State of Washington
**DEPARTMENT OF FISH AND WILDLIFE**
Mailing Address: 600 Capitol Way N - Olympia, Washington 98501-1091 - (360) 902-2200, TDD (360) 902-2207
Main Office location: Natural Resources Building - 1111 Washington Street SE - Olympia, WA

July 26, 2002

Dear Environmental Impact Statement Recipient::

**RE: Request for Public Comments on the Game Management Plan Draft Environmental Impact Statement, July 26, 2002**

The Washington Department of Fish and Wildlife (WDFW) has issued a Draft Environmental Impact Statement (DEIS) for their Game Management Plan (GMP) which covers a six-year period (2003 - 2008). The species covered by the GMP include elk, deer, bighorn sheep, mountain goat, moose, black bear, cougar, waterfowl, morning dove, band-tailed pigeon, coot, and snipe, wild turkey, mountain quail, forest grouse, upland game birds, small game animals, furbearers, and unclassified wildlife.

Extensive public involvement was initiated in May of 2001 asking the public to identify key issues that WDFW's Game Division should address. Additional surveys were issued to refine the issues. On June 7, 2002, a Scoping Notice and Determination of Significance was issued requesting comments that should be addressed in the DEIS. An additional 40 comments were received during the Scoping period. In addition, Ecology's Optional Non-Project Review Form (NPRF) was used to help plan and identify alternatives (strategies).

Key issues that were identified through the surveys and Scoping include the following:

1. Public support for hunting as a management tool
2. Hunter ethics and fair chase
3. Scientific/professional management of hunted wildlife
4. Predator management
5. Hunting season preferences
6. Private lands programs and hunter access

The GMP's purpose is to identify strategies to meet the Department's mandate of managing game species in the State of Washington based on what the public has identified as key issues. The GMP discusses first the objective or purpose for each sub-set of issues, and then lays out alternatives (strategies) that could be used to accomplish the objective. We are inviting comment on which strategies should be pursued, as well as any additional strategies that have not been considered.

The DEIS is located at the WDFW's Olympia Office, Habitat or Wildlife Programs, 600 Capitol Way North, Olympia, Washington 98501-1091, or at the department's Regional Offices. It may

also be reviewed at the following internet site along with the Scoping Notice and Determination of Significance sent out on June 7, 2002:

http://www.wa.gov/wdfw/hab/sepa/sepa.htm

The GMP DEIS can also be accessed at the agency's main internet site:

http://www.wa.gov/wdfw/

Comments are due on **August 26, 2002**. Please send your comments to the following address:

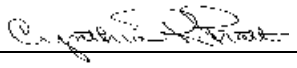
Washington Department of Fish and Wildlife
Attention: Cynthia R. Pratt
Responsible Official
Habitat Program
600 Capitol Way North, Olympia, Washington 98501-1091
HabitatSEPA@dfw.wa.gov

Please contact: Cynthia R. Pratt, SEPA/NEPA Coordinator, at (360) 902-2575, Facsimile: (360) 902-2946, or by e-mail at prattcrp@dfw.wa.gov, if you have questions about this Draft Environmental Impact Statement, or Dave Ware, Project Leader, Wildlife Program at (360) 902-2691, if you have questions concerning the Game Management Plan.

**Responsible Official:** Cynthia R. Pratt

**Position/Title:** SEPA/NEPA Coordinator, Regulatory Services Section

**Address:** 600 Capitol Way North, Olympia, WA 98501

**DATE OF ISSUE:** July 26, 2002 **SIGNATURE:** 

SEPA Log Number: 2002-1.EIS

# FACT SHEET

Draft Environmental Impact Statement
Game Management Plan

A. **Nature and location of proposal:**

This non-project, draft EIS evaluates the environmental impacts of game management activities. The objective of this draft EIS is to provide information to regulators, the public, and the Legislature for assessing the adequacy of existing and alternative management strategies for achieving agency mandates. The draft EIS identifies program goals and objectives, and provides alternative management strategies to achieve those objectives while avoiding significant adverse environmental impacts. The draft EIS encompasses all of Washington State, including marine environments, where game animals occur or have the potential to occur.

B. **Proponent and date of implementation:**

Under the direction of the Washington State Legislature and Fish and Wildlife Commission, Washington Department of Fish and Wildlife (WDFW) prepared this draft EIS with consultation with established co-managers. The date of implementation corresponds to Fish and Wildlife Commission adoption in September 2002.

C. **Lead agency, responsible official, and contact person:**

The lead agency is Washington Department of Fish and Wildlife.

Responsible official: Cynthia Pratt, SEPA/NEPA Coordinator
Habitat Division
Washington Department of Fish and Wildlife

Contact person: Dave Brittell, Assistant Director
Wildlife Program
Washington Department of Fish and Wildlife
600 Capitol Way North
Olympia, Washington 98501-1091

D. **License required:**

No license is required for this proposal.

E. **Authors and principle contributors:**

| Name | Areas of Contribution |
|---|---|
| Washington Department of Fish and Wildlife | Game Section Managers |

F. **Date of issue of draft EIS:**

July 26, 2002

G. **Date of action:**

No specific action date is proposed by Washington Department of Fish and Wildlife at this time. Upon issuance of the Final EIS and adoption by the Fish and Wildlife Commission, subsequent implementation of management strategies will occur.

H. **Type and timing of subsequent environmental review:**

Individual projects or management strategies beyond this proposal will be reviewed on a case-by-case basis under the appropriate SEPA protocols.

I. **Location of background data:**

Copies of the background data used in the preparation of this draft EIS are available for review at WDFW headquarters office (see location in item C above).

J. **Cost to the public for copy of final EIS:**

Copies of the draft EIS are available at no cost.

# DRAFT ENVIRONMENTAL IMPACT STATEMENT

For the

## GAME MANAGEMENT PLAN

July 2003 – June 2009

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

**Director, Washington Department of Fish and Wildlife** **Date**

**AN OFFICIAL PUBLICATION OF THE STATE OF WASHINGTON**

**STATE OF WASHINGTON**
**Gary Locke**
**Governor**

**WASHINGTON DEPARTMENT OF FISH AND WILDLIFE**
**Jeff P. Koenings**
**Director**

**WILDLIFE PROGRAM**
**Dave Brittell**
**Assistant Director**

**GAME DIVISION**
**Dave Ware**
**Game Division Manager**

This Program Receives Federal Aid in Wildlife Restoration, Project W-96-R, Game Surveys.

This report should be cited as:

Washington Department of Fish and Wildlife. 2002. Game Management Plan. Wildlife Program, Washington Department of Fish and Wildlife, Olympia, Washington, USA.

## TABLE OF CONTENTS

**Appendices**

**Game Management Plan**
**Executive Summary**

This plan will guide the Washington Department of Fish and Wildlife's management of hunted wildlife for the next six years. The focus is on harvest management and those factors that have the greatest effect on game populations. The history of this country and the state of Washington sets the stage for current wildlife management philosophy and the legacy of wildlife conservation provided by hunters. Hunting and hunters will continue to play a major role in wildlife conservation and management in Washington's future.

Washington's citizens played a very strong role in the development of this plan. Over the past two years, a variety of public involvement opportunities were utilized to solicit ideas. In all, several thousand citizens provided comments, edits, and priority issues. The Game Management Advisory Council, a group of citizens representing conservation and hunting organizations, landowners, and biologists was continually involved in identifying and refining issues. In addition, a very extensive public opinion survey was conducted for the Department by the private consulting firm, Responsive Management. Finally, a panel of scientists from various Universities and specialists from across the west reviewed several key issues associated with Washington's elk management and made recommendations to WDFW for changes. The information and the priority actions identified in this comprehensive process directed the development of this plan.

Chapter two of the plan addresses those priority issues identified by the public that are not specifically addressed in the species management sections in chapter three. These key issues are:

1. Scientific/professional management of hunted species
2. Public support for hunting as a management tool
3. Hunter ethics and fair chase
4. Private lands programs and hunter access
5. Tribal hunting
6. Predator management
7. Hunting season regulations
8. Game damage and nuisance

With all of these issues, it is understood that the development and implementation of strategies are conditioned first on meeting game population objectives. Science is the core of wildlife management and maintaining population objectives is what ensures accomplishment of the legislative mandate to preserve, protect, and perpetuate wildlife while maximizing recreation.

Many of the strategies identify education, public involvement in decisions, and subsequent monitoring of public satisfaction as priorities. Tribal hunting strategies hinge on the development of cooperative harvest management plans and increased coordination in the management of our respective hunters. Strategies to review and improve private land programs and address game damage rely on working groups of stakeholders to develop recommendations for future actions.

Attention is given to those values identified in recent public opinion surveys for hunting preferences, predator management, and fair chase regulations. The intent is to provide intensive public education on key issues to maintain public support for hunting; address human/wildlife

conflicts with very focused hunting strategies; and provide a variety of hunting opportunities to satisfy different preferences while meeting game population objectives.

The basis for all actions and issues identified in this plan is science and the professional judgment of biologists. At times the science may not be as strong as managers would like. In those instances, management actions will be more conservative to minimize the potential for negative impacts to hunted wildlife species. Chapter three focuses on the science and management of hunted species and lays out how those populations will be monitored to ensure long-term perpetuation.

**Elk Management**

The greatest issues for elk management stem from the recommendations of the panel of scientists and from existing elk herd plans. The most significant changes are to increase the number of bulls that survive after hunting seasons and to increase harvest of antlerless animals. Both of these measures would be phased in over six years with expected improvements to recruitment and herd dynamics carefully monitored. Distinct population management units would be reviewed and updated to form the geographic boundaries for achieving herd objectives. From the recreational standpoint, current general season strategies would be maintained to the extent possible with a variety of hunting opportunities available and balanced within each of WDFW's seventeen districts.

**Deer Management**

Recommended changes to deer management are more subtle with many of the factors that determine population levels beyond the control of state wildlife managers such as weather, wild fires, disease, and timber harvest. Activities that will be continued include improvement of population monitoring, mule deer research, and refinement of population model inputs such as mortality and recruitment rates. Actions will be increased for surveillance of chronic wasting disease and to determine population impacts from hair loss syndrome. Hunting season changes will be similar to elk regarding maintenance of current general season strategies while ensuring that a variety of hunting opportunities are available and balanced within each of WDFW's seventeen districts. These guidelines would allow continued public debate over the current three point restriction for mule deer along the east slope of the Cascade mountains and in north central Washington as well as other preferences of hunters regarding season regulations while maintaining the minimum population objective of 15 bucks per 100 does after the hunting season.

**Special Species Management**

Management of bighorn sheep, mountain goats, and moose will largely continue along current paths. The greatest issues for bighorns continue to be a slow recovery of Rocky Mountain bighorns along the Snake and Grande Ronde rivers and reintroductions of California bighorns in suitable portions of their historic range. With populations of mountain goats in apparent decline and subsequent declines in hunting opportunity, a new mountain goat research project is being initiated with federal funding. Moose populations continue to expand their distribution and management will focus on better documentation of suitable range and development of appropriate levels of harvest. Carefully regulated hunting will continue for all three species by issuing limited numbers of permits and managing for high success rates in these once in a lifetime opportunities.

**Black Bear Management**
Strategies for black bear management will continue to be refined mainly to address concerns for public safety, pet and livestock depredation, and timber damage. Hunting opportunities will be increasingly focused on those issues with anticipated controversy over the potential expansion of spring hunts.

**Cougar Management**
Cougar management would change fairly dramatically with implementation of the plan's recommended strategies. The greatest changes would be to identify cougar reserves where hunting would not be allowed and development of harvest quotas. Once the quota was met within one of nine cougar management areas, the hunting season would be terminated. Similar to black bear management strategies, harvest would be focused in those areas with concerns for public safety and pet and livestock depredation. A recently initiated cougar research project will be continued to determine behavior and habitat use of cougars with an emphasis on the urban-wild lands interface.

**Management of Migratory Birds**
The U.S. Fish and Wildlife Service and the Pacific Flyway states, including Washington, cooperatively manage migratory birds. Management efforts will continue to emphasize protection and enhancement of declining wetland habitats and closely monitored harvest management. Refinement of harvest strategies will further emphasize regional differences and address crop damage concerns, while protecting populations of migratory birds of management concern.

**Management of Upland Game Birds**
Management strategies for upland game birds (pheasant, quail, and partridge) will continue to target enhancing populations in suitable habitats and providing appropriate harvest opportunities for these largely non-native species. Wild turkey populations have expanded dramatically due to enhancement activities over the past twenty years. Several strategies are identified to review current management and success of introductions to determine future direction. Mountain quail are considered native to parts of south central and southeast Washington. Strategies are identified to re-establish mountain quail in their native range in eastern Washington and to better monitor harvest in western Washington.

Pheasants continue to be the focus of upland bird management efforts. Other upland bird populations are either considered healthier such as California quail or receive less attention from hunters. Dedicated and targeted funding for pheasant management is discussed with identified strategies for changes in emphasis. Access to private lands continues to be emphasized with strategies to focus on expanding opportunities in higher quality pheasant habitat and hunting areas. Forest grouse management strategies suggest emphasis on improving harvest management and monitoring.

**Management of Small Game Animals, Furbearers, and Unclassified Wildlife**
Management strategies for small game animals, furbearers, and unclassified wildlife are largely focused on refining distribution information and addressing nuisance problems. Harvest and education strategies will attempt to minimize negative human-wildlife interactions.

# Game Management Plan

## CHAPTER 1

## INTRODUCTION

The Washington Department of Fish and Wildlife's (WDFW) mission is "Sound Stewardship of Fish and Wildlife." The Department serves Washington's citizens by protecting, restoring and enhancing fish and wildlife and their habitats, while providing sustainable fish and wildlife-related recreational and commercial opportunities. Planning helps the Department prioritize actions to ensure accomplishment of its mission and mandate.

This Game Management Plan assesses current issues for hunted wildlife and allows the WDFW to prepare for the future. The emphasis is on harvest management and those factors that limit or significantly impact game populations in this state. This plan is dynamic and will facilitate resolution of emergent issues and adjustment of priorities when issues are resolved. It identifies priorities and keeps the Department focused, directed, and accountable. This six-year plan will guide the development of the next two, three-year hunting season packages (2003-05 & 2006-08). In addition the plan will direct the development of work plans and budget proposals with implementation beginning in July 2003.

## PUBLIC INVOLVEMENT

Active public involvement is important for successful planning. This planning process was formally initiated in May of 2001 by asking the public to identify the key issues that needed to be addressed in the next 5 to 10 years. To further refine the issues that were identified, WDFW conducted opinion surveys and consulted with the Game Management Advisory Council, the Wildlife Diversity Advisory Council, and members of the Fish and Wildlife Commission. These issues formed the basis for the development of this plan. Finally, the Environmental Impact Statement process is being utilized to facilitate public involvement in reviewing alternatives and setting priorities.

The main issues identified by the public were categorized into several key areas:

- Scientific/professional management of hunted wildlife
- Public support for hunting as a management tool
- Hunter ethics and fair chase
- Private lands programs and hunter access
- Tribal hunting
- Predator management
- Hunting season regulations
- Game damage and nuisance
- Species specific management issues

## COMMISSION AND DEPARTMENT AUTHORITIES

This plan has been prepared consistent with the authorities granted the Fish and Wildlife Commission and Department of Fish and Wildlife by the Washington State Legislature through Title 77 of the Revised Code of Washington (Appendix 1: Mandate of the Department and Commission). The Fish and Wildlife Commission develops regulations under their authority through the adoption of Washington Administrative Code. In addition, various Commission and Department Policies and Procedures guided the development of the plan.

The Washington Department of Fish and Wildlife Hunting Season Guideline was adopted in August 6, 1999 as follows:

*"Hunting seasons and regulation recommendations should be based on good science. When biological information is lacking or insufficient, management decisions should be conservative to ensure protection of wildlife resources. At no time should decisions favor income to the agency or recreation over protection of wildlife populations.*

1. *In general, hunting seasons and game management units should be easy to understand while maintaining hunting opportunity and management options.*
2. *Continuity in hunting seasons over time is highly valued by the public, therefore Department recommendations for significant changes to seasons should be based on resource or management need.*
3. *Hunting season establishment shall be consistent with the Hunting Co-Management Guidelines between WDFW and Tribes.*
4. *Hunting seasons should be consistent with species planning objectives and provide maximum recreation days while achieving population goals.*
5. *A three year season setting process should be maintained which will provide consistent general seasons from year to year with annual changes in permit levels to address emergent resource concerns; natural disasters; and to meet requirement of federal guideline changes; etc.*
6. *Substantial public involvement and timely opportunity to comment must be provided for 3-year season recommendations and must be in compliance with state's Regulatory Reform Act.*
7. *Public involvement for annual permit season setting shall include at a minimum, a standard written comment period and one public meeting where comments will be considered.*
8. *Provide separate deer and elk general season recreational opportunities for archers, muzzleloaders, and modern firearm hunters.*
9. *Special deer and elk permit hunt opportunities shall be allocated among three principal user groups (archery, muzzleloader and modern firearm) using the approved formula of success/participation rate.*

10. *Weapon and hunting equipment restrictions should be easy to understand and enforce, maintain public safety, protect the resource, and allow wide latitude for individuals to make equipment choices.*
11. *Enhanced general season considerations, special access opportunities, and other special incentives should be developed for disabled, Advanced Hunter Education (AHE) graduates, youth, and hunters 65 and older rather than special permit hunts. AHE incentives should return to the program's original intent, which was to address private lands, and associated hunter ethics issues. Disabled hunter opportunities should emphasize equal access consistent with the Americans With Disabilities Act.*
12. *Private landowner hunting issues such as season length, damage control, and trespass should be given consideration when developing hunting season recommendations.*
13. *Standardize furbearer regulations that provide trapping opportunity and address damage control.*
14. *Establish migratory bird and small game regulations to provide maximum hunting opportunity considering federal guidelines, flyway management plan elements, and Department management objectives.*
15. *Hunting season closures and firearm restrictions should be based on resource conservation and public safety.*
16. *Maintain a high quality goat, sheep, and moose permit hunting opportunity consistent with resource availability. "*

## HISTORICAL BACKGROUND

During the European settlement of North America, hunting was primarily a subsistence activity (Organ and Fritzell 2000). The same was true for the earliest immigrants to the Territory of Washington. Hunting was also used to eliminate animals that posed a threat to humans or their livelihood. Hunting eventually became a profitable commercial venture promoted initially by the fur trade and later for food, clothing, and jewelry. With the settlement of the state and establishment of a governing body, laws were enacted to protect the wildlife resources from indiscriminate takings. Conflicts between market hunters and sport hunters began to occur by the mid 1800s and nationally some influential sportsmen's organizations were formed (Trefethen 1972).

By the late 1800s, sportsmen and other conservation minded people, were led by Theodore Roosevelt who introduced a new thought, "conservation through wise use" (Madson and Kozicky 1971). Roosevelt led a social movement that pressed for an end to commercial traffic in wildlife and for government over sight of wildlife conservation (Reiger 1975, Warren 1997).

During the 19$^{th}$ century, hunting changed from mostly a subsistence activity to a commercial one, and then advanced to the beginnings of a leisure activity. At the same time, wildlife habitats were being fenced, plowed, burned, developed into towns, and cut by roads and rails (Madson and Kozicky 1971). President Theodore Roosevelt with foresight was responsible for the establishment of the U.S. Forest Reserves (Service) and created the National Wildlife Refuges.

His legacy of public lands is in place today, more important than ever before, as strongholds of fish and wildlife in Washington State and the Nation.

In 1928, the American Game Conference, chaired by Aldo Leopold, formed a committee on Game Policy. During this period wildlife conservation programs focused on laws and enforcement, but a formal wildlife management profession did not exist. The report (Leopold 1930) described the problem of declining wildlife. The committee recognized the need for scientific facts concerning game species management and called for the reorganization of state game departments and outlined the steps needed to reverse the trend (Madson and Kozicky 1971, Organ and Fritzell 2000).

*"The report strongly urged that conservation be taken out of politics, that fish and game funds be earmarked for fish and game programs, and that every effort be made to build competent, stable, adequately-financed conservation departments* (Madson and Kozicky 1971)."

Funding for key elements of the (government) agencies was linked to earmarked fees paid by hunters. Most significantly, the Migratory Bird Hunting Stamp Act (1934), which funded National Wildlife Refuges, and the Federal Aid in Wildlife Restoration Act (1937), which provided federal funding for state agencies.

The Legislative Assembly of the Territory of Washington enacted the first laws concerning wild animals within the territory. On January 19, 1863, the first game species law was passed giving the, *"county commissioners of each and every county authority, if they think proper, to offer a bounty for killing wild animals."* Although a few early laws were passed to preserve and protect game, they were largely ineffective and not enforced. In 1890, the Governor was given authority by the legislature to appoint game wardens in each county.

In 1901 the State Legislature passed the first hunting license requirement for a fee of $1.00 for residents and $10.00 for non-residents issued by the county. In addition, any person killing a male elk was required to pay an additional sum of $20. Thus game management in Washington entered the twentieth century with the beginnings of a user-fee hunting program to be administered by the county. Appendix 2 shows the cost of hunting licenses and deer and elk tag fee changes since 1901.

The passage of the Pittman-Robertson Federal Aid in Wildlife Restoration Act specified that an eleven percent excise tax on sporting arms and ammunition must be maintained in a separate fund in the Treasury, and allocated annually to the states. In order for the states to participate, each state was required to pass enabling legislation and adhere to the provisions of the Act, which required that all hunting license fees be dedicated to use by the state game department. The enabling legislation was passed by the Washington State legislature and signed into law in 1939. This was the beginning of modern wildlife management.

## NATIVE AMERICANS

The State of Washington has been inhabited for at least 9,000 years. Native American civilization in Washington evolved into two distinct patterns, with the Cascade mountain range

generally dividing the two cultures. The Pacific coastal Indians inhabited a land of plenty with an abundance of fish, shellfish, roots, berries, and game. They built homes of wood and their lives were mostly sedentary owing to the availability and abundance of natural resources for their subsistence (Pryor 1997).

While Native Americans east of the Cascades also had access to salmon and steelhead returning up the Columbia River system, they depended more on game and other food sources. The horse was introduced to Washington in the early part of the eighteenth century and thereafter the inland Tribes became mostly nomadic. Their housing was mostly portable and their nomadic travels were of necessity in search of food (Pryor 1997).

In 1853, Isaac I. Stevens was named the first Territorial Governor of the new Washington Territory. He was also appointed Commissioner of Indian Affairs, and negotiated treaties between Pacific Northwest tribes and the United States of America to pave the way for settlement and encourage the assimilation of Native Americans into non-Indian society (Table 1). He established a number of reservations for the Indian people, and in exchange the tribes ceded their territory to the government. The tribes that signed the treaties retained certain rights and privileges.

For example, Article 3 from the Medicine Creek Treaty with the Nisqually, Puyallup, Squaxin Island, and Muckleshoot Tribes states: *The right of taking fish, at all usual and accustomed grounds and stations, is further secured to said Indians in common with all citizens of the Territory, and of erecting temporary houses for the purpose of curing, together with the privilege of hunting, gathering roots and berries, and pasturing their horses on open and unclaimed lands: Provided, however, that they shall not take shellfish from any beds staked or cultivated by citizens, and that they shall alter all stallions not intended for breeding-horses, and shall keep up and confine the latter.*

Washington State courts have interpreted this treaty language to mean that tribes can hunt within the boundaries of the area ceded to the federal government by their treaty, or in areas of traditional use, on open and unclaimed lands that have not been put to a use that is inconsistent with hunting. As part of this ability, tribes are responsible for the management of their own hunters and hunting activities, on and off-reservation.

Since tribal and non-tribal hunters share the management of the wildlife resource over much of the state, it has been important that WDFW and the tribes work cooperatively to develop management strategies that can meet the needs of both. This process is complicated by the fact that tribal subsistence and ceremonial hunting and state recreational hunting are two very different philosophies steeped in tradition and cultural heritage (McCorquodale 1997). This means that both sides have to work very hard to understand and appreciate other views.

Tribal governments take an active role in the management of wildlife resources. They typically have a tribal hunting committee that meets to develop regulations and management strategies. Many tribes have hired biologists, or have access to biological staff that can advise them on the development of management approaches. Tribes have taken the lead in several areas on research projects to gather the information that is needed to better manage wildlife resources. WDFW

and various tribes are working together to develop herd plans for key wildlife populations. WDFW is also working cooperatively with tribes to rebuild or augment populations that are below desired levels.

Table 1. Treaties between the United States of America and Northwest Indian Tribes.

| Treaty | Indian Tribes | Location and Date |
|---|---|---|
| Treaty with the Yakamas | Yakama confederated tribes and bands | Camp Stevens, Walla Walla Valley June 9, 1855 |
| Treaty with the Walla Wallas | Walla Walla, Cayuse and Umatilla tribes and bands | Camp Stevens, Walla Walla Valley June 9, 1855 |
| Treaty of Olympia | Quinault, Hoh, and Quileute | Qui-nai-elt River –Jan. 25, 1856 Ratified March 8, 1859 Proclaimed April 11, 1859 |
| Treaty of Point No Point | Jamestown S'Klallam, Port Gamble S'Klallam, Lower Elwha S'Klallam, Skokomish | Point No Point, Suquamish Head Jan. 26, 1855 Ratified March 8, 1859 Proclaimed April 29, 1859 |
| Treaty of Point Elliot | Lummi, Nooksack, Stillaguamish, Swinomish, Upper Skagit, Suquamish, Sauk Suiattle, Tulalip, and Muckleshoot | Point Elliott January 22, 1855 Ratified March 8, 1859 Proclaimed April 11, 1859 |
| Treaty with the Nez Perces | Nez Perce' Tribe | Camp Stevens, Walla Walla Valley June 11, 1855 |
| Treaty of Neah Bay | Makah | Neah Bay January 31, 1855 Ratified March 8, 1859 Proclaimed April 18, 1859 |
| Treaty of Medicine Creek | Nisqually, Puyallup, Squaxin Island, Muckleshoot | Medicine Creek December 26, 1854 Ratified March 3, 1855 Proclaimed April 10, 1855 |

## THE NATURAL ENVIRONMENT

Washington has a rich diversity in flora. Forests cover about half of the state's land area. On the Olympic Peninsula there is a temperate rain forest consisting of spruce, cedar and hemlock with an understory of ferns and mosses. The areas surrounding the Puget Sound and the western slopes of the Cascade Range is a forest consisting mostly of cedar, hemlock and Douglas fir with an understory of shrubs. On the eastern slopes of the Cascades and the Blue Mountains of southeastern Washington ponderosa pine, Douglas fir, Grand fir, Western hemlock, sub alpine fir are the major species. The forests in these areas are more open with an understory of grasses and shrubs especially at the lower elevations. Across the northeast region of the state the forest is primarily made up of Douglas fir, Western red cedar, Western hemlock and sub-alpine fir. The forests of the state have been intensively logged and contain second and third growth forest plantations of mostly Douglas fir (Washington Department of Information Services 2002).

In the Columbia Basin the native vegetation is drastically different from the forested lands of the state, owing to the dryer and hotter climate of the region. The pristine vegetation consisted of shrubs and grass (shrub steppe). With the advances in agriculture and livestock grazing in the mid-1800 the vegetative character of the land took on a new look. Overgrazing by sheep, cattle

and horses was evident by 1885. Lands were cleared for intensive farming, both dry land and irrigated. On the prairies of the Palouse the conversion of all arable land was nearly complete by 1910 (Buchner 1953). Other lands are continuing to be converted to the growing of agricultural crops or converted to urban uses (Washington Department of Information Services 2002).

The introduction of non-native weed species by imported livestock, contaminated commercial seeds, and other sources have resulted in a dramatic change in the landscape and the productivity of the land for commercial use as well as intrinsic values. In Washington invading weeds have adversely impacted native wildlife habitat and domestic livestock rangelands (Washington Department Information Services 2002).

## THE SOCIAL ENVIRONMENT

The evolution of the human social environment and its impact on the natural environment has been dramatic from pre-settlement to the present. Some game species have benefited from this transition while others have not.

Washington's human population residing in incorporated areas in 1950 and 1960 represented 60 percent of the total. In 1990 this has shifted and now approximately 52 percent live in incorporated versus 48 percent in unincorporated areas (Washington State Data Book 1999). With expanding human population and development this trend will continue to impact wildlife and wildlife habitat.

Washington has the second largest human population of the western contiguous states but is the smallest in size. At the end of 2001 the population was estimated at 5,974,900 making it the 15$^{th}$ most populous state in the union. The long-term outlook in human population for the state of Washington is continued growth, with ever increasing impact to the natural resources of the state.

The ten largest cities are almost exclusively on the west side of the state, with Spokane and Yakima the two representatives from the east side. The Interstate Highway 5 corridor is the area of highest human population and where the greatest changes to the natural environment have taken place. Seattle is the largest city in the state with over a half million people. The cities of Spokane, Tacoma, Vancouver and Bellevue are all over 100,000 in population.

## INDUSTRY

Prior to settlement, the Pacific Northwest region was important for its fur-trapping industry. With the completion of the Northern Pacific Railroad in 1886 and Great Northern Railroad in 1893, Washington's economy grew. Agriculture and the lumber industry developed in western Washington and eventually to the east. A transportation network was a key to the growth of the state's economy (Washington State Department of Information Services 2002).

During the twentieth century the construction of dams on the Columbia and Snake Rivers provided abundant, cheap electrical power resulting in the rapid growth of manufacturing. Dams for agricultural irrigation also advanced farming in the dryer Columbia Basin. Farms in western

Washington are small, and dairy products, poultry, and berries are the primary commodities produced. The eastern side of the Cascade Range has larger farms, and small grains such as wheat and barley, potatoes, fruit, and vegetables are the primary crops.

According to the Economic Research Service of the U.S. Department of Agriculture the 2000 Census of Agriculture showed that Washington farmland acreage totaled 15.7 million or about 35.6 percent of the total land area. Farmlands are highly valued wildlife habitats for which the landowner is not often recognized. Game species such as pheasants, quail, deer, and waterfowl are attracted to private lands for their abundance of food and water.

Recent changes in natural resource policies and implementation of new ecosystem management strategies have affected the timber industry, the people of Washington, and the Northwest. The timber harvest changes in Washington between 1989 and 1994 have been substantial (Table 2), (Dodge 2001). The changes in forestry practices may have serious impacts to the future amount and quality of deer and elk forage and the population numbers over the long term.

Table 2. Timber harvest changes in Washington between 1989 and 1994.

| Ownership | 1989 harvest [a] | 1994 harvest [a] | Percent Decrease |
|---|---|---|---|
| Private | 4,027,278 | 2,965,848 | -26.4 |
| Public | 1,929,039 | 592,045 | -69.3 |
| Total | 5,956,317 | 3,557,893 | -40.3 |

[a] in thousand board feet

## LAND USE AND OWNERSHIP

Public lands: The total land area of the state is 45.9 million acres. Out of this total 2.6 million acres are aquatic lands and 43.3 million acres are uplands. The public land ownership and principal uses in the state are found in Appendix 3, (Interagency Committee for Outdoor Recreation 1999).

Public lands make up about 52 percent of the state. The largest amount of public land is owned and managed by the U.S. Forest Service, representing about 41 percent of the total. The total of all federal ownership in Washington represents about 58 percent. State lands represent about 27% of the total and the Department of Natural Resources is the largest manager of state lands. Local and Tribal lands make up the rest.

