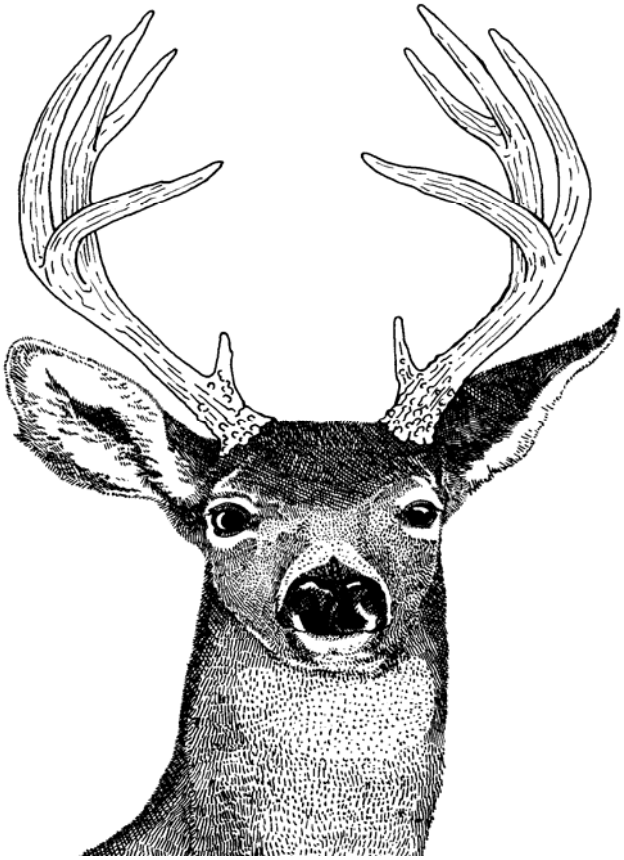
OREGON
BLACK-TAILED DEER MANAGEMENT PLAN
November 14, 2008



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EXECUTIVE SUMMARY

This Black-tailed Deer Management Plan is the first effort by the Oregon Department of Fish and Wildlife (Department) to develop a long-term management strategy for black-tailed deer.

The Goal of the plan is to: Manage black-tailed deer populations in Oregon to be consistent with both the available habitat of all lands of the state and the Oregon Conservation Strategy, compatible with primary land uses, and to provide optimum recreational benefits to the public.

The Objectives of the plan are to:

- Actively seek opportunities to work with all land owners and managers including Native American Tribes to restore, retain or develop black-tailed deer habitat.
- Increase cooperative efforts with private landowners to actively promote black-tailed deer habitat, considering, and remaining consistent with, primary uses of the land.
- Increase cooperative efforts with federal, state, and tribal land managers; to actively promote creation, maintenance, enhancement, and restoration of black-tailed deer habitat.
- Manage black-tailed deer populations to attempt to achieve buck ratios and populations at benchmark levels while collecting information over the next five years to develop Management Objectives.
- Enhance all recreational, consumptive, and cultural uses of the black-tailed deer resource.
- Provide timely response to property damage concerns.
- Identify key data needs and develop plans to promote and implement collaborative research projects.

The Columbian black-tailed deer (*Odocoileus hemionus columbianus*) is one of two subspecies of mule deer (*Odocoileus hemionus)* native to Oregon. Black-tailed deer are found from the Pacific Ocean coastline east to the forested portions along the east side of the crest of the Cascade Mountain Range. Since the 1990s the black-tailed deer population has been declining in part because of loss of habitat, the introduction of diseases, and an increased presence of predators.

Black-tailed deer are difficult to survey because of their secretive life history and the dense cover they inhabit. Therefore, populations are managed based on trends in populations, buck ratios, and damage reports, and not on actual counts of deer.

This Oregon Black-tailed Deer Management Plan provides an overall management framework and direction for the black-tailed deer program for the next five years. This plan emphasizes the need to estimate black-tailed deer populations and habitat management as well as identify future data needs.

Over the next five years, the Department will develop improved population estimates for black-tailed deer in western Oregon. Population estimates could be used to develop Management Objectives. The Department will also work with land managers to increase understanding of black-tailed deer habitat relationships and recommend management actions to improve black-tailed deer habitat on public and private lands within primary uses of the land.

This plan presents a brief historical overview, describes black-tailed deer biology and habitat requirements, and discusses several concepts that are used in black-tailed deer management. Economic values associated with black-tailed deer hunting are also presented. Issues related to black-tailed deer management are identified along with suggested strategies to address many of these issues and concerns.

Because many individuals will not read this entire plan but only sections of specific interest to them, two central concepts will be found in more than one section of this plan:

1) Black-tailed deer are difficult to survey.

2) Changes in habitat availability and quality have contributed to declining populations since the early 1980's. Habitat changes include both quantity of early seral habitat (particularly on federal lands where mature timber stands still have deer, but at reduced numbers), and quality influenced by changing reforestation management practices. Reforestation techniques have also been affected by regulation changes in response to public demands. The primary use of the land (agriculture, forestry, etc.), is also an important consideration when discussing black-tailed deer habitat.

The Oregon Conservation Strategy (the Strategy) is a statewide, comprehensive blueprint for conservation in Oregon. The Strategy was developed by the Department and many partners including members of the hunting and fishing community and was adopted by the Oregon Fish and Wildlife Commission (Commission) in 2005. Implementation of the Black-tailed Deer Management Plan is linked to priorities described in the Strategy and includes the goals of ensuring that Oregon maintains and promotes healthy fish and wildlife populations for future generations. The Strategy provides a framework for the Department to work collaboratively with all Oregonians to ensure that adequate habitats are available for all fish and wildlife.

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TABLE OF ABBREVIATIONS

1. Access and Habitat Program……A&H
2. Adenovirus Hemorrhagic Disease……...…….AHD
3. Bureau of Land Management……...BLM
4. Chronic Wasting Disease…….CWD
5. Crude Protein…….....CP
6. Deer Hair Loss Syndrome……..DHLS
7. Diameter Breast High……...DBH
8. Digestible Protein…….……DP
9. Forward Looking Infra-Red…….…….FLIR
10. Landowner Preference…….……..LOP
11. Management Objective……...MO
12. Northwest……NW
13. Oregon Department of Fish and Wildlife……..ODFW
14. Oregon Department of Forestry…….……ODF
15. Oregon Department of Transportation……...ODOT
16. Oregon Revised Statutes……ORS
17. “Sex-Age-Kill” Model……...SAK
18. Southwest…….SW
19. Travel Management Area……..TMA
20. United States Department of Agriculture……... USDA
21. USDA – Wildlife Services……USDA-WS or WS
22. USDA - Forest Service…….……....USDA-FS or FS

LIST OF FIGURES AND TABLES

BLACK-TAIL DEER MANAGEMENT PLAN
VISION STATEMENT

Black-tailed deer, and a mosaic of the riparian, forested and other upland habitats necessary to support healthy populations of deer, and the diverse array of other wildlife dependant upon these habitats, are preserved, restored and enhanced utilizing sound stewardship practices, for use and enjoyment by present and future generations of Oregonians.

GOAL

Manage black-tailed deer populations in Oregon to be consistent with both the available habitat of all lands of the state and the Oregon Conservation Strategy, compatible with primary land uses, and to provide optimum recreational benefits to the public.

OBJECTIVES

1. Actively seek opportunities to work with all land owners and managers including Native American Tribes to restore, retain or develop black-tailed deer habitat.

2. Increase cooperative efforts with private landowners to actively promote black-tailed deer habitat, considering, and remaining consistent with, primary uses of the land.

3. Increase cooperative efforts with federal, state, and tribal land managers; to actively promote creation, maintenance, enhancement, and restoration of black-tailed deer habitat.

4. Manage black-tailed deer populations to attempt to achieve escapement (buck ratios) and populations at benchmark levels (Table 1 on page 27) while collecting information over the next five years to develop Management Objectives.

5. Enhance all recreational, consumptive, and Native American cultural uses of the black-tailed deer resource.

6. Provide timely response to property damage concerns.

7. Identify key data needs and develop plans to promote and implement collaborative research projects.

INTRODUCTION

Black-tailed deer (*Odocoileus heminous columbianus*) are one of two subspecies of mule/black-tailed deer native to Oregon. They are the primary deer species found west of the Cascade Mountains. Black-tailed deer are generally smaller and darker in color than mule deer (*Odocoileus heminous heminous*) and prefer more forested and dense habitats. Concerns over population declines and the loss of habitat in western Oregon, provided the impetus for the Oregon Department of Fish and Wildlife (Department) to develop a comprehensive management plan for black-tailed deer. The primary purpose of the plan is to provide a framework for future management of black-tailed deer in Oregon

The plan reflects input from a 25-member public review committee, comprised of representatives from 19 constituent groups, six at-large members, and Department biologists. The Department also received public input from 24 public meetings (Appendix 1) and through written comments. The development of the plan was also guided by an analysis of the Department's historical black-tailed deer data including harvest data (hunter success rates and effort by Wildlife Management Unit) and population survey data. (Bowman and Pereria, Undated)

Historically, black-tailed deer may have been relatively scarce in western Oregon because of the presence of large predators such as wolves and cougar (Verts and Carraway 1998). As increased settlement occurred, numbers of deer decreased and regulations were imposed (Mace et al. 1995). Populations began to increase as hunting was regulated.

Since the late 1980's the total black-tailed deer population in western Oregon appears to be declining based on Department data including hunter harvest, hunter success rate, and field surveys conducted by biologists. While the Department believes there has been a widespread decline, it should be noted declines are not apparent or to the same extent in all areas. The reduction is likely related to the quality and quantity of habitat, increased incidences of disease, and higher rates of predation.

The Department's responsibility to manage black-tailed deer populations is guided by state statutes including Oregon Revised Statute (ORS) 496.012: "… that wildlife shall be managed to prevent serious depletion of any indigenous species and to provide the optimum recreational and aesthetic benefits for present and future generations of the citizens of this state." Additional, wildlife policy goals include managing habitat to enhance production and managing populations to be compatible with primary uses of the land such as agriculture and forestry. (For more detail, the entire Wildlife Policy, including goals are listed in the "Management Decisions" section of this plan.) The Department also recognizes the importance of integrating single species management plans into a larger framework for statewide conservation. The Oregon Conservation Strategy provides that link and enables the Department to incorporate game management objectives as part of a larger, concerted vision for statewide conservation actions and priorities.

The Black-tailed Deer Management Plan provides a brief historical overview of black-tailed deer, describes black-tailed deer biology and habitat requirements, management concepts, and economic values associated with deer hunting. The plan also discusses issues and concerns related to black-tailed deer management and provides strategies to address these factors. The plan is broad-based, but emphasizes key concepts such as population estimation and management, habitat relationships, and recreational values.

BLACK-TAILED DEER BIOLOGY

TAXONOMY AND DISTRIBUTION

Deer, moose, elk, and caribou are North American members of the deer family (Cervidae) commonly referred to as cervids. Mule deer, black-tailed deer, and white-tailed deer are members of the genus *Odocoileus*. Within the genus *Odocoileus,* there are two species of deer in Oregon, mule deer (*Odocoileus hemionus*) and white-tailed deer (*Odocoileus virginianus*). Two subspecies of mule deer occur in Oregon, the Columbian black-tailed deer (*Odocoileus hemionus columbianus*) and the Rocky Mountain mule deer (*Odocoileus hemionus hemionus*). Geist (1998) suggested that mule deer evolved from black-tailed deer. Distribution of Columbian black-tailed deer also includes western portions of California, Washington, and southern British Columbia. A third subspecies, Sitka black-tailed deer (*Odocoileus hemionus sitkensis*), inhabits the coastal rain forests from northern British Columbia to the panhandle of southeastern Alaska.

For this plan, Columbian black-tailed deer in Oregon will be referred to as black-tailed deer. Black-tailed deer are native to Oregon and occur throughout much of western Oregon including the Oregon Coast Range and the Cascade Mountains (Figure 1). Twenty-seven Wildlife Management Units (WMUs) have black-tailed deer. WMUs in the Cascade Mountains are inhabited by both black-tailed and mule deer.

Black-tailed deer have a wide, triangular tail with a dark brown or black top and a white underside. Mule deer have a thinner "ropelike" tail that is white with a black tip. Hair color and body size varies among the three subspecies of mule deer. Rocky Mountain mule deer are the largest and Sitka black-tailed deer the smallest of the three subspecies.

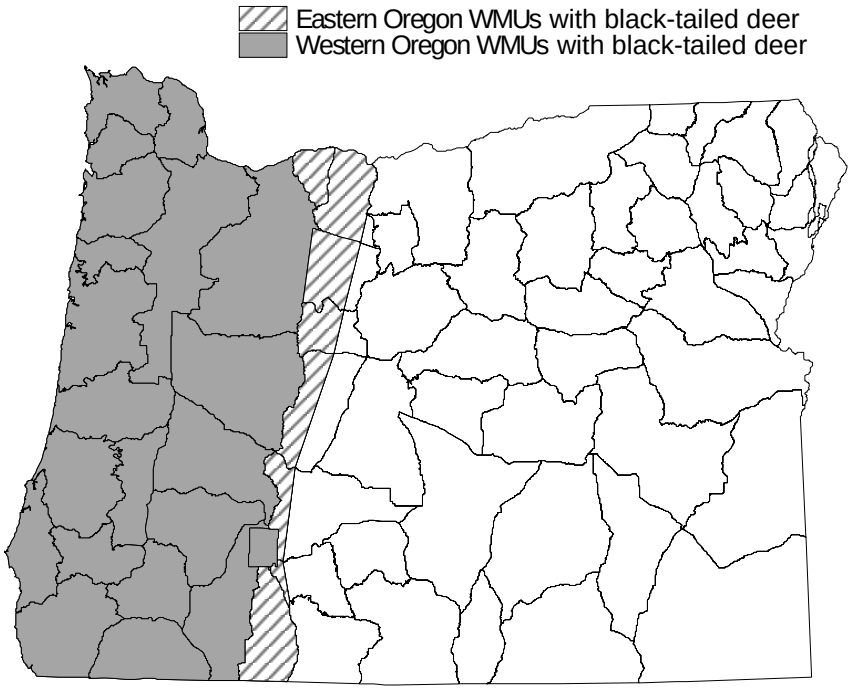

Figure 1. General distribution of black-tailed deer in Oregon.

REPRODUCTION AND PRODUCTIVITY

Female black-tailed deer (does) normally breed for the first time as yearlings (18 months old). They also may breed as fawns (Thomas and Smith 1973, Nellis et al. 1976) but this event is very rare. Yearling does are less productive than adults because of lower pregnancy rates and the production of only one fawn. Adult does in mid-age classes have the highest pregnancy rate and normally have two fawns. Breeding normally occurs in November, the gestation period is approximately 203 days. Fawns typically weigh 6 ½ to 7½ pounds at birth (Anderson 1981). The majority of fawns are born late May through mid-June. Pamplin (2003) found fawn production peaked on June 14 in the southern Oregon Cascades.

AGE

Wildlife management agencies frequently collect data on age and number of antler points from harvested deer. A large, unbiased sample of ages from the population can yield vital statistics about the entire population, and there have been considerable efforts to develop reliable techniques to age deer. Connolly (1981) summarizes methods used for determining the age of deer. In his summary he mentions three currently used methods: replacement and wear of deer teeth, eye lens weight (the lens gains weight throughout the deer's life), and counting cementum layers of a tooth. Of these methods, dental cementum is the most reliable method available for estimating age of deer (Erickson et al. 1970). The Department has not implemented deer tooth collection and aging on a large scale, but has evaluated the applicability of the technique via research in southwestern Oregon during 2001 and 2002. In addition to the research in southwest Oregon, teeth have been collected from deer at check stations and controlled hunts in other western Oregon locations.

An analysis of the black-tailed deer tooth collections in 2001-2002 confirmed that does live longer than bucks. Does live up to 15 years and bucks seldom more than nine years. Bucks have higher mortality because of both higher hunter harvest and natural mortality related to reduced body condition caused by breeding activities. The age distribution of teeth from harvested males >1 year of age was dominated by ages 2-4 which accounted for 68.4 percent of the teeth collected from males in 2001 and 2002 (Figure 2). The average age of harvested bucks (>1 year old) was 4. The age distribution of teeth from harvested females

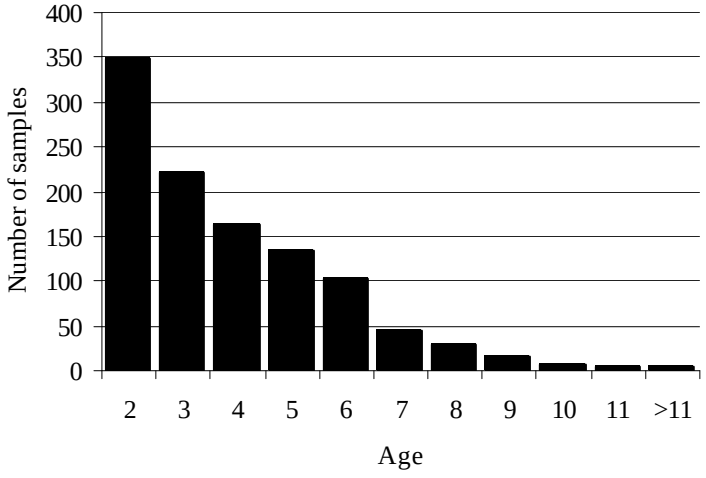

Figure 2. Age distribution of harvested male black-tailed deer > 1 year of age based on teeth collected in southwestern Oregon during 2001 - 2002.

greater >1 year of age was dominated by ages 2-5 which accounted for 68.8 percent of the teeth collected from females in 2001 and 2002 (Figure 3). The average age of females, for both years was 5.

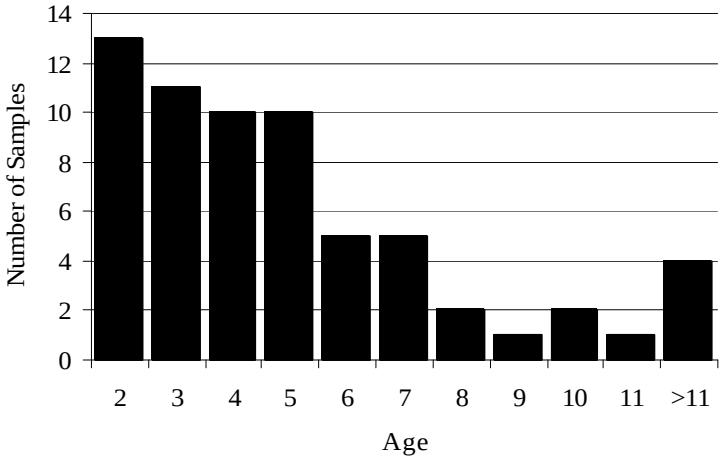

Figure 3. Age distribution of harvested female black-tailed deer > 1 year of age based on teeth collected in southwestern Oregon during 2001 – 2002.

