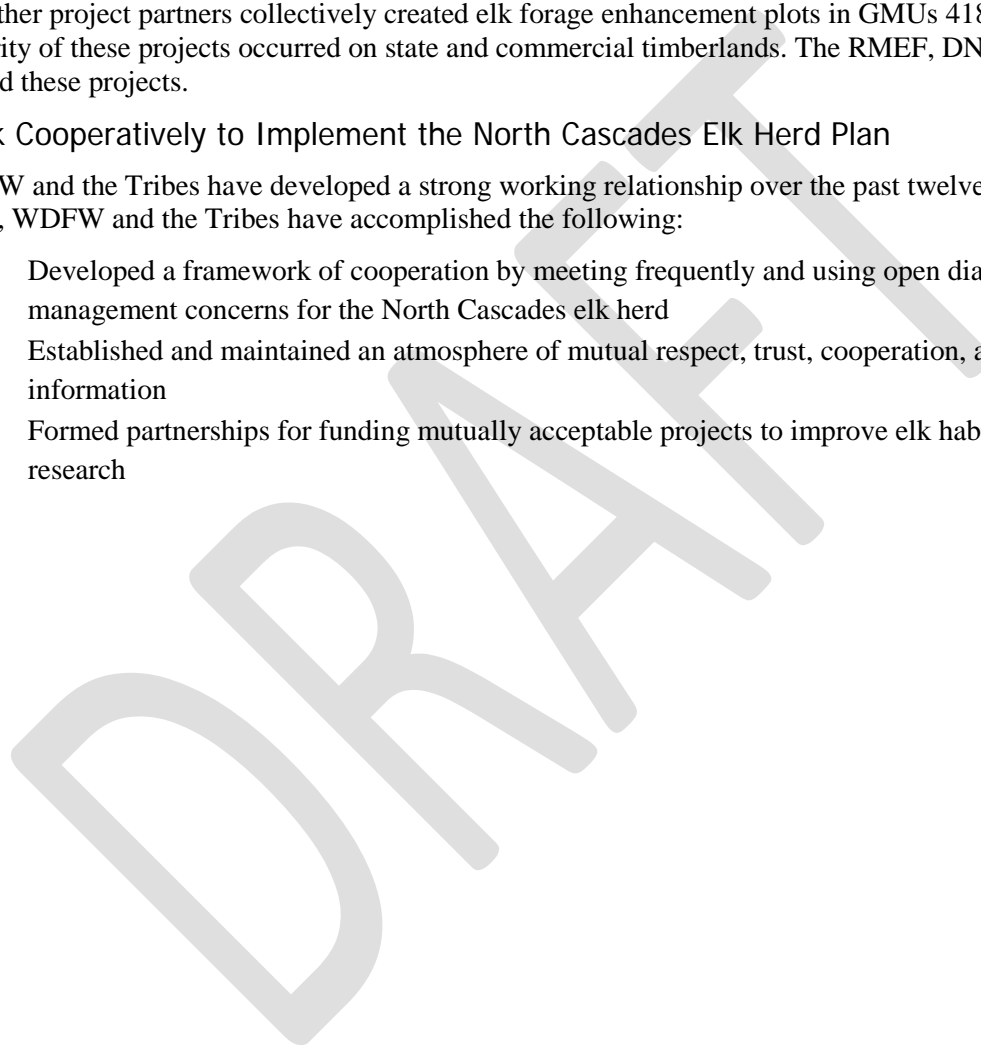
104 Between 2002 and 2015, WDFW, Tribes, DNR, Puget Sound Energy (PSE), Seattle City Light (SCL),
105 and other project partners collectively created elk forage enhancement plots in GMUs 418 and 437. The
106 majority of these projects occurred on state and commercial timberlands. The RMEF, DNR and the 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 US Highway 2. The southern boundary follows US 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 242nd 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.