Public lands are not evenly distributed across the state because of the historical pattern of settlement and development. The largest concentrations of public lands are at the higher elevations, while the lowlands and lands associated with waterways are mostly private. The Columbia Basin in eastern Washington and the Puget Trough region on the west side are mostly in private ownership.

## WASHINGTON HUNTERS

The number of licensed hunters in the state of Washington grew rapidly with the increase in leisure time and availability of game. Historical records of hunting license sales by the counties are not readily available from 1901 to 1933. From 1933 to 1953 hunting license sales show a

significant increasing trend, peaking at approximately 445,000 state and county hunting and fishing combination licenses sold (Figure 1). The incline in hunting license sales was particularly steep following World War II.

A state resident hunting license was introduced in 1954 resulting in a significant drop in total licenses sold. This drop most likely reflects the number of fishers who chose not to purchase a state hunting license rather than the hunting/fishing combination license because they had no intention of hunting. If this is true, then the increasing trend in hunters actually peaked quite a few years later in 1979 with about 358,000 hunting licenses sold. Thereafter sales showed a declining trend through 1989, when 269,000 licenses were sold.

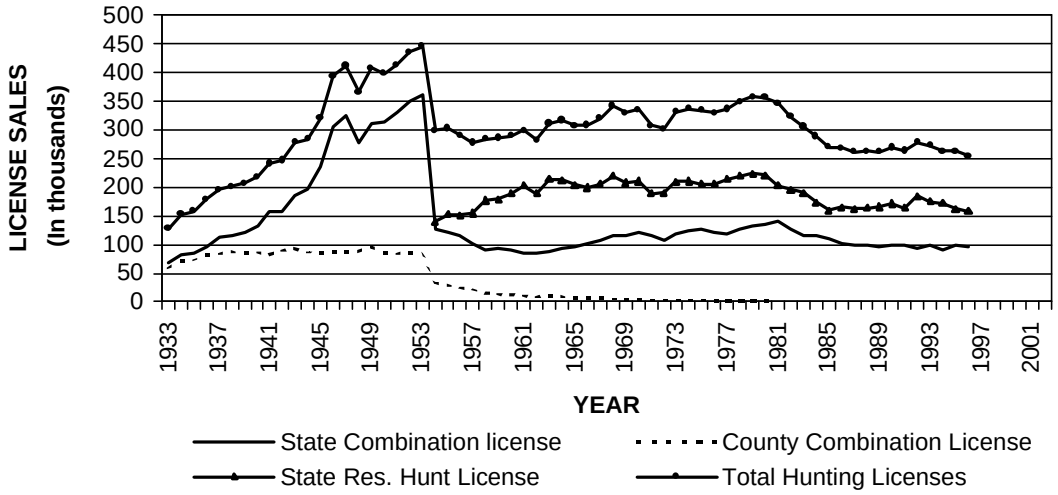



Figure 1. Washington hunting license sales and numbers, 1933-2002.

A discussion of trends in hunting participation by Brown et al. (2000) suggests that the trend of stable to decreasing numbers of hunters continues. They predict managing wildlife damage through hunting will be increasingly challenging because of declining recruitment of hunters and declining social support for hunting. In Washington, an analysis of general season deer hunter trends does not support the predicted decline. Since 1984, deer hunting participation rates are highly variable from one year to the next and no clear trends are evident (Figure 2).

Washington hunter characteristics in 2002 are very different from a century ago. They are mostly well educated, having graduated from high school or equivalent (37%), some having additional college or trade school training (18%), college graduates (16%), and some with post-graduate or professional degrees (12%), (Duda 2002). Washington hunters are mostly older than 45 and male dominated (93%). Waterfowl and furbearer hunter groups were almost exclusively males (Duda et al. 2002). In comparing a demographic study of Washington hunters (Johnson 1972) to the recent survey, there has not been any change in male dominance (94% males and 6% females) in the intervening 31 years. Age distribution of hunters in 1972 and 2002 are not directly comparable between the two studies, however, it is apparent the majority of hunters in 1972 were less than 29 years of age compared to 2002 data where age of respondents were predominantly over 35 years of age.

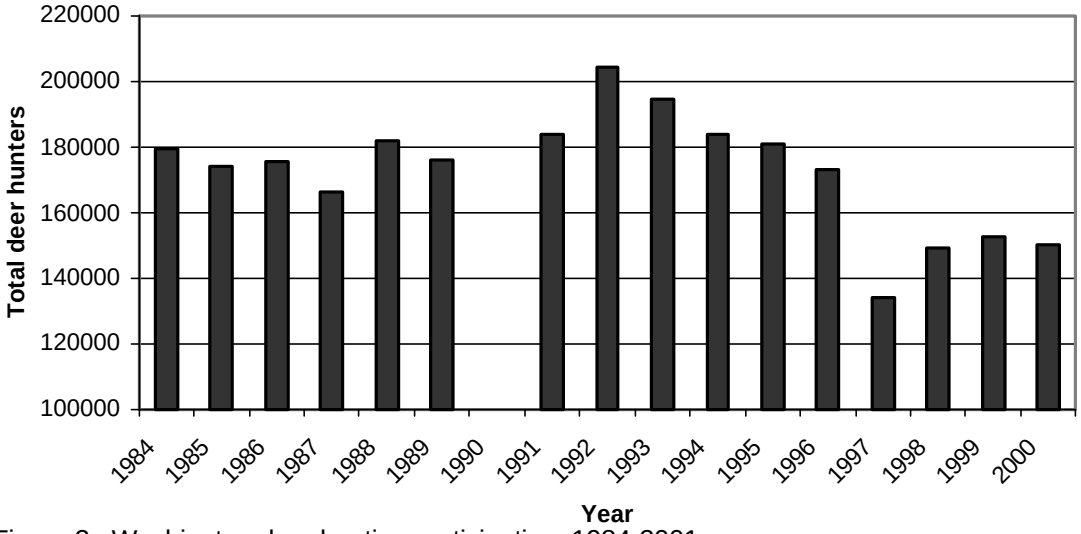


Figure 2. Washington deer hunting participation, 1984-2001.

## RESOURCE ALLOCATION

During the 1970s, big game hunter numbers in Washington were at an all time high. Hunter crowding, competition among hunters, and the declining quality of the hunting experience resulted in significant hunter dissatisfaction. As a result many hunters changed from the traditional use of modern firearms to primitive archery equipment and black powder muzzle loading rifles where hunting conditions were less crowded. In 1982, the Department formed a "Big Game AD Hoc committee" to address the problems facing hunters in Washington and develop a plan of fair allocation of hunting opportunity. The committee identified three major goals as follows:

1. Reduce crowding in the more popular modern firearm hunting seasons.
2. Provide quality-hunting opportunity.
3. Provide early primitive weapon opportunity.

Following extensive debate and public involvement in 1984, the Fish and Wildlife Commission adopted a major change in deer and elk hunting. This new rule required all deer and elk hunters to select one type of gear for hunting (modern firearm, archery or black powder muzzleloading rifle). In addition all elk hunters continued to be restricted to an elk tag area.

Since 1984, modern firearm deer hunters have continued to maintain the majority of active hunters. Archery deer hunter numbers increased for the first 5 years and then stabilized. Muzzleloader deer hunters have shown a more protracted incline but appears to have stabilized representing about 5 percent of the deer hunters (Johnson 1999).

Elk hunter numbers, on the other hand, have shown a more pronounced change in user group size. In 1984 modern firearm elk hunters represented 88 percent, archery hunters 9.5 percent and muzzleloader hunters 2.4 percent. In 1998 the modern firearm hunter only represented 68 percent of the total, archery hunter numbers doubled in percentage and muzzleloader hunters

increased six-fold. Since about 1994, the proportion of each user group (modern firearm, archery and muzzleloader elk hunter) has stabilized at about 69, 17 and 14 percent respectively (Johnson 1999).

Separating hunters by hunting method has successfully distributed hunting pressure, relieved congestion and increased primitive weapon opportunity. Quality hunting opportunity has been more difficult to assess.

Fair resource allocation continues to be a contentious issue with hunters. A few of the more contentious issues are related to:

1) Which group gets to hunt first?
2) How should timing of various hunting seasons between user groups be fairly established?
3) Should fairness be related to equal opportunity (days) or equal success?
4) How primitive should "primitive weapon" hunting seasons remain?

## HUNTER EDUCATION/SAFETY TRAINING

Hunter education programs are in place in all fifty states reaching about 650,000 hunters annually (Duda et al. 1998). In Washington all individuals born after January 1, 1972, must show proof that they have completed a hunter education course prior to purchasing a hunting license.

The Washington Department of Game first offered Hunter education in 1955 on a voluntary basis. In 1957, it became mandatory for all juveniles less than 18 years of age. In 1995, all individuals born after January 1, 1972 were required to successfully complete a hunter education class. In 1992 an Advanced Hunter Education Program was introduced as a voluntary program. For the last five years (1997-2001) enrollment in hunter education classes have been increasing with approximately 11,500 students taught by a shrinking voluntary corps of hunter education instructors. Currently, the demand for hunter education classes exceeds the schedule of classes offered each year (Mikitik personal communications 2002).

## HUNTER ACCESS

As early as 1875 the Legislative Assembly of the Territory of Washington passed a law that prohibited persons from entering upon private lands (enclosed premises) for the purpose of hunting grouse during the open season without permission from the landowner. This law demonstrates the early roots of conflict between hunters and landowners. Hunter access onto private lands and through private lands to public lands is a lingering issue.

The Washington Department of Fish and Wildlife has placed considerable emphasis over the years in obtaining sportsmen access to lands for the enjoyment of hunting. Currently there are several programs that are promoting hunter access. The Upland Wildlife Restoration Project provides incentives to private landowners through technical assistance, implementation of habitat enhancement strategies, and hunter management assistance. Landowners agree to open their lands for recreational opportunity in exchange for materials and help planting and developing

habitat. The Department provides free signs and assists the landowner in posting their lands as "free to hunt" or "hunt by written permission." There are over 4 million acres and over 1,300 landowners in Washington under cooperative agreement through 2001, (Johnson 2001).

The Private Lands Wildlife Management Area (PLWMA) program was developed and initiated on a trial basis in 1993. This program was designed to enhance wildlife habitat on private lands and encourage public access opportunities. Two PLWMAs were authorized in 1993, 201-Wilson Creek and 401-Champion's Kapowsin Tree Farm. A third PLWMA 600-Pysht was added in 1997.

Many changes have been made to improve the program for the private landowner as well as the public. A common criticism of this program from hunters is that public access is not adequately addressed. The value of enhanced wildlife habitat and other positive aspects of the program have yet to be fully evaluated.

There are many incentives for market-based programs on private lands; however, the major incentives are opening closed private lands to public access, protection and enhancement of wildlife habitat, economic benefit to private landowner and local economies. On the other-hand major impediments include loss of control by state agencies, potential for over-exploitation of the wildlife resource, and a potential for forced decline in participation rates because of escalating costs (Duda et al. 1998).

A survey of Washington hunters was conducted (Responsive Management 2002) to determine opinions about private land access and other private land programs. A strong majority of hunters felt that private lands were very important to wildlife and for outdoor recreation. All hunter groups surveyed felt that private land programs should provide incentives to landowners for improved wildlife habitat and allowing access onto their lands. The majority of all hunters agreed that access to private lands for hunting is important even if an access fee is charged.

Hunters are feeling the "crunch" in available hunting areas. Private lands are recognized as important to the future of hunting, especially upland game bird and waterfowl hunting. Maintaining hunting opportunities on these lands is becoming increasingly difficult and competitive. The hunter's willingness to pay landowners for hunting opportunity is a significant change from attitudes of the past.

## ECONOMICS

Washington hunters spent $327 million in 1996 for trip related expenses, equipment and other expenditures primarily for hunting (U.S. Dept. of Interior et al. 1998). About 28 percent of their expenditures were for food, lodging, transportation, 66 percent for hunting equipment (guns, ammunition, camping) and 6 percent for purchase of magazines, membership dues, land leasing, and licenses and permits.

The national survey reported there were 271,000 resident and nonresident hunters 16 years of age or older who hunted in Washington. These hunters spent 4.7 million days hunting in the state. The expenditures per hunter per day were $67.73 for all hunters.

## CHAPTER 2

## GENERAL GAME MANAGEMENT ISSUES

Within this historical context, the priority issues identified by the public, and grounded in science, this plan will guide game species management for the next six years. During the extensive public involvement process, several categories of issues were identified for WDFW to address in this plan. Some of the issues and the science behind the management will be addressed in chapter three that deals with specific game species or groups of game species. Those issues that are not species specific will be addressed in this chapter.

## SCIENTIFIC/PROFESSIONAL MANAGEMENT OF HUNTED WILDLIFE

While this issue is difficult to specifically define, the concept is very important to the public. The use of scientific information and the judgment of professionals in management decisions were rated very high by both the general public and hunters. While less important than scientific information and professional judgment, economic and social concerns were also highly rated in making management decisions. The only factor that was poorly rated was political concerns. Management strategies that are related to public preferences will only be implemented if and when they meet the game population objectives identified in chapter three.

*Issue Statement:* It is obvious that while science and professional opinion are important, social and economic issues often drive public opinion and ultimately, management strategies and regulations. A good public involvement process is necessary for people to make up their own minds and participate in the decision-making. The key is to develop programs that achieve biological objectives and are supported by the public.

*Objective 5:* To provide multiple opportunities for stakeholders to participate in development of three year regulation packages and in planning efforts for game species.

*Alternative Strategies:*

a. Maintain citizen advisory councils and use them throughout the process of developing plans and regulation packages.
b. Enhance the use of the WDFW Web page to encourage public comment and ideas for regulations and priorities.
c. Conduct one public meeting in each WDFW region for statewide issues, two per WDFW region for more local issues, and provide other routine opportunities for the public to interact with WDFW staff regarding plans and three-year regulation packages.
d. Conduct a public opinion survey at least once every five years to monitor support for agency programs, planned activities, and regulations.
e. Publicize and maintain a mailing list of citizens interested in receiving copies of plans and regulations and notify those on the list as plans and season recommendations are developed.
f. Encourage public participation and comment during the Fish and Wildlife Commission meeting process.

## PUBLIC SUPPORT FOR HUNTING AS A MANAGEMENT TOOL

With accelerating human population growth in Washington, a largely urban society, and two recent citizen initiatives that restricted lawful hunting or trapping techniques, many are questioning general public support for hunting as a wildlife population management tool. This issue was identified by the public as one of the most significant issues for WDFW to address in the plan.

*Issue Statement:* When the general public was asked a series of questions about support for hunting, it is apparent that overall support for legal, regulated hunting is very strong (82%).

However, there are some specific issues where opinions are very pronounced:

- In general there is less public support for hunting cougar, black bear, and furbearing animals than most other game species.
- Hunting for the purpose of obtaining a trophy was clearly not supported by the general public. Hunting contests were opposed by a majority of both the general public and hunters.
- The majority of respondents from the general public did not support introduction of non-native species and were split on the release of game birds to improve hunter success. A strong majority of hunters supported both of these activities.
- Sixty four percent of the general public did not think it is the WDFW's role to encourage participation in hunting, and while a majority of hunters do think it is the Department's role, a surprising 39 percent disagree.
- Somewhat surprising though perhaps related to the previous finding, was the general public's lack of support for providing special youth hunting opportunity, while a slight majority supported special opportunities for seniors. Hunters showed strong support for special opportunities for both youth and senior hunters.

In order to maintain public support for hunting, the Department should be sensitive to public opinion on these issues while still achieving population objectives.

*Objective 1:* By 2006, increase public support by 10 percent for using hunting to manage cougar, black bear, and furbearer populations; management of non-native species; release of game birds to improve hunter success; and providing special youth and senior hunting opportunity.

*Alternative Strategies:*

a. Conduct public outreach and measure subsequent support for controversial actions prior to implementation and only implement actions that receive greater than 55% public support.
b. Publicize three news stories per year that demonstrate the value and contribution of hunting and hunters related to these issues.
c. Minimize changes to controversial programs associated with these issues to maintain a low public profile.
d. Only make very gradual changes to activities associated with these issues to improve public acceptance over time.

e. Emphasize hunting opportunities in those instances that specifically address public safety, pet and livestock depredation, protection of threatened and endangered species, or property damage.
f. Develop a fact sheet and/or white paper explaining the public values for each of these issues by 2005.

*Objective 2:* By 2006, improve public acceptance of regulations associated with trophy hunting and hunting contests.

*Alternative Strategies:*
a. Measure the current level of public support for specific Department regulations regarding these issues. Then conduct public outreach to determine regulation modifications that would receive greater support.
b. Completely eliminate regulation of these issues.
c. Minimize changes to regulations for trophy hunting and hunting contests.
d. Ensure that changes to hunting regulations or programs do not support or even appear to support these concepts.

**HUNTER ETHICS AND FAIR CHASE**

This issue is actually closely related to the previous one in that the public perception of hunters and hunting regulation may strongly influence support for hunting as a management tool. This is also a very significant issue to hunters as identified during the initial public involvement process.

*Issue Statement:* One issue that is being increasingly debated is the expanding use of technology for hunting. This is particularly evident with equipment technology. During development of the 2000–2002 hunting season package, weapon technology was extensively debated and regulations were modified for archery, muzzleloader, and modern firearm equipment. The most recent debate has been over the use of motorized waterfowl decoys, with Fish and Wildlife Commission action in 2001 that restricted the use of electronic waterfowl decoys.

*Objective 3:* To develop and modify regulations for use of electronic equipment for hunting.

*Alternative Strategies:*

a. Minimize restrictions and allow individual hunters the latitude to determine what equipment constitutes fair chase in their mind.
b. Allow users to determine appropriate restrictions for their weapon of choice consistent with their idea of fair chase.
c. Conduct studies (as funds are available) on harvest effects of electronic devices used for hunting and only restrict those that result in greater harvest success.
d. Restrict the use of all electronic devices for hunting purposes and conduct studies (as funds are available) on harvest effects and only allow those devices that do not result in greater harvest success.
e. Regulate season length, timing, bag limits, and other restrictions rather than regulating equipment to address increased harvest success from electronic devices.

f. Conduct public outreach and restrict those electronic devices that receive greater than 60% support for restrictions regardless of whether the opposition is based on improved harvest success or perception of fair chase.

## HUNTER BEHAVIOR/ETHICS

Another very significant issue for hunters that was identified during the public involvement process is illegal activity and a desire for greater enforcement presence in the field.

*Issue Statement:* A majority of the general public thinks that a lot of hunters violate hunting laws. They feel that hunting without a license and poaching are the major violations, with shooting game out of season and hunting over the bag limit also common violations. Hunters recite these same common violations with the addition of shooting from a vehicle. The public has also indicated that hunter compliance with these laws should be 100% and that they developed their opinions from direct observation, physical evidence, and from talking with others. In addition, they support hunter refresher courses and feel that an additional training requirement would improve their opinion of hunters.

*Objective 4:* To improve compliance rates for common violations and public perception of hunters and violation rates by 2008.

*Alternative Strategies:*

a. Emphasize the importance of hunter compliance with regulations and public perception of hunters in hunter education classes, hunting pamphlets, and other information provided to hunters.
b. Determine current compliance rates for the most common violations, concentrate enforcement efforts on those violations, and monitor subsequent improvements in compliance.
c. Increase the frequency of field contacts and visible presence of officers and other uniformed agency staff during season openers to improve public perception of safety and enforcement.
d. Publicize three news stories per year that emphasize the value and contributions of hunters or successful programs to improve regulation compliance.
e. Publicize improvements in hunter compliance rather than just arrests.
f. Review and simplify, clarify, or eliminate regulations that are ambiguous or confusing.
g. Re-invigorate and publicize the Advanced Hunter Education program to help address public support for additional hunter training and to improve public opinion of hunters.

## PRIVATE LAND PROGRAMS AND HUNTER ACCESS

The vast majority of hunters feel that private lands are important to wildlife and to outdoor recreation. They agree that maintaining the economic viability of farming, timber production, and controlling urban sprawl are vital for conserving the agricultural and rural landscape so important to wildlife. Hunters also support private lands programs that provide incentives, including access fees, to landowners in exchange for improvements of wildlife habitat and access onto their lands for outdoor recreation. This was identified as a major issue to hunters during the public involvement process leading to this plan. WDFW currently manages two programs, the

Upland Wildlife Restoration Program and the Private Lands Wildlife Management Area (PLWMA) Program that address wildlife habitat and hunter access to private land.

*Issue Statement:* Even with these existing WDFW programs, hunters and landowners would like to see more. The major concerns for hunters are due to recent closures of private industrial timberlands in southwest Washington; a lack of access for waterfowl hunting in western Washington; limited pheasant hunting access in eastern Washington; extensive road management systems in south central Washington; and a lack of general information about how to access public lands and WDFW program lands.

*Objective 6:* To determine hunter and landowner preferences for private land programs that address landowners needs and increase hunter access by 15%.

*Alternative Strategies:*

a. Publicize current programs better through the agency Web page, direct mail, the hunting pamphlet and other hunter publications.
b. Identify the current level of hunter access to private land through a landowner survey and determine incentives that would be effective in encouraging landowners to provide greater levels of hunter access.
c. Host a symposium in 2003 with experts from across the western states to gather ideas about what types of programs are effective in other states.
d. Conduct a Washington hunter/landowner workshop in 2004 to develop the key attributes necessary for a successful hunting access program.
e. Form a task group of stakeholders to develop an implementation plan by November 2005, that includes recommendations for habitat and access requirements, addresses landowner needs, identifies a funding mechanism, includes draft legislation, and has strong public, hunter, and landowner support.

**ROAD MANAGEMENT**

While there is a need for public access for hunting, especially on private lands, there is also a need to control access during critical times of the year to protect wildlife resources. Road management has been recognized as a means of controlling human disturbance by limiting vehicular access seasonally or permanently. Studies have shown that limited-vehicular access reduces human disturbance that result in reduced movements and poaching of elk, Cole et al. (1977), Smith et al. (1994), Phillips and Alldredge (2000).

Washington hunters consider road closures as important for controlling hunter numbers and impacts to wildlife. A majority of hunters surveyed (>70%) considered road closures important in reducing illegal activity and supported the Green Dot Cooperative Road Management System (Duda 2002). A very high percentage also supported periodic or temporary hunting closure areas, road closures to protect game during critical periods of the year, and total access closure areas (refuge) to maintain numbers of game species in local areas.

*Issue Statement:* There is strong overall support for road management systems that are designed to help manage game populations. Some systems are more effective than others. Voluntary

systems such as the Green Dot System require high levels of enforcement to be effective. Public comments dealing with the issue of road management were mostly directed at southwest and central Washington.

*Objective 7:* Develop road management plans in southwest Washington and the central Cascades.

*Alternative Strategies:*

a. Because resources are limited, develop plans that focus on the Yakima, Colockum, Willapa Hills, and Mount Saint Helens areas that reduce road densities to target levels, yet maintain well-distributed access for hunting.
b. Expansion of private lands incentive programs would receive emphasis in these geographic areas.
c. Gated and barrier type closures would be emphasized rather than voluntary systems.
d. De-emphasize road management in areas dominated by private lands (e.g., Willapa Hills and parts of the Mount Saint Helens area).
e. De-emphasize road management in forested areas and allow new Forest and Fish regulations (salmon recovery) to address road management.

*Issue Statement:* While Washington hunters supported most of the concepts and rationale for road management issues, significant concern continues to be expressed regarding the closure of specific roads and loss of hunting access. Many road closures on private lands are for reasons other than game management and in some cases have resulted in extensive access restrictions over large areas. These concerns are especially evident in the Yakima area and in southwest Washington.

*Objective 8:* Identify the current level of hunter acceptance and understanding of road closures that address resource needs in the Yakima area and improve as appropriate.

*Alternative Strategies:*

a. Survey hunters that utilize the Yakima area in 2004 to determine the current level of understanding and acceptance of road closures. Determine key areas of concern for hunters and develop a plan to address those concerns.
b. Develop at least three news articles by 2005 that explain the rationale and demonstrate the value of road closures in the Yakima area.
c. Publish a comprehensive article for the 2003 Game Trails publication.
d. Develop and provide fact sheets at the Oak Creek viewing area, Regional and District offices, and hunter check stations.
e. Develop an electronic slide show presentation and use annually (2003-05) during presentations to hunting organizations.

*Objective 9:* Maintain hunter access opportunities on private industrial timberland in southwest Washington.

*Alternative Strategies:*

a. Inventory current access levels and distribution including landowner surveys.

b. Determine landowner concerns and ways to alleviate problems they experience.
c. Educate hunters about landowner concerns and facilitate the development of partnerships to alleviate problems and open up access.
d. Coordinate with other private lands and hunter access strategies and programs.
e. The priority for expansion of WDFW access programs should be in southwest Washington.

**TRIBAL HUNTING**

In the past ten years tribal hunters have been increasingly exercising their treaty rights to hunt game. They have their own unique tradition, culture, and values related to hunting game. Many tribes also have a special status due to the language of the treaties signed with the United States that allows tribes to manage their hunters, often with different rules than non-tribal hunters. This has lead to frustration, anger, and misunderstanding on the parts of both tribal and non-tribal hunters. At the same time limited state-tribal coordination has made it difficult for tribal and non-tribal wildlife managers to do their jobs of managing harvest and protecting game populations.

*Issue Statement:* Non-Indian hunters often do not understand the treaty rights issues, leading to anger and frustration.

*Objective 10:* Improve public understanding and acceptance of treaty hunting rights.

*Alternative Strategies:*
a. Develop an outreach package that can be sent to citizens concerned about tribal hunting.
b. Use Wild About Washington to highlight tribal rights and tribal management activities.
c. Develop cooperative management programs (see below) that can demonstrate state and tribal management programs.
d. Use links from the WDFW website to highlight tribal research, regulation packages, and harvest reporting.

*Issue Statement:* There is an increasing need to coordinate treaty and non-treaty hunting and wildlife management.

*Objective 11:* By 2007, develop five coordinated tribal/state management plans for deer, elk, and/or cougar populations subject to both tribal and non-tribal hunting.

*Alternative Strategies:*
a. Use existing herd plans to develop coordinated harvest management plans for elk herds.
b. Pick a key population in each treaty area as a starting place to build working arrangements and processes for developing coordinated harvest management plans.
c. Build upon existing working agreements where they exist to move the process forward as quickly as possible.
d. Pick key populations of concern where management and conservation are critical issues as early plans to develop.

## PREDATOR MANAGEMENT

This is one of the most contentious issues WDFW will face in the next few years. As mentioned previously, there is less support for hunting cougar and black bear than most other game species. In addition, a citizen initiative was passed in 1996 that restricted the use of hounds to hunt cougar and black bear. The passage of this initiative and subsequent debate, mainly centered on concerns for public safety and livestock depredation from cougar, has resulted in a dramatic polarization of public opinion regarding predator management. The legislature modified the initiative in 2000 to allow the use of hounds to hunt cougar to address public safety in limited areas.

Washington is blessed with healthy populations of both cougar and black bear and at times they come into conflict with humans. This conflict appears to be increasing, at least partly in response to the growing human population. Managing this conflict and maintaining an appropriate balance between predator and prey populations will be a very significant challenge over the next several years.

*Issue Statement:* Both the general public and hunters showed strong support for managing predator populations to address human safety, protect endangered species, and to prevent the loss of livestock and pets. There was a significant divergence of opinion between the general public and hunters when asked about managing predators to increase game populations. Hunters showed strong support, though less than for all other purposes, and the general public did not support reduction of predators to increase game populations.

*Objective 12:* While sustaining predator populations in balance with prey species and considering public safety and social tolerance, maintain public support (greater than 55%) for managing predator populations.

*Alternative Strategies:*

a. Focus hunting and harvest efforts for predators to those areas and situations that address human safety, protection of pets and livestock, and recovery of listed species (specific management proposals in species sections of this plan).
b. Conduct extensive public involvement and education prior to recommending focused predator-hunting activities designed to address recovery of locally weak game populations. Ensure greater than 55% local public support prior to implementing actions.
c. Maintain current predator hunting programs and minimize changes.
d. Incorporate focused predator harvest activities using licensed hunters while ensuring healthy predator populations.
e. Make any changes to current predator hunting on a gradual basis to increase public support.

*Issue Statement:* Black bear damage to commercial timber in the spring is expensive and significant to timber managers. Forest owners have the legal authority to protect their forests from documented damage by killing black bears with a permit from WDFW. The general practice is to contract with hound hunters and kill bears in areas receiving damage (this was exempt from the initiative). However, the public does not support reducing the number of black bears to prevent timber damage, opposes the use of hounds, and also opposes spring hunting

seasons to control damage. Yet when asked about the manner in which predator populations might be reduced if determined necessary by the Department, the general public supports trap and relocation highest, but also supports using licensed hunters. Contractors (using hounds) kill over 100 black bears each spring to control damage.

*Objective 13:* Develop greater than 55% support from the public for spring black bear hunting in those commercial timber areas that receive damage.

*Alternative Strategies:*

a. Conduct extensive public involvement and education prior to recommending spring black bear hunting designed to reduce commercial timber damage. Ensure greater than 55% public support prior to implementing actions.
b. Determine the feasibility of trap and relocation efforts prior to implementing spring seasons.
c. Implement localized spring hunts on a limited basis to determine effectiveness prior to recommending expansion.
d. Retain current black bear timber damage management program using contractors.

**HUNTING SEASON REGULATIONS**

The Washington State Legislature provides the directive: *"The commission shall attempt to maximize the public recreational game fishing and hunting opportunities of all citizens, including juvenile, disabled, and senior citizens"* (RCW 77.04.012).

During the public involvement process leading to the development of this plan, hunters expressed general satisfaction with their hunting experience. Although eastern Washington pheasant hunters, waterfowl hunters, furbearer hunters, bear and cougar hunters, and even deer and elk hunters feel that satisfaction could be higher. Harvesting an animal (hunter success) and seeing plenty of game were the main factors driving hunter satisfaction. Not enough game and dislike of the regulations or general management strategies were the main reasons given for dissatisfaction. It is fairly clear that harvest success plays a significant role in hunter satisfaction. Yet when asked, hunters often rank ability to harvest much lower than things like hunting with friends and family, seeing game, and low hunter densities.

*Issue Statement:* While some predict continued declines in hunter numbers over time, hunter demand for opportunity and game harvest still exceeds the supply of game animals in most situations in Washington. Hunters also feel that seasons are crowded and regulations too confining. In addition, they say that seasons are too short, success rates are too low, antler restrictions on deer and elk are too onerous, and there is not enough game.

*Objective 14:* Maintain sustainable game species populations while reducing hunter dissatisfaction as measured by a "poor" rating to less than a 10% for all game species hunting by 2008.

