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INTRODUCTION

Oregon’s Mule Deer Management Plan represents an update of the 1990 Mule Deer Plan and includes issues and concerns publicly identified in 2002 that will direct future management of mule deer. The following plan reflects the input obtained from a 22-member Mule Deer Committee, comprised of representatives from 14 constituent groups and eight agency biologists, as well as public input. Public input was provided to the Mule Deer Committee during 12 public meetings and through written comments received in response to news releases. In addition, notification regarding the plan update was added to the reverse side of the controlled hunt results card. All controlled hunt applicants received a card.

Prior to initiating the update of the Mule Deer Management Plan, nine priority issues identified in the 1990 Mule Deer Plan were assessed to determine if the stated objectives were met or not, what problems were solved, and if the strategies were ineffective or not implemented. A written review of those issues is titled, “Discussion of Issues Identified in the 1990 Mule Deer Plan” and is included in the Appendix of this plan.

The following plan presents a brief historical overview, describes mule deer habitat requirements, and discusses several management concepts that are used in mule deer management. Updated economic values associated with big-game hunting also are presented. Issues/concerns identified during the update also are included, with suggested strategies to address the stated issues/concerns.
OREGON’S
MULE DEER MANAGEMENT PLAN

GOAL

Manage mule deer populations to attain the optimum balance among recreational uses, habitat availability, primary land uses and other wildlife species.

OBJECTIVES OF MULE DEER MANAGEMENT PLAN

1. Optimize recruitment of mule deer populations and maintain buck ratios at approved levels.

2. Maintain, enhance and restore mule deer habitat.

3. Enhance all recreational uses of the resource.
BACKGROUND AND HISTORY

Population Fluctuations

Mule deer (*Odocoilius hemionus*) are native to Oregon and typically are found east of the crest of the Cascade Mountain Range (Figure 1). Peter Skene Ogden’s journal mentions a scarcity of deer on his expedition through Eastern Oregon in 1826 and 1827.

Figure 1. Mule deer distribution in Oregon.

John Fremont reported few deer or other big-game species in Southeastern Oregon during the 1840s. However, by the late 1850s, gold miners traveling from California to the Boise Basin found deer abundant in Eastern Oregon. Vernon Bailey (1936) estimated Oregon’s mule deer population to be 39,000 to 75,000 animals from 1926 to 1933. Mule deer populations increased through the 1930s and 1940s, peaking during mid-1950s, mid-1960s and in the mid-1970s. The estimated spring population in 1990 was 256,000 animals (Figure 2). 19 percent below the established statewide management objective of 317,400 as listed in the Mule Deer Plan (1990). The estimated 2001 population was 283,000 and continues to remain below established management objectives.
Fluctuations in mule deer populations can be attributed to several factors that directly or indirectly effect habitat. Drought conditions reduce forage and cover values, while severe winter weather conditions can result in large losses of deer. Both factors can cause poor deer condition and result in lower deer survival. In contrast, years of adequate moisture and mild winters will normally result in increased deer populations.

Overgrazing by livestock during the late 1800s and early 1900s resulted in rangelands that were dominated by shrubs and forb species and were more favorable for deer and populations increased. Similar patterns were noted in most western states (Workman and Low, 1976). Increased fire suppression activities allowed the encroachment of woody vegetation resulting in old decadent shrub plants that have less nutritional value for deer and the loss of desirable shrub and forage species.

Figure 2. Population estimates for mule deer in Oregon, 1979-2001.

Many mule deer ranges will no longer support historic deer population levels due to reduction of habitat caused by human development and changes in land use. Moderate population increases may be attained in some units with careful management. However, a return to the high deer population levels present in the 1950s, 60s and 70s probably will not occur due to changes to habitat and public acceptance.

Regulation History

Initially, deer hunting regulations in Oregon were set by the state Legislature. The first deer season was established in 1901 with a July 15 - Oct. 31 season, five-deer, either-sex bag limit. Bag limits and season lengths typically decreased through time until a buck-
only law went into effect in 1923 in response to public concern over reduced deer populations. The 1923 season had a bag limit of two bucks and ran for about 40 days.

In 1913, the state Legislature created several deer refuges closing the areas to hunting in an attempt to increase deer populations. However, by the early 1930s most refuges were overpopulated with deer, forage supplies were depleted, and many deer starved during the winters. The most notable area was Murderer’s Creek Basin in Grant County, where 3,000 to 5,000 deer died during the 1937-38 winter.

To reduce deer numbers in Murderer’s Creek Basin, the 1937 Legislature authorized a procedure for issuing special deer tags. During 1938, 1,250 tags were authorized for a 22-day season in the Murderer’s Creek watershed; however, only 270 tags were sold. The Legislature then declared an unlimited, open season for 1939 in Grant County and part of Harney County, with a two-deer, either-sex bag limit. Almost 11,000 animals were harvested during the season and a considerable amount of public concern was expressed.

In 1941, the state Legislature granted regulatory authority to the Game Commission and portions of several refuges were opened to hunting. A deer tag, separate from the hunting license, became effective in 1948 and provided a measurement of harvest through report card returns. By 1952, buck season opened on the Saturday nearest Oct. 1 and ran for three weeks. During the last three to five days of the season, the bag limit changed to any deer for those hunters with unused deer tags.

All refuges were abandoned by the Legislature in 1955 and spikes became legal in Eastern Oregon in 1956. Due to increasing hunting numbers and pressure, the hunter’s choice season was replaced by antlerless permit hunts on a unit basis during the late 1950s. Unit hunts were used for population reduction and damage control, with permits being limited and valid for an antlerless deer only. Special seasons were still authorized for specific damage/problem areas.

Buck ratios failed to recover sufficiently after the severe winter of 1968-69 and prompted the Department to initiate ways to reduce mule deer hunting pressure. Separate tags for mule deer and black-tailed deer were adopted in 1976, and hunters could legally hunt only one deer subspecies annually under this system. Season lengths for mule deer were also adjusted, with five, seven, nine and twelve days allowed, depending on deer populations. Antler point regulations were employed in a few units in an attempt to improve buck ratios and increase the numbers of older bucks. During 1982, the Oregon Fish and Wildlife Commission adopted minimum post-season buck ratios and population management objectives (MO) for each Wildlife Management Unit (WMU) in Eastern Oregon.

