

# **South Rainier Elk Herd Plan**

Washington Department  
of  
Fish and Wildlife  
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Region Five and Six

## I. Introduction

The herd plan is a step-down planning document under the umbrella of the Washington State Management Plan for Elk (McCall 1997) and the Environmental Impact Statement for Elk Management (McCall 1996). For management and administrative purposes the State has been divided into numerous Game Management Units (GMUs). A group of GMUs is described as a Population Management Unit (PMU). The South Rainier Elk Herd is one of ten herds designated in Washington. In this context an elk herd is defined as a population within a recognized boundary as described by a combination of GMUs. The South Rainier elk herd is in PMU's 55 and 62 and has the following GMUs: 510 (Stormking), 513 (South Rainier), that portion of 516 (Packwood) that lies north of Lake Creek, Packwood Lake, and Upper Lake Creek, extending to the Pacific Crest Trail, and GMU 667 (Skookumchuck).

The South Rainier Elk Herd Plan is a five-year planning document subject to annual review and amendment. Once approved the plan will remain in effect, as amended or until canceled. The Washington Department of Fish and Wildlife (WDFW) recognizes the sovereign status of federally recognized treaty tribes. This document recognizes a responsibility of the WDFW to cooperate and collaborate with the Medicine Creek Treaty Tribes. It also recognizes the role of public land management agencies, notably the U.S. Forest Service, U.S. National Park Service, Washington Department of Natural Resources, and private landowners in elk management.

## II. Area Description

**A. Location:** The South Rainier elk (*Cervus elaphus*) herd occurs in parts of three game management units (GMUs) in northeastern Lewis County, one in central Lewis/southeastern Thurston Counties, and in Mount Rainier National Park (MRNP). These units are GMU 510 (Stormking), GMU 513 [South Rainier; prior to 1997, this unit was divided into GMUs 512 (Sawtooth) and 514 (Tatoosh)] that portion of GMU 516 (Packwood) that lies north of Lake Creek, Packwood Lake, and Upper Lake Creek, extending to the Pacific Crest Trail, and GMU 667 (Skookumchuck). The South Rainier herd also includes the MRNP South herd. The range of the MRNP South herd roughly extends from Fryingpan Creek south (Bradley 1982). The herd area is bounded by the Cascade Crest to the east, on the south by the Cispus River and from Morton to Centralia by Highway 508 and the Centralia-Alpha Road, Interstate Highway 5 to the

west, and the Bucoda- Tenino Road and State Hwy 507, the Nisqually River and MRNP to the north. The area is entirely within the Southern Washington Cascade Physiographic Province (Franklin and Dyrness 1973).

- B. Ownership:** Land ownership in the herd area is varied. The primary landowner is the U.S. Forest Service (USFS), with the majority of the herd area contained within the Gifford Pinchot National Forest (GPNF). Mount Rainier National Park includes the northern fringe of the herd area. Private small acreage holdings, principally along the Cowlitz River, and smaller tracts of State and privately-owned industrial forest land comprise the remainder of the herd area.
- C. Topography:** Elevations in the South Rainier herd area range from about 250 ft along the Skookumchuck River to 14,408 ft at the summit of Mt. Rainier. The entire area is in the Cascade Mountains, and consists of moderate to steep topography. Level to gently rolling terrain occurs only along the major drainages, primarily the Cowlitz and Cispus rivers. Elk use virtually the entire herd area below approximately 6,500 ft, with the exception of extremely steep rocky terrain.
- D. Vegetation:** The three major forest zones in this area are arranged along elevational and moisture gradients (Franklin and Dyrness 1973). These are named after the climax conifer species and are, in order of increasing elevation: the Western Hemlock (*Tsuga heterophylla*), Pacific Silver Fir (*Abies amabilis*), and Mountain Hemlock (*T. mertensiana*) zones. Differences in aspect, soil type, and slope account for diversity within each of the major forest zones. This may be reflected in different seral species, codominants, and a variety of understory communities.
- E. Human Influences:** Human recreational use of the South Rainier herd area is high. Hiking, backcountry camping, cross-country skiing, and other nonconsumptive uses occur throughout the year in both MRNP and the GPNF. Fishing, hunting, and trapping also occur extensively throughout the GPNF and adjacent privately owned lands.

Extensive residential and agricultural development along the Cowlitz River has affected the principal wintering area of the South Rainier herd. This results in both a loss of key wintering habitat for the South Rainier herd as well as increased conflicts between humans and elk.