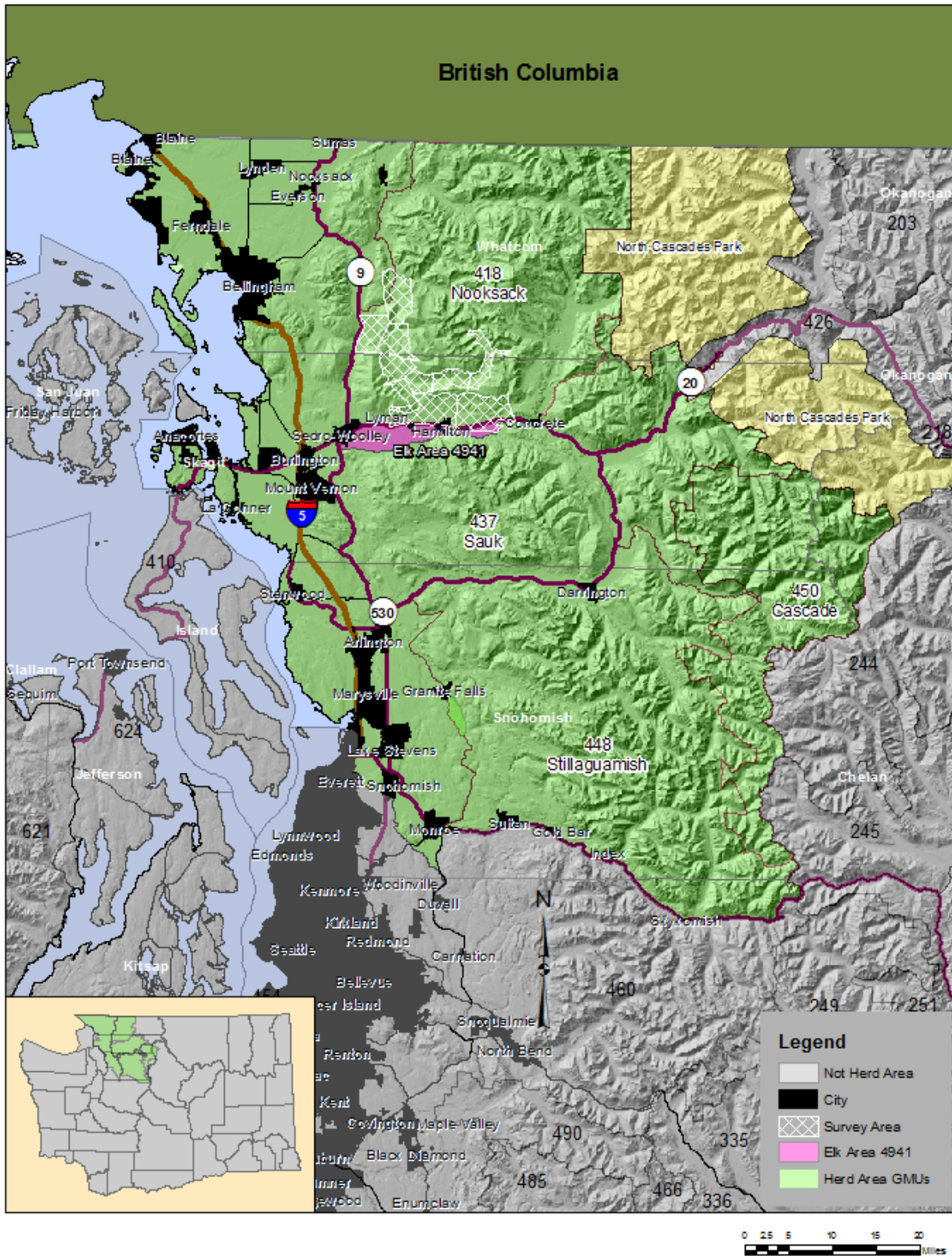
Ownership

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).

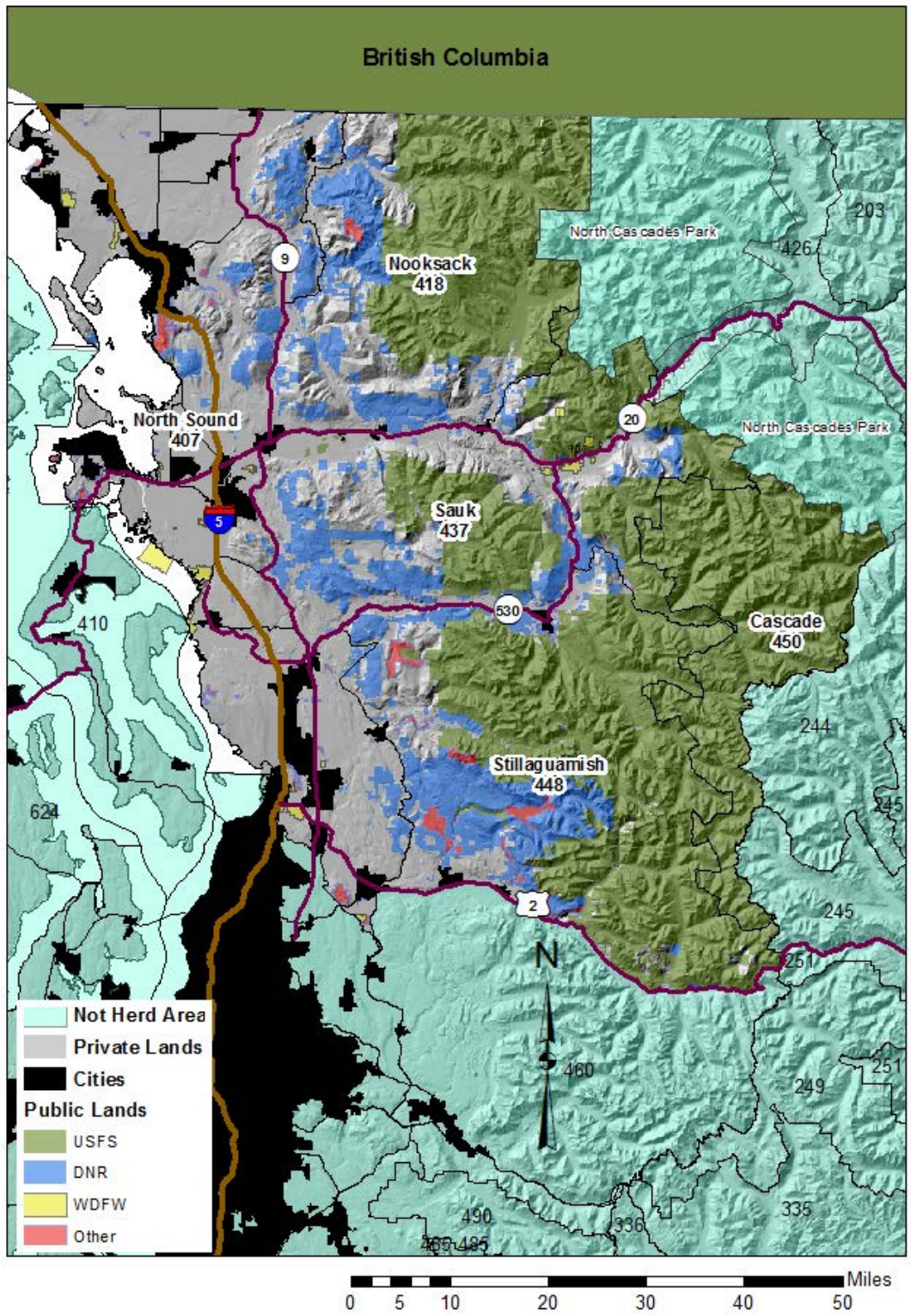
GMU	GMU 407 ^a (sq. km.)	GMU 418 (sq. km.)	GMU 437 (sq. km.)	GMU 448 (sq. km.)	GMU 450 (sq. km.)	Total
Total GMU	3,402	2,168	2,306	2,926	1,240	12,042
Total Public	392	1,553	1,405	2,463	1,238	7,051
% Public	11.5%	71.6%	60.9%	84.2%	99.8%	58.5
USFS	0	1,194	971	1,825	1,237	5,227
DNR	250	347	415	559	0	1,571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

