Washington Department of Fish and Wildlife

Game Management Plan

July 2009 - June 2015

Washington Department of FISH and WILDLIFE

2009-2015 GAME MANAGEMENT PLAN

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Washington Department of Fish and Wildlife
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This Program Receives Federal Aid in Wildlife Restoration, Project W-96-R, Game Surveys.

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EXECUTIVE SUMMARY

This Game Management Plan (GMP) will guide the Washington Department of Fish and Wildlife's management of hunted wildlife for the next six years. The focus is on the scientific management of game populations, harvest management, and other significant factors affecting game populations.

As mandated by the Washington State Legislature (RCW 77.04.012), "… the department shall preserve, protect, perpetuate, and manage the wildlife…"; "the department shall conserve the wildlife… in a manner that does not impair the resource…"; and "The commission shall attempt to maximize the public recreational… hunting opportunities of all citizens, including juvenile, disabled, and senior citizens." It is this mandate that sets the overall policy and direction for managing hunted wildlife. Hunters and hunting will continue to play a significant role in the conservation and management of Washington's wildlife.

An Environmental Impact Statement (EIS) was completed on November 27, 2002, after public review of draft and supplemental EIS documents. The Washington Fish and Wildlife Commission formally adopted the Game Management Plan on December 7, 2002. This comprehensive process facilitated public discussion and understanding, while cooperatively developing the priority strategies.

This purpose of this Supplemental EIS is to update the plan for 2009-15. The Environmental Impacts Chapter (Chapter 2) from the original EIS is not included in this document, as no changes were made to that section. Several of the original strategies and objectives have been accomplished; additional studies and research have been conducted; and some priorities have changed. Those are the changes that have been addressed in this SEIS. Public outreach earlier this year helped shape the priority issues, objectives, and strategies identified in the SEIS.

The overall goals are to protect, sustain, and manage hunted wildlife, provide stable, regulated recreational hunting opportunity to all citizens, protect and enhance wildlife habitat, and minimize adverse impacts to residents, other wildlife, and the environment.

With all of these issues, it is understood that the implementation of strategies are conditioned first on meeting game population objectives. Science is the core of wildlife management, supporting WDFW's Legislative mandate to preserve, protect, and perpetuate wildlife populations while maximizing recreation.

Science and the professional judgment of biologists is the foundation for all objectives and strategies identified in this plan. 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 significant 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 perpetuation of these species over the long term.

CHAPTER 1

Introduction

The mission of the Washington Department of Fish and Wildlife (WDFW) 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.

The purpose of the Game Management Plan is to assess current issues for hunted wildlife and outline strategies to help WDFW prepare for the future. The emphasis in this plan is the scientific management of hunted species populations, harvest management (hunting), and other significant factors affecting game populations. The plan is dynamic, and is designed to facilitate resolution of emergent issues and allow adjustment of priorities when issues are resolved. The issues and options in the plan are based on current management information. As new information becomes available, options may be modified or new ones developed.

The plan identifies priorities for hunted wildlife and keeps the Department focused, directed, and accountable. The plan will guide the development of the three-year hunting season packages for 2009-11 and 2012-14. In addition, the plan will direct the development of WDFW Game Division work plans and budget proposals. Implementation will begin July 2009 and continue through June 2015.

The overall goals of the plan are to protect, sustain, and manage hunted wildlife, provide stable, regulated recreational hunting opportunity to all citizens, to protect and enhance wildlife habitat, and to minimize adverse impacts to residents, other wildlife, and the environment.

Public Involvement

Active public involvement is important for successful planning. In May 2001, WDFW asked the public to identify the key game management issues that need to be addressed in the next five to ten years. This was done using a series of questionnaires and by providing a page on the agency website. Over 2,500 responses were received. Based on the issues identified during this process, WDFW hired a consulting firm to conduct a telephone survey of both the hunting public and the general public. This was used to get a more scientific sampling of the public. Responsive Management conducted the surveys using randomly selected telephone numbers with a sample of over 800 citizens for the general public survey and over 700 hunters for the hunter survey. References to public opinion based on this survey are made throughout this plan. To further refine the issues, WDFW consulted with the Game Management Advisory Council, the Wildlife Diversity Advisory Council, and members of the Fish and Wildlife Commission. The advisory councils include a cross section of interested citizens who provide feedback and advice to WDFW on a variety of topics. The information from the surveys, polls, and consultations identified the issues addressed in this plan. Finally, WDFW followed the Environmental Impact

Statement process (EIS) 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

The first public release of the Draft Environmental Impact Statement (DEIS) for the Game Management Plan (GMP) was on July 26, 2002. After an extension, the deadline for public comment was September 10, 2002. Comments were received from over 77 groups and individuals. Extensive public comments resulted in significant re-writing and re-formatting of the EIS and GMP. Key changes included the EIS formatting, modification of elk and cougar issues, objectives and strategies, and consideration of the impacts of hunting on non-target wildlife species.

A Supplemental EIS (SEIS) was released on October 18, 2002, with a public comment deadline of November 18, 2002. During this comment period, a scientific peer review of the cougar management section of the plan was also solicited by WDFW.

The process of developing a non-project EIS allowed WDFW to use an iterative process, with releases of a Draft and a Supplemental EIS to take comments and add, modify, or delete strategies. This iterative process was used instead of the more traditional use of preferred and alternative strategies. Essentially the number of alternative strategies was not limited and the preferred strategies were developed in concert with the public through a long scoping and development process and multiple comment periods.

The current process (2008) of developing a Supplemental EIS has included a public scoping period, discussions with the Game Management Advisory Council, and the current comment period for the draft of this supplemental EIS. Hundreds of comments have been received to help shape the amended issues, objectives, and strategies to be implemented in the 2009-15 Game Management Plan.

A few new issues or emphasis areas have also surfaced including:

- Improved communication
- Urban hunting management
- Wolf management impacts

Commission And Department Authorities

The establishment of hunting seasons and management of game species is 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. 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 guide game management.

The Washington Fish and Wildlife Commission and Department of Fish and Wildlife are responsible for the management and protection of fish and wildlife resources in Washington State. The Legislative mandate (RCW 77.04.012) for the Commission and the Department includes the following for wildlife:

- The commission, director, and the department shall preserve, protect, perpetuate, and manage the wildlife…
- The department shall conserve the wildlife resources in a manner that does not impair the resource. The commission may authorize the taking of wildlife 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 hunting opportunities of all citizens, including juvenile, disabled, and senior citizens (see Title 77 Revised Code of Washington).

In addition, various policies and procedures guided the Commission and Department in developing the plan. In particular, the Washington Department of Fish and Wildlife Hunting Season Guideline (August 1999) provided further guidance for this plan:

"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 requirements 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 the 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, Master Hunter program graduates, youth, and hunters 65 and older rather than special permit hunts. Master Hunter 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."*

Implementing the Legislative mandate and Commission guidelines for game species requires knowledge of game population trends and impacts of hunting regulations, development and management of hunting seasons and actions that support (maximizing) public hunting recreation, and conservation of wildlife resources. The Fish and Wildlife Commission adopts major hunting seasons every three years. Minor adjustments are made annually such as modifying permit levels or addressing crop damage or nuisance problems. Migratory waterfowl seasons are adjusted annually in coordination with the U.S. Fish and Wildlife Service and the Pacific Flyway Council.

The process for developing hunting seasons typically includes:

1. Determine the status of game populations and impacts of previous harvest strategies.
2. Preliminary discussion of ideas with the tribes, the public, state and federal agencies, and WDFW staff.

3. Development of season and regulation alternatives.
4. A formal drafting of regulations and establishment of a public comment period in compliance with the Administrative Procedures Act.
5. Development of final recommendations by WDFW staff.
6. Adoption of regulations by the Fish and Wildlife Commission.

The process of establishing hunting seasons, bag limits, and geographical areas where hunting is permitted is exempt from State Environmental Policy Act (SEPA) rules through WAC 197-11-840. In addition, feeding of game, issuing licenses, permits, and tags, routine release of wildlife or re-introductions of native wildlife are also listed as exemptions from SEPA rules. However, policy development, planning, and all other game management actions are not considered exempt from SEPA rules.

Background And Setting

Native Americans

Native Americans have inhabited the State of Washington for at least 9,000 years. The Cascade mountain range splits Washington State into two very distinct environments: the dry conditions of the east and the much wetter, rain forest areas of the west. Native Americans adapted to these different conditions and evolved into two distinct patterns. The Pacific coastal Indians inhabited a land of plenty with an abundance of fish, shellfish, roots, berries, and game. 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 (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 assimilation of Native Americans into non-Indian society. The treaties established a number of reservations for the Indian people, and in exchange the tribes ceded much of their territory to the U.S. government. The treaties and associated tribes are shown in Table 1.

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
Treaty of Point No Point	Jamestown S'Klallam, Port Gamble S'Klallam, Lower Elwha, Skokomish	Point No Point, Suquamish Head Jan. 26, 1855
Treaty of Point Elliott	Lummi, Nooksack, Stillaguamish, Swinomish, Upper Skagit, Suquamish, Sauk Suiattle, Tulalip, and Muckleshoot	Point Elliott January 22, 1855
Treaty with the Nez Perces	Nez Perce	Camp Stevens, Walla Walla Valley June 11, 1855
Treaty of Neah Bay	Makah	Neah Bay January 31, 1855
Treaty of Medicine Creek	Nisqually, Puyallup, Squaxin Island, Muckleshoot	Medicine Creek December 26, 1854

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..."*

Washington State courts have interpreted this treaty language to mean that treaty tribes can hunt within the boundaries of the area ceded to the federal government by their treaty, or in areas traditionally "used for hunting and occupied over an extended period of time," on open and unclaimed lands that have not been put to a use that is inconsistent with hunting. In conjunction with such hunting, tribes are responsible for the management of their own hunters and hunting activities.

Not all of the tribes signed treaties with the government. Several of these tribes have reservations designated by federal executive order. These include the tribes of the Colville, Spokane, and Kalispel reservations in eastern Washington, and the Chehalis and Shoalwater reservations in western Washington. Tribal hunting rights for these tribes are typically limited to areas on the reservation, or in the case of the Colville tribe to areas that were formerly part of the reservation. There are additional tribal groups that are recognized by the federal government, but have no specific reservation or tribal hunting rights.

Since tribal and non-tribal hunters impact the wildlife resource over much of the state, it is 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

different traditions and cultural heritages (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.

European Settlement

During the early European settlement of North America, hunting was primarily a subsistence activity (Organ and Fritzell 2000). The same was true for the early immigrants to the Washington Territory. 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. Conflicts between market hunters and sport hunters began to occur by the mid 1800s and nationally some influential sportsmen's organizations were formed (Trefethen 1975). During the 19th century, hunting changed from mostly a subsistence activity to a commercial one, and then to the beginnings of a recreational 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).

By the late 1800s, there was a new movement of sportsmen and other conservation minded people. Theodore Roosevelt led a social movement that pressed for an end to commercial traffic in wildlife and for government oversight of wildlife conservation (Reiger 1975, Warren 1997). Roosevelt introduced a new thought, "conservation through wise use" (Madson and Kozicky 1971). It was also the foresight of President Roosevelt that was responsible for the establishment of the U.S. Forest Reserves (Service) and the creation 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 and recognized the need for scientific facts concerning game species management. The committee 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 significant were, 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.

As the population of Washington increased, laws were enacted to protect the wildlife resources. The Legislative Assembly of the Territory of Washington enacted the first laws concerning wild animals within the territory in 1863. The first game species law allowed 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 allowing counties to issues licenses with a fee of $1.00 for residents and $10.00 for non-residents. 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. This required all hunting license fees be dedicated to use by the state game department. The enabling legislation was passed by Washington State Legislature and signed into law in 1939. This was the beginning of modern wildlife management.

The Natural Environment

Washington has a rich diversity of 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 are forested, 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, and 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 (Access Washington 2002).

In the Columbia Basin, the native vegetation is drastically different from the forested lands of the state, due to the dryer and hotter climate of the region. The pristine vegetation consisted of shrubs and grass (shrub steppe). With the introduction of agriculture and livestock grazing in the mid-1800s 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. Other lands are continuing to be converted to the growing of agricultural crops or converted to urban uses (Access Washington 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 (Access Washington 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.

Between 1950 and 1960 60% of Washington's human population resided in incorporated areas. In 1990, only 52% live in incorporated areas (Access Washington 2002). This movement of people into rural and formerly undeveloped lands had significant impacts on wildlife habitat and abundance.

Washington has the second largest human population of the western contiguous states, but is the smallest in size. In 2007, the population was estimated at 6,488,000 compared to 5,974,900 in 2001 making it the 13th most populous state in the union. The long-term outlook in human population for the state of Washington is continued growth, with ever increasing impacts 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, Bellevue, and Everett are all over 100,000 in population.

Industry

Before 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 (Access Washington 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; potatoes, fruit, vegetables, and small grains such as wheat and barley, 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% 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 2002 have been substantial (Table 2), (DNR 2006). The changes in forestry practices are necessary for the survival of many species that require older, larger trees. However there may be serious impacts to the future amount and quality of deer and elk forage and population numbers over the long term.

Table 2. Timber harvest changes in Washington between 1989 and 2002

Ownership	1989 harvest [a]	2002 harvest [a]	Percent Decrease
Private	4,027,278	3,000,342	-25.5
Public	1,929,039	581,728	-69.9
Total	5,956,317	3,582,070	-40.0

[a] in thousand board feet

Land Use and Ownership

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 C, (Interagency Committee for Outdoor Recreation 2001).

Public lands make up about 52% of the state. The U.S. Forest Service, representing about 41% of public lands, manages the greatest amount of public land. The total of all federal ownership in Washington represents about 58% of public lands. State lands represent about 27% of public lands. 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 in 1953 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.

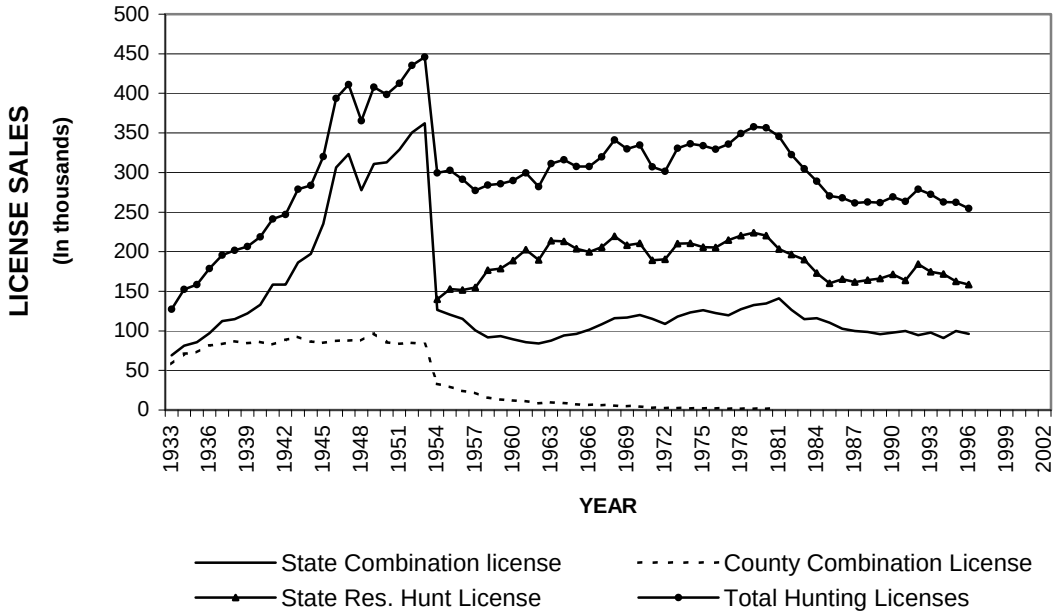


Figure 1. Washington hunting license sales and numbers, 1933-1997.

In 1954, a separate resident hunting license was introduced 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. Since 1989 there has been no clear trend in hunter numbers, however the state's human population has increased significantly.

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 2002b). Washington hunters are mostly older than 45 and male dominated (93%). Waterfowl and furbearer hunter groups were almost exclusively males (Duda 2002b). In comparing a demographic study of Washington hunters (Johnson 1973) 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

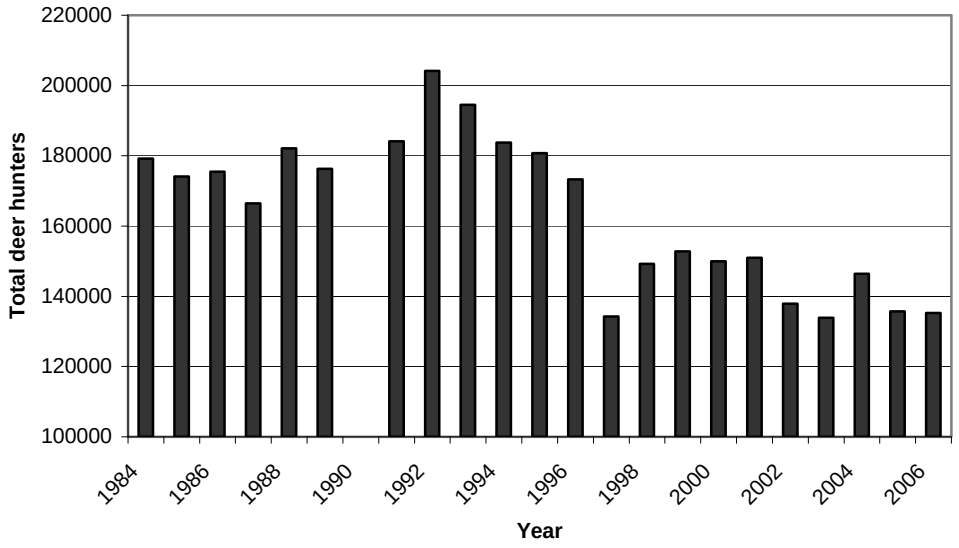


Figure 2. Washington deer hunting participation, 1984-2006.

less than 29 years of age compared to 2002 data where age of respondents were predominantly over 35 years of age.

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 use of modern firearms to primitive archery equipment and black powder muzzle loading rifles to take advantage of less-crowded hunting conditions. 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 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 represent the majority of active hunters. Archery deer hunter numbers increased for the first 5 years and then stabilized. The number of muzzleloader deer hunters has shown a more protracted incline but appear to have stabilized, representing about 5% 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 hunters represented 88% of all elk hunters, archery hunters 9.5%,

and muzzleloader hunters 2.4%. In 1998, the modern firearm hunter represented just 68% 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% respectively (Johnson 1999).

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

Resource allocation continues to be a contentious issue with hunters. A few of the more hotly contested issues include:

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?
5. How should quality opportunity be addressed?

Hunter Education/Safety Training

Hunter education programs are in place in all 50 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 before purchasing a hunting license.

The former 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. Since 1996, nearly 150,000 people have enrolled in a hunter education course.

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) without permission from the landowner for the purpose of hunting grouse during the open season. 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.

WDFW has placed considerable emphasis over the years on obtaining access to lands for the enjoyment of hunting. Currently there are several programs promoting hunter access. The WDFW Private Lands Program 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 "feel free to hunt" or "hunt by written permission." There are over 1 million acres and over 600 landowners in Washington under cooperative agreement.

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 and wildlife habitat enhancements may be driven by incentives, rationale, or regulations outside of the PLWMA program.

There are many benefits for market-based (economically beneficial) programs on private lands for both the public and the private landowner. The major benefits 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 the concern for loss of control by state agencies, potential for over-harvest of the wildlife resource, and a potential for forced decline in hunter participation rates because of escalating costs (Duda et al. 1998).

A survey of Washington hunters was conducted (Duda 2002b) 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.

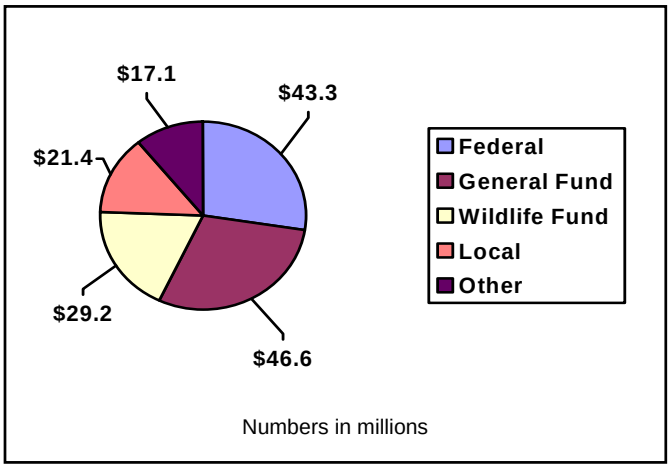
In 2006, the Fish and Wildlife Commission revised the state policy for the private lands program. As part of the revision, the PLWMA program was terminated and the Landowner Hunting Permit program (LHP) was developed. The major change included the provision of public hunting benefits.

Economics

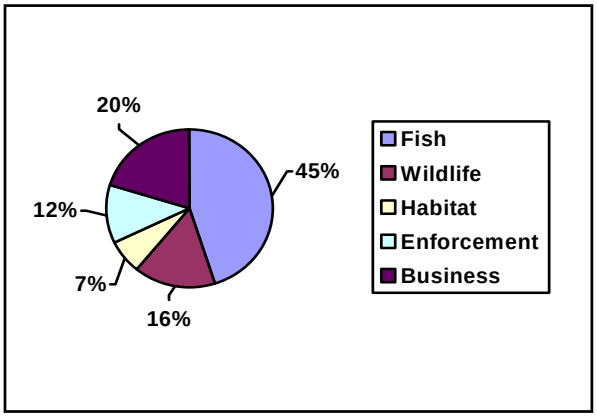
In 2006, Washington hunters spent $313 million for trip related expenses, equipment, and other expenditures primarily for hunting (U.S. Dept. of Interior et al. 2006). About 24% of their expenditures were for food, lodging, and transportation; 60% for hunting equipment (guns, ammunition, camping); and 16% for the purchase of magazines, membership dues, land leasing, and licenses and permits.