Intensive logging, virtually all by clear cutting, has greatly changed the character and structure of all forest outside of MRNP. Originally almost unbroken forest, most areas today are a patchwork of clearcuts and seral stands of various ages. The conversion of old growth forest to young regrowth is almost complete within the lower elevation

Western Hemlock Zone. This zone reaches to approximately 3,300 ft in the area and includes all of the winter range for this elk herd.

The greatest human influence on the South Rainier herd has been through direct mortality. Regulated hunting harvest alone removes from 40 to  $\geq 60\%$  of all bull elk annually from elk populations outside of MRNP.

- F. Other Ungulates:** The entire range of the South Rainier elk herd is also used by an estimated 11,000 black-tailed deer (*Odocoileus hemionus columbianus*). Mountain goats (*Oreamnos americanus*) occupy high-elevation rugged terrain throughout the South Rainier area, particularly along the Tatoosh, Backbone, Cascade Crest, and Carlton Ridge areas. Mountain goats and elk segregate during most of the year, due to the preference of mountain goats for steep, rocky terrain. During summer, both species occupy high elevation meadows. Domestic livestock, primarily cattle and horses, are common on wintering areas along the Cowlitz River.

### III. Distribution

- A. Historic Distribution:** The herd area is within the original range of the Roosevelt subspecies of North American elk (*C. e. roosevelti*). There has been some controversy as to whether elk originally occurred in this area. Bradley (1982) found no evidence that elk were listed as part of the resident fauna at the establishment of MRNP in 1899. However, by the late 1800's Roosevelt elk had already been largely extirpated over much of their former range. Citing archaeological and anthropological evidence Schullery (1984) concluded that elk were present in the area of MRNP prior to non-tribal settlement. It is generally accepted that elk populations in the area have increased as a result of various introductions of Rocky Mountain elk (*C. e. nelsoni*) from Yellowstone National Park in Wyoming. Beginning in the early 1900's, these releases continued through 1933. The introductions having the most direct effect on subsequent elk populations in the South Rainier herd occurred from 1914 to 1915 in the Bethel Ridge area and from releases from 1932 to 1933 between the western boundary of MRNP and the town of Eatonville (Appendix A).

The records of MRNP indicate low elk numbers in the park until the 1950's when elk numbers increased significantly. This increase coincided with logging activities outside the park, which increased the habitat carrying capacity on winter ranges.

Elk appeared in the Skookumchuck River drainage in the late 1970s when a small number were discovered on the Centralia Mine south of Tenino. The mine was closed to

public access and grass growing on lands being reclaimed after mining produced ideal conditions for growth of the herd.

- B. Current Distribution:** Elk numbers are highest in the Packwood (GMU 516) unit. Recently elk have expanded their range into the Stormking (GMU 510) unit, however the steep topography of this unit make high elk densities unlikely, despite adequate forage and cover attributes. Elk numbers in the Cowlitz and Cispus river valleys are highest during the late-fall and winter as migratory groups move to lower elevations outside of MRNP. These migratory Park elk use winter ranges in the former Tatoosh and Sawtooth units (now GMU 513, South Rainier). As USFS lands outside of MRNP were opened up by logging, creating a more favorable habitat mix for elk, many elk groups remained outside of the park year-around and are now considered local residents. The existence of large herds of local resident elk complicate a clear delineation of summer and winter range over the extent of the South Rainier herd. Many elk remain below 3,000 feet for the entire year, whereas other groups move from high alpine meadows at 6,000 feet to the valley floor during the winter. Winter range of this herd, however, can be broadly classified as habitat occurring below 2,800 feet. Elk in the Skookumchuck River watershed reside primarily south of Skookumchuck reservoir and on or adjacent to the Centralia Mine south of Tenino. These elk are essentially non-migratory.
- C. Proposed Distribution:** No landscape-scale changes are anticipated in the distribution of the South Rainier herd. Urbanization has led to increases in elk/human conflicts throughout the range of the South Rainier herd. These problems have led to management practices that strive to reduce or eliminate elk from given damage-prone areas. Thus, localized reductions in elk numbers may occur, however, the overall range of the herd will remain the same.

#### IV. Herd Management

##### A. Herd History, Current Status, and Management Activities:

*Estimated Population Size:* Elk population estimates are derived using a modified population reconstruction method (Bender and Spencer 1999). Elk herd demographic data and estimates of harvest are used to derive minimum population estimates. The South Rainier herd residing in the Cascades, east of SR 7, has been declining since 1994. The magnitude of this decline has been approximately 39%. The estimated population of the Cascade portion of the South Rainier herd has decreased from approximately 3,800 to just over 1,700 (Figure 1). A 1999 survey indicated that the MRNP South herd, however, has remained stable to increasing since 1996. The Skookumchuck herd has also remained stable over this period, averaging about 400 animals.

