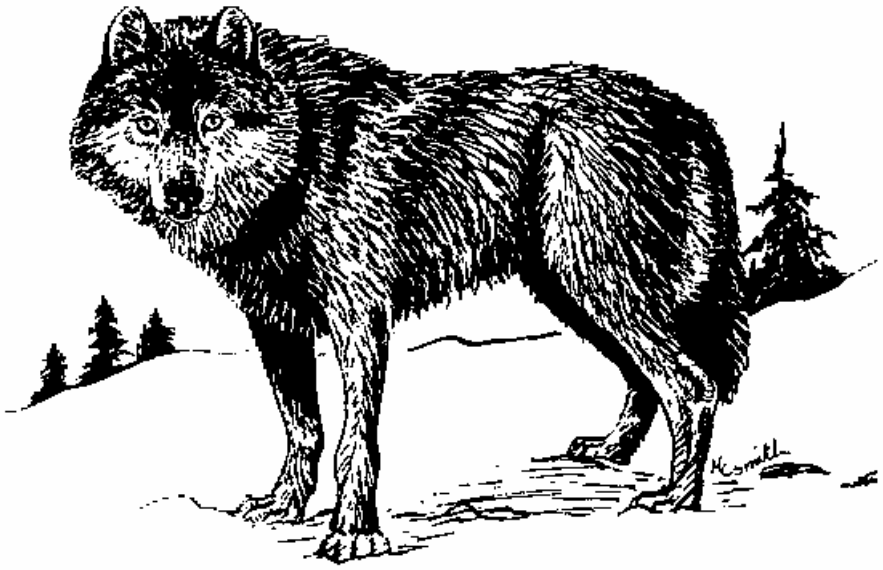
OREGON
WOLF CONSERVATION AND MANAGEMENT PLAN



OREGON DEPARTMENT OF
FISH AND WILDLIFE

FEBRUARY 2005

Important note: A recent federal court decision[1] under the Federal Endangered Species Act has changed the relationship between federal law and Oregon law concerning the gray wolf. On January 31, 2005, the U.S. District Court for the District of Oregon vacated a U.S. Fish and Wildlife Service rule on gray wolves. That rule, issued by the Service in April 2003, had downlisted the western populations of wolves from endangered to threatened and adopted special "4(d) rules" allowing take[2] of wolves under certain circumstances.

The April 2003 federal 4(d) rules had eased federal protections for wolves in several western states, including Oregon. In relation to those federal rules, the Oregon Endangered Species Act (which lists the gray wolf as endangered) imposed more stringent protections for the wolf. Because federal law sets the "floor" (minimum level) for wolf protections, state laws may be more protective, but the Federal ESA pre-empts any less-protective state provisions.

When the January 31, 2005, court decision vacated the federal 4(d) rules, that had the effect of "raising the federal floor" (increasing federal protections). Therefore, pursuant to the Supremacy Clause of the U.S. Constitution, federal law now pre-empts any provisions of Oregon's Wolf Conservation and Management Plan concerning harassment and take that are less restrictive than federal protections. All other portions of the Plan remain in full legal effect.

Having a wolf conservation and management plan in place will enable Oregon to quickly take over wolf management in the event the federal government once again downlists wolves of otherwise shifts management of wolves back to the states. The Oregon Fish and Wildlife Commission is under a legal obligation to satisfy the requirements of Oregon's ESA, which requires the Commission to work toward conservation of endangered species. An Oregon wolf plan also positions the Commission to best influence the development of federal wolf policy in Oregon.

[1] *Defenders of Wildlife, et al v. Norton* Civil No. 03-1348-JO Opinion and Order (D.Or. 2005).

[2] The Federal ESA's definition of "take" is broader than that in Oregon law. Federal "take" regulation governs not only killing and capturing wolves, but also harming or harassing them.

FISH AND WILDLIFE COMMISION PREAMBLE

To the Citizens of Oregon:

With the knowledge that gray wolves will re-establish in the near future a permanent residence in Oregon, we directed the development of a wolf conservation and management plan. It was our intent to proactively decide in advance of wolves' arrival how the State of Oregon would meet the intent of both the Oregon Endangered Species Act and the Oregon Wildlife Policy[3].

Wolves are a state-listed endangered species. The state ESA[4] requires us, as members of the Oregon Fish and Wildlife Commission, to conserve listed species by the use of methods and procedures so that protection measures in the ESA no longer are necessary. Once wolves are delisted, they will be managed, like all other species, under the directives of the Wildlife Policy. The Wildlife Policy guides decisions related to all native species – including one as controversial as the wolf. The policy directs the Commission to manage wildlife:

> **"…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 the state."**

The policy further directs us to achieve seven co-equal goals:

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.

We believe the Oregon Wolf Conservation and Management Plan meets the conservation mandate of the state ESA and the intent of the Wildlife Policy.

Throughout the process to develop this plan, we heard from many people passionately representing all interests related to wolves. At the two ends of the spectrum, there were those who said all wolves entering Oregon should be killed and those who said state wildlife officials should actively capture wolves from outside the state's borders and release them in Oregon. We would not be faithful to the Wildlife Policy if we agreed with either of the two extremes. Thus, it's important to view this plan with the knowledge of what it is not: **This plan is not a wolf reintroduction plan, nor is it a wolf eradication plan.** The Oregon Wolf Conservation and Management Plan describes the State of Oregon's response to wolves that come on their own from the growing Idaho population.

[3] ORS 496.012
[4] ORS 496.171-496.182

In adopting this plan[5], we ask that the Oregon Legislature consider three statutory changes that will enhance our ability to fully implement the plan, conserve the species and meet the intent of the Wildlife Policy. First, classify the wolf as a 'special status mammal' for long-term management. Second, amend the damage statute to allow livestock owners without a permit to shoot a wolf caught 'in the act' of killing livestock on their land. Third, create a new compensation program to mitigate for the loss of domestic livestock due to wolf depredation. Details of these proposed legislative changes are included in this plan.

At this time we hope to clarify a misconception related to human safety and the unlikely event that a person is attacked by a wolf: The plan describes a situation where state law would shield a person from liability if killing or harassing an attacking wolf was necessary to prevent imminent, grave injury to a human.

In addition, we wish to comment on the many questions and statements we have heard related to the interaction between wolves and public land grazing activities. This plan does not implicate in any way grazing on public lands. When directing the development of the plan in early 2003, the Commission determined that the plan not the appropriate vehicle to address this issue. Moreover, this Commission does not have the authority to change grazing policies on public lands in this state.

We wish to thank all the members of the Wolf Advisory Committee who freely gave many hours of their time to assist us in the crafting of this document. We also wish to thank all the citizens of this state for their active engagement and their willingness to provide us their thoughts, hopes and opinions on wolf management so that the final plan is one that provides a workable solution to the emotional issues surrounding the presence of wolves in Oregon.

Signed:

Marla Rae, Chair
Donald Denman, Vice Chair
Zane Smith, Jr.
Carter Kerns
Jon Englund
Dan Edge
Kenneth S. ("Skip") Klarquist, Jr.

[5] The plan was adopted by unanimous vote, with one commissioner absent but supportive of the plan. To memorialize specific concerns raised by individual commissioners but not adopted by a majority of the Commission, we note the following:

- Vice-Chair Denman objected in general to the concept of translocation.
- Vice-Chair Denman and Commissioner Edge objected to the special status mammal designation for wolves.
- Vice-Chair Denman objected to the reporting of non-injurious harassment in Phases 1 through 3 and Commissioner Smith objected to the reporting of non-injurious harassment in Phases 2 and 3.

EXECUTIVE SUMMARY

Gray wolves are listed as "endangered" under the Oregon Endangered Species Act (ESA). The law requires the Oregon Fish and Wildlife Commission to conserve the species in the state. Anticipating the re-establishment of wolves in Oregon from the growing Idaho population, the Commission directed the development of a wolf conservation and management plan to meet the requirements of both the Oregon ESA and the Oregon Wildlife Policy.[6]

As of this writing on February 11, 2005, the federal government manages gray wolves in Oregon as an "endangered" species under the federal Endangered Species Act. The federal laws establish the current minimum level of wolf protection.