ANTLERS

Genetics, nutrition, and age contribute to antler size. Bucks that have the genetic predisposition to grow large antlers, consume high quality forage, and survive to 4 years of age will typically grow large antlers. Antler growth typically begins in late April and is generally completed by late August. During the breeding season, antlers serve as a signal of fitness of bucks and are used to establish dominance among males. Larger, older bucks typically engage in most of the breeding. However, younger, smaller antlered bucks will also breed does. After the breeding season, hormonal changes initiate the annual shedding of antlers, which generally begins during January.

A buck's age is not necessarily related to antler point configuration (number of points). In southwest Oregon, the Department collected antler data from harvested bucks. Total antler point count (total number of points on both antlers without brow tines) averaged six points per buck for 1,062 bucks > 1 year old. The most frequent total antler point count was four points, which is typically a buck with both antlers forked. Total antler point count increased as age increased, but declined in bucks 8 years old or older. The optimal age for harvesting a buck is age 7 if total antler point count is the only consideration.

POPULATION ESTIMATE

Black-tailed deer populations are difficult to estimate so populations are managed based on trends in buck ratios, damage, and harvest surveys, not number of deer. In 1979, the Department estimated the statewide black-tailed deer population at 452,000. Population estimates during the next 10 years, based on computer modeling which relied primarily on population parameters collected during field surveys, varied between 400,000 and 500,000. In 2004, the black-tailed deer population estimate for Oregon was 320,000.

MORTALITY

Starvation

Habitat quantity and quality, including available forage and cover, influence mortality in black-tailed deer. Without a dependable and nutritious food source animals may die of starvation or become more susceptible to other mortality factors. In general, mortality can be partitioned into two categories: natural mortality (weather, parasites, disease, and predation) and mortality associated with humans (road-kill, poaching, and legal harvest). Black-tailed deer populations are likely influenced by the combined effects of all mortality factors. It is very difficult to precisely measure or quantify any single factor and its impact on the population (Connolly 1981).

Parasites and Disease

The Department's wildlife health program is designed to develop protocols for monitoring the health, including disease impacts, of Oregon's wildlife. There are several diseases and parasites affecting black-tailed deer populations including Deer Hair Loss Syndrome (DHLS) and adenovirus hemorrhagic disease (AHD). Other diseases that affect individual deer on a smaller scale include verminous and bacterial pneumonia, Clostridium bacterial overgrowth, fibropapilloma, parapoxvirus, tapeworms, muscle worms and other parasitic infections.

As part of the wildlife health program, the Department also participates in the active surveillance of infectious diseases including bovine tuberculosis and Chronic Wasting Disease (CWD). To date, neither pathogen has been documented in Oregon's wildlife. Important risk factors for black-tailed deer populations are interactions with domestic animals and deer associated with cervid ranch facilities. Disease transmission has been documented between wildlife and domesticated or captive animals including brucellosis from cattle to elk and bison and back into cattle in the Yellowstone Ecosystem (Meagher and Meyer 1994), bovine tuberculosis from cattle to deer in Michigan, and CWD from farmed to wild cervids in Nebraska, Wisconsin, and Saskatchewan, Canada (Miller and Thorne 1993). Contact with livestock and captive cervids provides the potential for transmission of diseases and parasites to wild black-tailed deer.

The impacts of diseases are important management considerations because they have the potential to negatively impact deer populations. Diseases may also be indicators of inadequate nutrition and poor habitat conditions. Disease transmittal is more serious when deer herds are concentrated. Pathogens that impact deer are best managed by maintaining and enhancing the critical habitat components needed during the various life history stages of deer. Management strategies should include surveying and monitoring for indications of disease in populations.

Deer Hair Loss Syndrome (DHLS) in Black-tailed Deer is a condition affecting both black-tailed and Columbian white-tailed deer. Initially described in western Washington in 1996, DHLS moved southward to infect deer from western Oregon to northern California. The condition produces hair discoloration, hair loss, weight loss, diarrhea, and lethargy. Fawns are impacted more than adults, resulting in poor fawn survival in some areas. The syndrome can ultimately result in the death of some animals, primarily from exposure. Black-tailed deer with DHLS have abnormally heavy infestations of lice. The parasitic louse affecting Oregon's deer with DHLS was identified as an exotic species naturally occurring in parts of Asia.

The Department conducted surveys from 2000-2008 to assess the prevalence of DHLS and found that the condition occurs throughout western Oregon. DHLS prevalence varied considerably (from 2 percent to 46 percent) by WMU; the highest proportion of deer with DHLS are in mid-coast WMUs.

Research on DHLS was initiated in 2003 on captive wild deer at E.E. Wilson Wildlife Area through a cooperative effort with Oregon State University, United States Department of Agriculture, Animal and Plant Health Inspection Service-Veterinary Service, and the Department. This study indicated that louse transmission could occur between black-tailed deer and mule deer. Also, the number of louse may increase on an affected animal by 20-30 times during the winter months and survive off a deer, in a bedding site, for up to a week depending on temperature (Robison 2007).

Adenoviral Hemorrhagic Disease – AHD, an endemic disease, is one of three viral hemorrhagic diseases known to affect deer. In May 2002, the Department confirmed AHD was a primary cause of mortality of mule deer populations in and around Crooked River Ranch in the Metolius WMU. Additional monitoring and testing indicated the disease had spread as far south as Sun River in the Upper Deschutes WMU and into the eastern portion of the Grizzly WMU. The Department estimated that approximately 500 mule deer died prior to December 2002, when the main outbreak subsided. AHD continues to cause mortality in deer populations in the affected area and there is little prospect to prevent or cure the disease.

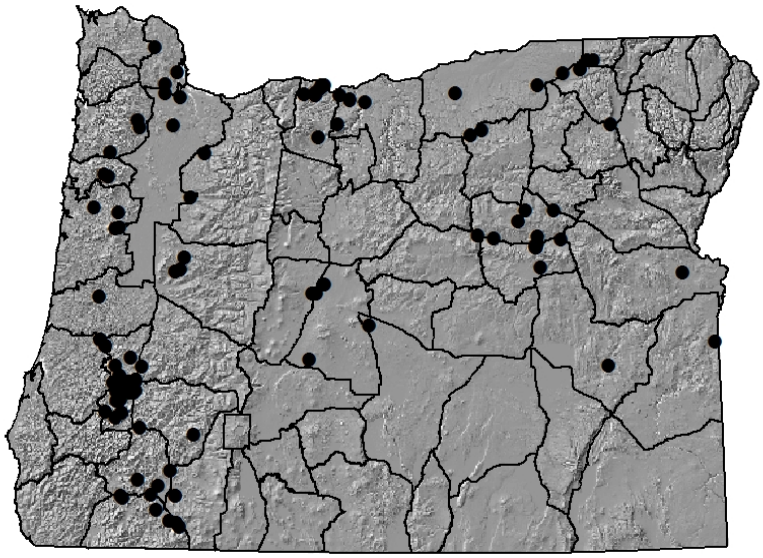

Figure 4. Location of serologically positive Adenoviral Hemorrhagic Disease samples collected from deer, elk, and captive reindeer in Oregon, 2003-2005.

Black-tailed deer are also exposed to and infected with AHD. Since 2003, 78 black-tailed deer in western Oregon have been diagnosed with AHD. During 2003–2005, the Department documented 153 serologically positive AHD black-tailed deer, 30 white-tailed deer, 41 mule deer, two elk, and two captive reindeer in Oregon (Figure 4).

The Department has implemented guidelines for monitoring deer populations for AHD and instituted special carcass disposal restrictions. Any animal showing symptoms of the disease is collected for testing and disposed of within the outbreak area to reduce the risk of further exposures. Since 2003, deer in 40 WMUs throughout Oregon have tested positive for AHD, black-tailed deer occur in 21 of those WMUs.

Chronic Wasting Disease in Wild Deer and Elk - CWD is a transmissible spongiform encephalopathy (TSE) affecting members of the deer family. CWD was recognized as a syndrome in 1967. During the 1990s, CWD emerged as an important disease throughout the world due to impacts to deer and elk populations and fiscal resources tied to monitoring, surveillance, and eradication efforts of the disease.

CWD has been endemic to Colorado and Wyoming for more than 20 years. However, more recently it was found in free-ranging and/or captive mule deer, white-tailed deer, elk, and moose in 14 states and two Canadian provinces, and South Korea. CWD is thought to be spread through natural animal migrations and movement of infected captive cervids. No cases of CWD have been detected in any Oregon samples since testing began in 1996. Every year, a large number of samples are collected and analyzed to determine whether CWD is present in wild populations. These samples come primarily from harvested deer and elk. Field staff also opportunistically sample cervids that were sick, injured, or emacipated or died from other causes such as vehicle collisions. Since 2002, the Department has attempted to collect a minimum of 1,200 samples each year from deer and elk distributed throughout the state. Beginning with 2002-03 hunting seasons through 2006-07 seasons, 1,315 samples (~270/year) have been collected from black-tailed deer. Information from field checks indicated that hunters are concerned about the disease and willing to provide samples.

Predation

Isolating the impact of predation on black-tailed deer populations is difficult because of the numerous factors that can affect deer. Reviews of the literature (Connolly 1980 and 1981, and Ballard et el 2001) found conflicting results on the impacts of predators on deer populations. The reviews found that the impact of predators appears to be influenced by differences in predator and prey densities, predator species, weather, disease, habitat, legal and illegal harvest, and whether the habitats are at carrying capacity. However, large numbers of predators may negatively affect deer herds particularly when populations are low (Neal et al. 1987). Predation impacts are most noticeable after winters when deer populations experience high weather-related natural mortality rates and their poor physical condition increases vulnerability to predation (McNay and Voller 1995, Unsworth et al. 1999, Cougar Management Guidelines Working Group 2005).

Pamplin (2003) found in southwest Oregon that coyotes (*Canis latrans)* and bobcats were the primary predators of black-tailed deer fawns. Coyotes feed primarily on small animals, carrion, and vegetation, but also prey on deer, especially fawns. Bobcats (*Lynx rufus)* were a significant predator of black-tailed deer fawns although on an annual basis they feed primarily on small animals. Deer and elk are the primary prey of cougars, throughout the year. Black bears *(Ursus americanus)* also prey upon black-tailed deer. Department biologists in western Oregon have also observed losses of black-tailed deer to domestic dogs.

Road-Kill

There have been no studies to determine the total number of deer killed on Oregon roads. In certain portions of western Oregon road-kill appear to be very high, while on other roads deer are killed infrequently. For example, 1,036 deer were removed from state and county roads in Jackson and Josephine counties in 2005. This is a conservative estimate since some deer that

collide with vehicles do not die immediately on the road. In comparison, an estimated 3,400 deer were taken by hunters in those county areas in the same year. All age and sex groups of deer populations are involved, deer-vehicle collisions often involve fawns in the spring and summer, and bucks in the late fall.

Deer/vehicle collisions will likely increase in areas where human population and/or activity increases. The Department works with Oregon Department of Transportation (ODOT) and county agencies to reduce deer-vehicle collisions by developing safety corridors and passageways in high deer-use areas. The Department and ODOT have initiated a partnership to develop an Oregon Conservation Strategy, Wildlife Movement Strategy for Oregon. The Department and ODOT are also collaborating with major land management agencies such as the USDA Forest Service, Oregon Department of Forestry, and Bureau of Land Management to improve cooperation and information gathering related to wildlife highway safety issues. Outcomes of implementing the Wildlife Movement Strategy will include safety corridors and passageways in high black-tailed deer use areas. Currently, the Department is cooperating in a deer/vehicle study on U. S. Interstate 84 in the Columbia River Gorge and has proposed a study on the movement of black-tailed deer along four miles of Highway 20 in Lincoln County.

Illegal Harvest

Poaching (illegal kill) is difficult to quantify and control in part because this activity is often in remote areas and the related costs of enforcement in these areas is high. Some data exists on illegal kill from radio-collared deer and is assumed to be similar in un-marked deer. In Washington, McCorquodale (1999) documented that 20 percent of all hunting deaths of radio-collared male black-tailed deer were illegal and that illegal kills exceeded legal hunting kills of radio-collared females. While the impact of poaching likely varies by area, in the South Cascade Black-tailed Deer Study in SW Oregon, of 115 deer radio-marked (64 males, 51 females) with a known cause of mortality, illegal harvest accounted for 7 percent of the mortality. A 10 year study of radio-marked elk in the Cascade Mountains quantified the impact of illegal harvest and found that poaching accounted for 42 percent of cow mortalities. The proportion may actually have been higher since 37 percent of mortality was from unknown causes (Stussy et al. 1992).

Oregon State Police (OSP) reviewed enforcement data from 1996 to 2005 to determine potential impacts of poaching on black-tailed deer populations (unpublished data, Oregon State Police) (Figure 5).

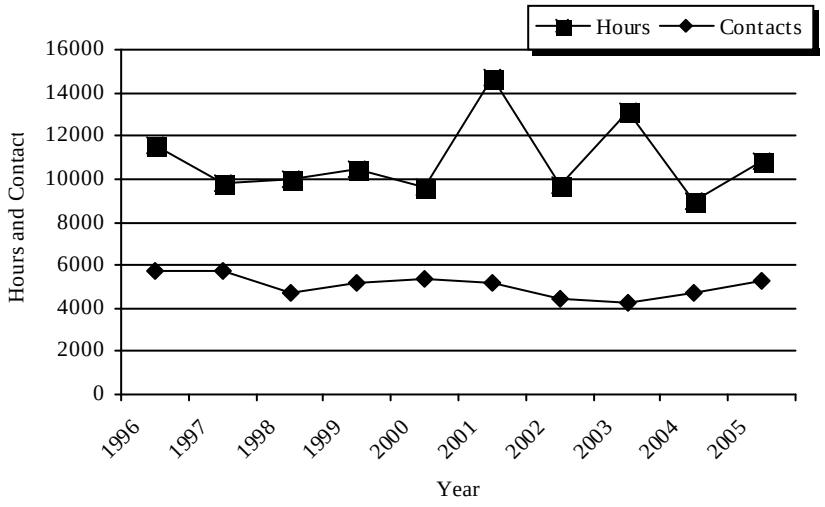

Figure 5. The number of hours worked and number of contacts made by Oregon State Police related to black-tailed deer, 1996–2005.

Illegal kill information was compiled from investigations of deer poaching. Violations related to black-tailed deer averaged 741 per year from 1996-2005 (Figure 6).

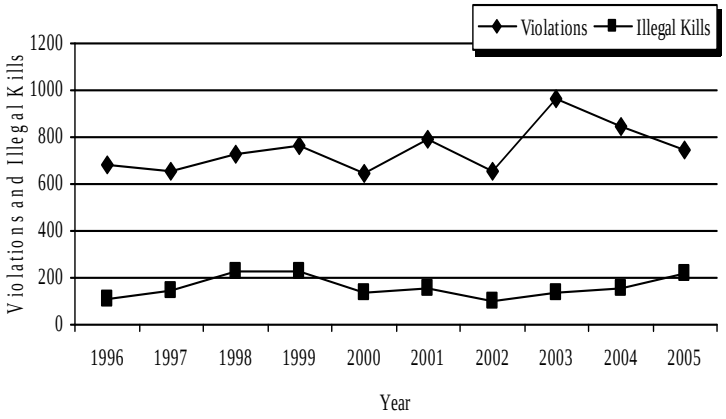

Figure 6. The number of violations and number of illegal kills detected by Oregon State Police related to black-tailed deer, 1996–2005.

Effects of Hunting on Deer Numbers

Hunting may impact the number of deer and population demographics (age and sex ratios) (Connolly 1981). However, abundance and demographics are interrelated and influenced by many factors other than hunting. Evaluating the impact of hunting to black-tailed deer over a large geographical area is confounded by many area-specific factors not related to hunting. For example, deer in different areas may be subject to different diseases and levels of disease, different habitat management, different predator species and different predator population levels.

Although legal harvest may directly impact some black-tailed deer populations in Oregon, the impacts are likely local and limited. The Department does not believe hunting is a significant factor in the observed long-term decline of black-tailed deer populations in Oregon because most hunting is focused on bucks. In 2006, antlerless deer comprised 12% of the black-tailed deer harvest (ODFW data, note, not all controlled hunts were surveyed). Habitat and disease are believed to be most significant factors contributing to the black-tailed deer population declines. Objectives and strategies of this plan include identifying the roles of habitat and effects of habitat management practices on black-tailed deer populations. Hunting does influence the demographics of populations such as the buck/doe ratio and age structure.

While the impact of hunting likely varies by area, the South Cascade Black-tailed Deer Study found that legal harvest accounted for 59 percent of male mortality which has little effect on populations as long as sufficient bucks remain for breeding purposes. Predators were responsible for 23 percent of buck mortality. For females, 51 percent of the verified mortality was attributed to predation and 14 percent was from legal harvest (ODFW 2003).

MOVEMENT, DISPERSAL, AND HOME RANGE

Annual seasonal movements of black-tailed deer herds in Oregon vary considerably. A majority of the black-tailed deer radio-marked in a southern Oregon study near Medford were documented to move seasonally from low-elevation winter range to high-elevation summer range (unpublished data, ODFW). During the same period, radio-marked black-tailed deer monitored in the North Umpqua drainage near Roseburg exhibited limited or no seasonal movements (ODFW 1999). Most (86 percent) radio-marked black-tailed deer in a Washington study migrated seasonally and moved an average of 17.27 miles between the seasonal activity

centers (McCorquodale 1999). Seasonal movement during spring and fall by black-tailed deer are likely in response to environmental factors such as snow depth and weather. Summer ranges are at higher elevations than winter range. In areas with mild winters and limited snow, such as Oregon's north coast, deer do not migrate and occupy the same general range year-round (Hines 1975).

HABITAT

The basic components of habitat are food, water, shelter/cover, and space. Habitat may be defined as "the resources and conditions present in an area that produce occupancy, including survival and reproduction, by a given organism" (Hall et al. 1997).