^aTotal area for GMU 407 includes only the land area.



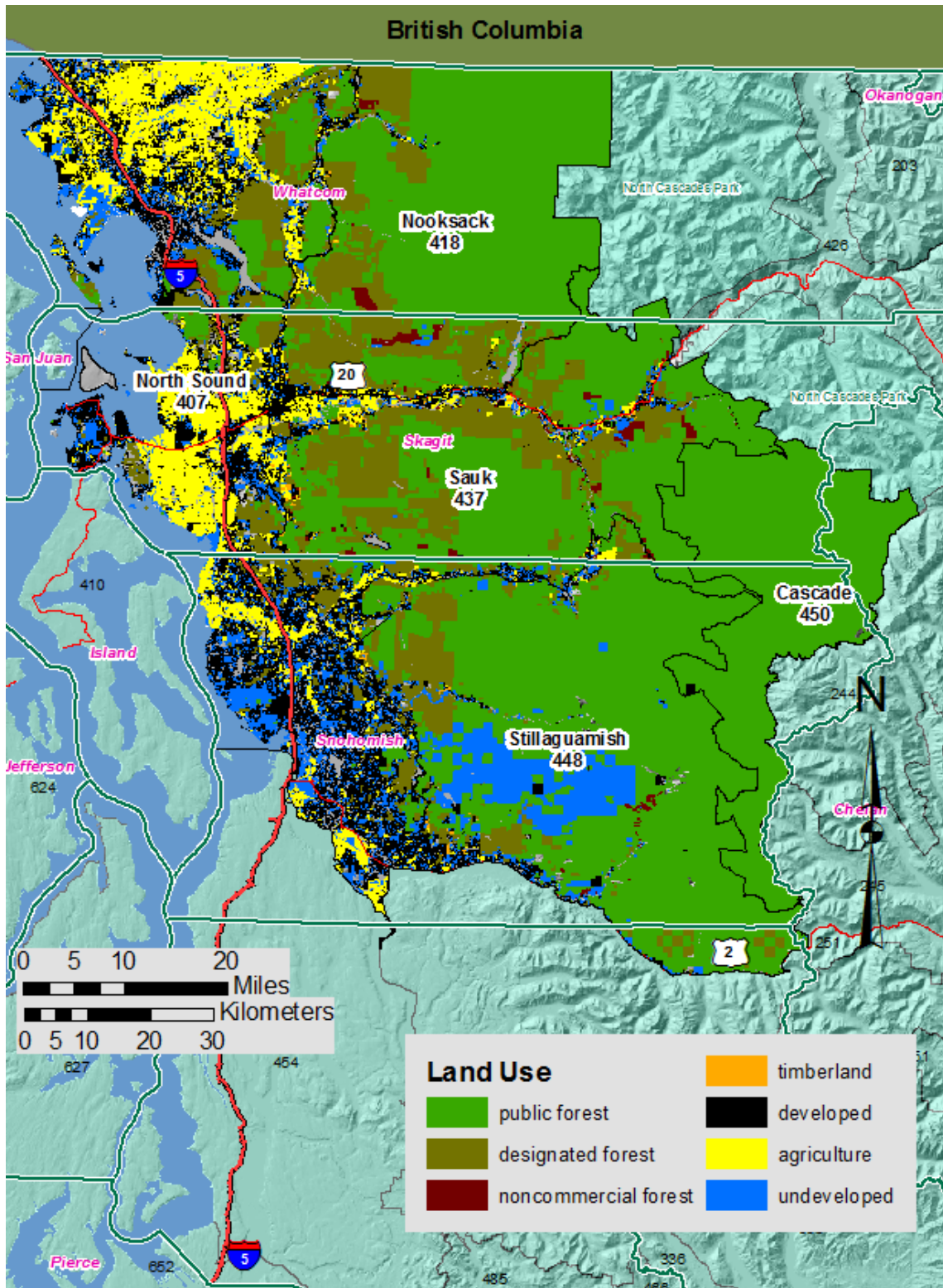
143

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, US Dept. of Defense, and US Fish and Wildlife**
 148 **Service.**



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151

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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.