The Wolf Conservation and Management Plan focuses on methods and procedures to protect wolves in the early stages of implementation so that the species can be delisted and a self-sustaining population persists. The plan was built to meet the five delisting criteria identified in state statutes and administrative rules:

- The species is not now (and is not likely in the foreseeable future to be) in danger of extinction in any significant portion of its range in Oregon or in danger of becoming endangered; and
- The species' natural reproductive potential is not in danger of failure due to limited population numbers, disease, predation, or other natural or human-related factors affecting its continued existence; and
- Most populations are not undergoing imminent or active deterioration of range or primary habitat; and
- Over-utilization of the species or its habitat for commercial, recreational, scientific, or educational purposes is not occurring or likely to occur; and
- Existing state or federal programs or regulations are adequate to protect the species and its habitat.

The 109-page plan plus 15 appendices describe measures the Oregon Department of Fish and Wildlife will take to conserve and manage the species. This includes actions that could be taken to protect livestock from wolf depredation and address human safety concerns. The following summarizes the primary components of the plan:

- Wolves that naturally disperse into Oregon will be conserved and managed under the plan. Wolves will **not** be captured outside of Oregon and released in the state.
- Wolves may be considered for statewide delisting once the population reaches four breeding pairs for three consecutive years in eastern Oregon.[7] Four breeding pairs are considered the minimum conservation population objective, also described as Phase 1. The plan calls for managing wolves in western Oregon as if the species remains listed until the western Oregon wolf population reaches four breeding pairs. This means, for example, that a landowner would be required to obtain a permit to address depredation problems using injurious harassment.

[6] ORS 496.012 states in relevant part: "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."

[7] The boundary between east and west wolf management zones is defined by U.S. Highway 97 from the Columbia River to the junction of U.S. Highway 20, southeast on U.S. Highway 20 to the junction with U.S. Highway 395, and south on U.S. Highway 395 to the California border.

- While the wolf remains listed as a state endangered species the following will be allowed:
  - Wolves may be harassed (e.g. shouting, firing a shot in the air) to distract a wolf from a livestock operation or area of human activity.
  - Harassment that causes injury to a wolf (e.g., rubber bullets or bean bag projectiles) may be employed to prevent depredation, but only with a permit.
  - Wolves may be relocated to resolve an immediate localized problem from an area of human activity (e.g., wolf inadvertently caught in a trap) to the nearest wilderness area. Relocation will be done by ODFW or Wildlife Services personnel.
  - Livestock producers who witness a wolf 'in the act' of attacking livestock on private land may kill the wolf. On public land, such an action would require a permit. Implementation of this component of the plan requires legislative action to amend the wildlife damage statutes.
  - Wolves involved in chronic depredation may be killed by ODFW or Wildlife Services personnel. However, non lethal methods will be emphasized and employed first in appropriate circumstances.
- Once the wolf is delisted, more options are available to address wolf-livestock conflict. While there are five to seven breeding pairs, landowners may kill a wolf involved in chronic depredation with a permit. Five to seven breeding pairs is considered the management population objective, or Phase 2.
- Under Phase 3 (seven breeding pairs), wolves caught in the act of killing livestock on public or private land may be killed without a permit. In addition, a limited controlled hunt could be allowed to decrease chronic depredation or reduce pressure on wild ungulate populations.
- The plan calls on the Legislature to amend the wildlife laws to classify the wolf as a "special status mammal" within the definition of game mammal. This designation would provide protection for the wolf under current wildlife laws and would give the Commission management authority following delisting. Any proposed change in legal status requires legislative action.
- The plan calls for establishing a state-run, wolf-related compensation program for confirmed and probable losses of livestock and working or hunting dogs due to wolf predation. Any compensation package requires legislative action.
- The plan provides wildlife managers with adaptive management strategies to address wolf predation problems on wild ungulates if confirmed wolf predation leads to declines in localized herds.
- In the unlikely event that a person is attacked by a wolf, the plan describes the circumstances under which Oregon's criminal code and federal ESA would allow harassing, harming or killing of wolves where necessary to avoid imminent, grave injury. Such an incident must be reported to law enforcement officials.
- A strong information and education program is proposed to ensure anyone with an interest in wolves is able to learn more about the species and stay informed about wildlife management activities.
- Several research projects are identified as necessary for future success of long-term wolf conservation and management. Monitoring and radio-collaring wolves are listed as critical components of the plan both for conservation and communication with Oregonians.
- An economic analysis provides estimates of costs and benefits associated with wolves in Oregon and wolf conservation and management.
- Finally, the plan requires annual reporting to the Commission on program implementation.

WOLF ADVISORY COMMITTEE LETTER TO THE FISH AND WILDLIFE COMMISSION

To the citizens of Oregon:

The following Wolf Conservation and Management Plan was drafted by Oregon Department of Fish and Wildlife (ODFW) staff and revised by 14 people from throughout the state, representing all sides of the issue. It is the result of many hours of hard work and personal sacrifice. These individuals developed this plan by investigating every conceivable aspect of living with wolves in Oregon that was presented to them by the citizens and scientists who took the time to make their ideas available. The group considered conflicting state and federal laws, scientific data, and human opinion.

We agree that the following draft plan represents a reasonable solution for wolf conservation and management in Oregon. It is intended to provide a credible conservation solution based on what is known, and on what is legal. There are some aspects of this plan that may prove not to work as expected. We have made every effort to anticipate where this may create hardship, conflict or disappointment among the citizens of Oregon, and to mitigate those issues with realistic, fair and flexible measures. This plan will be reviewed on an ongoing basis by ODFW staff to revisit issues and allow for changes in the future.

Wolves and humans have shared the landscape for thousands of years. During that time, wolves have been regarded by humans as symbols both of reverence and of evil. Writing any plan regarding wolves, under any set of circumstances or laws, will never erase the real or perceived conflicts that may exist between wolves and humans. We propose that this conservation and management plan will conserve the wolf in Oregon while minimizing human conflict.

- Brett Brownscombe, Hells Canyon Preservation Council, representing Range/Forest Land Conservationist category
- Joe Colver, Trapper, representing Trapper category
- Bill Gawlowski, Silverton Together Mentor Coordinator, representing Public at Large category
- Ken Hall, Confederated Tribes of the Umatilla Reservation, representing Tribal category
- Clint Krebs, Livestock Producer, representing Rural Oregon Resident category
- Robert Lund, Retired Oregon State Police Officer, representing Public at Large category
- Bret Michalski, Central Oregon Community College, representing Educator category
- Hans D. Radtke, Economist, representing Economist category
- Robert Riggs, Boise Cascade Corp., representing Wildlife Biologist/Researcher category
- Ivan Sanderson, Oregon Hunters Association, representing Hunter category
- Amaroq Weiss, Defenders of Wildlife, representing Wolf Conservationist category
- Kurt Wiedenmann, Wallowa-Whitman National Forest, representing Public Land Manager category

Two of the 14 committee members did not support this plan, but chose the option to submit minority reports to the Oregon Fish and Wildlife Commission.

- Sharon Beck, Oregon Cattlemen's Association, representing Livestock Producer category
- Ben Boswell, Wallowa County Commissioner, representing Eastern Oregon County Commissioner category

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INTRODUCTION

Following an absence of nearly 60 years, a lone gray wolf entered Oregon in 1999. Wolf B-45, a radio-collared female from the Idaho experimental population, was one of three wolves documented in the state during the period January 1999 - October 2000. Wolf B-45, arguably Oregon's most famous wolf, eventually was captured by the United States Fish and Wildlife Service (USFWS) in March 1999 near the Middle Fork of the John Day River and returned to Idaho. The other two wolves were found dead in Oregon. In May 2000 a radio-collared male wolf from Idaho was struck by a vehicle on Interstate 84 south of Baker City, and in October 2000 an uncollared male wolf was found shot between Ukiah and Pendleton. Through genetic analysis the uncollared wolf was determined to originate from the Idaho experimental population.

The arrival of wolves sparked intense interest throughout the state as Oregonians debated the possibility of wolves dispersing into Oregon from Idaho and establishing a permanent population. Views ranged from concern about the effects of wolves on livestock and native ungulates to support for the return of a native species. The Oregon Cattlemen's Association (OCA) in 2002 petitioned the Oregon Fish and Wildlife Commission (hereafter Commission) to have the wolf delisted. The same year, conservation groups filed a petition that the Fish and Wildlife Commission to adopt certain specific conservation measures for the wolf. Both the petitions were rejected by the Commission, OCA's because it lacked certain scientific information required by law and the other because state law does not require the requested conservation measures for species listed before 1995.