Black-tailed deer have been described as especially well adapted to dense, high-canopied conifer forests, but research in western Washington and northwest Oregon found that early successional habitats created by logging or fire had higher deer densities (Brown 1961, Hines 1973). Early successional forests have more diverse and abundant understory vegetation and provide substantial and nutritious forage for black-tailed deer.

Black-tailed deer are an edge adapted species using dense hiding cover during the day, emerging in the morning and evening to feed in more open areas (Maser et al. 1981). Throughout much of western Oregon, black-tailed deer reside year-round in relatively flat areas at mid to low elevations, on south facing slopes dominated by vine maple (*Acer circinatum*), huckleberry (Vaccinium spp), and salal (*Gaultheria shallon*) plant communities. These areas provide the preferred forage, minimal duration of snow cover, and protection from cold winds (Russell 1932, Zwickel and Brent 1953, Dasmann and Taber 1956, Crouch 1968, Gilbert et al. 1970, and Miller 1970). Although black-tailed deer may inhabit higher elevations, in northwest Oregon they preferred sites less than 1500 feet in elevation, with deep soils, and vine maple and sword fern (*Polystichum munitium*) understories because these sites provide relatively mild conditions with the maximum production of winter forage (Hines 1973). Forest and habitat management influencing black-tailed deer populations are discussed in the forest and vegetation management section.

Black-tailed deer populations (carrying capacity) are limited by habitat; different habitats will produce different densities of deer (deer/mile square). GIS data are available that could be used to inventory and potentially develop a model to estimate the black-tailed deer habitat potential for each WMU. This is a habitat management strategy that will be addressed by the Department (see Issue #1).

Habitat issues will become even more complex with the predicted global warming climate change and its effect on ecosystems of the Pacific Northwest. Global warming may lead to changes such as expanding the range of diseases and parasites, such as the lice which contribute to DHLS, and reduce forage as plant species composition changes. If global warming does lead to habitat changes it would also affect the distribution of species.

The Oregon Conservation Strategy identifies, as one of its priority goals, the need to manage landscapes for multiple uses that include fish and wildlife habitat. The Strategy describes a number of tools and actions for landowners and land managers that can result in significant habitat benefits for multiple species including black-tailed deer.

NUTRITIONAL NEEDS

Deer are relatively small ruminants unable to process large volumes of poor quality forage compared to elk and cattle. Deer require high quality forage and overall body condition affects many aspects of biology and survival. For example, productivity and winter survival are higher when deer begin the winter with large reserves of fat.

For deer to maintain fitness, particularly during winter and breeding seasons, they must have access to adequate year round forage. Plant consumption by black-tailed deer varies and is affected by seasonal quantity (availability) and quality (nutritional value). The nutritional value of forage varies by plant species and time of year, generally being higher when the plant is actively growing and lower after senescence in the fall and winter.

The fitness of an animal is dependant on the quality of forage and metabolic requirements of the animal. The nutritional needs to maintain fitness for adults are normally less than requirements for growth and maintenance of young animals. Females that are pregnant or lactating also require higher quality and quantities of forage. Nitrogen (protein) content is commonly used as an indicator for nutritional value of forage (Ramsey and Krueger 1986). Einarsen (1946) found that body condition of back-tailed deer was positively correlated with crude protein in forage. Only a portion of crude protein is digestible and insufficient levels of protein were linked to decreased growth rates in fawns (Verme and Ozogo 1980), reproduction (Verme 1969) and antler development (French et al. 1956). To maintain optimal growth, adult deer and elk require about 12-16 percent crude protein (7.3-10.9 percent digestible protein) in their diets (French et al. 1956). Approximately five to seven percent crude protein (0.77-2.66 percent digestible protein) was necessary to replace protein losses in deer during the winter (Robbins 1983).

The availability of forage varies considerably across Oregon's black-tailed deer range. Temperature and precipitation patterns affect forage type and availability including diversity and quantity of vegetation. Precipitation in western Oregon varies; in general annual rainfall is higher in northwest coastal areas, less in the southwest interior. As an example, Valsetz in northwest Oregon receives 131 inches of precipitation annually, while Ashland in the southwest interior averages 20 inches per year (Western Regional Climate Center, 1936-2007, unpublished data). Temperature gradients are also diverse across black-tailed deer range with lower temperatures in the Cascade Mountain and higher elevation Coast Ranges compared to the interior valleys and coastal areas.

In the Coast Range near Corvallis, black-tailed deer diets varied seasonally and included a wide variety of species (Crouch 1981). They consumed parts of 62 plant species with browse, (primarily leaves) compromising 59 percent of the diet. Forbs and green grasses were readily consumed when available, but were never the seasonally preferred foods (Couch 1981). Common foods in western Oregon consist of trailing blackberry (*Rubus ursinus*), red huckleberry (*Vaccinium parvifolium*), forbs, salal, grasses, acorns, lichens, and mushrooms (Brown 1961, Crouch 1966, Miller 1968, Maser et al. 1981). In northwestern Oregon, the most preferred, nutritious, and digestible food source of the black-tailed deer was trailing blackberry; its leaves supplied half of the food supply at the onset of winter (Hines 1973). Huckleberry twigs and evergreen salal provided residual winter food. In the spring, deer ate a variety of forbs; as herbaceous vegetation matured or disappeared during the summer months woody vegetation and leaves became a more important food source (Hines 1973). Black-tailed deer

during the summer also used thimbleberry (*Rubus parviflorus*) and vine maple, and in late summer, salmonberry (*Rubus spectabilis*) and trailing blackberry leaves are consumed extensively (Hines 1973).

In southwestern Oregon *Ceanothus cuneatus* (Wedgeleaf) provides a bulk of the winter feed for black-tailed deer in many areas (Randall, et. al. 1994). Studies have shown that Wedgeleaf makes up 60 to 90 percent of the winter diet of black-tailed deer in that portion of the region studied, an area located on the Oregon-California border in the Siskiyou Mountains of southwestern Oregon (ODFW, 1996).

In many areas of western Oregon the natural forage for black-tailed deer has been replaced by agricultural crops including vineyards, reforestation areas, Christmas tree farms, nurseries, field crops and row crops. At times agricultural areas which are irrigated and fertilized are selected in preference to natural vegetation. Damage caused by deer will be discussed in a separate section of this plan.

Black-tailed deer and Roosevelt elk co-occur in much of western Oregon. There is little documented evidence that Roosevelt elk (*Cervus elaphus roosevelti)* impact forage availability for black-tailed deer. However, research in northeast Oregon indicated that mule deer avoided areas selected by Rocky Mountain elk *(Cervis elaphus nelsoni),* (Johnson et al. 2000) but no information was presented on possible effects on the deer population or individual deer. In areas (such as western Oregon) of high quantity but poor quality forage, elk may have some impact on black-tailed deer populations, particularly in ranges where both species co-occur throughout the year (Happe 1990).

HUNTING REGULATIONS AND HARVEST

REGULATORY HISTORY

In recent years, black-tailed deer buck hunting has been managed in western Oregon by a combination of centerfire firearm and archery seasons, each with unlimited tags ("general seasons"). Archery seasons include antlerless deer as part of the bag limit in some WMUs. Controlled hunts (limited tag numbers) are implemented for muzzleloader, youth-only, and antlerless deer.

Historically, hunting regulations for deer in Oregon were set by the Legislature. In 1893, the first Fish and Game Protector was appointed. The first deer season was established in 1901 and hunters were allowed to harvest up to five deer of either sex from July 15 - October 31. In 1921, the Fish Commission was separated into the Fish Commission and Game Commission; the Commissions were recombined by the 1975 Legislature. Bag limits and season lengths decreased until a buck-only season (40 days with 2-buck bag limit) was established in 1923 in response to public concerns over reduced deer populations.

Deer tags were separated from hunting licenses in 1948, and a harvest estimate was provided through hunter returns of report cards. In 1952, buck season opened on the Saturday nearest October 1 for three weeks. During the last three to five days of the season, the bag limit changed to include a "Hunters Choice" of any deer for hunters with unfilled general season buck deer tags.

Prior to 1976, a general season buck tag was valid for either a black-tailed or a mule deer. In 1976, separate tags were adopted for mule and black-tailed deer because mule deer populations did not appear to recover from the severe winter of 1968-69.

Hunting regulations for archery and centerfire firearms evolved through the years in response to recreational and management needs. Archery hunters were initially restricted to specific units or portions of units. In 1972, archers were required to purchase a specific archery tag in addition to a regular hunting license. Separate deer tags for archery and rifle hunters were implemented in 1979, the same year general archery hunting was opened across the entire state.

Prior to 2004, the archery bag limit was one deer for all WMUs in western Oregon. Currently, the archery deer season opens on a Saturday in late August (five weeks prior to the general centerfire firearm season for black-tailed deer) and continues for 30 days, with a standard bag limit of one buck with at least a forked-antler. WMUs with a one deer bag limit for archery season are approved by the Fish and Wildlife Commission (Commission) each year. In western Oregon, spikes are part of the antlerless bag limit because of the difficulty distinguishing yearlings with small spikes from antlerless animals

The Department has also implemented special hunting seasons for hunters using muzzleloading weapons to provide additional hunting opportunities. These hunts generally have more liberal bag limits than seasons that allow modern firearms.

Advancements in muzzleloading technology, and the potential impact of technology on the harvest of big game, prompted the Department in 1999 to survey Oregon muzzleloader hunters on attitudes towards restricting technology. Results from the survey indicated that muzzleloader hunters thought it better to restrict technology than reduce hunting opportunities. In response to the survey results, the Department implemented restrictions on muzzleloader equipment, ammunition, and propellant beginning with the 2001 hunting season. These restrictions apply to controlled muzzleloader and muzzleloader/archery hunts.

Chronology of Regulatory Changes to Black-tailed Deer Seasons

Detailed information on general season lengths from 1970 through 2006 can be found in Appendix 2.

1960- A statewide general buck season ran for 23 days and included an additional one to six weekends with a one deer bag limit in much of western Oregon (two weekends in most WMUs). The extended season was generally restricted to areas where deer caused damage to property, e.g. within one mile of agricultural lands, valley floors, the Willamette WMU, and that portion of a WMU outside the National Forests. The extended season required an unused general season tag and did not provide an opportunity for an additional deer. Statewide, black-tailed deer harvest was estimated to be 41,000 bucks and 20,000 antlerless deer. Archery season was open in only two western Oregon WMUs including a 23 day early season and a 27 day late season.

1970- The general buck season in Western Oregon lasted 23 days. Hunting of antlerless deer required an unused general season deer tag and a Unit Permit. These permits were obtained through a drawing and did not allow harvest of an additional deer. Timing of permit seasons varied by WMU, hunts occurred before, during, and/or after the general season. Black-tailed deer harvest was estimated to be 25,000 bucks, and 4,000 antlerless deer. Archery season was open in only three western Oregon WMUs with a 30 day early and a 36 day late season. The general archery season was expanded to statewide in 1979.

1980- The general buck season in Western Oregon was 32-40 days. Antlerless deer hunting in northwest Oregon was during the hunter choice season (the last five days of the general season) and the bag limit was one deer. In southwest Oregon, hunting of antlerless deer was controlled with a limited number of tags valid for 25 days and provided an opportunity for a second deer. Black-tailed deer harvest was estimated to be 37,000 bucks and 17,000 antlerless deer. Archery hunting was allowed during a 37 day early season in all of western Oregon plus a 26-day late season in six units. In 1986, unless a hunter also purchased a tag for the Cascade Elk Season, the general firearms buck season was seven days shorter in Cascade Units because the deer season was closed in the Santiam, McKenzie, Indigo, Dixon, Evans Creek and Rogue WMUs, except for hunters who had both a general buck deer tag and a Cascade Elk tag. This opportunity to hunt deer and elk simultaneously was eliminated because deer hunters complained they were being forced to purchase elk tags.

1990- The western Oregon general buck season was a 40 day season in most WMUs, but only 33 days in Cascade Units because of the closure of deer season during the Cascade Elk Season. Antlerless hunting in NW Oregon was primarily during the hunter's choice season (during the last five days of the general season the bag limit was one deer). Hunter's choice was eliminated in 1994. In a few areas of NW Oregon and in SW Oregon, harvest of antlerless deer was by

controlled hunts. Most controlled tags were valid for 33 days and allowed for harvest of a second deer. Black-tailed deer harvest was estimated to be 39,000 bucks and 16,000 antlerless deer. Archery season consisted of a 30 day early season in western Oregon and a 23 day late season in nine WMUs.

2000-2007 - During the last 8 years (2000-2007) there were several changes in regulations that impacted black-tailed deer hunters. Major changes occurred in 2000, 2004, and 2005.

2000 - The western Oregon general buck season was 40 days but limited to 33 days in the Cascade WMUs. All antlerless deer hunting was by controlled hunts and allowed for a second deer tag (600 series hunts) with the potential for a third deer tag (800 series hunts) in the Willamette and Melrose WMUs. Black-tailed deer harvest was approximately 22,000 bucks and 5,000 antlerless deer. Archery season consisted of a 30 day early season in western Oregon and 23 day late season in 11 western WMUs.

2004 - In response to declining black-tailed deer populations and hunter success, the Commission adopted a 35 day general buck season. This was a reduction of five days from the 40 day seasons. This reduction eliminated one weekend from the season. Black-tailed deer harvest was approximately 26,000 bucks and 3,700 antlerless deer (harvest surveys for antlerless hunts were incomplete). In 2004, many antlerless seasons were shortened to 14 days compared to prior seasons of 33 days. Also in 2004 the standard bag limit for the western Oregon general archery season was changed from one deer to one buck deer having not less than a forked-antler. Antlerless deer were included in the bag limit for the general archery season in specific WMUs when regulations were adopted by the Commission in June.

2005 - Antlerless deer seasons were modified to reduce opportunities for hunters to harvest multiple deer. This reduction was primarily addressed by eliminating the 800 series hunts. Preference points that hunters had acquired for the 800 series hunts became applicable for 600 series tags. There were also significant reductions in the number of 600 series tags available for antlerless hunts in NW Oregon. Black-tailed deer harvest was approximately 21,000 bucks and 3,000 antlerless deer (harvest surveys were incomplete).

2007- Season was extended two days for youth with an unused Western Oregon General Season deer tag.

HUNTER NUMBERS AND HARVEST

In 1928, 57,000 hunting licenses were sold. In 1939, an increase in human population and interest in hunting resulted in the purchase of 88,000 licenses. Deer harvest was generally low during the 1930s, with a reported harvest of 6,506 black-tailed deer in 1934. The end of World War II brought a substantial increase in hunting and 167,000 hunting licenses were sold in 1946.

Hunter numbers peaked during the late 1970s through the mid-1990s. For the 15-year period, of 1979-94 an average of 147,000 people annually hunted black-tailed deer (Figure 7). The total number of black-tailed deer hunters (firearms and archery hunters combined) declined 33 percent from 1998 (152,000) to 2006 (102,000).

NOTE: Figures 7 and 8 include information through 2003 because beginning in 2004 not all hunts were surveyed so data for the subsequent years is incomplete.

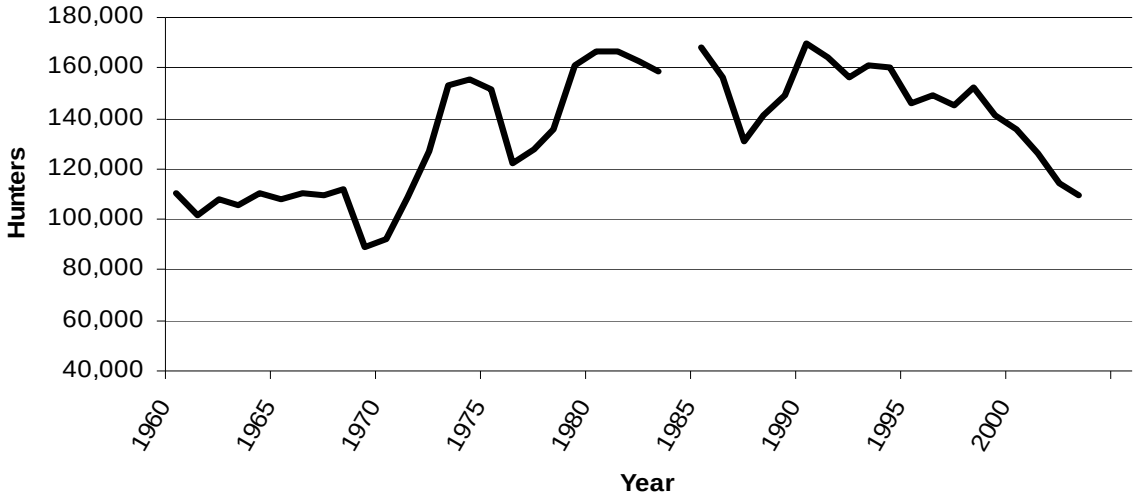

Figure 7. Number of black-tailed deer hunters in Oregon, 1960-2003.

Black-tailed deer harvest from 1979-94 averaged 38,000 deer with a 26 percent hunter success rate. Antlerless deer were approximately 30 percent of the annual harvest during this period, largely due to "Hunters Choice" harvest. The peak year of harvest was 1978 when 64,000 black-tailed deer (including antlerless deer) were taken (Figure 8).

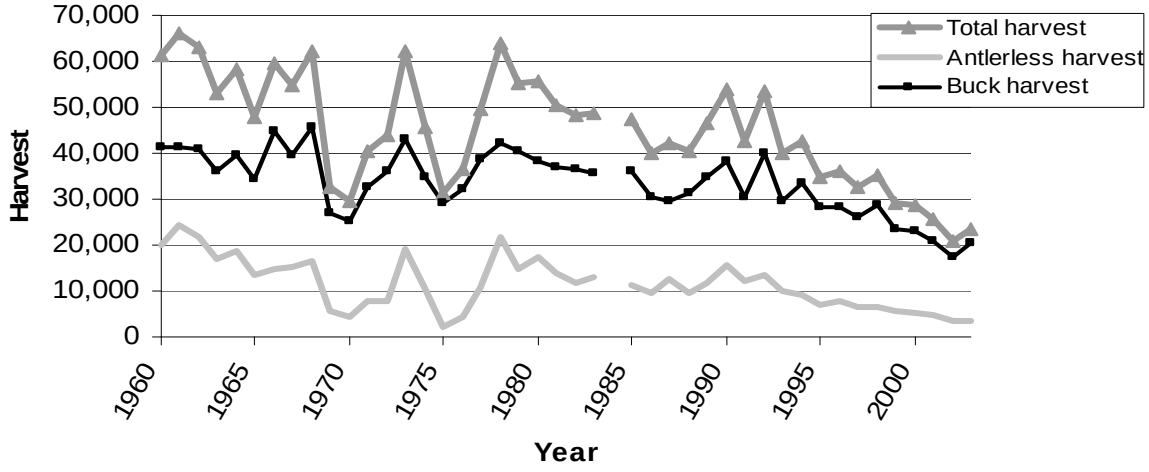

Figure 8. Black-tailed deer harvested in western Oregon, 1960 – 2003.