153 **Topography**

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

161 **Vegetation**

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

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

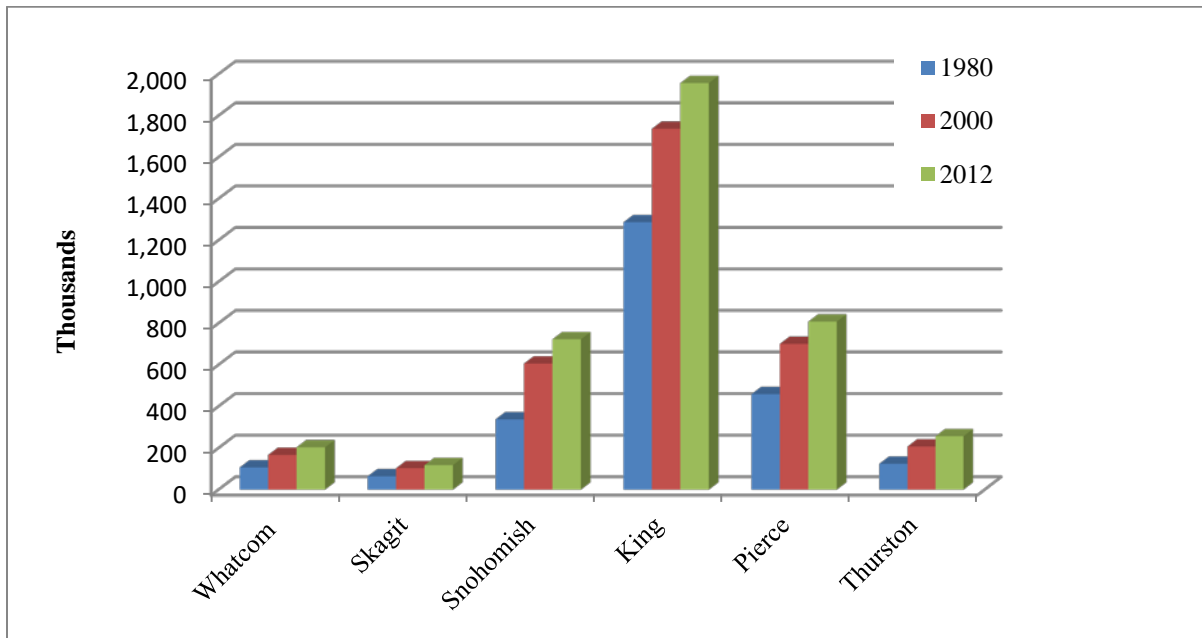
173 The Pacific silver fir zone occurs from about 600 to 1,300 meters (1,980-4,290 feet). Wetter and cooler
174 than the lower western hemlock zone, it receives more winter snowfall and has a shorter growing season.
175 Typical understory plants are often herbaceous, such as huckleberry (*Vaccinium spp.*)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

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

181 **Human Influences**

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

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



195 **Figure 4. Comparison of human population for five counties in the Puget Sound, 1980 to 2012 (WDOT 2015).**

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198 **Predation**

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

203 **Cougar**

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

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

214 **Black Bear**

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

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

221 **Bobcat**

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

224 The bobcat hunting season runs from 1 September to 15 March, and trapping season extends from 1
225 November to 31 March. A small game license is required to hunt bobcat. WDFW assesses the bobcat
226 harvest via trapper catch reports and during pelt sealing required by the Convention in International Trade
227 of Endangered Species (CITES). Reported bobcat harvest has declined since 2000 when Voter Initiative
228 713 made trapping more restrictive.

229 **Coyote**

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

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

239 **Gray Wolf**

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

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

246 Currently, there are no confirmed or suspected gray wolf packs (Wiles et al. 2011) in western
247 Washington. In western Washington gray wolves are currently listed as endangered under the federal
248 Endangered Species Act and remain listed by Washington as an endangered species throughout the state.
249 The U.S. Fish and Wildlife Service is the lead management authority over wolves where they remain
250 federally listed in the state.

251 **Other Related Species**

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

257

258 **HERD DISTRIBUTION**

259 **Historical Information**

260 WDFW considers the North Cascades elk herd a mixture of the Rocky Mountain subspecies (*C. e.*
261 *nelsoni*) and Roosevelt elk genomes. The first attempt at reintroducing elk into the area occurred in 1912

262 when Skagit County released 46 elk from Yellowstone National Park into the central Skagit River
 263 drainage near Birdsvie (Table 2). Reportedly, poachers later eliminated these animals. In 1946 WDFW
 264 released 15 elk, which increased in number and began to move throughout the drainages of the Middle
 265 Fork Nooksack River, South Fork Nooksack River and the north Skagit River. In 1948 WDFW released
 266 eight additional elk from the Yakima herd into the same general area (Adkins 1978). Five successful
 267 augmentations by WDFW and the Tribes (2003-2005) added an additional 98 animals to the North
 268 Cascades herd. All adult animals from these recent releases were radio collared and monitored to assess
 269 survival and distribution.