The dispersal of wolves is expected as a result of the re-establishment of wolf populations in the states of Montana, Wyoming and Idaho through the federal wolf recovery program. As wolves in these states continue to increase in numbers and expand their range, wolf biologists predict they will disperse into Oregon from Idaho and establish breeding populations. During the time this plan was drafted, biologists could not confirm the presence of wolves in Oregon. Historically, however, wolves were found throughout most of the state.

Upon learning of the wolf's arrival in the state, the Commission initiated a public involvement process in 2002 to become informed about wolves and prepare for the arrival of this controversial species. At the conclusion of the review process in 2003, the Commission agreed that development of a state wolf conservation and management plan was necessary to address the arrival of wolves, to provide livestock owners with tools to deal with expected depredation, and to fulfill the conservation mandate imposed by the Oregon Endangered Species Act (ESA). The Commission appointed 14 members to a Wolf Advisory Committee (hereafter Committee) and tasked them with developing a recommended plan. The Committee began working in November 2003 and completed an initial draft for review by the Commission in October 2004. Through a public rulemaking process that extended from November 1, 2004, through February 11, 2005, the Commission considered a "rulemaking package" that consisted of the draft Oregon Wolf Conservation and Management Plan and associated technical rules. On February 11, the Commission adopted this plan and associated rules[8].

[8] As with its other fish and wildlife management plans, the Commission adopted this Wolf Conservation and Management Plan into Oregon Administrative Rules (OAR) by reference. (See OAR 635-110-0000). It also adopted certain associated technical rules that implement (in enforceable terms) the portion of the Plan which regulates

The goal of the Wolf Conservation and Management Plan is to:

ensure the conservation of gray wolves as required by Oregon law while protecting the social and economic interests of all Oregonians.

To meet this goal, the plan includes such tasks as identifying and managing toward population objectives, engaging in public outreach and education, developing a response strategy for damage and a stable depredation compensation program, and conducting ongoing monitoring and research.

In developing their recommended plan, the Committee sought a product that is achievable, realistic, fair, flexible, cost-effective, defensible, sustainable and fundable, and which also engages the public and provides incentives for achieving wolf conservation goals. The plan calls for changes in statutes and administrative rules. It applies to all lands in Oregon with respect to the take provisions, except potentially those lands of Indian Nations which are identified as reservation lands and are managed under sovereign tribal authority. The plan does not intend to require private landowners to take action to protect the species or to impose additional requirements or restrictions on the use of private land.

This plan was developed prior to wolves becoming established in Oregon and as such, answers to many important questions were unknown. The developers of the plan did not know unequivocally what habitat wolves would choose, how they would behave or what impacts they would have upon arrival in Oregon. Significant changes to the landscape since the extirpation of wolves make it difficult to use historical information to predict which areas are most suitable for them to inhabit today. Furthermore, information regarding wolf habitat and prey in other states has limited applicability to Oregon due to each state's own unique landscape. For example, Wilderness Areas are relatively small when compared with Idaho and open road densities on public lands are considered high. Livestock grazing is common across Oregon on public and private lands. The developers of this plan did adapt information from states such as Idaho and Montana and used that information as a general guide.

Successful management of wolves will require that the parties responsible for implementing this plan are able to effectively and efficiently apply adaptive management principles. There are several aspects to the plan that the developers believe will be critical to its success.

1) Wolves need to be managed in concert with other species and resource plans. The way wolves are managed will affect and be affected by other species, particularly other top carnivores and primary prey. Each of these species (e.g., cougar, elk and deer) has its own management plans. However, because they are so interconnected, none of these species can be managed in isolation.
2) An active information and education program must offer guidance and information about rules and regulations related to the plan.
3) Sufficient funds must be available to implement the conservation and management plan.

harassment and take of wolves. (See OAR 635-110-0000 through 635-110-0030 and 635-043-0096.) In the event of conflict between this plan and the associated technical rules, the technical rules govern.

Individuals representing many interests were involved in crafting this plan by sharing their needs and balancing their interests with the interests of others. Therefore, this plan will serve the broad interests of Oregonians only if implemented in its entirety.

Since human tolerance has been and remains the primary limiting factor for wolf survival, building tolerance for this species will require acceptance of the plan's approach to addressing wolf conservation and human conflicts. Non-lethal and lethal control activities actually may promote the long-term survival of the wolf by enhancing tolerance, and providing redress to citizens legitimately impacted by the wolf is essential. This also may mean recognizing the wolf as a native species with legal, social and biological value in Oregon, and taking actions to minimize conflict to achieve conservation goals. Effective enforcement of illegal actions taken to harm the wolf also is a key part of ensuring conservation.

This plan calls for and depends upon certain legislative actions (amendment of existing statutes and enactment of new statutes). At its first regularly scheduled meeting after adjournment of the 2005 Legislative Assembly sine die, the Commission will consider the outcome of the legislative session and whether this plan needs to be repealed or amended. If the Commission decides that repeal or amendment is necessary, it will enter rulemaking accordingly.

I. BACKGROUND

This chapter describes the context for development of the conservation and management plan. Contents include the history of wolves in Oregon, their biology and ecology, the legal situation regarding wolves in Oregon, and the process conducted by the Commission to develop the plan.

A. History of Wolves in Oregon

The history of wolves in Oregon mirrors a familiar scenario played out across the western United States in the first half of the 20th century. Historical accounts point to a relatively wide distribution of wolves, although their abundance varied from place to place. As western immigration continued and wild prey populations were reduced, stock raisers found it necessary to protect their stock from carnivores. They eventually, with the assistance of governments, extirpated wolves entirely.

Early History

Evidence that wolves existed in Oregon can be documented through various means including archeological records, Native American accounts, journals and diaries of early explorers and pioneers, museum specimens, wolf bounty records, and various books and reports. The following written accounts[9] offer some interesting observations:

- "…(wolves) are exceedingly numerous in Oregon and Washington Territories, from the Cascades to the Rocky Mountain Divide…."
  -George Suckley, expedition Naturalist, 1853-55.
- "…the wolves are very numerous in this country and exceedingly troublesome."
  -Mr. Drayton, Wilkes Expedition, vicinity of Fort Walla Walla, 1841.
- Lewis and Clark noted that seven elk killed by expedition hunters were "…untouched by the wolves, of which indeed there are but a few in this country…."
  -Lewis and Clark, winter of 1805-06, Fort Clatsop area, near the mouth of the Columbia River.

Additional wolf location information was reported by biologist Vernon Bailey (1936):

- "…in 1834 Wyeth reported several (wolves) killed along the Deschutes River."
- "…in 1835 Townsend secured the type of this subspecies near Fort Vancouver just north of the Columbia River."
- "...in 1854 Suckley collected (wolf) specimens near The Dalles."
- "...in 1897 Captain Applegate reported them (wolves) formerly common, but at that time extremely rare in the southern Cascade region."
- "…Jewett reports one large male wolf taken…August 20, 1930, near Balm Mountain on the Umpqua National Forest."
- "...another old male wolf taken (1930)…on the shore of Crescent Lake in Klamath County."
- "...two other wolves were killed in Douglas County and one in Lane County during 1930, and one near McKenzie Bridge in Lane County in 1931."

[9] Excerpted from Young and Goldman (1944) and Young (1946).

Ironically, wolves played a pivotal role in the formation of the early Oregon territorial government. Young and Goldman (1944) wrote "…efforts to destroy the wolf in this country were instrumental in formation of the Oregon Territory. The "wolf meetings" of Oregon, officially the formal sessions of the Oregon Wolf Organization, drew pioneer leaders of the northwest together as did no other objective." With wolves and wolf eradication as the drawing card, meeting organizers were successful in assembling significant numbers of settlers to discuss formation of a civil government in the region.

Wolf bounty records provide some indirect data on the distribution and abundance of wolves, although amounts offered by the state and counties may have influenced effort. The first wolf bounty in Oregon was established in 1843 at an Oregon Wolf Association meeting in the Willamette Valley. The bounty for a large wolf was set at $3 and was paid from "subscriptions" to the association.