Although buck harvest has declined substantially, the reduction in antlerless harvest accounts for much of the reduction in total deer harvest since hunter's choice was eliminated in 1994. Separate hunter success and harvest rates between antlerless deer and bucks prior to 1994 are not available because the hunter's choice season allowed antlerless harvest during the last five days of the general season. General archery season also had a one deer bag limit during most years. In 1994, hunter's choice was eliminated and all subsequent hunting with firearms for antlerless deer has been administered by controlled hunts.

Antlerless deer harvest decreased after 1995 (Figure 8) due to 600 series tag reductions (Figure 9) and elimination of the 800 series "additional deer" hunts. In 2004, the bag limit during the general archery season was changed from one deer to one buck in most units which further reduced antlerless harvest.

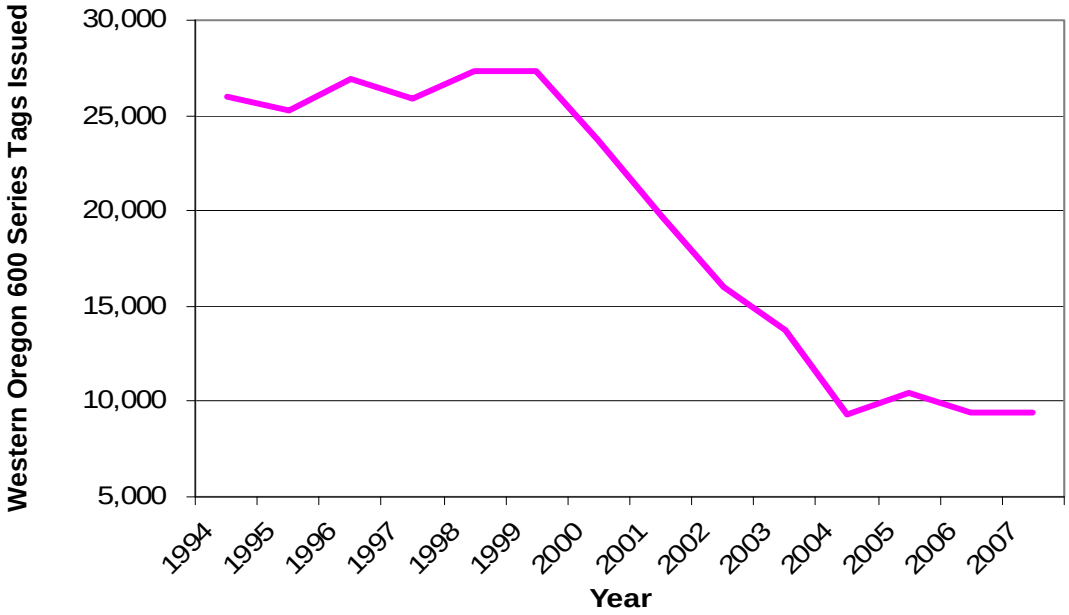

Figure 9. Tags issued for Antlerless/Spike or One Deer (600 Series) in Western Oregon, 1994-2007.

HUNTER RECRUITMENT

Black-tailed deer harvest, and the number of tags sold for the general firearm deer season have declined over the last decade (Figure 10).

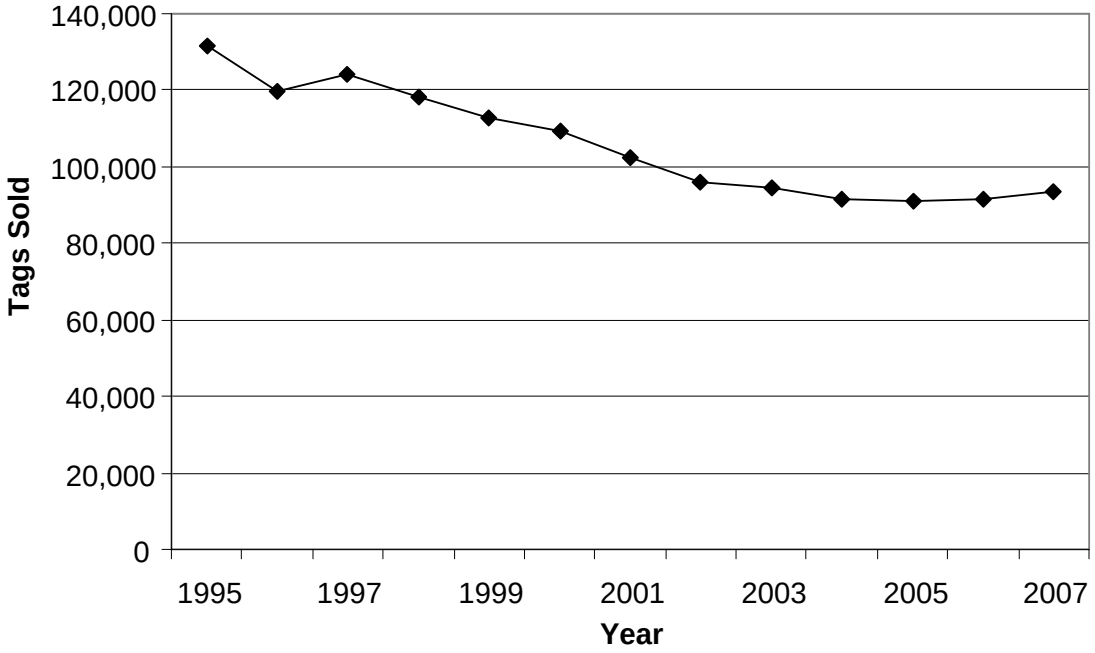

Figure 10. Number of general deer season firearm tags sold in Oregon, 1995-2007.

The Department is focused on recruiting youth, retaining existing hunters, and recruiting new adult hunters to mitigate for the continual decline in the number of hunters.

As the number of tags sold for the general black-tailed deer season declined, the number of youth less than 18 years of age with tags also declined by about 27 percent over the past 10 years (Figure 11). However, this age group continues to account for nearly 8 percent of hunters during the general black-tailed deer firearms season.

As the hunting population in Oregon aged, the Department was focused on encouraging younger age groups to participate in hunting. Oregon's Hunter Education Program, which emphasizes education of youth in safety and hunting knowledge, was initiated in 1962 and "youth-only" hunting opportunities were established across Oregon.

In 1991, the Department offered the first youth-only deer hunts. These opportunities have generally been in areas with good public access or in areas where private landowners agreed to provide access for youth.

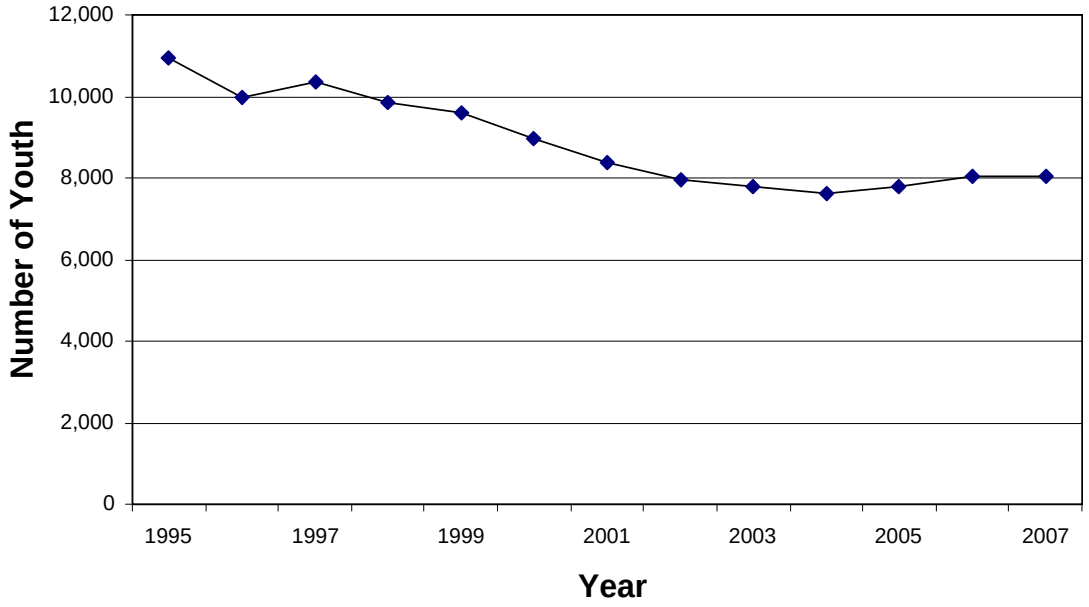

Figure 11. The number of youth (12-17 years of age) purchasing western Oregon general firearm deer season tags, 1995-2007. Youth tag estimates computed for 1995-1999 using the average youth tag percentage for the years 1999-2007.

The decrease in hunters is not unique to Oregon. This trend has occurred across all regions of the U.S. and most states (U.S. Fish and Wildlife Service 2007). In early 2006, the Department developed a Hunter Recruitment Working Group to assess problems contributing to the decline in hunters, identify opportunities to recruit hunters, and develop recommendations for future management. The working group's priority recommendations included the following:

- Develop an overall marketing plan with subcategories for each Department program.
- Assess current regulations and season structure that may be barriers to participation and recruiting of new hunters.

- Survey “lapsed” hunters, and hunters that failed to purchase controlled hunt tags, to find out why they quit hunting or did not hunt.
- Offer a mentored hunt program for youth.
- Form a standing committee on hunter recruitment and retention.

The focus of these recommendations was the recruitment and retention of hunters (with an emphasis on youth) and the need to bring back former hunters.

In response to these recommendations, the Department added new youth deer hunts and a youth-only two-day extension to the western Oregon general firearms black-tailed deer season in 2007.

BLACK-TAILED DEER MANAGEMENT CONCEPTS

MANAGEMENT DECISIONS

In managing black-tailed deer, the Department follows the Wildlife Policy (ORS 496.012) which reads; “It is the policy of the State of Oregon that wildlife shall be managed to prevent serious depletion of any indigenous species and to provide the optimum recreational and aesthetic benefits for present and future generations of the citizens of this state”. There are seven coequal goals of wildlife management:

“(1) To maintain all species of wildlife at optimum levels.
(2) To develop and manage the lands and waters of this state in a manner that will enhance the production and public enjoyment of wildlife.
(3) To permit an orderly and equitable utilization of available wildlife.
(4) To develop and maintain public access to the lands and waters of the state and the wildlife resources thereon.
(5) To regulate wildlife populations and the public enjoyment of wildlife in a manner that is compatible with primary uses of the lands and waters of the state.
(6) To provide optimum recreational benefits.
(7) To make decisions that affect wildlife resources of the state for the benefit of the wildlife resources and to make decisions that allow for the best social, economic and recreational utilization of wildlife resources by all user groups."

During periods with relatively high black-tailed deer populations, the Department provided optimal recreational opportunity and addressed damage concerns with little apparent impact on deer populations. Based on trends in field survey data and hunter harvest information black-tailed deer populations have declined since the late 1980s. The primary reasons for declines are likely the decrease in quantity of early seral habitat, particularly on federal lands, (see figure 13 on page 38), decreased quality of habitat on federal and private lands, disease, and an increase in predator populations (cougar, bear, coyote, bobcat, etc.) in some areas.

The Department adjusted hunting seasons as the population of black-tailed deer declined. Some management actions that were implemented included reducing the length of hunting seasons, adjusting bag limits, and reducing antlerless hunts.

While harvest has been reduced in response to declining black-tailed deer populations, the Legislature also provided the citizens of Oregon with the ability to respond to damage by wildlife. Private landowners and public land managers provide important habitat for black-tailed deer. Oregon Revised Statute 498.012 allows for the control or harvest of wildlife if these animals are damaging land and agricultural or forest crops. Hunting seasons are used as a primary tool to address damage caused by game animals. Some controlled hunts are designed to address specific areas with damage problems. Partially in response to DHLS, which increased concern for deer populations, controlled hunt tags for antlerless deer hunting in western Oregon have been reduced by 62 percent between the years 1997-2005.

General seasons and controlled hunts are also designed to maintain populations of game animals near Benchmarks or Management Objectives (MOs). During the 1980s, the Department reviewed management policies for deer and elk and adopted MOs for mule deer and elk. MOs for black-tailed deer were not adopted at that time due to the inability of existing inventory and trend data to accurately estimate populations. During a less extensive process, the Department developed population and buck ratio Benchmarks which are similar to MOs, but not formally adopted by the Commission. Wildlife damage was one of the factors considered when setting Benchmarks. Buck ratios continue to exceed Benchmarks in most western Oregon WMUs.

In general, management decisions that affect black-tailed deer consider:

- Statutory obligations in the Wildlife Policy (ORS 496.012)
    - To prevent serious depletion of any indigenous species and
    - To provide optimum recreational and aesthetic benefits
- Statutory obligations in the Damage Statute (ORS 498.012)
- Actions associated with implementation of the Oregon Conservation Strategy
- Buck ratio (annual and trend)
- Population level (annual and trend)
- Hunter success (annual and trend)
- Fawn recruitment (annual and trend)

In recent years, management strategies have focused on reducing seasons and related hunting opportunities in response to declines in black-tailed deer populations. Recent management changes included:

- In 1994, the "hunter's choice season" (under which the last five days of the general season the bag limit was one deer") was eliminated to address hunter concerns of uncontrolled doe harvest. Antlerless deer seasons in northwest Oregon were changed to controlled hunts with tag numbers designed to result in the same harvest levels as occurring during "hunter's choice".
- In 2000, significant reductions in tags numbers for controlled antlerless deer hunts began in some units.
- In 2004, the general buck firearms season was shortened to 35 days (reduced by five days).
- In 2004, many antlerless seasons were shortened reduced from 33 to14 days.
- In 2004, the western Oregon bag limit during the general bow season was changed from one deer to one buck with at least a forked antler.
    - Units offering a one-deer bag limit during the general archery season were reviewed and adjusted annually.
- In 2005, the third deer opportunity (800 series "additional deer" hunts) was eliminated.
- In 2006, antlerless tag numbers were further reduced.

POPULATION MONITORING

Biologists who manage black-tailed deer populations use various techniques to monitor different aspects or characteristics of the population. Monitoring black-tailed deer populations in Oregon involves annually assessing herd composition, trend counts, and information obtained from annual harvest surveys. Biologists also consider habitat condition, nutrition, damage, and weather when evaluating data and setting regulations.

Information gathered in the monitoring process may be used to develop models to predict population numbers and demographics (age and sex ratios). Models are based on a set of assumptions, and these assumptions are generated by analyzing data collected from the field. These data must be collected systematically and accurately in a repeatable manner and include appropriate sample sizes. Harvest data must also be gathered in a precise and accurate manner. Current data collected on black-tailed deer are not adequate to provide reliable population estimates. A new design for a population model based on more data including improved hunter harvest survey information will be discussed in another section of this plan.

After hunting seasons (November-December), fall herd composition counts are conducted by vehicle (spotlighting), aircraft, trail monitoring cameras, or on foot. Deer are counted and classified based on sex and age (buck and fawn) ratios. The information is used to calculate two ratios, bucks/100 does and fawns/100 does, in each WMU. These ratios are evaluated to determine and compare annual trends. Buck ratios are also compared with Benchmarks for each WMU.

During March and April, spring herd composition and total deer counts are conducted by vehicle (spotlighting), aircraft, trail monitoring cameras, or on foot. Each spring, deer are counted and classified as adults or fawns and a ratio of fawns/100 adults is calculated. Fawn ratios observed during spring and fall herd composition surveys are used to estimate over-winter survival and fawn recruitment. These data may also be used in population modeling. The number of black-tailed deer observed per mile of survey route in the current year is compared to previous year's information to determine population trends. Spring trend counts are not conducted in all areas because of limited access and/or visibility.

Spotlighting

The most common method used by the Department to survey and assess the composition of black-tailed deer populations is by spotlighting from a vehicle. Spotlights are used to conduct herd composition counts in summer and fall (before and after hunting seasons) to determine sex and age ratios. In spring, spotlights are used to count the number of deer per mile traveled and determine age.

Spotlight counts are less biased and more effective than daylight counts because deer primarily forage in the open at night and are more observable along survey routes (McCullough 1993; McCullough et al. 1994). Herd composition data and trend data vary considerably between seasons, location, and years. The least variation in buck ratios occurs between June and September, and usually produces the most stable ratios (McCullough et al. 1994). For fawn ratios, the most consistent counts were in July, September, and October (McCullough et al. 1994).

The composition of a deer herd (the true buck or fawn ratios or deer density such as number of deer per square mile) is unknown, but systematic spotlighting may be used to collect data to estimate herd composition. Population trend and herd composition data provide information about deer populations and assist in management planning. Buck and fawn ratios, combined with harvest data, and annual survival estimates, can be used to develop an estimate of a deer population.

Harvest Surveys

Telephone surveys of licensed tag holders are conducted each year after the hunting season to obtain harvest data from the 20 WMUs in western Oregon. The survey determines if the hunter hunted, number of days hunted, which WMU they hunted in most, and harvest success (including number of points on bucks taken). Harvest data is compiled for each controlled hunt and general season, and combined into three regions, North Coast, South Coast and Cascades.

The Department is initiating a new hunter reporting process for the 2008 hunting season. There will be two ways for hunters to report, via the Internet, or by calling 1-866-947-ODFW (6339) and using the Automated Phone System. Hunters will answer questions about where they hunted, how many days they hunted, whether or not they were successful, and if they shot a buck deer how many antler points it had on the side with the most points. Information regarding the new reporting system is included in the Oregon Big Game Regulations booklet.

Foot Routes

Foot routes or walking routes for black-tailed deer were established in 1960 in Jackson County. Foot routes were initially developed to establish trend information in the spring, but many of these routes were also conducted in the fall to compile herd composition. Data from these routes represent the most comprehensive and long-term information on population trends for black-tailed deer in southwest Oregon.