Severe weather conditions during the winters of 1983-84 and 1984-85 were responsible for high fawn mortality and up to 50 percent adult deer mortality in some northeastern and southeastern units. Some of these units were closed to all deer hunting in 1984 and
1985, and hunter numbers were controlled in other units in response to the severe winter losses. Closed units were reopened in 1986 to controlled buck hunting only.

In response to declining deer populations and increasing hunting pressure, the first Mule Deer Plan was written and adopted in 1990 to guide mule deer management in Oregon. The plan listed minimum post-season, buck-to-doe ratios, established winter-population levels, listed minimum recruitment levels for each WMU, and identified several issues of concern pertaining to future management of mule deer populations.

In response to high hunter densities and low post-season, buck-to-doe ratios, a total limited entry hunting for mule deer was initiated in 1991 in Eastern Oregon. Unit-wide antlerless hunting and various special hunts were maintained to assist with controlling deer populations and to address damage problems on private lands.

Archery hunting regulations evolved along with the various rifle season changes implemented through the years. For many years, archery hunters were restricted to hunting specific units or portions of units. In 1972, archers were required to purchase a specific archery tag in addition to the regular hunting license. Separate deer tags for archery and rifle hunters were implemented in 1979 requiring hunters to choose their preferred weapon.

The entire state was opened to general archery hunting in 1979. Currently, the deer archery season opens on the last Saturday in August and continues for 30 days, with a one-buck bag limit. Either-sex archery hunting has been allowed in those WMUs that have unit-wide antlerless permits authorized for rifle hunters. During the 1990 season, 8,444 archery hunters hunted mule deer and by the 2001 season, more than 18,000 archery tags were sold.

In recent years, separate muzzleloader seasons also have been implemented in management units throughout Oregon. Approximately 3,285 tags were offered for specific muzzleloader deer hunts during 2001.

**Hunting Pressure and Harvest**

In 1928, 57,000 hunting licenses were sold. In 1939, an increased interest in hunting resulted in 88,000 licenses being sold. Deer harvest was generally low during the 1930s, with a reported harvest of 6,506 mule deer in 1934. The end of World War II brought a substantial increase in hunting pressure as 167,000 licenses were sold in 1946.

Hunter numbers peaked during the late 1960s through the mid-1970s. For the 15-year period, 1955 through 1969, an average of 147,000 mule deer hunters was afield annually, see Figure 3. (Harvest surveys were not completed during 1984.) Since the initiation of limited-entry buck hunting, rifle hunter numbers have averaged 86,500 annually, an 11.7 percent reduction from earlier levels.
Figure 3. Mule deer hunter numbers in Oregon, 1960-2000.

Mule deer harvest during these years averaged 83,000 deer, with a 56 percent hunter success rate. Antlerless animals made up approximately 32 percent of the annual harvest. The peak year was 1961, when 98,000 mule deer were harvested in Oregon. Deer harvest information is shown in Figure 4.

Figure 4. Mule deer harvest in Oregon, 1960-2000
Mule Deer Biology

Females (does) usually breed for the first time as yearlings (18 months) and adult does normally produce twin fawns. Breeding peaks during November and the majority of fawns are born late May through mid June, with fawns typically weighing about 7 ½ pounds at birth. High numbers of fawns are produced annually. Fawn survival to breeding age ultimately determines the growth or decline of mule deer populations.

Does typically live longer than bucks, living up to 15 years. Bucks seldom live more than nine years. Their higher mortality rate is attributed to higher hunter harvest rates and higher natural mortality due to reduced body condition caused by breeding activities in November and December.

Nutritional intake is a critical component of deer biology. Deer are small ruminants and are unable to process large volumes of low value feed, as do elk and cattle. Deer require high quality feed and overall body condition affects many aspects of deer biology and survival. When deer begin the winter with adequate body reserves, reproductive rates improve and winter survival is good. The converse is true if deer enter the winter with insufficient body reserves. During severe winters, deer populations can experience drastic reductions in numbers regardless of body condition.

Genetics, nutrition and age determine antler growth. To attain antlers that meet ‘trophy’ proportions, a buck must have the genetic predisposition to grow large antlers, have high quality nutritious forage with adequate mineral content, and survive to an age of six or more years. Antler growth typically begins in late April and is normally complete by late August. Antlers function in the breeding season as an attractant to females. Larger, older bucks normally complete most of the breeding; however, younger, smaller antlered bucks can and do breed does. Upon completion of the breeding activities, a change in hormone production initiates the annual shedding of antlers, which generally begins during January.

High hunter harvest of bucks can cause reproductive problems in deer populations. Post-season ratios of 5-7 bucks per 100 does are generally recognized as a biological minimum level. The 1990 Mule Deer Plan lists 12 bucks per 100 does as a minimum post-season level for Eastern Oregon.

HABITAT REQUIREMENTS

Habitat is 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). The most important deer habitats in Eastern Oregon are summer habitat, including areas needed for reproductive activities and winter habitat.
Preferred summer habitat provides adequate forage to replace body reserves lost during winter and to maintain normal body functions. Summer habitat also includes areas specifically used for reproductive purposes. These areas must have an adequate amount of succulent vegetation, offering highly nutritional forage. In addition, areas used for reproduction should provide isolation from other deer, security from predators and minimal competition from other ungulates. Summer habitat areas are common throughout Eastern Oregon, and can be found in areas varying from lowland agricultural lands to high elevation mountain areas.

Winter habitat is found predominately in lower elevation areas of Eastern Oregon. These areas usually have minimal amounts of snow cover and provide a combination of geographic location, topography, and vegetation that provides structural protection and forage. Due to the low nutritive values of available forage during the winter, deer are forced to rely on their body reserves acquired during the summer for winter survival.

Big-game winter ranges have been delineated during implementation of county planning and federal land-management planning efforts. Identified big-game winter ranges typically are used by both deer and elk. Due to the combined use by these species, the winter range designations can have limitations if used to determine specific deer winter range areas.