*Alternative Strategies:*

a. Consistent with population goals, conservation principles, and social constraints, develop and maintain a variety of deer and elk hunting season opportunities within each administrative District of WDFW:
    1. Provide sufficient hunting opportunities for all three weapon-types to equal average statewide participation rates and seek to equalize overall success rates by 2005.
    2. In at least 10% of Game Management Units (GMUs) with adequate populations, maintain a minimum three-year average, mature (3+ year old) buck and bull, harvest level at 10% of total harvest by 2008.
    3. Develop hunting opportunities that emphasize low hunter densities and higher success rates (than current general seasons) through permit only restrictions.
    4. Provide general season antlerless harvest opportunities approximately equal to recruitment in Population Management Units (PMUs)(these are combinations of GMUs) meeting population objectives. Provide harvest opportunities that exceed recruitment in populations that are above objectives.
        (a) Provide general antlerless opportunity to users in the following order of priority:
            1) Hunters with disabilities
            2) Youth hunters
            3) Senior hunters
        (b) Provide antlerless opportunity to archery or muzzleloader hunters if needed to equalize success rates with modern firearm hunters; or equally between weapon types if success rates nearly equal.
    5. Embrace the Advanced Hunter Education program by providing graduates primary consideration in hunting efforts designed to resolve private land and sensitive damage issues.
b. Within population goals, provide consistent general season opportunity rather than permit restrictions when ever possible. Use other techniques to manage success rates before considering permit only restrictions.
c. While achieving population goals, maintain season length as a second priority to maintaining general seasons. Use other techniques to manage success rates, such as timing, antler points, etc.
d. Identify high priority (top 10%) waterfowl and pheasant hunting areas, increase hunter access, and provide a variety of hunting opportunities in these areas using access easements, cooperative programs, or acquisition.
    1. Develop limited entry areas, marked sites, walk-in sites, or other restrictions to reduce crowding.
    2. Focus habitat programs and population enhancement activities in these high priority areas.
e. Implement multiple public involvement strategies leading to Fish and Wildlife Commission adoption of three-year regulation packages.
f. Following implementation of strategies and allowing time for results, monitor level of dissatisfaction through opinion survey in 2007.

## GAME SPECIES DAMAGE AND NUISANCE

The legislature through RCW 77.36.005 has clearly articulated the state's policy that the responsibility to minimize and resolve conflicts between wildlife and humans is shared by all citizens of the state. However, in RCW 77.36.040, the legislature allows farmers and ranchers to receive payment for damages caused by deer and elk to crops and rangeland.

In a recent public opinion survey (Duda 2002), a substantial percentage of respondents indicated they had experienced problems with wildlife (26%). Raccoons (47%), deer and opossums (14% each) were the major culprits in Washington. Damage to garbage, pets, gardens, yards and livestock were the most common problems identified.

The public identified nuisance as a major issue especially associated with recent restrictions on the use of certain traps for furbearing species. How the public perceives wildlife is critical to maintaining wildlife protection over the long-term. If the public's experiences with wildlife are increasingly negative over time, they may not be as supportive for maintaining abundant populations. The public's ability to resolve problems they encounter with wildlife is important to help maintain support for wildlife.

*Issue Statement:* Twenty six percent of the public experienced problems associated with wildlife last year. The survey did not include questions regarding two important issues: 1) Is the public satisfied with WDFW's response and 2) Are property owner's satisfied with their ability to resolve their wildlife problems? The survey also found that the public is divided on whether funding for resolving problems should be the responsibility of impacted landowners or of local, state, or federal government.

*Objective 15:* Determine public support and desires for WDFW assistance in dealing with wildlife nuisance and damage by 2005.

*Alternative Strategies:*

a. Conduct a public opinion survey to determine satisfaction levels and desires for addressing nuisance and damage.
b. Develop Regional focus groups to help resolve local damage and nuisance problems.
c. Provide information to the public on how they can resolve nuisance problems themselves or by hiring contractors.
d. Develop alternate strategies to mitigate or prevent damage from taking place.
e. Form a task group of stakeholders to develop an implementation plan by November 2004, that includes recommendations for deer and elk damage resolution, dangerous wildlife concerns, nuisance wildlife problems, identifies funding mechanisms as needed, develops draft legislation, and has strong public, hunter, and landowner support.

*Issue Statement:* The level of concern for deer and elk damage to croplands generally depends on landowner tolerance and landowner tolerance often depends on how quickly the problem is resolved. Historically, crop damage by deer and elk has been addressed with hunting as the primary tool. Washington residents continue to show strong support of hunting to control animal

damage to private property. However some landowners and some situations do not favor resolution by hunting.

*Objective 16:* Develop greater landowner understanding of available options and WDFW priorities for resolving crop damage. Respond to crop damage complaints within 48 hours and initiate action to resolve damage within one week.

*Alternative Strategies:*

a. Develop brochure explaining available tools and priorities for resolving crop damage.
b. Provide list of options to landowner for handling damage and allow flexibility to the landowner.
c. Use harassment and other non-lethal methods to address damage in deer and elk populations that are below management goals.
d. Continue to prioritize hunting as the most efficient means of resolving damage problems in those deer and elk populations that are above management goals and focus efforts on the animals causing the problem rather than general herd reductions. The priority for addressing damage problems:
    1. Provide landowner's name to hunters or landowner selects hunters during general season hunt.
    2. Provide landowner's name to hunters or landowner selects hunters during permit only hunt.
    3. Agency selects hunters through "Hot Spot" hunt.
    4. Allow the landowner (or immediate family member) to kill and retain one or more deer or elk through issuance of a "Landowner Preference" permit.
    5. Allow the landowner to select one or more hunters to kill and retain one deer or elk through issuance of a "Landowner Damage Access" permit.
    6. Issue the landowner a "Kill" permit to kill one or more deer or elk with state retaining the carcass.
    7. Pay the landowner for the crop damage.
e. Conduct annual survey of landowners filing complaints to determine satisfaction with WDFW actions for resolving their problem.

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**ELK *(Cervus elaphus)***

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## I. POPULATION STATUS AND TREND

Elk (*Cervus elaphus*) have been present in Washington for 10,000 years (McCorquodale 1985, Dixon and Lyman 1996, Harpole and Lyman 1999). Although complete prehistoric distribution and prehistoric densities are not fully understood at this time, it is known that some form of elk was present in western Washington, on the Olympic Peninsula, on both sides of the Cascade Crest, in northeast and southeast Washington as well as the relatively arid Columbia Basin during the latter half of the Holocene epoch (McCorquodale 1985, Dixon and Lyman 1996, Harpole and Lyman 1999).

Elk were utilized regularly, but not always extensively, by Indian tribes in both eastern and western Washington (McCabe 1981). As European settlement expanded into this region, both from the east and from the Pacific coast, elk exploitation increased dramatically. By the beginning of the 1900s, most if not all of the elk in eastern Washington had been eliminated. Small populations of Roosevelt elk persisted in southwestern Washington and on the Olympic Peninsula (Washington Dept. of Fish and Wildlife 1996).

The Washington Department of Fish and Wildlife (WDFW) currently recognizes 10 major elk herds totaling approximately 56,000 animals. Both Roosevelt elk (*C. e. roosevelti*) and Rocky Mountain elk (*C. e. nelsoni*) are native to Washington (Murie 1951, Bryant and Maser 1982, Spalding 1992). Roosevelt elk are found on the Olympic Peninsula and portions of southwestern Washington. Based on preliminary genetic work conducted by WDFW, Rocky Mountain elk introduced in the early 1900s have interbred with Roosevelt elk on the west slope of the Cascade Crest. Elk occurring in central and eastern Washington are Rocky Mountain elk that either avoided extirpation or were reestablished by reintroductions of elk originating from Montana and Wyoming (Washington Dept. of Fish and Wildlife 1996).

## II. RECREATIONAL OPPORTUNITY

In Washington, elk are hunted from September through December with some special permit hunts taking place as late as February to address agricultural damage. Hunting seasons for archery, muzzleloader, and modern firearms are currently available to both resident and non-resident hunters. There are no restrictions on the number of non-resident elk licenses that can be sold. There are currently no quotas on general elk season licenses sold. At the time of license sale, hunters are required to choose one weapon type and whether they will hunt east side or west side elk. Antler point restrictions are spike only with branch-antlered bulls by limited permit only in eastern Washington. West side elk restrictions are usually 3-point minimum or greater. Some "any elk" hunting opportunities exist in parts of northeast, south central, and southwest Washington where expansion of elk populations is discouraged. In a recent public opinion survey of hunters in Washington, elk hunters indicated that they prefer less restrictive hunting seasons with more opportunities to harvest a legal animal and with more days available to hunt elk (Duda et al. 2002a).

## III. DATA COLLECTION

Elk populations are assessed for a variety of characteristics, often including herd composition and population size. Herd composition is an estimate of the proportions of various age and sex classes occurring in the population such as the number of calves per cows, the number of bulls per cows, or the number of spike bulls per total bulls. These data are collected using a variety of techniques, depending on data needs and local conditions. Common tools used to assess elk populations include:

- Surveys conducted by personnel on the ground.
- Aerial surveys with and without visibility (sightability) corrections.
- Mark-resight population estimates from air or ground surveys where a known number of animals are marked using neckbands or paintballs and then subsequent surveys are conducted and the number of marked and unmarked animals observed are entered in statistical formulas (models) to estimate the total population.
- Population modeling using aerial survey and/or harvest data and population reconstruction (Bender and Spencer 1999).

## IV. ASSESSMENT OF CURRENT MANAGEMENT OF ELK

The Department is currently developing management plans for each of the ten elk herds in the state. Herd plans specifically address the unique conservation challenges that face each herd. Elk herd plans come under the management directive of this Game Management Plan and are designed to be revised and updated every three to five years.

In April 2001, WDFW contracted with an external, independent panel of elk experts to evaluate the current elk management program. That evaluation addressed 1) The effectiveness of using post-hunt bull:cow ratios as management objectives; 2) The effects of hunting elk during the rut; 3) the effects of late season elk hunting, especially from a disturbance and caloric expenditure standpoint; and 4) The genetic consequences of using post-hunt bull:cow ratios as management objectives. This evaluation culminated in an assessment report on elk management in Washington (Peek et al. 2002).

## V. ELK MANAGEMENT GOALS

The statewide management goals for elk are:

1. Preserve, protect, perpetuate, and manage elk and their habitat to ensure healthy, productive populations.
2. 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. Manage elk populations for a sustained annual harvest.

## VI. ISSUE STATEMENTS, OBJECTIVES, AND ALTERNATIVE STRATEGIES

### Population Management

*Issue Statement*: The primary goal is to manage for viable and productive elk populations with desirable population characteristics using the best available science (Tables 1 and 2). Consistent with the primary goal, the secondary goal is to provide recreational opportunity and sustained annual harvests.

Table 1. Current population levels and population objectives for 10 elk herds in Washington.

| ELK HERD | CURRENT POPULATION | POPULATION OBJECTIVE |
|---|---|---|
| Yakima | 10,500 | 9,500 |
| Olympic | 10,000 | 11,000 |
| Colockum | 4,500 | 4,000 |
| North Rainier | 1,825 | 2,800 |
| South Rainier | 2,100 | 3,000 |
| North Cascades | 350 | 800 |
| Selkirk | 1,200 | 1,200 |
| Willapa Hills | 7,600 | 7,600 |
| Mount St. Helens | 13,350 | 13,350 |
| Blue Mountains | 4,400 | 5,600 |

Table 2. Criteria required for a shift in hunting season structure and which class of animals would be impacted by the change in season.

| Criteria | Sub-Population Targeted by Season Change | Liberalize Season | Acceptable | Restrict Season |
|---|---|---|---|---|
| Pre-hunt Bull:Cow Ratio | Antlered & Antlerless | > 35 bulls: 100 cows | 20–35 bulls:100 cows | < 20 bulls: 100 cows |
| Post-hunt Bull:Cow Ratio | Antlered & Antlerless | > 20 bulls:100 cows | 18–20 bulls:100 cows | < 18 bulls:100 cows |
| Bull Mortality | Antlered | < 45 % | 45 to 50 % | > 50 % |
| Percent Mature Bulls In Pop. | Antlered | > 10 % | 5 to 10 % | < 5 % |
| Population Objective | Antlerless | Above Objective | At Objective | Below Objective |

*Objective 17:* Maintain elk populations that are consistent with Tables 1 and 2.

*Alternative Strategies:*

a. Conduct aerial surveys to estimate populations or to estimate composition ratios of bulls, cows, and calves.
b. Manage for a cow mortality rate that is consistent with the desired rate of increase or rate of decline for that elk herd.
c. Manage for a post-hunt bull:cow ratio of 18 to 20 bulls:100 cows as stated in the Elk Management Risk Assessment Report (Peek et al. 2002) (Table 2).
d. Manage for a total bull mortality rate of 50 % or less (Table 2).
e. Manage for a post-hunt mature bull (≥ 5 years old) percentage of 5 % of the bull sub-population (Table 2).
f. Manage for herd composition and population goals at the Population Management Unit (PMU) level.
g. Reduce and maintain the Yakima elk herd to 9,500 by the year 2008.
    1. Increase antlerless harvest for the Yakima elk herd.
    2. Increase antlered harvest for the Yakima elk herd where appropriate.
h. Maintain Willapa Hills, Olympic, and Selkirk elk herds at their current population level.
    1. Maintain the level of antlerless harvest consistent with the cow survival and annual recruitment to maintain population levels of Willapa Hills, Olympic, and Selkirk elk herds.
    2. Maintain the level of bull harvest consistent with bull survival and annual recruitment to maintain population levels of Willapa Hills, Olympic, and Selkirk elk herds.
i. Minimize disturbance and selective harvest of older bulls during peak breeding September 15-30.

*Issue Statement:* Low recruitment in the Colockum elk herd may be the result of the elk herd exceeding the habitat's carrying capacity.

*Objective 18:* Manage the Colockum herd for an overall lower residual population (post-hunt, pre- birth pulse) population but a higher annual sustained yield (Peek et al. 2002).

*Alternative Strategies:*

a. Incrementally increase the antlerless portion of the harvest each year.
b. Monitor annual recruitment to detect a correlation between increased antlerless harvest and juvenile survival.
c. Monitor body condition of elk using ultrasonography to detect any correlations between reduced elk population density and changes in individual elk body condition.
d. Monitor forage quantity and quality to detect any changes in response to changes in elk population density.

*Issue Statement:* Elk are currently managed at the Population Management Unit (PMU) level. To be an effective tool in elk management and season setting, PMUs must have some biological relevance in terms of populations, sub-populations, and how elk physically use the landscape through all seasons of the year.

*Objective 19:* Develop a report that assesses if the current PMU structure system is the most relevant grouping for elk populations and sub-populations by 2005.

*Alternative Strategies:*

a. Determine the status of the current PMU system through a mapping and GIS inventory.
b. Radio-collar elk within a PMU and determine seasonal use of available habitat types.
c. Determine seasonal use within and outside the designated PMU. Compare area use between hunting season, winter, the calving period, summer, and transitional periods.
d. Redefine PMUs if necessary.

*Issue Statement:* Data on elk population size and composition often are collected using helicopter surveys. Age ratios or sex ratios by themselves are inadequate when trying to detect population growth or decline (Caughley 1977). The use of sightability models has improved population estimates derived from helicopter surveys by accounting for sighting biases (Samuel et al. 1987). Segregation between males and females can potentially bias aerial surveys during certain times of the year (Bender and Spencer 1999). However, the assumption that mixing of the sexes in the fall significantly reduces or eliminates gender-based sighting biases remains untested as well. The assumption that sightability models eliminate negative sighting biases associated with different age classes and sex classes (i.e. juveniles, adults, males, females, breeders, non-breeders) should be tested. The benefits of surveying elk at times when they are freely intermixing could be outweighed by lower overall sightability during summer-fall. These effects on the accuracy and precision of parameter estimates should be explored further (Lancia et al. 1996, 2000).

*Objective 20:* Evaluate the efficacy of summer/fall aerial surveys and evaluate and refine the use of winter helicopter surveys to estimate size and composition of Washington elk populations by 2005.

*Alternative Strategies:*

a. Refine current data collection protocols and explore the development of new approaches to monitor elk populations and the effects of management strategies on elk populations.
b. Expand efforts to monitor elk populations with summer-fall surveys where appropriate.
    1. Assess current protocols for winter helicopter surveys of elk and refine where necessary. Expand winter survey efforts where needed.
    2. Identify populations that are most effectively monitored with winter helicopter surveys.
    3. Continue efforts to standardize and improve survey protocols to provide reliable data on the size and structure of Washington elk herds.
c. Explore the utility of currently available winter sightability models and develop herd-specific models where appropriate.
d. Validate and refine sightability models used in Washington.
e. Conduct sightability experiments to assess bias and precision associated with summer/fall helicopter surveys for elk.
f. If needed, construct new sightability bias models for elk on summer and fall range in Washington.

**Recreation Management**

*Issue Statement*: Washington elk hunters harvest approximately 7,000 elk annually. Washington has more elk hunters per elk than any other western state and has no quotas or limits on the number of elk licenses sold. Subsequently, success rates for hunters are low and without 3-point minimum or spike only antler point restrictions, the male sub-population would be over-harvested.

*Objective 21:* Maintain a sustained annual elk harvest that is consistent with Tables 1 and 2 (see Objective 17).

*Alternative Strategies:*

a. Conduct aerial surveys to estimate populations or to estimate composition ratios of bulls, cows, and calves.
b. Manage for a cow mortality rate that is consistent with the desired rate of increase or rate of decline for that elk herd.
c. Maximize season length where possible while maintaining consistent elk hunting seasons in eastern and western Washington.
d. Retain spike only seasons in eastern Washington and adjust bull permit levels to achieve bull ratio goals.
e. Retain 3-point restriction in western Washington and develop road access restrictions, limited permit only units, and/or refuges to achieve bull ratios.
f. Develop hunter quotas for PMUs that do not achieve goals – permit only.
g. Design and implement harvest strategies based on the best available information for recruitment rates and mortality rates of specific elk populations and sub-populations.
h. Manage for a post-hunt bull:cow ratio of 18 to 20 bulls:100 cows as stated in the Elk Management Risk Assessment Report (Peek et al. 2002) (Table 2).
i. Manage for a total bull mortality rate of 50 % or less (Table 2).
j. Manage for a post-hunt mature bull (≥ 5 years old) percentage of 5 % of the bull sub-population (Table 2).
k. Manage for herd composition and population goals at the Population Management Unit (PMU) level.
l. Minimize hunting and focused harvest pressure on older age class bulls during the peak of breeding, September 15-30.
m. Allow three years to determine effectiveness of regulation changes designed to achieve ratio goals.
n. Reduce and maintain the Yakima elk herd to 9,500 by the year 2008.
o. Increase antlerless harvest for the Yakima elk herd.
p. Increase antlered harvest for the Yakima elk herd where appropriate.
q. Maintain Willapa Hills, Olympic, and Selkirk elk herds at their current population level.
r. Maintain the level of antlerless harvest consistent with the cow survival and annual recruitment to maintain population levels of Willapa Hills, Olympic, and Selkirk elk herds.
s. Maintain the level of bull harvest consistent with bull survival and annual recruitment to maintain population levels of Willapa Hills, Olympic, and Selkirk elk herds.

*Objective 22:* Maintain overall stability of elk hunting season regulations as provided during the 1997-2002 time period if possible, while still maintaining the criteria set forth in Tables 1 and 2.

*Alternative Strategies:*

a. Document recruitment and mortality rates for elk populations under a wide variety of conditions such as weather, human access, range condition, supplemental feeding, and herd densities.
b. Adjust hunting season regulations to achieve the desired population characteristics.
c. Monitor elk population responses to various harvest strategies.
d. Develop population models that simulate various harvest strategies before implementation.
e. Validate results of population modeling efforts abundance, composition, mortality, recruitment, and harvest data collected annually.
f. Implement an adaptive harvest strategy based on the past season harvest, composition counts, and/or population estimates available for each population or sub-population.

*Issue Statement:* Elk provide a wide variety of viewing and photographic opportunities for the citizens of Washington.

*Objective 23:* Increase non-harvest recreational opportunity for elk when consistent with the health and viability of elk populations.

*Alternative Strategies:*

a. Develop elk viewing sites.
b. Improve existing elk viewing sites.

*Issue Statement:* Not all elk hunters are the same (Duda et al. 2002a). Some hunters want a high probability of harvesting an elk every year. Other elk hunters will accept a lower probability of success if they have a chance to take a trophy animal. Still others just want the opportunity to recreate outdoors with some chance of harvesting an elk. Meeting the needs of all hunters requires a variety of harvesting schemes across the landscape.

*Objective 24:* Provide more than one type of elk hunting opportunity, allowing elk hunters to select a GMU or group of GMUs that best fits their preferred style of hunting.

*Alternative Strategies:*

a. Identify elk population management units that can be managed for lower hunter densities and higher bull escapement by 2005.
b. Identify elk population management units that can be managed for higher levels of recreational opportunity by 2005.
c. Identify population management units that can be managed for low success but with some chance to harvest older age class bulls.

*Issue Statement*: Annual harvest data are used as an index to elk population abundance and herd health and to monitor impacts of changing regulations.

*Objective 25:* Improve the utility of harvest data to monitor elk populations and the effects of various management strategies.

*Alternative Strategies:*
a. Continue to implement and improve the mandatory harvest reporting system.
b. Explore the possibility of expanding efforts to collect age-at-harvest data from elk teeth collected from successful hunters.
c. Explore the possibility of collecting data on elk condition from harvested elk at check stations or using other sampling strategies.

*Issue Statement:* Sex-age-kill and other modeling techniques are currently used to assess some elk populations in Washington. Data have generally been obtained from harvest reporting and aerial survey composition counts. Although the approach is sound if input data are unbiased and precise, the relative impact of biased input parameter estimates on estimates of population size and composition has not been rigorously addressed.

*Objective 26:* Improve the reliability of population estimates derived from the sex-age-kill model.

*Alternative Strategies:*
a. Assess the utility of population modeling approaches currently being used in Washington and evaluate the need for new models and/or applications of population modeling.
b. Compare independent and unbiased estimates of sex-age-kill model input parameters with estimates routinely estimated for sex-age-kill modeling. Conduct this work on 2 separate elk populations by 2008.

*Issue Statement:* Historically hunters and managers have been conservative in harvesting antlerless elk. The philosophy is based on a desire for ever increasing elk populations. With some populations at or exceeding population goals, antlerless harvest could be expanded to match recruitment.

*Objective 27:* Maximize antlerless harvest opportunities in populations at or above population goals.

*Alternative Strategies:*
a. Monitor annual recruitment and population response to increased or decreased harvest.
b. In stable population meeting population objective, develop harvest strategies to equal recruitment minus estimated annual, non-harvest mortality.
c. In populations above goals, incrementally increase antlerless hunting opportunity and harvest each year until the population stabilizes within some targeted range of criteria.

**Damage Management**

*Issue Statement:* Elk provide a sustained annual harvest, but they also contribute to agricultural damage in some cases. Some herds that are at or below population objective can still contribute to agricultural damage.

*Objective 28:* Identify areas of elk damage and minimize the number of damage incidents if possible.

*Alternative Strategies:*
a. Increase antlerless harvest in specific damage areas that target elk causing damage.
b. Increase any elk harvest in certain situations where localized bull herds are causing depredation problems.
c. Address site-specific damage situations by utilizing hot spot hunts, landowner preference tags, or issuing kill permits.
d. Reduce elk damage using non-lethal means in elk herds below population objective.
e. Use site-specific lethal means in elk herds at or above population objective. Identify and map areas that will not be managed for elk and provide liberal harvest opportunities in those areas.

**Habitat Management**

*Issue Statement:* Elk habitat in Washington State is declining due to human population expansion, changes in timber management practices, progression of successional age of habitat, and competition with domestic livestock.

*Objective 29:* Maintain, enhance, and acquire habitat for Rocky Mountain and Roosevelt elk.

*Alternative Strategies:*
a. Identify highest priority elk ranges to target for acquisition or conservation easements.
b. Identify lands that fit financial and biological criteria consistent with WDFW's elk management program.
c. Identify and access funding sources to complete acquisitions and easements that will benefit elk.
d. Where habitat condition or quantity limits herd productivity, identify and implement large scale habitat conservation and enhancement projects.
e. Improve habitat condition where possible, by implementing habitat enhancements and coordinating with land management agencies and private landowners to improve elk habitat quality where those opportunities exist.
f. Establish cooperative cost share projects with U. S. Forest Service, Washington Department of Natural Resources, U. S. Fish and Wildlife Service, Rocky Mountain Elk Foundation, Safari Club International and other entities to improve elk habitat.
g. Manage for elk herd distribution within tolerance limits of landowners.

*Issue Statement:* The biggest threat to the sustainability of elk populations is loss of quality habitat. To effectively manage for elk in Washington, certain priority lands must be set aside with the management of elk habitat identified as the primary activity on those lands.

*Objective 30:* Identify and prioritize important elk habitat that is at risk of being lost to other land use practices. Acquire the land or acquire conservation easements that will benefit elk on those lands classified as high priority.

*Alternative Strategies:*

Yakima Herd
a. Secure private lands with valuable winter range in GMU 368.
b. Secure in-holdings in the Wenas Wildlife Area in GMU 342.

Colockum Herd
c. Acquire critical elk habitat in the Skookumchuck and Naneum Basins.

Blue Mountains Herd
d. Secure important elk habitat in the Lick Creek unit GMU 175.
e. Secure important elk habitat in the Tumalum Drainage of the Tucannon unit, GMU 166.
f. Secure elk winter range in the Mountain View unit, GMU 172.

South Rainier Herd
g. Secure important elk habitat in the bottomlands along the Upper Cowlitz River.

North Cascades Herd
h. Purchase, lease, acquire easements and use other incentives to protect and enhance critical elk winter ranges located along the Skagit River bottomlands.

**Information and Education**

*Issue Statement:* Washington citizen's want to know more about elk and their natural history (Duda et al. 2002b).

*Objective 31:* Inform and educate all portions of the general public regarding elk biology and elk issues impacting the state of Washington. Provide the general public with more pertinent information about elk.

*Alternative Strategies:*
a. Expand educational opportunities pertaining to elk on the agency web site and develop brochures for direct mailing.
b. Develop a brochure that informs the public how to best enjoy elk without adding undue stress during critical times of the year (e.g. winter, calving, breeding).
c. Publish two news articles per year regarding watchable opportunities.

**Winter Feeding**

*Issue Statement:* Historic elk winter range has been removed due to agriculture and housing development. At current population levels, some elk in Washington must be fed every winter due to inadequate winter range available. The average amount of hay fed annually from 1981 to 2001 was 1,302 tons (range 320 to 5,100 tons). Elk winter feeding programs can be problematic. The programs are expensive, elk that are unnaturally congregated have a higher potential for spreading diseases, elk that are fed in the winter can have extreme impacts on shrubs and trees

near feeding sites, winter feeding programs may artificially allow elk populations to exceed the carrying capacity of the land.

*Objective 32:* Maintain Yakima elk feeding program.

*Alternative Strategies:*
a. Identify which feeding sites are essential to meeting Yakima elk herd management objectives.
b. Pursue outside fund sources to augment winter feeding budget.
c. Identify areas where elk feeding efforts might be reduced. Eliminate some elk feeding sites if possible.
d. Evaluate alternate feed sources such as forage grains on some areas if cost effective or if it helps redistribute elk activity.

**Disease**

*Issue Statement:* Wild elk suffer from a wide variety of diseases. Some diseases are commonplace and have very little impact at the population level. Other diseases can be far more serious, have major impacts at the population level and have severe economic consequences.

*Objective 33:* Monitor the health and disease status of wild elk in Washington.

*Alternative Strategies:*
a. Take blood and tissue samples when elk are captured and test for diseases common to elk.
b. Sample hunter harvested elk for chronic wasting disease.
c. Follow U. S. Department of Agriculture and Washington Department of Agriculture guidelines for reporting and action when a disease is detected.

**Research**

*Issue Statement*: The Yakima elk herd is the largest in the state, and herd characteristics have responded well to management strategies designed to increase bull:cow ratios and the survival of adult bulls. Recruitment during recent years has typically been below long-term means, similarly to other regional elk populations. Much of the historical winter range for ungulates is now under agricultural and rural development. Much of the potential winter range is used for high-value agriculture. Fences and artificial feeding are used to control elk distribution and movements on the very limited winter range. The U.S. Forest Service (USFS) has questioned whether the size of the current elk population can be maintained without damage to sensitive habitats, such as wet and dry meadows, on spring-summer-fall range. Better information is needed on the relationship between the size of the Yakima elk herd and the habitat supporting that herd.

*Objective 34:* Determine the appropriate population size for the Yakima elk herd given the number of environmental, social, recreational, and economic values assigned to this herd by various user-groups.

*Alternative Strategies:*

a. Detailed analysis of habitat condition and trend is needed to better define a population goal that protects other values, including environmental, social, and economic values of this region
b. Conduct intensive remote sensing data collection and GIS analyses.
c. Use radio-telemetry to define elk use of sensitive habitats.
d. Use radio-telemetry to define movements of elk between specific summer and winter ranges.

*Issue Statement:* The Blue Mountains elk herd has historically provided considerable recreational hunting opportunity and supported subsistence and ceremonial needs for Native Americans. Like many other regional elk herds, the Blue Mountains herd has exhibited declining recruitment in the past decade. The herd is below population objective. Although spike-only hunting has improved bull elk survival, limited, hunting opportunities for branch-antlered bulls continues in some areas. The lack of documentation of tribal harvest impacts has complicated management of this elk herd. In some units, high poaching losses have contributed to a reduction or elimination of mature bull hunting opportunity. Estimates of both adult and yearling bull survival as well as adult cow survival need to be improved for this elk herd. The overall impact of human-caused mortality is known only in very general terms.

*Objective 35:* Identify research questions to be answered regarding elk ecology and management and design experiments and studies that address those questions. Estimate total mortality for adult elk in the Blue Mountains. This project would focus on estimating survival for male elk, but information on female elk survival would also be useful to managers. Partition the total mortality as accurately as possible among all sources of mortality. Complete project by 2008.

*Alternative Strategies:*

a. Quantify total mortality for adult elk for one or more PMUs in the Blue Mountains. To accomplish this, a large-scale telemetry project is needed to obtain defensible survival estimates.
b. Quantify the impact of human-caused mortality on elk in the Blue Mountains, particularly the impacts of various sources of hunting mortality on adult and yearling bull elk.
c. Quantify the impacts of unreported mortality, such as tribal harvest, wounding losses, damage hunt loss, and poaching losses.
d. Address the management implications of those various sources of mortality.

*Issue Statement:* The Colockum elk herd has long been plagued by low bull:cow ratios, and during the last decade, calf:cow ratios have also declined precipitously. In 1994, spike-only hunting was adopted for general license holders. This regulatory change occurred throughout eastern Washington and was designed to increase bull survival, increase the ratios of adult bulls to adult cows, and to yield early, synchronized breeding. In the Yakima elk herd, the effect on bull:cow ratios was rapid and dramatic. A similar response has not occurred in the Colockum herd. Bull survival apparently remains low. Bull:cow ratios have generally remained below objective. Branch-antlered bull hunting has essentially been eliminated. No positive effects have been seen in recruitment patterns in the Colockum herd as well. Habitat condition also appears to be generally poor in some concentrated use areas, such as the Coffin Game Reserve. There are a number of potential factors that may be impacting elk recruitment, including poor

nutrition, predation, and low numbers of breeding adult bulls. Defensible estimates of yearling bull survival and calf survival are needed.

*Objective 36:* Ascertain the population dynamics of the Colockum elk herd by 2008.

*Alternative Strategies:*
a. Determine adult and juvenile elk survival for the Colockum herd.
b. Determine the cause of poor recruitment, including an assessment of body condition dynamics of adult cow elk.
c. Analyze habitat conditions and trends at the landscape scale using remote sensing and ground-truthing.