The Oregon State Game Commission (OSGC) began offering a $20 wolf bounty in 1913 in addition to the regular $5 paid by the state at the time. During the period of October 1, 1913 through May 10, 1914, payments were made on 30 wolves in Oregon: Douglas County, 10; Crook County, 6; Clackamas County, 6; Linn County, 6; and Lane County, 1.[10]

During the period 1913-1946, 393 wolves were presented for payment in Oregon (Olterman and Verts 1972). Many of these wolves were taken prior to the mid -1930s and no more than two wolves per year were bountied after 1937. The last record of a wolf submitted for bounty in Oregon was in 1946 for an animal killed in the Umpqua National Forest in southwest Oregon.[11]

Bailey (1936) authored the first major work on Oregon mammals, titled *The Mammals and Life Zones of Oregon.* He described wolves as present in most timbered areas of Oregon. He considered wolves to be the most common in the western portion of Oregon, from the western foothills of the Cascade Range to the Coast. This observation may have been influenced by the distribution of the human population rather than directly related to abundance of wolves. Information regarding wolves from other locations in Oregon where good habitat existed may not have been available.

Olterman and Verts (1972), in a special report on endangered mammals of Oregon, sought to determine the distribution and abundance of native Oregon mammals which were rare, endangered or recently extirpated from the state. They located 80 wolf specimens in various museums and private collections that were collected from Oregon. They stated that "…most specimens were collected from the western slope of the Cascade Mountains…. This distribution is not representative of the range originally occupied by the wolf in the state because the species probably was eliminated from some areas before 1913 when specimens were first preserved." At the time of their report, they believed the wolf to be extirpated from the state and the absence of populations in neighboring states to preclude natural immigration or re-establishment.

A report compiled by Marshall (1996) stated no authentic gray wolf records were known between 1946 and 1974. During the period 1974-1980, four records of wolves were noted. He considered at least two of these records to be tame wolves or wolf-dog hybrids.

[10] From the Oregon Sportsman 2 (6):19, 1914, as quoted in Bailey 1936.
[11] OSGC Annual Game Report 1947.

Human attitudes toward wolves in North American have undergone significant changes during the second half of the 20th century. Strong support for wolf conservation has been documented throughout the United States (Mech and Boitani 2003). Cultural influences such as popular literature, the work of researchers, and the voice of conservationists such as Aldo Leopold have provided information and support for conservation. A 1999 poll of Oregonians showed a 70 percent support rate for the return of wolves to the state.[12] These changes in wildlife values are embodied in the federal Endangered Species Act (ESA) of 1973 and the Oregon ESA enacted in 1979. However, values and attitudes in the United States are complex and not homogenous. They depend on area of residence (rural-urban), occupation (agriculture/ natural resource-technical/service), and many other factors.

Native American History[13]

Wolves and native tribes coexisted for untold generations, not competing with one another, but complementing one another and adapting to an ever-changing seasonal system of events.

As with other natural resources, tribal people learned the value of the wolves and revered them to a spiritual level. In tribal legends passed down through the generations, wolf, coyote and fox are related to one another and to the tribal peoples. Individual experiences with the wolf more often than not resulted in life-changing lessons. These experiences strengthened the connection between all surrounding events occurring within the natural world and helped maintain an order that everyone understood and respected. This order was circular, involving everyone and everything, with no one part being of greater importance than another.

Following the influence of early Euro-American values in the late 1700s and early 1800s toward natural resources, the order began to change. As one part of the order after another began to fall out of place, it disrupted the whole. Soon there was an imbalance, causing the values and relationships to one another to be weakened. The tribal people as well as others suffer today because of this disorder. To be able to maintain and re-learn the value of one another, the tribal people believe the wolf should have its place without limits or restrictions so that future generations may have a complete circle once again.

Euro-American History

As the first European immigrants arrived in North America they brought with them an aversion for the wolf. This prejudice was founded either by direct contact with wolves in their homelands or was ingrained by their culture or religion. In fact, by the time immigrants departed their homelands, the wolf had been eradicated from some of those areas due to suspicion and dislike for the animal. Once in North America, the immigrants found wolves to be a threat to their domesticated animals. Domesticated animals were a necessary part of Euro-American life, not only to provide the food and the fiber needed for sustenance, but to provide transportation and the energy needed for tilling

[12] Poll by Davis & Hibbitts, April 1999. The poll was commissioned by the Oregon Natural Desert Association (ONDA), and paid for by ONDA, Defenders of Wildlife, Oregon Natural Resources Council, and Predator Defense Institute. The poll consisted of 500 five-minute phone interviews with individuals randomly selected from statewide voter registration. Accuracy estimate is +/- 5 percent.

[13] This section provided by WAC member Ken Hall, member of the Confederated Tribes of the Umatilla Indian Reservation.

the land. The ability of the wolf to kill the domesticated animals served to create a competition between Euro-Americans and the wolf.

Wolf persecution was intense in Europe to the point that the last wolf was killed on the British Isles in the early sixteenth century under Henry VII. In Scotland, despite intense efforts to kill wolves, the immense Scottish forests offered safe retreats. Scotland's final solution was to burn the forests. At a time where wood was a major fuel source, this event demonstrates the severity of the extermination effort (Boitani 2003).

Folklore of the time was very much a part of propagating the Euro-American cultural attitudes about wolves. "Little Red Riding Hood" and the "Three Little Pigs" were intended to be symbolic or metaphorical, but they had a profound effect on how wolves were viewed (ibid.).

"The Pilgrim Fathers arrived with all the prejudices, beliefs and devices that had been used to eradicate the wolf in their homelands and the war against the wolf in North America began in Jamestown, Virginia, when the first domesticated animals arrived in 1609. Plymouth Colony enacted a wolf bounty in 1630 and bounties were soon established in all the other settlements along the eastern seaboard. By 1700, the wolf had disappeared from New England (ibid.)."

Although the threats to human safety were low, incidents involving attacks on humans furthered the belief in Euro-American culture that the wolves must be exterminated. Lewis and Clark's journals report that on August 8, 1806, Sergeant Nathaniel Pryor had his hand bitten through by a wolf while he slept (Chuinard 1998). The combination of prejudices, religious beliefs, folklore, the need to protect animals which had been domesticated for the benefit of man, and actual human safety concerns led to a continuation of the extermination policy started by the Pilgrims on the eastern seaboard as the Euro-American population expanded westward.

As the western migration began, wolves were systematically killed by the expanding human population. "The removal of the bison from the Great Plains may have fostered an increase in wolf population because of the large numbers of bison carcasses left by hunters.…The removal of the bison allowed for the expansion of domesticated animals and for the expansion of cropping, into areas of North America with wolf populations which were unnaturally inflated, at a time when the wolves' natural prey base was exterminated" (Mech and Boitani 2003). This served to create a level of predation on domesticated animals that was unacceptable to citizens throughout the country. In 1915 the responsibility of predator control became a responsibility of the U.S. government with the establishment of the Division of Predator and Rodent Control. Official hunters were paid to kill the last wolves. Stories about the killing of the last remaining wolves were widely published and they had the effect of strengthening the rationale regarding the need for extermination.

Interestingly, the dislike of wolves was a factor in organizing the Euro-Americans. Meetings that were held to discuss the need for extermination of wolves were in many cases the starting points for many of the state and local governments that were formed in the western expansion of North America.

In his chapter on "Wolf Conservation and Recovery" in *Wolves, Behavior, Ecology, and Conservation* (2003), Luigi Boitani writes: By 1930, the wolf had disappeared from almost all the forty-eight contiguous states, including Yellowstone National Park (Jones 2002). The last wolves were killed in Arkansas in 1928, in Oregon in 1946 and in Colorado and Wyoming in 1943 (Busch 1995). Only the

wolves of the Lake Superior region survived a bit longer: the last wolves in Wisconsin were slain between 1950 and 1970, although bounties in Wisconsin and Michigan were repealed in 1956 and 1960 respectively (Thile 1993). A few wolves may have remained in Michigan after 1970 (Henderson et al. 1975). Several hundred wolves did survive in northern Minnesota.

Wolves were granted protection from the long-held Euro-American pursuit to exterminate them by passage of the federal ESA in 1973. As a result of this legislation, the wolf was re-introduced into the contiguous 48 states by the reintroduction of Canadian wolves into central Idaho and Yellowstone National Park. These actions indicate that the cultural beliefs of Euro-Americans may be softening in regard to the historical position of extermination.