**MANAGEMENT CONCEPTS**

**Population Monitoring**

Monitoring mule deer populations in Oregon is largely dependent on annual herd composition and trend counts and information obtained from annual hunter harvest surveys. Additional information regarding habitat condition, nutrition, and weather is used, if available, as it pertains to population monitoring.

Following hunting seasons, usually in November and December, fall herd composition counts are conducted. These counts are conducted by vehicle, horseback, aircraft or on foot. Deer are counted and classified to determine sex and to determine if they are adults or fawns. The information is used to calculate bucks per 100 does and fawns per 100 does in each WMU. Post-season buck ratios indicate numbers and age classes of bucks available for breeding. They also are compared with established MOs for each WMU to determine if post-season buck ratio objectives are being met. Information regarding fall fawn ratios is used to determine numbers of fawns present in populations before winter.

During March and April, spring herd composition and total deer counts are conducted by vehicle, horseback, aircraft or on foot. Deer are counted and classified as adults or fawns and a spring ratio of fawns per 100 adults is calculated. The observed spring fawn ratio and fall herd composition information are used to estimate over-winter survival and fawn recruitment. The number of mule deer observed in the current year is used to compare
previous years information to determine population trends. Annual survey effort is substantial with more than 75,000 mule deer classified in 2000-01.

Harvest surveys are conducted by telephone after completion of the hunting seasons to determine average days-hunted, success rates and total harvest. Historic telephone hunter surveys were less accurate, due to the unknown number of hunters who hunted a particular unit. As a result harvest figures were reported to be accurate at a 60 percent level. Since initiation of limited-entry hunting, harvest surveys information were conducted to obtain a 90 percent confidence interval with a 10 percent error. However, budget limitations experienced during 2001 resulted in a reduced harvest survey effort and resulted in an 80 percent confidence interval with a 20 percent error (results of the 2001 hunter survey are not available).

A total of 78,764 controlled hunt mule deer tags were sold for the 2000 hunting seasons. To meet the 90 percent confidence and 10 percent error statistical objectives, 27,544 hunters were contacted and interviewed during the harvest survey.

**Controlled Buck Hunting**

Controlled buck hunting was initiated in 1991 in response to low post-season, buck-to-doe ratios in many WMUs. After the 1990 buck seasons, only 16 of the 47 WMUs in Eastern Oregon were at or above the minimum post-season buck-to-doe ratios. Of those 16 units, 12 units already had limited-entry hunting due to deer recruitment problems that started during the winter of 1983-84.

Hunter numbers were substantially reduced during the 1991 controlled buck season and post-season buck ratios began to improve immediately. Total hunter numbers were reduced from 104,745 in 1990 to 90,661 in 1991, a decrease of approximately 14 percent. Following the 1991 hunting seasons, 37 of 47 WMUs were at or slightly below their MOs for bucks. Limited-entry buck hunting has been maintained in all 47 Eastern Oregon WMUs and after completion of the 2001 seasons, 33 of the 47 WMUs were at or above their recommended post-season, buck-to-doe ratios.

**Antlerless Hunting**

In healthy mule deer herds, antlerless harvest can affect the size and growth of mule deer populations. Buck-only seasons do not remove enough animals to solve either concern. Placing all hunting pressure on bucks can result in buck ratios falling below identified MO levels.

A deer surplus exists when annual spring census indicates that a deer herd is approaching or is above the population MO for the WMU. To effectively reduce populations, significant numbers of antlerless deer must be removed through controlled hunt tags.
Antlerless harvest can keep a deer population in balance with its habitat and has the additional benefit of removing some of the older, less productive does. Damage hunts are designed to harvest antlerless deer causing damage to agricultural crops. These hunts are limited to specific areas and generally do not have a major effect on the overall deer population within a WMU.

**Population Models**

Since the adoption of the 1990 Mule Deer Plan, additional techniques have been developed to assist biologists in constructing mathematical-based models of deer populations. POP2, a computer program, uses herd ratios, ages and productivity rates, combined with harvest rates, natural mortality and weather severity to determine future deer population levels. Flying grid patterns in representative habitat types within a WMU and recording all deer observed determine sightability indexes. The data obtained are expanded based on the total amount of each habitat type within the WMU and a final population estimate is determined. Other methods include varied mathematical processes and formulas that incorporate many or all of the above-mentioned information to estimate deer populations. The processes described above and other similar techniques are used throughout the western states to assist biologists in determining deer population levels.

**Management Objectives**

Mule deer management objectives were established during a public review process that occurred prior to the adoption of the Mule Deer Plan in 1990. The winter population levels were initially determined in 1982 using a mathematical ratio, based on harvest estimates that were obtained from the statewide annual hunter survey. During a statewide public review of the 1990 Mule Deer Plan, the 1982 estimates were adjusted to reflect winter population objective levels for each WMU. A minimum post-season, buck-to-doe ratio of 12 was determined for all WMUs. In addition, in an effort to address public requests for ‘diverse hunting opportunities’ varied minimum post-season buck ratios were set in a total of 50 sub-units. Post-season ratios were set at 12 bucks for 18 units, 15 bucks for 24 units and 25 bucks for eight units. Minimum recruitment levels of spring fawn-to-adult ratios were also determined for each WMU or sub-unit.