In the southern Oregon Cascade and Siskiyou Mountain ranges black-tailed deer use distinct winter-range habitat consisting of hillsides with oak woodlands, mixed coniferous-hardwood forests, and open, south facing, wedgeleaf ceanothus (*Ceanothus cuneatus*) brush fields. These areas are generally open habitats and allow excellent daytime observations of deer. Nine foot routes were established in 1960 and totaled 65 miles. Another route was added in 1972 and increased the survey distance to 74 miles. Slow growing vegetation, stable land ownerships and land management activities which maintain visibility of deer have enabled the routes to remain relatively unchanged for more than 45 years.

Forward Looking Infra-Red (FLIR)

The use of infrared thermography (IT) in wildlife surveys has been investigated since the late 1960s, and has been used operationally across the U.S. for big game survey work. An IT system detects heat "signatures" from animate or inanimate objects through a camera and processes it to produce an image on a video monitor. For wildlife surveys, the technology is best used in situations were background or ambient heat is minimal, which allows easy detection of deer and other warm-blooded mammals against a cold landscape.

Most IT wildlife surveys have used a thermal imaging technology known as forward-looking infrared or "FLIR". The equipment needed to conduct IT surveys with FLIR is expensive. For example, a FLIR unit suitable for big game surveys may cost more than $200,000. The high cost of thermal imaging may be justified by a significant increase in the number of observations and the reduction in labor costs associated with ground observations (Focardi et al. 2001).

In Oregon, FLIR was first used by the Department in the early 1990s on an experimental basis, and later for actual surveys. FLIR was used in 1995-99 on the north coast to assist in the evaluation of a moratorium on antlerless deer hunting in the Saddle Mtn. WMU (Biederbeck 1999). Although FLIR appeared to be excellent at detecting deer under the right conditions,

there was a potential bias related to variable behaviors of deer foraging in clearcuts. FLIR was most effective when deer were in clearcuts rather than in taller, denser cover. Wildlife biologists have long recognized that monitoring techniques that rely primarily on counts of animals in easily detected areas are flawed and may provide incorrect estimates of abundance.

In Douglas County, FLIR was used in the 1990s to assess Columbian white-tailed deer and black-tailed deer numbers in oak woodland habitats. There was a consensus from survey teams that a high-percentage of the deer in the area were detected because of the limited forest over-story that may typically block a deer's heat signature.

In addition to the limitations of FLIR in identifying ambient heat signatures (such as stumps on warm days) and detecting deer in heavy vegetative cover, this technique does not reliably distinguish between species, sexes, and ages of deer.

Despite its limitations and expense, FLIR could provide accurate counts of deer in open habitats. In densely forested deer habitat with interspersed open areas, survey teams have used FLIR to locate 100-200 deer per hour from helicopters compared to 10-20 deer per hour typically located with spotlighting on a very productive night.

Handheld Cameras **-** Thermal imaging technology with handheld cameras has been used to survey wildlife. These devices have become less expensive and more efficient as the technology improves. However, there is little or no literature on the use of these cameras as survey tools.

Trail Cameras

Trail cameras have been used successfully in southwest Oregon to monitor herd composition of black-tailed deer. Since 1996, still cameras and video cameras have been strategically placed on migration trails in the fall to capture black-tailed deer on film or electronic media. Three hundred to 500 deer were observed annually and provided an excellent sample to determine herd composition and migration characteristics. This method of observation seemed to be effective in Jackson County where black-tailed deer are highly migratory. However, there may be limitations in other regions of Oregon where deer are less mobile or do not follow established routes.

POPULATION MODELS

Population models are simple representations of dynamic and complex biological relationships. They provide wildlife managers with a tool to predict future distributions and abundances of populations, and evaluate factors that may influence habitat use, distribution, and abundance.

Population models for deer may be conceptual, diagrams, or complicated mathematical equations, but almost always include biological parameters of age, gender, mortality rates, reproductive rates, and numbers of deer. Models can be used to examine impacts of management practices (e.g. evaluating the impact of a regulation change), to evaluate trends in deer populations, or predict future trends.

The Department has explored the use of population models to assist in the management of black-tailed deer. One commonly-used model is POP II, a computer based model that tracks seven different characteristics of a population through a biological year. The model allows the user to

simulate the changes in a population over a period of time that corresponds to field observations or to "predict" what may happen in the future if certain factors (e.g. harvest levels) change or unforeseen events (e.g. severe winter snow) occur.

Other models have been developed to evaluate deer populations, but they generally are very site specific and not applicable to other areas. For example, Colorado developed a model for mule deer that may have merit for managing black-tailed deer in Oregon. However, the model required mortality data from intensive radio telemetry monitoring. Replicating similar protocols for data collection in western Oregon may be logistically and financially difficult.

Wisconsin Model "Sex-Age-Kill Model"(SAK)

The SAK population estimation model was selected by the Department and is proposed to be implemented in the next few years (Appendix 3). The SAK model has been used since the 1950s to estimate white-tailed deer populations in the Midwest (Skalski et al. 2005). Obtaining accurate data on the total number and age of bucks in the harvest is critical for the effective performance of the SAK model. The Department intends to use mandatory reporting of deer harvest by all hunters and age sampling of harvested deer from teeth submitted by hunters as the primary source data for the model. To be sure the Department receives this critical information hunters will be required to submit teeth by mail, as has been done in the past for special projects. Mandatory harvest reporting has broad based support among many in the hunting community.

During the next five years, the Department proposes to develop a SAK model for black-tailed deer in western Oregon. The intent is to use the population estimate from the SAK model to develop MOs for black-tailed deer. As with all population models, the better the information put into a model, the better the information it will provide.

Information and changes needed to implement the SAK model include*:

- understanding mortality factors of deer in different areas of western Oregon,
- increasing and altering the scope and timing of deer surveys,
- requiring mandatory harvest reporting and tooth collections by hunters, and
- obtaining the age of deer by analyzing teeth.

(*It may also be necessary to change the bag limit for bucks to include all yearlings, many of which are spikes.)

MANAGEMENT OBJECTIVES AND BENCHMARKS

Management Objectives (MOs) are population targets adopted by the Commission to provide direction for management decisions and activities such as administration of hunting seasons and harvest. There is considerable public and internal review and comment before MOs are adopted. MOs are proposed based on biological, economic, and social characteristics, including (but not limited to) population survey data, modeling, habitat capacity, primary uses of the land and damage to property.

Benchmarks are essentially the same as MOs except they are less formal targets which have not been adopted by the Commission. Benchmarks were developed based on the considerations

mentioned above for establishing MOs including estimates of post season buck ratios, population trend data and reports of property damage in each WMU.

Black-tailed deer in Oregon are managed using Benchmarks as opposed to MOs because of the difficulty estimating the number of deer in populations. The relative abundance of deer is compared from year to year to observe trends and black-tailed deer are managed based on the change or trend in the population indices, rather then a direct count of deer. This process is basic indexing and calculated for all WMUs and sub-units. These indices are derived from spotlight and hiking surveys and expressed as deer per mile.

Population Benchmarks varied from 1.0 deer per mile in the Wilson WMU to 13 deer per mile in the East Applegate sub-unit (Table 1). The average population Benchmark across black-tailed deer range in Oregon is 2.9 deer per mile.

Benchmarks for post-season buck ratios vary from 15 to 25 bucks per 100 does by unit or subunit (Table 1). Buck ratio Benchmarks were established based on biological and social factors. Current (2007) buck ratios are at or above Benchmarks in most WMUs.

In general, population indices are more variable than buck ratios. Estimates of deer per mile may far exceed Benchmarks during one year and be well under these targets the next year. This variation suggests that the inventory methods do not provide reliable information and are inadequate for assessing year to year changes in deer abundance. During the mid-1990s, many Department districts discontinued these techniques for analyzing population trends because of the lack of reliability in the trend estimates. Other districts with more open habitats continued to collect and use the trend data because they believed their surveys were more accurate.

There are no Benchmarks for the Willamette WMU which is designated as a de-emphasis zone for deer. This designation is applied to this WMU because 99 percent of the land is in private ownership and damage from deer is a significant problem. The de-emphasis classification allows for more latitude in managing deer populations particularly related to damage problems.

Collecting accurate survey and biological information will enhance the ability of the Department to obtain better population estimates and develop appropriate MOs for future black-tailed deer management in Oregon. Benchmarks or MOs will be reviewed at five year intervals during the periodic plan review.

Table 1. Management Benchmarks for Black-tailed deer in Oregon by Wildlife Management Unit or Sub-unit.

Wildlife Management Unit (#)	Post season buck ratio benchmark (bucks per 100 does)	3-year average buck ratio 2004-2006	Population benchmark	Spring population benchmark (deer per mile)	3-year average deer/mile 2004-2006
Saddle Mtn. (10)	20	30	13,000	1.5	-
Scappoose (11)	20	16	10,000	1.5	-
Wilson (12)	20	35	8,500	1.0	-
W Trask	20	31	14,100	2.0	-
NE Trask	20	19	3,500	2.2	-
SE Trask	20	-	5,000	2.2	-
Trask (14)	20	25	22,600	2.2	-
Willamette (15)	-	-	8,000*	-	-
N Santiam	15	30	6,000	1.6	-
S. Santiam	15	35	18,000	1.8	-
Santiam (16)	15	33	24,000	1.7	-
E. Stott	20	31	4,000	2.0	-
W. Stott	20	41	2,500	2.0	-
Stott Mt. (17)	20	36	6,500	2.2	-
Alsea (18)	20	49	55,500	2.2	-
N McKenzie	25	-	7,400	3.5	-
S McKenzie	25	-	29,600	3.5	-
McKenzie (19)	25	52	37,000	3.5	-
S Siuslaw	-	-	6,700	3.0	-
E Siuslaw	25	18	21,300	3.0	-
W Siuslaw	25	36	-	3.0	-
Siuslaw (20)	25	6	28,000	3.0	-
N Indigo	25	42	19,000	3.5	-
S Indigo	25	22	11,000	3.0	1.6
Indigo (21)	25	31	30,000	3.3	1.6
Dixon (22)	25	25	33,000	3.0	3.6
Melrose (23)	15	12	15,500	3.0	3.3
E Tioga	20	12	4,300	2.0	2.1
W Tioga	20	9	6,400	2.0	3.3
Tioga (24)	20	9	10,700	2.0	2.5
Sixes (25)	20	11	15,000	1.5	2.3
E Powers	20	14	3,000	2.0	0.6
W Powers	20	10	3,500	1.6	3.1
Powers (26)	20	10	6,500	1.6	2.0
E Chetco	15	18	6,000	1.5	-
W Chetco	15	15	9,000	1.5	-
Chetco (27)	15	19	15,000	1.5	-
E Applegate	20	33	6,600	13.0	4.2**
W Applegate	20	26	5,400	2.8	5.4**
Applegate (28)	20	29	12,000	5.7	3.0**
Evans Creek (29)	20	26	9,500	2.5	5.0**
Rogue (30)	15	26	24,000	11.5	6.8**

* Estimate, not a Benchmark

** 2-year averages (2005-2006)

HUNTING SEASONS

Both black-tailed and mule deer are present in the Cascade Mountains. The crest of the Cascades is generally considered the boundary between western Oregon WMUs where buck deer are hunted during general seasons, and eastern Oregon WMUs where buck hunting is general season for archery and controlled hunts for firearms (Figure 1).

General Season Hunting

Most hunting for black-tailed deer in Oregon is during general seasons; the basic season framework includes:

- a 35 day firearms buck season which begins on the Saturday closest to October 1,
- a 30 day early archery season (late August – late September) that begins five weeks before the general firearms season, and
- a 16 to 23 day late archery season during November – December in selected WMUs.

Within the general season structure, season length, bag limit and date can be manipulated to affect harvest. With relatively long seasons, it is difficult to evaluate the impacts of reducing the season on reductions in harvest and hunter success. For example, the general firearm season was shortened by five days in 2004 and hunter success was higher than any year since 1992. Higher hunter success was related to ideal hunting conditions (a wet "quiet" season). In 2005, (still a 35 day season) harvest and success returned to 2003 levels (20 percent success rate and a harvest of 15,000 bucks).

The bag limit during the general black-tailed deer season is one buck deer having not less than a forked antler. A one buck (with visible antler) bag limit would likely increase hunter success (at least in the short term) and reduce post season buck ratios. The timing of the season may also influence hunt success resulting in higher harvest rates. Late fall hunts tend to be more successful in part because the ground is wet and because it is closer to the rut and more bucks are visible.

Controlled Hunting

Controlled hunting, as opposed to general season hunts, limits the numbers of hunters. Most black-tailed deer buck hunting in western Oregon is through a general season. All antlerless hunts (firearms, muzzleloader and youth only) for black-tailed deer are controlled hunts.

Controlled hunts are used for a variety of reasons including:

- increase the number of deer removed from specific locations to reduce agricultural damage,
- reduce the number of hunters to protect deer populations from over-harvest,
- offer a different bag limit such as one deer or one antlerless deer,
- provide additional recreational opportunities by limiting the type of weapon used such as muzzleloaders or bows,
- offer hunts at different dates than the standard season,
- provide youth hunting opportunities, and
- reduce hunter density to provide a better quality hunt.

Controlled hunting requires that hunters complete a controlled hunt application. Successful applicants are chosen through a random drawing process. The first controlled hunts for black-tailed deer were for antlerless deer permits in specific WMUs. A second type of controlled hunt began in 1973. This High Cascade Buck hunt offered 5,000 permits to hunt buck black-tailed deer in portions of the Santiam, McKenzie, Indigo, Dixon, Evans Creek and Rogue WMUs. Tags for the High Cascade Hunt are valid during mid-September, prior to the general buck season, and for the western Oregon general buck season. Initially, the Hood and part of the White River WMU were included in the High Cascade hunt units but recently these two units were placed in a separate controlled hunt. Currently, there are numerous controlled hunts for antlerless black-tailed deer and muzzleloader and youth-only hunts.

Antlerless Deer Hunting

Antlerless hunting is a management tool to reduce deer populations and damage and to provide more hunting opportunities. In western Oregon, bucks with spike antlers are included in the bag limit for antlerless seasons primarily to eliminate accidental illegal harvest of deer with very short spike antlers.

Antlerless hunting for both mule and black-tailed deer began in 1938 after populations recovered from unregulated hunting and low populations (Mace et al. 1995). From 1938 to 1951, 29,000 antlerless deer were harvested in Oregon. Hunter's choice, a hunting system where the last three-five days of the buck season had a bag limit of one deer, began in 1952. WMUs were created in 1958 to distribute hunters and harvest throughout the state. Quotas for antlerless deer were implemented at that time. Black-tailed deer antlerless harvest increased from 8,600 in 1970 to 40,850 in 1973 in an effort to reduce damage to agricultural crops (Mace et al. 1995).

Deer populations generally include a harvestable surplus, including does (Connolly 1981). Studies of deer in Tillamook County, Oregon, in the 1960's indicated that good deer habitat had a carrying capacity of 75 deer per square mile with a harvestable surplus of 23 deer per square mile (Hines 1973). Harvest of deer at MacDonald State Forest, Benton County, Oregon, averaged over 14 deer per square mile for 17 consecutive years, an indication that harvest levels were compensatory (part of the natural mortality) and did not impact population abundance (Hines 1975). Connolly (1981) in a review of black-tailed deer studies found little to indicate that managed hunting reduced black-tailed deer populations. Studies of black-tailed deer and modeling of black-tailed deer populations have demonstrated that buck hunting can be enhanced by harvest of antlerless deer (Connolly 1981, McCullough et al. 1990, McCullough 2001).

Currently, antlerless hunting is primarily used to reduce damage to farm and forest crops. Damage hunts are typically limited to specific areas and generally do not impact overall deer populations within a WMU. Hines (1973) suggested that in the Tillamook Burn, special seasons for antlerless deer reduced the deer population by 10-40 deer per square mile and reduced damage to young conifers in some areas.

Landowner Preference (LOP)

In Western Oregon, a landowner with at least 40 contiguous acres and whose property is within a controlled hunt boundary can register their land with the Department and qualify for Landowner Preference (LOP) tags. By registering, the landowner can apply each year and receive LOP tags

for use only on their registered property. LOP tags provide an opportunity for landowners to address property damage caused by deer on their properties and provide additional hunting opportunity on their land.

DAMAGE

Although there is concern over the decline in black-tailed deer numbers in western Oregon, there continues to be localized chronic problems with deer damage on private lands.

Wildlife damage control statutes were first designed to address agricultural and livestock damage in rural areas (ORS 498.012). The statutory authority granted to the Department and to landowners was designed to protect agricultural and forest landowners while also protecting wildlife populations.

The Department receives damage complaints from landowners who report deer damage to gardens, residential landscaping, and agricultural or forest crops. The location of the damaged property and the type and extent of the damage determines the options and type of response that may alleviate the damage. From 2002-2006, the Department received an average of 420 damage complaints per year related to black-tailed deer with an estimated value of $640,000 annually in damages reported. It should be noted that the information above is based on "reported damage". Not all landowners report damage and many that do report damage do not provide an estimate of the value of their loss.

Private forestlands are also susceptible to black-tailed deer damage. Oregon Forest Industries Council (OFIC) data from their annual Animal Damage Survey reported 351 deer damage complaints in 2005 and 504 during 2006. The 2006 survey initiated an estimate of the acreage impacted by deer; 19,788 acres were reported as being damaged. The average was 23 acres per complaint. In 2007 the damage survey reported an increase to 720 deer complaints, 424 were listed as "Moderate" damage and 296 reported "Severe" damage. Not all respondents included estimates of acres impacted. For the OFIC survey, areas with "Moderate" damage generally met state reforestation stocking levels and did not necessitate replanting, although losing the potential future revenue from commercial thinning. In areas with "Severe" damage, stocking levels were below stocking requirements and replanting was required.

In 2007, even with several larger operations not providing voluntary estimates of acres affected, a total of 34,201 acres of damage were reported, averaging 47.5 acres per complaint. Using very conservative estimates the reported damage has an estimated minimum value of $2.25 million (296 "Severe" complaints X average of 47.5 acres per complaint X average of $160 per acre cost of replanting). The OFIC survey is voluntary. The reported acres affected do not include all members or small woodland owners' reports which would increase the annual loss due to deer damage.

Damage Response Options

Advice **-** Providing advice is usually the first response to landowners who have not previously filed a damage complaint with the Department. Advice is often the only option the Department can offer landowners within city limits where hazing and lethal means of control are prohibited. Advice inside city limits may include types of fencing, repellent, motion activated sprinklers and

other non-lethal means. In the case of landowners outside the city limits the Department will include advice related to the landowner preference program, hazing permits, kill permits and emergency hunts.