The national survey reported that there were 182,000 resident and nonresident hunters 16 years of age or older who hunted in Washington. These hunters spent 2.1 million days hunting in the state. Expenditures per hunter were $1,721 or $147 per day per hunter.

The revenues for the Department during fiscal year 2006 were nearly $158 million. Funding was from a variety of state, federal, and private/local sources. The chart below shows relative proportions of those funds.



There are six programs within WDFW. Each program's proportion of the operating budget is shown in the chart below:



The Game Division is one of five divisions in the Wildlife Program. The 2007-2009 biennial budget for the Game Division is just over $11 million. Of that total, over $2 million is dedicated to specific activities. The dedicated fund sources are from auction and raffle sales ($318,000), migratory bird permit sales ($667,000), turkey tag sales ($242,000), background license plate sales ($119,000), and the eastern Washington pheasant enhancement program ($660,000). Another $200,000 is from the general fund, dedicated for monitoring sea ducks as part of the Puget Sound Ambient Monitoring Program. The remaining funds come from the general fund ($279,000), revenue from license sales or the wildlife fund ($5.1 million), and federal funds ($4.7 million), which is mostly from the Pittman-Robertson Act (excise tax on sporting equipment and ammunition).

This $11 million is the base funding for most of the activities identified in this plan except for research, hunter education, most game damage, and law enforcement. These activities are funded from other divisions or programs within WDFW. Implementation of new activities in this plan will be dependant on additional funding, grants, and partnerships.

CHAPTER 2

General Game Management Issues

The process of developing a non-project EIS allowed WDFW to use an iterative process. Essentially the number of alternative strategies is not limited and the strategies are developed in concert with the public through a scoping and development process and multiple comment periods. The original 2003-09 plan was updated for 2009-15.

During the original 2003-09 public involvement process, issues were identified in nine categories for WDFW to address in the plan. The major categories included scientific/professional management, 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, and game damage and nuisance. The final category, which centered around species-specific management issues, is addressed in Chapter Three of this document. The issues, objectives, and strategies contained within this plan are the preferred alternatives.

Scientific/Professional Management of Hunted Wildlife

The concept of scientific management is very important to the public. The use of scientific information and the judgment of professionals in management decisions were rated very high (>90%) by both the general public and hunters. Next came economic (>68%) and social concerns (>54%), followed by political concerns (<25%), which received low ratings.

Issue Statement:

WDFW wildlife managers and biologists have developed goals, objectives, and strategies in this plan to ensure long-term sustainability of all wildlife. The best available science will be the basis for the maintenance of all endemic wildlife populations. Strategies for hunted wildlife will not have significant negative impacts on the sustainability of other wildlife or their habitats. None of the strategies or subsequent hunting season recommendations or implementation of activities will deviate from these fundamental principles. Science is the core of wildlife management, the basis for achieving the agency's mandate, and the foundation of this plan.

Objective 1:

Game Division Section Managers, Regional Wildlife Program Managers, District Wildlife Biologists, and field biologists should each attend at least one professional workshop each year.

Strategies:

a. Agency staff will maintain regular contact with peer scientists and wildlife managers by attending Wildlife Society, Western Association of Fish and Wildlife Agency, and Technical Group meetings or other professional workshops.

b. Significant impacts and the scientific basis for recommended actions may be "peer reviewed" by scientists outside WDFW when determined necessary by WDFW biologists, and managers.

Issue Statement:

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 making decisions. The key is to develop programs that achieve biological objectives and are supported by the public.

Objective 2:

Provide three opportunities for stakeholders to participate in development of three-year regulation packages, collection of biological information, and in planning efforts for game species.

Strategies:

a. Maintain citizen advisory councils and seek their input at least twice during the process of developing plans and regulation packages.
b. Use the WDFW Web page to encourage public comment and ideas for regulations and priorities.
c. Conduct a minimum of 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 six years to monitor support for agency programs, planned activities, and regulations.
e. Publicize and maintain a mailing list and an email 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.
g. Develop and maintain opportunities for citizens to help with collection of data and interact with biological staff.

Hunter Ethics And Fair Chase

This issue is related to improving the public perception of hunters and support for hunting as a management tool. This is a very significant issue to hunters, as identified during the 2002 public involvement process. Different people define fair chase in different ways.

Issue Statement:

Many hunters think that the latitude to determine what constitutes fair chase belongs to the individual. They feel that others should not determine what is fair chase for someone else. Other hunters are concerned that the image and standard of ethics for hunting may be compromised, particularly with the expanding use of technology for hunting. This is particularly evident with equipment technology.

Objective 3:

During each three-year package, facilitate public debate of regulations for use of electronic equipment and baiting of wildlife for purposes of hunting.

Strategies:

a. Conduct public outreach and consider restricting new electronic devices or baiting of wildlife.
b. Develop effective regulations regarding fair chase that are understandable and enforceable.
c. Consider exceptions to new equipment regulations to accommodate the needs of hunters with disabilities.

Hunter Behavior/Ethics

Another significant issue for hunters 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 believes that many hunters violate hunting laws. They feel that hunting without a license and poaching are the major violations, and that shooting game out of season and hunting over the bag limit are also common violations. Hunters cite these same concerns with the addition of shooting from a vehicle. The public has also indicated 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 will improve their opinion of hunters.

Objective 4:

Develop baseline compliance rates for common violations.

Strategies:

a. Work with the Enforcement Program to develop science based, objective compliance rates for common violations.
b. Emphasize the importance of hunter compliance with regulations and public opinion of hunters in hunter education classes, hunting pamphlets, and other information provided to hunters.
c. Concentrate enforcement efforts on improving compliance for the most common violations.
d. Increase the frequency of field contacts and visible presence of officers and other uniformed agency staff during hunting seasons.
e. Review and simplify, clarify, or eliminate regulations that are dubious, ambiguous, or confusing.

Private Land Programs and Hunter Access

Based on opinion surveys, hunters believe that private lands are important to wildlife and to outdoor recreation. They agree that maintaining the economic viability of farming and 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 (Duda 2002b). This continues to be a major issue for hunters. WDFW currently manages two hunter access programs, the Private Lands Program and the Landowner Hunting Permit 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. Hunters are especially concerned about closures of private industrial timberlands in southwest Washington. The most recent survey (Duda 2008) shows that this is one of the most important issues to hunters; a lack of access for waterfowl hunting in western Washington; limited pheasant hunting access in eastern Washington; extensive road closures; and a lack of general information about how to access public lands and WDFW lands. In addition, recent events in the agricultural community indicate that significant changes may occur in the US Department of Agriculture's Conservation Reserve Program (CRP). These changes could release farmers from their CRP contracts, which would also allow them to cancel their access agreements with WDFW. Because of this, it is difficult to project the number of acres the department will be able to maintain in the coming years.

Objective 5:

Increase lands available for hunter access from 1.2 to 1.5 million acres over the next six years.

Strategies:

a. Implement the recommendations of the Hunter Access Stakeholders Group.

b. Publicize current programs better through the agency Web page, direct mail, the hunting pamphlet, and other hunter publications.
c. Maintain a task group of stakeholders to support and monitor recommendations for habitat and access, address landowner needs, identify funding mechanisms, and maintain strong public, hunter, and landowner support.
d. Identify locations where public lands are landlocked by private ownership and work with the landowner to improve access to public lands where possible.
e. Increase public education efforts to improve hunter awareness and provide guidance for hunting on private lands.
f. Evaluate existing private lands access programs and adjust program delivery based on hunter and landowner needs and support.
g. Develop a reservation system that helps landowners manage hunter participation rates and provides a quality hunting opportunity.

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 an important means of controlling human disturbance by limiting vehicular access seasonally or permanently. Studies have shown that limited vehicular access reduces human disturbance that results 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 considered road closures important in reducing illegal activity and supported the Green Dot Cooperative Road Management System (Duda 2002b, 2008). 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 (refuges) 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 as well as protect fish and wildlife habitat. WDFW recognizes the need to improve the balance between hunter access and wildlife and habitat protection. Some systems are more effective than others. Voluntary systems such as the Green Dot System require high levels of enforcement to be effective. In addition, with expanding regulations on road access, hunters are increasing use of off-road vehicles (ORV) to gain motorized access. Indiscriminant ORV use can cause environmental damage and circumvents the intent of road access restrictions.

Objective 6:

Develop at least four road management plans in key areas of the state.

Strategies:

a. Develop a template and set of road management guidelines in 2009.
b. Complete plans for the Colockum by 2009, the Blue Mountains in 2009, Mount Saint Helens by 2010, Willapa Hills by 2011, Yakima by 2011, and the Selkirk area by 2012 that reduce active road densities to target levels, yet maintain well-distributed access for hunting.
c. Place emphasis on the expansion of private lands incentive programs in these geographic areas.
d. Emphasize gated and barrier type closures, rather than voluntary (green dot) systems.
e. Incorporate access exceptions for hunters with disabilities where possible and consider the needs of senior hunters.
f. Increase publication of road management goals and programs through the hunting pamphlet, news releases, and on the Internet.

Tribal Hunting

Native people have their own unique tradition, culture, and values related to hunting game and gathering traditional foods and medicines. Many tribes also have reserved rights to hunting and gathering in the language of the treaties signed with the United States. These rights allow tribes to manage their hunters, often with different seasons and rules than non-tribal hunters. This has lead to frustration, anger, and misunderstanding on the parts of both tribal and non-tribal citizens. 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 7:

Develop baseline levels of public understanding and acceptance of treaty hunting rights.

Strategies:

a. Measure the current level of support for treaty hunting rights by hunters.
b. Develop an outreach package that can be sent to citizens concerned about tribal hunting.
c. Develop cooperative management programs that demonstrate state and tribal management programs.
d. Use links from the WDFW website to tribal websites with information on tribal harvest statistics.
e. Include a segment on tribal hunting rights and tribal management activities as part of the Hunter Education Program.

f. Include a description about tribal hunting rights and wildlife management programs in the hunting pamphlet.

Issue Statement:

Improve coordination of treaty and non-treaty hunting and wildlife management.

Objective 8:

Complete at least five additional coordinated tribal/state harvest management plans for species such as deer, elk, mountain goat, and/or cougar populations subject to both tribal and non-tribal hunting.

Strategies:

a. Use existing herd plans to develop coordinated harvest management plans or MOUs for elk herds or other game species. The MOUs should include harvest objectives that are sustainable and meet the needs of both state and tribal hunters; result in sharing of harvest information and hunting regulations; encourage cooperative research and population monitoring; and supports both party's interests in gaining access to lands for hunting.
b. Based on tribal interest and availability, pick key populations in each treaty area as a starting place to build working arrangements and processes for developing coordinated harvest management plans.

Wolf Recovery Issues

Issue Statement:

Wolf recolonization in Washington is a very controversial issue. Hunter and general public opinion surveys indicate that most citizens' support allowing wolves to recolonize the state. The key is how management strategies are implemented. Sixty one percent support lethal control of wolves if they cause livestock losses and fifty six percent support compensating livestock producers for losses out of the state general fund (state taxes).

Objective 9:

Complete the wolf conservation plan by 2010 with recovery objectives and strategies that are supported by the public, while minimizing conflicts with game population objectives and livestock losses.

Strategies:

a. Implement the wolf conservation plan.
b. Monitor impacts to game species.
c. Update management objectives for game species if necessary due to changing ecosystem dynamics.

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).

In hunter opinion survey's, most hunters expressed general satisfaction with their hunting experience. Eastern Washington pheasant and waterfowl hunters were least satisfied and deer and elk hunters expressed that satisfaction could be higher. Harvesting an animal (hunter success) and seeing plenty of game were the main factors driving hunter satisfaction. It is fairly clear that harvest success plays a significant role in hunter satisfaction.

Issue Statement:

Hunters 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 overall, there is not enough game.

Objective 10:

Maintain hunter satisfaction and participation at or above 2008 levels for the life of this plan.

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:
    i. Provide sufficient hunting opportunities for archers, muzzleloaders, and modern firearm hunters to approach average statewide participation rates and seek to generally equalize success rates. Address additional "fairness" issues between users through the Allocation Committee of the Game Management Advisory Council and recommend changes supported by the Council.
    ii. Develop new deer or elk hunting opportunities in each District that emphasize low hunter densities and higher success rates (than current general seasons) through permit only opportunities. These opportunities should occur outside of general season timeframes.
    iii. 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 are nearly equal.

iv. Support the Master Hunter program by providing graduates primary consideration in hunting efforts designed to resolve private land and sensitive damage issues.

b. Districts should retain general-season opportunity whenever possible. Use other techniques to manage harvest rates within a population management unit before considering permit only restrictions.

c. While striving to achieve population goals, maintain season length as a second priority to maintaining general seasons. Use other techniques to manage harvest rates, such as timing, antler points, etc.

d. Increase hunter access and provide a variety of hunting opportunities in priority pheasant and waterfowl areas using cooperative programs, access easements, or acquisition.

i. Develop limited entry areas, marked sites, walk-in sites, or other restrictions to reduce crowding.

ii. Focus habitat programs and population enhancement activities in high priority areas.

e. Conduct a public opinion survey in 2013 to determine hunter satisfaction levels.

Pronghorn Antelope Reintroduction

Issue Statement:

Pronghorn antelope are a native species that have been extirpated from Washington since about the mid nineteenth century. From the 1930s to 1960s, WDFW conducted 4 releases in eastern Washington, but all attempts failed to establish a sustainable population. The small number of animals released and minimal monitoring likely hindered those early attempts. The Department is interested is in exploring the potential for re-establishing pronghorn in Washington. As such, a habitat assessment was recently conducted and suggested that suitable pronghorn habitat does exist in eastern Washington (Tsukamoto 2006).

Objective 11:

Complete the project assessment and public input process for reintroducing pronghorn in Washington.

Strategies:

a. Develop a planning document describing the history of pronghorn in Washington, their habitat requirements, potential issues if pronghorn are reintroduced, and options associated with reintroduction.

b. Develop a mechanism for assessing and mitigating potential landowner conflict (e.g., agriculture damage, fence damage) by 2010.

c. Develop a project cost-benefit analysis for reintroduction and funding mechanism by 2010.

d. Conduct a formal public input process (e.g. SEPA or NEPA) for collecting input on the Department's reintroduction plan.

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 recent public opinion surveys (Duda 2002a, 2008), a substantial percentage of respondents indicated they had experienced problems with wildlife. Raccoons, deer, and opossums were the major culprits in Washington. Damage to garbage, pets, gardens, yards and livestock were the most common problems identified.

The public identified nuisance wildlife as a major issue frequently citing recent restrictions on the use of certain traps for furbearing species. Public appreciation of 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:

Over twenty-five percent of the public experienced problems associated with wildlife. The surveys have 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 12:

Conduct a survey to determine the level of public support and needs for WDFW assistance in dealing with wildlife nuisance and property damage.

Strategies:

a. Evaluate the survey results with stakeholders to develop strategies for addressing nuisance and property damage.
b. Implement the strategies identified by the Wildlife Conflict Stakeholder Group.

Issue Statement:

The level of concern for deer and elk damage to property 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 13:

Expand the pilot program (currently in Yakima and Ellensburg) that relies on dedicated deer and elk conflict specialists to assist property owners. Respond to crop damage complaints within 48 hours to initiate action to resolve damage.

Strategies:

a. Expand the number of conflict specialists from two to at least six, with the priority being in eastern Washington.
b. Develop a brochure explaining available tools and priorities for resolving crop damage.
c. Provide list of options to landowner for handling damage and allow flexibility to the landowner.
d. Develop a "Communications Plan" for distributing damage resolution information to landowners.
e. Use harassment and other non-lethal methods to address damage in deer and elk populations that are below management goals.
f. 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 alternatives for addressing damage problems:
    - Provide landowner's name to hunters or landowner selects hunters during general season or permit only hunts.
    - Agency selects hunters for "hot spot" hunts.
    - Allow the landowner (or immediate family member) to kill and retain one or more deer or elk through issuance of a "landowner preference" permit.
    - Allow the landowner to select one or more hunters to kill and retain one deer or elk through issuance of a "damage prevention" permit.
    - Issue the landowner a "kill" permit to take one or more deer or elk, with the state retaining the carcass. Provide the meat to charitable organizations or to tribes to meet ceremonial and subsistence needs.
    - Pay the landowner for the crop damage as the last resort.
g. Conduct an annual survey of landowners filing complaints to determine satisfaction with WDFW actions for resolving their problem.
h. Determine the level of landowner understanding of options for addressing deer and elk damage.

Urban Hunting Issues

Since early in the history of Washington, wildlife management has focused on hunting as the primary means of managing wildlife population levels and for funding wildlife conservation. As the human population grows and expands or dominates the landscape, this traditional wildlife management technique is being challenged. Increasingly, the demand for resolution of wildlife population problems also includes the constraint that hunting is a less acceptable method of alleviating conflicts. Unfortunately, the concept of general public responsibility for wildlife problem resolution has not risen to a level of political support that results in adequate funding from general taxpayers.

Issue Statement:

As the number of people in the state increase, citizen demands for resolution of conflicts with wildlife are expanding. At the same time, constraints to address perceived safety issues, noise levels, and the nuisance associated with hunter management results in significant challenges.

Objective 14:

Develop a minimum of five local level plans or significant actions designed to resolve wildlife-human problems.

Strategies:

a. Assist local governments in identifying current and potential issues for wildlife/human conflicts.
b. Support conflict resolution that includes hunting as a principal means of state funded resolution.
c. Recommend alternative conflict resolution techniques for local government consideration and funding.
d. Develop model ordinance language for local governments that supports hunting as the primary wildlife population management resolution provided by the state.

Communication Issues

Communication between the Department and constituents was a very consistent and important issue to the public that was identified in the 2008 opinion survey.

Objective 15:

Improve the department's rating on game management communication by 2013.

Strategies:

a. Expand the use of direct mail to communicate with those directly affected by game management decisions.
b. Expand the use of the department's website to explain game management policy and direction and the rationale behind decisions related to game management.
c. Continue the use of news (magazines and newspaper) releases to facilitate media coverage of important game issues.
d. Expand the use of the hunting regulation pamphlets to provide information regarding game management.
e. Implement the results of the department's communication plan being completed in 2009.
f. Hire a consultant to conduct a comprehensive review of game management communications to improve effectiveness, credibility, and public support by 2011.
g. Conduct a public opinion survey in 2013 to determine how the department rates on game management communication.

Plan Monitoring

In order to clearly identify accomplishment of the objectives identified throughout this plan, an annual reporting or "report card" will be prepared by the Game Division. This list of accomplishments will clearly demonstrate public accountability associated with implementation of the Game Management Plan.

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ELK *(Cervus elaphus)*

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 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 (McCorquodale 1985, Dixon and Lyman 1996, Harpole and Lyman 1999).

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 in portions of southwestern Washington. Based on preliminary genetic work conducted by WDFW, Roosevelt elk on the west slope of the Cascade Crest have interbred with Rocky Mountain elk. 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 Game 1939, Washington Dept. of Fish and Wildlife 2001, 2002a, 2002b, 2002c, 2002d, 2005, 2006a, 2006b).

Elk were hunted regularly but not always extensively, by Indian tribes in both eastern and western Washington (McCabe 1981). As European settlement expanded into this region, elk harvest 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 2005).

By the beginning of the last century, Roosevelt elk were greatly reduced in numbers as well, but due to denser forests with more escape cover, small groups of Roosevelt elk were able to persist. Efforts to re-introduce Rocky Mountain elk were conducted from as early as 1912 through the 1930s (Washington Dept. of Game 1939). Elk populations peaked in Washington in the late 1960s and early 1970s mostly due to habitat conditions and forest management practices. A recent marked reduction in timber harvest, especially west of the Cascade Crest, and an increase in the human population in Washington has reduced the overall carrying capacity for elk in Washington compared to decades past. The Washington Department of Fish and Wildlife (WDFW) currently recognizes 10 major elk herds totaling approximately 56,000 animals.

II. RECREATIONAL OPPORTUNITY

In Washington, elk are hunted from September through December with some special permit hunts to address agricultural damage taking place as late as March. Hunting seasons for archery, muzzleloader, and modern firearms are currently available to both resident and non-resident hunters. There are currently no quotas on the number of general elk season licenses sold. Hunters are required to choose one weapon type and declare whether they will hunt east side or west side

elk. In general, antler point restrictions are spike-only with branch-antlered bulls by limited permit-only in eastern Washington, with some exceptions in northeastern 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 than are currently available (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 100 cows, the number of bulls per 100 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 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 (Eberhardt 1969).

IV. ASSESSMENT OF CURRENT MANAGEMENT OF ELK

Issue Statement

The Department is currently developing or updating 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, which come under the overall management guidance of this Game Management Plan (GMP), also facilitate cooperative management with tribes. Existing herd plans are an important resource used in implementation of this GMP, and are designed to be updated every five years.

The elk herd management plans as they currently stand include:

- Blue Mountains February 2001
- South Rainier January 2002
- North Rainier March 2002
- North Cascade (Nooksack) March 2002
- Yakima December 2002

- Olympic July 2005
- Colockum October 2006
- Mount St. Helens November 2006
- Selkirk draft
- Willapa Hills draft

Objective 16:

Update or finalize drafts of the elk herd management plans.

Strategies:

a. Update the Blue Mountains Elk Herd Plan by 2009.
b. Finalize the Selkirk Elk herd Plan by 2009.
c. Update the North Cascades (Nooksack) Plan by 2010.
d. Update the North Rainier elk Herd Plan by 2010.
e. Update the South Rainier Elk herd Plan by 2010.
f. Finalize the Willapa Hills Elk Herd Plan by 2010.
g. Update the Yakima Elk Herd Plan by 2011.
h. Update the Olympic Elk Herd Plan by 2011.
i. Update the Colockum Elk Herd Plan by 2011.
j. Update the Mount St. Helens Elk Herd Plan by 2012.

Nearly all of the state's elk herds are being impacted by development and other built environments as a result of the human population increase. In some cases it involves housing developments, in other cases, it may be low density or recreational development.