270
 271

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

Date	Release site	Elk	Origin	Results	By
1912	Birdsvie, 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 Point Elliott Treaty Tribes
Sept. 2004	S. Fork Nooksack River	4	Mt. St. Helens	Successful	Point Elliott Treaty Tribes
March 2005	S. Fork Nooksack River	10	Mt. St. Helens	Successful	Point Elliott Treaty Tribes
Sept. 2005	S. Fork Nooksack River	2	Mt. St. Helens	Successful	Point Elliott Treaty Tribes
Oct. 2005	S. Fork Nooksack River	39	Mt. St. Helens	Successful	WDFW and Point Elliott Treaty Tribes

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Current Distribution

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

282 Elk fitted with radio collars (some of which have a GPS feature) have contributed to the current
 283 understanding of elk movements in the North Cascades herd area. While not comprehensive, these data
 284 revealed that most of the marked elk did not undertake long-distance migrations. Rather, with few
 285 exceptions, they tended to maintain relatively small home ranges, which were generally closely associated

286 with river/riparian habitats throughout the year. However, some did show seasonal migratory patterns,
287 exploiting higher elevation habitats during the snow free summer months, and lower elevations during the
288 winter. The upper elevation limit of their distribution, about 600 m (2,000 feet), corresponds with the
289 lowest elevation of the snow pack during years with normal winter conditions. In most years, this
290 constriction of habitat by the snowpack typically occurs November to April. The majority of all elk
291 observed during annual population surveys (essentially winter conditions) are below 300 meters (1,000
292 feet). Alternatively, during the summer months, elk venture to higher elevation habitats including creek
293 drainages and headwaters within the Baker River watershed and on the south and west facing slopes of
294 Mount Baker.

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

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

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

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

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

321 Proposed Distribution

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

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326

327 **HERD MANAGEMENT**

328 **History**

329 WDFW believes that the North Cascades elk herd declined from a high of 1,400-2,000 elk in 1984 to only
330 a few hundred by the late 1990s (M. Davison, WDFW, unpublished data). However, biologists did not
331 generate population estimates using formal sampling protocols so the true rate of decline is unknown.
332 Nonetheless, this decline was readily apparent, which prompted WDFW, the Tribes, and other
333 cooperators to implement several strategies in the 1990s and early 2000s in an effort to promote growth
334 and expansion of the North Cascades elk herd. These strategies included restricting vehicle access,
335 implementing a harvest moratorium (1997-2006), and augmenting the population with 98 elk from MSH
336 (2003-2005). These actions have reversed the decline and the surveyed population has grown to an
337 estimated 1,170 to 1,375 elk. Recent observations suggest the elk population is expanding out into
338 peripheral portions of their historic range.

339 **Population Modeling**

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

348 **Estimated Population Size**

349 Surveys conducted in spring 2016 using mark-resight methodologies estimated there were 1,269 (95%
350 C.I. > = 1,170-1,379) elk within the portions of GMUs 418 and 437 surveyed (Figures 1 and 5). Figure 1
351 shows the approximate area covered by the surveys. These surveys were a joint effort by WDFW and the
352 Tribes. Mark-resight estimates of the cow and bull subpopulations (Figure 5) in spring 2016 were 778
353 (95% CI = 717-845) cows and 363 (95% C.I. = 274-481) bulls. These surveys underestimate the number
354 of calves in the surveyed population.

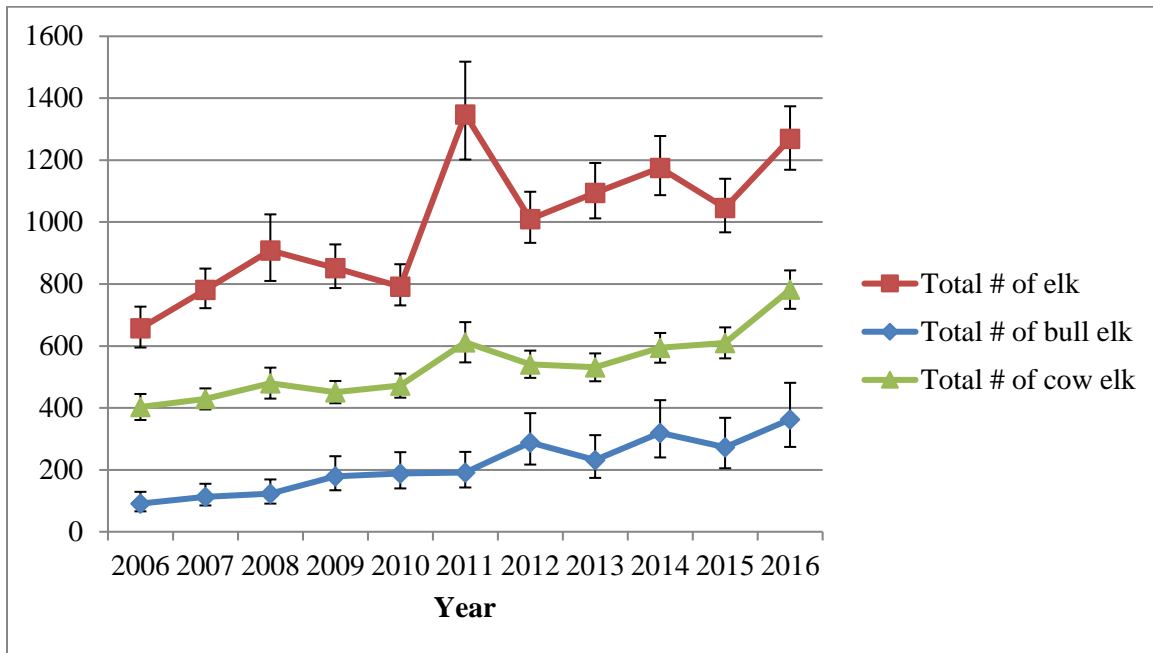
355 From 2006 to 2016, estimates of population size within the survey areas in GMUs 418 and 437 indicate
356 that the North Cascades elk herd has increased, at a rate of 5-7%, annually. Additionally, biologists'
357 observations and other anecdotal information suggest that an additional 200-400 elk occur elsewhere in
358 GMU 437, primarily south of the Skagit River between Sedro Woolley and Marblemount, and at least
359 100 more within the Sauk River Valley south of Rockport.