The population goal for the South Rainier herd is to increase the population from present levels back to the 1996 level of approximately 2,500 elk, assuming normal fluctuations. Apart from in damage-prone areas, population sizes in existing elk areas will be maintained at current levels or increased.

*Herd Composition:* In western Washington, herd composition of elk is determined in the fall (pre-hunting season) because this is when the most unbiased information can be obtained. Statewide objectives for bull:cow ratios are reported using post-hunting season ratios to provide a comparable objective for western and eastern Washington.

Fall bull:cow ratios in the area east of SR 7 (GMU's 510, 513 and 516) have averaged 17 bulls per 100 cows since 1996 (Appendix B). Survey coverage and subsequent sample sizes, however, have been sparse. Calf production, based on these fall surveys has averaged 48 calves per 100 cows. Data from Units with the identical historic harvest regimes have averaged 25 bulls per 100 cows pre-season (fall).

Fall bull:cow ratios in the Skookumchuck unit (GMU 667) averaged 16 bulls per 100 cows during 1998 and 1999 (Appendix B). Sample sizes in this unit have also been small and geographic coverage generally limited. Calf production over this same period has averaged 46 calves per 100 cows.

Using estimates of harvest and other sources of mortality, the pre-hunting season composition information for western Washington is converted to post-hunting season data to compare to statewide objectives, which are based on post-season surveys. Post-hunting season bull:cow ratios in the area east of SR 7 (GMU's 510, 513, 516) have averaged 9 bulls per 100 cows.

The WDFW has established a minimum bull elk survivorship goal of 12 bulls per 100 cows based on post-hunting season surveys (Washington Dept. of Fish and Wildlife 1996). Based upon an analysis completed in early 2000, modeled post-season bull:cow ratios of the South Rainier herd east of SR 7 (GMU's 510, 513, and 516) are ~9 bulls per 100 cows. This is significantly lower than objectives. The current modern firearm general season regulations are 3-pt minimum for bull elk. Currently, this harvesting strategy is not resulting in the desired post-season ratios. The 3-pt minimum regulation has only been in effect, however, since 1998. It remains to be seen whether this harvesting strategy will result in achievement of bull escapement goals in these Units.

Calf production has historically been excellent in the South Rainier herd (with the exception of the MRNP South herd). Calf production in parks or reserves where hunting

is not allowed is generally lower than areas where hunting occurs (Thomas and Toweill 1982). Populations are probably closer to the carrying capacity of the habitat in areas where elk are not hunted. Fall (pre-hunting season) calf ratios are key in that they provide an index of the amount of mortality the elk population can withstand before declining. Calf ratios greater than 30:100 indicate a minimum cow mortality threshold of about 15% assuming no overwinter calf mortality, and about 7.5% assuming 50% overwinter calf mortality. A regulated cow elk harvest rate of 2.5-5.0% has been managed for in the South Rainier herd, well within the population's ability to withstand the harvest. High levels of cow harvest, however, have resulted in population decline.

*Mortality:* Modeled annual bull mortality rates of the South Rainier herd east of SR 7 (GMU's 510, 513, and 516) are approximately 71%. Observed rates from surveys are ~62%. Due to the paucity of recent, good, representative survey data, the modeled rates are likely closer to the actual figures. Modeled mortality rates are derived using harvest estimates and a population reconstruction model. Without annual observations of the elk herd, modeled demographic parameters provide the best estimate of actual conditions. This level of overall bull elk mortality indicates that the South Rainier herd is unable to meet WDFW bull elk escapement objectives (Washington Dept. of Fish and Wildlife 1997) based on observed bull:cow ratios. To meet WDFW escapement objectives, bull elk mortality must be decreased in the South Rainier herd.

Non-hunting specific mortality rates for the Mt. Rainier herd are unknown. It is estimated in other areas of Washington, however, that hunting accounts for 80% of all bull mortality. This estimate, however, was derived in an area with little extraneous harvest pressure. This figure is likely not realistic for the South Rainier herd east of SR 7.