There are many other factors controlling elk population levels as well. For some elk herds, the limiting factors that prevent elk herds from reaching population objective may be identifiable. For others, the limiting factors may be more difficult to isolate or the concept of limiting factors may not apply in the strictest textbook sense. The focus of the plans is to correct limiting factors and achieve the population objectives.

- For the Blue Mountains elk herd the limiting factor is likely historic antlerless harvest levels on the Oregon side of the Wenaha and more importantly, the current lack of regular fire regime in the Wenaha unit. All other units are currently at population objective. Without the benefits of fire in the Wenaha wilderness, the habitat will not support the desired number of elk and the population objective will need to be reduced.
  - The top spending priorities for this herd are habitat preservation, wildlife conflict resolution, and annual surveys.
- The South Rainier elk herd is being limited primarily by direct mortality caused by both legal and illegal hunting or undocumented harvest, and secondarily by limited habitat.
  - Securing winter habitat, annual surveys, and an increased enforcement presence are the priorities for this herd.
- The North Rainier elk herd is also limited by direct mortality caused by both legal and illegal hunting, and secondarily by loss of habitat.

  - The priorities for the North Rainier herd are habitat enhancement and annual surveys to document harvest impacts.
- The North Cascade (Nooksack) elk herd is continuing to grow and is not currently limited by the carrying capacity of the elk habitat. If the Nooksack herd is limited, it is probably as a result of agricultural lands adjacent to core elk habitat and the Agency's legal requirements to address wildlife damage.
  - The top priorities are to protect winter range on private land, enhance elk habitat quality, and minimize elk damage to agricultural lands.
- The Yakima herd is at population objective. Limiting factors affecting this herd will be better isolated when research pertaining to the carrying capacity for this herd is completed.
  - The spending priorities for this herd include research, habitat preservation, resolving wildlife damage conflicts, and winter-feeding.
- The Olympic herd is probably limited by loss of elk habitat to human encroachment and available elk habitat, which is a function of timber management on private industrial timber lands and to a lesser extent, limited timber management on U.S. Forest Service lands.
  - The top priorities identified for this herd are the green forage program, reduction of open roads, and annual surveys.
- Although there are still many unanswered questions related to the Colockum elk herd, one of the primary limiting factors is probably related to direct mortality resulting from legal hunting, undocumented harvest, kills related to resolving agricultural damage.
  - The priorities for the Colockum herd are habitat preservation, habitat enhancement, and road management.
- The Mount St. Helens elk herd is above objective at this writing. The limiting factor for this herd is likely adequate forage.
  - The spending priorities for managing this herd are enhancing habitat and improving annual surveys to determine the impacts of harvest strategies.
- The Selkirk elk herd is at population objective. The limiting factor for this herd is probably the amount of habitat created by active timber management and wildlife damage issues occurring on agricultural lands adjacent to elk habitat.
  - The priorities include habitat enhancement, annual surveys, and resolving damage issues.
- Very little is known about the Willapa Hills elk herd. The limiting factors are probably loss of habitat and direct mortality resulting from legal and illegal hunting.
  - Spending priorities have not been finalized.

In April 2001, WDFW contracted with an external, independent panel of scientists 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, subsistence, cultural and ceremonial uses by Native Americans, wildlife viewing, and photography.
3. Manage elk populations for a sustainable annual harvest.

VI. ISSUE STATEMENTS, OBJECTIVES, AND STRATEGIES

Population Management

Background: The primary goal is to manage for viable and productive elk populations with desirable population characteristics using the best available science. The Department measures elk populations using a variety of techniques. Techniques that work well in the more open habitats of eastern Washington may be of little value in areas that are densely forested. Population objectives defined in this plan are consistent with objectives defined in the respective elk herd plans. A realistic approach to the management of wild animal populations does not rely on exact numbers and pinpoint accuracy. Therefore, the preferred target population objectives for each elk herd are presented as an acceptable range of plus or minus 5% of the population objective (Table 1).

The population objectives are determined by agency staff using a combination of factors that include:

- Current population estimates
- Harvest history
- Current harvest levels
- Currently occupied summer and winter range
- Current condition of available forage
- Current land use practices
- Number and location of elk damage complaints
- Landowner tolerance
- Hunter satisfaction

Consistent with the primary goal, the secondary goal is to provide recreational opportunity and sustainable annual harvests that fluctuate somewhat due to weather conditions, hunter participation, the number and density of available legal animals, the number of special permits issued for a particular GMU, etc. Hunting seasons are designed to limit extreme fluctuations in sustainable harvests from year to year, although some aspects are out of the control of the Department.

The Washington Fish and Wildlife 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).

The secondary goal can be met as long as it doesn't impinge on the population objectives for total population numbers and population composition and a viable, productive elk population defined as the primary goal. Population composition is typically measured as a ratio of bulls per 100 cows and calves per 100 cows. In some elk populations, these surveys are conducted before the hunt and then post-hunt ratios are projected using harvest information. In some populations, both pre-hunt and post-hunt information is gathered.

In a limited number of GMUs, a large enough number of elk are radio-marked to allow biologists to estimate annual mortality rates for different age classes and sex classes (Table 2). There are no elk herds in Washington where all of the parameters listed in Table 2 are collected. Different information is collected for different elk herds that live in different habitats and under differing circumstances. Two or more of the parameters in Table 2 are collected for most elk sub-populations that are monitored.

Mature bulls are defined as being older than four years, which is usually equated to having antlers with at least six tines on one side. Antler points are used as an index of age because it is a characteristic that is readily visible when conducting aerial surveys. WDFW will explore the possibility of using a different number of antler points to define mature bulls if average age correlations or other circumstances warrant.

The parameters collected in Table 2 function as guidelines for biologists to make management decisions. The challenge presented to managers is to interpret parameters and guidelines that are not in complete agreement. Pre-hunt bull:cow ratios may be high for a particular population but post-hunt bull:cow ratios could be very low. Post-hunt bull:cow ratios may be acceptable while bull mortality rates may be higher than desired.

These parameters are typically averaged over a 3-year period before changes are implemented, except for extreme cases when immediate action is required. These guidelines are not a rigid prescription. Oftentimes extenuating circumstances will dictate whether management changes will be made and what direction those changes might take. Un-hunted elk populations have shown bull-to-cow ratios ranging from 30 to 45+ bulls per 100 cows (Biederbeck et al. 2001, Houston 1982, Flook 1970).

Issue Statement:

An effective strategic plan for managing wild animals allows a certain degree of flexibility for field staff to decide if changes are warranted. Biologists must take all of the parameters available for a particular elk population into account and use their professional judgment when making management decisions.

Table 1. Population estimates and population objectives with (+/- 10 %) acceptable range for 10 elk herds in Washington.

ELK HERD	CURRENT POPULATION ESTIMATE	POPULATION RANGE OBJECTIVE
Yakima	9500	8,550-10,450
Olympic	8,620[b,c]	10,215-12,485
Colockum	3,900	4,050-4,950
North Rainier	1,845[b]	2,520-3,080
South Rainier	2,100	2,700-3,300
North Cascades	600[b]	1,755-2,145
Selkirk	2,400	2,160-2,640
Willapa Hills	7,600	7,200-8,800
Mount St. Helens	12,000[d]	9,000-11,000
Blue Mountains	4,400	4,824-5,896

a: Does not include GMUs 372 and 382
b: Estimate made in 2007.
c: Does not include Olympic National Park.
d: Mean estimate from 1996 to 1999.

Table 2. Parameter guidelines that affect decisions pertaining to hunting season structure and which class of animals would be impacted by a change in season structure.

Criteria	Class of Elk Targeted by Season Change	Consider Liberalizing Season	Acceptable Range	Consider Restricting Season
Pre-hunt Bull:Cow Ratio	Antlered & Antlerless	Greater than 35 bulls:100 cows	15 to 35 bulls:100 cows	Less than 15 bulls:100 cows
Post-hunt Bull:Cow Ratio	Antlered & Antlerless	Greater than 20 bulls:100 cows	12 to 20 bulls:100 cows	Less than 12 bulls:100 cows
Total Bull Mortality[a]	Antlered	Less than 40 %	Less than or equal to 50 %	Greater than 50 %
Percent Mature[b] Bulls In the Post-hunt Bull Sub-Population	Antlered	Greater than 10 %	2 to 10 %	Less than 2 %
Population Objective	Antlerless	Above Objective	At Objective	Below Objective

a: Total mortality from all sources including state hunting, tribal hunting, predation, winter kill, disease, etc.
b: Mature bulls are defined as having antlers with at least six tines on one side.

Objective 17:

Monitor elk populations annually to determine whether they are consistent with Tables 1 and 2.

Strategies:

a. Conduct aerial surveys to estimate populations, estimate indices, or to estimate composition ratios of bulls, cows, and calves.
b. Manage for cow elk sub-populations that are consistent with the desired rate of increase or rate of decline that will allow the population objective to be met for that elk herd (Table 2).
c. Manage for a post-hunt bull:cow ratio range of 12 to 20 bulls:100 cows (Peek et al. 2002, Biederbeck et al. 2001, Noyes et al. 1996, Squibb et al. 1991, Squibb 1985, Houston 1982, Prothero et al. 1979, Flook 1970,).
d. Manage for pre-hunt bull cow ratio range of 15 to 35 bulls: 100 cows (Peek et al. 2002, Biederbeck et al. 2001, Noyes et al. 1996, Squibb et al. 1991, Squibb 1985, Houston 1982, Prothero et al. 1979, Flook 1970,).
e. When bull mortality is measured for a population, manage for a total bull mortality rate of less than or equal to 50% averaged over three years.
f. Manage for a post-hunt mature bull (4 ½ years-old or older) percentage of 2% to 10% of the bull sub-population (Table 2).
g. Manage for herd composition and population goals at the Population Management Unit (PMU) level.

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. This issue is carried over from the 2003-09 Game Management Plan because it was not completed. The current PMU structure has been defined and discussions held among biologists and managers to assess relevant groupings.

Objective 18:

Develop a report that assesses if the current PMU structure system is the most relevant grouping for elk populations and sub-populations by 2009.

Strategies:

a. Review the current PMU data; develop a mapping inventory of the current PMU structure; and redefine PMUs where 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 in detecting population growth or decline (Caughley 1974, 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. 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 visibility differences (statistical 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 19:

Evaluate aerial surveys to estimate population size, population indices, and population composition of Washington elk. Complete the evaluation of eastern Washington surveys by 2009 and western Washington surveys by 2012. Continue efforts to standardize and improve survey protocols to provide reliable data on the size and structure of Washington elk herds.

Strategies:

a. Assess current protocols for winter helicopter surveys of elk and refine where necessary. Identify populations that are most effectively monitored with winter helicopter surveys. Develop herd-specific models where appropriate.
b. 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 (Eberhardt 1969).
c. Assess the population modeling approaches currently being used by WDFW and evaluate the need for new models and/or applications of population modeling.
d. Ensure adequate peer review of protocols developed and modified.

Recreation Management

Issue Statement:

One hundred thousand Washington elk hunters harvest approximately 7,000 elk annually from an estimated population of approximately 56,000. Washington has more elk hunters per elk than any other western state and has no limit on the number of elk licenses sold. Because anyone can purchase a license and hunt elk, success rates for general season hunters are low. Without carefully managed season timing, antler point restrictions, and relatively short seasons, the male sub-population would be over-harvested. Opportunities to hunt and spend time afield must be balanced against achieving or maintaining elk population objectives. As herd population levels increase, harvest levels will increase as well.

Objective 20:

Maintain a sustainable annual elk harvest (range 7,500 to 9,000) that is consistent with the population objectives in Tables 1 and 2.

Strategies:

a. Maximize season length where possible while maintaining or approaching elk population objectives.
b. In those eastern Washington GMUs that currently have spike-only hunting seasons, retain spike-only seasons and adjust branch antlered bull permit levels to achieve bull ratio objectives. Retain any bull and any elk seasons in northeastern Washington as long as population objectives are being met or have a reasonable likelihood of being met.
c. Retain 3-point restriction in western Washington as long as population objectives are being met or have a reasonable likelihood of being met over time.
d. Design and implement harvest strategies based on the best available information collected for those specific elk populations and sub-populations.
e. Unless extreme circumstances warrant, allow at least three years to determine effectiveness of regulation changes designed to achieve population objectives.

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 21:

Improve the harvest data used to monitor elk populations and the effects of various management strategies by conducting a review of the reporting accuracy by 2010 and correcting the deficiencies identified by 2014.

Strategies:

a. Implement and improve the mandatory harvest reporting system.
b. Develop and implement strategies to improve deficiencies identified in the review.
c. Expand efforts to collect age-at-harvest data from elk teeth submitted by successful hunters.
d. Evaluate the feasibility of collecting data on elk body condition from harvested elk at check stations or using other sampling strategies.

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. The biggest threat to the sustainability of elk populations is loss of quality habitat. To effectively manage 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 22:

Maintain and enhance 2000 acres and acquire 2000 acres of habitat for Rocky Mountain and Roosevelt elk during the life of this plan.

Strategies:

a. Identify and prioritize important elk habitat that is at risk of being lost to other land use practices. Identify highest priority elk ranges to target for acquisition or conservation easements.
b. Where habitat condition or quantity limits herd productivity, identify and implement large-scale habitat conservation and enhancement projects.
c. 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.
d. Purchase, lease, acquire easements, and use other incentives to protect and enhance other key areas identified in elk herd plans.

Winter Feeding

It is the intent of the Washington Department of Fish and Wildlife that wildlife should exist under natural conditions supported by suitable habitat. Although artificial feeding may assist in wildlife winter survival, it should not generally be considered a substitute for lost habitat and feeding shall be done only in limited situations as prescribed by Department policy.

Despite this intent, the Department maintains some supplemental feeding operations for wildlife. The main example is the Yakima elk herd where winter habitat has been eliminated. The historic winter habitat is currently growing high value agricultural crops. These crops are at risk of damage by elk unless supplemental feeding is provided each winter.

The Department also recognizes that extreme winter conditions sometimes necessitate implementation of emergency feeding operations. Both supplemental and emergency feeding of wildlife introduces an artificial food source. Feeding also results in the concentration of animals, which can make them more susceptible to disease, predation, and poaching.

The Department will attempt to identify methods designed to balance the size of populations with available winter habitat. Winter-feeding will not occur in areas where species can be hunted for recreation while feeding activities are underway. The Department will periodically evaluate the need to continue winter feeding operations.

Issue Statement:

Supplemental Feeding is defined by the Department as the regular winter feeding operations to provide feed to wildlife where adequate winter habitat is not available and feeding is necessary to support the population level as identified in a management plan, or for specific control of deer or elk damage.

A large percentage of what is considered historic elk winter range before European settlement 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. To prevent elk in the Yakima herd from causing agricultural damage, elk fencing and a winter feeding program was established. Elk winter-feeding programs can be problematic. They are expensive and cause elk to congregate at high densities, where they have a higher potential for spreading diseases. Elk that are fed in the winter also can have extreme impacts on shrubs, trees, and riparian zones near feeding sites. Winter-feeding programs may allow elk populations to exceed the carrying capacity of the available winter range, which can often be one of the most important factors in determining the size of an elk population that the landscape can support.

Objective 23:

Conduct an evaluation of the current elk-feeding program. Reduce the dependency on supplemental feeding if possible.

Strategies:

a. Using data generated from the Yakima elk herd study (see Research Section), report on the costs, benefits, and impacts on range condition of managing for different Yakima elk herd sizes.
b. Using the data generated from the Yakima elk herd study, determine if the Yakima elk herd population objective needs to be adjusted.

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 24:

Monitor the health and disease status of wild elk in Washington by collecting at least 30 samples each year. Take blood and tissue samples when elk are captured and tested for diseases common to elk.

Strategies:

a. Continue to monitor for pathogenic conditions in elk such as foot rot and tick paralysis.
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 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 25:

Finalize current research regarding elk ecology and management in the Blue Mountains.

Strategies:

a. Quantify total mortality for adult elk in the Blue Mountains.
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.
e. Finalize report and submit manuscripts to peer-reviewed scientific journals for publication.
f. Develop a research proposal to identify limiting factors associated with achieving the herd's population objectives.

Issue Statement:

The Yakima elk herd is one of 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. 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 26:

Complete the research project and 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.

Strategies:

a. Complete the current research project developed to accomplish this objective, including 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.

Issue Statement:

The Colockum elk herd has long been plagued by low bull: cow ratios, and calf: cow ratios have also declined precipitously during the last decade. 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 promote 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. 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. Gain a better understanding of the population dynamics and habitat use of elk in the upper Kittitas Valley.

Objective 27:

Develop two peer reviewed study proposals for the Colockum elk herd. The first proposal should address landscape use and elk movements and will be completed by 2009. The second should examine survival rates and limiting factors and should be completed by 2011.

Strategies:

a. Using radio-telemetry, gather specific information on elk movements, landscape use, and population dynamics in the upper Kittitas Valley.
b. Determine adult and juvenile elk survival for the Colockum elk herd.
c. Determine the cause of poor recruitment.
d. Analyze habitat conditions and trends at the landscape scale using remote sensing and ground-truthing.

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DEER

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 in the state numbers approximately 300,000 to 320,000 (Washington Dept. of Fish and Wildlife 2006). White-tailed deer populations appear to be stable or increasing. Mule deer populations in northeastern Washington are below historical levels. Other mule deer populations in central and eastern Washington are stable, with the exception of the southern Cascades where mule deer numbers have declined the last two years. Black-tailed deer populations seem to be stable across their range. The goal set by the 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 sustainable 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. State regulations provide for archery, muzzleloader, and modern rifle seasons. Historically about 45% of Washington's deer harvest was black-tailed deer, 35 % mule deer, and 20 % white-tailed deer. Due to robust white-tailed deer populations, increased opportunity for antlerless white-tailed deer hunting, 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).

White-tailed deer hunting seasons have remained consistent for the last few years, except in 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.

Throughout western Washington, black-tailed deer harvest has remained relatively stable in recent years in terms of total numbers harvested. However, success per unit of effort has decreased in southwest Washington black-tailed deer regions. Black-tailed deer still provided 12,672 or approximately 33.7% of the total 2006 deer harvest. The average annual harvest of black-tailed deer over the past six years was 14,065.

Table 1. Estimated Washington deer harvest by deer type for 1995 through 2007. Deer harvest estimates generally have confidence intervals that are within 5 percent.

Year	Black-tailed Deer	White-tailed Deer	Mule Deer	Total
2001	16,658	12,366	11,915	40,939
2002	12,968	12,087	13,639	38,694
2003	13,933	13,553	13,280	40,766
2004	15,859	14,684	13964	44,507
2005	12,301	14,852	12,638	39,791
2006	12,672	14,839	10,074	37,585
2007	12,974	14,500	10,421	37,895

III. DATA COLLECTION

WDFW conducts composition surveys from the air and on 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, early fall (pre-hunt), and early winter (post-hunt) before the deer shed 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. All survey work is restricted by budget and staffing constraints.

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 (Eberhardt 1969).

Pre-hunt and post-hunt surveys are generally conducted in eastern Washington for both white-tailed deer and mule deer. Deer populations in selected areas are frequently 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 are used to sample 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, subsistence, and ceremonial uses by Native Americans, wildlife viewing, and photography.
3. Manage statewide deer populations for a sustainable annual harvest.

V. ISSUE STATEMENTS, OBJECTIVES, AND STRATEGIES

Population Management

Deer population management goals are to maintain relatively stable populations for both white-tailed deer and black-tailed deer. 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).

Aside from raw counts, one of the most straightforward measures to quantify deer herds is composition ratios such as buck:doe ratios. Post-hunt buck:doe ratios reflect how aggressively the antlered class of the population is being hunted. The Department has designated four levels of hunting intensity and assigned a range of post-hunt buck ratio targets for each (Table 2). Recruitment rates and mortality rates vary substantially depending upon species, subspecies, and location.

Table 2. Hunting intensity and related buck:doe ratios.

Hunting Level	Post-hunt Buck Ratios
Liberal	10 to 14 bucks:100 does
Standard	15 to 19 bucks:100 does
Moderate	20 to 24 bucks:100 does
Conservative	25+ bucks:100 does

ALL DEER

Issue Statement:

Deer in Washington are currently managed at the Population Management Unit (PMU) level by WDFW. Most PMUs are made up of more than one Game Management Unit (GMU). Hunting season dates and bag limits are set at the GMU level with the understanding that total harvest will affect the deer population at the PMU level. This issue is carried over from the 2003-09

Game Management Plan because it was not completed. The current PMU structure has been defined and discussions held among biologists and managers to assess relevant groupings.

Objective 28:

Determine by 2009 if the current PMU designations for Washington deer populations are representative from a biological standpoint.

Strategies:

a. Review the current information available for Washington deer including the primary literature, WDFW reports, federal reports, tribal reports, university research, and contractual reports. Investigate the current information seasonal movements, migrations, critical areas, home range sizes, etc.
b. Modify those PMUs that do not currently represent deer population movement, activity, and harvest.

BLACK-TAILED 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 due to the type of habitat they occupy, making it difficult to detect population changes. Age ratios or sex ratios by themselves are inadequate when trying to detect population growth or decline (Caughley 1977, 1974). Nonetheless it is incumbent to the process of setting deer harvest objectives to have some estimate or index of the number of animals in the population available for harvest (Table 3).

Objective 29:

Determine how well existing survey protocols for black-tailed deer are working by 2010.

Strategies:

a. Conduct a literature search and peer review for existing population estimate and population index techniques that would be appropriate for black-tailed deer.
b. Document, develop, and standardize survey protocols for black-tailed deer.

Issue Statement:

Black-tailed deer habitat has been reduced in western Washington due to human encroachment, a reduction in timber harvest, and the natural progression of aging timber stands (succession). Annual harvest reports indicate that black-tailed deer numbers are remaining fairly static, however, the number of days per harvested animal would suggest that black-tailed deer might have declined somewhat over the past two decades. To complicate matters further, hunting regulations have varied quite a bit over the years. Because of the terrain they inhabit and the

difficulties involved with surveying them, there are still many unknowns about black-tailed deer population dynamics that have yet to be revealed.