B. Biology and Ecology

A discussion on the biology and ecology of wolves includes physical characteristics, pack size, reproduction, food habits, movements and territories, dispersal, mortality, genetics, and population growth. Significant numbers of books and papers have been written on these subjects. Efforts to condense these for the western United States have been undertaken during development of other state management plans. Appendix B, Wolf Biology and Ecology, includes a description of this topic that was adapted from the Montana Gray Wolf Conservation and Management Plan (2002). Appendix B also includes citations of books and papers on recent research. Much of the research specific to the western United States has been conducted in the Greater Yellowstone Ecosystem. Because portions of this ecosystem contain some non-hunted ungulate populations and have no livestock grazing, the results may not be directly transferable to Oregon in all aspects.

C. Legal Status

Overview

In Oregon, wolves are subject to both the federal ESA and the Oregon Endangered Species Act (Oregon ESA). These laws are independent but somewhat parallel. As the federal government eases protections for the wolf under the federal ESA, the regulatory spotlight may shift to the Oregon ESA as well as to underlying state wildlife statutes and regulations. But so long as the wolf remains federally listed, it is crucial to consult both federal and state law to understand the protections that pertain to wolves in Oregon.

Following a series of "Wolf Information Group" stakeholder meetings, initiated in 1999 and held quarterly by United States Fish and Wildlife Service (USFWS), in January 2004 the USFWS developed an "Interim Response Strategy for Reporting Gray Wolf Activity in Oregon" (see Appendix C). The purpose of the document was to prepare for the potential migration of wolves from the Idaho population into Oregon. Within the document a common understanding of roles and responsibilities was discussed to ensure close coordination of agencies' actions to conserve wolves. The strategies were not intended to direct recovery of wolves in Oregon, but to ensure actions by agencies were consistent with the applicable state and federal laws. Now that the Commission has adopted an Oregon Wolf Conservation and Management Plan, this plan is the primary document governing the State of Oregon's wolf conservation and management actions.

This plan is based on an analysis of the federal and state laws that govern the management of the wolf. The federal ESA sets the minimum level for wolf management while the wolf remains listed federally. Oregon's ESA also provides the fundamental legal authority and direction for this plan and is implemented under the state's legal authority to manage wildlife within the boundaries of Oregon. Local governments express the concerns of their citizens. The Wolf Conservation and Management Plan is a statewide document that integrates state policy across all Oregon to provide a consistent approach for wolf management.

Legal Status – Federal

Wolves gained endangered status in 1974 with their listing under the federal ESA. In 1987, USFWS completed the Northern Rocky Mountain Wolf Recovery Plan. Four years later Congress initiated an administrative process to reintroduce wolves into Yellowstone National Park and central Idaho. Extensive public input showed general support for wolf recovery, and the U.S. Secretary of Interior approved reintroduction. In 1995 and 1996, 66 wolves were captured in Alberta and British Columbia, Canada. Of those, 35 were released in central Idaho and 31 were released into Yellowstone National Park.

Wolves were protected as a "non-essential experimental population" under the federal ESA within a specified zone that included portions of Idaho, Wyoming and Montana. The original 66 wolves had increased to an estimated population of 761 wolves in the three-state area by the end of 2003.

In April 2003, the USFWS established the Western Distinct Population Segment (DPS) of gray wolves and down-listed their federal ESA classification from "endangered" to "threatened" because of their recovery progress. At the same time, special regulations under section 4(d) of the ESA were adopted. These rules provided livestock producers more options to deal with problem wolves than are available under the endangered status. The 4(d) rules (since vacated by a federal court decision) were very specific and included numerous conditions. As a condition of de-listing the wolf in the Western DPS, the USFWS required state management plans for Idaho, Montana, and Wyoming to ensure the conservation of the species into the future. No such state plan was required of Oregon. After considering the reality and impacts of wolves moving into the State as well as its legal obligations under the Oregon ESA, Oregon decided to craft its own management plan.

Any gray wolves found in Oregon are under the primary jurisdiction of the USFWS and are federally listed as endangered under the federal ESA of 1973. When the 4(d) rules went into effect in 2003 the USFWS approached the Oregon Department of Fish and Wildlife (ODFW) and initiated discussions regarding procedures and processes for responding to wolf-related issues in Oregon. The Interim Response Strategy was developed by the USFWS to address Oregon's situation. The document emphasizes close coordination between USFWS and ODFW, and outlined procedures for dealing with wolves while wolves remained federally listed and Oregon lacked an adopted Wolf Conservation and Management Plan. As of February 2005, this strategy has not needed to be implemented other than to track unconfirmed reports of wolf activity. Because the federal ESA preempts any less-protective state regulations, the federal ESA sets the minimum level for wolf protection so long as the wolf remains federally listed. Once federally de-listed, the Oregon ESA will apply until wolves are de-listed by the Commission.

Legal Status – State of Oregon

Wolves have been classified as endangered in Oregon under the Oregon ESA[14] since the Oregon ESA was established by the Oregon Legislature in 1987, and continue to be listed as endangered at present. When the Oregon Legislature enacted the Oregon ESA in 1987, it grandfathered onto the Oregon list all species native to Oregon that were then listed under the Federal ESA.[15] State law generally does not allow "take" (i.e., killing or obtaining possession or control according to the State of Oregon definition[16]) of wolves.

The Oregon ESA requires the conservation of listed species, and defines conservation as "the use of methods and procedures necessary to bring a species to the point at which the measures provided under ORS 496.171-496.182 (the Oregon ESA) no longer are necessary. Such methods and procedures include, but are not limited to, activities associated with scientific resource management such as research, census taking, law enforcement, habitat acquisition and maintenance, propagation and transplantation" ORS 496.171(1).[17] Thus, so long as the wolf remains listed under the Oregon ESA, the Commission is required to conserve the species in Oregon, according to the Oregon Attorney General (See Appendix D). The law provides an array of management tools from which the Commission may choose when determining how to conserve the species. Those tools include some which may permit regulated take of wolves for particular purposes, if the Commission determines such take is consistent with conservation of the species in Oregon. In other words, successful conservation should lead to delisting and strive to ensure that future "relisting" is unnecessary. Within the context of the conservation mandate, consistent with the federal ESA and to the extent allowed by wolf biology, the Commission has authority under the state ESA and other statutes to develop a conservation and management plan for wolves in Oregon that eventually will lead to delisting.

While much of the focus related to wolves has focused on the state and federal ESA, eventually it will be Oregon's wildlife policy that will guide long-term management after state delisting. The wildlife policy includes a number of co-equal management goals, one of which is "…that wildlife shall be managed to prevent the serious depletion of any indigenous species…" (ORS 496.012).

County Actions

Beginning in 1999, upon learning of the reintroduction of wolves in Idaho, local governments in northeast Oregon took actions to respond to potential wolf migration into Oregon. Wallowa County convened a Wolf Summit in Enterprise in February of 2000. This meeting brought parties of interest together to share information about wolf presence in Oregon.

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[14] The Oregon ESA appears at Oregon Revised Statutes (ORS) 496.171-192. The prohibition on taking state-listed species is at ORS 498.026(1).

[15] ORS 496.004(6) and (17); 171(2); and .176.(1)(a); and OAR 635-100-0100(8).

[16] ORS 496.004(16). Note that, unlike the federal ESA definition of "take," the Oregon definition does not extend to harming and harassing.

[17] Any such habitat protections would only be obligated on public land, however, since "nothing in (the Oregon ESA) is intended, by itself, to require an owner of any private land to take action to protect a threatened species or an endangered species, or to impose additional requirements or restrictions on the use of private land." ORS 496.192(1). It is important to note that certain conservation and management mechanisms under the Oregon ESA would apply only to state-owned lands or the authorities of state agencies. Others, such as the "take" prohibition, apply anywhere in Oregon ORS 498.026(1).

Several counties passed resolutions calling for wolves to be returned to Idaho by the USFWS. Supporting resolutions also were passed by the state and national county associations. These resolutions call for consultation with local officials before wolves can be permitted to remain in their jurisdiction. Copies of these resolutions can be obtained by contacting the Association of Oregon Counties.

D. Wolf Plan Development

The arrival of three wolves from Idaho into Oregon in 1999 and 2000 spurred a series of events which eventually led the Commission to direct ODFW staff to organize four informational workshops. These workshops, held in 2002, allowed the Commission to examine wolf issues and discuss wolf biology and ecology. Twenty-nine speakers from various states including Oregon addressed the Commission regarding the political, social, economic and biological aspects of wolf management. Members of the public were provided the opportunity to observe and listen to the proceedings but did not interact with the presenters or Commissioners.