*Issue Statement:* Forage enhancement areas were created to mitigate elk habitat loss associated with construction of the Wynoochee Reservoir. No assessment of the realized value of these areas to elk has been done. It is unclear if the costs of such mitigation efforts are warranted or if the enhancement areas actually benefit elk relative to the background habitat mosaic. The efficacy of this and similar mitigation projects compensating for elk habitat loss is unknown.

*Objective 37:* Quantify the differences in body condition, productivity, and recruitment for 2 elk sub-populations, one having access to mitigation enhancement fields and one that does not.

*Alternative Strategies:*
a. Using telemetry, evaluate elk use of the Wynoochee forage enhancement fields.
b. Assess the effect of use of the fields on elk body condition and productivity.
c. Monitor demographics in both elk sub-populations.
d. Monitor body condition in both sub-populations and relate body condition scores to elk landscape use, including use of the forage enhancement fields.

*Issue Statement:* Movements and population dynamics of elk and deer in the upper Kittitas valley are poorly understood. Elk-landowner conflicts have been increasing on private lands in the upper Kittitas valley. Specific movement patterns for this sub-population of elk are poorly understood and abundance is unknown. Development continues to change the landscape of the upper Kittitas valley and the planned community will increase elk-human interaction. Management of elk numbers and distribution can be anticipated to become increasingly complicated. This area is also the study area for Project CAT, a large-scale cougar ecology project. The goal of Project CAT is to better define the movements and behavior of cougars in human occupied landscapes such as the I-90 corridor. It will be difficult to fully understand how cougars use this landscape without better knowledge of the movements and landscape use of their primary prey, elk and deer.

*Objective 38:* Gain a better understanding of the population dynamics and habitat use of elk in the upper Kittitas Valley.

*Alternative Strategies:*
a. Gather specific information on elk and deer movements, landscape use, and population dynamics in the upper Kittitas Valley.

b. Collect data on deer and elk in a dynamic landscape where managing human-wildlife interactions can be expected to become increasingly complex.
c. Coordinate project with staff conducting the Project CAT effort.
d. Explore possible elk management options despite the presence of a large private land refugium.
e. Enhance the specific project objectives of the on-going cougar project.

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## DEER

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## I. POPULATION STATUS AND TREND

Black–tailed deer (*Odocoileus hemionus columbianus*), mule deer (*O. h. hemionus*), and white-tailed deer (*O. virginianus*) are all native to the state of Washington. The total deer population for the state numbers approximately 300,000 to 320,000 (Washington Dept. of Fish and Wildlife 2001). White-tailed deer populations are stable or increasing. Mule deer populations in northeastern Washington are below historical levels. Other mule deer populations in central and eastern Washington are growing in response to recent mild winters. Black-tailed deer populations seem to be stable or declining across their range. The goal set by Washington Department of Fish and Wildlife (WDFW) for the management of black-tailed deer, mule deer, and white-tailed deer populations in Washington is to maintain numbers within habitat limitations. Landowner tolerance, a sustained harvest, and non-consumptive deer opportunities are considered within the land base framework.

## II. RECREATIONAL OPPORTUNITY

Deer are hunted in Washington from September to December. Archery, muzzleloader, and modern rifle seasons are accommodated. Historically about 45 percent of Washington's deer harvest was black-tailed deer, 35 percent mule deer, and 20 percent white-tailed deer. Due to expanding white-tailed deer populations, recently depressed mule deer populations and conservative hunting seasons for mule deer, white-tailed deer have outnumbered mule deer in the harvest for the past few years (Table 1). For the 2001 hunting season, initial estimates suggest that mule deer and white-tailed deer harvest are equal at approximately 10,500 animals or 31% of the harvest respectively.

White-tailed deer hunting seasons have remained consistent for the last few years, except for northeastern Washington where the white-tailed deer antlerless opportunity has gradually increased. Beginning in 1997, youth, senior, and disabled hunters were allowed to take antlerless white-tailed deer during general buck seasons in northeast Washington.

Eastern Washington mule deer seasons have been much more restrictive since 1997, although some mule deer opportunity is being reestablished in areas where mule deer herds are recovering. Some of the restrictive measures include a three-point minimum restriction for all mule deer in eastern Washington and a shortened deer hunting season for most hunters. Antlerless hunting opportunities are offered mostly by special permit only. The 2001 hunting season provided some additional antlerless opportunity as well as some any deer opportunity for youth and disabled hunters.

Throughout western Washington, black-tailed deer harvest has remained relatively stable in terms of total numbers harvested in recent years. However success per unit of effort has decreased in southwest Washington black-tailed deer regions. Black-tailed deer still provided the most of Washington's 2001 deer harvest with initial estimates at 13,200 or approximately 38.5% of the total deer harvest. The 7-year average for black-tailed deer harvest was 14,875.

Table 1. Estimated Washington deer harvest by deer type for 1995 through 2001.

| Year | Black-tailed Deer | White-tailed Deer | Mule Deer | Total |
|---|---|---|---|---|
| 1995 | 17,048 | 9,800 | 10,971 | 37,765 |
| 1996 | 14,808 | 11,600 | 13,034 | 39,442 |
| 1997 | 15,875 | 9,700 | 6,566 | 32,141 |
| 1998 | 13,966 | 8,960 | 7,327 | 30,253 |
| 1999 | 15,268 | 11,007 | 9,232 | 35,507 |
| 2000 | 13,932 | 15,161 | 11,883 | 40,976 |
| 2001 | 13,226* | 10,574* | 10,519* | 34,319 |

* Initial estimates not finalized.

## III. DATA COLLECTION

WDFW conducts composition surveys from the air and the ground to index buck, doe, and fawn ratios. Depending on the species, location and terrain involved, deer composition surveys are conducted in the spring, the summer, pre-hunt in the early fall and post-hunt in the early winter prior to deer shedding their antlers. Population estimates are also conducted for mule deer using the visibility bias model initially developed in Idaho for elk (Samuel et al. 1987). Variants of the model have been developed for a variety of other species including mule deer.

In western Washington, black-tailed deer surveys are coupled with hunter check station information and harvest data to model populations. Sex ratios, age ratios, and survival rates are reconstructed using harvest information and those vital statistics are then entered into a sex/age/kill (SAK) population model to estimate population size (Bender and Spencer 1999).

Pre-hunt and post-hunt surveys are conducted in eastern Washington for both white-tailed deer and mule deer. Deer populations in selected areas are surveyed again in March and April to assess winter survival and recruitment.

White-tailed deer are surveyed in summer to determine pre-hunting season fawn and buck ratios and again in spring to determine recruitment – those fawns that have survived their first 10 or 11 months and will likely reach their first birth date alive. Hunter check stations and harvest report cards are used to monitor age distribution of whitetail bucks in the harvest.

## IV. DEER MANAGEMENT GOALS

The statewide management goals for deer are:

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

## V. ISSUE STATEMENTS, OBJECTIVES, AND ALTERNATIVE STRATEGIES

### Population Management

Deer population management goals are to maintain relatively stable growth for both white-tailed deer and black-tailed deer populations. The population goal for mule deer management is an increase in populations within the limitations of available mule deer habitat, landowner tolerance, and extreme weather events (i.e. summer and fall drought, catastrophic fire, protracted winters with deep snow). Recreation management for deer is directly tied to population management. The recreation goal for deer is to maintain or increase hunting opportunity, improve hunting quality, and be responsive to landowner conflicts (see below). The general, post-hunt buck:doe ratio goal for deer in Washington is 15 bucks:100 does for most populations although this may vary depending on the location, species, or subspecies. A post-hunt range of 20 to 25 bucks:100 does is targeted in areas managed for mature buck deer hunting. Recruitment rates and mortality rates also vary substantially depending upon species, subspecies, and location.

*Issue Statement:* Mule deer population levels are closely tied to severe winter events and are susceptible to over harvest.

*Objective 39:*

i. Maintain ≥ 15 bucks: 100 does in post-hunt surveys.
ii. Define which Population Management Units (PMUs) or Game Management Units (GMUs) will be managed for older age structure in the buck sub-population.
iii. Maintain ≥ 20 to 25 bucks:100 does in post-hunt surveys in those GMUs that are being managed for older age class bucks.
iv. Maintain an adequate number of mature bucks in the post-hunt population for breeding purposes and for biological, genetic, and behavioral integrity of the population.
v. Increase both antlered and antlerless hunting opportunity for all user groups when biologically feasible.

*Alternative Strategies:*

a. Conduct post-hunt population surveys to ascertain population size or index.
b. Conduct post-hunt population survey to ascertain buck survival through the hunt period.
c. Conduct spring "green-up" surveys to determine winter survival of adults and juveniles and use this information to set special permit quotas and antlerless seasons for the coming fall hunting season.

*Issue Statement*: Mule deer populations are more amenable to population surveys than the other two types of deer in Washington. Currently, not enough resources are being invested to adequately survey mule deer populations in all parts of the state (Mayer et al. 2002).

*Objective 40:*

Improve and expand the survey protocols for mule deer by 2005.

*Alternative Strategies:*

a. Conduct a literature search for existing population estimation techniques that would be appropriate for mule deer.
b. Document and/or standardize best-case survey protocols for mule deer throughout the state.
c. Validate the efficacy of existing survey protocols for mule deer.
d. When necessary, develop and standardize new survey protocols for mule deer.

*Issue Statement*: Of the three types of deer hunted in Washington, black-tailed deer have historically provided the highest number of deer harvested. Black-tailed deer are difficult to survey and detect population changes due to the type of habitat they occupy. Age ratios or sex ratios by themselves are inadequate when trying to detect population growth or decline (Caughley 1977). Incumbent to the process of setting deer harvest objectives is having some estimate or index of the number of animals in the population available for harvest.

*Objective 41:*

Determine the efficacy of existing survey protocols and how the resulting information is used for black-tailed deer management decisions by 2004.

*Alternative Strategies:*

a. Conduct a literature search for existing population estimate and population index techniques that would be appropriate for black-tailed deer.
b. Document and/or standardize existing survey protocols for black-tailed deer.
c. When necessary, develop and standardize new survey protocols for black-tailed deer.
d. Determine key parameters to monitor for black-tailed deer. Incorporate those parameters in population models. Validate the parameters.

*Issue Statement:* White-tailed deer population levels are closely tied to severe winter events. White-tailed deer have the highest potential maximum rate of increase of all North American ungulates due to the type of habitat they occupy, their age at first reproduction when on a high nutritional plane, and their ability to successfully recruit twins into the population (McCullough 1987). Compared to mule deer, white-tailed deer are less susceptible to overharvest. The antlerless component of white-tailed deer populations are often under utilized. Age ratios or sex ratios by themselves are inadequate when trying to detect population growth or decline (Caughley 1977).

*Objective 42:*

i. Manage white-tailed deer populations to meet appropriate post-hunt buck ratios while providing as much opportunity to all user groups as is biologically sound.
ii. Maintain ≥ 15 bucks: 100 does in post-hunt surveys.
iii. Maintain an adequate number of mature bucks in the post-hunt population for breeding purposes and for biological, genetic, and behavioral integrity of the population.
iv. Increase both antlered and antlerless hunting opportunity for all user groups when biologically feasible.
v. Maintain white-tailed deer populations within the tolerance of landowners.

*Alternative Strategies:*

a. Conduct post-hunt population surveys to ascertain population size or index.
b. Conduct post-hunt population survey to ascertain buck survival through the hunt period.
c. Conduct spring "green-up" surveys to determine winter survival of adults and juveniles and use this information to set special permit quotas for the coming fall hunting season.

*Issue Statement:* Like black-tailed deer, white-tailed deer populations are difficult to estimate in Washington (Roseberry and Woolf 1991, Lancia et al. 1996, Lancia et al. 2000, Mayer et al. 2002). Age ratios or sex ratios by themselves are inadequate when trying to detect population growth or decline (Caughley 1977).

*Objective 43:*

Develop a population index or a population estimate for white-tailed deer in Washington.

*Alternative Strategies:*

a. Conduct a literature search of existing techniques.
b. Consult with statisticians at various universities for latest developments in population estimation.
c. Develop a new technique for estimating or indexing white-tailed deer in eastern Washington.
d. Determine key parameters to monitor for white-tailed deer. Incorporate those parameters in population models. Validate the parameters.

*Issue Statement:* Habitat quality and herd health can be expressed through a variety of proxy measurements. One measurement used for white-tailed deer in other parts of North America is the live weight or the dressed, carcass weight of 1.5 year-old males. In those GMUs that allow any buck hunting, carcass weights of field dressed 1.5 year-old males can be readily obtained through check station data collection. Live weight estimates can be made using known conversion factors or measuring chest girth of the animal. Lower than desired 1.5 year-old male weights can be an indicator of deer densities that are too high and may suggest a more aggressive harvest strategy.

*Objective 44:*

i. Evaluate the efficacy of using 1.5 year-old male weights as a measurement of herd health or habitat condition in those GMUs that allow any buck hunting for white-tailed deer.
ii. If possible, develop a range of standardized weights that indicate whether a 1.5 year-old buck is in good, fair, or poor condition.

*Alternative Strategies*:

a. Conduct hunting season check stations and collect data on yearling buck carcass weights.
b. Correlate yearling buck carcass weights to deer population density and quality of available forage.

*Issue Statement:* Another measurement that can be used for deer in North America is a body condition score measured using ultrasonagraphy.

*Objective 45:*
Develop a baseline set of measurements using body condition ultrasonagraphy for mule deer.

*Alternative Strategies:*
a. Complete cooperative mule deer research study.

**Recreation Management**

*Issue Statement:* The recreation goal for deer management is to maintain or increase hunting opportunity, improve hunting quality, and be responsive to landowner/deer conflicts. Deer hunters do not all have similar expectations (Duda et al. 2002a). Some hunters want a high probability of harvesting a mature buck. Others want a high probability of harvesting a legal deer. Meeting the needs of all hunters requires a wide diversity of hunting opportunities spread across the landscape.

*Objective 46:*
i. Maintain a variety of deer hunting opportunities within each administrative district of WDFW.
ii. Maintain a minimum of ten percent mature bucks in the harvest.
iii. Increase antlerless hunting opportunity to harvest 50 percent of recruitment in PMUs meeting population goals.

*Alternative Strategies:*
a. Increase or decrease the number of days in the general hunting season when appropriate.
b. Increase or decrease the number of antlerless special permits when appropriate.
c. Increase or decrease the number of any deer opportunities when appropriate. Allocate opportunity according to general strategies identified in Chapter 2 under Hunter Regulations.

**Research**

*Issue Statement:* In the 1990s mule deer exhibited declines across most of the western United States. The public, the press, and wildlife scientists have postulated a variety of theories to explain this decline. One of the major contributors to the decline in mule deer numbers in Washington were deterioration of mule deer habitat due to successional progression and also high winter mortality due to the severe winter of 1996-97. As a result of this decline, the Department invested in a multi-cooperator, long-term mule deer research project.

*Objective 47:*
Determine the relationship between habitat, predation, body condition and other factors as they relate to Washington mule deer survival and recruitment.

*Alternative Strategies:*
a. Complete Mule Deer Cooperative Study.

**Habitat Management**

*Issue Statement:* Mule deer habitat is being lost throughout the west due to urban suburban sprawl, expansion of agriculture into mule deer habitat, fire suppression, and ecological succession of younger aged habitat.

*Objective 48:*
Maintain and enhance deer habitat including forage and security cover.

*Alternative Strategies:*
a. Acquire critical deer habitat or conservation easements on critical deer habitat.
b. Work with state, federal, and private land managers to conduct prescribed burns that will benefit deer.
c. Work with county governments to limit the expansion of human development on deer range.

**Information and Education Goal**

*Issue Statement:* The general public has an interest in deer from more than a consumptive standpoint (Duda 2002b). Information pertaining to deer for the general public is lacking at this time.

*Objective 49:*
Inform and educate all portions of the general public regarding deer biology and deer issues impacting the state of Washington.

*Alternative Strategies:*
a. Interact with local outdoor groups to discuss deer management topics.
b. Produce new informational handouts for black-tailed deer, white-tailed deer, and mule deer on deer biology and natural history for Regional Offices and Headquarters.
c. Insert deer information in the Go Play Outside program.
d. Update and continue to produce the chronic wasting disease (CWD) handout, fact sheet, and web site.

**Damage and Depredation Goal**

*Issue Statement:* Deer cause agricultural damage. Expansion of agricultural operations on deer range has increased in the last 20 years. Conflicts between deer and the agricultural community will continue to grow as human activity expands across traditional deer habitat.

*Objective 50:*
Reduce damage caused by deer.

*Alternative Strategies:*
a. Increase antlerless harvest in damage areas using all 3 major weapon groups (archery, muzzleloader, and modern firearm).
b. Offer early and late season hunts specific to damage areas.

c. Increase harassment factor with archery hunters.

**Disease**

*Issue Statement:* Wild deer suffer from a number of diseases. Some can have severe but localized impacts on a sub-population.

*Objective 51:*
Monitor deer for disease and reduce the risk of disease when possible

*Alternative Strategies:*
a. Continue to monitor for chronic wasting disease (CWD).
b. Develop a prevention plan to reduce the risk of CWD entering Washington.
c. Enforce the current regulations that prevent the captive farming of native deer and elk in Washington.
d. Develop a contingency plan in the event that CWD is ever found in Washington.
e. Continue to monitor for epizootic hemorrhagic disease (EHD).
f. Continue to monitor for adenovirus hemorrhagic disease (AHD).
g. Continue to monitor for tuberculosis.

*Objective 52:*
Determine the population level impact to black-tailed deer of hair loss syndrome.

*Alternative Strategies:*
a. Initiate comparative studies on herds with high levels of hair loss syndrome and those at lower levels to determine differences in fawn and doe survival.

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**BIGHORN SHEEP (*Ovis canadensis*)**

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## I. POPULATION STATUS AND TREND

Washington State has approximately 1,100 bighorn sheep distributed in 16 herds. Of those, 11 herds are California bighorn sheep and 5 are Rocky Mountain bighorn sheep. Average herd size is 68 sheep, and ranges from 27 to 173 sheep. Populations are stable to increasing in 11 herds and declining in 5 herds, where diseases and parasites are the primary causes for decline.

## II. RECREATIONAL OPPORTUNITY

Currently, only California bighorn sheep are hunted in Washington, as populations of Rocky Mountain bighorns are still recovering from the *pasteurella* die-off. In Washington, hunters typically pursue mature rams. Therefore, harvest thresholds are based on total population size, sex structure, and the number of mature rams in a herd. Hunting opportunity is allocated by permit drawing and is a once in a lifetime opportunity (except for raffle and auction permit holders). The number of controlled hunt applications received annually ranges from 1,000-4,500, which averages approximately 151-applications per bighorn sheep hunting permit. Statewide, permit levels have ranged from 9-22 and hunter success is high (92%).


Figure 1. Bighorn sheep herds in Washington, 2002.

## III. DATA COLLECTION

The Department surveys each herd 1-2 times annually, using either aerial or ground surveys. Surveys typically are conducted during lambing or rutting periods and data are used to estimate lamb recruitment, sex ratio, adult survival, population size, and percentage of mature rams in the population. In addition to surveys, individuals from selected herds are screened for disease and parasites during winter captures or feeding operations.

## IV. BIGHORN SHEEP MANAGEMENT GOALS

The statewide goals for bighorn sheep are:

1. Manage statewide bighorn sheep populations for a sustained yield.
2. Manage bighorn sheep for a variety of recreational, educational and aesthetic purposes including hunting, scientific study, cultural and ceremonial uses by Native Americans, wildlife viewing and photography.

3. Preserve, protect, perpetuate, and manage bighorn sheep and their habitats to ensure healthy, productive populations.

## V. ISSUE STATEMENTS, OBJECTIVES, AND ALTERNATIVE STRATEGIES

### Habitat Management

*Issue Statement:* Habitat quality influences bighorn sheep reproduction, survival, and abundance. Unfortunately, habitat conditions are deteriorating in many bighorn herds, primarily due to the spread of noxious weeds, poor forage growth, and forest encroachment. To improve habitat quality for bighorn sheep, there is a need to conduct various habitat improvement projects, as the need and opportunity arises, in several herds.

*Objective 53:* Conduct habitat improvement projects on ≥10% of the habitat in bighorn ranges in Vulcan Mountain, Swakane, and the Blue Mountains.

*Alternative Strategies:*
a. Inventory and map habitat conditions.
b. Conduct controlled burns to improve habitat quality.
c. Distribute fertilizer and herbicides to improve forage quality.
d. Distribute mineral blocks to supplement forage quality.
e. Distribute water sources to improve habitat quality.

### Population Management

*Issue Statement:* Washington's bighorn sheep populations are few in number, isolated, and relatively small. To address these concerns, relocation is used as a tool to increase sheep abundance and link populations. With this comes the need to prioritize potential relocation areas, while considering funding limitations, availability of sheep, social-economical concerns, and biological merit.

*Objective 54:* Develop a prioritized list of potential bighorn sheep relocation areas.

*Alternative Strategies:*
a. Prioritize potential relocation areas using a geographical information system (GIS), coupled with various landscape variables (e.g., forage, cover, and anthropogenic activities), and a meta-population analysis.
b. Prioritize potential relocation areas based on cooperative agreements, collaborations, and funding availability.
c. Prioritize potential relocation areas using on-the-ground habitat evaluations.

*Issue Statement:* Relocation is used as a tool to establish new populations and augment existing ones. This, in turn, increases the long-term viability of bighorn sheep by increasing total population size, increasing the number of populations, and providing linkages between populations for the exchange of individuals and genetic material (Bailey 1992).

*Objective 55:* Establish two new bighorn sheep herds by 2008.

*Alternative Strategies:*
a. Relocate sheep from existing herds in Washington or out-of-state herds.
b. Allow the established to new herds through natural colonization of bighorn sheep.

*Issue Statement:* To properly manage bighorn sheep populations, managers strive to maintain sustainable and healthy populations of bighorns, while at the same time maintain sheep at levels that minimize the risk of disease and reduce agricultural damage on private lands.

*Objective 56:* Maintain bighorn sheep population size as indicated in Table 1.

*Alternative Strategies:*
a. For herds that are exceeding population goals trap and relocate sheep to an alternate area.
b. For herds that are exceeding the desired population size, establish ewe harvest opportunities as indicated in ***Objective 59, Strategy g***.
c. For herds that are below the desired population size, consider restricting harvest (see ***Objective 59, Strategy d***) and augmenting the population.

Table 1. Population size objectives for specific bighorn sheep herds.

| | Population Size | |
|---|---|---|
| **Herd** | **2000** | **Desired** |
| Hall Mountain[a] | 29 | 40-70 |
| Asotin Creek[a] | 38 | 50-60 |
| Black Butte[a] | 80 | 300 |
| Wenaha[a] | 65 | 140 |
| Cottonwood Creek[a] | 27 | 50-60 |
| Tucannon | 27 | 60-70 |
| Vulcan | 24 | 80-110 |
| Mt. Hull | 65 | 55-80 |
| Sinlahekin | 30 | 50 |
| Swakane | 35 | 50-60 |
| Quilomene | 165 | 150-250 |
| Umtanum(+Selah Butte) | 173 | 300 |
| Cleman Mountain | 156 | 150 |
| Lincoln Cliffs | 95 | 60-70 |
| Lake Chelan | 47 | 100 |
| Tieton River | 37 | 75-150 |
| **Total** | **1,093** | |

[a] Rocky Mountain bighorn sheep

*Issue Statement:* Bighorn sheep populations are sensitive to over-exploitation because of their low population growth rate and low population size (Berger 1990). As such, assessing the status of each bighorn population annually is necessary to ensure sustainability.

*Objective 57:* Monitor bighorn sheep herds at a level where a 20% change in population size can be detected within 3-years or less.

*Alternative Strategies:*
a. Estimate minimum number of sheep, ram:ewe ratio, and ewe:lamb ratio annually for each herd.
b. Develop a sightability correction factor to estimate population size from annual surveys (Bodie et al. 1995).

c. Use population models to estimate changes in population size.

*Issue Statement:* Certain types of *Pasteurella* spp. are pathogenic and produce acute bacterial pneumonia in bighorn sheep (Forety and Jessup 1982). The occurrences of lethal strains of *Pasteurella* in bighorns are most commonly associated with overlapping ranges of bighorn and domestic sheep; as *Pasteurella* is commonly found in domestic sheep. There are many uncertainties about the mode of transmission, vulnerability, and other epidemiological factors of *Pasteurella* (Martin et. al 1996). However, given the present state of knowledge, the current management practice used throughout North America to prevent the disease in bighorn sheep is to eliminate the interactions between domestic sheep and bighorn sheep.

*Objective 58:* Eliminate interactions between domestic sheep and bighorn sheep in the Swakane herd, Hells Canyon herds, and areas identified for repatriation of bighorn sheep.

*Alternative Strategies*
a. Maintain at least a 9-mile buffer between domestic sheep and bighorn sheep (BLM 1998).
b. Pursue the purchase of grazing leases and conservation easements.
c. Develop physical or habitat barriers between domestic and bighorn sheep.
d. Work with livestock producers to reduce transmission of disease and parasites from domestic sheep to bighorns.

**Recreation Management**

*Issue Statement:* The demand for bighorn sheep hunting opportunity exceeds the allowable harvest for sustainable populations. Therefore, the Department restricts bighorn sheep harvest to a level compatible with long-term sustainability of each herd. With bighorn sheep, hunters typically select the largest, hence oldest, rams in the herd. Consequently, the Department manages sheep as a high quality hunting opportunity and takes precautionary steps to ensure that ample numbers of mature rams are left in the population. The result is a relatively high harvest success (mean = 92%) and post-season ram: ewe ratios that are favorable for healthy bighorn sheep populations.

*Objective 59:* Provide recreational hunting opportunities in individual bighorn sheep herds where harvest success averages $\geq$85% over a 3-year period, while at the same time bighorn population size remains stable or increasing.

*Alternative Strategies:*
a. Conduct bighorn sheep hunts by permit only and allow harvest of any ram.
b. Do not hunt transplanted animals for at least 5 years after release to ensure success of the transplant.
c. Survey herds annually for at least 2 years prior to being hunted to determine size, composition, and trend.

d. Set ram permit levels as indicated in Table 2 below:

Table 2. Permit levels for bighorn sheep herds.

| | …when the herd has… | | | |
|---|---|---|---|---|
| | Population | Ram:ewe | Number rams with… | |
| *Permit level is…* | Size [a] | ratio | ≥½ curl [b] | ≥ ¾ curl [c] |
| 20% of the mature rams[d] | ≥30 | >50:100 | 8 | 2 |
| 15% of the mature rams[d] | ≥30 | 25-50:100 | 8 | 2 |
| 10% of the mature rams[d] | ≥30 | <25:100 | 8 | 2 |

[a] Total population size, excluding lambs. Population must be stable or increasing.
[b] Used as a measure of >3-year-old rams.
[c] Used as a measure of >6-year-old rams.
[d] Rams ≥½ curl.

e. Adjusted permit levels for herds bordering other states and provinces to account for management activities of these other areas.
f. Consider reducing permit levels or terminating all permits (depending on population size and rate of decline) for herds declining due to disease or high parasite loads.
g. Use trap and relocation as the primary method of reducing overpopulated herds. Consider ewe harvest as a secondary method, with the following conditions:
   - Ewe permits should not exceed 10-20% of the adult ewe population.
   - A harvested ewe would not count toward the one sheep a hunter can harvest in a lifetime.

*Issue Statement:* Bighorn sheep claim a strong aesthetic value throughout most western states. However, because bighorns have a relatively small range in Washington, viewing opportunities are limited. Where viewing opportunities do exist, they have proven to be extremely popular with the public.

*Objective 60*: Develop viewing opportunities for two bighorn sheep herds.

*Alternative Strategies:*
a. Develop vehicle tour and education board for bighorn sheep viewing areas.
b. Develop a web-cam viewing opportunity for bighorn sheep.

**Information and Education**

*Issue Statement:* Bighorn sheep were extirpated from Washington by the early 1900s. However, by securing critical habitats and transplanting sheep, bighorns have slowly recovered. As bighorns continue to do well in Washington, it's important to inform the public about the biology and management of bighorn sheep, as well as their ecological role in the ecosystem.

*Objective 61:* Provide educational information on bighorn sheep to at least 50,000 people annually and emphasize contribution of hunters to bighorn sheep recovery.

*Alternative Strategies:*
a. Develop a brochure describing bighorn sheep ecology and management, as well as their history in Washington.
b. Develop educational viewing opportunities for bighorn sheep.
c. Discuss bighorn sheep management at public forums.

d. Develop segment for Wild About Washington.

**Enforcement**

*Issue Statement:* There are only about 1,100 bighorn sheep in Washington. So any illegal harvest or harassment has the potential to impact populations. Unfortunately, the rarity and majestic nature of mature rams (i.e., their horns) makes them likely targets for illegal take.

*Objective 62:* Account for all known bighorn sheep mortalities.

*Alternative Strategies:*
a. Permanently mark the horns of all dead bighorn sheep rams that are recovered from the field.
b. Require mandatory reporting for all bighorn sheep hunters.

**Research**

*Issue Statement:* Bighorn sheep are vulnerable to many parasites and diseases that significantly impact population levels. In addition, small population sizes create situations where predators and genetic inbreeding can cause impediments to population growth.

*Objective 63:* Acquire biological information that aids in bighorn management.

*Alternative Strategies:*
a. Investigate parasite outbreak in the Vulcan Mountain herd.
b. Investigate the recovery of bighorn sheep from *pasteurella* in Hells Canyon.
c. Investigate the impacts of predation on recently established herds or herds with fewer than 100 animals.
d. Investigate the probability of interactions between bighorn sheep and domestic sheep in areas where the two overlap.
e. Investigate inbreeding effects among bighorn sheep.

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**MOUNTAIN GOAT (*Oreamnos americanus*)**

## I. POPULATION STATUS AND TREND

Mountain goat populations have been on the decline in Washington for many years. Historically, goat populations may have been as high as 10,000 animals. Today goats likely number fewer than 4,000. Hunting opportunity has decreased accordingly, and current permit levels are conservative and represent 4% of the known population in herds that are stable to increasing. Despite reductions in hunting opportunity many local goat populations continue to decline. However, a few populations are doing well. Goat populations along the southern Cascades, the north shore of Lake Chelan, and the Methow region appear to be stable to slightly increasing.

## II. RECREATIONAL OPPORTUNITY

Mountain goats have been hunted in Washington State since 1897, when hunters could harvest two goats annually (Johnson 1983). Following several years of over hunting, seasons were restricted in 1917, and all hunting closed by 1925. Later, goat populations rebounded and hunting resumed in 1948. Since 1948 mountain goat hunting opportunity has been limited by permit.

Figure 1. Historic mountain goat distribution and current hunting units for goats.

Unfortunately, goat abundance has decreased dramatically over the last decade. As such, hunting opportunity has declined from 218 permits in 1991 to 26 permits in 2001 – about a 9% decline/year. The number of permit applications received annually tends to range from 2,000 to 4,200, which averages about 42-applications/mountain goat permit. The hunting season for mountain goat is generally about 47 days (September 15 to October 31) and harvest success averages 63% ($n$ = 9 years).

Currently, mountain goat hunting is an once-in-a-lifetime opportunity. Hunters may harvest any adult goat with horns $\geq$4 inches, although hunters are urged not to harvest a nanny and it's unlawful to harvest a nanny accompanied by kids. During the 2001 season, only a fraction of the mountain goat range was open to hunting, with 24 permits in 11 goat units (Fig. 1).