Table 3. Hunting intensity and related black-tailed deer buck:doe ratios.

Hunting Level	Post-hunt Buck Ratio Targets	Known Status by PMU	Desired Status by PMU
Liberal	10 to 14 bucks:100 does		
Standard	15 to 19 bucks:100 does	46, 51	46, 51
Moderate	20 to 24 bucks:100 does		
Conservative	25+ bucks:100 does		

Objective 30:

- Measure the status of the buck to doe ratios or buck mortality rates for at least 5 PMUs by 2012.

Strategies:

a. Review the current information available for black-tailed deer including the primary literature, WDFW reports, federal reports, tribal reports, other state agency reports, university research, and contractual reports.
b. Conduct post-hunt population surveys to ascertain population size or index where appropriate.
c. Conduct post-hunt population survey or conduct mortality studies to ascertain buck survival through the hunt period where appropriate.
d. Conduct pre-hunt surveys in summer and early fall to measure productivity and to measure the ratio of bucks per does and the ratio of legal bucks per 100 does.

MULE DEER

Issue Statement:

Mule deer population levels are closely tied to severe winter events and are susceptible to over-harvest. Hunting season structure for mule deer reflects this susceptibility (Table 4). Depending on the district, mule deer may be surveyed after the hunting season, before the hunting season, or during the spring green-up. Some mule deer populations may be surveyed more than one time during the year.

Table 4. Hunting intensity and related mule deer buck:doe ratios.

Hunting Level	Post-hunt Buck Ratio Targets	Known Status by PMU	Desired Status by PMU
Liberal	10 to 14 bucks: 100 does	23	
Standard	15 to 19 bucks: 100 does	11, 13, 15, 16, 21, 22, 24, 25, 32, 33, 35, 36	11, 13, 16, 21, 22, 23, 24, 25, 32, 33, 35, 36
Moderate	20 to 24 bucks: 100 does	14, 17, 31, 34	14, 15, 17, 31, 34
Conservative	25+ bucks: 100 does	21, 26	21, 26

Objective 31:

- Conduct population surveys each year for major herds and expand the areas surveyed by 2013 to include all PMUs where more than 50 mule deer bucks are harvested annually.

Strategies:

a. Conduct post-hunt population surveys to ascertain population size or index, and buck survival through the hunt period.
b. Expand the areas where post-hunt surveys are conducted annually to include Columbia Basin PMUs and east slope Cascades PMUs.
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.
d. Conduct pre-hunt surveys in summer and early fall to measure productivity and to measure the ratio of bucks per does and the ratio of legal bucks per does.
e. Determine the feasibility of using body condition scoring to assess overall health of mule deer and mule deer range.

Provide information to landowners regarding the needs of mule deer (e.g. Western Association of Fish and Wildlife Agencies mule deer habitat guidelines) using agricultural organization's newsletters, etc.

Issue Statement:

Mule deer populations are more amenable to population surveys than the other two types of deer in Washington. Currently, not all mule deer populations in all parts of the state are being surveyed (Mayer et al. 2002).

Objective 32:

Improve and expand the survey protocols for mule deer by 2012.

Strategies:

a. Conduct a literature search and peer review of 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. When necessary, implement new survey protocols for mule deer.

WHITE-TAILED DEER

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 and the hunting season structure

for whitetails reflects their ability to withstand harvest (Table 5). 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).

Table 5. Hunting intensity and related white-tailed deer buck:doe ratios.

Hunting Level	Post-hunt Buck Ratio Targets	Known Status by PMU	Desired Status by PMU
Liberal	10 to 14 bucks: 100 does	15	
Standard	15 to 19 bucks: 100 does	11, 13, 14, 16	11, 13, 16
Moderate	20 to 24 bucks: 100 does	17	14, 15, 17
Conservative	25+ bucks: 100 does		

Objective 33:

Document the buck-doe ratios for all PMUs where at least 50 bucks are harvested each year by 2012.

Strategies:

a. Conduct post-hunt population surveys to ascertain population size or index.
b. Conduct post-hunt population surveys 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.
d. Conduct pre-hunt surveys in summer and early fall to measure productivity and to measure the ratio of bucks per does and the ratio of legal bucks per does.

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 34:

Improve and expand the existing survey protocols for white-tailed deer by 2011.

Strategies:

a. Conduct a literature search of existing techniques.
b. Consult with statisticians at various universities and with other peers for latest developments in population estimation.
c. Document and/or standardize best-case survey protocols for white-tailed deer throughout the state.

Research

MULE DEER

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. 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. Because of this decline, the Department invested in a multi-cooperator, long-term mule deer research project.

Objective 35:

Complete the Mule Deer Cooperative Study by 2010 and determine the relationship between habitat, predation, body condition, and other factors as they relate to Washington mule deer survival and recruitment.

Strategies:

a. Provide information summaries and technical reports to the public.
b. Present results for the study in a variety of public forums.
c. Publish the results of the study in the primary, scientific literature.
d. Implement recommendations as appropriate.

BLACK-TAILED DEER

Issue Statement:

The mortality rates for black-tailed deer in hunted populations have been, for the most part, unknown. The Department initiated studies on buck mortality in both Region 4 and Region 6 from 1999 through 2001 (WDFW unpubl. data). Initial work suggests that buck mortality in black-tailed deer is quite variable, both between years and between sites. Further work on this topic, as well as population dynamics, habitat needs, and better techniques to estimate populations would help the Department better understand black-tailed deer.

Objective 36:

Initiate a black-tailed deer research project by 2009 to develop a better understanding of population dynamics, survival, habitat needs, and population estimation techniques for black-tailed deer.

Strategies:

a. Identify new locations to conduct black-tailed deer studies.

b. Develop a peer reviewed study proposal that considers study areas in Regions 4, 5, and 6 that will address population dynamics, limiting factors, survival, habitat needs, and better approaches to estimating populations by 2009.

WHITE-TAILED DEER

Issue Statement:

Little is known about survival, population dynamics, and movements of white-tailed deer in Washington State.

Objective 37:

Develop research questions to be answered for white-tailed deer by 2010.

Strategies:

a. Develop peer reviewed study proposal(s) to better understand white-tailed deer population dynamics.
b. Conduct basic survival and movement research on white-tailed deer in eastern Washington.
c. Identify and implement new white-tailed deer research in eastern Washington that will address population dynamics, survival, habitat needs, and better approaches to estimating populations by 2010.

Disease

ALL DEER

Issue Statement:

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

Objective 38:

Monitor deer for disease each year and implement means to reduce the risk of disease when possible

Strategies:

a. Continue to monitor for chronic wasting disease (CWD) in coordination with the other western state's deer and elk managers.
b. Enforce the current regulations that prevent the captive farming of native deer and elk in Washington.
c. Continue to monitor for epizootic hemorrhagic disease (EHD), adenovirus hemorrhagic disease (AHD), hair loss syndrome, and tuberculosis (TB).

d. Monitor for other diseases and maintain coordination with other state's wildlife veterinarians as necessary.

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BIGHORN SHEEP *(Ovis canadensis)*

I. POPULATION STATUS AND TREND

Washington State has approximately 1,200 bighorn sheep distributed in 17 herds. Of those, 12 herds are California bighorn sheep and 5 are Rocky Mountain bighorn sheep. Average herd size is 92 sheep, and ranges from 10 to 198 sheep. Populations are stable to increasing in 14 herds and declining in 3 herds, where diseases and parasites are the primary causes for decline.

II. RECREATIONAL OPPORTUNITY

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, and ewe hunts). 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%).

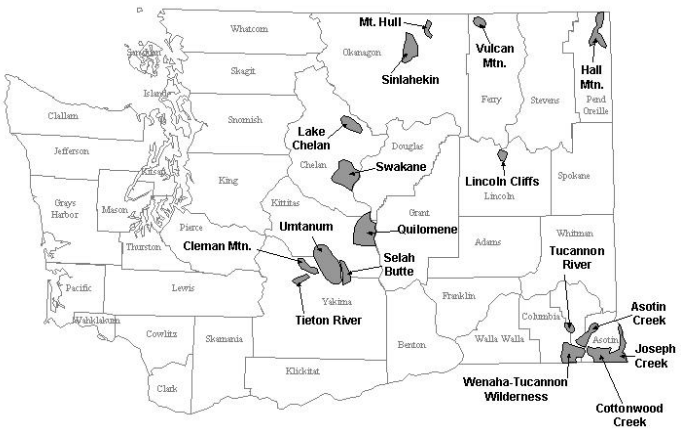

Figure 1. Bighorn sheep herds in Washington, 2008.

III. DATA COLLECTION

The Department surveys each herd 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. Preserve, protect, perpetuate, and manage bighorn sheep and their habitats to ensure healthy, productive populations.
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. Manage statewide bighorn sheep populations for a sustained yield.

V. ISSUE STATEMENTS, OBJECTIVES, AND 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, human development, 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 39:

Conduct habitat improvement projects or protect 3000 acres of the habitat in bighorn ranges in Vulcan Mountain, Swakane, Sinlahekin, and the Blue Mountains by 2015.

Strategies:

a. Inventory and map habitat conditions.
b. Conduct controlled burns to improve habitat quality.
c. If not detrimental to other habitat or wildlife objectives, consider distributing fertilizer and herbicides to improve forage quality.
d. Distribute mineral blocks to supplement forage quality.
e. Distribute water sources to improve habitat quality.
f. Pursue other activities that enhance desirable native plant communities.
g. Pursue conservation easements and fee title purchases.

Population Management

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 40:

Establish new bighorn sheep herds in Moses Coulee and Tucannon by 2012.

Strategies:

a. Relocate sheep from existing herds in Washington or out-of-state herds.
b. Allow the establishment of new herds through natural colonization of bighorn sheep.
c. Re-establish the Tucannon herd as Rocky Mountain bighorns instead of California bighorns.
d. Establish California bighorns in Moses Coulee drainage.

Issue Statement:

To better 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 41:

Achieve desired bighorn sheep population levels for a minimum of 10 herds as indicated in Table 1 by 2015.

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.
c. For herds that are below the desired population size, consider restricting harvest and augmenting the population.

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

	Population Size	
Herd	**Current**	**Desired**[b]
Hall Mountain[a]	26-31	40-70
Asotin Creek[a]	34-42	50-60
Black Butte[a]	72-88	300
Wenaha[a]	59-72	140
Cottonwood Creek[a]	24-30	50-60
Tucannon	24-30	60-70
Vulcan	21-27	80-110
Mt. Hull	59-72	55-80
Sinlahekin	27-33	50
Swakane	48-58	50-60
Quilomene	148-182	250-300

Umtanum (+Selah Butte)	156-190	250-300
Cleman Mountain	140-172	140-160
Lincoln Cliffs	85-105	90-100
Lake Chelan	41-51	100-150
Tieton River	33-41	75-150
Total	**997-1224**	**1,750-2,130**

[a] Rocky Mountain bighorn sheep
[b] Based on biologists estimates of habitat capacity, including forage, escape cover, and water sources

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 42:

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

Strategies:

a. Conduct big horn sheep sightability surveys annually for each herd.
b. Use radio collared sheep to enhance sightability of sheep during surveys.
c. Complete the survey protocol document by December 2009.

Issue Statement:

Certain types of *Pasteurella* spp. are pathogenic and produce acute bacterial pneumonia in bighorn sheep (Foreyt 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 interactions between domestic sheep and bighorn sheep (Schommer and Woolever 2001).

Objective 43:

Eliminate interactions between domestic sheep and bighorn sheep in the Swakane herd, Hells Canyon herds, Cleman Mountain, Tieton, and areas identified for repatriation of bighorn sheep.

Strategies:

a. Pursue management actions consistent with the "bighorn sheep-domestic sheep management guidelines" authored by the Western Association of Fish and Wildlife Agencies bighorn

sheep working group (2007) and the "Payette Principles" produced by the U.S. Forest Service (2007).

b. Maintain at least a 9-mile buffer between domestic sheep and bighorn sheep (BLM 1998).
c. Pursue the purchase of grazing leases and conservation easements.
d. Pursue the conversion of domestic sheep grazing allotments to cattle allotments.
e. Develop physical or habitat barriers between domestic and bighorn sheep.
f. Work with livestock producers to reduce transmission of disease and parasites from domestic sheep to bighorns.
g. Develop MOUs with land managers to maintain existing buffers and agreements for separation of domestic and bighorn sheep.

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 growing bighorn sheep populations.

Objective 44:

Provide recreational hunting season opportunities for individual bighorn sheep herds where harvest success averages ≥85% over a 3-year period, while at the same time bighorn population size remains stable or increasing.

Strategies:

a. Conduct bighorn sheep hunts by permit only and allow harvest of any ram.
b. Do not hunt transplanted animals for at least five years after initial release to ensure success of the transplant.
c. Survey herds annually for at least two years before being hunted to determine size, composition, and trend.
d. Set ram permit levels as indicated in Table 2 below:

Table 2. Permit levels for all bighorn sheep herds (see example below).

	…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]	≥50	>50:100	8	2
15% of the mature rams[d]	≥50	25-50:100	8	2
10% of the mature rams[d]	≥50	<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.

For example, the permit level for herd "X" is 15% of the mature ram population because the total population size is >30 sheep, the ram:ewe ratio is between 25-50 rams per 100 ewes, and the number of rams with ½ curl is >8 and at least 2 of those 8 rams are >¾ curl.

e. Adjust 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, nuisance activity, or agricultural damage. 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.

Enforcement

Issue Statement:

There are only about 1,200 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 45:

Account for all known bighorn sheep mortalities.

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.
c. Avoid lethal removal of bighorn sheep involved in damage and/or nuisance situations to the maximum extent possible and promote other non-lethal alternatives.

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 46:

Complete an evaluation of the relative risk of exposure or infection from *pasteurella* for all bighorn sheep herds in the state by 2010.

Strategies:

a. Monitor the recovery of bighorn sheep from *pasteurella* in Hells Canyon.
b. Investigate the probability of interactions between bighorn sheep and domestic sheep in areas where the two overlap.
c. Work collaboratively with Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, and Washington State University of disease research specifically addressing disease related issues between domestic and bighorn sheep.
d. Collect data for each herd opportunistically for assessing herd health.

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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. Currently, goats likely number fewer than 2,500 (Rice, Pers. Commun.). 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 remain low. However, a few populations are doing well. Goat populations along the southern Cascades, the north shore of Lake Chelan, surrounding Mount Baker, 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 excessive hunting, seasons were restricted in 1917, and all hunting closed by 1925. Later, goat populations recovered and hunting resumed in 1948. Since 1948, mountain goat hunting opportunity has been limited by permit.

Figure 1. Mountain goat distribution (shaded, excluding Olympic and Mount Rainier National Parks) and areas open to hunting (crosshatch), 2008.

Unfortunately, goat abundance has decreased dramatically over the last few decades. As such, hunting opportunity has declined from 218 permits in 1991 to 18 permits in 2008. The number of permit applications per hunt area ranges from 1,000 to 4,700, and averages over 1,000 applications/mountain goat permit. The hunting season for mountain goat is generally about 61 days (September 1 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 ≥4 inches, although hunters are urged not to harvest a nanny and it's unlawful to harvest a nanny accompanied by a kid. During the 2008 season, only a fraction of the mountain goat range was open to hunting, with 18 permits in 10 goat units.

III. DATA COLLECTION

For many years, funding limitations greatly limited the Department's ability to conduct thorough and consistent surveys. However, funding from cooperative grant sources, and auction and raffle revenue, has now allowed the Department to survey all goat units open to hunting. All surveys are conducted using a helicopter and generally occur in July or September. Because funding has not been sufficient to survey all goat units, hunted units have been the priority.

The Department initiated a mountain goat research project 4 years ago. The goals of the project were to develop robust survey protocols and determine the cause(s) for the decline of goats in much of their range. Preliminary findings from that study are now available and incorporated within this chapter.

IV. MOUNTAIN GOAT MANAGEMENT GOALS

The statewide goals for mountain goats are:

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

V. ISSUE STATEMENTS, OBJECTIVES, AND STRATEGIES

Population Management

Issue Statement:

Mountain goat populations typically occur as meta-populations scattered across the landscape on "habitat islands" where topographic and vegetative characteristics are suitable for goats. The sizes and distribution of these islands of suitable habitats are just now being documented in Washington (Wells 2006 and other work in progress). Understanding the spatial relationship between these habitats and mountain goat use from a meta-population perspective is critical for sustainable management of mountain goats.

Objective 47:

Develop a map (and supporting documents) identifying population management units based on habitats and meta-population structure of mountain goats in Washington by 2011.

Strategies:

a. Develop a GIS model predicting quality and locations of suitable mountain goat habitats in Washington.
b. Develop a meta-population model for goats based on research findings of suitable habitats, goat movement, and population centers.
c. Re-define goat unit boundaries if spatial use patterns of distinct populations are inconsistent with current unit boundaries.

Issue Statement:

Mountain goat populations are sensitive to over-exploitation because of their low population growth rate and relatively low densities (Hamel et al. 2006, Festa-Bianchet and Côté 2008). As such, assessing the status of each mountain goat population annually is necessary to ensure sustainability.

Objective 48:

Monitor population demographics of mountain goats at a level where declines in population size can be detected within 3-years or less.

Strategies:

a. Survey all hunted goat populations annually to estimate population size.
b. Manage local goat abundance at the population management unit level.
c. Continue using demographic data from annual surveys and population modeling to assess long-term viability of mountain goat populations.
d. Incorporate demographic data from Washington mountain goats into population models as opportunities become available.

Issue Statement:

Mountain goat populations have declined dramatically in some portions of the North Cascades. Research findings suggest historical hunting levels may have been too high and unsustainable for goats. As such, many of the areas that were historically hunted have been closed to hunting for several years. Although research on other potential causes of declines would be beneficial, there is a need to develop strategies for recovering the populations in these areas.

Objective 49:

Implement management strategies that result in a detectable increasing trend in mountain goat abundance in the North Cascades by 2015.

Strategies:

a. Maintain hunting closures in population management unit areas with less than 100 goats.

b. As new information becomes available about the cause of goat declines, pursue strategies to mitigate those causes.
c. Develop an implementation document by December 2009 for relocating goats to vacant suitable habitats or augmenting depressed goat populations. The document should include at a minimum:
    - Rationale and justification for relocation
    - Priority areas for relocation
    - List of collaborating groups, agencies, and tribes
    - Source populations for relocation and impacts of removals on source population
    - Time line for relocation
    - Monitoring plan

d. Develop cooperative agreements with Tribes and land managers (e.g., U.S. Forest Service, Park Service) for habitat enhancement projects, harvest allocation and reporting agreements, and translocation efforts.

Recreation Management

Issue Statement:

Mountain goat populations are sensitive to over-harvest (Hamel et al. 2006, Festa-Bianchet and Côté 2008); goats have a low reproductive potential, extended parental care, low juvenile survival, and older age of sexual maturity in mountain goats. 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 (Rice and Gay. in prep).

Objective 50:

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.

Strategies:

a. Manage abundance and harvest on a population management unit level.
   Goat populations will be surveyed beginning at least three years before being hunted to determine population size and trend. For populations to be hunted, surveys must indicate a population size of at least 100 goats in a population management unit (Rice and Gay. in prep).
b. For herds meeting the above criteria, permits shall be issued to limit the goat harvest to 4% or less of the estimated local population (excluding kids) (Hebert and Turnbull 1977, Kuck 1977, Festa-Bianchet and Côté 2008, Rice and Gay. in prep).
c. For each hunted population, nanny harvest will be maintained at or below 30% of the total harvest. This will be accomplished by:
    i. Encouraging goat hunters to harvest males in a letter accompanying each permit.

ii. Requiring all goat hunters to view an educational video on mountain goat sex identification.
iii. Restricting hunting opportunity for populations with excess nanny harvest for three years of a 5-year period.

Enforcement

Issue Statement:

Mountain goats naturally occur as bands in 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 potentially critical factors. To ensure the sustainability of specific sub-populations, and the long-term existence of the entire meta-populations, it is important to document all mortalities and minimize illegal harvest and harassment of mountain goats.

Objective 51:

Develop a procedure to account for all mountain goat harvest mortalities by 2010.

Strategies:

a. Require reporting of all harvested mountain goats.
b. Develop a harvest allocation and reporting agreement with Tribes.
c. Enforce regulations to limit illegal harvest and harassment of mountain goats.
d. Investigate the potential for harassment of mountain goats resulting from recreational activities.

Research

Issue Statement:

Mountain goat abundance has declined steadily over recent decades throughout much of their historic range.

Objective 52:

Develop peer-reviewed publications that describe why mountain goat populations have declined, how to monitor goat populations and makes recommendations on how to recover populations by 2010.

Strategies:

a. Analyze data from recently completed research.
b. Develop publications and reports with research cooperators summarizing results and making recommendations for management.

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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 850-1,000 in 2002, to 1,500-2,000 in 2008 corresponding to about a 9.6% annual increase in population size (Poelker 1972, Zender and Ferguson, pers. Comm.2008). 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 Chelan, Lincoln, Whitman, Okanogan, and Whatcom Counties, and a few dispersing animals have been documented in surrounding areas and in the Blue Mountains.

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 800–10,000, corresponding to about 100-900 applications/permit (2007 season).

Figure 1. Moose range in Washington as of 1997 (Johnson and Cassidy 1997).

Currently, moose hunts are by permit only and, if drawn, it is an once-in-a-lifetime opportunity (except antlerless hunts). Hunting season dates are October 1 - November 30 and hunters may use any legal equipment. Moose hunts are either “any moose” or “antlerless only”. In “any moose” hunts, the majority of the harvest is adult bulls. Hunters typically see seven moose/day and, as such, harvest success is high (over 90%;). All moose hunters are required to report their hunting activities, regardless of whether 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. Preserve, protect, perpetuate, and manage moose and their habitats to ensure healthy, productive populations.
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. Manage statewide moose populations for a sustained yield.