With initiation of controlled rifle deer hunting in Eastern Oregon, mule deer harvest estimates became more accurate and indicated that earlier deer population estimates in some WMUs were inaccurate. However, before changes are made to the existing management objectives as listed in the 1990 plan and shown below, the management objectives for each WMU will be reviewed in a public forum. It is anticipated the public review of the management objective information will be initiated in 2003.
Table 1. Management Objectives by Wildlife Management Unit

<table>
<thead>
<tr>
<th>Wildlife Mgmt Unit (#)</th>
<th>1990 Pop. MO</th>
<th>Bucks/100 does Post season</th>
<th>Fawns/100 adults</th>
<th>Unit Sq Miles</th>
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<td>Fawns/100 adults</td>
<td>Unit Sq Miles</td>
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<td>960</td>
</tr>
<tr>
<td>N. Warner</td>
<td>25</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S. Warner</td>
<td>15</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central-South Zone</td>
<td>78,300</td>
<td></td>
<td></td>
<td>13,267</td>
</tr>
<tr>
<td>Wagontire – 73</td>
<td>1,400</td>
<td>15</td>
<td>35</td>
<td>2,912</td>
</tr>
<tr>
<td>Beattys Butte - 70</td>
<td>2,300</td>
<td>15</td>
<td>25</td>
<td>2,507</td>
</tr>
<tr>
<td>Juniper – 71</td>
<td>2,300</td>
<td>15</td>
<td>25</td>
<td>2,955</td>
</tr>
<tr>
<td>Steens – 69</td>
<td>11,000</td>
<td>25</td>
<td>35</td>
<td>1,916</td>
</tr>
<tr>
<td></td>
<td>5,500</td>
<td>15</td>
<td>35</td>
<td>4,882</td>
</tr>
<tr>
<td>Whitehorse – 68</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. Whitehorse</td>
<td>15</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trout Creek Mtns.</td>
<td>25</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owyhee – 67</td>
<td>5,000</td>
<td>15</td>
<td>35</td>
<td>3,027</td>
</tr>
<tr>
<td>Southeast Zone</td>
<td>27,500</td>
<td></td>
<td></td>
<td>18,199</td>
</tr>
<tr>
<td>TOTALS/AVERAGES</td>
<td>317,400</td>
<td></td>
<td></td>
<td>65,781</td>
</tr>
</tbody>
</table>
**Point Regulations**

Point regulations are often suggested as a way to increase the number of older bucks in a deer population. In theory, point regulations are designed to increase the number of older bucks in the population by limiting harvest to only larger bucks, allowing younger bucks to mature. However, past experience in Oregon has shown that three-point or four-point regulations do not produce additional older bucks in an area unless hunter numbers are severely limited.

Steens Mountain WMU was managed under a four-point regulation, with no limitation on hunter numbers for 12 years (1975-86) and provides an excellent source of information to address this issue. During the course of the four-point or better regulation, there was a high illegal buck harvest and a decline of approximately 30 percent of the number of four-points available for harvest. The long-term effect of the four-point regulation imposed on Steens Mountain WMU was that legal buck harvest declined by nearly 50 percent by the end of the 12 years the point restriction was in effect. Currently, those WMUs that have identified post-season buck ratios of 25 are units being managed for ‘trophy’ opportunities in Oregon.

In general, point regulations result in illegal kill of sub-legal bucks, hunter expectations of a quality experience are not realized, and both the total number of legal bucks available and the total harvest decrease.

**Habitat Programs**

Oregon biologists are responsible for managing mule deer herds at healthy and sustainable levels. ODFW is not a land-management agency and therefore has little direct control over most mule deer habitat. However, biologists routinely discuss habitat management issues/practices with private landowners and public land managers. When possible, and if funding exists, habitat projects are initiated to improve deer habitat. Funding for these projects come from a combination of hunter license and tag fees and/or moneys derived from federal excise taxes on sporting goods. The primary habitat programs used in Oregon are listed below.

**Green Forage Program:** The Green Forage (GF) program was created in 1983 to assist landowners who are experiencing damage caused by wildlife. The objective of the GF program is to alleviate or prevent big-game damage on private lands while benefiting wildlife by improving forage quality and quantity on public or private lands.

**DEAR Program:** The Deer Enhancement and Restoration (DEAR) program was initiated in 1983 to provide funding to improve mule deer ranges for the enhancement of deer populations. DEAR projects are typically designed to improve or enhance any component of deer habitat on private or public lands.
**Habitat Improvement Program:** The Habitat Improvement program (HIP) is used to enhance wildlife habitat for a wide range of wildlife species and is more general than the GF or DEAR programs. 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 ODFW 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 sponsored by several landowner and hunter associations and was created during the 1993 session of the Oregon Legislature. The A&H program was designed to improve wildlife habitat and provide sportsmen with access to private and public lands for hunting. Annual funding for the program is derived from a $2 surcharge on hunting licenses and from moneys collected from the auction and raffle of 10 deer and 10 elk tags. While the program is funded with license dollars, it is not directly controlled by ODFW. Regional councils and a state board comprised of landowners and sportspeople review project proposals and make recommendations to the Fish and Wildlife Commission for funding. During the 1997 legislative session, the A&H program was reauthorized and is currently in effect through 2003.

**Travel Management**

In response to declining buck ratios and increasing road densities in many parts of Eastern Oregon, ODFW developed cooperative road closure areas with public and private land managers. The cooperative closures attempted to limit motorized-vehicle access and provide areas where deer were less vulnerable to harassment. The program was initiated in 1967 and was well supported by hunters. By 1990, approximately 1,450,000 acres were under a motorized vehicle management program. However, it was difficult to correlate any increase of buck ratios to the closures, as most areas were relatively small. In addition, due to program popularity, hunter density was often higher in the vehicle closure areas and often a higher percentage of bucks were harvested. However, the program did provide areas that hunters could use without having to contend with vehicle interference and did provide protection against vehicular-caused damage on many roads.

During the mid-1990s, federal agencies began to develop their own Access and Travel Management (ATM) programs. Big-game winter range areas were identified during the ATM process and seasonal vehicle restrictions were implemented to ensure optimum use by big-game species. During the development of the federal ATM programs, all public recreation user needs were addressed and subsequently many of the historic closure areas were changed; however, the total acreage involved in road closure programs remains near 1,500,000 acres.
Vegetation Management

Livestock Grazing: Livestock grazing systems can be designed to improve deer habitat by providing an array of forage conditions. ODFW uses livestock grazing on some of their Wildlife Management Areas (WMA) to improve habitat for mule deer and other wildlife species. Wildlife habitat objectives are achieved by manipulating the type of livestock, season of use and the amount of use to produce a desired forage type or condition. Annual changes in environmental conditions also must be considered.