## III. DATA COLLECTION

For many years, funding limitations greatly reduced the Department's ability to conduct thorough and consistent surveys. However, during the last three years, funding from cooperative grant sources, and auction and raffle revenue, allowed the Department to survey all goat units open to hunting. All surveys were conducted using a helicopter and generally occurred between July and September. Because the funding level hasn't been enough to survey all goat units,

hunted units have been the priority. As such, no consistent survey effort has been accomplished during the last 5 years for goat units closed to hunting.

## IV. MOUNTAIN GOAT MANAGEMENT GOALS

The statewide goals for mountain goats are:

1. Enhance statewide mountain goat populations and manage goats for a sustained yield.
2. Manage mountain goats 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. Preserve, protect, perpetuate, and manage mountain goats and their habitats to ensure healthy, productive populations.

## V. ISSUE STATEMENTS, OBJECTIVES, AND ALTERNATIVE STRATEGIES

### Habitat Management

*Issue Statement:* Mountain goat populations typically occur as meta-populations scattered across the landscape on "habitat islands" where structural and vegetative characteristics are suitable for goats. The sizes and distribution of these islands of suitable habitats are largely unknown in Washington. Understanding the juxtaposition and quality of these habitats and their potential carrying capacity is critical for sustainable management of mountain goats.

*Objective 64:* Develop a document identifying the locations and quality of suitable mountain goat habitat in Washington.

*Alternative Strategies:*

a. Map goat habitats from a review of historic distribution and local expertise of all mountain goat sub-herds.
b. Conduct surveys to determine locations and quality of suitable goat habitats.
c. Develop a GIS model predicting quality and locations of suitable mountain goat habitats.
d. Develop cooperative partnerships for mapping suitable goat habitats.

### Population Management

*Issue Statement:* Mountain goat populations are sensitive to over-exploitation because of their low population growth rate and relatively low densities (Cote et al. 2001, Gonzales-Voyer et al. 2001). As such, assessing the status of each mountain goat population annually is necessary to ensure sustainability.

*Objective 65:* Monitor population demographics of mountain goats at a level where a 20% decline in population size can be detected within 3-years or less.

*Alternative Strategies:*

a. Survey all goat populations annually to estimate minimum population size and recruitment.
b. Estimate goat population trends annually through hunter reports.
c. Develop a sightability model to estimate population size from annual helicopter surveys.

**Recreation Management**

*Issue Statement:* In most native mountain goat populations, recovery from population reductions is relatively slow (Cote and Festa-Bianchet 2001). This is the result of the low reproductive potential, extended parental care, low juvenile survival, and older age of sexual maturity in mountain goats. Given these demographic characteristics, the population growth rate of goats is sensitive to exploitation. As a result, harvest levels for mountain goats should be restricted to levels that approximate recruitment and the status of goat populations should be evaluated annually (Cote et al. 2001).

*Objective 66:* Provide recreational hunting opportunities in individual mountain goat herds where harvest success averages ≥50% over a 3-year period, while at the same time goat population size remains stable or increasing.

*Alternative Strategies:*

a. Goat populations will be surveyed annually beginning at least 3 years prior to being hunted to determine population size, herd composition, and trend.
b. For populations to be hunted, surveys must indicate:
   - Population size of at least 50 goats (Oldenburg 1991).
   - Average production ratio of at least 25 kids: 100 non-kids over a 3-year period.
c. For herds meeting the above criteria, permits shall be issued to limit the goat harvest to 4% of the estimated local population (excluding kids) (Hebert and Turnbull 1977, Kuck 1977, Cote et al. 2001).
d. For each hunted population, nanny harvest will be maintained at or below 30% of the total harvest. This will be accomplished by:
   - Requiring all goat hunters to view an educational video on mountain goat sex identification.
   - Restricting hunting opportunity for populations with excess nanny harvest for 3 years of a 5-year period.
e. Populations declining due to disease or high parasite loads may still be hunted but harvest generally will be reduced or possibly terminated depending on population size and rate of decline.

*Issue Statement:* The number of goat applications/permit has steadily increased from 11 in 1992 to 182 in 2001. There is a need for a fair and equitable approach for allocating goat permits while maintaining a quality hunt experience.

*Objective 67:* Distribute recreational opportunity to as many individuals as possible, compatible with high quality goat hunting experiences and the biological status of goat populations.

*Alternative Strategies:*

a. Allow mountain goat hunting by permit only.
b. Allow individuals to hunt mountain goat only once during their lifetime.

*Issue Statement:* Mountain goats are intriguing to many people. However, goats are a species that occur in low densities and typically occur in areas far from human disturbances. Nonetheless, some mountain goat populations are visible from roads, yet no formal viewing opportunities have been developed.

*Objective 68:* Develop one viewing opportunity for mountain goats.

*Alternative Strategies:*
a. Develop a web-cam viewing opportunity for mountain goats.
b. Develop vehicle tour and education board for mountain goat viewing areas.

**Information and Education**

*Issue Statement:* The public is not engaged in the recovery of declining goat populations. The public either is not aware of the status of mountain goats or lacks the necessary information to make informed decisions.

*Objective 69:* Provide educational information on mountain goats to at least 50,000 people annually.

*Alternative Strategies:*
a. Develop a brochure describing mountain goat ecology and history of Washington's populations and their locations.
b. Develop an educational viewing opportunity and information website.
c. Discuss management of mountain goats at public forums.
d. Develop a segment for "Wild About Washington".

**Enforcement**

*Issue Statement:* Mountain goats naturally occur as bands of relatively low-density meta-populations. The scattered nature of these bands plus the marginal status of some specific mountain goat populations make illegal harvest or harassment a potentially critical factor. To ensure the sustainability of specific sub-populations, and the long-term existence of the entire meta-population, it's important to document all mortalities, and minimize illegal harvest and harassment of mountain goats.

*Objective 70:* Develop a procedure to account for all mountain goat mortalities.

*Alternative Strategies:*
a. Require reporting of all harvested mountain goats.
b. Permanently mark all mountain goat mortalities.

**Research**

*Issue Statement:* Mountain goat abundance has declined steadily over the last decade throughout much of their historic range. Little is know about the cause of the decline or the necessary steps to reverse the trend.

*Objective 71:* Develop a peer-reviewed publication that describe at a minimum why mountain goat populations are declining, how to reverse the decline, and how to monitor goat populations.

*Alternative Strategies:*
a. Conduct a mountain goat research project investigating the cause of the goat decline.

b. Solicit funding to sustain a five-year research project.
c. Encourage partnerships with interested stakeholders to fund and participate in mountain goat research projects.

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**MOOSE (*Alces alces*)**

## I. POPULATION STATUS AND TREND

The number of moose in Washington has increased from about 60 in 1972 to 850-1,000 in 2002, corresponding to about a 9.6% annual increase in population size (Poelker 1972, Zender, pers. Commun.). This increase is the result of both increased moose density in prime habitats and colonization of moose into new areas. Today, moose occur in the northeastern counties of Ferry, Pend Oreille, Stevens, and Spokane (Figure 1). Moose are occasionally spotted in the northwestern and north-central counties of Whatcom and Okanogan, and a few dispersing animals have been documented in surrounding areas.

## II. RECREATIONAL OPPORTUNITY

Moose hunting in Washington began in 1977 with three permits in the Selkirk Mountains. Since then, moose populations have increased and expanded and the number of permits has increased accordingly. Since 1977, moose hunting has been limited by permit and the demand for moose hunting is high. The number of applications for moose permits has ranged from 1,214–8,623, corresponding to about 63–152 applications/permit (1992–2002 seasons).

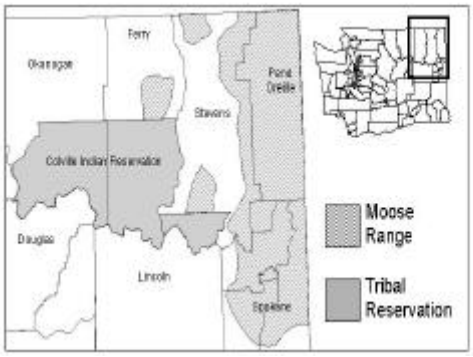


Figure 1. Occupied moose range in Washington, 2002.

Currently, moose hunts are by permit only and, if drawn, it is an once-in-a-lifetime opportunity (except youth-only antlerless hunts). Hunting season dates are October 1 - November 30 and hunters may use any legal weapon. Moose hunts are either “any moose” or “antlerless only”. In “any moose” hunts, the majority of the harvest is adult bulls. Antlerless only hunts are typically associated with population control efforts near suburban areas. Hunters typically see seven moose/day and, as such, harvest success is high (mean = 91%; 1992–2002). All moose hunters are required to report their hunting activities, regardless if they harvest a moose or not.

## III. DATA COLLECTION

The Department conducts aerial surveys of all moose populations once every 1 to 3-years. Surveys typically are conducted during early winter and data are used to estimate calf recruitment, sex ratio, and trend. In addition to surveys, the Department monitors trends in harvest data, including number of hunters, total harvest, days hunted/kill, harvest success, moose seen while hunting, antler spread (if harvested a bull), and age of harvested moose.

## IV. MOOSE MANAGEMENT GOALS

The statewide goals for moose are:

1. Manage statewide moose populations for a sustained yield.
2. Manage moose 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. Preserve, protect, perpetuate, and manage moose and their habitats to ensure healthy, productive populations.

## V. ISSUE STATEMENTS, OBJECTIVES, AND ALTERNATIVE STRATEGIES

### Habitat Management

*Issue Statement*: Moose are expanding both in abundance and range in Washington. However, the quantity and quality of moose habitat has not been evaluated or mapped. Therefore, the potential density and range expansion of moose is unknown.

*Objective 72*: Develop a document that identifies the distribution and quality of moose habitat in Washington State.

*Alternative Strategies:*
a. Conduct literature review on moose habitat requirements.
b. Conduct a survey to assess the quality of moose habitats.
c. Develop a GIS model to predict moose range and the quality of moose habitats.
d. Develop cooperative partnerships to assess the quality of moose habitats.

### Population Management

*Issue Statement*: Currently, the status of moose populations is estimated through aerial surveys that are conducted on a 3-year rotation (i.e., all units surveyed once every 3-years). The efficacy of the data collected to serve as an indicator of population sustainability is unknown and has not been quantified.

*Objective 73*: Monitor population demographics of moose at a level where a 20% decline in population size can be detected within 3-years.

*Alternative Strategies:*
a. Conduct helicopter surveys for all moose population annually to estimate minimum abundance, bull:cow ratios, and cow:calf ratios.
b. Develop a sightability correction factor to estimate relative moose density from aerial surveys.
c. Develop an index (e.g., snow track or pellet group) to estimate moose density.

### Recreation Management

*Issue Statement*: The demand for moose hunting opportunity exceeds the allowable harvest for sustainable moose populations. As such, the Department restricts moose harvest to a level compatible with long-term sustainability. In doing so, the Department manages moose harvest

as a high quality hunting opportunity, with moderate densities of moose and ample numbers of mature bulls. The result is a relatively high harvest success (mean = 91%) and post-season bull: cow ratios that are favorable for healthy moose populations.

*Objective 74:* Provide recreational hunting opportunities in individual moose herds where harvest success averages ≥85% over a 3-year period, while at the same time moose population size remains stable or increasing.

*Alternative Strategies:*
a. Moose populations will be surveyed annually beginning at least 2 years prior to being hunted to determine size, composition, and trend.
b. Moose harvest will be prescribed as follows:
   - Maintain ≥90% adult bulls in total harvest (Boer and Keppie 1988).
   - Maintain 10-30% antlerless moose in total harvest in areas where moose present a threat to human safety (Boer and Keppie 1988).
c. Consider liberalizing or restricting moose hunting opportunity as indicated below:

| | Harvest | | |
|---|---|---|---|
| **Parameter** [a] | **Liberalize** | **Acceptable** | **Restrict** |
| Average bull:100 cow ratio | >70 bulls | 50-70 bulls | <50 bulls |
| Average calf:100 cow ratio[b] | >60 calves | 30-60 calves | <30 calves |
| Median age of harvested bulls | >6.5 years | 4.5-5.5 years | <4.5 years |

[a] Averaged over a 3-year period
[b] From Courtois and Lamontagne 1997

*Issue Statement:* Since 1991, the average number of moose applications/permit was 104 (range = 63–152). Given the high demand for hunting moose, there is a need for a fair and equitable approach for allocating moose permits while maintaining a quality hunt experience.

*Objective 75:* Distribute recreational opportunity to as many individuals as possible, compatible with high quality moose hunting experiences and the biological status of moose populations.

*Alternative Strategies:*
a. Allow moose hunting by permit only.
b. Allow individuals to hunt moose only once during their lifetime (except youth-only antlerless moose hunts, and auction and raffle hunts).

**Information and Education**

*Issue Statement:* The Department has no information available for the public on moose ecology, population status, and management. To encourage public involvement in moose, there is a need for an educational document.

*Objective 76:* Develop educational document for moose in Washington.

*Alternative Strategies:*
a. Develop a brochure describing moose ecology and management in Washington.

b. Expand WDFWs website on moose to include basic biology, population statistics, management.

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## BLACK BEAR (*Ursus americanus*)

## I. POPULATION STATUS AND TREND

Washington State has an abundant and healthy black bear population. Statewide, there are an estimated 25,000-30,000 bears and regional populations are likely stable to slightly increasing (Washington Dept. of Fish and Wildlife 1997). For management purposes, the state is divided into nine black bear management units (BBMUs) (Fig. 1). Harvest levels vary between BBMU depending on local population dynamics and conditions. To maintain stable bear populations, modifications to harvest levels are made on a 3-year rotation. The percentage of females in the total harvest and median ages of males and females are used as indicators of under or over exploitation (Beecham and Rohlman 1994) (Table 1).

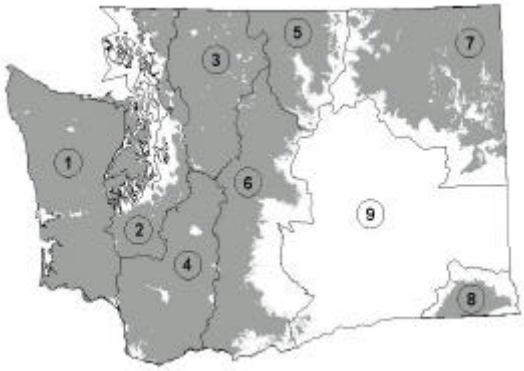


Figure 1. Black bear distribution and black bear management units (BBMU) in Washington, 2002.

## II. RECREATIONAL OPPORTUNITY

Black bear seasons have changed significantly over the last 6 years. Washington voters passed Initiative 655 (which banned the use of bait and hounds for hunting black bear) in the November 1996 general election. Therefore, the use of bait and hounds for the hunting of black bear became illegal for the 1997 season. In an effort to mitigate the anticipated decrease in bear harvest (i.e., post I-655), 1997 bear seasons were lengthened and bear bag limit was increased in some areas. Legislation also was passed that provided the authority to the Fish and Wildlife Commission to establish reduced costs for black bear transport tags; an effort to increase the number of bear hunters and, therefore, bear harvest. As a result of these efforts, the post I-655 black bear harvest has stabilized similar to previous levels.

## III. DATA COLLECTION

Table 1. Statewide black bear harvest, hunter effort and median age information, 1990 - 2000.

| | | | | | | | | Median Age | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | Male | Female | Total | # hunters | Success | Hunter Days | Days per kill | Males | Females | % females |
| 1991 | 876 | 503 | 1,379 | 10,839 | 13% | 84,771 | 61 | 3.5 | 4.5 | 36% |
| 1992 | 921 | 521 | 1,442 | 13,642 | 11% | 98,434 | 68 | 4.5 | 4.5 | 36% |
| 1993 | 986 | 521 | 1,507 | 12,179 | 12% | 102,558 | 68 | 3.5 | 5.5 | 35% |
| 1994 | 654 | 419 | 1,073 | 11,530 | 9% | 110,872 | 103 | 3.5 | 4.5 | 39% |
| 1995 | 850 | 368 | 1,218 | 11,985 | 10% | 102,859 | 84 | 3.5 | 4.5 | 30% |
| 1996 | 951 | 359 | 1,310 | 12,868 | 10% | 104,431 | 80 | 4.5 | 5.5 | 27% |
| 1997 | 546 | 298 | 844 | 11,060 | 8% | 97,426 | 115 | 4.5 | 5.5 | 35% |
| 1998 | 1,157 | 645 | 1,802 | 20,891 | 9% | 216,456 | 120 | 4.5 | 5.5 | 36% |
| 1999 | 757 | 349 | 1,106 | 37,033 | 3% | 481,319 | 435 | 4.5 | 5.5 | 32% |
| 2000 | 777 | 371 | 1,148 | 37,401 | 3% | 296,849 | 259 | 4.0 | 6.0 | 32% |

No formal surveys are conducted in Washington for black bears. In the recent past, Washington Department of Fish and Wildlife conducted bait station surveys as an index of relative bear abundance. However, an analysis of statistical power indicated that at the level of survey intensity (limited by funding), managers would not be able to detect a change in bear abundance using bait stations (Rice et al. 2001). As such, the survey technique was discontinued. Ideas for future survey efforts are being planned and will likely focus on monitoring adult female survival and capture-recapture via DNA or resight methods.

## IV. HUMAN-BEAR CONFLICT

Bears and humans are often in conflict given the distribution of bears in Washington and their adaptability to suburban environments. Approximately 300-600 human-bear interactions are documented annually (Washington Dept. of Fish and Wildlife 2001). There is a tendency to equate levels of human-bear interactions with bear abundance. However, bear nuisance and damage activity may not be a good indicator of population status, but more likely reflects the variability of environmental conditions. For example, in 1996 human-bear complaints were at an all time high, the same year Washington experienced a late spring with poor forage conditions for black bear, followed by a poor fall huckleberry crop.

## V. MANAGEMENT

Washington has a unique and challenging situation when it comes to management of our black bear population. Washington is the smallest of the eleven western states, yet has the second highest human population; a population that continues to grow at record levels. Washington also has one of the largest black bear populations in all of the lower 48 states. Given that approximately 75% of the black bear habitat is in federal or private industrial ownership, a large portion of core black bear habitat is relatively secure. This means that the long-term outlook for black bear is generally good.

## VI. BLACK BEAR MANAGEMENT GOALS

The statewide goals for black bear are:

1. Manage statewide black bear populations for a sustained yield.
2. Manage black bear 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. Preserve, protect, perpetuate, and manage black bear and their habitats to ensure healthy, productive populations.
4. Minimize threats to public safety from black bears, while at the same time maintaining a sustainable and viable bear population.

## VII. ISSUE STATEMENTS, OBJECTIVES, AND ALTERNATIVE STRATEGIES

### Habitat Management

*Issue Statement:* Black bear distribution and habitat use are influenced by a variety of environmental and anthropogenic factors. It's important to understand and predict how these factors influence bears to properly manage bear populations for sustainable harvest as well as minimizing negative human-bear interactions.

*Objective 77:* Develop a document and map identifying core habitat areas for black bears.

*Alternative Strategies:*
a. Delineate core habitat areas for black bears from regional staff expertise.
b. Expand habitat preference results from 2001 black bear study final report to entire state.
c. Work cooperatively with state, federal, tribal, and private entities to develop relative habitat use probability model for black bears.

**Population Management**

*Issue Statement:* Protecting black bears from harvest in key geographic areas is one way to safeguard from potential over-harvest. Bear reserves protect a core population of breeding females and act as a source for surplus animals to disperse in to surrounding habitats. Reserves can be specific areas closed to hunting solely to protect bears, or areas that are closed to hunting for other reasons and thereby act as *defacto* reserves (e.g., national parks, private land with restricted access).

*Objective 78:* Develop a document that identifies 10% of land area as black bear reserves in each BBMU (except BBMU 9).

*Alternative Strategies:*
a. Identify all public and private lands currently closed to bear hunting as reserves.
b. Identify priority areas that may be closed to bear hunting as potential bear reserves.
c. Coordinate with state, federal, tribal, and private landowner for identifying bear reserves.

*Issue Statement:* Managers often use sex and age structure data of harvested bears as an index to population growth (Pelton 2000). However, examining just sex and age structure may provide misleading interpretations (Caughley 1974, Bunnell and Tait 1981, Garshelis 1991, Clark 1999). That is, the age structure of a declining bear population can be exactly the same as the age structure in an increasing population. In addition to this shortcoming, there is often a time lag between when a population begins to decline and when that decline is evident in sex and age structure data (Harris 1984). In some cases, by the time a decline is detected, bear numbers may have been reduced to a point where it could take as long as 15-years to recover the population. However, detecting a decline early can enable managers to make a quicker recovery.

Sensitivity analyses of bear populations indicate that adult female and cub survival are the most influential parameters to population growth rates (Clark 1999). As such, managers should focus survey efforts on improving the estimates of these parameters, while at the same time evaluating harvest data to assess long-term trends (Clark 1999).

*Objective 79:* Monitor population demographics of black bears at a level where a 20% decline in population size can be detected within 3-years or less.

*Alternative Strategies:*
a. Develop a survey method to estimate female and cub survival of bears in each BBMU (excluding BBMU 9).
b. Estimate population growth using population reconstruction and modeling.
c. Use sex and age ratio's of harvest bears as indicators of population change.

**Recreation Management**

*Issue Statement:* Hunting is the largest source of mortality for hunted bear populations (Bunnell and Tait 1985, Pelton 2000). Coupled with the low reproductive potential of bears, this makes bear populations especially sensitive to over-exploitation. For that reason, managers use a variety of biological and population trend data to assess the impacts of hunting on bear populations. In Washington, managers have used sex and age data from harvested bears as an indicator exploitation levels (Washington Dept. of Fish and Wildlife 1997). The premise of this method is based on the vulnerability of different sex and age classes of black bears (Beecham and Rohlman 1994). As ages of harvest bears decline, and percentage of females in the population increases, the exploitation level of the bear population is increasing. A drawback of this method is that sex and age data alone are not necessarily accurate measures of population status (see ***Issue Statement for Objective 79***). A supplemental measure of population status is needed to properly manage bear populations in Washington.

*Objective 80:* Provide recreational hunting opportunities to harvest 800–1,200 black bears statewide, while at the same time maintaining a sustainable bear population in each BBMU.

*Alternative Strategies:*
a. Provide black bear hunting opportunities in each BBMU, with focused harvest in areas where public safety, property damage, and pet and livestock depredation are evident.
b. Develop harvest criteria that incorporate survey data from monitoring female and cub survivorship.
c. Until more robust harvest criteria are developed, consider liberalizing or restricting bear hunting opportunity in each BBMU as indicated below:

| | Harvest | | |
|---|---|---|---|
| **Parameter** | **Liberalize** | **Acceptable** | **Restrict** |
| % Females in harvest | < 35% | 35-39% | > 39% |
| Median age of harvested females | > 6 years | 5-6 years | < 5 years |
| Median age of harvested males | > 4 years | 2-4 years | < 2 years |

**Timber damage**

*Issue Statement:* Bear foods are scarce during spring, particularly those with a high nutritional value. Consequently, bears often forage on the cambium layer of coniferous trees. During spring, cambium is one of the few foods available to bears and it has a relatively high nutritional value compared to other available foods. Trees with the highest nutritional value, hence

preferred by bears, are those with high growth rates, such as trees on private industrial timberlands. Bear selection for high-nutritional cambium is so acute that industrial timberlands can experience damage that exceeds one-third of the trees in a given stand. These damage rates can result in economic losses for landowners. For that reason, private landowners of industrial timberlands seek ways to mitigate tree damage caused by bears.

*Objective 81:* Reduce annual bear damage to <30 trees/stand on private industrial timberlands.

*Alternative Strategies:*

a. Provide educational information on how to avoid timber damage by bears.
b. Encourage the use of non-lethal methods, such as capture-relocation or aversive conditioning, for responding to timber damage by bears.
c. Provide focused recreational bear hunting seasons in spring to mitigate timber damage by bears.
d. Issue a bear depredation permit when one of the following criteria is met:
   - $\geq$ 30 trees peeled in a spring and trees are in a clumping pattern within a stand.
   - $\geq$ 30 trees peeled over an ongoing 3-year period and trees in a clumping pattern within a stand of precommerically-thinned timber, $\leq$ 30 years of age.

**Enforcement**

*Issue Statement:* In several Asian countries, gall bladders of native Asian bear species are used for food or medicinal purposes (Williamson 2001). The high demand for bear gall has resulted in severe over-exploitation, in both Asiatic and brown bear. This situation has placed greater pressure on North American bears to supply the exorbitant demand for gall bladders. To protect Washington's black bears from this type of commercialization, laws were established to make it illegal to trade, barter, buy, or sell any bear parts. However, the demand for bear gall is so high, that several states have found commercialized poaching rings that specialize in black bears only. Given the economic incentives for poaching bears for galls and the history of offenses in numerous states, it's important to develop a long-term program to assess this form of illegal activity.

*Objective 82:* Develop a long-term monitoring plan for assessing the level of illegal trading of bear gall bladders.

*Alternative Strategies:*

a. Develop protocols to determine the prevalence of hunters that illegally sell the gall bladders from bears they harvest.
b. Assess the level of poaching by monitoring radio marked bears.
c. Use under cover enforcement operations, to prevent over exploitation of black bears, focused on public lands and reserves.

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**COUGAR (*Puma concolor*)**

## I. POPULATION STATUS AND TREND

Cougar occur throughout most of the forested regions of Washington State, and encompass approximately 88,497 $km^2$ or 51% of the state (Figure 1). No reliable estimate of lion abundance is available, however model estimates indicate that their current population size ranges between 2,500-4,000 animals statewide. For management purposes, the state is divided into nine cougar management units (Figure 1).

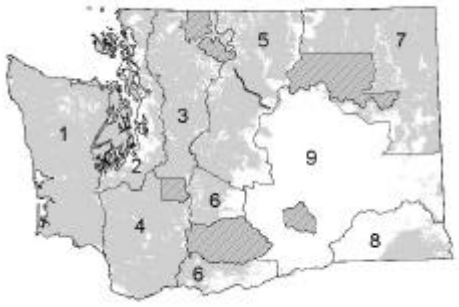


Figure 1. Distribution of cougars (grey) and cougar managment units (CMUs) (numbers) in Washington.

## II. RECREATIONAL OPPORTUNITY

Cougar were classified as a bounty animal in Washington State from 1935-1960. They were reclassified as a predator from 1961-1965, and again as a game animal from 1966-present (Figure 2). Historically, dogs were used to aid in lion harvest and accounted for about 90% of the take. In the last decade, hunting methods have shifted toward spot and stalk harvest and incidental take by deer and elk hunters. As a result of the season structure changes, the number of recreational days open to lion hunting has increased from a low of 30 days in 1996 to a high of 228 days in 1999.

The number of hunters purchasing a cougar tag has increased in Washington, largely an artifact of changes in license cost, bag limits, and season length. Interestingly, the number of lions harvest annually has not significantly changed. This disparity is most likely a result of the lower success rate of lion hunting without hounds (1%) compared to hunting with hounds (60%), and

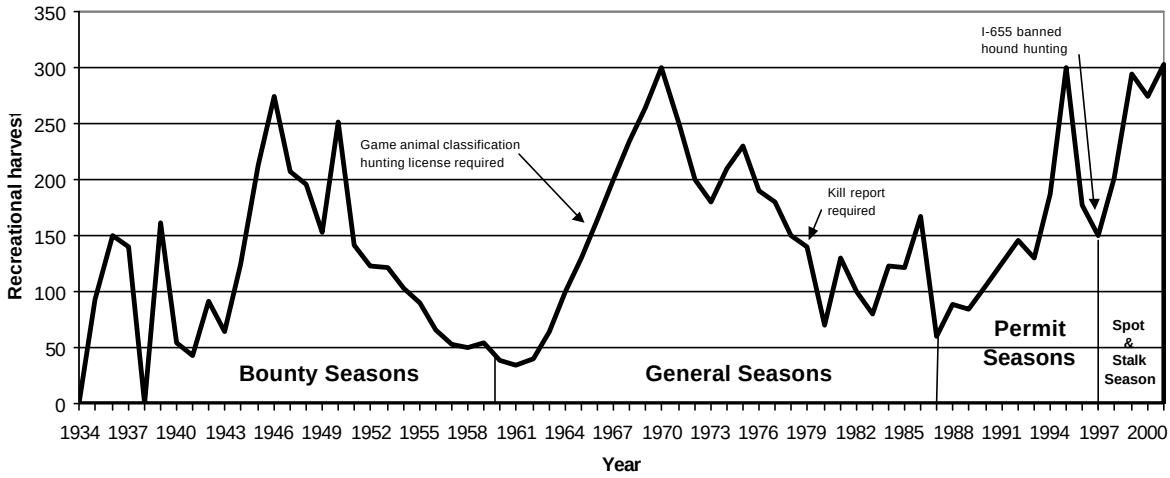


Figure 2. Trends in cougar season structure and harvest in Washington, 1935-2001.

the increase in the number of hunters purchasing a cougar tag.

## III. DATA COLLECTION

The majority of data collected on cougar is from harvest, as no formal surveys are conducted. A mandatory carcass check is required for all harvested lions, where data samples are collected including; kill date and location, sex, age (via cementum annuli analysis), physical condition, weight, DNA (via tissue sample), and hunter information. From these data the Department monitors kill date and location, total kill, and sex and age composition of the harvest. In addition, age and sex data are used to develop population size estimates using reconstruction and modeling.

## IV. COUGAR MANAGEMENT GOALS

The statewide goals for cougar are:

1. Manage statewide cougar populations for a sustained yield.
2. Manage cougar 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. Preserve, protect, perpetuate, and manage cougar and their habitats to ensure healthy, productive populations.
4. Minimize threats to public safety from cougars, while at the same time maintaining a sustainable and viable cougar population.

## V. ISSUE STATEMENTS, OBJECTIVES, AND ALTERNATIVE STRATEGIES

### Habitat Management

*Issue Statement:* The density of cougars is not uniform across the landscape. Rather, cougar densities likely vary based on prey abundances, vegetation conditions, human disturbances, and other factors that influence cougar habitat. To properly manage cougar populations (e.g., harvest, public safety), it's important to identify core and peripheral habitats so management decisions can be adjusted accordingly.

*Objective 83:* Develop a map identifying core habitat areas for cougar.

*Alternative Strategies:*

a. Conduct literature review on cougar habitat requirements.
b. Identify distributions of important prey items.
c. Develop a model identifying relative habitat suitability for cougar.
d. Incorporate data from past and current studies.

*Issue Statement:* Within the framework of maintaining a sustainable cougar population statewide, the primary tool used to manage cougar abundance is lethal control (either through recreational harvest or public safety removal). However, the lethal taking of a predetermined number of cougars is not always achieved and annual harvest can fluctuate widely. This makes managing cougars on an annual basis, and within sustainable levels, problematic.

Protecting cougars from harvest in key geographic areas is one way to safeguard form potential over-harvest (Clark 1999). Cougar reserves protect a core population of breeding females and provide a source for surplus animals to disperse in to surrounding habitats (Lindzey et al. 1988, Spreadbury et al. 1996, Spencer et al. 2001). Reserves can be specific areas closed to hunting solely to protect cougars, or areas that are closed to hunting for other reasons and thereby act as *defacto* reserves (e.g., national parks, watersheds, wilderness areas, and private land with restricted access).