V. ISSUE STATEMENTS, OBJECTIVES, AND STRATEGIES

Population Management

Issue Statement:

Currently, the status of moose populations is estimated through aerial surveys that are conducted on a three-year rotation (i.e., all units surveyed once every three years).

Objective 53:

Monitor population demographics of moose at a level where a 20% decline in population size can be detected within three years.

Strategies:

a. Conduct helicopter surveys for all moose population annually to estimate minimum abundance, bull:cow ratios, and cow:calf ratios.
b. Incorporate survey data into a sightability model to evaluation the population status of moose at a GMU level.
c. Continue to develop, test, and employ most effective and efficient survey techniques for moose.

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 (over 90%) and post-season bull: cow ratios that are favorable for healthy moose populations.

Objective 54:

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

Strategies:

a. Moose populations will be surveyed annually beginning at least two years before 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 or property damage (Boer and Keppie 1988).
c. Consider liberalizing or restricting moose hunting opportunity as indicated below:

Table 1. Moose harvest guidelines.

	Harvest		
Parameter [a]	**Liberalize**	**Acceptable**	**Restrict**
Average bull:100 cow ratio	>75 bulls	60-75 bulls	<60 bulls
Average calf:100 cow ratio[b]	>45 calves	30-45 calves	<30 calves
Median age of harvested bulls	>5.5 years	4.5-5.5 years	<4.5 years

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

Issue Statement:

Since 1991, the average number of moose applications/permit has risen from 63 to as high as 458 applications perm permit in 2006. 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 55:

As part of the 2009-11 hunting season regulation package, evaluate modification of the permit drawing that is supported by the majority of hunters.

Strategies:

a. Maintain moose hunting by permit only.*
b. Allow "once-during-a-lifetime" opportunity for moose hunters (except antlerless only moose hunts, and auction and raffle hunts).
c. Consider alternatives that may result in hunter support, and improve the odds of drawing a permit.

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BLACK BEAR *(Ursus americanus)*

I. POPULATION STATUS AND TREND

Washington State has an abundant and healthy black bear population. Estimates using population reconstruction suggest the statewide bear population is roughly 25,000-30,000 bears (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 three-year rotation. The percentage of females in the total harvest and median ages of males and females are used as indicators of exploitation (Beecham and Rohlman 1994).

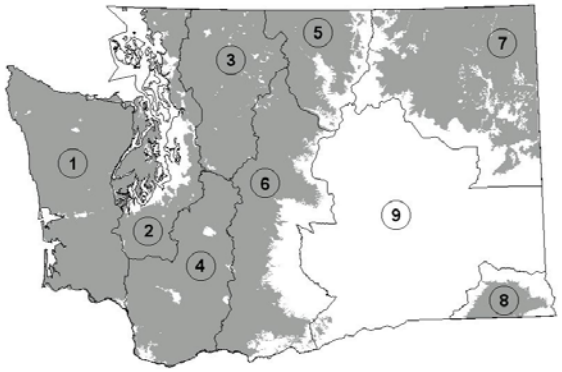

Figure 2. Black bear distribution and black bear management units (BBMU) in Washington, 2002

II. RECREATIONAL OPPORTUNITY

Black bear seasons changed considerably in 1996 when Washington voters passed Initiative 655 (which banned the use of bait and dogs 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, because of I-655, 1997 bear seasons were lengthened and the bag limit was increased in some areas. Legislation also was passed that provided the authority to the Fish and Wildlife Commission to reduce 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. During the first edition of the Game Management Plan (2003-2009), the majority of the hunting opportunity was in the fall, with a limited permit-only spring hunt in southeastern Washington. The Department extended the spring bear hunt opportunity in 2005 during a pilot damage hunt to address tree damage caused by bears on commercial timberlands in westerns Washington. Since 2003, the average harvest during fall and spring (excludes bears harvested under depredation permits) seasons were 1,549 and 21 bears, respectively.

Table 1. Statewide black bear harvest, hunter effort and median age information, 1991 - 2006.

								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%
2001	924	515	1,439	25,188	5.7	230,431	160	3.5	5.0	36%
2002	1,133	592	1,725	24,844	6.9	219,428	127	4.5	6.5	34%
2003	983	583	1,566	22,510	7.0	192,544	123	3.5	5.5	37%
2004	1,093	561	1,654	21,573	7.7	186,626	113	4.0	5.5	34%
2005	940	393	1,333	20,724	6.4	172,527	129			29%
2006	1,061	581	1,642	21,801	7.5	168,237	103			35%

III. DATA COLLECTION

Assessing the status of a bear population is extremely difficult given their secretive nature. The Department tested the use bait station surveys as an index of relative bear abundance in the 1990s. 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. 2002). Based on those finding, the project was discontinued and no formal surveys were conducted between 1997 and 2005. Since 2005, the Department began experimenting with using adult female survivorship as an indicator to bear status (Clark 1999). During the last three years, the Department has radio-marked bears in central Washington and south Puget Sound.

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 300-500 human-bear interactions are documented annually (Washington Dept. of Fish and Wildlife 2007). 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 11 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. Preserve, protect, perpetuate, and manage black bear and their habitats to ensure healthy, productive populations.
2. Minimize threats to public safety and property damage from black bears, while at the same time maintaining a sustainable and viable bear population.
3. 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.
4. Manage statewide black bear populations for a sustained yield.
5. Improve our understanding of predator-prey relationships and the potential impacts of black bears on key prey populations.

VII. ISSUE STATEMENTS, OBJECTIVES, AND STRATEGIES

Population Management

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 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 or retain stability.

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 56:

Monitor population demographics of black bears at a level where a 20% change in population size can be detected within three years or less.

Strategies:

a. Develop and test a survey method using female and cub survival of bears as an indicator to population status.
b. Estimate population growth using data from long-term monitoring projects, research projects, and modeling.
c. Evaluate the use of population reconstruction from ages of harvested bears as a indicator to population status.
d. Use sex and age ratios of harvest bears as secondary indicator of population change.

Recreation Management

Public Opinions

Issue Statement:

Public support for hunting black bears is lower than support for hunting several other big game animals (Duda et al. 2002, 2008). Recognizing public and hunter attitudes, WDFW faces challenging decisions about balancing hunter opportunities and public safety with public attitudes.

Objective 57:

Develop a whitepaper by 2010 describing the objectives, rationale, and public opinions for implementing spring bear hunt opportunity in Washington.

Strategies:

a. Provide strategies to mitigate problems caused by bears that correspond to methods supported by the public (see objective 60).
b. In the annual Status and Trend report, publish the results of strategies implemented under the population objectives and public safety objectives.
c. Make any changes to current bear hunting on a gradual basis and promote public involvement.

Harvest Guidelines

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 of 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 harvested 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. A supplemental measure of population status is needed to better manage bear populations in Washington.

Objective 58:

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

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:

Table 2. Black bear harvest guidelines.

	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

Note: Thresholds outlined in strategy "c" above are currently implemented.

Issue Statements:

Impacts to black bear populations and other native wildlife. The harvest guidelines above favor a stable and healthy bear population and are consistent with long-term sustainability. The corresponding bear population should remain at or near current levels and it is unlikely it will result in greater impacts to other wildlife species (i.e., deer and elk) or habitat communities.

Black bear harvest impacts on native species. The public has voiced concern about potential impacts of black bear hunting has on grizzly bears. With the prohibition on the use of dogs and

bait for recreational hunting of bears, potential impacts to grizzly bears caused by dogs or bait was greatly reduced. However, there is a need to educate black bear hunters on how to identify and distinguish a black bear from a grizzly bear.

Objective 59:

Provide educational materials to 50% of black bear hunters in the Selkirk and North Cascades grizzly bear recovery zone by 2013.

Strategies:

a. Provide educational brochures to black bear hunters in areas with a known grizzly bear population.
b. If black bear hunting results in repeated deaths to grizzly bears, develop additional strategies to minimize the impacts to grizzly bears recovery.

Public Safety

Issue Statement:

A primary objective of WDFW is to protect people from dangerous wildlife, including black bears. While guaranteeing that black bears will never negatively impact people is impossible, the Department does implement activities to reduce human-bear interactions.

Objective 60:

Minimize negative human-bear interactions so that the "number of negative interactions per capita" is constant or declining over the life of this plan.

Strategies:

a. Develop a black bear education and outreach plan by 2012.
b. Distribute educational materials to key entities and locations.
c. Evaluate the efficacy of capture-relocation and hazing of problem bears for mitigating conflict.
d. Utilize agency kill authority and depredation permits for problem bear incidents.
e. Promote rules, activities, and programs (e.g., fines, bear proof containers) that reduce the likelihood of bears encountering accessible garbage.

Timber Damage

Issue Statement:

Bear foods are scarce during spring, particularly those with a high nutritional value. Consequently, bears often forage on the sapwood of coniferous trees. During spring, sapwood is one of the few foods available to bears and it has a relatively high sugar content compared to other available foods. Trees with the highest sugar content, hence preferred by bears, are those

with high growth rates, such as trees on private industrial timberlands. Bear selection for sapwood 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 61:

Provide informational materials/brochures to help timber owners with: validating and anticipating bear damage; use of non-lethal methods to avoid damage; and lethal removal options that emphasize the use of licensed hunters. Develop a minimum of one of these brochures each year beginning in 2011. .

Strategies:

a. Develop an educational tool for validating bear damage.
b. Develop survey protocols for timber owners to determine the level and severity of bear damage over time.
c. Provide educational information on how to avoid timber damage by bears.
d. Encourage the use of non-lethal methods for responding to timber damage by bears.
e. Provide focused recreational bear hunting seasons in spring to mitigate timber damage by bears.
f. Implement an incentive-based program by 2010 for timber owners to use spring hunting seasons with licensed hunters in lieu of bear removals using contracted hunters or bear feeding programs.
g. 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 pre-commercially-thinned timber, $\leq$ 30 years of age.

*The current threshold for issuing bear depredation permits for removal of bears on private industrial timberlands is <30 trees/stand. The threshold was developed jointly in 1997 by WDFW and Washington Forest Protection Association.

Predator-prey dynamics

Issue Statement:

Black bears predominately eat vegetation. However, in some areas, a sizable portion of their diet is deer and elk, particularly deer fawns and elk calves. Bears have naturally evolved with deer and elk; so even in these scenarios predation rates usually do not result in significant impacts to ungulate growth rates. However, bear predation has the potential to impact prey populations under various environmental conditions.

Objective 62:

Develop a report summarizing the current state of scientific knowledge about black bear predation on ungulates (i.e., deer and elk), the potential impacts to ungulate population growth, and management options for black bears in Washington by 2010.

Strategies:

a. Conduct a literature and peer review on impacts of black bear predation of ungulates.
b. Develop a list of potential areas in Washington where black bear predation might be impacting deer or elk population growth.
c. Discuss black bear-prey management strategies and options with other state, federal, and tribal managers.
d. Develop a peer reviewed study design for measuring the impacts of black bear predation on ungulates in the Blue Mountains by 2011.

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COUGAR *(Puma concolor)*

I. POPULATION STATUS AND TREND

Cougar occur throughout most of the forested regions of Washington State, encompassing approximately 88,497 km^2 or 51% of the state (Figure 1). For management purposes, the state is divided into nine cougar management units (CMUs)(Figure 1). No reliable estimate of statewide cougar abundance is available for Washington. In 2003, two techniques were used to provide an approximate range of statewide cougar abundance. A rough estimate from population reconstruction indicated that the minimum number of cougars in Washington might be around 900 animals. An extrapolation across the state with the highest cougar density reported in the literature suggested the maximum number of cougars in Washington might be around 4,100 animals. Since 2003, cougar population size has been assessed in three project areas in Washington. Currently, the best available estimate of statewide abundance is from an extrapolation from those projects, corresponding to about 1,900 to 2,100 animals (excluding kittens).

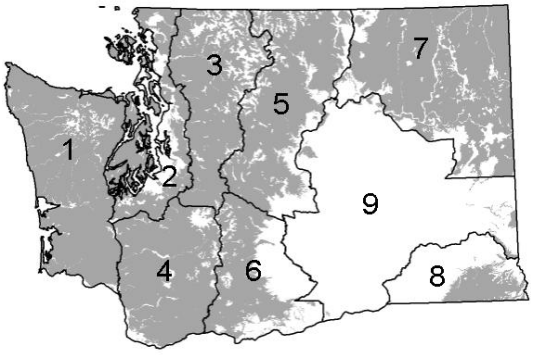

Figure 1. Distribution of cougars (gray) and cougar management units (CMUs) (numbers) in Washington.

Cougars generally are shy, secretive animals and occur throughout a variety of habitat types. Because of their reclusive nature, few people actually encounter a cougar in the wild or have an opportunity to harvest one. As a result, cougar populations can be fairly resilient to moderate-heavy exploitation. This point was demonstrated during the bounty seasons of the early 1900s, when cougar populations persisted during years of widespread persecution.

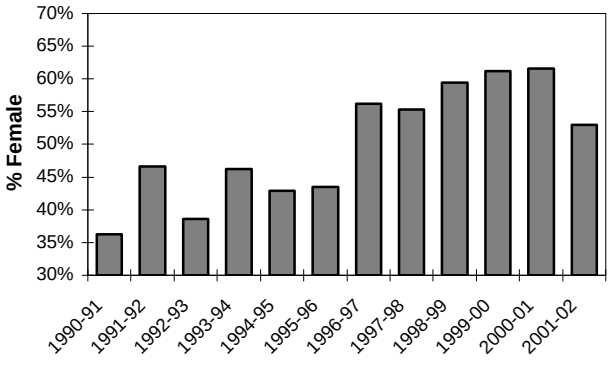

Figure 2. Percent female in statewide cougar harvest, 1990-2002, Washington.

Cougar populations and management emphasis have visibly changed during the past 12 years in Washington State. From 1987 to 1996, cougar harvest was conservative and was controlled by permit only hunting. The majority of the cougars harvested were done so with the aid of dogs. As a result, hunters tended to be selective, harvesting mostly males (Fig. 2) and older aged animals (Fig. 3). In 1996, Voter Initiative 655 banned the use of dogs for recreational cougar hunting and cougar harvest changed dramatically. From 1996 to 2003, the majority of cougars were harvested either as opportunistic encounters by deer-elk hunters and cougars, or using tracking and calling techniques. These harvest methods are not as selective as using dogs. Consequently, hunters harvested more females (Fig. 2) and younger cougars (Fig. 4) from 1996 to 2003.The changes in harvest vulnerability for specific sex and age classes of cougars have important implications for cougar populations. Without the aid of dogs, the potential for negatively impacting cougar populations is greater due to the shift to harvesting more females and younger animals (as well as more total animals) (Martorello and Beausoleil 2006, Lambert et al. 2003).

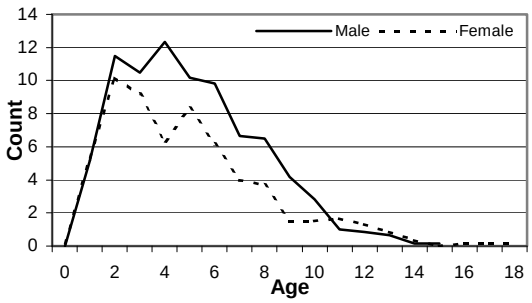

Figure 3. Age structure of harvested cougar using selective harvest methods, Washington.

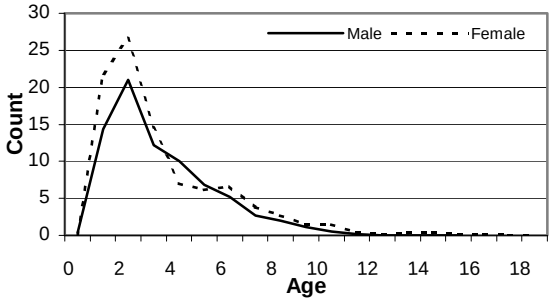

Figure 4. Age structure of harvested cougar using non-selective harvest methods, Washington.

Since 1996, WDFW has recorded information on human-cougar interactions. Of particular concern is the level of human safety incidents, and pet and livestock depredations. Recognizing the widespread scope of the issue and its importance to cougars and people in the future, current cougar management goals include maintaining sustainable cougar populations and reducing human-cougar interactions. In some cases, reducing cougar populations to a lower, but sustainable level may help achieve both of these goals. From 2004-2007, the Department experimented with reducing cougar populations to address public safety needs and reduce pet/livestock depredation. Results from the pilot program suggested that there might be a correlation between reduced cougar populations and reduced complaint levels, but it's unclear if it's a cause-and-effect relationship (WDFW 2008). WDFW plans to continue the pilot program until spring 2011 under the legislative authority of ESHB 2438. Research is also being conducted by University of Washington and Washington State University investigating a multitude of factors that might influence human-cougar interactions.

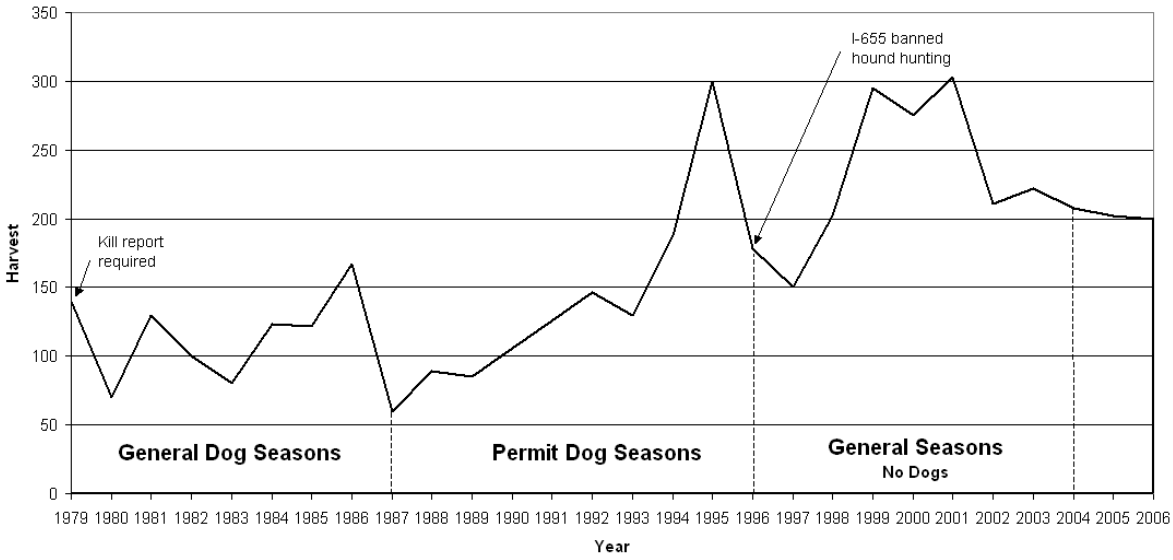

Figure 5. Trends in cougar season structure and harvest in Washington, 1979-2006.

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 5). The number of hunters purchasing a cougar tag has increased in Washington, largely an artifact of changes in license cost, license structure, bag limits, and season length. Because of the season structure changes, the number of recreational days open to cougar hunting has increased from a low of 30 days in 1996 to a high of 228 days in 1999. This has, in part, resulted in an increase in the number of cougars harvested annually.

III. DATA COLLECTION

The majority of data collected on cougar is from harvested animals. A mandatory carcass check is required for all harvested cougars, where data samples are collected including; kill date and location, sex, age (from tooth analysis), physical condition, weight, DNA (via tissue sample), and hunter information. From these kill data the Department monitors kill date and location, total kill, and sex and age composition of the total harvest.

In addition to harvest data, the Department also collects demographic data from various ongoing cougar research projects in the state. Using these data and population modeling methods, the Department monitors the status of cougar populations in a few areas of the state and assess the impacts of hunting on cougar populations. Information from these study areas may then be extrapolated to other similar areas in Washington.

IV. COUGAR MANAGEMENT GOALS

The statewide goals for cougar are:

1. Preserve, protect, perpetuate, and manage cougar and their habitats to ensure healthy, productive populations.
2. Minimize threats to public safety and private property from cougars.
3. 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.
4. Manage statewide cougar populations for a sustained yield.
5. Improve our understanding of predator-prey relationships and the potential impacts of cougar on key prey populations.

V. ISSUE STATEMENTS, OBJECTIVES, AND STRATEGIES

Zone Management

Issue Statement:

The environmental factors (e.g., prey density and human density) that influence cougar populations are not uniform across Washington, nor is the level of interaction that cougars have with people or even other wildlife. For example, in some regions cougars exist in fairly remote areas and have minimal interaction with people, while in others regions cougars exist on the fringe of suburban environments and have frequent interactions with people. In some regions it may be excellent cougar habitat, but there is a long-standing history of cougar depredation on livestock. While in other regions, cougar populations may be at carrying capacity with minimal conflict with people, but cougar predation on recovering prey populations is a concern. Each of these scenarios has different management needs and would likely have different population objectives and even harvest strategies. One way to facilitate these differences is through a zone management approach, where the population objectives and potential management actions match the resource need in a particular zone.

Objective 63:

Transition to a zone management approach for managing cougar by 2010.

Strategies:

a. Implement zones that correspond to each CMU or portions of CMUs.
b. Implement population objectives outlines in Table 1.
c. Collect public attitudes on cougar management issues for priority zones by 2012.
d. Implement hunting season options that correspond to management needs and local public preferences for each zone.

Population Objectives

Issue Statement:

Wildlife managers are frequently asked to balance the desire for abundant wildlife populations and other equally important objectives. For example, white-tailed deer managers often manage herds below carrying capacity to reduce deer damage to crops, but at a level that is still sustainable and healthy. Given the variety of interests in cougars, cougars are managed in some areas of Washington to balance the need for public safety and protection of property, while at the same time maintaining long-term sustainable populations.

Objective 64:

Manage cougar populations through appropriate harvest strategies within each CMU as indicated in Table 1 over the life of this plan.

Table 1. Cougar population objectives for each CMU.