360 **Herd Composition**

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

368

369



370
 371 **Figure 5. Mark-resight estimates of total elk, cow elk, and bull elk population size in GMU 418 (Nooksack),**
 372 **2006–2016. Estimates also include elk within the northern portion of GMU 437 north of the Skagit River**
 373 **between Lyman and Concrete.**

374
 375 WDFW conducted pre-season surveys in the North Cascades elk herd area during most years from 1984
 376 to 2003, and on average would classify 167 elk (Appendix A). Resulting bull:cow ratios averaged 33:100,
 377 but were highly variable ranging from 15 to 78 bulls:100 cows. Age ratios were much more stable and
 378 averaged 49 calves:100 cows. WDFW also conducted post-season surveys during this same period, but
 379 less consistently (Appendix B). Post-season bull:cow ratios during this period were highly variable and
 380 ranged from 13 to 61 bulls:100 cows. Variations in sex ratios were likely due to small sample sizes rather
 381 than actual changes in the cow and bull subpopulations.

382
 383 Since implementing a standardized mark-resight survey protocol in 2006, calf:cow ratios have ranged
 384 from 26-47 calves:100 cows and bull:cow ratios have steadily increased to $\geq 50:100$, which are well
 385 above the objective of 12-20 bulls:100 cows. Spring calf:cow ratios $\geq 35:100$ generally represent good
 386 recruitment and excellent recruitment occurs when ratios are ≥ 40 .

387 Management Activities

388 Harvest Implementation

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

398 and other elk management activities. Decisions of this group reflect the annual co-management agreement
399 between WDFW and the Tribes.

400 Harvest Restrictions

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

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

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

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

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

428 Recreational Harvest

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

437 During 1997-2006, the North Cascades elk herd area was under a conservation closure for state-licensed
438 elk hunters. Most Tribes also implemented a conservation closure during this time, but some limited
439 ceremonial hunting may have occurred during the closure. By spring 2006, survey data and population
440 modeling suggested that the North Cascades elk herd had increased sufficiently to meet previously
441 defined criteria necessary for reinstating bull harvest (WDFW 2002). In 2007, WDFW and the Tribes
442 agreed to reinstate limited permit-controlled bull elk hunting in GMU 418. In 2007 and 2008, state and

443 tribal elk hunters equally shared 30 bull elk permits allocated each year. In the fall of 2009, WDFW
444 increased total permit allocation to 40 permits, shared equally between state-licensed and tribal hunters;
445 half of the permits for each group were designated as spike-only permits in 2009. This approach and the
446 total permit allocation remained the same for the 2010 and 2011 hunting seasons. In 2012, the permits
447 then increased to 50 to be shared equally. In 2015 the permits increase to 100 share equally. The State
448 permits were distributed between GMU 418 and Elk Area 4941, with 22 in GMU 418, and 28 in Elk Area
449 4941. Since 1997, GMU 437 has been closed to state hunters.

450 Poaching

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

456

457 **SOCIAL AND ECONOMIC VALUES**

458 Elk Hunting

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

462 Revenue generated by elk hunters provides significant economic benefits to Washington State. Myers
463 (1999) estimated the value of an elk to the state and local economy was as high as \$1,945 per harvested
464 elk in the Blue Mountains. The *2011 National Survey of Fishing, Hunting, and Wildlife-Associated
465 Recreation* reported that annual trip and equipment expenditures for big game hunting in Washington
466 averaged \$973 per hunter (U.S. Department of Interior et al. 2014). With the drop in hunter numbers
467 (Table 3), it is clear that the economic contribution of elk hunting in the North Cascades elk herd area is
468 now less than it once was. The mean number of hunters for the years 2005 to 2014 was only 166 hunters.

469 Elk Related Agricultural Conflicts

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

480

481 Elk/human conflict within agricultural areas of the North Cascades elk herd area has increased since
482 2006. Agricultural damage here mostly involves foraging and trampling of commercial agricultural and
483 horticultural crops (Table 4). In residential areas, elk cause damage to gardens and landscaping, pastures,
484 and fencing. Chronic elk damage in the North Cascades elk herd area is concentrated in the Acme-Saxon

485

486 Table 3. North Cascades elk herd annual tribal, state recreational and damage harvest, 2001–2015. These
 487 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

488

489 area in the Nooksack River Valley and along the lower Skagit River Valley from Bacus Hill to the town
 490 of Marblemount. In the Acme-Saxon area more than 100 elk are causing damage on agricultural lands.