*Objective 84:* Develop a document and map that identifies 10% of land area as cougar reserves in each CMU (except CMUs 2 and 7).

*Alternative Strategies:*
a. Identify all public and private lands closed to cougar hunting.
b. Identify all private lands with restricted access.
c. Identify priority areas as potential cougar reserve areas.

**Population Management**

*Issue Statement:* Historically, trends in sex ratios and ages of harvested cougar were used to evaluate the impact of cougar harvest on long-term sustainability. However, trend analyses are only useful when the parameters being monitored are proven to be valid indicators of population status and when the collection methods are constant overtime (Caughley 1977). Today, neither of these two requirements have been satisfied for cougars in Washington. As such, there is a critical need for a robust population indicator to properly manage cougars.

*Objective 85:* For each CMU, monitor population demographics of cougar at a level where a 20% decline in population size can be detected within 3-years or less.

*Alternative Strategies*
a. Evaluate the utility of age structure and sex ratio as indicators of relative population size.
b. Develop inventory and monitoring protocols for cougars.
c. Estimate population growth using population reconstruction and modeling.
d. Estimate minimum and maximum harvest thresholds through modeling.

**Recreation Management**

*Issue Statement:* In general, cougars are managed to protect human safety and provide recreational hunting opportunities, while at the same time ensuring long-term sustainability. To accomplish this cougars are managed geographically in nine CMUs and the management needs vary based on the biological and public safety issues in each CMU.

To enhance this type of management system, cougar harvest is regulated through harvest quotas for male and female lions (Ross and Jalkotzy 1996). Quotas vary according to biological information, public safety concerns, and local public opinion. Within that framework, total harvest represents about 11% of the cougar population in each CMU and adult females are

afforded added protected compared to males (Ross and Jalkotzy 1996, Logan and Sweanor 2000).

*Objective 86:* Provide recreational opportunities to harvest ≤236 cougars statewide, while at the same time maintaining a sustainable cougar population in each cougar management unit.

*Alternative Strategies:*

a. Implement male and female harvest quotas for areas open to hunting (Table 1).
b. Close cougar hunting in each CMU when female or total quota is achieved (except CMUs 2 and 7).

Table 1. Harvest quotas[a] for cougar by Cougar Management Unit (CMU).

| | Quota[a] | | |
|---|---|---|---|
| **CMU** | **Female** | **Male** | **Total** |
| 1. Coastal | 10 | 18 | 28 |
| 2. Puget Sound[b] | | No quota | |
| 3. North Cascades | 10 | 18 | 28 |
| 4. South Cascades | 7 | 15 | 22 |
| 5. East Cascades North | 13 | 27 | 40 |
| 6. East Cascades South | 4 | 9 | 13 |
| 7. Northeastern | 26 | 54 | 80 |
| 8. Blue Mountains | 8 | 17 | 25 |
| 9. Columbia Basin | | No quota | |
| **Statewide** | **78** | **158** | **236** |

[a] quotas includes recreational harvest, depredation kills, and public safety cougar removals. However, quotas may be exceeded for depredation kills and public safety cougar removals.
[b] no quotas due to public safety concerns

**Public Safety**

*Issue Statement:* A primary objective of WDFW is to protect people from dangerous wildlife, including cougars. While guaranteeing that cougars will never negatively impact people is impossible, the Department does implement activities to reduce human-cougar interactions in areas with a demonstrated history of conflict (Conover 2001).

*Objective 87:* Minimize cougar-human interactions to fewer than 11 confirmed complaints annually in each Game Management Unit (GMU).

*Alternative Strategies:*

a. Conduct "Dangerous Wildlife" workshops annually.
b. Distribute educational materials to key entities and locations.
c. Encourage recreational cougar harvest in areas with demonstrated human-cougar interactions.
d. Revise "control of dangerous wildlife" policy.
e. Utilize agency kill authority and depredation permits for problem cougar incidents.
f. Conduct public safety cougar removals in GMUs with demonstrated history of human-cougar interactions

**Enforcement**

*Issue Statement:* To properly manage cougar populations for sustainability, prevent over harvest, and achieve public safety goals, it's imperative to know how many animals are lethally removed each year, the kill location, and biological data related to the animal (e.g., age, sex, weight).

*Objective 88:* Account for all cougar mortalities.

*Alternative Strategies:*

a. Require mandatory carcass check of all harvested cougar.
b. Mark all harvested cougar with a unique pelt identification tag.
c. Collect biological information from all harvested cougar.

**Research**

*Issue Statement:* Cougars and people live in close proximity to each other in several areas of the state, making the potential for conflict high. Unfortunately, little information is known about cougar populations, particular in suburban environments. Understanding cougar dynamics in these environments is critical, as the potential for conflict will likely increase as human populations continue to increase and expand into rural environments (Spencer et al. 2001).

*Objective 89:* Develop a document that describes the demographic and behavioral differences between cougar populations in suburban versus rural environments.

*Alternative Strategies:*

a. Initiate a cougar research project investigating cougar populations in rural and suburban environments.

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## WATERFOWL (Family *Anatidae*)

### I. POPULATION STATUS AND TREND

Washington provides wintering habitat for approximately 850,000 ducks, 125,000 geese, and 8,000 swans annually. In addition, the state provides habitat for approximately 160,000 breeding ducks and 50,000 breeding geese each spring and summer. The Pacific Flyway waterfowl population contains almost six million ducks, geese, and swans, and many of these birds pass through the state during fall and spring. Washington ducks are classified in the subfamily *Anatinae*, and belong to 4 tribes, 12 genera, and 27 species. The most common duck species in the winter, in the harvest, and during breeding season is the mallard. Washington geese and swans are classified in the subfamily *Anserinae*, and belong to 2 tribes, 4 genera, and 8 species. Canada geese found in Washington include 7 subspecies. The most common goose during the breeding season and in the harvest is the western Canada goose. The most common swan using Washington wintering habitats is the tundra swan.

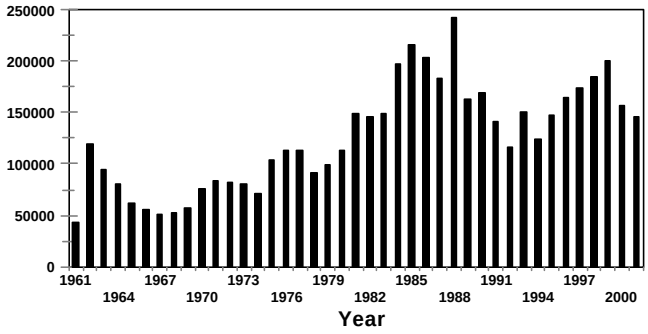


Figure 1. Eastern Washington breeding ducks.

### II. RECREATIONAL OPPORTUNITY

Waterfowl are hunted from September's youth hunt through special damage hunts in March. Seasons are based on frameworks established by USFWS, in conjunction with the Pacific Flyway Council. Over 40,000 hunters harvest 500,000 ducks and 70,000 geese each year in Washington, providing over 400,000 days of recreation annually. Washington ranks second among the 11 Pacific Flyway states and in the top ten states in the U.S. considering waterfowl harvested and number of hunters.

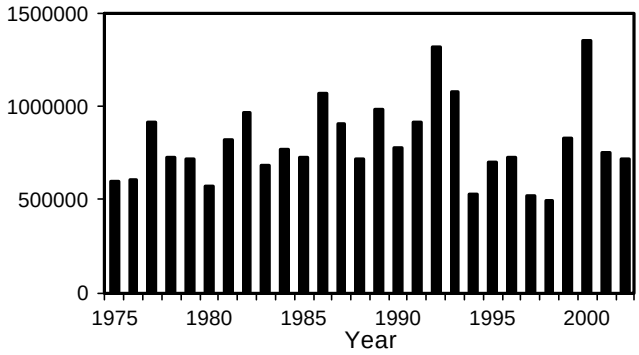


Figure 2. Washington mid-winter waterfowl inventory.

### III. DATA COLLECTION

The Department maintains a variety of activities to estimate the size of the waterfowl population, productivity, movements, and harvest. Breeding surveys are completed in April and May, duck

production surveys in July, migration counts in October-December, and winter index counts in January, completed cooperatively with USFWS. Duck and goose harvest is estimated using a mail questionnaire and special card survey completed in May.

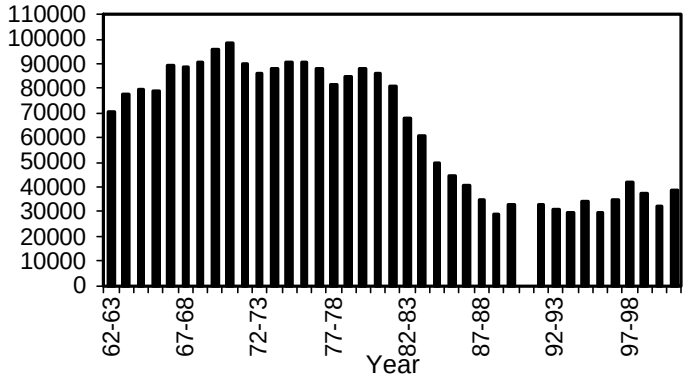


Figure 3. Western Washington waterfowl hunters.

## IV. MANAGEMENT

This section describes the management direction of the waterfowl program on a statewide basis. Management of Washington waterfowl is linked to numerous long-term interagency and international management programs. Although the USFWS has nationwide management authority for migratory birds, effective management of these resources depends on established cooperative programs developed through the Pacific Flyway Council and North American Waterfowl Management Plan (NAWMP) Joint Ventures. Goals and objectives described in this plan follow interagency and other cooperative planning efforts. Strategies identified in this plan will guide work plan activities and priorities, and must be accomplished to meet the goals and objectives.

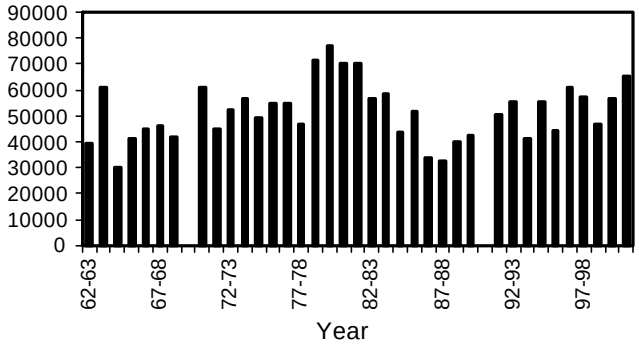


Figure 4. Washington Canada goose harvest.

## V. WATERFOWL MANAGEMENT GOALS

The statewide goals for waterfowl are:

1. Manage statewide populations of mourning doves, band-tailed pigeons, coots, and snipe for a sustained yield consistent with Pacific Flyway management goals.
2. Manage waterfowl 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. Preserve, protect, perpetuate, and manage waterfowl and their habitats to ensure healthy, productive populations.

## VI. ISSUE STATEMENTS, OBJECTIVES, AND ALTERNATIVE STRATEGIES

**Habitat Management**

*Issue Statement*: Wetlands and other waterfowl habitats are being lost throughout Washington due to development and conversion to other uses.

*Objective 90:* Quantify and reduce habitat loss to achieve Joint Venture objectives.

*Alternative Strategies:*
a. Update or develop habitat management guidelines and maps showing recent habitat losses.
b. Provide resource information to other agencies and organizations to influence land use decisions.
c. In cooperation with other agencies, track critical habitat status and trends (e.g., freshwater wetlands)

*Objective 91:* Provide funding through state migratory bird stamp/print revenues and the Washington Wildlife and Recreation Program to protect / enhance 1000 acres of new habitat annually for all migratory birds. This acreage target was selected based on past annual accomplishments of the migratory bird stamp/print program.

*Alternative Strategies:*
a. Determine habitat protection and enhancement needs considering Joint Venture plans, literature, and regional expertise.
b. Solicit project proposals from regional staff and external organizations.
c. Develop a stamp/print expenditure plan before the start of each new biennium, using an evaluation team from a statewide cross-section of Department experts.
d. Provide emphasis on projects to increase waterfowl recruitment in eastern Washington, wintering habitat and access in western Washington.
e. When allocating migratory bird stamp funds, consider fund allocation goals presented to the Legislature when the program was established:
   - Habitat acquisition 48%
   - Enhancement of wildlife areas 25%
   - Project administration 18%
   - Food plots on private lands 9%
f. Monitor effectiveness of habitat projects through focused evaluation projects before and after implementation.

*Objective 92:* Interact with other agencies and organizations to leverage migratory bird stamp funding by at least 100% annually. This percentage target was selected based on past annual accomplishments of the migratory bird stamp/print program.

*Alternative Strategies:*
a. Participate in organizations designed to deliver habitat improvements via multi-organization partnerships (e.g., Pacific Coast Joint Venture, Intermountain West Joint Venture).
b. Seek outside funding sources to leverage state revenues, through habitat improvement grants (e.g., National Coast Wetlands Grant, North American Wetlands Conservation Act).

**Population Management**

*Issue Statement*: Documentation of population size, movements, and mortality factors is difficult due to the highly migratory nature of waterfowl species.

*Objective 93*: Manage waterfowl populations consistent with population objectives outlined in Table 1, developed considering NAWMP, Pacific Flyway Council, and Joint Venture plans.

Table 1. Waterfowl population objectives.

| Species / subsp. / population | Area | Population Objective | Measure |
|---|---|---|---|
| Mallard | N. America | 8.7 million | breeding index |
| Pintail | N. America | 6.3 million | breeding index |
| Western Canada goose | W. Wash. | 1,500 | nest index |
| Western Canada goose | E. Wash. | 2,000 | nest index |
| Cackling Canada goose | Flyway | 250,000 | breeding index |
| Dusky Canada goose | Flyway | 16,000 | winter index |
| Canada goose | L. Col. R. / W.V. | reduce 133K 107K | winter index |
| Wrangel Island snow goose | Skagit/Fraser | 35,000 | winter index |
| Wrangel Island snow goose | Flyway | 120,000 | spring index |
| Black brant | Flyway | 150,000 | winter index |
| Black brant | Wash. Bays | 13,000 | winter index |
| Western High Arctic brant | Skagit/Fraser | 12,000 | winter index |
| White-fronted goose | Flyway | 300,000 | breeding index |
| Tundra swan | Flyway | 60,000 | winter index |
| Trumpeter swan | Flyway | 13,000 | breeding index |

*Alternative Strategies:*

a. Monitor annual status and trends of waterfowl populations through coordinated surveys with other agencies, including USFWS, flyway states, Puget Sound Action Team (PSAT).
b. Work with other agencies to improve estimates of waterfowl in other areas of the flyway important to Washington
c. Provide training for new observers in waterfowl population estimation techniques.
d. Periodically re-evaluate surveys to optimize accuracy and precision, including review of current literature and peer review.

*Objective 94*: Maintain regional populations in accordance with Joint Venture population goals.

*Alternative Strategies:*

a. Evaluate needs for modifying waterfowl distribution in major concentration areas every five years.
b. Establish game reserves and closure areas in proximity to other habitat components.
c. Publish results in game status reports.

*Objective 95:* Document distribution, movements, and survival in accordance with flyway management goals.

*Alternative Strategies:*
a. Band a minimum of 500 mallards each year (2003-2008) to provide survival estimates.
b. Participate in operational annual dusky Canada geese banding and observation programs to estimate distribution, survival, abundance, and derivation of harvest.
c. Conduct focused banding emphasis on select species (e.g., harlequins, seaducks, lesser Canada geese, dark Canada geese, and western Canada geese) as time allows.

*Objective 96:* Minimize mortality due to disease and contaminants.

*Alternative Strategies:*
a. Conduct surveillance monitoring to identify sources of disease and contaminants associated with mortality events.
b. In cooperation with other management agencies (e.g., National Wildlife Health Research Center), take corrective action to minimize exposure to disease and contaminant sources.

**Recreation Management**

*Issue Statement*: Federal harvest management strategies are not specific to Washington duck populations, although states are given more flexibility in developing goose harvest management strategies.

*Objective 97*: Measure harvest, number of hunters, and effort, accurate to ±10% at the 90% CI for each management unit.

*Alternative Strategies:*
a. Participate in federal Harvest Information Program (HIP) for migratory birds.
b. Provide supplemental estimates to determine regional differences in harvest (e.g., hunter questionnaire, daily card survey, snow goose harvest reports, brant color composition).

*Objective 98*: Maximize duck hunting recreation consistent with USFWS Adaptive Harvest Management (AHM) regulation packages, considering duck availability during fall and winter.

*Alternative Strategies:*
a. Establish regulations to maximize effective season days and bag limits, locating most season days later in the framework period:

Table 2. AHM Regulation Packages and Washington Season Timing.

| Regulation package | EASTERN WASHINGTON Days | Limit total/mall/ mall | Season Timing* | WESTERN WASHINGTON Days | Limit total/mall/ mall | Season Timing* |
|---|---|---|---|---|---|---|
| Liberal | 107 | 7/7/2 | mid-Oct. thru late Jan. | 107 | 7/7/2 | mid-Oct. thru late Jan. |
| Moderate | 93 | 7/5/2 | mid-Oct. – 9 days; remainder early-Nov. thru late-Jan. | 86 | 7/5/2 | mid-Oct. – 9 days; remainder mid-Nov. thru late-Jan. |
| Restrictive | 67 | 4/3/1 | mid-Oct. – 9 days; remainder mid-Nov. thru mid-Jan. | 60 | 4/3/1 | mid-Oct. – 9 days; remainder mid-Nov. thru early-Jan. |
| Very Restrictive | 45 | 4/3/1 | mid-Nov. thru early Dec.; late Dec. thru mid-Jan. | 38 | 4/3/1 | mid-Nov. thru early Dec.; late Dec. thru early-Jan. |

* USFWS rules on duck season timing:
1. Washington zones (2) – E. Washington and W. Washington
2. Season dates must be the same within each zone
3. Seasons may only be split into 2 segments
4. Youth days in addition to above days, except for liberal package
5. Youth days may be no more than 14 days before start of regular season

b. Assist in refining USFWS duck harvest management programs to reflect regional population differences (e.g., western mallards).
c. Maintain state harvest restrictions, in additional to federal frameworks, on waterfowl species of management concern in Washington (e.g., harlequin ducks, scoters)

*Objective 99*: Maximize goose hunting recreation consistent with Pacific Flyway Council plans, considering goose availability during fall and winter.

*Alternative Strategies:*
a. Establish regulations to follow flyway and state harvest thresholds:

Table 3. Pacific Flyway Goose Harvest Thresholds (except WDFW action levels denoted by *).

| Goose | Area | Harvest Threshold | 2001 Index | Measure |
|---|---|---|---|---|
| Western Canada goose | W. Wash. | Restriction level: 800<br><800 = reduce days/limit*<br>Liberalization level: 1,500<br><1,500 = eliminate Sept. season* | 2,145 | West index |
| Western Canada goose | E. Wash. | Restriction level: 1,300<br><1,300 = reduce days/limit*<br>Liberalization level: 2,000<br><2,000 = eliminate Sept. season* | 2,225 | nest index |
| Dusky Canada goose | Flyway | Closure level: 6,500<br>Restrict level 1: 6.5-8K = 70 quota<br>Restrict level 2: 8-16K = 85 quota<br>Liberalization level = 16,000<br>>85 quota, increase limit/days* | 16,665 | winter index |
| Cackling Canada goose | Flyway | Closure level: 80,000<br>Reopening level: 110,000 | 181,659 | nest index |

| | | | | |
|---|---|---|---|---|
| Wrangel Island snow goose | Skagit | Closure level: <35,000 and 3 yrs. <10% juv.* | 54,354, >10% juv. last 3 yrs. | winter index + % juveniles |
| | | Liberalization level: 120,000 (flyway) = end date Jan.8* | 97,000 | spring pop. |
| Brant | Flyway | Closure level: 90,000<br>Restrict level 1: 90-110K<br>Restrict level 2: 110-135K<br>Liberalization level: >135K | 129,664 | winter index |
| Brant | Skagit<br>Others | Closure level: 6,000*<br>Closure level: 1,000* | 8,964**<br>Willapa<br>2,628**, others<1000 | winter index<br>winter index |
| White-fronted goose | Flyway | Closure level: 80,000<br>Reopening level: 110,000 | 392,953 | nest index |

Note: Above thresholds are three-year averages, except ** (annual index)

b. Utilize recreational harvest as the primary method to address depredating / nuisance goose populations above management objectives (e.g., implement Pacific Flyway SW Wash. / NW Oregon Goose Depredation Control Plan).

*Objective 100*: Distribute harvest evenly over public hunting areas.

*Alternative Strategies:*

a. Evaluate needs for modifying waterfowl distribution in one of the six major harvest areas each year.
b. Evaluate and establish game reserves and waterfowl closures every five years to maximize harvest opportunity.
c. Develop map of reserves and closures and some measure of harvest or use in surrounding areas.

*Objective 101*: Maintain hunter numbers between 35,000-45,000 and recreational use days between 300,000-500,000.

*Alternative Strategies:*

a. Periodically survey hunter opinion to determine and recommend optimal season structures within biological constraints.
b. Work with USFWS to simplify hunting regulations and minimize annual hunting regulation changes.
c. To reduce confusion, minimize closed periods within seasons, maximize overlap between duck and goose seasons, and reduce the number of zones with different season structures.
d. Provide special opportunity for youth by providing special recreational opportunities separate from regular seasons (e.g., youth hunts 2 weeks before regular season opener).
e. Modify regulations to reduce crowding and increase hunt quality on wildlife areas (e.g., shell limits, limited entry, established blind sites, limited open days), without reducing total use days.

f. Utilize habitat funding in combined programs to provide hunter access to private lands with and emphasis in western Washington.
g. Work with local governments to maintain opportunity in traditional hunting areas, minimizing or finding alternatives to no shooting zones.
h. Maintain diversity of recreational hunting and viewing opportunities.

**Research**

*Issue Statement*: Additional information is needed to manage populations and harvest more effectively.

*Objective 102*: Generate or support at least one publication every year regarding waterfowl research or management.

*Alternative Strategies:*
a. Support and/or conduct research investigating limiting factors influencing duck recruitment.
b. Support and/or conduct research investigating factors related to waterfowl wintering distribution and carrying capacity.
c. Support and/or conduct research investigating duck survival.
d. Support and/or conduct research investigating genetic relationships of goose subspecies / populations.
e. Support and/or conduct research investigating goose distribution and survival.
f. Develop current list of research needs to guide additional research emphasis.

**Information and Education Goal**

*Issue Statement*: Members of the general public and recreational users are sometimes uninformed about management issues and waterfowl hunting opportunities.

*Objective 103*: Generate at least 5 information and education products each year to improve transfer of information to public.

*Alternative Strategies:*
a. Increase public awareness through brochures, news releases, internet, pamphlets.
b. Provide materials to assist waterfowl identification in the field.
c. Provide information to improve hunter proficiency.
d. Obtain outside review of hunting pamphlet to improve clarity.
e. Discuss waterfowl population management at public meetings and select sports group forums.
f. Develop materials describing waterfowl hunting opportunities in Washington.

**Enforcement Goal**

*Issue Statement*: Compliance with regulations is low in areas where regulations are not enforced at adequate levels.

*Objective 104*: Ensure a 90% compliance rate for waterfowl hunting regulations (i.e. 90% of hunters checked are in compliance with regulations).

*Alternative Strategies:*

a. Develop enforcement priorities to target regulations affecting population status (e.g., dusky Canada goose reporting requirements) and changes in select species bag limits (e.g., pintail).
b. Provide adequate training of enforcement officers in waterfowl identification and regulations.
c. Conduct emphasis patrols to determine nontoxic shot compliance in Skagit and Whatcom counties.

## VII. LITERATURE CITED

North American Waterfowl Management Plan, 1998. USFWS, Washington DC.

Pacific Coast and Intermountain West Joint Venture Management Plans, USFWS, Portland, OR.

Pacific Flyway Council Management Plans for Pacific Population of Western Canada Goose, Cackling Canada Goose, Dusky Canada Goose, Wrangel Island Snow Goose, Brant, White-fronted Goose, Tundra Swan, Pacific Coast Population of Trumpeter Swans, USFWS, Portland, OR.

## I. POPULATION STATUS AND TREND

Washington provides habitat for a variety of migratory game birds other than waterfowl, including mourning doves, band-tailed pigeons, coots, and snipe. Mourning doves and band-tailed pigeons are monitored by cooperative breeding surveys in Washington, which provide indices but not estimates of actual abundance. Coots and snipe population trends are monitored by USFWS standardized surveys on breeding areas.

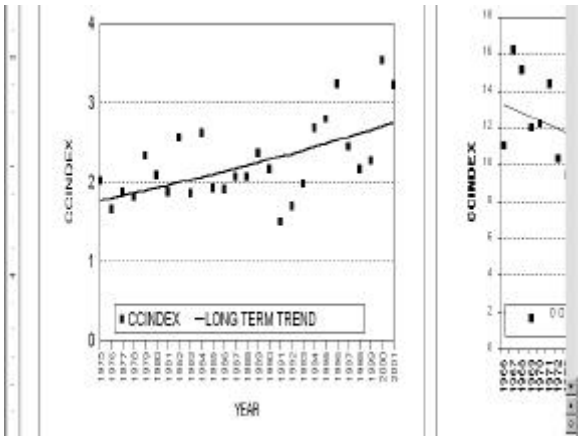


Figure 1. Band-tailed pigeon survey information, Washington, 1975-2001.

## II. RECREATIONAL OPPORTUNITY

Mourning doves provide the majority of recreational opportunity for this group of species, and are hunted during a September season. Seasons are based on frameworks established by USFWS, in conjunction with the Pacific Flyway Council. Approximately 9,000 hunters harvest 90,000 doves annually in Washington.

## III. DATA COLLECTION

The Department maintains two surveys to estimate the size of dove and band-tailed pigeon populations. Dove call-count surveys are completed in May, band-tailed pigeon call-count surveys are conducted in June / July, and winter index counts for coots are completed with waterfowl surveys in January. These surveys are completed cooperatively with USFWS. Harvest of these species is monitored by a variety of state and USFWS questionnaire surveys.

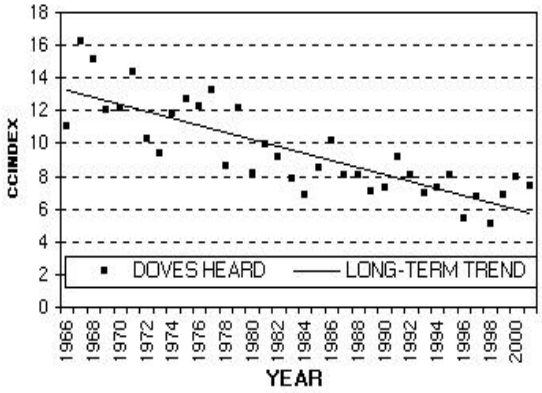


Figure 2. Morning dove survey information, Washington, 1966-2001.

## IV. MOURNING DOVE, BAND-TAILED PIGEON, COOT, AND SNIPE MANAGEMENT GOALS

This section describes the statewide management direction for mourning doves, band-tailed pigeons, coot, and snipe. Management of these species in Washington is accomplished through

the Waterfowl Section of WDFW. Although the U.S. Fish and Wildlife Service (USFWS) has nationwide management authority for migratory birds, effective management of these resources depends on established cooperative programs developed through the Pacific Flyway Council. Goals and objectives described in this plan follow interagency and other cooperative planning efforts. Strategies identified in this plan will guide work plan activities and priorities, and must be accomplished to meet the goals and objectives.

The statewide goals for mourning doves, band-tailed pigeons, coots, and snipe are:

1. Manage statewide populations of mourning doves, band-tailed pigeons, coots, and snipe for a sustained yield consistent with Pacific Flyway management goals.
2. Manage mourning doves, band-tailed pigeons, coots, and snipe 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. Preserve, protect, perpetuate, and manage mourning doves, band-tailed pigeons, coots, and snipe and their habitats to ensure healthy, productive populations.

## V. ISSUE STATEMENTS, OBJECTIVES, AND ALTERNATIVE STRATEGIES

### Habitat Management

*Issue Statement*: Habitats for mourning doves, band-tailed pigeons, coots, and snipe are being lost throughout Washington due to development and conversion to other uses.

*Objective 105:* Quantify and reduce habitat loss by developing habitat maps and management guidelines.

*Alternative Strategies:*

a. Provide resource information to other agencies and organizations to influence land use decisions (e.g., PHS management guidelines for band-tails).
b. In cooperation with other agencies, track critical habitat status and trends (e.g., mineral sites, freshwater wetlands)

*Objective 106:* Provide funding through state migratory bird stamp/print revenues to protect / enhance 30 acres of habitat annually for doves, pigeons, coots, and snipe.

*Alternative Strategies:*

a. Determine habitat protection and enhancement needs considering literature and regional expertise.
b. Solicit project proposals from regional staff and external organizations.
c. Develop expenditure plan before the start of each new biennium, using an evaluation team from a statewide cross-section of Department experts, to fulfill funding requirements for non-waterfowl migratory birds specified in legislation.
d. Monitor effectiveness of habitat projects through focused evaluation projects before and after implementation.

**Population Management**

*Issue Statement*: Documentation of population size, movements, and mortality factors is difficult due to the highly migratory nature of dove, band-tailed pigeon, coot, and snipe species.

*Objective 107*: Assist in meeting Pacific Flyway Council goals for mourning doves (15 calls/route in flyway) and band-tailed pigeons (1980-84 call-count index in Washington).

*Alternative Strategies:*
a. Monitor annual status and trends of doves and band-tailed pigeons through coordinated breeding ground surveys with other agencies, including USFWS and flyway states.
b. Monitor annual status and trends of coots through the Midwinter Inventory, coordinated with other agencies including USFWS and flyway states.
c. Provide training for new observers in population estimation techniques, particularly for call-count surveys.
d. Participate in focused banding projects to answer specific management questions (e.g., dove reward band study).

*Objective 108*: Minimize mortality due to disease and contaminants.

*Alternative Strategies:*
a. Conduct surveillance-monitoring studies to identify sources of disease and contaminants associated with mortality events.
b. In cooperation with other management agencies (e.g., National Wildlife Health Research Center), take corrective action to minimize exposure to disease and contaminant sources (e.g., trichomoniasis in band-tailed pigeons.)

**Recreation Management**

*Issue Statement*: Management of limited populations requires refined harvest estimates.

*Objective 109*: Measure statewide harvest, number of hunters, and effort, accurate to ±10% at the 90% CI.

*Alternative Strategies:*
a. Participate in federal Harvest Information Program (HIP) for migratory birds.
b. Provide supplemental measures to refine harvest estimates (e.g. band-tailed pigeon harvest report).

*Objective 110*: Maximize recreational opportunities consistent with population status.

*Alternative Strategies:*
a. Maintain state harvest restrictions in addition to federal frameworks.
b. Maintain opening/closure level for band-tailed pigeons based on 3-yr. ave. call-count, compared to Pacific Flyway plan population objective.

c. Maintain restrictive dove season length until significant increase in 10-year call-count index trend is observed.

*Issue Statement*: Traditional hunting areas are being lost to development.

*Objective 111*: Maintain a minimum of 5,000 hunters and current recreational use days between 90,000-110,000.