Fire Management: Prescribed fire is recognized as a tool used to improve several components of deer habitat. Fire often rejuvenates old browse plants, making them more palatable and productive. However, fire management requires a good understanding of how various plant species respond to a burn treatment and what fire intervals were responsible for developing the existing ecosystem. Reoccurring fire, whether prescribed or wild, or fire suppression can lead to the elimination of desired browse and forb species, changing the overall plant composition and the range may take several years to re-establish the preferred browse and forage conditions.

Prescribed fire is needed in many forested areas of Eastern Oregon; however, land managers are concerned about fire control due to fuel loads that have accumulated with past fire suppression. Land managers will continue to use prescribed fires as a land management practice, but increases and improvement of habitat quality and quantity may take several years.

Wildfires in sagebrush habitats often burn vast acres, burn extremely hot and can result in the loss of critical winter range habitat. In many areas, it may take 30 to 50 years before the areas have recovered to a level to support significant numbers of deer.

Noxious weeds: Weeds are generally described as non-native plants that are invasive and typically displace native plants. Noxious weeds are plants that are potential threats to the ecological, social or economic status of any given area. Many areas in Eastern Oregon have been identified with noxious weed problems and many Eastern Oregon counties have county-funded weed control programs. Control of noxious weeds on identified deer winter range and summer range areas is beneficial when the weed control program maintains the native forage species.

Parasites and Disease

In Oregon, several parasites are known to occur in mule deer and are common throughout the west. Ticks and deer keds are the most common external parasites found on deer. Both parasites feed by sucking blood from their hosts and can become a problem if an individual deer is in a weakened condition.
Diseases are of greater concern because they are difficult to diagnose and have potential for a greater negative impact to deer populations. Mule deer populations that are relatively stable and that are found in good habitat rarely are in danger of disease epizootics. However, the danger of disease transmittal is more serious when deer herds are concentrated. Adenovirus hemorrhagic disease (AHD) and Epizootic hemorrhagic disease (EHD) have been confirmed in limited areas of Central and Southeast Oregon. At present, there is no evidence or recorded outbreaks of brucellosis, tuberculosis (TB) or chronic wasting disease (CWD) in wild deer herds of Oregon.

Because mule deer share rangeland with other wild and domestic animals and often occur adjacent to big game farm facilities, the potential exists for transmission of certain diseases and parasites. Diseases in deer are best managed by maintaining healthy habitats, managing appropriate animal densities, and recognizing diagnostic symptoms of various diseases.

**Supplemental Feeding**

Weather, especially severe winters, can negatively impact deer populations and often leads to public requests or demands to initiate supplemental feeding. In Oregon, managed supplemental winter-feeding programs are limited to a few situations where deer and elk are purposely fed annually to prevent damage to nearby agricultural lands. Artificial feeding programs can easily divert the public’s attention away from the real problem: maintenance and enhancement of habitat needed for year-round support of mule deer.

Natural strategies for winter survival, such as migration, animal distribution, dispersal, and foraging behaviors developed by deer for survival is preferred to artificial feeding. However, because of severely reduced deer winter ranges in many areas, the Department recognizes that human intervention to control damage or increase survival may, at times, be necessary.

Emergency feeding programs were initially implemented in Oregon in 1948 and have long been identified as costly and ineffective programs. After the severe winter of 1992-93, when a substantial amount of public moneys and ODFW personnel time were spent on emergency feeding, ODFW developed a draft emergency-feeding plan. While the plan was not adopted as agency policy, the draft plan is still used throughout Eastern Oregon to determine when winter-feeding is needed.

The draft plan states that winter-feeding programs for deer will be conducted in only extraordinary situations when natural forage and traditional winter ranges are unavailable and severe weather will have a decimating impact on deer populations. Emergency winter feeding will be implemented under the following conditions: 1) to prevent damage to private property where other methods are deemed ineffective, 2) to supplement winter range in a Department-managed program on a state-owned or managed wildlife management area, and 3) where emergency feeding will increase winter survival and not
cause significant problems with disease, damage or habitat. Emergency feeding is
generally limited to areas where there is a substantial public demand for such feeding,
and where the public makes resources available for such a program through volunteer
efforts and donation of money and materials.

**Predation and Predator Management**

The effect of predation on mule deer is often difficult to determine due to numerous
factors that can affect mule deer herds. Studies in some areas of the western United States
have concluded that predators have a major effect on mule deer populations, while other
studies have found predators have little effect. Differences in deer and predator densities,
species of predators, weather, disease, human harvest, and whether the prey population is
at habitat carrying capacity influence study results.

The most significant predators of mule deer in Oregon are coyotes and cougars. Coyotes
feed primarily on small animals, carrion and vegetation but will also prey on deer,
especially fawns. Cougars rely on deer and elk as their primary prey, feeding on both
adults and young throughout the year. Coyote populations in Oregon increased
significantly after use of the poison compound 1080 was banned on federal lands in 1972.
Cougars have increased from an estimated population of 200 in 1961 to more than 4,000
in 2001. In general, population numbers of both predators have increased during the past
few decades. Large numbers of predators may function to negatively affect population
increases in deer herds and the effects are most noticeable after those winters when deer
populations experience high mortality rates.

Presently, Oregon’s wildlife managers have limited influence on cougar and coyote
populations. Hunter harvest is having minimal effect on controlling overall numbers of
either predator. Other management techniques, such as regulated trapping and damage
control programs target specific areas and/or animals. Widespread predator control
programs have not been used since the early 1990s primarily due to a lack of public
support.

Before initiating a predator control program to increase deer numbers, several factors
must be considered. Most importantly, predation must be identified as a major factor
limiting deer herds and the deer population must be below habitat carrying capacity.
Other factors to consider are whether: 1) reliable methods exist for the removal of the
identified predator, 2) an assessment of the total number of predators to be removed
within an identified project area needs to be completed, 3) the cost of the proposed
project will be justified with a realistic increase in deer numbers and subsequent hunter
harvest, and 4) the proposed project will be publicly accepted. While predator control is
not always the appropriate management tool, in the right situation it may be an option for
managing predator species and mule deer populations.
Technology

Technological advancement in outdoor equipment has increased hunter efficiency and is changing the way many 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 permit hunters to hunt larger tracts of land and make game retrieval easier. Global positioning units, two-way radios, and cellular phones allow hunters to travel farther into unknown areas and maintain communication with other members of their hunting party. Improvements in waterproof clothing and insulated clothing allow hunters to withstand the elements longer. Development and availability of night-vision optics and infrared cameras have created an advantage for some hunters. By being able to monitor animals’ nighttime activities and locations, hunters may increase their chances for success during legal hunting times.