A factor negatively affecting bull and cow survival rates east of SR 7 is the existence of widespread poaching. The actual extent and effect of these losses and their contribution to the observed and modeled bull mortality rates is unknown, but may account for more than the estimated 10-15% of annual mortality that is attributable in other areas of Washington (WDFW 1994).

Current elk harvest of the entire South Rainier herd has averaged 178 (range:129-203) since 1995. Over this period, hunters harvested a mean of 125 bulls and 56 cows (Appendix C). Over half of the antlerless harvest over this time period has come from Skookumchuck.

Increased harvest, in conjunction with high poaching losses, are hypothesized to be the driving factors affecting general population decline of the South Rainier herd, east of State Highway 7. Increased monitoring of the South Rainier herd will be necessary to evaluate the effects of tribal and recreational hunting on elk. It was originally hypothesized that

many of the elk that were harvested by tribal members were migratory MRNP animals. Recent surveys indicate that this hypothesis may be false. A 1999 survey effort in the south part of MRNP indicated an increase in the Park population, while the South Rainier herd has been declining. Further clarification is needed as to the contributions of local and MRNP South herd elk to both tribal and recreational harvest.

## **B. Social and Economic Values**

*Hunter Days:* In 1998, 3,374 non-tribal hunters spent an estimated 13,226 days afield hunting for South Rainier elk. Hunter pressure has averaged 3,865 hunters since 1995. The overall trend in hunter effort is declining. The revenue generated by hunters contributes significantly to the local economies of the small towns located within the range of the South Rainier herd. Based upon figures compiled in a 1996 national survey, approximately 2.4 million dollars is generated annually either directly or indirectly by hunters in the area encompassed by the South Rainier herd.

*Harvest Strategies:* Historically, harvest regimes in the Units comprising the South Rainier herd have been variable (Appendix D). These harvesting strategies have ranged from; (1), any bull to, (2), 'spike-only', branched bull by permit to, (3), 3-pt minimum.

Currently, the entire South Rainier herd is managed under a 3-pt minimum harvest regime. This type of harvest regime puts extreme harvest pressure on the older age classes of the population (\$2.5 years old). Antler point restrictions will typically result in higher post-season bull:cow ratios, at the expense of survivorship and recruitment into the older age classes. Prior to 2000, antlerless harvest was allowed during archery seasons, and through permit during firearm and muzzleloader seasons. For the 2000-02 hunting seasons, no regulated antlerless harvest during general hunting seasons will be allowed, except for during early archery seasons in the Skookumchuck Unit. Antlerless hunting is allowed during special damage hunts, only within the boundaries of the damage area.

*Nonconsumptive Uses:* Public viewing of the South Rainier herd is high, particularly summer viewing in the high country of MRNP, the adjacent Tatoosh Wilderness area, and the Goat Rocks Wilderness area. Due to the large number of non-consumptive users relative to hunters using the elk resource, the economic benefit derived through non-consumptive uses of the elk resource are likely higher than the 2.4 million dollar estimate for consumptive uses of the resource.

*Damage:* Legislative mandate under RCW 77.12.270 and 77.12.280 requires that the Washington Department of Fish and Wildlife respond and compensate landowners for elk damage. The issue of elk damage and the most effective method to alleviate such damage is one of the most important aspects of elk management, particularly in Southwest



Washington. Possible solutions to chronic elk damage include; hazing with pyrotechnics, trap and transplant, lethal removal. In southwest Washington, hazing of elk through the use of 'cracker shells' and other pyrotechnic devices has not been effective in the past because elk quickly become conditioned to the disturbance. Due to financial and logistic concerns, trap and transplant of damage-causing elk is not practical. Lethal removal has been the tool that has proven the most effective. Presently, efforts are underway to assess the efficacy of the present policies and programs (e.g. specific damage area hunts vs landowner or kill permits). It is of utmost importance that methods are used that target damage-causing elk herds for reduction, rather than merely elk herds in general. In some areas of their range, elk are declining where they are wanted and increasing in areas where they are not. The overall range of the South Rainier herd provides such an example.

Further complicating the damage issue are the varying public perceptions concerning the role and place of elk in the ecosystem. Farmers, Christmas tree growers, and residential home owners all have differing attitudes towards an elk herd. In Packwood, for instance, lawns are specifically groomed to attract elk, whereas a mile away, elk are considered a nuisance and are actively being harassed or removed through a landowner preference permit.