Hazing - This option is available only to landowners outside city limits with enough acreage to safely discharge firearms or agriculture pyrotechnics without imposing on adjacent landowners. The intent of hazing is to scare/harass deer off the property using non-lethal methods. It usually involves issuing permits to the landowner and/or an agent to discharge a firearm to repel deer from the property. It may include the use of shotgun shells with small shot or pyrotechnic loads (shell crackers, screamers, whistlers, etc.). Pyrotechnics require an Agricultural Fireworks Permit from the State Fire Marshal. Hazing permits can be issued for weeks or months at a time and be authorized for control work during the day or night. Propane cannons may also be used to haze deer. When using pyrotechnic devices on forestland a permit is necessary through the Oregon Department of Forestry. Forest landowners are encouraged to address damage issues primarily with repellents and other techniques before they consider pyrotechnic materials.

Repellants – These substances are intended to discourage deer because they smell and/or taste bad. There are a wide variety of commercial repellants available. Some individuals report home remedies such as bars of soap suspended by a string or small bags of human hair as effective deer repellents. Information regarding the type of available repellents, sources of repellents and advice for application of repellents is provided by the Department's District Wildlife Biologist and/or the local Oregon State University Extension office. Repellents may be effective in addressing damage to gardens, flowers, ornamental shrubs, berries and fruit trees for varying lengths of time. There are sprays available and seedlings for nurseries or reforestation can be dipped in liquid repellants before planting. However, broad-scale use of repellents on large commercial crops is expensive and is effective for only a limited time. If advice, repellants and/or hazing do not provide relief from deer damage, lethal control methods may be considered.

Landowner Preference (LOP) (as it relates to damage) – Within the area of a controlled hunt, registered landowners that experience deer damage may use unused LOP tags to address damage. One unused LOP tag may be exchanged for two tags by Department wildlife biologists with each tag issued to different individuals to address damage. Tags can be issued for up to a 30 day period (starting as early as August 1 and end as late as March 31). If the damage continues to occur unused tags may be authorized for additional 30-day periods.

Public Hunting – Some deer damage occurs on lands where there is an opportunity for public hunting. During a general buck season, the landowner may contact hunters to provide some relief from deer damage. If the landowner's property is within a controlled hunt boundary, lists of successful hunters who drew that hunt can be given to the landowner who may contact individuals to hunt their property. Many controlled hunts are designed specifically to address damage problems. Landowners recognize that public hunting is a critical component of an integrated damage reduction program. When weather conditions reduce the risk of fire danger many landowners welcome public hunters.

In recent years some opportunities for access to private lands have been impacted by drought and the resulting increased risk of wildfire. Many landowners have found it necessary to make difficult choices, such as whether to use public hunting to control damage or restrict access to help prevent costly resource damage and suppression costs which could result from increased

public presence. Other considerations affecting access year round include other liabilities such as: vandalism, trespass, trash, and toxic material dumping, riparian zone damage by off road vehicles, meth labs, marijuana growing operations and other non-desirable activities.

Emergency Hunts **-** If acute deer damage occurs on a property outside of deer hunting seasons, but it is between August 1 and March 31, an emergency hunt can be implemented. Emergency hunts are designed to harvest antlerless deer to reduce the local deer population. Emergency hunts may include lands adjacent to deer damage sites or on land where damage animals are residing outside of the damage area. Department biologists discuss the situation with landowner(s) and determine how many antlerless deer tags will be issued and how many days will be open to hunting. Emergency hunters are then contacted from an Emergency Hunt List. Landowners are eligible for LOP tags for the emergency hunt in addition to other LOP tags.

Kill Permits **-** There are some situations where public hunting, LOP tags, or emergency hunts are not the best option to provide a landowner relief from deer damage. Some examples are:

- A landowner is not comfortable with hunters he/she does not know hunting on their property;
- Damage is occurring that is not addressed by normal hunting situations.
  - Damage occurring at night and the animals are not present or accessible during the day.
  - Damage occurring during April-July, outside of hunting seasons.

In these cases, the landowner may opt to do the control work or enlist an agent to do the work through a kill permit. Some kill permits are authorized to allow shooting at night with the aid of a spotlight on the property. It is the policy of the Department to limit kill permits to does but, in special cases, kill permits can be issued for bucks that damage trees with their antlers. Deer taken under kill permits must be salvaged and taken to a location specified by the Department. Salvaged carcasses are usually given to a charitable organization. Salvaging deer under a kill permit is labor intensive for the landowner/agent and is usually a last resort when damage reaches an intolerable level.

HABITAT PROGRAMS

The Department is responsible for managing black-tailed deer herds at healthy and sustainable levels. Although the Department owns and manages Wildlife Management Areas throughout the state, it is not a land-management agency and does not have direct control over most black-tailed deer habitat. The Department will continue to discuss habitat management issues/practices with private landowners and public land managers. Recognizing the importance of habitat for black-tailed deer and other wildlife, the Department will increase efforts to actively participate in habitat planning processes such as developing management plans and as members of Interdisciplinary Teams.

Actively participating on planning teams and coordinating with on-going conservation actions associated with implementation of the Oregon Conservation Strategy will increase the opportunity to provide input to land managers when setting priorities for habitat management for black-tailed deer. These actions may include identifying and controlling invasive vegetation, working cooperatively with neighbors and other stakeholders to conserve and improve important

habitat areas, and working with federal and state partners to obtain funding for restoration and wildlife management planning on private lands. When opportunities are identified the Department will work cooperatively to initiate projects to improve deer habitat. The Department's funding contribution for these cooperative projects come from a combination of hunter license and tag fees and moneys derived from federal excise taxes on sporting goods. Sport groups, landowners, and public land management agencies also contribute to habitat projects.

Green Forage Program

The Green Forage Program was created in 1983 to assist landowners who are experiencing damage caused by wildlife. The program is funded by hunting license and tag dollars. The objective of the Green Forage Program is to alleviate or prevent big-game damage on private lands while benefiting wildlife by improving forage quality and quantity on nearby public or private lands. Fifteen percent of the annual Green Forage Program funds are allocated to the Access and Habitat Program.

Habitat Improvement Program

The Habitat Improvement Program is used to enhance wildlife habitat for a wide range of wildlife species and is more general than the Green Forage Program. It is funded by Pittman-Robertson dollars, a federal excise tax on sporting firearms and ammunition. The Department uses the moneys to acquire and maintain Department wildlife areas and to improve wildlife habitat on public and private lands. Many of the projects are cooperatively funded by contributions from hunting organizations.

Access and Habitat Program

The Access and Habitat (A&H) Program was created during the 1993 Legislative Session. The A&H program was designed to improve wildlife habitat and provide increased access to private and public lands for hunting. Annual funding for the program is derived from a $2 surcharge on hunting licenses, from moneys collected from the auction and raffle of 10 deer and 10 elk tags, and 15 percent of the annual Green Forage program funds. The Commission oversees the program and approves project funding. Regional councils and a state board comprised of landowners and hunters review project proposals and make recommendations to the Commission for funding. During the 2003 legislative session, the A&H program was reauthorized through 2009.

LAND USE PLANNING

Development, residential and industrial, in urban and rural areas impacts black-tailed deer habitat in several ways including: roadways/transportation corridors, which often occur in sensitive wetland and forest habitat along the coast and in river valleys and riparian corridor areas of the Willamette Valley; conversion of areas from forest to home and industrial sites. Black-tailed deer are also impacted when agricultural and forested areas are converted to high value crops such as vineyards and plant nurseries. These commercial activities often do not tolerate the presence of deer or other species that may damage their products.

The human population in the Willamette Valley is projected to double by 2050. The continued expansion of urban growth boundaries to accommodate population growth, the need to develop more lands for industrial and residential uses as a result of population growth, and the associated

infrastructures to support the increased population will further impact the availability and quality of habitat for black-tailed deer. All of the changes and impacts described in the two paragraphs above will result in increasing pressure by black-tailed deer on remaining habitat.

These land-use changes are an important aspect of land use planning in Oregon. Planning efforts usually are in cooperation with federal, state, and county agencies, but also may involve cities and landowners or corporations. Black-tailed deer populations can be negatively impacted by new land development laws and ordinances; the Department's field biologists review land-use rules and projects to help ensure that negative impacts are minimized. Loss of habitat and fragmentation of habitat by development in rural areas can lead to reduced black-tailed deer populations.

Protection of winter range is one aspect of land use planning. In the south Cascade Mountains black-tailed deer exhibit a migratory life-history pattern that allows them to escape the harshest periods of winter, while exploiting the more stable winter food supply found at lower elevations. Jackson and Josephine counties have adopted ordinances to protect valuable black-tailed deer winter range. The Oregon Conservation Strategy identifies Conservation Opportunity Areas (COAs) in each of the 8 ecoregions identified in the Strategy. COAs are priority conservation areas with outstanding ecological values. For example, the Willamette Valley Ecoregion has 27 COAs and many of these areas provide substantial habitat for black-tailed deer and other Strategy species. There are no regulatory requirements associated with COAs, but they can help planners and land managers by providing guidance for land use decisions.

TRAVEL MANAGEMENT

Travel Management Areas (TMAs) have been used throughout Oregon with a variety of goals and purposes. TMAs are cooperative partnerships, with private landowners, corporations, and federal land management agencies, established to control or regulate access to large tracts of land. Many TMAs were established to assure continued hunter and angler access, increase and improve fish and wildlife habitat effectiveness, and to reduce soil erosion, road maintenance, vandalism, forest fires, timber theft, and garbage dumping. TMAs can also improve wildlife protection (especially for wintering deer and elk) promote watershed health, and increase quality hunting opportunities.

For example, in Jackson County, the Jackson TMA consists of four separate units totaling approximately 55,000 acres. This TMA was established for a variety of reasons, but one of the primary goals is to protect critical black-tailed deer winter range from human disturbance caused by motor vehicles including off-road vehicles.

FOREST AND VEGETATION MANAGEMENT

As described earlier in the Habitat and Food Habits Sections, black-tailed deer populations are dependent on the native food sources found in early successional stages of the forest (Miller 1966, Crouch, 1968, 1868b, Hines 1973, Verts and Carraway 1998). Changes in land management, timber management activities, and land use have contributed to a decline in early seral forb and shrub habitats available to deer. The following land management activities, some in response to public pressure and regulation changes, may have contributed to this decline in habitat quantity and quality:

- Reductions in the use of controlled fire (under burning), hazard reduction/site preparation (prescribed burning) and suppression of forest fires.
- Reduced timber harvest on federal forest lands (U.S. Forest Service and Bureau of Land Management).
- Changing agricultural crops, for example from reforestation to vineyards.
- Reforestation prescriptions that do not produce optimal browse species and conditions.
- Invasive vegetation including exotics on sites disturbed by various land use activities.
- Expansion of urban growth boundaries and loss of rural forest lands from residential and industrial developments.

Both forest clear-cutting and fires open up the forest canopy and promote shrub, forb, and grass communities. Fire, historically, was probably the single most important factor in maintaining and creating forage for black-tailed deer. Natural fires were generally low intensity and created extremely productive mosaics of habitat types (Agee 1993). Native Americans used fire extensively in the Willamette Valley to enhance and maintain vast habitats for deer and elk (Boyd 1999). In lieu of reduced early seral habitat from changes to management activities, massive wildfires, while possibly detrimental to black-tailed deer in the short term, periodically have caused heavily timbered areas to revert to the early successional stages favored by deer.

Data from the Oregon Department of Forestry indicates that in western Oregon the use of prescribed fire on state and private lands has declined over the past 30 years (Figure 12). From 1975 to 1985 an average of approximately 100,000 acres per year were treated with prescribed fire; from 1986 to 1996 the average was approximately 62,000 acres per year, and from 1997 to 2005, about 48,000 acres per year were treated. Total acres of prescribed fires on private and state forestlands from 1975 to 2005 created over 2.2 million acres of early successional vegetation. Since 1997 there has been a minor increase in the “acres burned” in western Oregon; however some of the increase is due to increased pile burning rather than broadcast burning of entire units.

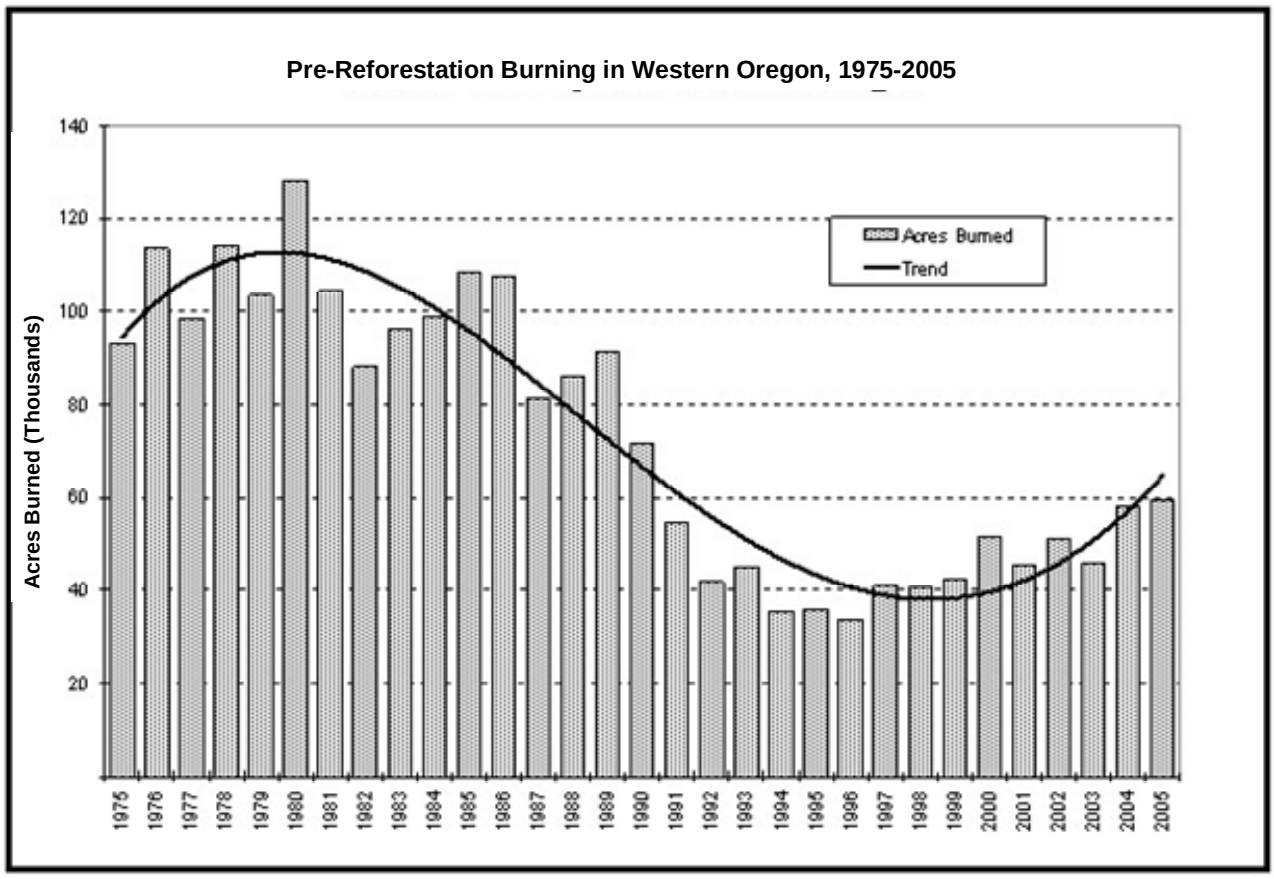

Figure 12. Pre-reforestation acres burned in Western Oregon, 1975-2005

Recently revised Smoke Management Rules (adopted by ODF and DEQ) base the Smoke Management Program on the expectation that 90,000 acres per year will be burned in western Oregon; pile burning of materials from 50,000 acres and 40,000 acres of traditional broadcast burning. The Smoke Management Program is funded by fees paid by the timber harvester.

Large scale controlled burns on private and public timber lands where they occur in checkerboard ownership patterns are less common due to the constraints of surrounding land use, smoke management, public safety, and other considerations. Social and economic decisions to limit the timing, duration, and the area of prescribed fires results in decreased opportunities to use fire to benefit black-tailed deer and other species dependant on early seral habitat.

Federal agencies manage 46 percent of the forestland in western Oregon, private landowners and timber companies own and manage 50 percent (Oregon Dept. of Forestry 2004). During the past 20 years, timber harvest on private lands remained relatively constant, while harvest on federally managed lands decreased significantly (Figure 13). Simultaneously, to compete in the global wood products market without the previous volume of timber from federal land harvest, private land managers adapted management activities to include shorter timber stand rotations. Manufacturing technology has also adapted to process smaller diameter (younger) trees. Other changes in silvicultural practices included the planting of genetically superior seedlings, fertilization to increase the growth rates, and herbicide applications to reduce competing vegetation during the critical period of plantation establishment.

Figure 13. Timber harvest from private and federal lands in western Oregon, 1975- 2005.

Reduction of habitat availability associated with the decline of timber harvest activities on federal lands began in the 1980's. Additionally, social pressures regarding use of prescribed fire as a preferred site preparation tool before replanting began to increase. Public complaints regarding smoke, and air quality regulations, moved the need to control competing vegetation, so critical in the seedling establishment phase, to more of a reliance on chemical applications. These alterations in silvicultural management were intended to maximize timber production by reducing competition between conifer seedlings and other vegetation, increase the rate of growth through planting of genetically improved seedlings , and decrease rotation periods for timber harvest. A consequence of these management changes is the reduction in forage quality and quantity and in the length of time early seral forage is available in each reforestation plantation. Although, as an alternate theory suggests, with shorter rotations there are more reforestation acres in early seral stages at any given time. Since growing timber for profit is the primary use of many private lands, it is understandable that in these areas forage production for wildlife is not the prime consideration and at times conflicts with the objective of growing timber. On federal lands, the reduction in harvest volumes beginning in the 1980s reduced the availability of early seral habitats typically preferred by black-tailed deer on a significant portion of their range in western Oregon.

Collectively, changes in forest management and habitat/forage availability likely contributed to declines in black-tailed deer populations in parts of western Oregon (Figure 14). However, there is little research that describes or quantifies how these management practices impact deer populations. The Department will work with land managers, the Oregon Forest Industries Council, the Wildlife Services National Wildlife Research Center, and other cooperators to further existing knowledge and identify research needs related to black-tailed deer/habitat relationships.