There has always been interest to provide additional hunting opportunities for ‘primitive weapon’ hunters, primarily for archery and muzzleloaders. However, archery and muzzleloader equipment of today is far more technologically advanced than that of 10 years ago and new improvements are continually being added. Rules to limit their effectiveness recently have been adopted by the Oregon Fish and Wildlife Commission.

Technological improvements in hunting equipment will continue and the Oregon Fish and Wildlife Commission will be constantly challenged to determine how new technologies may impact future hunting opportunities and may be required to develop rules that limit the effectiveness of the hunter or equipment.

ECONOMIC ASPECTS OF OREGON’S MULE DEER RESOURCE

Economic Impact of Mule Deer Hunting in Oregon

Estimates of the economic impact of hunting on statewide personal income have been developed using expenditure data and economic ‘input-output’ models. Total expenditures for all types of hunting by Oregonians were estimated at about $625 million in 1996 (U.S. Fish and Wildlife Service, 1998a). This estimate includes expenditures on special equipment such as vehicles used primarily for hunting. These estimated expenditures for all hunting produced roughly $315 million in statewide personal income (Southwick Associates, 1998).

The amount that a hunter spends in order to take part in a hunting trip has an impact on state or regional economies as well as the local economy. For example, the expenditures related to big-game hunting in Eastern Oregon also generate income outside Eastern Oregon. A portion of hunting trip expenditures are made near hunters’ homes and enroute
to the hunting destination; and income also is generated because of ‘leakages,’ or purchases, of the local area economy from the larger state and regional economies.

Among the data collected in a study on hunting in the Starkey Experimental Forest (during 1989-91) were deer and elk hunter trip expenditures. These expenditures did not include spending on hunting equipment and special equipment. The associated impact on personal income from the expenditures has been estimated for the state level and for Eastern Oregon. The estimates for deer hunting are shown in the following table:

Table 2. Starkey Experimental Forest Deer Hunter Average Hunter Day Expenditures and Associated Impacts on Total Personal Income

<table>
<thead>
<tr>
<th>Hunt Period</th>
<th>Usable Responses</th>
<th>Average Total Trip Expenditures (per hunter day)</th>
<th>State Level Personal Income Impact (per hunter day)</th>
<th>Average Eastern Oregon Expenditures (per hunter day)</th>
<th>Eastern Oregon Personal Income Impact (per hunter day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEER HUNTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1989</td>
<td>68</td>
<td>$46.29</td>
<td>$35.05</td>
<td>$21.25</td>
<td>$9.03</td>
</tr>
<tr>
<td>October 1990</td>
<td>20</td>
<td>$48.09</td>
<td>$34.12</td>
<td>$20.95</td>
<td>$8.25</td>
</tr>
<tr>
<td>October 1991</td>
<td>19</td>
<td>$57.18</td>
<td>$42.98</td>
<td>$36.82</td>
<td>$17.48</td>
</tr>
<tr>
<td>WEIGHTED AVERAGE</td>
<td>107 total</td>
<td>$48.56</td>
<td>$36.28</td>
<td>$23.96</td>
<td>$10.38</td>
</tr>
<tr>
<td>WEIGHTED AVERAGE (2001 $)</td>
<td></td>
<td>$58.76</td>
<td>$43.90</td>
<td>$28.99</td>
<td>$12.56</td>
</tr>
</tbody>
</table>

No comparable estimates of expenditures and personal income impacts have been made for Western Oregon elk and deer hunting.

**Economic Value of Mule Deer Hunting**

The first in-depth study of the net economic value of big-game hunting in Oregon was based on a 1968 survey (Brown, 1973). In this study Brown, Nawas and Stevens estimated the net economic value for big game hunting in Northeastern Oregon, using what is called the ‘travel cost’ model approach. The average net economic value in 1968 was an estimated $9.20 per hunter day.

Using Oregon data collected during the 1991 national survey (U.S. Fish and Wildlife Service, 1993), Waddington, et. al. (1994) estimated updated values for deer hunting in Oregon. The estimated mean net economic value per year for Oregon deer hunting was $433. This translates to a value per day of deer hunting of about $59. This is substantially higher than the estimates Hay made with the 1985 data.

Based on the studies cited above, a net economic value of $30 to $60 per hunter day for mule deer hunting in Oregon, the roughly 495,850 days of mule deer hunting in Oregon (2001) probably yielded between $14.9 million and $29.8 million in net economic benefits. This estimate represents the aggregate user value of mule deer hunting to those who hunted in Oregon, over and above their actual expenditures (costs) for this recreation.

2002 MULE DEER PLAN REVIEW PROCESS

An internal committee was selected during November 2001 and was comprised of seven ODFW personnel and one OSP representative. At the first committee meeting in mid-December, a process was discussed and identified that was to be used to guide the review of the 1990 Mule Deer Plan. The process developed included an updating of the biological and management information and completing an assessment of the publicly identified management issues listed in the 1990 plan. After completion of the above activities, a list of current mule deer management issues was developed.

The internal committee members completed the information update and the assessment of the 1990 issues during the period of December through April. In March, Portland staff sent 33 letters to individual and constituent groups, inviting them to participate in the Mule Deer Plan review. The list of individuals and constituents that received letters of invitation is shown on Pages 2, 3 and 4 of the Appendix. In response to the invitation, 14 people volunteered to serve on the Mule Deer Committee. A list of all 22 Mule Deer Committee members and their affiliation is shown on Page 4 of the Appendix.