Elk damage to commercial agricultural and horticultural crops or silvicultural areas in the South Rainier herd area is becoming more widespread. Although the number of claims that are financially compensated is slight, the volume of complaints continues to increase (Appendix E). Damage occurs on farms and ranches occupying both the Cowlitz and Skookumchuck River lowlands and the Hanaford Creek bottomlands, the traditional wintering areas for the South Rainier herd. Horticultural damage also occurs in developed areas adjacent to Packwood and Randle, the principal municipalities in the eastern extent of the herd area.

Several special damage-control hunts are held in the South Rainier herd area. One such hunt is conducted during January and is designed to target specific herds of elk that cause damage along the Cowlitz and Cispus rivers near the town of Randle. Another, on or adjacent to the Centralia Mine, provides disabled hunters an opportunity to take antlerless elk. Damage complaints have also been addressed in these areas through the issuance of landowner kill permits. These permits have worked to provide some compensation to landowners, but have not effectively reduced damage and use by elk. It is hoped that the more widespread harassment and harvest of cow elk achieved through special damage hunts will ultimately result in fewer incidences of damage.

## V. Habitat Management

The South Rainier elk herd is currently being limited by direct mortality, primarily human-related harvest, and not by habitat quantity or quality (with the possible exception of elk numbers in GMU 510 (Stormking), which may be limited by topography). Several projects, however, have been initiated to increase carrying capacity of the habitat east of SR 7. A forage seeding program begun in 1989 and lasting through 1994 was implemented on 368 acres of USFS land within the range of the South Rainier herd. An additional 60 acres of wintering habitat was planted with preferred browse species (Appendix F). A lack of intensive site preparation limited the ultimate efficacy of the forage seeding program. Browse plantings have been somewhat more successful, however, more expensive and labor intensive to implement. Mitigation lands in the Skookumchuck River floodplain, managed by PacifiCorp in cooperation with WDFW, produce forage specifically for elk. Forage seeding and fertilization to enhance elk forage are also part of the reclamation protocol on Centralia Mine properties.

The South Rainier herd faces continued future losses of habitat through the decrease of both summering and wintering habitat on USFS lands due to modified USFS management procedures, primarily the creation of extensive Late Successional Reserve areas. Loss of habitat due to Late Successional Reserve establishment is expected to decrease the capability of GPNF lands to support elk by up to 40% in certain areas (R. Scharpf, GPNF, unpubl. data). Efforts to minimize this impact, including manipulating Managed Late Successional Areas to provide elk forage, are currently being evaluated by the GPNF and the WDFW. Additionally, both the Randle and Packwood Districts of the GPNF are demonstration areas for new USFS silvicultural practices aimed at maintaining timber production while minimizing impacts on late successional wildlife species. These demonstration projects may help identify methods which minimize the loss of elk habitat as well.

Mining operations also eliminate elk habitat in the Skookumchuck unit, sometimes displacing elk to adjacent private pasture lands. Landowner intolerance of elk damage to hay crops and fences makes these lands unsuitable as winter range and damage hunts and landowner kill permits are used to attempt to reduce elk numbers and drive them from these attractive areas.

Forest encroachment on high elevation meadows also threatens critical elk habitat in the South Rainier herd area. An analysis conducted by the USFS and WDFW indicated that approximately 20% of high elevation meadows in the southern extent of the range of the South Rainier herd was lost to conifer encroachment from 1959-90 (WDFW 1998). An additional 79% of remaining meadow was classified as having moderate to high levels of intrusion. Presently, WDFW and USFS are looking at methods to reduce/inhibit conifer encroachment.

Winter closure (December-April) of approximately 45 miles of USFS road have helped to reduce human harassment of wintering elk. Closures of entire drainages within the wintering range would greatly reduce poaching and other human-related mortality. Road closures and subsequent restriction of human access has been demonstrated to result in lower stress and higher survival for elk (Cole et al. 1999). Public sentiment is currently strongly against any further restrictions in access, so further opportunities for road closures are likely limited.

The South Rainier elk winter primarily along the Cowlitz River, from just upstream of Randle. This wintering habitat is shared with elk from the St. Helens herd, and much is already in agricultural or residential development (including the towns of Packwood and Randle). Residential development along the Cowlitz continues to result in loss of key wintering habitat, as well as increase the potential for human/elk conflicts. Acquisition and subsequent closures of key wintering range are possible methods to reduce some of the damage issues in the Valley, and reduce the poaching and other harvest that occurs on these animals after November.

The WDFW review of and coordination with the GPNF and the Washington Department of Natural Resources (DNR) regarding timber harvest plans in the elk winter range has facilitated maintaining the quality of elk wintering habitat associated within the remaining forested tracts along the Cowlitz.