CMU		Objective
1	Coastal	Maintain a stable cougar population
2	Puget Sound	Manage cougar population at a level that increases public safety and protection of property (see objectives 71 and 75)
3	North Cascades	Maintain a stable cougar population
4	South Cascades	Maintain a stable cougar population
5	East Cascades North	Maintain a stable cougar population at 2007 level.
6	East Cascades South	Maintain a stable cougar population
7	Northeastern	Maintain a stable cougar population at 2007 level.
8	Blue Mountains	Maintain a stable cougar population
9	Columbia Basin	Unsustainable; not considered suitable cougar habitat

Strategy:

a. For each CMU, implement a female harvest quota that corresponds to the cougar population, objective.
b. For each CMU, develop a male harvest guideline for a maximum sustainable harvest while at the same time providing a stable, healthy male age structure.
c. Modify harvest strategies and objectives consistent with changing prey population levels and cougar population trends.

Impacts:

Prey impacts on cougar. It is unlikely that cougar populations will be negatively impacted by management strategies for deer, elk, and other prey species. The current population levels for deer and elk populations are compatible with the cougar population objectives for each CMU.

Cougar impacts on prey. The cougar population objectives may impact some prey species. Because of a lower harvest level of female cougar in some CMUs, cougar populations are expected to stabilize and may increase in some local areas. Any local increases in cougars will result in more predation by cougar on ungulates (primarily deer and elk). However, if there is an

increase in the predation rate, it's unknown whether the increase would be additive (additional prey killed by cougars causing total prey mortality to increase) or compensatory (as predation by cougars increases, another prey mortality source decreases, so total mortality remains constant), or whether the net result would be large enough to detect. While there is evidence that cougar populations can impact a prey population's growth rate, this is typically associated with a small, isolated prey population, or a prey population that suffers from other environmental stressors.

Some hunters voiced concerns about the impacts of cougar predation on deer and elk herds. The primary prey species for cougars are deer and elk, and in some cases cougar populations can influence the growth rates of deer and elk populations. Increased cougar harvest is a management action that can be used to increase deer or elk populations. When Washington citizens were asked about their attitudes about managing cougars to increase deer and elk populations, support was low (Fig. 6). Recognizing the role of cougars in the ecosystem and public attitudes, WDFW manages for stable cougar populations in most management units. However, cougar management objectives and strategies do include some flexibility to address the recovery of low prey populations. In these situations, local cougar populations can be managed to enhance recovery efforts of prey species as long as the total cougar harvest within the respective CMU stays within the female harvest guidelines in Table 2.

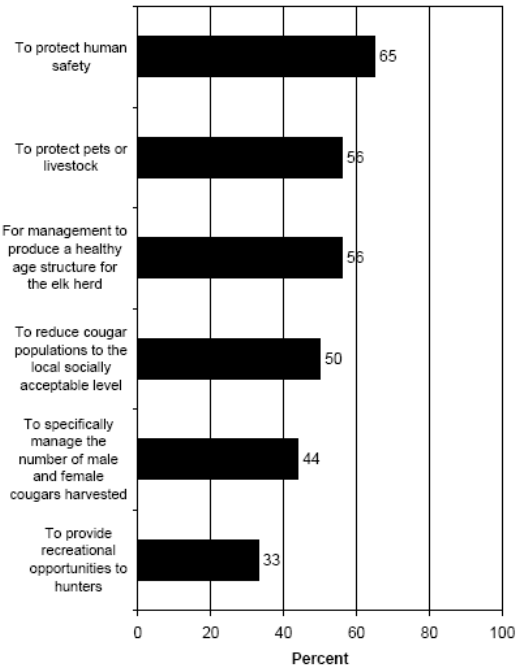

Figure 6. During a general public survey, the percent of respondents that supported cougar hunting for specific purposes (Duda et al. 2008).

Population Status

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 valid indicators of population status, and when the collection methods are constant overtime (Caughley 1977). Today, neither of these two requirements has been satisfied for cougars in most CMUs. The lack of a valid population indicator, coupled with limited biological data, results in many uncertainties about cougar populations in Washington, including:

- The number of cougars in each CMU.
- The trend in cougar population size.
- The rate of population increase or decrease.
- The age and sex structure of the living cougar population.
- Cougar population responses to harvest.

- Age and sex specific survival rates.
- The effects of hunter harvest and how that relates to natural mortality.

Given these uncertainties, there is a critical need for the collection of accurate and precise biological data on cougar populations, and the development of a robust population indicator.

Objective 65:

Monitor the population demographics of cougar at a level where a significant change in population size can be detected within three years or less for CMUs 5, 7, & 8. Others may be added if appropriate due to high complaint levels or where hunts with dogs are allowed.

Strategies:

a. To ensure population sustainability, mark and monitor cougars in CMUs where the objective is to maintain the cougar population at 2007 levels (CMUs 5 and 7).
b. Estimate cougar population size using data from marked cougar, capture-recapture experiments, and population modeling in CMU 8 (Blue Mountains).
c. Develop inventory and monitoring protocols for cougar.
d. Estimate the impacts of harvest on cougar populations through modeling.
e. Evaluate the age structure of living cougar population in CMUs 5 and 7, and implement management actions that result in a stable, healthy age distribution.

Predator-prey dynamics

Issue Statement:

Cougar populations exist within a complex balance between prey availability, habitat quality and quantity, social behaviors, dispersal, natural mortality, and human-induced mortality and disturbance. Of these, the relationship between cougars and ungulates is central to cougar population dynamics. Cougars are effective and efficient predators and average about one deer kill (or deer equivalent) every 10 days (Ackerman et al. 1986). This has important implications when considering an ungulate population's ability to support cougars and the impacts of cougars on ungulate populations. The intricate details of the predator-prey relationship are critical for managing cougars and several questions remain, including: how carry capacity for cougars change as ungulate densities fluctuate, the impacts to ungulate populations when cougar abundance is high or low, the role of habitat quality, fragmentation, and connective corridors on the cougar-ungulate relationship. By understanding these relationships wildlife managers will be able to manage cougars with greater scientific certainty.

Objective 66:

Develop a peer reviewed research proposal by 2010 to determine the effects of manipulating cougar – population level impacts to ungulate population objectives.

Strategies:

e. Develop a study proposal and seek grants and other funding support.
f. Initiate cougar population monitoring in the Blue Mountains.
g. Manipulate cougar harvest strategies and monitor changes to prey population levels.

Sources and Sinks

Issue Statement:

Cougar population size is not constant throughout all areas of Washington State. Factors that influence cougar populations, such as prey densities and human-induced mortality, vary from region to region and certain areas of the state may act as cougar "source" or "sink" areas. "Sources" are those areas where prey densities are relatively high and cougar mortality is low. As a result, the area acts as a source population for cougars to migrate out of and into surrounding habitats (Lindzey et al. 1988, Spreadbury et al. 1996, Spencer et al. 2001). "Sinks" are those areas where prey densities are relatively low and cougar mortality is high. As a result, the area acts as a sink where cougars that migrate into the area have a low chance of surviving (Clark 1999, Logan and Sweanor 2001).

The distribution and effects of source and sink areas are important for managing cougars, particularly if they are counter to the population objectives for the surrounding area. The existence of source and sink areas, and the potential effects, have not been investigated in Washington State.

Objective 67:

Identify a minimum of four cougar habitats that act as a population source or sink by 2011.

Strategies:

a. Evaluate cougar survival rates in areas that appear to be problematic or where population objectives are not being met.
b. Evaluate the impacts of source or sink habitats on human-cougar conflicts.
c. Identify priority areas where management changes may be necessary.

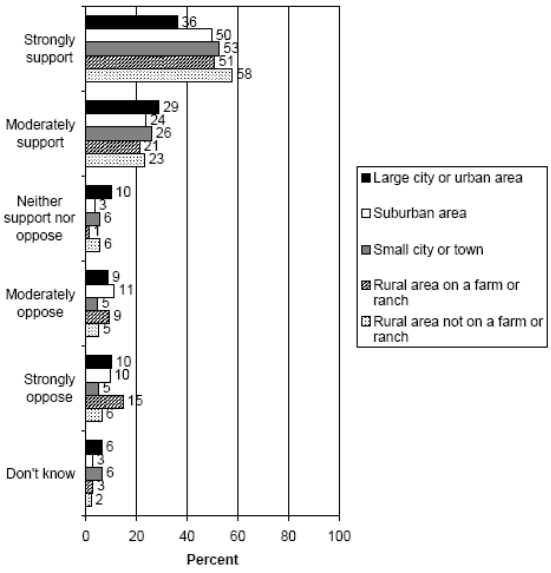

Figure 6a. During a general public survey, the percentage respondents supporting weighting local public preference more than statewide input for local cougar issues (Duda et a. 2008)

Recreational Opportunity

Public Opinions

Issue Statement:

Public attitudes on cougar management and hunting vary from region to region in Washington.

Recognizing those differences, WDFW asked the general public if they supported weighting local public preferences more than statewide input for local cougar management issues. Overall, 74% (n=805) of respondents supported weighting local public preferences. The relatively high support also appeared to be consistent regardless if respondents were from an urban, suburban, or rural areas (Fig. 6a).

Objective 68:

Implement harvest strategies that are consistent with the biological status of cougars and local public preferences.

Strategies:

a. Provide a variety of harvest strategies (e.g., general, dog, and permit season options, season dates) to the public that fosters local input for selecting the preferred strategy.
b. Implement a public education program on cougar management and public safety.
c. Provide strategies to mitigate problem cougars that correspond to methods supported by the local public.
d.
e. In the annual Status and Trend Report, publish the results of strategies implemented under the population objectives and public safety objectives.

Harvest Guidelines

Issue Statement:

In general, cougars are managed to protect human safety and property, 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, harvest guidelines for female cougars were established for each CMU (Ross and Jalkotzy 1996). These harvest guidelines were developed using two methods: by evaluating data on past harvest and age-sex structure of harvested cougar, and developing a science based population growth model to evaluate the impacts of harvest on cougar populations. For each CMU (except Puget Sound), the guidelines correspond to a female harvest necessary to achieve a stable and sustainable cougar population at current levels (Ross and Jalkotzy 1996, Logan and Sweanor 2000).

Objective 69:

Provide recreational opportunities to target the annual harvest of 45-60 female cougars statewide, while at the same time maintaining a sustainable cougar population in each cougar management unit (excluding CMU 2 and 9).

Strategies:

a. Establish recreational hunting seasons that target the harvest quota identified in Table 2.
b. Update harvest guidelines every three years, corresponding to the three year hunting season package.
c. Update the quotas annually as appropriate, with a priority on the areas included in pilot cougar hunts allowing the use of dogs.
d. For each CMU, develop a male harvest guideline for a maximum sustainable harvest (if necessary) while at the same time providing a stable, healthy male age structure.
e. Consider creating a male-only season for cougar hunts with the aid of dogs or other regulations to maintain adult male objectives within a CMU.

Table 2. Female cougar harvest guidelines [a] by Cougar Management Unit (CMU).

CMU	Objective	Female Harvest Quota	**Average Female Harvest 2002-2005**
1. Coastal	Stable	9	7
2. Puget Sound	Maintain public safety	No limit	5
3. North Cascades	Stable	7	3
4. South Cascades	Stable	8	9
5. East Cascades North	Stable	11	25
6. East Cascades South	Stable	4	5
7. Northeastern	Stable	10	41
8. Blue Mountains	Stable	4	5
9. Columbia Basin	Unsustainable	No limit	3
Statewide		**53**	**103**

[a] Quotas are based on current biological information and harvest levels during the past 3-years; quotas include recreational harvest, depredation kills, and public safety cougar removals. However, quotas may be exceeded for depredation kills and public safety cougar removals.

Impacts:

The public has voiced concern about impacts of cougar hunting on non-target species (i.e., lynx or grizzly bear). With the prohibition on the use of dogs for recreational hunting on all native cats and bears in 1996, potential impacts to non-target species caused by dogs was greatly reduced. The only exception to this is the potential impacts to lynx or grizzly bears during public safety cougar removals, when it's lawful to use dogs to pursue cougar. However, the potential for an encounter between dogs and these listed species is low given the narrow geographical focus of the removals, lynx, and grizzly bears, and the relatively low number of participants. In addition, the timing of the cougar removals (Dec.–Mar.) corresponds to the winter dormancy period for bears, thereby greatly diminishing any potential impact to grizzly bears. Recognizing that there is some potential to encounter a lynx, specific educational materials that outline steps to minimize impacts to lynx will be provided to all cougar removal participants in lynx habitat.

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 70:

Account for all human related cougar mortalities every year.

Strategies:

a. Require mandatory carcass check of all harvested cougar and provide a summary in the harvest report each year.*
b. Mark all harvested cougar with a unique pelt identification tag.*
c. Collect biological information from all harvested cougar.*
d. By 2009, implement a mandatory reporting system for all cougar hunters regardless if they harvested a cougar or not.

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 that attempt to minimize human-cougar interactions in areas with a demonstrated history of conflict (Conover 2001).

Objective 71:

Minimize negative human-cougar interactions so that the "number of interactions per capita" is constant or declining from 2007 levels.

Strategies:

a. Distribute educational materials to key entities and locations.
b. Encourage recreational cougar harvest in areas with demonstrated human-cougar interactions.
c. Conduct public safety cougar removals and hunts in GMUs with a demonstrated history of human-cougar interactions.
d. Implement actions identified in agency policy for problem cougar incidents.

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, particularly 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 72:

Develop a report that describes the demographic and behavioral differences between cougar populations in suburban versus rural environments by 2014.

Strategies:

a. Develop publications documenting the results of completed research.
b. Utilize research findings to modify policy and management as appropriate.
c. Update educational materials to incorporate research findings.
d. Investigate the role of corridor design for facilitating or discouraging cougar movements.
e. Determine the relationship between the level of human-cougar conflict in a stable versus unsustainable cougar population.
f. Evaluate the propensity of specific sex and age class of cougar to be involved in human-cougar conflict.

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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 150,000 breeding ducks and 50,000 breeding geese each spring and summer (see Figures 1 and 2). 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.

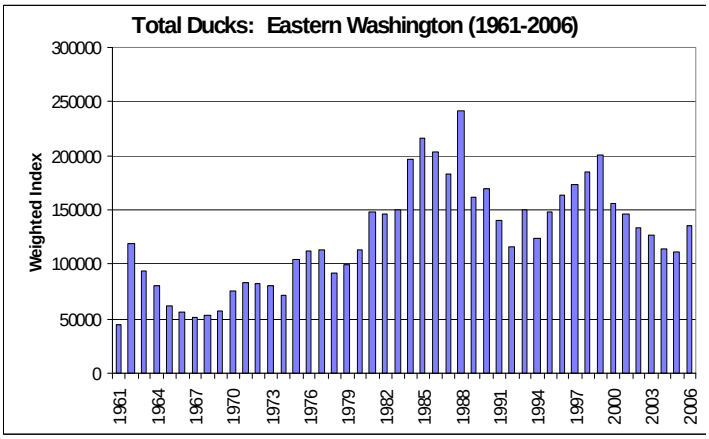

Figure 3. Eastern Washington breeding ducks.

Duck management programs are complex, due to the wide variety of species that occur here. Ducks are classified in the subfamily *Anatinae*, and the 27 species occurring in Washington belong to 4 tribes and 12 genera. The most common duck species in the winter, in the harvest, and during breeding season is the mallard.

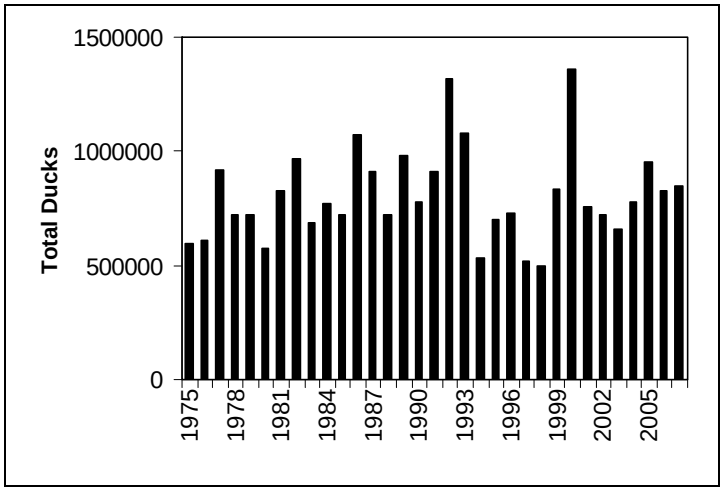

Figure 2. Washington midwinter waterfowl survey.

Management of Washington's geese and swans is also complex. Geese and swans are classified in the subfamily *Anserinae*, and Washington's 8 species belong to 2 tribes and 4 genera. 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.

II. RECREATIONAL OPPORTUNITY

Waterfowl are hunted from the early September goose season through special damage hunts in March. Seasons are based on frameworks established by U.S. Fish and Wildlife Service (USFWS), in conjunction with the Pacific Flyway Council (composed of wildlife agencies from the 11 western states). Over 30,000 hunters harvest 400,000 ducks and 50,000 geese each year in Washington, providing over 300,000 days of recreation annually. Washington ranks second

among the 11 Pacific Flyway states and usually ranks in the top ten states in the U.S. based on waterfowl harvested and number of hunters.

III. DATA COLLECTION

The Department conducts a variety of activities to estimate the size of the waterfowl population, production, migration patterns, and harvest. Breeding surveys are completed in April and May to measure status of the breeding population; waterfowl are marked during molting periods in the summer to document movements; duck production surveys are conducted in July to measure recruitment; migration counts are completed in October-December to track seasonal trends; and winter index counts are completed in January to document population status. Duck and goose hunter numbers and harvest are estimated using a mail questionnaire, special card survey, and mandatory harvest reports for some species (see Figures 3 and 4).

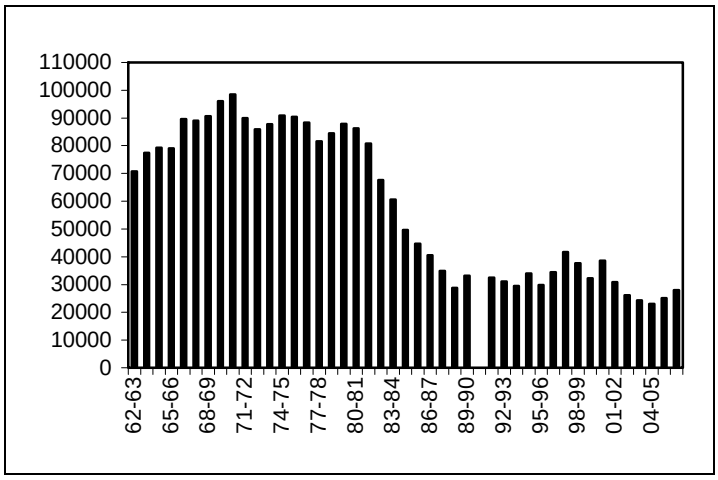

Figure 3. Washington waterfowl hunters.

IV. MANAGEMENT

Statewide 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 State 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.

V. WATERFOWL MANAGEMENT GOALS

The statewide goals for waterfowl are:

1. Manage statewide populations of waterfowl 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 STRATEGIES

Habitat Management

Issue Statement:

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

Objective 73:

Provide funding through state migratory bird stamp/print revenues and outside grants to conserve/enhance 1000 acres of new habitat annually for all migratory birds.

Strategies:

a. Determine habitat conservation and enhancement needs considering habitat trends, Joint Venture plans, literature, and regional expertise.
b. Solicit project proposals from regional staff and external organizations.
c. Utilize an evaluation team from a statewide cross-section of Department experts to rank projects.
d. The waterfowl advisory group, comprised of citizen stakeholders, will review project lists for prioritization.
e. Provide emphasis on projects to increase waterfowl recruitment in eastern Washington, wintering habitat and access in western Washington.
f. 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%; and food plots on private lands - 9%.
g. Develop a stamp/print program expenditure plan before the start of each new biennium.
h. Monitor effectiveness of projects through focused evaluation projects before and after implementation. Participate in organizations designed to deliver habitat improvements via multi-organization partnerships (e.g., Pacific Coast Joint Venture, Intermountain West Joint Venture).
i. Seek outside funding sources to leverage state migratory bird stamp revenues, through habitat improvement grants (e.g., National Coast Wetlands Conservation Grant, North American Wetlands Conservation Act, Washington Wildlife and Recreation Program).

Population Management

Issue Statement:

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

Objective 74:

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 (3-yr averages, unless noted).

Species / subsp. / pop.	Area	Current Index (2007)	Population Objective	Measure
Mallard	N. America	8.3 million (annual)	8.7 million (annual)	breeding index
Pintail	N. America	3.3 million (annual)	6.3 million (annual)	breeding index
Western Canada goose	W. Wash.	2,057	1,500	nest index
Western Canada goose	E. Wash.	2,023	2,000	nest index
Cackling goose	Flyway	166,526	250,000	breeding index
Dusky Canada goose	Flyway	12,593	10,000-20,000	breeding index
Canada goose	L. Col. R. / W.V.	125,710	reduce 133K→107K	winter index
Wrangel Island snow goose	Skagit/Fraser	57,353 adults	50,000-70,000 adults	winter index
Wrangel Island snow goose	Flyway	130,000	120,000	spring index
Black brant	Flyway	123,063	150,000	winter index
Black brant	Wash. Bays	5,901	13,000	winter index
Western High Arctic brant	Skagit/Fraser	8,533	12,000	winter index
White-fronted goose	Flyway	483,190	300,000	breeding index
Tundra swan	Flyway	98,855	60,000	winter index
Trumpeter swan	Flyway	24,928 (every 5 yr.)	25,000 (every 5 yr.)	breeding index

Strategies:

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

Objective 75:

Document distribution, movements, and survival in accordance with flyway management goals by achieving annual banding objectives.

Strategies:

a. Band a minimum of 500 mallards each year to provide survival estimates.
b. Participate in dusky Canada goose banding programs to estimate distribution, survival, abundance, and derivation of harvest.
c. Conduct focused banding emphasis on select species (e.g., western Canada geese-ongoing, lesser Canada geese – 2008, scoters – 2008-2009, harlequins – 2009).