Mule Deer Committee members began meeting in mid-April to review the update information in the plan and to review the discussion of the 1990 issues and strategies. The written assessment of the identified issues from the 1990 Mule Deer Plan is included in the Appendix, beginning on Page 46. During the last committee meeting in May, the committee developed a series of management issues that highlighted concerns of the committee and this initial list was used during the public review process.

The statewide public review process began with a series of news releases and a printed notification on the reverse side of controlled hunt report cards sent to 180,000 hunter applicants. Twelve public meetings were scheduled to provide an opportunity for interested publics to attend throughout the state. At each meeting, the public participants were presented a short review of the existing plan and past management activities prior to receiving comments from those in attendance. Depending on the location, meeting
participants were offered an opportunity to comment on mule deer, black-tailed deer, and elk management issues. The location and other pertinent information regarding the public meetings are listed below.

Table 3. Public Meeting Schedule for Review of:
2002 Elk Plan, Mule Deer Plan, Black-tailed Deer Strategies

<table>
<thead>
<tr>
<th>City</th>
<th>Date</th>
<th>Time</th>
<th>Meeting Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burns</td>
<td>August 5</td>
<td>7-9 p.m.</td>
<td>Senior Citizen Center</td>
</tr>
<tr>
<td>Elk, Mule Deer</td>
<td></td>
<td></td>
<td>17 South Alder</td>
</tr>
<tr>
<td>Tillamook</td>
<td>August 6</td>
<td>3-7 p.m.</td>
<td>Dept. of Human Resources</td>
</tr>
<tr>
<td>Elk, Mule Deer, BT</td>
<td></td>
<td></td>
<td>Wilson River Building</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4670 Third St.</td>
</tr>
<tr>
<td>Medford</td>
<td>August 6</td>
<td>7-9 p.m.</td>
<td>Jackson County Courthouse</td>
</tr>
<tr>
<td>Elk, Mule Deer, BT</td>
<td></td>
<td></td>
<td>Auditorium, Oakdale St. between 8th and Main St.</td>
</tr>
<tr>
<td>Redmond</td>
<td>August 7</td>
<td>7-9 p.m.</td>
<td>Redmond High School, Large</td>
</tr>
<tr>
<td>Elk, Mule Deer, BT</td>
<td></td>
<td></td>
<td>Auditorium</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>675 SW Rimrock Dr.</td>
</tr>
<tr>
<td>La Grande</td>
<td>August 8</td>
<td>7-9 p.m.</td>
<td>ODOT Office, Large Conference Room</td>
</tr>
<tr>
<td>Elk, Mule Deer</td>
<td></td>
<td></td>
<td>3012 Island Ave.</td>
</tr>
<tr>
<td>Roseburg</td>
<td>August 8</td>
<td>7-9 p.m.</td>
<td>SW Regional office</td>
</tr>
<tr>
<td>Elk, Mule Deer, BT</td>
<td></td>
<td></td>
<td>4192 N Umpqua Hwy</td>
</tr>
<tr>
<td>North Bend</td>
<td>August 13</td>
<td>7-9 p.m.</td>
<td>North Bend Community Center</td>
</tr>
<tr>
<td>Elk, Mule Deer, BT</td>
<td></td>
<td></td>
<td>2222 Broadway</td>
</tr>
<tr>
<td>Newport</td>
<td>August 14</td>
<td>7-9 p.m.</td>
<td>Hatfield Marine Science Center</td>
</tr>
<tr>
<td>Elk, Mule Deer, BT</td>
<td></td>
<td></td>
<td>Auditorium</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2030 SE Marine Science Drive</td>
</tr>
<tr>
<td>Pendleton</td>
<td>August 15</td>
<td>7-9 p.m.</td>
<td>Pendleton Convention Center</td>
</tr>
<tr>
<td>Elk, Mule Deer</td>
<td></td>
<td></td>
<td>1601 Westgate</td>
</tr>
<tr>
<td>Klamath Falls</td>
<td>August 20</td>
<td>7-9 p.m.</td>
<td>OSU Extension Office</td>
</tr>
<tr>
<td>Elk, Mule Deer, BT</td>
<td></td>
<td></td>
<td>3328 Vandenberg Rd.</td>
</tr>
<tr>
<td>Corvallis</td>
<td>August 21</td>
<td>7-9 p.m.</td>
<td>ODFW Corvallis Office</td>
</tr>
<tr>
<td>Elk, Mule Deer, BT</td>
<td></td>
<td></td>
<td>7118 NE Vandenberg Ave. (Adair Village)</td>
</tr>
<tr>
<td>Portland</td>
<td>August 22</td>
<td>7-9 p.m.</td>
<td>ODFW - Commission Room</td>
</tr>
<tr>
<td>Elk, Mule Deer, BT</td>
<td></td>
<td></td>
<td>2501 SW 1st Street</td>
</tr>
</tbody>
</table>
Public attendance at most of the meetings was low, with attendance varying from a high of 57 at Redmond to a low of 5 at Tillamook. All public comments and input received at the meetings were recorded and compiled locally before being sent to the Information and Education Division for final tallying. Additional written comments and input were received via the Internet or mail. At the completion of the public review and comment process, a total of 310 comments were received, 243 from the public meetings and 67 written.

During mid-September the Mule Deer Committee reviewed all of the public comments and input that was received. The committee then categorized and prioritized all information received. The public input is shown in the Appendix, Pages 6 through 41.

Public comments regarding archery season and the landowner preference program are included in the Appendix, however issues and strategies were not developed due to scheduled reviews of both subjects. Public review processes will be designed to address archery and Landowner Preference Program issues identified during the Mule Deer Plan review. These processes will be implemented during 2003. In addition, management objective numbers for each WMU will be reviewed at the local level and added to this plan as adopted by the ODFW Commission.

The following Issues and Strategies were developed using the public input that was received.

**MULE DEER ISSUES DEVELOPED DURING THE 2002 PUBLIC REVIEW PROCESS**

**Issue 1.** Accurate biological and harvest information is needed to determine mule deer population levels, allowing for optimal management of populations enabling biologists to provide equitable use by all user groups.

**Objectives:**
1) Improve accuracy of population estimates.
2) Update current population management objectives for all WMUs.
3) Provide an equitable harvest opportunity for all user groups.
4) Maximize hunter opportunity without increasing overall season lengths.