491 However, the situation in the lower Skagit River Valley area is more complex. Elk/human conflicts occur
 492 over a larger geographic area and include multiple groups of elk that regularly move across State Route
 493 20 between Sedro Woolley and Rockport. A wide variety of agricultural and horticultural crops and
 494 infrastructure are involved including commercial apple orchards, vineyards, pasture, hay crops, green
 495 chop, feed corn, silage, blueberries, tree farms, and damage to fencing. The damage to fencing
 496 occasionally results in escaped livestock and resulting damage to neighboring properties and increased
 497 liability to livestock owners. Landowners in residential areas also routinely report elk caused damage to
 498 lawns, gardens, and associated landscaping. These conflicts are likely to increase as forestland conversion
 499 leads to residential and commercial development throughout the lower Skagit River Valley.

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

505

506 Table 4. Elk-related agricultural damage claims and payments from 2002-2016 in GMUs 407, 418, 437,
507 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

508 * The Washington legislature suspended elk agricultural damage payments in 2011 and 2012
509

510 In the 2003 season, Elk Area 941 became elk area 4941 (Figure 1) with boundary changes that extended
511 the eastern boundary further east on the north side of the Skagit River (Appendix C, D). The legal hunting
512 in Elk Area 4941 began in 2003 with general hunt seasons for both archery and muzzleloader hunters; in
513 2009, a permit only hunt for muzzleloaders was added, as well as some master hunter permits. Archery
514 remained as it was. For the 2010-2014 seasons, this area was limited entirely to master hunter antlerless
515 only permits. In 2015 and 2016, Elk Area 4941 became limited entry permits for master hunters, youth,
516 hunters with disabilities, and seniors.

517 Public Safety

518 The primary elk related public safety issue in the North Cascades elk herd area is the growing number of
519 elk-vehicle collisions along State Route 20 between Sedro Woolley and Concrete. Elk-vehicle collision
520 data are not precise, however available road kill mortality reports suggest that the average number of elk-
521 vehicle collisions more than doubled between the periods 2001-2006 and 2007-2011. Currently, the

522 annual number of elk-vehicle collisions is likely in the range of 20-30 (WDFW unpublished data). This
523 presents an important public safety issue to motorists and requires attention.

524 In addition, landowners have expressed concern about vehicle collisions with livestock when they escape
525 from elk-damaged fencing, suggesting that elk damaged fences could result in loss of property and a
526 substantial threat to motorists.

527 Tribal Values

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

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

538 Other Recreational Uses

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

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

557

558 HABITAT MANAGEMENT

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

564

565 **Limitations and Losses**

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

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

576 **Enhancement and Improvement Projects**

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

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

609

610 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)		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)		7.6	DNR
2004	DNR Edfro Block (Brigantine)		2.8	DNR
2004	DNR Edfro Block (Slip Knot)		5.4	DNR
2004	DNR Edfro Block (Windjammer)		6.4	DNR
2005	DNR Edfro Block (Frigate Units 2 & 3)		8.5	DNR
2005	DNR S. Cavanaugh Block (Quark Units 1 and 2)		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		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		6	PSE
2014	Burpee Hill		25	PSE
2014	Alder Creek		4	PSE
2014	Sauk-Suiattle Reservation	\$5,000	10.5	
2015	Burpee Hill		5	PSE
2015	Alder Creek		5	PSE
2015	Salvage Slough		50	SCL
2015	300 Road		15	Upper Skagit
2016	Upper South Fork Nooksack	\$140,000	14	SCL, Upper Skagit Indian Tribe

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612 **HERD MANAGEMENT GOALS**

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

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

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622 **MANAGEMENT OBJECTIVES AND STRATEGIES**

623 Population, Population Monitoring and Harvest Management

624 Background

625 The North Cascades elk herd is nearing the population objective of 1,950 elk. This includes the elk
626 sampled in the survey area (Figure 1) and other elk scattered throughout the herd area. There are
627 limitations to local population size based upon landowner tolerance and public safety; in particular, elk
628 numbers are to be reduced in areas of known elk/human conflict.

629 Maintaining a healthy elk population requires adequate bull:cow ratios. Harvest monitoring and collection
630 of biological samples associated with age and sex class identification are a part of our annual surveys. The
631 Game Management Plan (WDFW 2014) currently recommends a post-hunt range of 12 to 20 bulls per
632 100 cows, or when survival is estimated, an overall bull mortality rate of less than or equal to 50%.

633 Objective 1

634 The population objective for the North Cascades elk herd is 1,950 elk ($\pm 10\%$). The population objective
635 includes the elk within Skagit River Valley, the Acme Valley, and areas where WDFW's intent is to
636 minimize elk-human conflicts and ensure public safety (see Objective 5).

637 Strategies

- 638 1. Promote population growth in areas where the potential for elk/human conflict is low by limiting
- 639 opportunities to harvest elk in those areas
- 640 2. Maintain the recommended post-hunt bull:cow ratio in areas where the potential for elk/human
- 641 conflict is low while still providing opportunities for state and Tribal hunters to harvest elk
- 642 3. Adjust harvest recommendations based upon results of Tribal and state survey and harvest data
- 643 4. Use survey data to evaluate population trends at a minimum three-year interval

644 Background

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

652 Objective 2

653 By 2018, implement a monitoring strategy that will provide a sound basis for herd size estimation using
654 acceptable, cost effective methodologies.