## **VI. Research Needs**

1. More information is needed on the movement patterns and wintering areas of elk in the South Rainier herd. The patterns of movement of the MRNP South herd have been described (Bradley 1984), but the movements and wintering areas of the elk occurring outside of MRNP are less understood. This information is necessary to understand the specific wintering areas of elk, and would be useful in assessing the potential impacts of increased development along the upper Cowlitz and modified forest practices in the GPNF. Complicating this issue, a portion of the St. Helens herd also winters along the Cowlitz River in the Randle-Packwood area.

A joint effort between the Medicine Creek Treaty Tribes and WDFW to elucidate the movements and summering origin of wintering elk in the Cowlitz River valley was undertaken in the winter of 1999-2000. This project is slated to continue and hopefully the data gathered will help further understanding of the population dynamics of the elk in MRNP.

## **VII. Herd Management Objectives**

The South Rainier Elk Herd Plan provides the historical background, current condition and trend of this important resource. It is essentially an assessment document that, identifies management problems, develops solutions to overcome these problems, and sets direction. The plan outlines strategies and helps establish priorities in resolving management of the elk herd. It provides a readily accessible resource for biological information collected from the herd and identifies inadequacies in scientific information. The objectives of the South Rainier Elk Herd plan are to:

- 1.) To manage the South Rainier elk herd for sustained yield.
- 2.) To manage elk for a variety of recreational, educational and aesthetic purposes including hunting, scientific study, cultural and ceremonial uses by Native Americans, wildlife viewing and photography
- 3.) Protect, manage and enhance elk habitats to ensure healthy, productive populations.

## VIII. Management Goals, Problems and Strategies

### A. Herd Management Goals, Problems and Strategies:

1. *Goal:* Increase the scientific database for managing the elk population.

*Problems:*

Lack of consistent survey data for the South Rainier herd.

*Strategies:*

- a. Increase level of pre-hunting season composition surveys by 100% to more precisely (90% C.I. of  $\leq 10\%$  of the mean) document herd demographics and population size.
  - b. Increase precision and accuracy of tribal harvest.
  - c. Increase precision and accuracy of recreational harvest.
  - d. Standardize data collection methods.
  - e. Initiate spring surveys to better assess calf recruitment.
2. *Goal:* Increase the estimated elk population from present levels to the 1996 estimate of 2,500 elk in keeping with habitat limitations and landowner tolerance.

*Problems:*

Estimated elk population has declined approximately 39% since 1994. Decline is likely attributable to over-harvest.

*Strategies:*

- a. Increase elk in areas where they cause little conflict and decrease elk in areas

where they cause problems.

1. Strive to acquire key wintering habitat, increase habitat quality of summer range.
  2. Determine efficacy and overall success of damage hunt program.
  - b. Eliminate antlerless hunting if population goals are not being met.
3. *Goal:* Manage all elk units for post-hunting season bull ratios of  $\geq 12$  bulls per 100 cows in combination with overall bull mortality rates  $\leq 50\%$ .

*Problems:*

Bull mortality rates are too high to meet current post-season ratio objectives.

*Strategies:*

- a. Maintain current management strategies for GMUs for at least the next 3 years to determine whether they achieve objectives for bull:cow ratios and bull mortality rates.
  - b. Explore other options for meeting management strategies such as, reducing season length or initiating permit-only hunting.
4. *Goal:* Monitor the ratio of calves to cows to assess production and recruitment.

*Problems:*

Inadequate survey intensity.

*Strategies:*

- a. Monitor annual production and recruitment levels using pre-hunting season composition surveys.
  - b. If recruitment levels are inconsistent with population objectives, strategies for harvest management will be adjusted and the cause will be investigated.
  - c. Increase the precision of pre-hunting season surveys of calf production to evaluate the ability of the herd to tolerate observed levels of harvest.
  - d. Utilize spring surveys to better estimate ultimate recruitment rates.
5. *Goal:* Increase public awareness of the elk resource and promote non-consumptive values of elk including viewing and photographic opportunities.

*Strategies:*

- a. Develop a brochure for the public with general information on where elk are likely to be found and their natural history and management.
6. *Goal:* Determine movement patterns of elk and effect of tribal harvest on South

Rainier elk herd.

*Problems:*

Lack of data.

*Strategies:*

- a. Increase the precision of bull elk mortality rates and elk population estimates by increasing the level of surveys by 100%.
- b. Continue joint research project with the Medicine Creek Treaty Tribes to determine movement patterns, herd composition, mortality rates of elk using radio telemetry.