The Commission learned from several wolf experts that wolves would continue to disperse into Oregon and eventually establish a permanent population.[18] It was clear from the testimony that wolves would be just as controversial in Oregon as in other states with wolf populations. Concern for the welfare of livestock, big game herds, pets and humans were on the minds of Commissioners and others in attendance.

Following the workshops, the Commission initiated a public process that involved 15 town hall meetings held throughout the state in late 2002 and early 2003. The majority of 2,639 oral statements and questions and 1,502 written comments received during the three-month process fell into 12 "themes" when reviewed and analyzed by ODFW staff:

1. Human and pet safety should/should not be a concern
2. Do/do not write a management plan
3. Educate the public about wolves and wolf issues
4. ESA listing questions and comments
5. Improved ecosystem health
6. Compensation for livestock losses
7. Cost of wolf management
8. Depredation of wolves on livestock
9. Suitable wolf habitat: there is, there is not, is there?
10. Revenue loss to agency and rural communities
11. Predation on wildlife (mostly deer/elk) and/or the loss of hunting opportunities
12. Yes to wolves, no to wolves, with no other concern or recommendation provided

It was stated and recognized at the March 2003 Commission meeting that there is a large constituency for delisting the wolf and keeping the species out of Oregon. The Commission was also advised of a 1999 poll showing 70 percent approval for wolves.[19] By the March 2003 meeting, the Commission decided to initiate a process to develop an Oregon Wolf Conservation and Management Plan based on: science-based information from invited wolf biologists at the

[18] List of wolf experts: Ed Bangs, Curt Mack, and Carter Niemeyer.
[19] Poll by Davis & Hibbitts, April 1999.

Commission sponsored workshops; a review of the oral and written comments received from the public during the wolf town hall meetings; a summary of other states' wolf management plans and how those plans address the concerns and comments heard during Oregon's town hall process; information on strategies to provide livestock owners with flexibility to address wolf depredation; and a legal analysis of the Commission's wolf conservation requirements.

In April 2003, a planning process was approved which included the formation of the Wolf Advisory Committee. At that time, the Commission adopted as a working goal for the Wolf Conservation and Management Plan: "to ensure the long-term survival and conservation of gray wolves as required by Oregon law while minimizing conflicts with humans, primary land uses and other Oregon wildlife." This goal was later modified by the Committee as follows: "to ensure the conservation of gray wolves as required by Oregon law while protecting the social and economic interests of all Oregonians."

The Commission also developed guiding principles to direct the work of the Committee and the planning process:

1. Commission provides direction to write a wolf management plan based on "conservation" of wolves, as required by state law.
2. Commission will select a "Wolf Advisory Committee" to advise the Commission on wolf issues and draft a wolf management plan.
3. Ideas from wolf management plans produced by other states will be considered.
4. The themes and concerns expressed by the public through town hall meetings and written comments must be considered and incorporated in the final plan.
5. Active re-introduction of wolves will not be considered. Natural dispersal of wolves from the Idaho population will be accepted.
6. The final plan will be consistent with the Oregon ESA (ORS 496.171-496.192) and the Oregon Wildlife Policy (ORS 496.012).
7. A final plan will strive for flexibility in managing wolf populations while providing needed protections for wolves.
8. A final plan will seek relief for livestock producers from expected wolf depredation.
9. The Committee and the final Wolf Conservation and Management Plan will maintain its focus on wolves and will not address public land grazing or other public land management issues.
10. A final plan will address impacts to prey populations, including deer and elk.

Finally, the Commission adopted a draft framework for the wolf conservation and management plan that incorporated components of other state wolf plans, Oregon's big game species management plans, and the concerns of Oregonians. This framework was not intended to suggest a course of action in advance of the advisory committee process, but to initially guide the Committee. In June 2003 the Commission appointed 14 members to the Committee after a public nomination process. During the course of plan development two Committee members were replaced due to other obligations which took precedence over their participation (see Appendix E for a list of Wolf Advisory Committee members). After their first meeting, the Committee members agreed upon a slightly revised framework and the Commission approved the revised version at their January 9, 2004, meeting.

The Committee met 10 times throughout the state, with the assistance of ODFW staff and an independent facilitation team, to develop a draft conservation and management plan for the Commission. The Committee also was assisted by a Wolf Technical Committee composed of wolf experts from many parts of the country. These experts acted as a resource for the Committee and ODFW as the plan was constructed, and several of them gave presentations at Committee meetings. A "Resource Roster" of technical experts can be found in Appendix F. In addition, the Committee was provided with resource materials from peer-reviewed literature and other state wolf management plans. Information provided to the Committee can be seen in Appendix G. The Committee members also shared articles, literature and information with one another throughout the planning process via e-mail, hard copy and conversation. A list of "Member Suggested Resources" can be found in Appendix H.

The Commission adopted the draft Plan in October 2004 and released it for a full public review process through rulemaking. During the mid-point of the public process, the WAC reconvened to assess the public comments received to that point and recommended several changes to the Commission (see Appendix I).

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II. WOLF CONSERVATION

There cannot be a single recipe for wolf conservation that can be applied in all ecological and social contexts. Rather, there are several diverse solutions depending on the needs of both humans and wolves at the local level.
-Mech and Boitani, 2003

This chapter focuses on methods and procedures that lead to conservation of wolves in Oregon. The Oregon ESA, under which the gray wolf is listed as endangered, requires the "conservation" of listed species, and defines "conservation" as:

> "…the use of methods and procedures necessary to bring a species to the point at which the measures provided under ORS 496.171 to 496.182 are no longer necessary. Such methods and procedures include, but are not limited to, activities associated with scientific resource management such as research, census taking, law enforcement, habitat acquisition and maintenance, habitat protection and restoration, propagation and transplantation." [20]

Before the wolf can be delisted under the Oregon ESA, conservation must be achieved. This definition, and the Commission's long-term goal for listed species, requires sufficient actions be taken to ensure that future protections under the Oregon ESA would not be required. In other words, successful conservation should lead to delisting and strive to ensure that future "relisting" is unnecessary.

The criteria for delisting come from the Oregon ESA and the Commission's rules. In essence, they require the Commission to make the following determinations for delisting to occur:

- The species is not now (and is not likely in the foreseeable future to be) in danger of extinction in any significant portion of its range in Oregon or in danger of becoming endangered; and
- The species' natural reproductive potential is not in danger of failure due to limited population numbers, disease, predation, or other natural or human-related factors affecting its continued existence; and
- Most populations are not undergoing imminent or active deterioration of range or primary habitat; and
- Over-utilization of the species or its habitat for commercial, recreational, scientific, or educational purposes is not occurring or likely to occur; and
- Existing state or federal programs or regulations are adequate to protect the species and its habitat.

These determinations must be based upon verifiable scientific information.[21]

Conservation Approach

A conservation approach for wolves was designed to satisfy delisting criteria while encouraging human tolerance for wolves and ensuring distribution of wolves across the Oregon landscape.

[20] ORS 496.171(1).
[21] ORS 496.176; OAR 635-100-0112 Removing Species from State List.

Conservation of the gray wolf will be achieved through an approach that establishes objectives for wolf distribution, population management, and monitoring. The objectives are as follows:

- Permit establishment of a naturally reproducing wolf population in suitable habitat[22] within Oregon, connected to a larger source population of wolves, which allows for expansion into other areas of the state.
- Promote social tolerance for wolves by effectively and responsibly addressing conflict with competing human values through the use of management measures consistent with long-term wolf conservation in all phases of wolf management status under this plan.
- Set separate population objectives for two regions of the state: east and west of a line defined by U.S. Highway 97, U.S. Highway 20, and U.S. Highway 395 (see Figure 1: Divide Between East and West Wolf Management Areas).
- Set a conservation population objective for eastern Oregon of four breeding pairs of wolves present for three consecutive years (a breeding pair is a pack of wolves with an adult male and an adult female with at least two pups surviving to the end of December (see page 27).
- Set a management population objective for eastern Oregon of seven breeding pairs of wolves present for three consecutive years.
- Protect wolves entering western Oregon, following delisting, under a management regime that replicates Oregon ESA protections.
- Set a conservation population objective for western Oregon of four breeding pairs of wolves present for three consecutive years.
- Set a management population objective for western Oregon of seven breeding pairs of wolves present for three consecutive years.
- Determine the status of the wolf population in Oregon through a comprehensive monitoring program.
- Develop and implement agreements with other agencies and/or organizations to help achieve wolf conservation.
- Re-classify the legal status of the gray wolf to "special-status mammal" within the "game mammal" category in ORS 496.004(9).