655 Strategies

- 656 1. Work with the Tribal/State technical team to investigate survey methodologies or population
657 estimation techniques that have been successful in similar habitats.
658 2. Explore options that may provide supplemental funding that would allow continuation of the
659 mark-resight methods currently used on the herd survey area.
660

661 Hunter Access

662 Background

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

666 Objective 3

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

668 Strategies

- 669 1. Work with private landowners to increase hunter access to land ownerships along and adjacent to
670 the Skagit River throughout Elk Area 4941
671 2. Increase hunting opportunities in the Skagit River Valley by establishing a minimum of five
672 public access sites on privately owned lands by using the WDFW Private Lands Hunter Access
673 Program
674

675 Public Safety

676 Background

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

686 Objective 4

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

689 Strategies

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

705

706 Elk/Human Conflicts

707 Background

708 As the North Cascades elk herd has increased, elk distribution has expanded into agricultural areas in the
709 valleys where elk/human conflicts have arisen. In particular, in the Skagit River Valley and the Acme
710 Valley areas complaints have increased to 49 and 65 in 2015 and 2016 respectively. At this time,
711 complaints are defined as an event that would lead to a site-visit by a conflict specialist. As part of
712 completing this objective the program will decide upon a final definition of complaint. WDFW is the
713 primary source for property owners seeking to determine legal and effective remedies for addressing
714 wildlife interactions (WDFW 2016). By reducing the number of complaints that come to WDFW, the
715 number of claims will be kept to a minimum. A reduction in the number of complaints is also an
716 indication of increased social tolerance. Since 2013, WDFW has had staff stationed in the Skagit/Acme
717 areas entirely dedicated to addressing wildlife/human conflict complaints.

718 Objective 5

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

721 Strategies

- 722 1. Develop a program to track the number of elk/human conflict complaints requiring WDFW
723 response
- 724 2. Limit elk numbers in the Skagit River Valley, Acme Valley, and areas that experience chronic
725 elk/human conflicts by applying consistent hunting pressure on identified private properties from
726 July 1st to March 31st
- 727 3. Continue to use non-lethal preventative measures (e.g., hazing, fencing, etc.) to mitigate
728 elk/human conflicts

- 729 4. Continue to use cooperative agreements between landowners and WDFW (e.g., Damage
730 Prevention Cooperative Agreements, fencing agreements, etc.) to promote resolution of
731 elk/human conflicts
- 732 5. Continue to inform landowners of useful tools and techniques to minimize potential elk/human
733 conflicts
- 734 6. Continue to implement master hunter or other special permit hunts when appropriate and
735 encourage private land hunting access to provide added hunting pressure and opportunity
- 736 7. The Tribes and WDFW will develop survey protocol to accurately monitor elk numbers in areas
737 experiencing chronic elk/human conflicts
- 738 8. Continue to work with the Tribes on elk damage mitigation efforts
739

740 Intergovernmental Coordination

741 Background

742 WDFW acknowledges the right of the Tribes to hunt on open and unclaimed lands within their ceded
743 areas (Appendix E), which includes nearly the entire North Cascades elk herd area. WDFW also respects
744 the Tribes' co-management authority and adjusts State harvest target levels to account for tribal harvest.

745 Objective 6

746 Annually cooperate and collaborate with the Tribes to implement the North Cascades Elk Herd Plan and
747 to coordinate season setting and herd management in traditional hunting areas.

748 Strategies

- 749 1. Collaborate with the Tribes to update an annual Elk Harvest Agreement
- 750 2. Include the Tribes in development, review, and implementation of elk management within the
751 herd area. Identify areas of high, moderate, and low elk/human conflict risk so that staff can take
752 educational and preventative efforts to minimize potential conflict
- 753 3. Provide opportunity for discussion of elk management at the North Cascades Technical Group
754 meetings
- 755 4. Share harvest, monitoring and survey data, and promote joint enforcement efforts with the Tribes
756 to achieve management objectives
757
758

759 SPENDING PRIORITIES

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

761 Time Line: Annually

762 Cost: \$15,000 Annually
763

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

765 Timeline: 2016

766 Cost: \$5,000 Annually (payments to secure private lands access)
767
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769 HERD PLAN REVIEW AND AMENDMENT

770
771 WDFW will update and amend the North Cascades Elk Herd Plan as necessary. The plan will remain in
772 effect until revised. As new information is gathered and conditions change, it will be necessary to

773 maintain a free exchange of communication among WDFW, cooperators, and the Tribes. Meetings with
774 affected Tribes, the Northwest Indian Fisheries Commission and WDFW will occur when proposed
775 changes in elk harvest or habitat management strategies deviate substantially from the objectives and
776 strategies outlined in this document. The managers will address issues as needed, either at the technical or
777 policy level through regular meetings.
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838 **APPENDICES**

839 **Appendix A. North Cascades elk herd aerial pre-season composition survey data (1984-2003). Pre-**
 840 **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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Appendix B. North Cascades elk herd aerial post-season composition survey data (1991-2015)

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	

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

848 **Appendix C. State hunting seasons in the North Cascades elk herd area from 2002 to 2015. (For**
849 **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) 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)
	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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851 **Appendix D. North Cascades elk herd area boundary changes since 2002. (For changes from 1980**
 852 **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 Birdsview area.
2009- 2016	GMU 407, 418, 448 GMU 437 (closed) Elk Area 4941	No changes made.

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