*Alternative Strategies:*
a. Utilize habitat funding in combined programs to provide hunter access to five new private land holdings.
b. Work with local governments to maintain opportunity in three traditional hunting areas, minimizing or finding alternatives to no shooting zones.

**Information and Education**

*Issue Statement*: Members of the general public and recreational users are sometimes uninformed about management issues and hunting opportunities.

*Objective 112*: Generate at least one information and education product each year to improve transfer of information to public.

*Alternative Strategies:*
a. Increase public awareness about management issues through brochures, news releases, Internet, pamphlets.
b. Develop materials describing hunting opportunities for other migratory game birds in Washington.

**Research**

*Issue Statement*: Additional information is needed to manage populations and harvest more effectively.

*Objective 113*: Generate or support at least one publication every five years regarding research or management of doves, band-tails, coots, or snipe.

*Alternative Strategies:*
a. Support and/or conduct research investigating habitat use around mineral springs.
b. Support and/or conduct research investigating optimal survey and timing for band-tailed pigeon trend analysis.
c. Support and/or conduct research investigating band-tailed pigeon distribution and survival.
d. Support and/or conduct research investigating limiting factors affecting mourning dove populations in Washington.
e. Develop current list of research needs to guide additional research emphasis

## VII. LITERATURE CITED

Pacific Flyway Council, Management Plans for Band-tailed Pigeons and Mourning Doves, USFWS, Portland, OR.

**WILD TURKEY (*Maleagris gallopavo*)**

## I. POPULATION STATUS AND TREND

Turkey introductions in Washington State occurred as early as 1913, however, these early release efforts (1913–1959) did not result in established populations. In 1960, 12 wild-trapped Merriam's turkeys from New Mexico were released in Klickitat County. This release resulted in establishment of Washington's largest, most stable turkey population from 1960 through 1990. In addition, 15 Merriam's turkeys were released in 1961 in the Rice area of Stevens County and a population became established. From the mid 1960s through the early 70s, turkeys were released in several Washington counties, including Okanogan, Chelan, Whitman, Pend Oreille, Kittitas, Ferry, Spokane, Clallam, Thurston, San Juan and Lewis counties. Many of these releases did not result in established populations.

From 1984 through 2001, major transplant projects were undertaken to establish wild turkey populations in eastern and southwestern Washington. Wild turkeys trapped in Texas, South Dakota, Missouri, and Pennsylvania were brought into the state and released in suitable habitats in eastern and southwestern Washington. By the early 1990s wild turkey populations in eastern Washington had increased to the point that the WDFW began to transplant Washington birds into other suitable habitats within several eastern Washington counties. Western Washington wild turkey populations also received additional augmentation in the 1990s when several hundred wild-trapped birds from Iowa were released in Thurston, Lewis, Cowlitz, and Grays Harbor counties.

According to harvest trend information, most turkey populations in Washington are increasing with Stevens County having the highest population density. Other eastern Washington counties, such as Ferry, Lincoln, Pend Oreille and Columbia, also have substantial turkey populations. Wild turkey populations in western Washington are not experiencing the same level of expansion as northeastern Washington, however, there are areas in Thurston, Cowlitz, Mason and Grays Harbor counties that support huntable populations of the eastern sub-species of wild turkey.

## II. RECREATIONAL OPPORTUNITY

Hunting seasons for wild turkeys have varied from a 2-day fall season in 1965 to the current 31-day spring season statewide and 5-day fall permit-only seasons. The statewide, April 15 to May 15, spring season was established in 1994 and a fall season has existed since 1965. At one time, the fall season was in late November, but in 2000, fall hunting was changed from a general season to a permit-only hunt by drawing and the hunt dates were moved from late November to early October to avoid overlapping other seasons.

Statewide harvest and hunter numbers have increased each year since 1991 (Figure 1). In 2000, 1,615 turkeys were taken and 19,209 tags were purchased. Prior to turkey augmentation activity in the late 1980s, hunter numbers fell to a low of 428 (1987) and turkey harvests averaged 65-birds/ year (1983-1987).

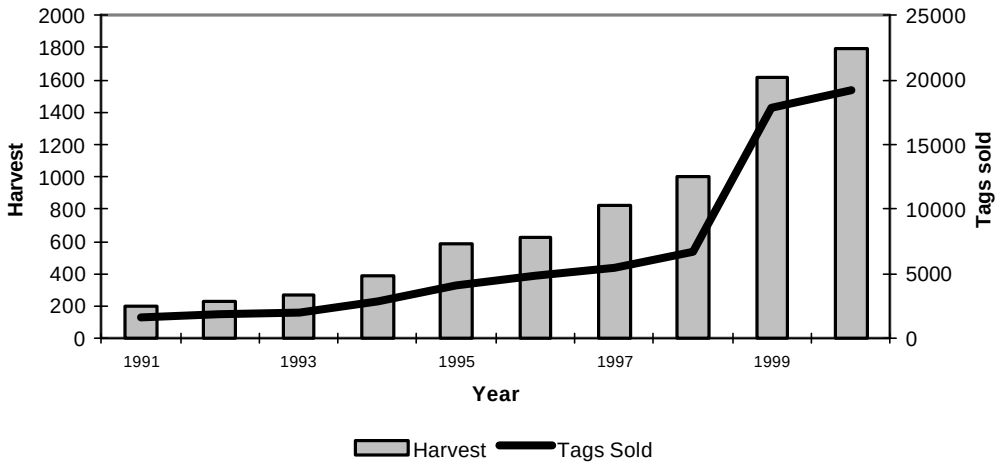


Figure 1. Trend in turkey harvest and number of tags sold in Washington, 1991-2000.

## III. DATA COLLECTION

The largest amount of data collected on wild turkeys has been estimated harvest and hunter effort. Some limited radio tracking has been done in Pend Oreille, Yakima, Chelan, and western Washington counties to help estimate survival and production of recently released birds. Future efforts to collect these types of data are described in the management section below.

## IV. WILD TURKEY MANAGEMENT GOALS

The statewide goals for wild turkeys are:

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

## V. ISSUE STATEMENTS, OBJECTIVES, AND ALTERNATIVE STRATEGIES

### Population Management

*Issue Statement*: Wild turkeys have been introduced in Washington State since 1960. Since the late 1980s, WDFW has been more aggressive in transplanting turkeys into suitable habitats in much of the state. An evaluation of past activities and a plan for future activities is needed.

*Objective 114*: Develop a population enhancement plan by December 2003.

*Alternative Strategies*:

a. Develop criteria for evaluating success of wild turkey releases.

b. Evaluate past translocations within each WDFW region on a district-by-district basis.
c. Evaluate reintroduction focus area criteria and make modifications to primary wild turkey population areas as necessary.
d. Develop criteria that help identify areas where turkey populations are not desired (e.g., urbanization, depredation, nuisance).
e. Develop population enhancement plans for areas that analysis and evaluation deem appropriate.
f. Conduct an analysis of potential release areas for habitat suitability as well as public and agency support.

*Issue Statement*: Turkey populations in some areas of eastern Washington have expanded substantially over the past 5 years. WDFW is receiving a considerable number of damage complaints from residents in some of these areas.

*Objective 115*: Develop a damage response plan by December 2003.

*Alternative Strategies*:
a. Document locations of complaints.
b. Evaluate WDFW responses to past complaints.
c. Determine major factors relating to damage complaints.
d. Develop a plan that addresses major factors and incorporates multiple methods of addressing the issues. Possible methods may include, but are not limited to, liberalizing hunting seasons, deterrent activities, depredation permits and removal through trapping.

*Issue Statement*: Turkey populations need to be monitored to help determine appropriate hunting seasons and identify population management needs.

*Objective 116*: Monitor turkey populations in primary management zones of the state on a yearly basis.

*Alternative Strategies:*
a. Identify areas within the state that have population monitoring needs.
b. Evaluate potential monitoring tools and develop a recommended monitoring protocol.
c. Implement recommended turkey population monitoring protocol.

**Recreation Management**

*Issue Statement*: Turkey populations in some portions of Washington have expanded to the point that hunting opportunities need to be evaluated.

*Objective 117*: By December 2003, develop a fall hunting opportunity recommendation for Fish and Wildlife Commission consideration.

*Alternative Strategies:*
a. Define population indexes for turkey populations.

b. Evaluate the potential impacts of season options (including open season, increased season length, and increased permits).

*Issue Statement*: Members of the public have contacted the WDFW and expressed a desire to eliminate inclusion of a turkey tag with the purchase of a small game license. In response, hunters were asked whether they would like to see the turkey tag separated in the hunter opinion survey conducted in January 2002. Survey results show that 57% of turkey hunters oppose separating the tag (48% strongly opposed) while 39% support separating the tag (24% strongly supporting).

*Objective 118*: By December 2002, determine if a turkey transport tag should be included with the purchase of a small game license.

*Alternative Strategies:*
a. Survey and/or discuss the subject with hunters and hunting groups to determine their position.
b. Evaluate what impacts including or not including the tag may have on recreational opportunity.
c. Develop a recommendation by 2004.

*Issue Statement*: Turkey hunters and district biologists report that turkey-hunting opportunities in some areas of eastern Washington are limited due to large acreage owned by private landowners. Private land access has also been identified as an important issue in hunter opinion surveys conducted by WDFW.

*Objective 119*: Over the next 5 years, increase the number of acres of private land available for public turkey hunting opportunities by 10%.

*Alternative Strategies:*
a. Increase public access to private lands through the efforts of WDFW's upland restoration program.
b. Investigate using public funding to acquire access to private property (e.g., block management, landowner incentives).

*Issue Statement*: A definitive method of determining when a hunting season change would be appropriate does not currently exist.

*Objective 120*: By April 2005, develop a set of criteria that, when met, would direct a change in season structure or hunting opportunity.

*Alternative Strategies:*
a. Continue to collect harvest information via mandatory reporting.
b. Define turkey population indexes for the different areas of the state.
c. Develop and/or implement a method of monitoring turkey populations and harvest that includes triggers for adaptive management.

**Public Education**

*Issue Statement*: The public is not well informed of turkey management history or practices in Washington and does not support introduction of non-native wildlife.

*Objective 121*: Create educational pamphlets and news releases describing past management activities and future management objectives on a yearly basis.

*Alternative Strategies:*
a. Produce a publication that provides information about non-native wildlife and inter-specific competition issues related to turkeys in Washington.
b. Create a wild turkey pamphlet that describes past and future WDFW management activities and watchable wildlife opportunities.
c. Produce timely news releases that cover substantial new management activities.
d. Create an informational web page that addresses common concerns or interests surrounding wild turkeys.
e. Develop a pamphlet or flyer that addresses the potential negative effects of feeding turkeys and guidelines describing how to avoid negative turkey interactions.

**Research**

*Issue Statement*: Research on wild turkeys in the western United States is not common. If research were to be done in western habitats, managers would have a better tool to use when managing the species.

*Objective 122*: By 2008, participate in or support research projects that increase our knowledge of wild turkeys in western habitats.

*Alternative Strategies:*
a. Conduct a literature review of western U.S. wild turkey research.
b. Identify research needs.
c. Cooperate with public agencies and natural resource groups (e.g., National Wild Turkey Federation) to develop research projects in Washington.
d. Develop and/or participate in inter-specific competition research projects funded through the National Wild Turkey Federation.

**Enforcement**

*Issue Statement*: Illegal activities such as trespass are becoming a problem in some areas of the state, especially in parts of northeastern Washington where turkey hunter numbers are rising annually.

*Objective 123*: Concentrate efforts on reducing illegal methods of harvest and emphasizing landowner relations on a yearly basis.

*Alternative Strategies:*

a. Increase enforcement patrols in areas where turkey hunters are concentrated.
b. Work with landowners to address their concerns/needs.

## MOUNTAIN QUAIL (*OREORTYX PICTUS*)

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## I. POPULATION STATUS AND TREND

Historically, mountain quail are thought to have existed in western Washington and along the southern border in eastern Washington; however, mountain quail populations in Washington have been low for several years. While there are a few areas in western Washington that hold birds, eastern Washington populations have all but disappeared. The last known mountain quail populations in eastern Washington were in southeastern Asotin County. The current status of this, and other eastern Washington populations is largely unknown but is assumed to be minimal at best.

## II. RECREATIONAL OPPORTUNITY

Mountain quail hunting season extends from October 6 through November 30 in western Washington; however, there have been no hunting seasons for mountain quail in eastern Washington since 1997. The 2000 mountain quail harvest was likely less than 200. Mountain quail do not represent a major recreational opportunity in the state of Washington.

## III. DATA COLLECTION

To date, only incidental data on mountain quail populations in Washington have been collected. These data suggests that mountain quail are limited in distribution and abundance. Future data collection may be focused on monitoring reintroduction efforts in eastern Washington.

## IV. MOUNTAIN QUAIL MANAGEMENT GOALS

The statewide goals for mountain quail are:

1. Preserve, protect, perpetuate, and manage mountain quail and their habitats to ensure healthy, productive populations.
2. Manage mountain quail for a variety of recreational, educational and aesthetic purposes including hunting, scientific study, wildlife viewing and photography.
3. Manage western Washington mountain quail populations for a sustained harvest.

## V. MANAGEMENT ISSUES, OBJECTIVES, AND STRATEGIES

### Habitat Management

*Issue Statement*: Little is known about mountain quail habitat in eastern Washington. Historic distribution has been estimated, but suitability and ability to sustain mountain quail populations is largely unknown.

*Objective 124*: Determine potential mountain quail habitat in southeastern Washington by 2008.

*Alternative Strategies:*

a. Develop a map showing potential mountain quail habitat in eastern Washington.

b. Evaluate potential habitat areas in southeastern Washington to determine the most appropriate areas for re-introduction efforts.
c. Conduct an evaluation of eastern Washington mountain quail habitat conditions and suitability based on results from monitoring released quail.

**Population Management**

*Issue Statement*: Mountain quail occupy little of their historic range in eastern Washington.

*Objective 125*: Re-establish mountain quail populations in historic range in eastern Washington.

*Alternative Strategies:*
a. Secure funding for a reintroduction project.
b. Enter into a cooperative project with Oregon and Idaho designed to address mountain quail re-introduction in southeastern Washington, northern Oregon and western Idaho.
c. Support and/or conduct trapping of wild mountain quail in Oregon and release into identified areas of southeastern Washington.
d. Implement a post-release monitoring program for quail as part of re-introduction efforts.
e. Evaluate the need to close California quail hunting seasons in areas targeted for reintroduction.

**Recreation Management**

*Issue Statement*: Harvest of mountain quail in western Washington is not well understood. To date, mountain quail harvest has been reported as part of general quail harvest and cannot be reliably separated.

*Objective 126*: Determine what proportion of the reported western Washington quail harvest is mountain quail.

*Alternative Strategies:*
a. Develop wing collection survey to estimate mountain quail harvest in western Washington.
b. Develop a telephone survey to sub-sample quail hunters who report harvest in counties supporting mountain quail populations.
c. Require mountain quail hunters to possess an authorization permit and report harvest annually.

*Issue Statement*: Recreational hunting opportunities in western Washington are still available, but are limited in distribution.

*Objective 127*: Maintain a limited hunting season for mountain quail in western Washington unless harvest declines by greater than 50% over 3 years.

*Alternative Strategies:*
a. Monitor mountain quail harvest in Mason and Kitsap counties in such a way that a 50% decline over 3 years can be detected with confidence.

**FOREST GROUSE (Blue (*Dendragapus obscurus*), Ruffed (*Bonsa umbellus*), and Spruce (*Falcipennis canadensis*))**

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## I. POPULATION STATUS AND TREND

Forest grouse in Washington include blue (*Dendragapus obscurus*) and ruffed grouse (*Bonsa umbellus*), which occur throughout the forested lands in Washington, and spruce grouse (*Falcipennis canadensis*) that are closely tied to higher elevation spruce/fir habitats. Statewide biological surveys designed to estimate forest grouse populations have not been conducted in Washington. For many years, population monitoring has been based on the long-term harvest trend (Figure 1). This trend shows an apparent decline in forest grouse populations, however, it is difficult to draw concrete conclusions because harvest estimation methods have changed over time and other factors such as hunter effort and access to private lands may be biasing results.

From 1984 to 2000, harvest estimates were conducted using a 3 wave mailed hunter survey (as opposed to a one-mailing survey in prior years). The harvest trend during that time shows a moderate decline (P = 0.0464). In 1999, the small game survey was conducted differently than other years, which may explain the extremely low estimated harvest. If that data point is removed from the analysis, then the decreasing trend from 1984 to 2000 is not statistically significant (P = 0.1535).

A wing collection study in 1997 revealed that hunters did not accurately report the species of grouse harvested. Since hunters have not been able to accurately report the species harvested, evaluating harvest, and thus population trends for individual species is very difficult. Current grouse populations are thought to be relatively healthy, however, loss of habitat to urban expansion and changes in forest management techniques may impact population status over time.

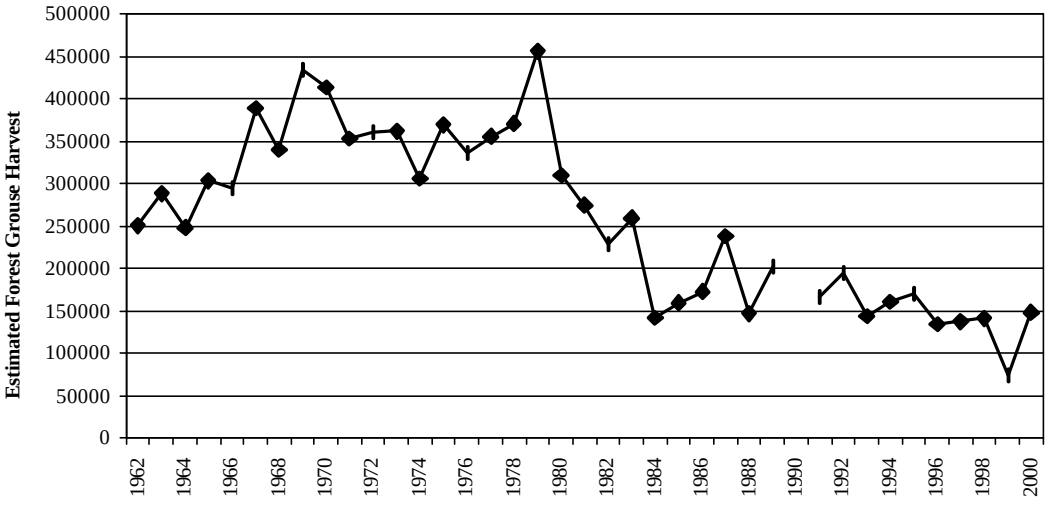


Figure 1. Estimated forest grouse harvest in Washington State from 1962 to 2000.

## II. RECREATIONAL OPPORTUNITY

The current Sep. 1 to Dec. 31 hunting season, which is similar to forest grouse seasons in Oregon (Sept. 1 – Jan. 6) and Idaho (Sept. 1 – Dec. 31), has been in place since 1987. The daily bag limit of 3 of any species (mixed or straight bag) has not changed since 1952. Estimated hunter numbers slowly declined from the late 1980's through 1997, but then fell sharply in 1998 and 1999 (Figure 2). The decline seen in 1999 may be a result of sampling difficulties that made data collection inconsistent with previous and subsequent years. Hunter numbers rebounded in 2000, but are still below historic levels.

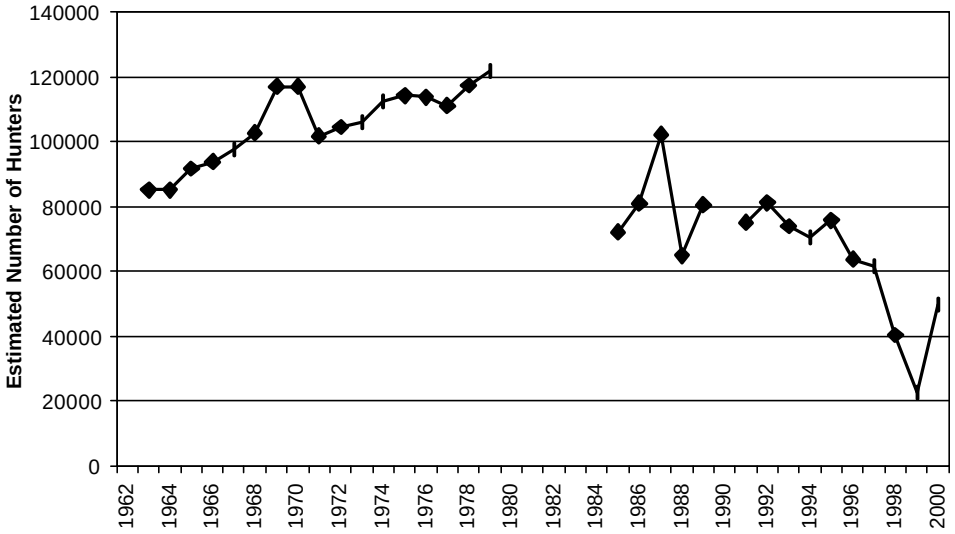


Figure 2. Estimated number of forest grouse hunters in Washington from 1963 to 2000.

## III. DATA COLLECTION

Statewide population surveys for forest grouse have not been conducted, however, forest grouse wings were collected in 2000 by placing barrels in strategic locations in north-central Washington where hunters voluntarily deposited one wing from each grouse killed. Wings were classified as to species, sex, and age.

Statewide wing collections from 1993-95 provided several pieces of important information, such as, more than 70% of forest grouse harvest occurs in September and early October, before modern firearm deer seasons. Therefore, current seasons that extend through December probably have very little impact on grouse populations. In addition, there is a tendency for hunters to misidentify grouse species, which has resulted in forest grouse species being combined for current harvest survey purposes.

The most extensive data set held for forest grouse is harvest estimation, which has been collected since 1963. Data was collected by surveying approximately 10% of hunting license buyers. These data are reported in the annual WDFW Game Harvest Report.

## IV. FOREST GROUSE MANAGEMENT GOALS

The statewide goals for Forest Grouse are:

1. Preserve, protect, perpetuate, and manage forest grouse and their habitats to ensure healthy, productive populations.
2. Manage forest grouse for a variety of recreational, educational and aesthetic purposes including hunting, scientific study, wildlife viewing and photography.
3. Manage statewide forest grouse populations for a sustained harvest.

## V. ISSUE STATEMENTS, OBJECTIVES, AND ALTERNATIVE STRATEGIES

### Habitat Management

*Issue Statement:* Forest grouse habitat quality is tied directly to forest management strategies implemented on public and private lands. As new information about forest grouse management becomes available, it is important to make that information available to forest managers.

*Objective 128:* Develop one additional habitat management publication by 2008.

*Alternative Strategies:*

a. Review forest grouse literature concerning forest management techniques.
b. Update existing or create additional forest grouse habitat management guidelines.
c. Make guidelines available to forest landowners and encourage them to incorporate management practices that benefit forest grouse.

### Population Management

*Issue Statement:* Current harvest estimation, which is used as an indicator of population trend, is not adequate to detect a significant change in the forest grouse harvest at a local geographic level. With improved harvest estimates, WDFW will be able to identify appropriate management actions when needed.

*Objective 129:* Improve harvest estimation to detect a 50% decline over a 3-year period at the WDFW Regional level.

*Alternative Strategies:*

a. Analyze harvest report data to include estimation at the WDFW Regional level.
b. Develop a statistical model of harvest that includes the effects of weather and hunter effort.

*Objective 130:* When harvest estimates at the WDFW Regional level show a decline of 50% over a 3-year period, focus management efforts on determining the causes for decline.

*Alternative Strategies:*

a. Evaluate and implement population-monitoring protocols independent of harvest monitoring.
b. Determine whether large-scale habitat changes have occurred in areas of concern.

c. Correlate changes in forest grouse habitat and populations with changes in timber management practices.

**Recreation Management**

*Issue Statement:* Grouse hunters and other members of the public have questioned the ethics of hunting forest grouse with a center-fire cartridge firearm. The main issues are ethical fair chase, wastage, and respect for the species being hunted.

*Objective 132:* Develop a recommendation to the Commission for regulating legal weapons for forest grouse hunting.

*Alternative Strategies:*
a. Determine level of hunter support for greater firearm restrictions and evaluate the rationale behind their opinion.
b. Work with hunters to develop a firearm restriction recommendation.

*Objective 133:* Develop a method to identify harvest of forest grouse species and report findings in the annual Game Status Report.

*Alternative Strategies:*
a. Develop a species distribution map.
b. Use wing collection data to create a correction factor to adjust hunter species composition reports.

*Objective:* Develop a report on hunting season impacts on grouse populations by 2008.

*Alternative Strategies:*
a. Conduct a literature review targeting grouse hunting season impacts.
b. Determine impacts of grouse harvest through banding studies.

**UPLAND GAME BIRDS: Pheasant (*Phasianus colchicus*) California Quail (*Callipepla californica*), Chukar (*Alectoris chukar*) and Hungarian Partridge (*Perdix perdix*)**

## I. POPULATION STATUS AND TREND

According to harvest estimates, (used as an index of population densities), pheasant populations in Washington have apparently been declining since the early 1980's (Figure 1). Harvest estimation techniques did not change between 1984 and 2000, so estimates made during that time should be comparable. In addition, crowing count surveys and brood index surveys conducted between 1984 and 1998 also indicate a decrease in pheasant populations in many areas of eastern Washington (Cliff Rice, pers comm.). Interviews with hunters and biologists support the theory that pheasant populations have decreased over time. The cause of the decline is not definitively known, although several factors are thought to have contributed, including loss and degradation of habitat.

The cause of the increase in pheasant harvest from 1995 to 1997 may be an artifact of the eastern Washington pheasant enhancement program. Since rooster pheasants were released in the fall between 1997 and 2000, harvest estimates may be artificially high when compared to harvest estimates between 1992 and 1996 when no pheasants were released in eastern Washington. Current populations do not appear to be significantly higher than periods prior to 1997.

Upland game bird fall population densities, and related harvest, are often dependent on spring weather conditions since chicks have a difficult time thermoregulating in cold, wet weather conditions. In addition, chicks need high protein diets in the spring and cold, wet springtime weather often decreases insect availability (Offerdahl and Fivizzani, 1987). Although variable from year to year, harvest estimates for quail, chukar and Hungarian partridge (Huns) have not dropped below 1993 levels. Currently, harvest levels are at or near the 17 year high for quail and Huns, but chukar harvest is 60% lower than the 17 year high (Figure 2). In general, biologist opinions of upland game bird populations correlate with the harvest trends, or lack thereof, seen in Figures 1 and 2.

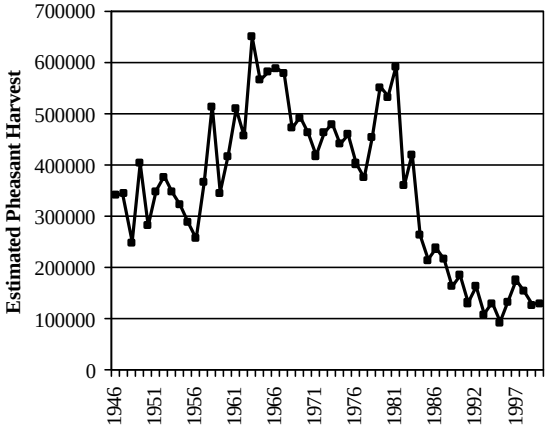


Figure 1. Estimated pheasant harvest for Washington, 1946 - 2000.

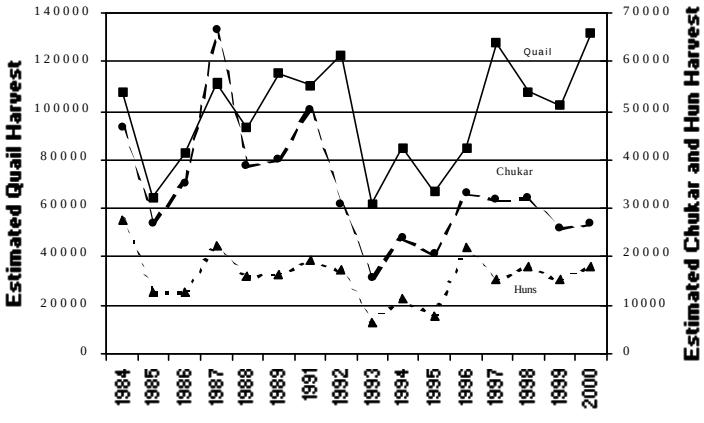


Figure 2. Estimated quail, chukar and Hungarian Partridge harvest for Washington, 1984-2000

## II. RECREATIONAL OPPORTUNITY

Pheasant season timing in Washington State has varied only slightly over the past 10 years, usually starting in mid-October and lasting through December. For many years, pheasant hunters have been able to hunt for 11 or 12 weeks, depending on the year, with a daily bag limit of 3 roosters. In 2000, and estimated 35,789 people hunted pheasant in Washington. For 9 out of the last 10 years, fewer than 40,000 people hunted pheasants, down from an estimated high of 142,000 in the early 1950's and a more recent high of 109,000 in 1979 (Figure 3). The spike in hunter participation in 1997 may have been due to the initiation of the eastern Washington pheasant enhancement program that year. In 2000, hunters spent over 233,000 days pursuing pheasant.

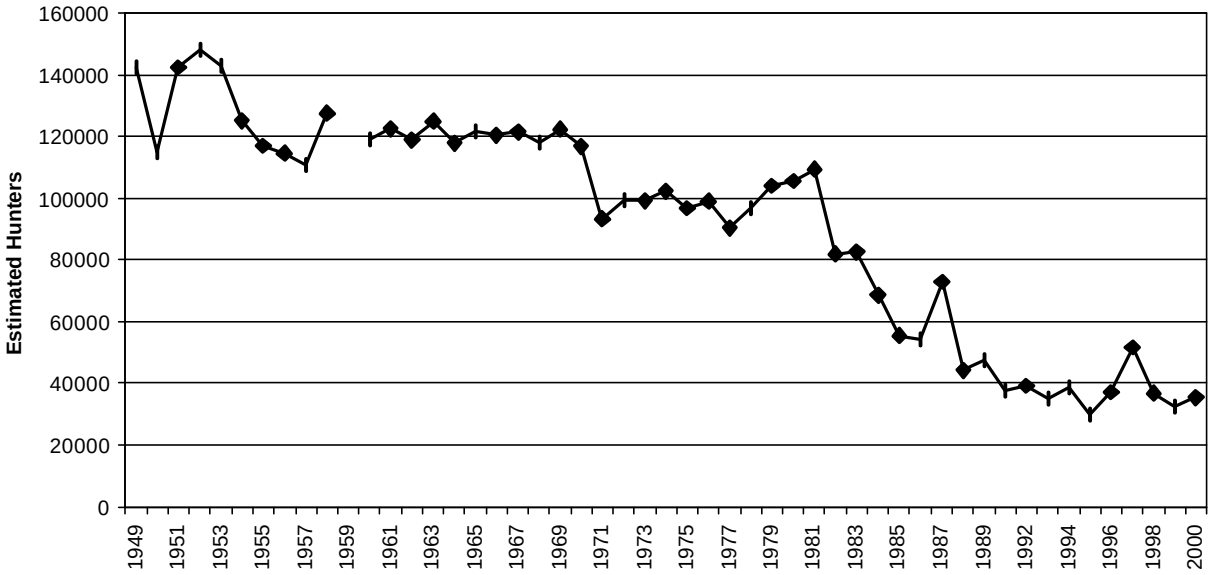


Figure 3. Estimated pheasant hunter participation in Washington State, 1949 to 2000.