Objective 76:

Monitor mortality due to disease and contaminants each year and take corrective action as indicated.

Strategies:

a. Identify sources of disease and contaminants associated with mortality events (e.g., lead shot mortalities of swans in north Puget Sound)).
b. In cooperation with other management agencies, (e.g., National Wildlife Health Research Center, USFWS) take corrective action to minimize exposure to disease and contaminant sources).
c. Participate in surveillance for avian influenza, pending federal funding

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 77:

Increase accuracy of surveys to measure harvest, number of hunters, and effort, accurate to ±10% at the 90% CI for each management unit.

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, mandatory harvest reports (brant, snow goose, SW Canada goose, seaduck), and brant color composition.

Objective 78:

Continue current policies to maximize duck hunting recreation consistent with USFWS Adaptive Harvest Management (AHM) regulation packages, considering duck availability during fall and winter.

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.

	EASTERN WASHINGTON			WESTERN WASHINGTON		
Regulation package	**Days**	**Limit** total/mall /♀mall	**Season Timing***	**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-late Oct. – 9 days; remainder early-Nov. thru late-Jan.	86	7/5/2	mid-late Oct. – 9 days; remainder mid-Nov. thru late-Jan.
Restrictive	67	4/3/1	mid-late Oct. – 9 days; remainder mid-Nov. thru mid-Jan.	60	4/3/1	mid-late 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

b. Assist in refining USFWS duck harvest management programs to reflect regional population differences (e.g., western mallards) by 2009.

c. Maintain state harvest restrictions, in additional to federal frameworks, on waterfowl species of management concern in Washington (e.g., sea ducks, snow geese, brant), depending on harvest levels and population status.

Objective 79:

Maximize goose-hunting recreation consistent with Pacific Flyway Council plans, considering goose availability during fall and winter.

Strategies:

a. Continue to establish regulations to follow flyway and state harvest thresholds (see Table 1 for current population indexes).

Table 3. Flyway and State Harvest Thresholds (3-yr. averages unless noted)

Goose	**Area**	**Flyway Harvest Thresholds**	**Additional WDFW Harvest Thresholds**	**Measure**
Western Canada goose	W. Wash.	Restriction level: 800 Liberalization level: 1,500	<800: reduce days/limit <1,500: eliminate Sept. season	nest index
Western Canada goose	E. Wash.	Restriction level: 1,300 Liberalization level: 2,000	<1,300: reduce days/limit <2,000: eliminate Sept. season	nest index

Dusky Canada goose	Flyway	Closure level: 5,000 Restrict level 1: 5,000-10,000 Restrict level 2: 10,000-20,000 Liberalization level: 20,000	None	breed. pop. index
Cackling Canada goose	Flyway	Closure level: 80,000 Reopening level: 110,000	None	nest index
Wrangel Island snow goose	Flyway	Closure level: 50,000 Restriction level: 120,000 Liberalization level: 160,000	None	spring pop. index
	Skagit-Fraser	Closure level: 30,000 Restriction level: 50,000 adults Liberalization level: 70,000 adults	S-F <50K adults or Flyway <120K: season ends 1st wk. Jan. S-F>70K adults: season extends past late Jan.	winter index
Brant	Flyway	Closure level: 90,000 Restrict level 1: 90,000-110,000 Restrict level 2: 110,000-135,000 Liberalization level: 135,000	None	winter index
	Skagit	None	Closure level: 6,000 (annual)	winter index
	Others	None	Closure level: 1,000	winter index
White-fronted goose	Flyway	Closure level: 80,000 Reopening level: 110,000	None	nest 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 80:

Maintain hunter numbers between 35,000-45,000 and recreational use days between 300,000-500,000, consistent with population objectives.

Strategies:

a. Periodically survey hunter opinion to determine and recommend optimal season structures within biological constraints, to reduce the percentage of hunters who are very dissatisfied with waterfowl hunting to less than 15%.
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 two 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 emphasis in western Washington and the Columbia Basin.
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.

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 81:

Generate at least five information and education products each year to improve transfer of information to public.

Strategies:

a. Increase public awareness of management issues and waterfowl hunting opportunities through brochures, news releases, internet (e.g. GoHunt), and pamphlets (ongoing).
b. Update web site information regarding migratory bird stamp projects and provide web page links to other organizations (every two years).
c. Continue to discuss waterfowl population management at Waterfowl Advisory Group meetings, public meetings, and select sports group forums (ongoing).

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.

MOURNING DOVE, BAND-TAILED PIGEON, COOT, AND SNIPE

I. POPULATION STATUS AND TREND

Washington provides habitat for a variety of migratory game birds other than waterfowl. This includes 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 (see Figure 1). Coots and snipe population trends are monitored by U.S. Fish and Wildlife Service (USFWS) standardized surveys on breeding areas.

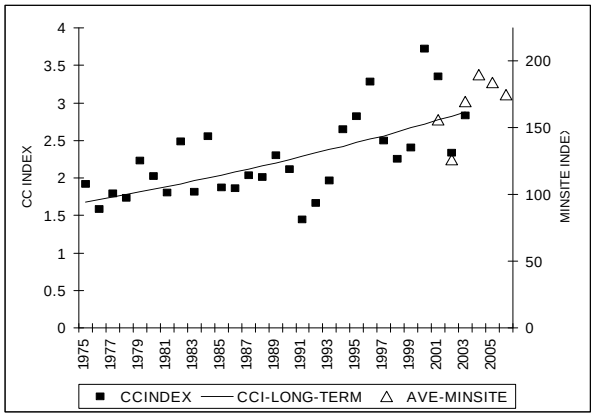

Figure 4. WA band-tailed pigeon survey information.

II. RECREATIONAL OPPORTUNITY

Mourning doves, hunted during a September season, provide late summer recreational opportunity for bird hunters. Seasons are based on frameworks established by USFWS, in conjunction with the Pacific Flyway Council (composed of wildlife agencies from the 11 western states). Approximately 6,000 hunters harvest 70,000 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 (see Figure 2) and band-tailed pigeon mineral sites surveys are conducted in July. Winter index counts for coots are completed with waterfowl surveys in January, in cooperation with USFWS. Harvest of these species is monitored by a variety of state and USFWS questionnaire surveys.

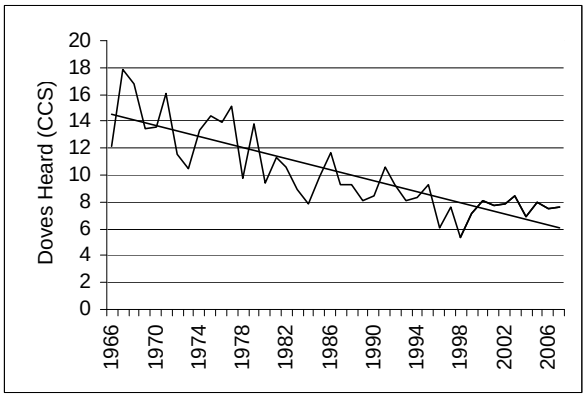

Figure 2. WA mourning dove survey information.

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 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 82:

Quantify habitat loss by developing habitat maps and management guidelines. These maps and guidelines should be posted on the agency web site by 2010.

Strategies:

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

Objective 83:

Provide funding through state migratory bird stamp/print revenues to conserve/ enhance 50 acres of habitat annually for doves, pigeons, coots, and snipe.

Strategies:

a. Determine habitat conservation and enhancement needs considering habitat trends, Joint Venture plans, literature, and regional expertise.
b. Solicit project proposals from regional staff and external organizations.
c. Utilize an evaluation team from a statewide cross-section of Department experts to rank projects.
d. Develop a stamp/print program expenditure plan before the start of each new biennium.
e. Monitor effectiveness of 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 84:

Conduct annual surveys and participate in studies to monitor whether Pacific Flyway Council population objectives are being met for mourning doves and band-tailed pigeons.

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 aids for new observers in population estimation techniques, particularly for call-count surveys.
d. Participate in the Pacific Flyway dove-banding project by marking a minimum of 700 doves each year

Recreation Management

Issue Statement:

Management of limited populations requires refined harvest estimates.

Objective 85:

Increase accuracy of surveys to measure statewide harvest, number of hunters, and effort, accurate to ±10% at the 90% CI.

Strategies:

a. Participate in federal Harvest Information Program (HIP) for migratory birds, including new focus on providing estimates for lightly harvested species (e.g., snipe).
b. Provide supplemental measures to refine harvest estimates (e.g., band-tailed pigeon harvest report).

VII. LITERATURE CITED

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WILD TURKEY *(Meleagris gallopavo)*

I. POPULATION STATUS AND TREND

Efforts to introduce wild turkey, which are not native to Washington, 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. Many of these releases did not result in established populations.

From 1984 through 2003, 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, a 5-day fall general season, and a late fall permit-only season. The statewide, April 15 to May 15, spring season was established in 1994, and in 2004 the spring season was extended through May 31.

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. Since 2002, fall hunting opportunities have been gradually increased in response to increasing

populations in northeastern Washington. A fall general season was established for northeastern Washington in 2004 with a late fall permit season established for the same area in 2006.

Before turkey augmentation activity in the late 1980s, hunter numbers fell to a low of 428 (1987) and turkey harvests averaged 65 birds per year (1983-1987). Statewide harvest has increased almost every each year since 1991 (Figure 1). These estimates suggest that the extremely fast growth in Washington's turkey population ended in 2002, but hunter interest remains high as hunter participation ranged between 15,000 and 17,000 from 2002 to 2006.

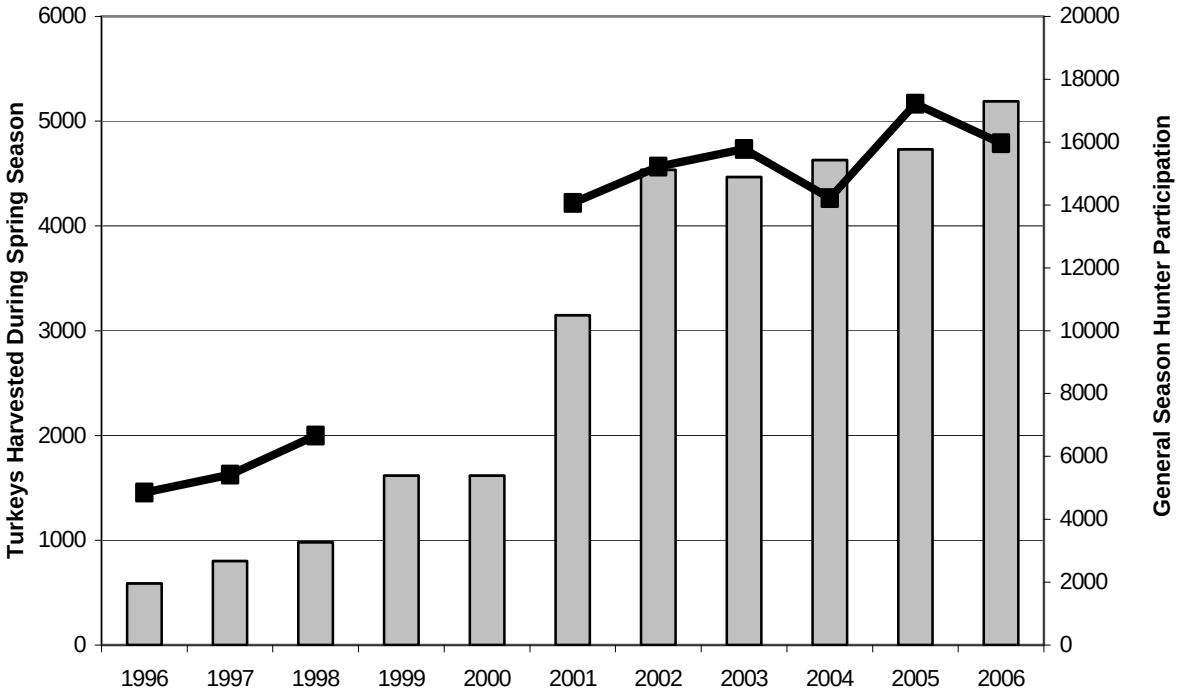

Figure 1: Spring season turkey harvest and general season hunter participation from 1996 to 2006. (Note: Hunter participation was not collected in 1999 and 2000.)

In 2006, the state legislature changed the small game hunting law to require turkey hunters to purchase their first turkey tag, which had been included with the purchase of a small game license from 1999 through 2005. The legislation changed the price of all turkey tags to $14 and dedicated 1/3 of the revenue to turkey management, 1/3 to upland bird management, and 1/3 to the Wildlife Fund in general. This revenue will be used to help the Department provide more focus on turkey and upland game bird management in the future.

A Wild Turkey Management Plan was developed through the Washington State Environmental Protection Act (SEPA) process, which included a 30-day public review and comment period, was completed in 2005. The Upland Game Advisory Committee and the Fish and Wildlife Commission reviewed the plan before adoption by the Director of the Department of Fish and Wildlife. Detailed historical and biological information and data are included in the plan, along with specific goals, objectives, and strategies for future wild turkey management in Washington. Much of the direction provided in the plan is included in this Game Management Plan.

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. In 2005-06, WDFW staff began implementing a pilot project to use wintertime driving route turkey counts as a harvest independent indicator of population status. Future efforts to collect these types of data are described in the population 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, wildlife viewing cultural and ceremonial uses by Native Americans, and photography.
3. Manage statewide wild turkey populations for a sustained harvest.

V. ISSUE STATEMENTS, OBJECTIVES, AND STRATEGIES

Population Management

Issue Statement:

Turkey populations in some areas of eastern Washington have expanded substantially over the past five years. WDFW continues to receive damage complaints from residents in some of these areas. A nuisance/damage response matrix was included in the Wild Turkey Management Plan that was completed in 2005.

Objective 86:

Monitor damage complaints each year and implement effective nuisance/damage management strategies to help resolve issues as they arise and report activities in the annual Status and Trend report.

Strategies:

a. WDFW regional staff will document the location of complaints on a yearly basis and determine major factors causing complaints.
b. Use multiple methods to resolve complaints as outlined in the Wild Turkey Management Plan.
c. Provide public education materials that address problems associated with feeding wildlife.

d. Encourage planting alternate food sources to keep nuisance or damage-causing turkeys away from habitual problem areas.

Issue Statement:

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

Objective 87:

Develop a protocol for monitoring turkey populations by 2011.

Strategies:

a. Conduct scientific and peer review of pilot turkey monitoring protocol.
b. If approved, implement turkey monitoring protocol in Turkey PMU P10 and report results in Status and Trend reports.
c. Evaluate other turkey PMUs and implement monitoring if appropriate.

Issue Statement:

Turkeys occupy almost all suitable habitats in Washington. In the Turkey Management Plan, one area in Skagit and Whatcom counties was identified as a potential introduction area. The area will be evaluated and management actions identified utilizing a process outlined in the Turkey Management Plan. The goal of a wild turkey release is to establish a self-sustaining, huntable population of birds in habitats and locations that do not result in significant damage problems.

Objective 88:

Complete the northwestern Washington turkey introduction evaluation and implement recommended strategies by June 2011.

Strategies:

a. Complete identification and evaluation of potential release sites as outlined in the 2005-2010 Wild Turkey Management Plan.
b. Identify mitigation measures needed to meet introduction goals
c. Implement an introduction operation if the evaluation supports introduction by 2010.

Issue Statement:

The 2005-2010 Wild Turkey Management Plan (WTMP) will need to be updated during the timeframe of the 2009-2015 Game Management Plan. As described in the WTMP, many areas of the state have strong, self-sustaining populations. However, in some areas of the state, turkey introductions have not resulted in robust populations. Factors limiting turkey population growth in these areas have not been identified and evaluated.

Objective 89:

Evaluate turkey population trends in each Wild Turkey Population Management Unit (PMU), identify limiting factors, and develop management strategies in the updated Wild Turkey Management Plan by July 2010.

Strategies:

a. Use harvest data to illustrate population trends in each PMU.
b. Identify and evaluate potential factors affecting population levels in PMUs with low or negative population growth.
c. Update the WTMP to include evaluation results as well as additional management strategies consistent with the 2009-2015 Game Management Plan.

Recreation Management

Issue Statement:

Turkey populations in some portions of Washington have increased to the point that expanded hunting opportunities need to be evaluated.

Objective 90:

By December 2009, develop a fall hunting opportunity recommendation that addresses concerns about population levels and fall/winter male turkey survival in PMU P10.

Strategies:

a. Determine if either sex fall hunting affects male turkey harvest during the following spring hunt.
b. Identify public preferences for increasing hen harvest through various hunting season options.
c. Identify and evaluate potential fall season options each year.

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 91:

Over the next five years, increase the number of acres of private land available for public turkey hunting by 10% within priority turkey range.

Strategies:

a. Investigate potential incentives (e.g., payment, liability protection, hunter access management) for public hunting access on private property. Develop program options and implement those incentives that are determined to be most beneficial to the public and the landowner.
b. Increase public access to private lands by focusing efforts from WDFW's private lands access program within turkey PMU P10.
c. Partner with local chapters of the National Wild Turkey Federation and other sportsman's groups to find landowners who would allow public hunting.

Habitat Management

Issue Statement:

Opportunities to enhance wild turkey habitat exist on private and public lands throughout areas supporting turkey populations. Improving habitat conditions for turkeys also has additional values to other wildlife species that utilize the same resources.

Objective 92:

Conduct 10 habitat improvement projects in key wild turkey management areas to accomplish multiple goals including addressing nuisance issues, improving public recreational opportunities, and improving habitat conditions for multiple species by 2015.

Strategies:

a. Identify and prioritize key areas for habitat improvement.
b. Utilize available enhancement grants and dedicated turkey management funding to improve habitats utilized by wild turkeys.
c. Facilitate habitat enhancement projects on private and public properties within the primary turkey management zone (e.g., oak habitat enhancement in Klickitat County).
d. Develop habitat enhancement projects to help address issues related to winter nuisance complaints.
e. Prioritize enhancement projects on areas open to public hunting and in areas that benefit species of concern or benefit a wide variety of wildlife species.

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 93:

Support at least two research projects that increase our knowledge of wild turkeys in western habitats.

Strategies:

a. Cooperate with public and private entities (e.g., National Wild Turkey Federation) to develop research projects in Washington.
b. Develop and/or participate in inter-specific competition research projects funded through the National Wild Turkey Federation and other public entities.

MOUNTAIN QUAIL (*Oreortyx pictus*)

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 the first weekend in October through November 30 in western Washington; however, there have been no hunting seasons for mountain quail in eastern Washington since 1997. The 2006 mountain quail harvest was likely less than 400. Mountain quail do not represent a major recreational opportunity in the state of Washington.

III. DATA COLLECTION

To date, only incidental data on statewide mountain quail populations in Washington have been collected. These data suggest that mountain quail are limited in distribution and abundance. The Department, in cooperation with the University of Idaho, has collected data on mountain quail released as part of a population re-establishment project in southeastern Washington. Data collected through this effort include survival, nest success, and habitat use. Additional releases and other monitoring efforts are discussed in this management plan.

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 cultural and ceremonial uses by Native Americans, 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. Mountain quail released into southeastern Washington in 2005 and 2006 were monitored through a cooperative effort with the University of Idaho, resulting in a student producing a masters thesis. The information presented in the thesis will be helpful in future habitat management efforts.

Objective 94:

Utilize data collected in the 2005-07 mountain quail study to help determine distribution of potential mountain quail habitat in Washington by 2013.

Strategies:

a. Develop a map showing potential mountain quail habitat.
b. Conduct an evaluation of eastern Washington mountain quail habitat conditions and suitability based on results from monitoring released quail.
c. Identify potential habitat enhancement projects based on the evaluation.

Population Management

Issue Statement:

Mountain quail occupy little of their historic range in eastern Washington. In 2005 and 2006, wild-trapped mountain quail from southwestern Oregon were released in southeastern Washington. This project was part of an effort to re-establish mountain quail populations in part of their historic range.

Objective 95:

Based on results from the first re-introduction effort in Asotin County, begin an additional reestablishment project in historic range in eastern Washington by 2014.

Strategies:

a. Evaluate initial reintroduction attempts to determine probability of successfully establishing populations.
b. Should probability of success be sufficient, continue to coordinate with Oregon and Idaho on additional transplant efforts.
c. Participate in a multi-state mountain quail management effort that includes participation from Oregon, Idaho, California, Nevada, and Washington.
d. Secure additional funding to support ongoing reintroduction efforts.

e. Implement short term (post release) and long term (population trend) monitoring of introduced mountain quail populations.

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

I. POPULATION STATUS AND TREND

Forest grouse in Washington include dusky blue grouse (*Dendragapus obscurus)* and sooty blue grouse (*Dendragapus fuliginosus*) 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) based on estimates generated by conducting a mailed hunter survey. This trend shows an apparent decline in forest grouse populations, although harvest has been fairly stable since 1996. 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 forest lands may be biasing results.

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.

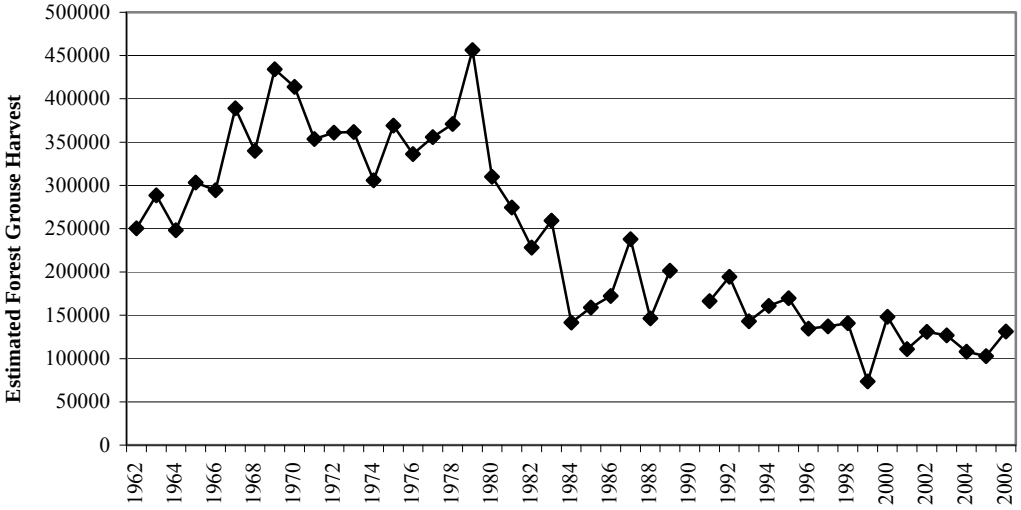

Figure 1. Estimated forest grouse harvest in Washington State from 1962 to 2006.