7. *Goal:* Reduce damages caused by elk.

*Problems:*

Increasing number of elk/human conflicts throughout the wintering habitat of the South Rainier herd, caused in part by residential encroachment.

*Strategies:*

- a. Use hot-spot hunts, landowner damage hunts, and landowner preference permits that target the elk doing the damage. In areas of widespread historic damage, special late-season hunts will be used to suppress local populations of elk.
- b. Increase forage enhancement projects on USFS, DNR, PacifiCorp, and industrial forest lands.
- c. Investigate and identify factors which predispose areas to damage, such as elk numbers, elk behavior, cultural practices (cultivating techniques, crops grown), and landscape patterns.

**B. Habitat Management Goals, Problems and Strategies:**

1. *Goal:* Maintain current habitat capability of USFS lands (no net loss).

Problems: Reduction in timber harvest volume, conifer encroachment of high elevation meadows.

*Strategies:*

- a. Work with USFS to develop silvicultural treatments to increase elk habitat quality on Managed Late Successional Areas.
- b. Identify suitable matrix lands and other early successional habitat to manage preferentially for elk.

- c. Continue to reduce road densities to 1 mi/mi<sup>2</sup> on wintering areas.
  - d. Continue to work with USFS to identify and maintain openings at high elevation.
2. *Goal:* Maintain current level of winter range along the Cowlitz and Skookumchuck Rivers and the Hanaford system.

*Problems:*

Loss of habitat due to increasing urban development.

*Strategies:*

- a. Look to acquire key wintering areas and subsequently restrict human access into these areas.
  - b. Work with both public and private landowners to design development strategies which do not result in declines in winter range capability for elk.
  - c. Continue to work with the USFS, DNR and PacifiCorp to manage for no net loss of winter range capability from forest practices and mining.
  - d. Acquire management authority over critical elk wintering areas through conservation easements, lease agreements, land exchanges, landowner incentives, and fee purchases.
  - e. Continue to reduce road densities to 1 mi/mi<sup>2</sup> on wintering areas.
3. *Goal:* Maintain quality of elk summer ranges on all land ownerships.

*Problems:*

Changing land-use patterns are resulting in loss of early successional forest habitat.

*Strategies:*

- a. Increase forage enhancement efforts with public and private landowners.
  - b. Identify and protect key habitats, such as wintering and calving areas.
4. *Goal:* Develop partnerships to improve habitat for elk.

*Problems:*

Lack of broad support base.

*Strategies:*

- a. Seek funding and support from conservation organizations.
- b. Work closely with agencies and industrial timber landowners.
- c. Solicit volunteers to conduct projects.

## IX. Spending Priorities

- A. Pre-hunting season composition surveys:** Pre-hunting season composition surveys should be substantially increased in the South Rainier herd area. Pre-season composition surveys allow the estimation of mortality rates for bull elk and the level of antlerless harvest that the herd can sustain. These rates must be more precisely estimated to assess the success of the new bull elk harvest strategies, increase the precision of population estimates, and document the effect of recreational and tribal harvest. Pre-season composition surveys are the single most important activity WDFW conducts for elk management, and funding levels should be enhanced to allow more precise management of the elk resource.
- Priority:* High  
*Time line:* Fall/Spring annually 2001-2006  
*Cost:* \$6000/year
- B. Secure and enhance more wintering habitat.** Work in conjunction with USFS, DNR, and private landowners to secure and then enhance, through browse plantings and access limitations, large tracts of winter range. This is critical to reducing damage complaints and to protect wintering animals from human-related mortality. Human-related mortality is the driving mechanism in the decline of this elk herd. Much of this mortality has historically been occurring outside of the regulated hunting seasons.
- Priority:* High  
*Time line:* Ongoing  
*Cost:* Unknown
- C. Monitor tribal and recreational harvest:** Increase the precision and accuracy of tribal and recreational harvest estimation from the South Rainier herd.
- Priority:* High  
*Time line:* Ongoing  
*Cost:* \$0
- D. Increase enforcement emphasis:** Increase the level of law enforcement by adding one FWO. Implement an “Eyes in the Woods” program to better involve citizens in anti-poaching campaigns. Poaching is a major factor driving population decline of this herd. Present staffing levels are inadequate to address the problem.
- Priority:* Moderate  
*Time line:* FY2001-02  
*Cost:* ~ \$10,000 to \$100,000