[22] Suitable habitat (e.g., high, medium, low suitability) is defined by factors including availability of natural prey, level of human occupation, level of livestock activity, and density of open roads. As habitat generalists, wolves are able to survive in many places. Therefore, unsuitable habitat likely will be defined by human tolerance. Without specific data or experience with wolves on the Oregon landscape, defining the range of habitat suitability must be necessarily vague at this point in time.

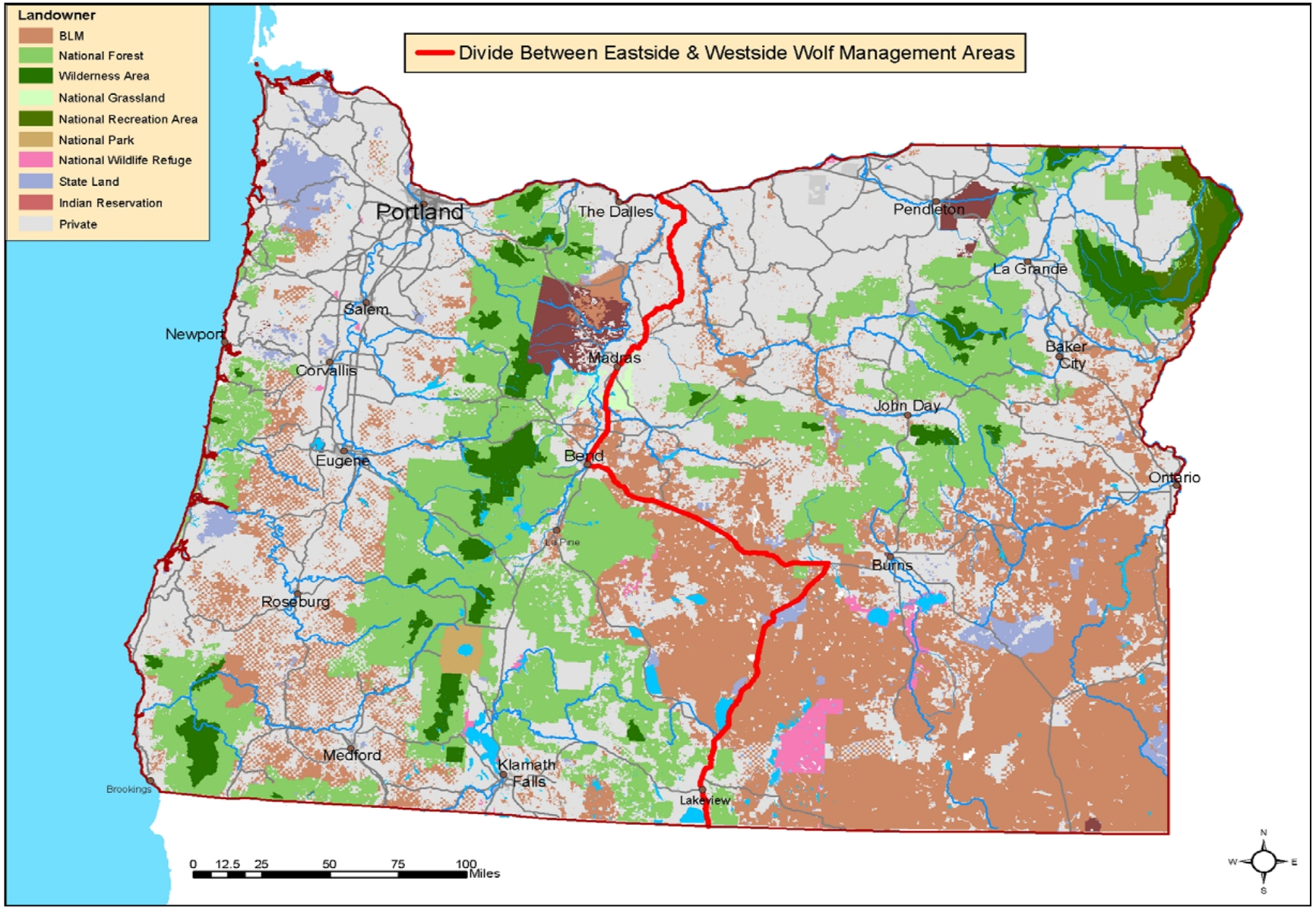

Figure 1. The boundary between east and west wolf management zones is defined by U.S. Highway 97 from the Columbia River to the junction of U.S. Highway 20, SE on U.S. Highway 20 to the junction with U.S. Highway 395, south on U.S. Highway 395 to the California border.

A. Wolf Distribution

Objectives

- Permit establishment of a naturally reproducing wolf population within Oregon connected to a larger source population of wolves, which allows for expansion into other areas of the state.
- Promote social tolerance for wolves by effectively and responsibly addressing conflict with competing human values through the use of management measures consistent with long-term wolf conservation in all phases of wolf management status under this plan.

Strategies

- Expect wolf populations to become established in eastern Oregon before wolves reach western Oregon.
- Allow wolves to establish packs in Oregon through dispersal from adjacent states and not through active reintroductions involving transport of wolves from outside the state.
- Establish two wolf conservation regions in Oregon to provide maximum flexibility in achieving wolf conservation goals for the state.
- Wolf distribution will not be restricted by management zones, property ownership boundaries, or other administrative designations, unless adaptive processes deem them necessary.
- Management actions will support wolf packs that occupy large, contiguous blocks of public land with minimal human activity and adequate prey base.
- Translocation of wolves within the state may be used where needed to achieve conservation objectives.

Historically, wolf distribution in Oregon was thought to include much of the state (see Chapter I). During the nearly 60 years that wolves have been absent from Oregon, humans have significantly altered the landscape throughout the state. Habitat once occupied by wolves has been significantly reduced by development and land conversion, and now exists in fragments rather than contiguous blocks. Road densities have increased dramatically and the human population has grown to more than three million people.

Wisdom et al. (2000) suggested four major challenges to wolf conservation within the Interior Columbia Basin: excessive mortality from humans, mortality related to roads, displacement from habitat by human activities, and population isolation. Humans have indeed changed the Oregon landscape to great extent during the past 150 years. Wolves are habitat generalists, and thus a wide range of Oregon ecosystems are theoretically capable of supporting wolves. In some areas, wolves are capable of occupying habitats that might be considered marginal based on human population densities and land management practices, and with few conflicts. Nevertheless, it will be difficult to predict the specific areas in the state wolves will occupy first, and also difficult to predict where it will be possible for the species to persist. The ability to persist will be determined largely by the degree of human tolerance for the species across the state's vast rural landscapes.

Continued wolf movement into Oregon from the Idaho population or other adjacent states is likely given the current population of wolves in the state of Idaho (an estimated 422 wolves in 34 reproductive packs at the end of 2004 [Mack and Holyan 2005]). The wolf population in Oregon will

grow as wolves from other states enter Oregon through natural dispersal. The natural dispersal method, adopted by the Commission as a guiding principle,[23] differs from wolf restoration efforts in the Rocky Mountain Recovery Area where wolves were captured elsewhere and released into secure and remote areas with abundant prey, no livestock and few humans (USFWS 1994).

The natural dispersal method provides an ongoing connection to a larger source population in Idaho. The Idaho population is expected to continue to supply new dispersing wolves to Oregon, which will diversify the gene pool and fill in home ranges that become vacant due to lethal control, natural mortality, unintended mortalities or westward dispersal. The natural dispersal method also is free of some of the costs and risks (financial, political and biological) that accompany active reintroduction. For example, wolves may not stay in the areas identified as suitable wolf habitat or could be subject to transplant- or capture-related injuries. In addition, natural dispersal eliminates the need to choose, in a public process, which areas of the state initially are occupied by wolves. This plan, rather than choosing specifically where wolves will go, merely intends that the wolf population in Oregon eventually occupy both the east and west side of the state.