Changes in forest policy in the 1980s and 1990s greatly affected black-tailed deer forage habitat. The 1972 Oregon Forest Practices Act required private foresters to replant their harvested stands within two years in western Oregon. In 1994, the Northwest Forest Plan was adopted to protect federal forest habitat for spotted owls, a federally listed species. One effect of the Northwest Forest plan was to decrease early seral habitat created by timber harvest on federal lands. The USDA Forest Service Pacific Northwest Research Station reported that older forests acreage increased from 1.25 to 1.5 million acres in the first 10 years following implementation of the 1994 Northwest Forest Plan (USDA-FS 2005).

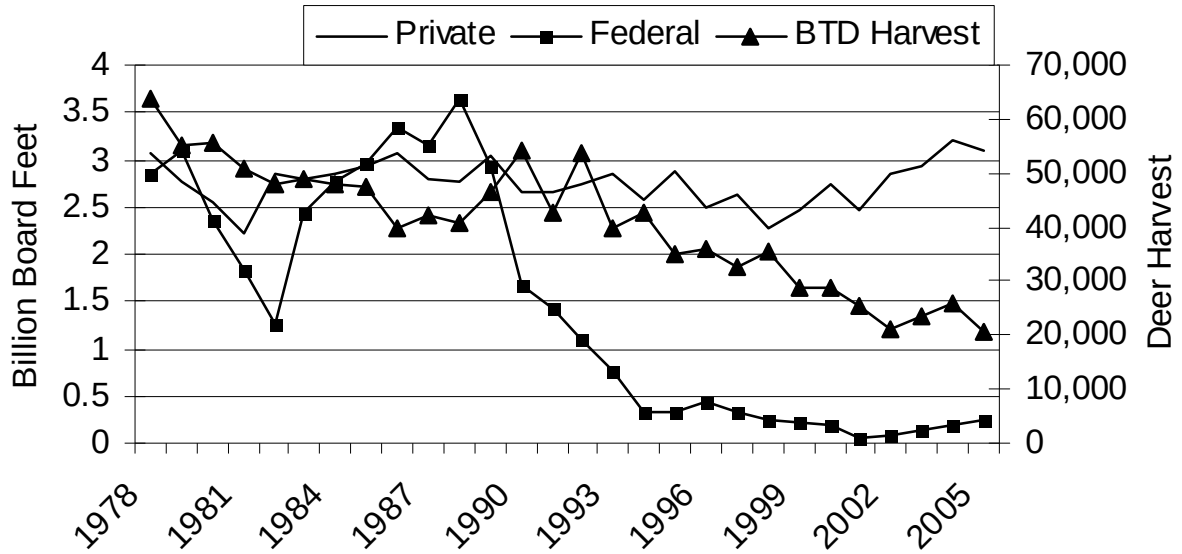

Figure 14. Timber harvest from private and federal lands and estimated Oregon black - tailed deer harvest in western Oregon, 1978 – 2005.

Livestock Grazing

Livestock grazing, if managed properly, can provide improved forage for deer. Deer select the new plant growth of grass, shrubs, and forbs stimulated by grazing. Grazing, like fire, can stimulate new plant growth. However, unlike many wildfires, grazing can be directed and managed to influence specific habitat needs. The type of livestock, season of use, and the amount of use can be adjusted to produce a desired forage type or conditions. Grazing can be used in areas where fire is not acceptable and the use of mechanical mowers not practical. Grazing can be used to manage both shrubs and grasses.

Fire Management

While fire can have both positive and negative effects on wildlife habitat, prescribed fire can be used to improve several components of deer habitat. Fire will often stimulate growth in old browse plants, making them more palatable and productive. Fire also affects the composition, abundance, and diversity of plant communities. High intensity fires may not only remove most trees, but also sterilize the soil and eliminate seed banks of native forbs and shrubs. Fire may also stimulate the growth of exotic invasive species that are adapted to disturbance and that out-compete native species.

Prescribed fire can improve deer habitat in some forested areas of western Oregon. However, the current condition of forestlands in many areas of Oregon precludes the extensive use of fire because of the need to protect nearby residential developments and the high fuel loads on forest floors from decades of fire suppression. The outcomes of prescribed fires do not exactly replicate conditions of naturally occurring wildfires. Typically, wildfires result in a mosaic of habitat conditions including large and small openings, different seral stages, and forest patch sizes.

Invasive Plant Management

For the purposes of this document, "invasive plants" are defined as any plant listed on the Oregon Invasive Species Council's "100 Worst" list, or a non-native plant that has the ability to spread 10 percent beyond its origination area within two years and maintain a 75 percent total density over a five year period. There are non-native plants including some grasses and legumes that benefit black-tailed deer. Beneficial non-natives should be considered acceptable when managing black-tailed deer habitat unless an equally beneficial native plant is available in adequate quantity at a price that is not prohibitive.

Many non-native plant and animal species have been introduced to Oregon and are thriving. A number of these species are invasive and have serious commercial and ecological impacts and can potentially displace or out-compete native vegetation and wildlife. The Oregon Conservation Strategy lists invasive species as one of six key conservation issues. Invasive plants with negative effects on black-tailed deer include Armenian blackberry (*Rubus discolor*), evergreen blackberry (*Rubus laciniatus*), Scot's (scotch) broom (*Cytisus scoparius*), Japanese Knotweed (*Polygonum cuspidatum*), Canada thistle (*Cirsium aryense*), and gorse (*Ulex europaeus*). Invasive plants are potential threats to the ecologic status of an area and may also have economic impacts. Invasive plants commonly occur in areas disturbed by timber harvest, fire, road construction, off road vehicle use, etc. Many areas in western Oregon have the potential for invasive plant problems. Control of invasive plants in black-tailed deer habitat is beneficial when weed control maintains or helps establish beneficial forage species.

SUPPLEMENTAL FEEDING

The Department believes that in most situations maintaining habitats for deer provides adequate resources (food, cover, and water) to meet their life history needs; if the habitat is adequate to meet these requirements, artificially feeding of deer should not be needed. Weather, especially severe winters, can negatively impact deer populations and often leads to public requests or demands to initiate supplemental feeding. In western Oregon, winter conditions are typically not severe enough to warrant consideration of supplemental winter-feeding programs. Artificial feeding programs can easily divert the public's attention away from the real problem of maintaining and enhancing existing habitat for year-round support of black-tailed deer populations.

Supplemental feeding has a number of associated problems that include:

- increasing concentrations of animals that may increase the possibility of disease outbreaks and transmission,
- increasing damage to habitat in the area of the feed site resulting in long-term damage and potentially causing damage to adjacent private lands,

- increasing the likelihood of an artificially high black-tailed deer population that could experience a local "die off" if the feeding program is interrupted,
- habituating black-tailed deer to seek food in agriculture or populated areas, causing them to seek out decorative plants, nursery, or agricultural crops rather than natural forage,
- using resources such as staff time and funding which is generally not available and could be better spent maintaining or enhancing natural habitat for long-term benefits to black-tailed deer and other wildlife, and
- causing animals undue stress by providing winter forage that may cause rumen problems when the animal tries to adapt to a new diet.

In summary, such programs tend to be inefficient, expensive, and divert public attention and funding from the more critical underlying habitat-related problems.

PREDATOR MANAGEMENT

The primary predators of black-tailed deer in Oregon are coyotes, bobcats, cougars and black bear. Management techniques for predator populations include regulated trapping and damage control programs that target specific areas and/or problem animals. Populations of some predators have likely increased because of changes in hunting regulations (the ban on the use of dogs for hunting cougar and bear) and the federal ban on the use of controls substances such as 10-80, primarily for coyotes. Predator control activities by Animal Plant and Health Inspection Service – Wildlife Services for reducing livestock damage may have secondary benefits to black-tailed deer populations.

The Department has not developed population estimates for bobcat or coyote, the Department has population estimates for cougars and black bear based on research and monitoring in northeast and southwest Oregon (Oregon Cougar Management Plan 2006 and Oregon Black Bear Management Plan 1993, ODFW). The population estimate for cougars in black-tailed deer range (cougar Zones A and B) was ~2,250 in 2005. This area includes western Oregon plus the Hood, White River, Metolius and Keno Units along the east side of the Cascades. This estimate was 36 percent higher than the population estimate for 1994. The statewide population estimate for black bear in 2006 was 25,000-30,000. The Department is developing methods including tooth marking techniques that may provide more accurate population estimates for black bear.

Predator control programs that target specific areas and animals could be used as a management tool to benefit deer. However, before control efforts would be considered, predation must be identified as a major limiting factor and the deer population below the benchmark. Other factors to consider include:

- identifying reliable methods for the removal of specific predators,
- developing methods to determine how many animals (predators) should be removed to meet stated objectives for a control program,
- understanding how the costs of control compare with benefits to deer populations, and
- adequate public review and input of any proposed control actions.

TECHNOLOGICAL DEVELOPMENTS IN HUNTING EQUIPMENT

Technological advancements in outdoor equipment have increased hunter efficiency and are changing the way some people hunt. Improvements to weapons, ammunition and optics have increased the distance at which game can be taken. All-terrain vehicles, mechanized carts and portable winches make it easier to hunt larger tracts of land and retrieve game. Global positioning units, two-way radios and cellular phones allow hunters to access remote areas and maintain communication with other members of their hunting party. Development and availability of night-vision optics and infrared cameras have created an advantage for some hunters by enabling them to monitor nighttime animal activities and locations. Nighttime monitoring may increase hunter chances for success during legal hunting hours.

Because of interest expressed by hunters, wildlife managers have explored opportunities to provide additional hunting options for "primitive weapon" hunters, primarily for archery and muzzleloaders. However, some of the currently available archery and muzzleloader equipment may increase hunter efficiency and have greater impacts on deer populations. As hunter effectiveness increases the Department must consider either restricting technology or reducing opportunities (tag numbers or season length) to maintain populations and benchmark buck ratios. Administrative Rules to limit the advancements in technology of archery and muzzleloader equipment have been adopted by the Commission. Additional rules that limit the effectiveness of the hunter or equipment could be adopted and implemented in the future.

ECONOMIC FACTORS ASSOCIATED WITH OREGON'S BLACK-TAILED DEER

The hunting of black-tailed deer provides substantial economic benefits to Oregon. However, deer damage to agricultural and forest crops and residential landscaping also results in considerable economic costs. Based on damage complaints from landowners, the Department estimated that deer damage accounted for $3.2 million worth of property losses from 2002 through 2006. In addition, OFIC estimated a minimum of $2.25 million worth of damage to private forestlands in 2007 alone. Many landowners do not report damage to either the Department or OFIC. Damage to property is considered when deer population MOs or Benchmarks are established. While black-tailed deer have the potential to cause damages to private property and crops, deer hunting and viewing generates important economic benefits.

Hunters spend money on equipment, hotels, transportation and other goods and services at regional and local levels. These purchases initiate cash flows that have economic impacts on businesses, personal income and employment in the general economy. Benefits that cannot be easily measured are values associated with the direct hunting experience (satisfaction of the hunt, family traditions, generational and friendship bonding, etc.). Some of these values are captured in the market goods that hunters purchase, while others are net economic values over and above what is actually paid to participate. When people make the decision to spend money on hunting or wildlife watching, it is with an expectation that they will gain at least as much from that activity as the amount spent. In most cases, the net willingness to pay for an activity is actually higher than the actual amount paid to participate.

An estimate of the economic impact of hunting on statewide personal income was developed by evaluating expenditure data and economic models. Total expenditures for hunting by residents and nonresidents in Oregon are estimated at about $378.6 million annually (U.S. Fish and Wildlife Service, 2007). This estimate does not include expenditures on special equipment such as vehicles used primarily for hunting. These estimated expenditures for all hunting produced roughly $175.7 million in statewide personal income.

The amount a hunter spends on hunting trips has an impact on state or regional economies as well as the local economy. For example, expenditures related to big-game hunting in western Oregon also generates income outside western Oregon. A portion of hunting trip expenditures are made near hunters' homes and in route to the hunting destination.

Statewide economic impacts from eastern Oregon mule deer hunts were estimated in the early 1990s (Carter 1992). When updated to 2007 dollars, expenditures per hunter-day were approximately $68 with personal income (salaries and wages of those providing services) at $50.50 per day (Carter 1992). Economic impacts specifically from hunting black-tailed deer in Oregon have not been evaluated. These impacts are directed to more local economies because most black-tailed deer hunters are residents of the areas where they hunt; daily expenditures are likely less than estimates based on mule deer hunting. The Department is initiating an economic survey in 2008 which will provide information at the county level related to deer hunting.

Analysis by Waddington, et al (1994) using data from the 1991 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation estimated that the net economic value for a year of

deer hunting in Oregon is $410, with a net economic value per day of $61. In 2007 dollars, this translates to $543 annually, and $81 per day. Hay (1988) estimated an average net economic value per day of deer hunting of $30 for Oregon. In 2007 dollars, this translates to $47 per day of hunting. Based on the studies cited above, a net economic value of $47 to $81 per hunter-day for black-tailed deer hunting in Oregon and the roughly 743,000 days of black-tailed deer hunting in Oregon (U.S Fish and Wildlife Service 2003) yielded between $34.9 million and $60.1 million in net economic benefits.

ISSUES AND STRATEGIES

Issue 1. Black-tailed deer habitat availability and sustainability

Objectives:

1) Identify, protect and enhance priority habitat areas and winter range in all WMUs.
2) Promote and educate the public and land managers regarding the value of habitat to black-tailed deer and how human activities, including lack of forest management activities, can influence black-tailed deer habitat.

Proposed Strategies:

1) Identify planned land use changes that will be detrimental to black-tailed deer habitat.
2) Identify opportunities to mitigate losses caused by land use changes.
3) Identify potential habitat changes that may occur due to predicted global warming climate change.
4) Protect and improve existing habitat using Access and Habitat and other fund sources and explore the potential for the purchase of critical habitat areas by various public agencies.
5) Expand, or at a minimum maintain, curent habitat enchantement/improvement programs.
6) Continue to use, and encourage expanded use, of Access and Habitat funds to improve black-tailed deer habitat.
7) Coordinate and cooperate with public and private forest managers to identify research needs that may result in practices that promote black-tailed deer habitat improvement efforts including development of: early seral habitat, travel management areas, silvicultural practices and control of invasive plants consistent with the primary uses of the land.
    a. Advocate through active Department and Commission participation in USFS and BLM planning and management activity review processes to create early seral habitat.
    b. Work with the USFS and BLM to assure that applicable area plan standards and guidelines that would be beneficial to black-tailed deer habitat are followed and achieved.
    c. Continue to encourage cooperative seeding, fertilization and meadow restoration efforts on private and public lands, utilizing the best-suited seeds/plants.
    d. Explore, and where possible use incentives, to encourage private forest landowners to adopt forest management practices that would extend the time intervals of early seral stage habitat on their managed forest lands.
8) Develop habitat standards and habitat management guidelines for black-tailed deer for distribution to all land managers. (For example, forage/hiding/thermal cover ratios, and the best plant species and methods for seeding, fertilization and meadow restoration.)
9) Pursue alternative vegetation management techniques to improve black-tailed deer habitat while enabling landowners and land managers to achieve their desired goals.
10) Develop a method, using GIS data, to quantify and track over time habitat availability and quantify seral stages present in each WMU.
11) Provide habitat educational material to the public using available publications and information outlets (hunting rules and regulations, and the media).

Issue 2. Relationship of habitat quantity and quality to black-tailed deer populations

Objectives:
1) Based on historical and current information to establish a baseline; identify habitat/forage factors in each WMU which may be limiting black-tailed deer populations.

Proposed Strategies:
1) Support and pursue collaborative habitat management research opportunities to investigate current relationships and determine the influence of a broad range of habitat management activities on habitat and black-tailed deer. Topics of investigation should include forage quality and quantity resulting from:
    a. Various types of vegetation manipulation
    b. Various forest management activities (including lack of management)
    c. Fire, both wild and prescribed
2) Investigate results of past studies to determine current validity and application and identify future research needs.
3) Conduct literature review and/or develop collaborative studies to determine if competition for habitat resources by elk is an important factor limiting black-tailed deer populations in areas where the two species co-exist. Information would be considered when developing habitat management alternatives and MOs for black-tailed deer and Roosevelt elk.

Issue 3. Monitoring and evaluation protocols to assess black-tailed deer populations need to be updated and validated for western Oregon

Objectives:
1) Establish consistent data collection methods and techniques over the next five years.
2) Improve precision and reliability of herd composition data.
3) Develop and implement a population estimation technique over the next five years.
4) Using the information from Objectives 2 and 3, develop MOs for black-tailed deer in western Oregon.
5) Ensure continued funding for Department and collaborative research on black-tailed deer.

Proposed Strategies:
1) Improve harvest information by requiring hunters to report success via mandatory reporting of harvest and effort by telephone or through the Internet.
2) Improve herd composition data by developing and utilizing consistent data collection methodology utilizing the best available techniques for the given habitat.
3) Phase in use of Sex Age Kill (SAK) modeling (population estimation) for black-tailed deer.
    a) Would require hunters to submit a tooth from each black-tailed deer harvested.
4) After population studies are completed and improved data gathering techniques are established, develop MOs to be compatible with habitat availability, primary land uses and other wildlife.

Issue 4. Non-harvest mortality of black-tailed deer in western Oregon needs to be estimated

Objectives:
1) Identify the various causes and amount of non-harvest mortality that occurs to black-tailed deer populations.

Proposed Strategies:
1) Develop methods that estimate non-hunting losses such as vehicle strikes, predation, illegal harvest, parasites, and disease.
    a) Design and implement studies to determine causes/impacts of mortality.
    b) Coordinate efforts with ODOT and county road managers to determine the extent of road related deer mortality.
    c) Use vehicle strike information provided by ODOT liaisons to develop wildlife crossings and signing.
    d) Coordinate and implement predator management activities to be consistent with the Oregon Cougar Management Plan and the Oregon Black Bear Management Plan.
    e) Support funding for OSP to provide enforcement and continue to rank deer seasons as a high priority.
    f) Coordinate with OSP to implement projects and methods to determine the extent of illegal take of black-tailed deer.

Issue 5. Recreational use (primarily hunting and viewing) of black-tailed deer is declining

Objectives:
1) Provide optimal recreational opportunity for present and future generations of Oregon citizens.
2) Determine reasons black-tailed deer hunter numbers are declining.
3) Stop the decline in the number of black-tailed deer hunters.