## **X. Literature Cited**

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**APPENDIX A. HISTORY OF ELK RELEASES IN THE RANGE OF THE SOUTH RAINIER ELK HERD.**

Date	Location of plant	Number planted	Origin of planted elk
January 20, 1913	Naches River	50 (42 Cow, 8 Bull)	Montana
Winter 1932	Eatonville	30	Montana

**APPENDIX B ELK COMPOSITION DATA FROM SOUTH RAINIER ELK HERD, 1996-1999.**

YEAR	DATE(S)	SURVEY TYPE	GMU	TOTAL OBSERVED	TOTAL CLASSIFIED	ADULT BULLS	SPIKE BULLS	RAGHORN BULLS	TOTAL BULLS	COWS	CALVES	RATIO B/100C/C	OBSERVER
1999	Oct 14	Aerial	516	34	34	0	4	2	6	19	9		
1999	Sept 24	Aerial	667	37	37	1	0	0	1	24	12	4/100/50	McAllister/Schirato
1998	Oct 5	Aerial	667	29	29	1	4	0	5	17	7	29/100/41	McAllister/Schirato
1997	Fall	Aerial	516	95	95	1	7	3	11	56	28		
1997	Fall	Aerial	513	2	2	0	0	0	0	2	0		
1996	Fall	Aerial	516	28	28	2	2	0	4	18	6		
1996	Fall	Aerial	512	50	50	0	0	0	0	32	18		

**APPENDIX C ESTIMATED HARVEST FROM SOUTH RAINIER ELK HERD, 1994-1999.**

<b>Year</b>	<b>Bulls</b>	<b>Cows</b>	<b>Total</b>
1999	Not Available	Not Available	Not Available
1998	142	41	183
1997	76	53	129
1996	128	69	197
1995	143	60	203
1994	286	118	404

**APPENDIX D SUMMARY OF GENERAL FIREARM HUNTING SEASONS FOR SOUTH RAINIER ELK HERD, 1991-2000.**

<b>YEAR</b>	<b>GMU 510</b>	<b>GMU 512</b>	<b>GMU 513</b>	<b>GMU 514</b>	<b>GMU 516</b>	<b>GMU 667</b>
2000	3 PT MINIMUM		3 PT MINIMUM		3 PT MINIMUM	3 PT MINIMUM
1999	3 PT MINIMUM		3 PT MINIMUM		3 PT MINIMUM	3 PT MINIMUM
1998	3 PT MINIMUM		3 PT MINIMUM		3 PT MINIMUM	3 PT MINIMUM
1997	SPIKE ONLY		3 PT MINIMUM		SPIKE ONLY	SPIKE ONLY
1996	ANY BULL	3 PT MINIMUM		ANY BULL	ANY BULL	ANY BULL
1995	ANY BULL	3 PT MINIMUM		ANY BULL	ANY BULL	ANY BULL
1994	ANY BULL	3 PT MINIMUM		ANY BULL	ANY BULL	ANY BULL
1993	ANY BULL	ANY BULL		ANY BULL	ANY BULL	ANY BULL
1992	ANY BULL	ANY BULL		ANY BULL	ANY BULL	ANY BULL
1991	ANY BULL	ANY BULL		ANY BULL	ANY BULL	ANY BULL

**APPENDIX E SUMMARY OF ELK DAMAGE COMPLAINTS ASSOCIATED WITH SOUTH RAINIER ELK HERD.**

<b>Year</b>	<b>Total Complaints</b>	<b>Monetary Compensation</b>
1999	29	0
1998	13	0
1997	16	0
1996	22	1,235.00
1995	10	1,470.00

**APPENDIX F      SUMMARY OF HABITAT ENHANCEMENT PROJECTS CONDUCTED FOR SOUTH RAINIER ELK HERD,  
EAST OF SR 7.**

<b>YEAR</b>	<b>PROJECT</b>	<b>ACRES</b>	<b>LOCATION</b>
1989	FORAGE SEEDING AND FERTILIZATION	102	GMU 513, 516
1989	BROWSE PLANTING	30	GMU 516
1990	FORAGE SEEDING AND FERTILIZATION	173	GMU 513, 516
1991	BROWSE PLANTING	30	GMU 516
1992	FORAGE SEEDING AND FERTILIZATION	81	GMU 513 AND 516
1993	FORAGE SEEDING AND FERTILIZATION	12	GMU 513

Draft

Fig. 1. Estimated total elk population for the South Rainier herd using population reconstruction, for 1994 to 1998