II. RECREATIONAL OPPORTUNITY

The current Sept. 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 three of any species (mixed or straight bag) has not changed since 1952. Estimated hunter numbers slowly declined from the late 1980s 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 and have remained fairly consistent, although still below historic levels.

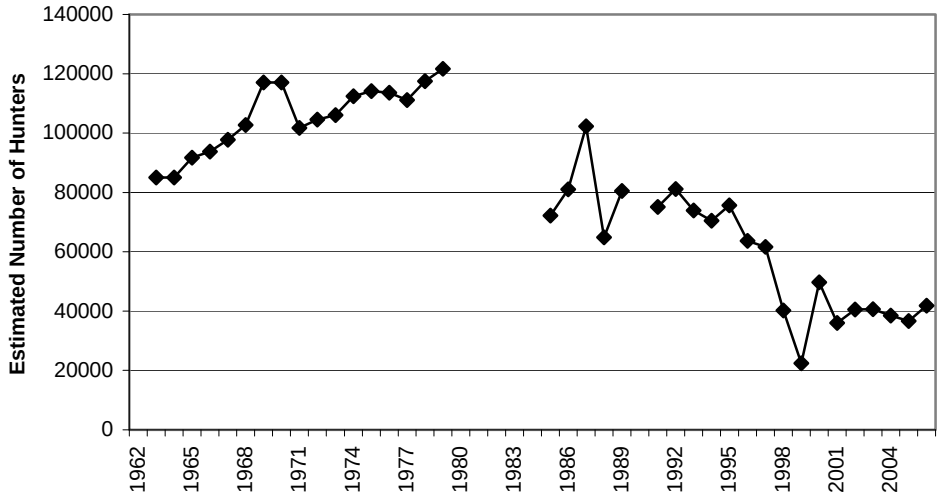

Figure 2. Estimated number of forest grouse hunters in Washington from 1963 to 2006.

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, cultural, and ceremonial uses by tribes, and photography.
3. Manage statewide forest grouse populations for a sustained harvest.

V. ISSUE STATEMENTS, OBJECTIVES, AND STRATEGIES

Population Management

Issue Statement:

Current harvest estimation, which is used as an indicator of population trend, is not adequate to detect significant changes in forest grouse harvest at a local geographic level.

Objective 96:

Improve harvest estimation precision at the WDFW regional level by 2014.

Strategies:

a. Analyze harvest report data to include valid estimation at the WDFW regional level.
b. Develop a statistical model of harvest that includes the effects of weather and hunter effort.
c. Investigate the potential to report grouse harvest on the WDFW website and implement if appropriate.

Recreation Management

Objective 97:

Develop a report on hunting season impacts on grouse populations by 2010.

Strategies:

a. Conduct a literature review targeting grouse hunting season impacts on forest grouse populations

b. Determine if existing WDFW data can contribute to identification of potential impacts of season changes
c. Assimilate results into a report with recommended management actions if appropriate.

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 been declining since the early 1980s (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, with loss and degradation of habitat being a primary factor.

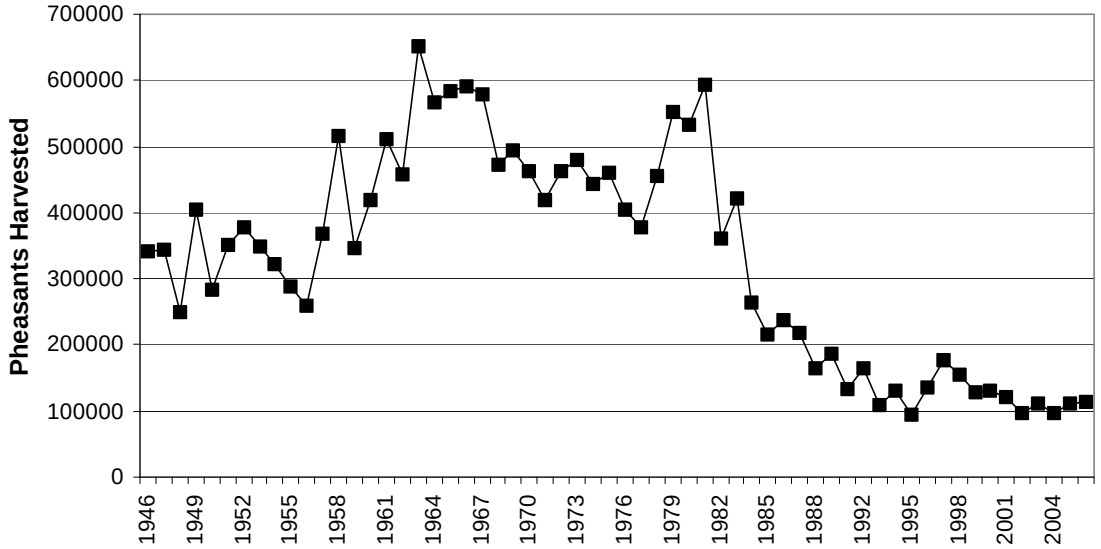

Figure 1. Estimated pheasant harvest for Washington, 1946 - 2006.

Upland game bird fall population densities, and related harvest, are often dependent on spring weather conditions and available cover since chicks have a difficult time thermo-regulating in cold, wet weather conditions. In addition, chicks need high protein diets in the spring and cold, wet springtime weather can decreases insect availability (Offerdahl and Fivizzani, 1987). Although variable from year to year, harvest estimates for quail and chukar have not dropped below 1993 levels. Currently, quail harvest levels are near the 22-year high, but chukar and gray partridge harvest are 68% and 75% lower than the 22 year high respectively (Figure 2). In

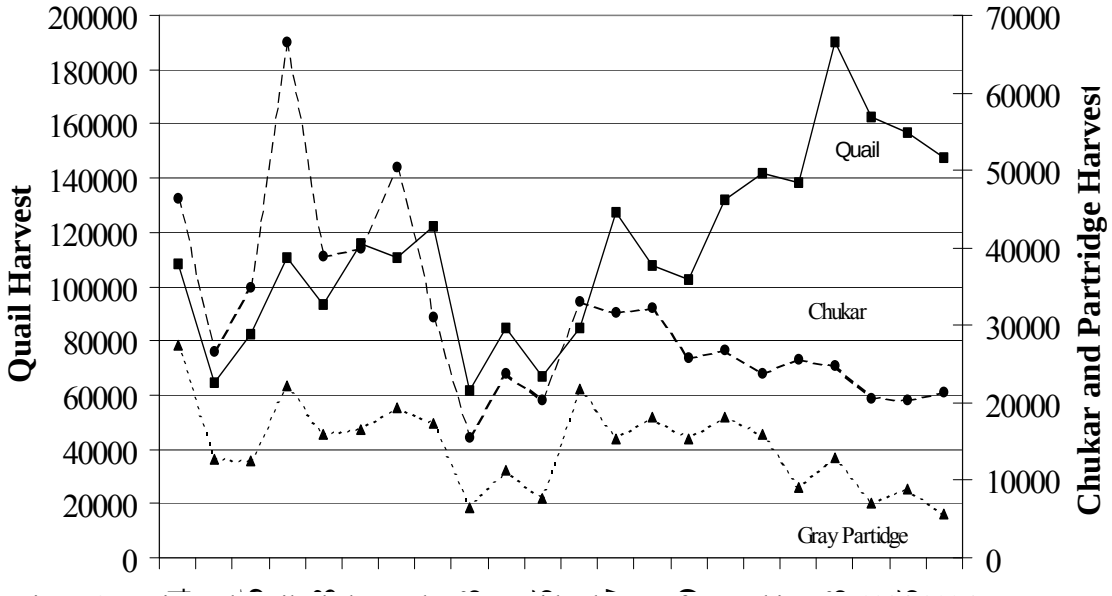

Figure 2. Estimated quail, chukar and gray partridge harvest for Washington, 1984-2006

general, Department biologist opinions of upland game bird populations correlate with the harvest estimates seen in Figures 1 and 2.

II. RECREATIONAL OPPORTUNITY

Eastern Washington pheasant season timing in Washington State has varied over the past 10 years. For many years, the season started in early to mid-October and lasted through December 31, providing hunters 11 or 12 weeks of hunting, depending on the year. In 2004, the pheasant opener was moved to the weekend after general deer season, one week later than previous years.

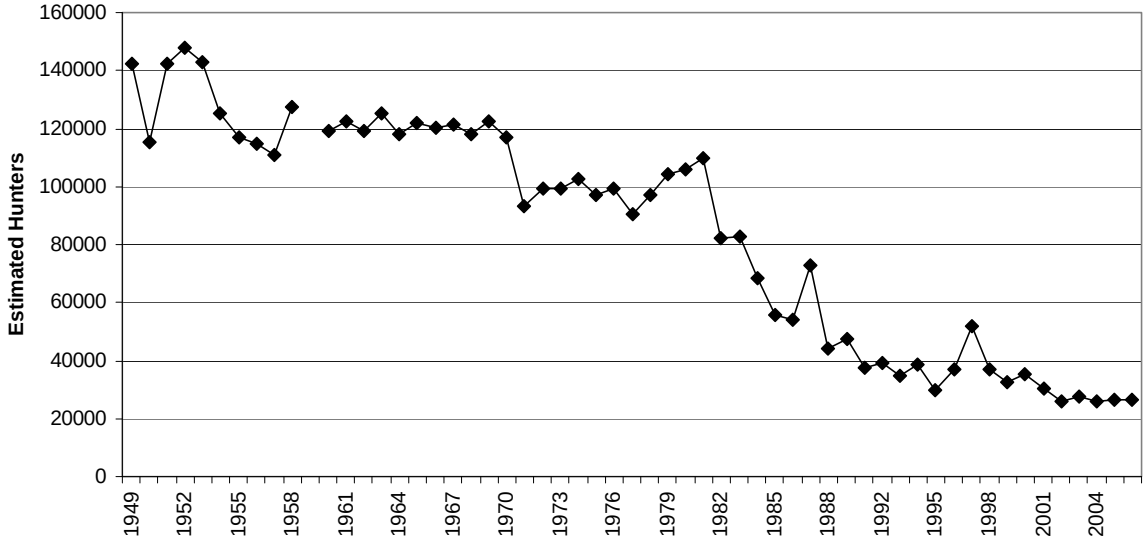

Figure 3. Estimated pheasant hunter participation in Washington State, 1949 to 2006.

With that move, the season ended up shortened in 2004, so in 2005, the season was extended into January to maintain the number of hunting days. In 2006, an estimated 26,712 people hunted pheasant in Washington. Between 1996 and 2006, only one year (1997) had more than 40,000 pheasant hunters, down from an estimated high of 142,000 in the early 1950s 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 2006, over 26,000 hunters spent almost 170,000 days pursuing pheasant.

Hunting seasons for other upland game birds have also varied in length over the years. During the 1960s and 70s, 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 per day to six. Currently, the daily bag limits for chukar and Huns are six of each species and quail has a bag limit of 10. In 2006, an estimated 15,595 people hunted quail, 4986 hunted chukar, and 2520 hunted gray partridge. Hunters spent over 128,902 days afield pursuing these upland birds.

III. DATA COLLECTION

Three types of pheasant surveys were conducted up until the mid to late 1990s in most areas of the state; 1) sex ratio counts in February and March, 2) crow counts (a male pheasant population index) in late April and early May, and 3) production counts in late July and August. In addition, aerial population surveys for chukar were completed through the late 1990s. All of these surveys were discontinued mainly due to the limited time and funding for district biologists considering all game species priorities.

Limited 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 pheasant 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 cultural and ceremonial uses by Native Americans, and photography.
3. Manage statewide upland game bird populations for a sustained harvest.

V. ISSUE STATEMENTS, OBJECTIVES, AND STRATEGIES

Habitat Management

Issue Statement:

Pheasant habitat in eastern Washington has been lost, altered, or degraded over the past 50 years. This is considered a major factor in the decline in pheasant populations (Flaherty 1979). A Pheasant Focus Area has been identified in southeastern Washington. Three major factors influenced identification of this area: 1) cost of improving habitat is relatively low when compared to irrigated agriculture areas; 2) annual rainfall in the area is conducive to producing quality habitat without irrigation; 3) availability of federal Farm Bill programs (e.g., Conservation Reserve Program).

Objective 98:

Document the amount of quality pheasant habitat in the Pheasant Focus Area by 2009. Double the number of acres of quality pheasant habitat by 2014.

Strategies:

a. Purchase high priority pheasant habitat acreage.
b. 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). Specific emphasis will be put on "mid-contract management."
c. Improve pheasant habitat quality by funding habitat improvement projects through the Eastern Washington Pheasant Enhancement Program (EWPEP) and the Partnerships for Pheasants program.
d. Integrate pheasant habitat improvements and priorities with native species needs (e.g. sharp-tailed grouse and salmon).
e. Partner with non-governmental organizations (e.g., Pheasants Forever) to produce and distribute habitat enhancement informational material.

Population Management

Issue Statement:

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

Objective 99:

Monitor population status and trend to be able to detect a 20% change over three years within the key areas identified for habitat improvement and document results in the annual Game Status Report.

Strategies:

a. Develop and/or adopt a standardized method to monitor pheasant population status within the pheasant focus area.
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 100:

By 2015, increase the number of hunters utilizing the pheasant focus area to 15,000 and provide a variety of hunting opportunities.

Strategies:

a. Utilize the Private Lands Program to increase public access on private lands.
b. Continue to publicize where public hunting access is available.
c. Develop limited entry areas, marked sites, walk-in sites, or other restrictions to reduce crowding and provide quality-hunting areas.
d. Monitor eastern Washington pheasant hunter satisfaction through random surveys as was done in 2003 and 2007.

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 101:

Monitor upland game bird harvest on a yearly basis.

Strategies:

a. Improve the precision of harvest data at the county level with priority for improving data in the pheasant focus area.

b. Continue to collect harvest information on a yearly basis such that it is comparable to previous seasons.
c. Develop a method to determine if eastern Washington pheasant releases impact overall pheasant harvest estimates.

Issue Statement:

Lead is a well-documented environmental toxin and lead shot use has been prohibited for all waterfowl, coot, and snipe hunting in Washington since a nationwide phase-in was implemented in 1986-1991. WDFW has proposed amendments to WAC 232-12-068, which expanded nontoxic shot requirements to pheasant release sites and other areas, based on a high potential for ingestion of lead by wildlife.

Objective 102:

As new information and nontoxic alternatives become available, make nontoxic shot use recommendations to the Fish and Wildlife Commission through the 2009-11 season setting processes.

Strategies:

a. Research, develop, and present recommendations to the Fish and Wildlife Commission regarding bird hunting with nontoxic shot.
b. Develop and implement a public outreach and communication plan regarding nontoxic shot use regulations.

Issue Statement:

Some upland game birds exist in areas where sharp-tailed grouse and sage grouse can be found. Concerns over misidentification of game birds have been expressed and it is important that hunters know the differences between upland game birds and non-game upland wildlife.

Objective 103:

Post WDFW managed properties and distribute educational materials to hunters that describe the differences between upland game species and non-hunted upland birds each year.

Strategies:

a. Include information describing the differences between pheasants and sharp-tailed grouse and sage grouse and include it in the annual upland bird hunting pamphlet.
b. Post signs notifying hunters of sage or sharp-tailed grouse being present in areas where upland game bird hunting occurs.

Research

Issue Statement:

Implementation of habitat enhancement in the pheasant focus area is designed to improve pheasant numbers, hunter harvest, and hunter participation. Different habitat enhancement techniques can have variable effectiveness on improving pheasant numbers and it is important to understand and utilize the most effective means. In addition, past efforts in working with landowners has shown that a variety of programs are necessary to meet individual needs and provide quality-habitat and hunting opportunity.

Objective 104:

Develop annual reports that describe efforts to evaluate habitat enhancement effects on pheasant population levels.

Strategies:

a. Conduct specific experiments to determine the best vegetation or habitat manipulations to produce pheasants.
b. Provide annual progress reports in the Game Status and Trend report.
c. Update pheasant habitat management publications, USDA techniques publications, and informational brochures as appropriate.

Eastern Washington Pheasant Enhancement Program (EWPEP)

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…" A 2007 State Auditor's Office sanctioned performance audit evaluated the program to determine if the program is achieving its objectives. The program should meet legislative goals and the program should be implemented to achieve the objectives in this plan.

Objective 105:

Develop recommendations for legislative or other action to address the audit findings by 2011.

Strategies:

a. Review and analyze performance audit findings.
b. Work with conservation organizations, such as Pheasants Forever, and the public to develop recommendations.
c. Focus habitat enhancements in identified key management areas (Pheasant Focus Area).
d. Provide dedicated pheasant management and habitat improvement staff within the Pheasant Focus Area.
e. Present identified changes to legislature, Fish and Wildlife Commission, or WDFW administration for adoption as needed.

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.

Objective 106:

Evaluate the current funding mechanism for the western Washington pheasant program and identify new ways to create a self-funded budget by June 2010.

Strategies:

a. Determine what percentage of small game license buyers hunts strictly western Washington pheasants.
b. Identify and present appropriate proposals to make the program self-funded.

VI. LITERATURE CITED

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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

I. CLASSIFICATION

In Washington, there are approximately 31 mid-to-small sized mammals or mammal groups that can be hunted or trapped (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
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*	Unclassified	X	X
Muskrat	*Ondatra zibethicus*	Furbearer	X	
River otter	*Lutra canadensis*	Furbearer	X	
Coyote	*Canis latrans*	Unclassified	X	X
European rabbit	*Oryctolagus spp.*	Unclassified	X	X
Gophers [c]	*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.
[c] Except mazama pocket gophers (*T. mazama)* 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 290 trappers take 7,574 furbearers annually (Table 3). However, the trend in the number of trappers and total take has declined significantly since 2000. The majority of the take is beaver (37%) and muskrat (31%), followed by raccoon (6%), coyote (6%), and nutria at (6%).

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 property damage or nuisance activities.

Table 2. Harvest trends for small game mammals, 1991-2006, Washington.

Species	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Cottontail rabbit										
Harvest	7,304	8,203	7,065	7,203	8708	10290	5689	8477	10010	6582
Hunters	3,502	2,809	2,409	3,485	3146	2550	2530	2830	3046	2099
Snowshoe hare										
Harvest	1,042	1,463	483	2,398	2339	1663	1488	1548	1384	865
Hunters	1,113	991	729	1,270	1248	952	922	1010	871	753
Raccoon										
Harvest	1,759	1,838	2,776	2,008						
Hunters	484	794	504	1,117						
Bobcat										
Harvest	152	140	253	206	312	214	416	290	234	503

Table 3. Trapping trends for furbearers and unclassified wildlife, 1991-2006, Washington.

Species	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Furbearers										
Bobcat	365	180	296	59	62	98	253	250	223	302
Raccoon	1,307	832	571	250	196	281	375	396	382	542
Red fox	0	0	0	0	0	0	0	0	0	0
Badger	14	2	13	7	3	0	2	2	1	6
Beaver	8,116	4,558	4,819	642	1,150	1,703	1,414	1,715	1,505	2,626
Mink	607	424	462	101	33	62	45	64	47	78
Marten	80	14	140	18	28	19	0	0	0	0
Muskrat	10,924	4,117	3,572	1,159	453	682	452	566	527	1,111
River otter	772	656	727	83	138	115	331	438	231	366
Weasels	49	47	87	44	8	26	59	39	1	69
Unclassified wildlife										
Coyote	1,606	922	838	503	116	32	129	62	253	113
Nutria	1,116	486	712	267	687	239	315	744	NA	NA
Skunks	127	164	175	16	17	78	179	61	67	128
Number of Trappers	601	488	473	261	169	---	153	173	165	134

IV. 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 verified human-wildlife conflicts, the species, location, number of animals, sex and age information, and fate of the animals are recorded. 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. Preserve, protect, perpetuate, and manage species and their habitats to ensure healthy, productive populations
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. Manage statewide populations for a sustained yield.

VI. ISSUE STATEMENTS, OBJECTIVES, AND STRATEGIES

Population Management

Issue Statement:

There is little documentation on the current distribution and relative densities of individual small game and furbearer species in Washington.

Objective 107:

Revise the distribution map for select small game and furbearer species by 2012.

Strategies:

a. Revise the distribution maps from harvest and trapping data, sightings, and regional biologist interpretations.
b. Verify distribution as necessary from survey and ground truthing activities.

Recreation Management

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 form is problematic in terms of ease of reporting and data utility.

Objective 108:

Develop a web based reporting system for furbearers and unclassified wildlife.

Strategies:

a. Provide a mechanism for reporting capture of non-target species.

Problem wildlife management

Issue Statement:

In the last two years, over 25% 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 et al. 2002, 2008). This accounts for nearly 425,000 negative human-wildlife interactions annually.

Objective 109:

Minimize negative human-wildlife interactions so that the "number of negative interactions per capita" is constant or declining by 2014.

Strategies:

a. Increase recreational harvest (trapping and hunting) in areas prone to furbearer complaints.
b. Develop educational partnerships for informing the public on how to avoid furbearer damage and nuisance activity.
c. Use contracts with private wildlife control specialists for managing individual furbearer species involved in damage and nuisance activities.

VII. LITERATURE CITED

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