Hunting seasons for other upland game birds have also varied in length over the years. During the 1960's and 70's, the chukar season was split into early and general seasons, depending on geographic area. In 1997, the early-general season was eliminated in favor of a standardized season running from early October to mid-January, which is the current regulation. The bag limit for chukar was reduced after the population crash in the early 1980s, from 10 birds\day to 6. Currently, the daily bag limits for chukar and Huns are 6 of each species and quail has a bag limit of 10. In 2000, an estimated 17,317 people hunted quail, 7713 hunted chukar, and 6979 hunted Huns. Hunters spent over 159,000 days afield pursuing these upland birds.

## III. DATA COLLECTION

Three types of pheasant surveys were conducted up until the mid to late 1990's in most areas of the state; 1) Sex ratio counts in February and March, 2) Crow counts in late April and early May, 3) Production counts in late July and August. In addition, population surveys for quail and

chukar were completed through the late 1990's. All of these surveys were discontinued mainly due to the limited funding and time for district biologists considering all game species priorities.

Data are still collected annually in the irrigated farmland portions of Grant and Adams counties to provide indices of breeding population size and production of chicks. The population index is useful in determining long-term trends and major short-term population changes. The production index is a good predictor of hunting prospects and may provide information useful in determining reasons for annual changes in population size. In addition, a post-season mail survey of hunters is conducted to estimate harvest and hunter effort.

## IV. UPLAND GAME BIRD MANAGEMENT GOALS

The statewide goals for upland game birds are:

1. Preserve, protect, perpetuate, and manage upland game birds and their habitats to ensure healthy, productive populations.
2. Manage upland game birds for a variety of recreational, educational and aesthetic purposes including hunting, scientific study, wildlife viewing and photography.
3. Manage statewide upland game bird populations for a sustained harvest.

## V. ISSUE STATEMENTS, OBJECTIVES, AND ALTERNATIVE STRATEGIES

### Habitat Management

*Issue Statement:* Pheasant habitat in eastern Washington has been lost, altered or degraded over the past 50 years. This is considered to be a major factor in the decline in pheasant populations (Flaherty 1979).

*Objective 134:* By 2008, increase the quantity and quality of pheasant habitat in select WDFW districts within identified key pheasant management areas.

*Alternative Strategies:*

a. Inventory current pheasant habitat and identify and prioritize key areas for improvement.
b. Define quality pheasant habitat.
c. Develop specific strategies for enhancing pheasant habitat.
d. Purchase high priority pheasant habitat acreage using funds from the sale of western Washington land holdings identified for that purpose.
e. Work with public and private landowners and funding agencies (e.g. United States Department of Agriculture (USDA)) to increase quality pheasant habitat acreage through programs like the Conservation Reserve Program (CRP), and the Wildlife Habitat Incentives Program (WHIP).
f. Improve pheasant habitat quality by funding habitat improvement projects through the Eastern Washington Pheasant Enhancement Program (EWPEP).
g. Integrate pheasant habitat improvements and priorities with native species needs (e.g. sharp-tailed grouse and salmon).

*Issue Statement:* The WDFW has been involved with improving upland wildlife habitat through the Upland Wildlife Restoration Program and various federal government sponsored programs

such as CRP. Maximizing future involvement in federal and state programs is critical to increasing pheasant populations in eastern Washington in the future.

*Objective 135:* By 2006, develop a report that evaluates past upland habitat program involvement and identifies those that are most effective.

*Alternative Strategies:*
a. Evaluate the impacts of USDA programs and develop recommendations on how to best support these programs in Washington.
b. Evaluate past acquisitions for their contribution to pheasant population densities.
c. Support or conduct a thorough literature review and/or study to help determine the value of guzzlers to upland game species.

**Population Management**

*Issue Statement:* Harvest and survey trends indicate that pheasant populations have declined over the past 50 years.

*Objective 136:* Monitor population status and trend within the key areas identified for habitat improvement and document results in the annual Game Status Report.

*Alternative Strategies:*
a. Develop and/or adopt a standardized method to monitor pheasant population status.
b. Consistently monitor pheasant populations to provide a gauge of how habitat improvements are affecting population trends.

**Recreation Management**

*Issue Statement:* Hunters and district biologists report that upland game bird hunting opportunities in some areas of eastern Washington are limited due to large acreage owned by private landowners. Private land access has also been identified as an important issue in hunter opinion surveys conducted by WDFW.

*Objective 137:* By 2008, increase the number of acres of private land available for hunting by 10% within the areas identified as priorities.

*Alternative Strategies:*
a. Utilize the WDFW upland restoration program to increase public access to private lands.
b. Investigate using public funding to acquire access to private property.
c. Investigate alternatives to replace the loss of access to Snake River mitigation properties.
d. Publicize where public hunting access is available.

*Issue Statement:* Estimated harvest figures show that there has been a decline in pheasant and chukar harvest over the past 18 years and other upland game birds have experienced large fluctuations in harvest. Harvest estimation data are used as an indicator of overall harvest, and population status as well as hunter effort and are the best long-term data set held by WDFW.

*Objective 138:* Monitor upland game bird harvest on a yearly basis.

*Alternative Strategies:*
a. Continue to collect harvest information on a yearly basis such that it is comparable to previous seasons.
b. Evaluate harvest data to estimate trends in population status.
c. Develop a method to collect eastern Washington pheasant release harvest data (e.g. an additional box on the hunter questionnaire).

**Public Education**

*Issue Statement:* Broad distribution of information regarding the biology and management of upland game birds will increase public understanding of management activities implemented by the WDFW.

*Objective 139:* Provide information to the public on a yearly basis that increases the public's understanding of upland game bird management in Washington.

*Alternative Strategies:*
a. Produce timely news releases when substantial developments in upland game bird management occur with an emphasis on youth hunting opportunities.
b. Produce pamphlets or other informational material that addresses upland game bird biology, emphasizing the impact of weather on annual population density.
c. Enter into cooperative educational ventures with resource-oriented groups such as Pheasants Forever.

**Research**

*Issue Statement:* Pheasant populations in Washington have declined over the past 50 years and the causes for the decline are not known with confidence.

*Objective 140:* By 2008, develop a report that identifies the factors limiting pheasant populations in Washington and provides management recommendations.

*Alternative Strategies:*
a. Conduct a literature review to identify potential factors and related research needs.
b. Conduct studies that identify factors that are limiting pheasant populations in eastern Washington.
c. Compare brood count/crow count data with population decline and habitat change data.

*Issue Statement:* Noxious weeds such as yellow star thistle and knapweed may be impacting habitat quality for upland birds, especially Huns and chukar.

*Objective 141:* Support and/or conduct activities that evaluate the effects of noxious weeds on chukar and Hun habitat and populations.

*Alternative Strategies:*
a. Support and/or conduct activities that document current habitat distribution as well as current noxious weed distribution.
b. Identify and secure additional funding that would allow an evaluation of noxious weed impacts on chukar and Hun populations.
c. Conduct a study that evaluates the impacts of noxious weeds on chukar and Hun populations.

**Eastern Washington Pheasant Enhancement Program**

*Issue Statement:* The EWPEP was developed "to improve the harvest of pheasants by releasing pen-reared rooster pheasants…and by providing grants for habitat enhancement…". It is not known if the program is achieving its objectives. Also, the Program should be implemented to achieve the objectives in this plan.

*Objective 142:* Evaluate the EWPEP and develop recommendations for any needed changes for legislative action in 2003.

*Alternative Strategies:*
a. Review and analyze past EWPEP funded pheasant releases and develop a summary document that evaluates the success of the program and provides recommendations for future action.
b. Work with conservation organizations, such as Pheasants Forever, to develop recommendations.
c. Focus habitat enhancements in identified key management areas.

**Western Washington Pheasant Program**

*Issue Statement:* In 1997, the WDFW closed the Whidbey Island game farm to increase the efficiency of the program. Since that time, the program has gone from being 61% self-funded to 78% with the remainder being paid for by general hunting license revenue. It is important that this program become 100% self-funded since it is a recreational program serving a specific group of hunters and it is appropriate to ensure the program does not have a financial impact on general hunting license revenues. In addition, being self-funded helps maximize the chances that the program can continue to operate since it would not compete well for funding.

*Objective 143:* Evaluate the current funding mechanism for the western Washington pheasant program and identify new ways to create a self-funded budget by June 2003.

*Alternative Strategies:*
a. Work with hunting public to determine the best way to increase revenue.
b. Determine what percentage of small game license buyers hunts strictly western Washington pheasants.
c. Identify cost saving efficiencies in pheasant production.

*Issue Statement:* Hunter crowding and safety at several existing western Washington pheasant release sites are becoming more common.

*Objective 144:* Develop and implement a plan to reduce hunter crowding by 2004.

*Alternative Strategies*:
a. Identify and secure access to additional pheasant release sites.
b. Evaluate need for even/odd regulation at additional release sites.
c. Coordinate with western Washington pheasant program volunteers to develop crowd reduction recommendations.

*Issue Statement:* Returned pheasant harvest permits have been used to help allocate pheasants to the different release sites, however, a very low number of these permits are returned every year making accurate allocation difficult.

*Objective 145:* Develop a more effective method to appropriately allocate pheasants to pheasant release sites by September 2003.

*Alternative Strategies:*
a. Require hunters to identify their primary hunting site when purchasing a permit.
b. Survey hunters at release sites.
c. Conduct a telephone survey of registered western Washington pheasant hunters.

**Enforcement**

*Issue Statement:* Protecting the resource from illegal exploitation and working together with landowners is important.

*Objective 146:* Concentrate efforts on reducing illegal harvest, public education, and emphasizing landowner relations on a yearly basis.

*Alternative Strategies:*
a. Maintain a field presence in areas of high hunter density.
b. Work with landowners to address their concerns/needs.

## VI. LITERATURE CITED

Flaherty, D.C. 1979. Phasianus c. and the Farmer. State of Washington Water Research Center Publication. 17pp.

Offerdahl, S.D. and A.J. Fivizzani. 1987. The Development of Thermoregulation in Gray Partridge Chicks. In Proceedings of Perdix IV: Gray Partridge Workshop. 155pp.

## SMALL GAME, FURBEARERS, AND UNCLASSIFIED SPECIES

## I. CLASSIFICATION

In Washington, there are approximately 31 mid-to-small sized mammals or mammal groups that can be hunted or trapped for recreational purposes (Table 1). Of these, 6 species are classified as game species (including 3 cross-classified as furbearers) and can be hunted (RCW 77.12.020; WAC 232-12-007). Eleven of the 31 species or groups are classified as furbearers (indicating that their hide has a commercial value in the fur industry). These 11 species can be trapped but not hunted unless seasons have been established (i.e., 3 species cross-classified as game species). The remaining species or species groups are "unclassified", and can be trapped or hunted year-around.

Table 1. Mid-to-small sized mammals that can be hunted or trapped in Washington.

| Species | Genus species | Classification | Trapped | Hunted |
|---|---|---|---|---|
| Bullfrog | *Rana catesbeiana* | Game animal | | X |
| Cottontail rabbits | *Sylvilagus spp.* | Game animal | | X |
| Snowshoe hare | *Lepus americanus* | Game animal | | X |
| Bobcat | *Lynx rufus* | Game animal & furbearer | X | X |
| Raccoon | *Procyon lotor* | Game animal & furbearer | X | X |
| Red fox | *Vulpes vulpes* | Game animal & furbearer | X | X |
| American beaver | *Castor Canadensis* | Furbearer | X | |
| Badger | *Taxidea taxus* | Furbearer | X | |
| Ermine | *Mustela erminea* | Furbearer | X | |
| Long-tailed weasel | *Mustela frenata* | Furbearer | X | |
| Marten | *Martes Americana* | Furbearer | X | |
| Mink | *Mustela vison* | Furbearer | X | |
| Mountain beaver | *Aplodontia rufa* | Furbearer | X | |
| Muskrat | *Ondatra zibethicus* | Furbearer | X | |
| River otter | *Lutra canadensis* | Furbearer | X | |
| Coyote | *Canis latrans* | Unclassified | X | X |
| European rabbit | *Oryctolagus* | Unclassified | X | X |
| Gophers | *Thomomys spp.* | Unclassified | X | X |
| Gray and fox squirrels [a] | *Sciurus spp.* | Unclassified | X | X |
| Ground squirrels [b] | *Sperophilus spp.* | Unclassified | X | X |
| Mice | *Mus, Onychomys, Reithrodontomys, Peromyscus, Perognathus, Zapus spp.* | Unclassified | X | X |
| Moles | *Scapanus spp.* | Unclassified | X | X |
| Nutria | *Myocastor coypus* | Unclassified | X | X |
| Virginia opossum | *Didelphis virginiana* | Unclassified | X | X |
| Porcupine | *Erethizon dorsatum* | Unclassified | X | X |
| Rats | *Dipodomys, Neotoma, Rattus spp.* | Unclassified | X | X |
| Shrews | *Sorex, Neurotrichus spp.* | Unclassified | X | X |
| Spotted skunk | *Spilogale gracilis* | Unclassified | X | X |
| Striped skunk | *Mephitis mephitis* | Unclassified | X | X |
| Voles | *Clethrionomys, Lemmiscus, Micotus, Phenacomys spp.* | Unclassified | X | X |
| Yellow-bellied marmot | *Marmota flaviventris* | Unclassified | X | X |

[a] Except western gray squirrels (*S. griseus*) are protected and cannot be hunted or trapped.

[b] Except golden-mantled ground squirrels (*S. saturatus* and *S. lateralis*) and Washington ground squirrels (*S. washingtoni*) are protected and cannot be hunted or trapped.

## II. POPULATION STATUS AND TREND

The abundance of individual small game animals, furbearers, and unclassified wildlife is largely unknown. However, because these animals typically have high population growth rates and often experience compensatory mortality, the risk of over-exploitation is low. Nonetheless, because biological data on individual species populations are limited, harvest levels are generally managed at conservative levels.

## III. RECREATIONAL OPPORTUNITY

A combination of hunting and trapping seasons are provided for small game and furbearing animals, respectively. Hunting seasons for small game animals typically extend from late fall to early spring of the following year. Combining all species, an average of 7,038 hunters harvest 18,436 small game animals per year, which averages about 1–6 harvested animals per hunter (Table 2). The majority of the harvest is cottontail rabbits (64%), followed by raccoons (20%), snowshoe hares (13%), and bobcats (3%).

Trapping season for furbearers are generally through the winter months. Combining all species, an average of 475 trappers take 14,207 furbearers annually (Table 3). The majority of the take is muskrat (44%) and beaver (37%), followed by raccoon (6%), river otter (6%), mink (4%), and bobcat (2%); other species represent less than 1% of the total trapping harvest.

Unclassified wildlife can be hunted or trapped year-around and no bag limits are set. Harvest pressure is low for the majority of these animals, as there is little to no documented harvest for 12 of the 16 species or groups. Those that are harvested or trapped are usually associated human-wildlife conflict and lethal take is a mitigating tool for nuisance or damage activities.

Table 2. Harvest trends for small game mammals, 1991-2000, Washington.

| Species | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|
| Cottontail rabbit | | | | | | | | | | |
| Harvest | 15,528 | 17,706 | 12,574 | 14,944 | 13,619 | 12,704 | 7,304 | 8,203 | 7,065 | 7,203 |
| Hunters | 5,954 | 6,354 | 4,411 | 5,101 | 4,883 | 5,178 | 3,502 | 2,809 | 2,409 | 3,485 |
| Snowshoe hare | | | | | | | | | | |
| Harvest | 2,017 | 4,488 | 3,793 | 3,110 | 2,826 | 2,533 | 1,042 | 1,463 | 483 | 2,398 |
| Hunters | 1,744 | 2,207 | 2,013 | 1,638 | 1,948 | 1,405 | 1,113 | 991 | 729 | 1,270 |
| Raccoon | | | | | | | | | | |
| Harvest | 3,418 | 3,792 | 3,843 | 8,329 | 4,632 | 4,985 | 1,759 | 1,838 | 2,776 | 2,008 |
| Hunters | 1,255 | 1,261 | 1,076 | 1,787 | 1,551 | 1,408 | 484 | 794 | 504 | 1,117 |
| Bobcat | | | | | | | | | | |
| Harvest | 675 | 1,026 | 661 | 565 | 1,074 | 1,227 | 152 | 140 | 253 | 206 |

Table 3. Trapping trends for furbearers and unclassified wildlife, 1991-2000, Washington.

| Species | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|
| Furbearers | | | | | | | | | | |
| Bobcat | 218 | 257 | 245 | 262 | 485 | 691 | 365 | 180 | 296 | 59 |
| Raccoon | 1,172 | 833 | 950 | 1,105 | 810 | 1,273 | 1,307 | 832 | 571 | 250 |
| Red fox | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Badger | 30 | 20 | 17 | 40 | 6 | 11 | 14 | 2 | 13 | 7 |
| Beaver | 5,036 | 3,785 | 5,968 | 7,347 | 5,163 | 7,456 | 8,116 | 4,558 | 4,819 | 642 |
| Mink | 732 | 624 | 640 | 720 | 375 | 596 | 607 | 424 | 462 | 101 |
| Marten | 246 | 140 | 67 | 176 | 52 | 74 | 80 | 14 | 140 | 18 |
| Muskrat | 9,275 | 4,420 | 6,005 | 6,056 | 5,335 | 11,028 | 10,924 | 4,117 | 3,572 | 1,159 |
| River otter | 482 | 597 | 564 | 798 | 1,368 | 2,070 | 772 | 656 | 727 | 83 |
| Weasels | 66 | 78 | 2 | 78 | 49 | 49 | 49 | 47 | 87 | 44 |
| Unclassified wildlife | | | | | | | | | | |
| Coyote | 1,875 | 1,610 | 2,341 | 2,288 | 1,770 | 1,864 | 1,606 | 922 | 838 | 503 |
| Nutria | 0 | 0 | 289 | 365 | 320 | 923 | 1,116 | 486 | 712 | 267 |
| Skunks | 0 | 0 | 146 | 204 | 79 | 225 | 127 | 164 | 175 | 16 |
| Number of Trappers | 492 | 445 | 435 | 537 | 451 | 562 | 601 | 488 | 473 | 261 |

## VI. DATA COLLECTION

There are no formal population surveys for small game mammals, furbearers, or unclassified wildlife. Rather, WDFW examines trends in total harvest and catch-per-unit-effort, which are collected annually using a hunter questionnaire or mandatory "Trapper's report of catch" form.

Data are also collected when any of these species are in conflict with humans. For bona fide human-wildlife conflicts, the species, location, number of animals, sex and age information, and fate of the animals are record. These data are used to help assess trends in wildlife populations and identify species distributions at the local scale.

## V. SMALL GAME, FURBEARERS, AND UNCLASSIFIED WILDLIFE MANAGEMENT GOALS

The statewide goals for small game mammals, furbearers, and unclassified wildlife are:

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

## VI. ISSUE STATEMENTS, OBJECTIVES, AND ALTERNATIVE STRATEGIES

### Population Management

*Issue Statement*: There is little documentation on the known distribution and relative densities of individual small game and furbearer species in Washington.

*Objective 147*: Revise the distribution map for all small game and furbearer species by 2008.

*Alternative Strategies:*
a. Revise the distribution maps using Priority Habitats and Species (PHS) protocols.
b. Revise the distribution maps from harvest and trapping data, sightings, and regional biologist interpretations.
c. Revise the distribution maps from survey and ground truthing activities.

*Issue Statement:* Managers typically define and organize species populations by geographical units (e.g., Game Management Units). Management prescriptions are then applied according to the status of the population within each unit. This approach helps distribute sustainable populations evenly across the species range.

Currently, furbearers are managed at a relatively large geographical scale; that is, eastern and western Washington. Because of this, the densities of individual furbearer species probably fluctuate widely, making local management of nuisance activity and sustainability problematic.

*Objective 148:* Develop furbearer management units by 2005.

*Alternative Strategies:*
a. Maintain current management units (eastern and western Washington) for furbearer species.
b. Develop furbearer management units based on species biology and populations dynamics.
c. Develop furbearer management units based on nuisance activity.

*Issue Statement:* Accurate information on the status of furbearer populations is absent; as a result harvest levels are conservative. A more rigorous method of assessing animal populations is needed in order to maximize recreational opportunities and suppress nuisance problems.

*Objective 149:* Develop quantitative protocols for assessing the population status of small game and furbearing species by 2005.

*Alternative Strategies:*
a. Develop quantitative methods for assessing population status from harvest data (e.g., catch-per-unit-effort, population modeling).
b. Develop quantitative methods for assessing population status from survey data; the appropriate survey also would be developed and implemented.
c. Improve the precision of current harvest estimates.
d. Develop management criteria that address damage and nuisance problems on private property while ensuring long-term sustainability of populations on public lands.

**Recreation Management**

*Issue Statement:* Information on the status of individual populations is necessary to accurately prescribe a harvest level that is compatible with maintaining sustainable and healthy populations. In the absence of such information, managers typically set conservative harvest levels, thereby

minimizing the potential for over-exploitation (see page 2).

*Objective 150:* Until *Objective 3* is completed, use at least two methods to assess the impacts of harvest on populations, and then set harvest levels based on the more conservative method.

*Alternative Strategies:*
a. Assess harvest impacts from three-year trends in total harvest, catch-per-unit-effort, or nuisance activity.
b. Assess harvest impacts using population modeling (e.g., population viability analysis, sensitivity analysis).
c. Assess harvest impacts using survey data, research findings, or other biological information.

*Issue Statement:* Currently, there is no harvest reporting mechanism for unclassified wildlife, except those that are reported as non-target or nuisance captures on trapper's report of catch forms. Moreover, the trappers report of catch for is problematic in terms of ease of reporting and data utility.

*Objective 151:* Develop a web based reporting system for furbearers and unclassified wildlife.

*Alternative Strategies:*
a. Provide web reporting in addition to mail-in version of trapper's report of catch forms.
b. Provide web reporting only and discontinue the mail-in version of trapper's report of catch forms.
c. Develop web-reporting system in collaboration with Washington Trappers Association.

**Nuisance management**

*Issue Statement:* In the last two years, approximately 26% of Washingtonians have experienced problems with wild animals or birds. Of these, over half the problems were associated with small game mammals, furbearers, and unclassified wildlife (Duda, unpublished data). This accounts for nearly 425,000 human-wildlife interactions annually.

*Objective 152:* Minimize negative human-wildlife interactions so that the "number of interactions per capita" is constant or declining.

*Alternative Strategies:*
a. Develop limited hunting seasons for appropriate furbearer species.
b. Simplify special trapping permits via Enforcement Program to resolve damage caused by furbearers.
c. Increase recreational harvest (trapping and hunting) in areas prone to furbearer complaints.
d. Develop educational package with tips on how to avoid furbearer damage and nuisance activity.
e. Develop educational partnerships for informing the public on how to avoid furbearer damage and nuisance activity.
f. Develop contracts with private wildlife control specialists for managing individual furbearer species involved in damage and nuisance activities.

**Public Education**

*Issue Statement:* Hunters may misidentify game species of rabbit or unclassified wildlife with a protected, non-game species or furbearers.

*Objective 153:* Develop 2 publications that describe the differences between game and non-game or furbearer species that may be easily mistaken.

*Alternative Strategies:*
a. Develop publications, in conjunction with WDFW diversity staff, describing the differences similar game and non-game species, including ground squirrels and western gray squirrels.
b. Develop simple identification materials for use in hunting pamphlets.

*Issue Statement:* Washington State is home to approximately five million people and one-half million furbearers. Both people and furbearers exert pressures on one another (such as encroachment and habitat modification) and these pressures will likely increase in future years. Therefore, it's important the public understands the role of habitat for both conserving furbearer species and minimizing human-furbearer conflicts.

*Objective 154:* Provide educational information on furbearer habitat that reaches 100,000 people annually.

*Alternative Strategies:*
a. Develop a website describing proper habitat management for maintaining furbearer populations while at the same time minimizing human-furbearer conflicts.
b. Develop a viewing opportunity demonstrating proper habitat management for maintaining furbearer populations while at the same time minimizing human-furbearer conflicts.
c. Develop a brochure describing proper habitat management for maintaining furbearer populations while at the same time minimizing human-furbearer conflicts.

**APPENDIX A**

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**RCW 77.04.012**

**Mandate of department and commission.**
Wildlife, fish, and shellfish are the property of the state. The commission, director, and the department shall preserve, protect, perpetuate, and manage the wildlife and food fish, game fish, and shellfish in state waters and offshore waters.

The department shall conserve the wildlife and food fish, game fish, and shellfish resources in a manner that does not impair the resource. In a manner consistent with this goal, the department shall seek to maintain the economic well-being and stability of the fishing industry in the state. The department shall promote orderly fisheries and shall enhance and improve recreational and commercial fishing in this state.

The commission may authorize the taking of wildlife, food fish, game fish, and shellfish only at times or places, or in manners or quantities, as in the judgment of the commission does not impair the supply of these resources.

The commission shall attempt to maximize the public recreational game fishing and hunting opportunities of all citizens, including juvenile, disabled, and senior citizens.

Recognizing that the management of our state wildlife, food fish, game fish, and shellfish resources depends heavily on the assistance of volunteers, the department shall work cooperatively with volunteer groups and individuals to achieve the goals of this title to the greatest extent possible.

Nothing in this title shall be construed to infringe on the right of a private property owner to control the owner's private property.

[2000 c 107 § 2; 1983 1st ex.s. c 46 § 5; 1975 1st ex.s. c 183 § 1; 1949 c 112 § 3, part; Rem. Supp. 1949 § 5780-201, part. Formerly RCW 75.08.012, 43.25.020.]

**APPENDIX B**

Resident Hunting License, Deer and Elk Tag Fee Changes Since 1901

| Year | State Hunt & Fish | State Hunt | County Hunt & Fish | Deer Tag | Elk Tag |
|---|---|---|---|---|---|
| 1901 | NA* | NA | $1,00 | | $20 additional for killing a male elk |
| 1905 | NA | **$5.00** | $1,00 | NA | NA |
| 1913 | **$5.00** | NA | $1.00 | NA | NA |
| 1921 | **$7.50** | NA | **$1.50** | NA | NA |
| 1929 | $7.50 | NA | $1.50 | NA | **$5.00**** |
| 1933 | **$3.00** | NA | $1.50 | NA | $5.00 |
| 1948 | **$5.00** | NA | **$2.50** | NA | $5.00 |
| 1953 | $5.00 | NA | $2.50 | **$1.00** | **$5.50** |
| 1954 | **$7.00** | **$4.00** | **$3.00** | $1.00 | $5.50 |
| 1956 | $7.00 | $4.00 | **$3.50** | $1.00 | $5.50 |
| 1957 | $7.00 | $4.00 | $3.50 | $1.00 | **$7.50** |
| 1958 | **$8.00** | **$4.50** | **$4.25** | **$2.00** | $7.50 |
| 1966 | **$9.00** | **$5.50** | **$5.25** | $2.00 | $7.50 |
| 1971 | **$12.00** | **$6.50** | **$8.00** | **$3.00** | **$10.00** |
| 1975 | $12.00 | $6.50 | $8.00 | **$5.00** | $**11.00** |
| 1976 | **$14.00** | **$7.50** | **$9.00** | $5.00 | $11.00 |
| 1981 | $14.00 | $7.50 | $9.00 | **$10.00** | **$15**.00 |
| 1982 | **$20.00** | **$10.50** | **NA** | $10.00 | $15.00 |
| 1985 | **$24.00** | **$12.00** | NA | **$15.00** | **$20.00** |
| 1992 | **$29.00** | **$15.00** | NA | $15.00 | $20.00 |
| 1999 | **NA** | **NA** | NA | **$36 deer only. $28 with elk.** | **$36 elk only. $28 with deer.** |

* Not Applicable

** Bold Indicates change from previous year.

## APPENDIX C

Summary of 1999 Public land ownership and use (acres) in Washington State.

| Landowner/ Agency | Outdoor Recreation, Habitat, Environmental Protection. | Resource Production and Extraction | Transportation and Utilities Infrastructure | Other Government Services and Facilities | Unknown Upland Uses | Total Upland Acres | Total Aquatic Acres | Grand Total |
|---|---|---|---|---|---|---|---|---|
| Federal | | | | | | | | |
| US Forest Service | 6,887,490 | 2,115,089 | 82,703 | 531 | 18,560 | 9,104,373 | 85,045 | 9,189,418 |
| National Park Ser. | 1,831,274 | | 9 | | | 1,831,283 | 0 | 1,831,283 |
| B. of Reclamation | | | 468,808 | | | 468,808 | 11,341 | 480,149 |
| US Army | | | | 404,313 | | 404,313 | 0 | 404,313 |
| Bureau of Land Mgt. | 74,154 | 318,429 | | | | 392,583 | 3,346 | 395,929 |
| US Dept. Energy | 162,879 | | 1,094 | 198,723 | | 362,696 | 916 | 363,612 |
| Corp of Engineers | 1,098 | | 84,916 | 4 | | 86,018 | 5,764 | 91,782 |
| All Other Federal | 186,567 | 2,032 | 9,798 | 36,787 | 162 | 235,345 | 1,905 | 237,250 |
| Federal Total | 9,143,462 | 2435,550 | 647,328 | 640,358 | 18,722 | 12,885,421 | 108,317 | 12,993,738 |
| State | | | | | | | | |
| Natural Resources | 82,474 | 2,830,167 | 18,211 | 3,523 | 40,762 | 2,975,136 | 2,407,000 | 5,382,136 |
| Fish and Wildlife | 456,289 | 4,677 | 8 | 62 | | 461,036 | 540 | 461,576 |
| Transportation | | | 150,561 | 1,903 | | 152,464 | 0 | 152,464 |
| Parks | 107,608 | | | 11 | | 107,619 | 0 | 107,619 |
| All Other State | 2,127 | 1,850 | 70 | 29,307 | 5 | 33,359 | 11,689 | 45,048 |
| State Total | 648,498 | 2,836,694 | 168,850 | 34,806 | 40,767 | 3,729,614 | 2,419,229 | 6,148,843 |
| Local | | | | | | | | |
| Counties | 46,930 | 45,596 | 90,683 | 14,278 | 15,581 | 213,068 | 4,054 | 217,122 |
| Cities/towns | 167,044 | 14,981 | 119,897 | 12,049 | 2,691 | 316,661 | 3,189 | 319,850 |
| Port Districts | 4,032 | 2,836 | 18,170 | 16,779 | 176 | 41,993 | 3,849 | 45,841 |
| All Other Local | 19,033 | 2,491 | 14,185 | 24,153 | 781 | 60,643 | 15,489 | 76,132 |
| Local Total | 237,038 | 65,903 | 242,935 | 67,259 | 19,229 | 632,365 | 26,580 | 658,945 |
| Total Public | 10,028,998 | 5,338,147 | 1,059,113 | 742,424 | 78,718 | 17,247,400 | 2,554,126 | 19,801,526 |
| Tribal | 47,358 | 205,980 | 1,502 | 10,415 | 2,412,026 | 2,677,281 | | 2,677,281 |
| | | | | | | | | |
| Total Public/Tribal | 10,076,356 | 5,544,127 | 1,060,615 | 752,839 | 2,490,744 | 19,924,681 | 2,554,126 | 22,478,807 |
| Total Private Lands | | | | | | | | 20,821,193 |