Proposed Strategies:
1) Develop programs and opportunities to increase/preserve public access to black-tailed deer habitat.
2) Provide information to the public describing ways to increase viewing opportunities.
3) Improve awareness of available hunting opportunities through marketing.
4) Continue to identify and implement opportunities for youth hunts.
5) Evaluate hunting-related technological improvements and the effect on hunter success and hunting opportunity for black-tailed deer hunters for consideration when setting regulations.
6) Use hunting to manage black-tailed deer populations at levels appropriate for the current habitat, considering the primary uses of the land, and to attain Benchmarks/MOs.

Issue 6. Introduction of exotic wildlife diseases that pose threats to black-tailed deer and other native wildlife

Objectives:
1) Prevent or limit the introduction and spread of wildlife diseases that effect black-tailed deer.
2) Monitor black-tailed deer to detect diseases.

Proposed Strategies:
1) Respond to disease issues as outlined in the Oregon Wildlife Disease Response Plan.
2) Coordinate species management plans and OAR Division 049 (Cervid Rules) regarding disease related issues.
3) Encourage Oregon Department of Agriculture to continue testing requirements for any wildlife being imported into Oregon.
4) Continue implementation of field sampling to monitor disease occurrence in wild populations.
5) Publicize information regarding diseases and the safe handling and use of meat by hunters.
6) Regulate private cervid holders in a manner that protects native black-tailed deer.
7) Emphasize education of Oregonians who hunt out-of-state to prevent game carcasses potentially infected with Chronic Wasting Disease from entering Oregon.
8) Ensure continued funding for Department wildlife veterinarian and disease investigations.

PLAN REVIEW PROCESS

- March 7, 2006, Department workgroup compiled Draft Black-tailed Deer Management Plan
- May 23, 2007, presented Draft to External Black-tailed Deer Management Plan Review Committee
  - Incorporated Committee recommendations
- July 26, 2007, presented revised Draft to External Black-tailed Deer Management Plan Review Committee
  - Incorporated Committee recommendations
- September 19, 2007, independent internal scientific review and editing of second revision
  - Incorporated independent review recommendations
- February 15, 2008, third Draft to Review Committee and Districts prior to public distribution
  - Incorporate edits
- April 3, 2008, provided Draft Plan for Commission mail-out and for public review
  - Place Draft Plan on website
- April 18, 2008, Commission Briefing in Salem
- May 1-18, 2008, Draft BTD Plan discussed at District public meetings
- June 13, 2008, filed w/ Secretary of State
- October 1, 2008, incorporated Commission and public comments
- October 9, 2008, to Division Administrators for review
- October 30, 2008, Copies for Commission Mail-out
- November 14, 2008, to Commission in Salem for potential adoption

Black-tailed Deer Management Plan Review Committee Members:

Mike Dykzeul - Oregon Forest Industries Council and Oregon Small Woodlands Association
Ty Stubblefield - Oregon Bow Hunters Association
Kevin Thompson - Traditional Archers of Oregon
Bill Perkins - Safari Club International
Larry Jones - Black-Tailed Deer Foundation
Swede French - Rocky Mountain Elk Foundation
Don Backman - Oregon Hunters Association
Chuck Woosley - Izaak Walton League of America
Dennis Cook - Oregon Guides and Packers Association
Roy Bartlett - Mule Deer Foundation
Lieutenant David M. Cleary - Oregon State Police-Fish & Wildlife Division
Rosemary Mannix - Oregon Department of Forestry
Bill Otani - U.S. Forest Service
George Buckner - Bureau of Land Management
Katie Fast - Oregon Farm Bureau Federation
Mark Penninger - Oregon Chapter of the Wildlife Society
Jeff Baker - Confederated Tribes of Grand Ronde
George Siniscal - Confederated Tribe of the Siletz Indians
Jason Robinson – Coquille Indian Tribe
Fred Walasavage – At Large (The Dalles)
Mark Woolbright – At Large (Portland)
John Toman – At Large (North Bend)
Clay Baumgartner – At Large (Oakland)
John Nagy – At Large (Eugene)
Dr. Robert Jarvis – At Large (Astoria)

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H. Biederbeck, May 21, 2006. ODFW in Tillamook, OR. Personal Communication with Douglas Cottam, ODFW

A. Clark, May 16, 2006. USFWS in Cathlamet, WA. Personal Communication with Herman Biederbeck, ODFW.

APPENDICES

APPENDIX 1. PUBLIC MEETINGS

OREGON BLACK-TAILED DEER PLAN PUBLIC MEETINGS

City	Date	Time	LOCATION
LAKEVIEW	May 1	6 pm	Eagle's Lodge,-27 South "E" Street
CHARLESTON	May 1	7 – 9 pm	North Bend Public Library 1800 Sherman Avenue
HEPPNER	May 2	6 – 8 pm	ODFW Heppner Office – 54173 Highway 74
ONTARIO	May 2	7 pm – 9 pm	Malheur County Ext. Office 710 SW 5th Ave
GRANTS PASS*	May 3	7 pm	JJ North's Grand Buffet 1150 NE E St
SEASIDE	May 3	4 – 7 pm	Oregon Convention Center- Seamist Room 415 First Avenue
LA GRANDE	May 8	2 – 7 pm	ODFW NE Region office, 107 20th St
SALEM	May 8	7 – 9 pm	Chemeketa Comm. College, Bldg 48 Rm 210, 4000 Lancaster Dr NE
SPRINGFIELD	May 8	7 – 9 pm	OR Dept of Forestry Bldg – 3150 East Main St
GOLD BEACH	May 8	7 pm	Gold Beach Fire Hall - 29844 Ellensburg Ave
JOHN DAY	May 9	4 – 7 pm	Grant County Health Dept. – 528 E Main
BURNS	May 9	7 – 9 pm	Harney Co Museum Club Room, 18 West D St
THE DALLES	May 9	7 – 9 pm	The Dalles Screen Shop 3561 Klindt Dr
ALBANY	May 10	7 – 8 pm	Albany Armory 104 SW 4th St
MEDFORD*	May 10	7 pm	Hungry Woodsman Restaurant, 2260 Biddle Rd
BAKER CITY	May 10	1 – 6 pm	ODFW Baker City District Office 2995 Hughes Lane
KLAMATH FALLS	May 10	7 pm	OSU Extension Service, 3328 Vandenberg Rd
REDMOND	May 10	7 – 9 pm	Redmond High School, Room 37 675 Rimrock Dr Redmond OR
ENTERPRISE	May 11	3 – 6 pm	ODFW Enterprise District Office 65495 Alder Slope Rd
PENDLETON	May 14	3 – 7 pm	ODFW Pendleton office 73471 Mytinger Lane
ROSEBURG	May 15	7 pm	ODFW Roseburg Regional Office 4192 N. Umpqua Hwy
CLACKAMAS	May 16	7 – 9 pm	ODFW NW Region Office, Bldg. 16 17330 SE Evelyn St
NEWPORT	May 16	6 – 8 pm	Hatfield Marine Science Center, 2030 SE Marine Science Dr., Rms 30 -32
CENTRAL POINT	May 24	7 – 9 pm	ODFW Rogue Watershed District Office 1495 E. Gregory Rd.

APPENDIX 2. BLACK-TAILED DEER SEASON LENGTHS 1970-2007

Summary of general rifle and archery black-tailed deer seasons, 1970-2006. Individual Wildlife Management Units (WMU) may vary; dates listed correspond to the greatest number of WMUs.

	General Rifle				General Archery - Early			General Archery - Late		
Year	Start	End	Length Coast	Length Cascade	Start	End	Length	Start	End	Length
1970	3-Oct	25-Oct	23	23	22-Aug	20-Sep	30	26-Oct	30-Nov	36
1971	2-Oct	31-Oct	30	30	21-Aug	19-Sep	30	1-Nov	30-Nov	30
1972	7-Oct	5-Nov	30	30	26-Aug	24-Sep	30	6-Nov	19-Nov	14
1973	6-Oct	11-Nov	37	37	25-Aug	30-Sep	37	12-Nov	2-Dec	21
1974	5-Oct	10-Nov	37	30	24-Aug	29-Sep	37	11-Nov	1-Dec	21
1975	4-Oct	2-Nov	30	30	23-Aug	28-Sep	37	10-Nov	30-Nov	21
1976	2-Oct	7-Nov	37	37	28-Aug	26-Sep	30	8-Nov	30-Nov	23
1977	1-Oct	30-Oct	30	30	27-Aug	25-Sep	30	7-Nov	30-Nov	24
1978	30-Sep	5-Nov	32	37	26-Aug	24-Sep	30	6-Nov	30-Nov	25
1979	29-Sep	4-Nov	37	37	11-Aug	26-Sep	47	5-Nov	30-Nov	26
1980	4-Oct	4-Nov	32	32	23-Aug	28-Sep	37	5-Nov	30-Nov	26
1981	3-Oct	3-Nov	32	32	22-Aug	27-Sep	37	28-Nov	15-Dec	18
1982	2-Oct	10-Nov	40	40	21-Aug	26-Sep	37	11-Nov	30-Nov	20
1983	1-Oct	8-Nov	39	39	27-Aug	25-Sep	30	10-Nov	29-Nov	20
1984	29-Sep	7-Nov	40	40	25-Aug	23-Sep	30	10-Nov	30-Nov	21
1985	28-Sep	6-Nov	40	40	24-Aug	22-Sep	30	9-Nov	29-Nov	21
1986	4-Oct	5-Nov	33	33	22-Aug	20-Sep	30	8-Nov	30-Nov	23
1987	3-Oct	4-Nov	33	26	26-Aug	24-Sep	30	7-Nov	29-Nov	23
1988	1-Oct	9-Nov	40	33	27-Aug	25-Sep	30	12-Nov	4-Dec	23
1989	30-Sep	8-Nov	40	33	26-Aug	24-Sep	30	11-Nov	3-Dec	23
1990	29-Sep	7-Nov	40	33	25-Aug	23-Sep	30	10-Nov	2-Dec	23
1991	28-Sep	6-Nov	40	33	24-Aug	22-Sep	30	9-Nov	1-Dec	23
1992	3-Oct	11-Nov	40	33	29-Aug	27-Sep	30	14-Nov	6-Dec	23
1993	2-Oct	10-Nov	40	33	28-Aug	26-Sep	30	13-Nov	5-Dec	23
1994	1-Oct	9-Nov	40	33	27-Aug	25-Sep	30	12-Nov	4-Dec	23
1995	30-Sep	8-Nov	40	33	26-Aug	24-Sep	30	11-Nov	3-Dec	23
1996	28-Sep	6-Nov	40	33	24-Aug	22-Sep	30	9-Nov	1-Dec	23
1997	4-Oct	5-Nov	33	26	30-Aug	28-Sep	30	15-Nov	7-Dec	23
1998	3-Oct	11-Nov	40	33	29-Aug	27-Sep	30	21-Nov	13-Dec	23
1999	2-Oct	10-Nov	40	33	28-Aug	26-Sep	30	20-Nov	12-Dec	23
2000	30-Sep	8-Nov	40	33	26-Aug	24-Sep	30	18-Nov	10-Dec	23
2001	29-Sep	7-Nov	40	33	25-Aug	23-Sep	30	17-Nov	9-Dec	23
2002	28-Sep	6-Nov	40	33	24-Aug	22-Sep	30	16-Nov	8-Dec	23
2003	4-Oct	5-Nov	33	26	30-Aug	28-Sep	30	15-Nov	7-Dec	23
2004	2-Oct	5-Nov	35	28	28-Aug	26-Sep	30	13-Nov	5-Dec	23
2005	1-Oct	4-Nov	35	28	27-Aug	25-Sep	30	20-Nov	12-Dec	23
2006	30-Sep	3-Nov	35	28	26-Aug	24-Sep	30	18-Nov	10-Dec	23
2007	4-Oct	7-Nov	35	28	30-Aug	28-Sep	30	15-Nov	7-Dec	23

[1] First year archery season is statewide.

[2] Start date moves one week to be consistent with Mule Deer Plan (Sat closest to Oct. 1). One week removed from end of season to avoid overlap with 1st coast bull elk rifle season.

[3] Dates listed are for northwest Late Archery WMUs, dates for southwest and Saddle Mountain Late Archery seasons may vary from those listed.

APPENDIX 3. PROCESS AND RATIONALE FOR SELECTING THE SEX-AGE-KILL (SAK) MODEL FOR ESTIMATING OREGON'S BLACK-TAILED DEER POPULATION

As indicated in Issue 3 of the Black-tailed Deer Management Plan, the Department has not been able to obtain a reliable population estimate of black-tailed deer by using current inventory methodology. Primarily this is because of the secretive nature of black-tailed deer, the dense cover they occupy, and rapidly changing habitat conditions influenced by changing timber management practices. One of the strategies to address this issue is the Department proposal to develop a sex-age-kill (SAK) population estimation model for black-tailed deer in the next five years.

Background of the Decision to Develop a SAK Model Proposal

A committee of Department biologists evaluated 18 population and trend estimation techniques used to obtain reliable population estimates of black-tailed deer (see attached matrix). The committee then looked at the potential and feasibility of implementing these techniques relative to the Department's objective of obtaining a reliable population estimate. The criteria used to evaluate the various techniques included:

- Likelihood that the technique would result in attaining the objective.
- Would the technique provide the information needed to fill knowledge gaps.
- Time required to implement the technique.
- How frequently would required data need to be collected for the technique.
- Cost in terms of personnel, equipment, etc. for implementing the technique.
- Probability that the Department could implement the technique.

Of the 18 techniques examined, the committee determined that 3 were feasible given the above criteria.

1. Spotlight Counts
2. Viable Population Analysis Model (VPA)
3. The Sex-Age-Kill, Maximum Likelihood Estimator Model (SAK-MLE)

Spotlight counts of black-tailed deer are the current method the Department uses to measure population trends in black-tailed deer. However, spotlight counts do not provide a reliable population estimate because of factors such as weather, changes in habitat, and inaccurate counts of fawns. In some areas very few deer are counted which further reduces confidence of the counts. Costs to continue this method were estimated at $40,000 annually, but, like now, the results would not likely provide a reliable population estimate.

The evaluation of techniques indicated the VPA model had a high likelihood that the Department could get a reliable population estimate, however, it would be very expensive to implement. The model requires an accurate estimate of age-specific harvest which would require mandatory harvest checks to collect teeth and determine gender. In addition, radio telemetry studies would

be needed to determine annual survival rates of deer in each area that might have significantly different survival rates. Cost to conduct this project was estimated at $400,000 per year.

The SAK-MLE model was selected by the committee as the most likely and appropriate technique to obtain a reliable population estimate relative to cost. Cost is estimated at $70,000 per year for tooth analysis and $40,000 per year for spotlight counts to collect herd composition (ratio) information (which is already being collected).

The following data are needed for the model:

1. **Total buck harvest**. This data would be obtained by the mandatory harvest reporting system that the Department has currently implemented.
2. **Age of harvested bucks**. This would require collection of a tooth from each deer killed, which is an additional cost.
3. **Buck:doe ratios (pre-season).** Biologists are now doing post-season spotlight counts. Timing of counts would need to be adjusted, with little or no additional cost above costs for current counts, which are increasing due to fuel costs.
4. **Fawn:doe ratios (pre-season)**. Biologists are now doing post-season spotlight counts so timing of counts would need to be adjusted with little or no additional cost above costs for current counts, which are increasing due to fuel costs.
5. **Total annual survival (initially from telemetry data).** We currently have annual survival data from the black-tailed deer study in SW Oregon which is representative for a portion of that region. After a few years, total annual survival can be calculated from tooth samples for estimates in other regions or telemetry studies could be implemented to provide the information sooner.
6. **Proportion of total mortality associated with harvest (initially from telemetry data)**. Survival data from the black-tailed deer study in SW Oregon could be used for a portion of that region. After a few years total annual survival can be calculated from tooth samples for estimates in other regions or telemetry studies could be implemented to provide the information sooner.

One concept is to start with a pilot study in the SW Region and expand as necessary data is available. The Department believes that the SAK-MLE model will provide a valid population estimate of black-tailed deer for Oregon. As stated in the Black-Tailed Deer Management Plan: "The SAK model has been used since the 1950's to estimate white-tailed deer populations in the Midwest (Skalski et al. 2005). Obtaining good data on the total number and age of bucks in the harvest is critical for the effective performance of the SAK model. The Department intends to use mandatory reporting of deer harvest by all hunters and age sampling of harvested deer from teeth submitted by hunters as the primary data source for the model".

Estimated Costs If Radio Telemetry Is Used To Obtain Survival Statistics

Obtaining deer survival rates and causes of mortality across the range of black-tailed deer could be done with radio telemetry. Several options are available depending on the information preferred. A minimum of 50 deer would need to be collared in a representative area. For example, the information gained from collaring deer in the Wilson Unit probably could be used in an assessment of the Trask Unit because habitat types and management actions are similar due to ownership (Oregon Dept. of Forestry). A similar scenario might exist for the Alsea and Siuslaw Units or the Santiam and McKenzie Units. To obtain causes of mortality would require

weekly monitoring. VHF collars would be adequate for survival estimates; to obtain habitat use information would require the use of GPS collars, primarily on adult females. Capture would be most efficient with helicopter net-gunning. The table below shows estimated costs (2008) for four different collaring scenarios across 3 years with 85% year-end survival, no re-collaring effort, and all work done by district personnel. If permanent personnel were assigned full-time to the project costs would be expected to increase. Likewise there may be opportunities to use graduate students to conduct the monitoring which could be a cost savings.

Activity	**Cost/Deer**	**50 VHF Collars**	**40 VHF & 10 GPS Collars**	**25 VHF & 25 GPS Collars**	**50 GPS Collars**
Capture	$750	$37,500	$37,500	$37,500	$37,500
Disease Testing	$100	$5,000	$5,000	$5,000	$5,000
VHF Collars	$350	$17,500	$14,000	$8,750	0
GPS Collars	$3,000	0	$30,000	$90,000	$150,000
Total Capture & Collaring Cost		$60,000	$86,500	$141,250	$192,500
Ground Monitoring/Collar Retrieval—1st Year	$2,000	$100,000	$100,000	$100,000	$100,000
1st Year Cost—start with 50 deer		$160,000	$186,500	$241,250	$292,500
Cumulative 2nd Year Cost—start with 43 deer alive (85%)		$246,000	$272,500	$327,250	$378,500
Cumulative 3rd Year Cost—start with 37 deer alive (85%)		$320,000	$346,000	$401,250	$452,500