**Proposed Strategies:**
1) Improve harvest information by requiring hunters to report success via mandatory report card or via an Internet response.
2) Develop studies to determine adult mortality, yearly recruitment and migration in identified WMUs.
3) Conduct a public review of the existing population levels for each WMU and develop new MO population estimates that reflect the existing habitat available in each WMU.
4) Review post-season buck ratio levels and determine if the three-tier, post-season buck ratio is needed for management purposes.
5) Biologists should determine the annual archery bag-limit and remove the current requirement of allowing archery antlerless harvest in those units having unit-wide antlerless rifle harvest. (This will be referred to the archery review committee.)
6) Eliminate the opportunity for hunters to have multiple deer tags, allowing the maximum number of hunters to participate in deer seasons.
7) Regulate technological improvements that increase hunter efficiency and ultimately reduce the number of hunters who can participate in harvest seasons.
8) Investigate the possibility of overlapping seasons of suitable hunter groups (archery and muzzleloader) and consolidating big-game seasons (deer and elk, or deer and antelope).

**Issue 2.** There are increasing public concerns regarding the effects of predation and the extent of other nonharvest losses to mule deer populations.

**Objectives:**
1) Determine the extent and overall effect of predation on deer populations.
2) Determine the type and amount of other nonhunter losses that occur.

**Proposed Strategies:**
1) Develop methods that provide estimates of predation losses for each WMU.
2) To the extent allowed by the federal and Oregon Endangered Species Acts, manage predators to maintain a balance with mule deer populations.
3) Coordinate efforts with state and county road managers to determine the extent of losses that occur on highways and roads.
4) Annually determine the amount of deer killed in addition to controlled hunt harvest.

**Issue 3.** Mule deer habitat should be maintained and enhanced in all WMUs to keep deer populations at or near identified management objective levels.

**Objectives:**
1) Identify habitat conflicts and determine solutions.
2) Protect winter range and other critical habitat areas in all WMUs.
3) Coordinate habitat improvement efforts between public and private managers.

**Proposed Strategies:**
1) Compile research information or develop studies to determine if competition with elk is an important factor limiting deer populations.
2) Identify limiting habitat factors in each WMU.
3) Protect and improve existing winter range areas and explore the potentials for the purchase of winter ranges and critical habitat areas by various public agencies.
4) Maintain current habitat enhancement/improvement programs.
5) Field staff should continue to encourage cooperative seeding efforts on private and public lands, utilizing the best-suited seeds/plants.
6) Habitat improvement projects should provide benefits to multiple species of wildlife.

**Issue 4.** Law enforcement efforts and effectiveness in Oregon should be increased to provide adequate protection and to deter future violations.

**Objectives:**
1) Develop minimum fines and penalties for all wildlife violations.
2) Improve funding for increased enforcement activities.

**Proposed Strategies:**

1) Initiate a process that will encourage all Justice and District Courts in Oregon to adopt minimum fines/penalties for all wildlife violations.
2) Increase license fees or develop an ‘enforcement stamp’ that could be purchased by sports people with intent to increase revenues directed to enforcement activities.
3) Use Oregon State Police traffic officers to assist with wildlife enforcement during big game seasons.

**Issue 5.** There is a heightened public awareness and concern regarding the potential for the introduction and spread of wildlife diseases in Oregon.

**Objectives:**
1) Prevent the introduction and spread of wildlife diseases.
2) Monitor big-game species to detect any disease.
3) Limit the expansion of cervid ranching in Oregon.

**Proposed Strategies:**

1) Encourage Oregon Department of Agriculture to continue their testing/requirements for any wildlife being transported into Oregon.
2) Implement a field sampling effort to monitor for disease occurrence in wild populations.
3) Publicize information regarding diseases and information regarding the safe handling and use of meat by hunters.
4) Do not permit any additional cervid licenses in Oregon.

**Issue 6.** The increasing and indiscriminate use of all-terrain vehicles (ATVs) and similar recreational vehicles during all periods of the year are of concern to the majority of hunters and land managers.
Objectives:
1) Increase enforcement of ATV rules on all public lands and roadways.
2) Manage ATV use during hunting seasons.
3) Encourage federal land managers to develop ATV rules that restrict use on winter range areas and other critical habitat areas.

Proposed Strategies:
1) Make enforcement of ATV rules during hunting seasons a priority with OSP and seek Oregon State Parks fund costs from ATV licensing funds.
2) Regulate ATV use during hunting seasons and investigate the possibility of limited use of ATVs for game retrieval during specific periods of the day.
3) Work with public and private land managers to restrict the use of ATVs on identified winter range areas.
4) Expand the existing travel management areas to include archery seasons. (This will be referred to the archery review committee).

Issue 7. Harassment and overall disturbances need to be minimized, providing mule deer an opportunity to use available habitat more readily and reduce stress caused by continual hunting seasons.

Objectives:
1) Reduce the total number of days of hunting for all big game species.
2) Recognize the effects of deer season opening on elk breeding activities.
3) Control collection of shed antlers.

Proposed Strategies:
1) Investigate ways to reduce the total number of days of hunting to minimize overall harassment and disturbances; i.e., combining portions of deer with other big-game seasons.
2) Delay the opening of the buck season by one week to allow additional time without hunting disturbances, reduce disturbances to elk during rut and to provide optimal hunting conditions for deer hunters.
3) Develop rules to control the collection of shed antlers on winter range areas and require a fee permit, which could fund administration/enforcement.

Issue 8. Improve public access to public and private lands in Oregon.

Objectives:
1) Support consolidation of public lands.
2) Provide access to public lands through the use of easements when possible.
3) Improve access to private lands.
Proposed Strategies:

1) ODFW should encourage support of efforts by federal land managers to consolidate public lands, gaining additional areas for public access.
2) The Access and Habitat Board should prioritize funding for projects that provide access to private lands and for projects that provide access through private lands to public lands.
3) Incentive payments to private landowners for public access to their property need to be competitive with payments offered by private interests.
LITERATURE CITED