Because wolves will begin to establish breeding pairs and/or packs through dispersal from the Idaho population, it is expected that wolves will become established in the eastern portion of Oregon prior to colonizing western Oregon. Establishing two wolf conservation regions in the state recognizes this situation and provides opportunities for active management of wolves in the eastern portion of the state following delisting while maintaining needed protections for wolves that enter western Oregon. To ensure connectivity to the Idaho population of wolves, delisting cannot occur in Oregon until four breeding pairs of wolves are present for three consecutive years in the eastern region.

Establishing conservation population objectives for both regions provides the needed protections to ensure establishment of wolves in both areas regardless of their status under the state ESA. It likely will take a number of years for wolves to disperse into western Oregon and establish breeding pairs through natural dispersal processes. Establishing separate wolf conservation regions in Oregon allows state delisting goals to be achieved in eastern Oregon while ensuring continued protections for wolves in western Oregon.

Based on the proximity of wolf packs to the Oregon border, the northeastern portion of the state likely will be the area initially occupied by wolves. As wolf packs develop in the Hells Canyon-Wallowa and Blue Mountains region, it is expected that wolves will continue to expand their range and eventually could reach historic habitat in the Cascade and Siskiyou mountains of central and southwestern Oregon. The timeframe for wolves to disperse into Oregon and establish a population is unknown. It could take one to two decades for eastern and western Oregon to reach management population objectives. Wolves could possibly occupy portions of the high desert region of southeastern Oregon if human tolerance is sufficient and prey is adequate. However, the rate of wolf dispersal into and throughout Oregon cannot be predicted. The ability of wolves to reach areas of habitat outside northeast Oregon is assumed but unproven, with the large expanse of private land in the center of the state being a potential obstacle. To help achieve conservation of wolves in Oregon, the state will be divided into two distinct regions defined by U.S. Highway 97, U.S. Highway 20, and U.S. Highway 395 (see Figure 1).

[23] See pages 12-13.

The habitat requirements of any wildlife species determine the species' potential or likely distribution on the landscape. Some species have very specific habitat requirements whereas others, like the gray wolf, are considered habitat generalists. Wolves can occupy a variety of habitats provided adequate prey is available and they are tolerated by humans. Absent conflicts with humans, much of Oregon could support wolves. Wolves in Idaho currently are found predominantly in landscapes that are relatively remote, lightly roaded, and contain substantial forest cover and abundant prey.[24] It is expected that wolves should be able to persist in similar habitats in Oregon. As habitat generalists, gray wolves will be able to establish packs where prey is sufficient and human tolerance is high. The specific habitat chosen will be determined by prey availability and human tolerance and probably will include forests and rangeland habitats. (See Figure 2: Primary Vegetation and Land Cover in Oregon)

Habitat such as wilderness areas or other areas away from livestock use offers the best chance for success provided prey is sufficient. Habitats in northeastern Oregon with few potential human conflicts include Eagle Cap, Wenaha-Tucannon, North Fork John Day and Strawberry Mountain wilderness areas, Hells Canyon National Recreation Area, designated roadless areas on public lands, and areas characterized by low density of open roads (See Figure 3: Forested, Roadless and Wilderness Areas in Oregon). Such areas would be characterized as highly suitable because human densities and activity levels are low and ungulate numbers are considered adequate to support wolves. Wolf presence in these areas will be supported through management actions.

[24] Curt Mack, Nez Perce Tribe wolf biologist, February 2004 presentation to the Oregon Wolf Advisory Committee.

Figure 2. Primary vegetation and land cover in Oregon (Source: National Land Cover Data 1992).

Because wolves have been absent for so many years in Oregon, it is difficult to predict where wolves will become established in the landscape. Figures 3 (Forested, Roadless and Wilderness Areas in Oregon) and 4 (Wilderness and Roadless Land in Eastern Oregon and Central Idaho) display forested public wilderness and roadless areas in Oregon and in eastern Idaho, areas that offer highly suitable habitat. A comparison of the two figures shows that Oregon lacks the vast acres of highly suitable habitat that are present in Idaho. As wolf activity is documented through discovery of individual wolves or wolf pack activity, efforts to radio-collar individual wolves will be initiated. By monitoring and observing wolves regularly, determinations regarding the habitats they select and occupy will be possible. Management decisions will be evaluated for reducing conflicts per available prey, competition with other carnivores and human activities.

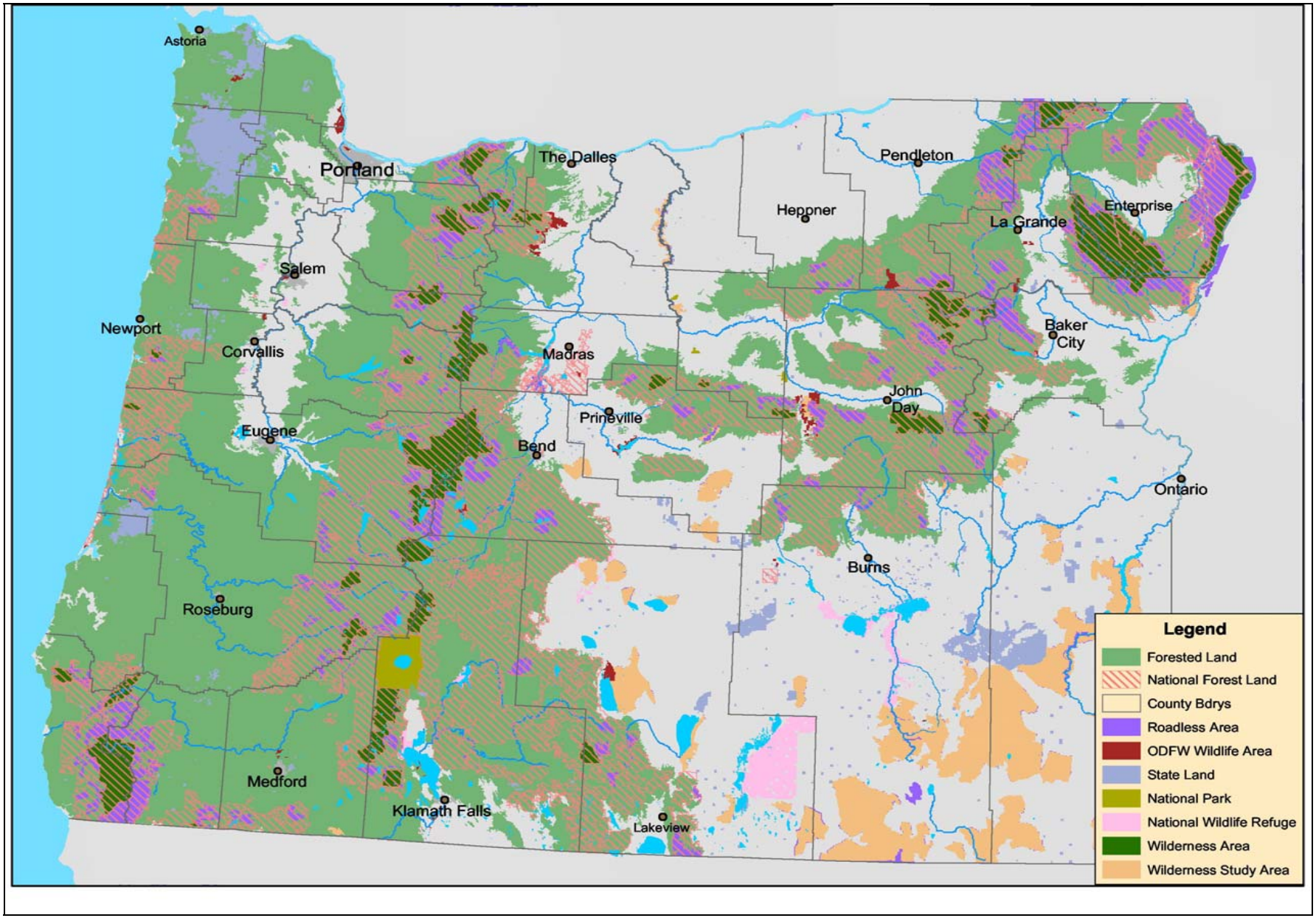

Figure 3. Forested land in Oregon, National Forest boundaries, and the location of wilderness, roadless, and wilderness study areas.

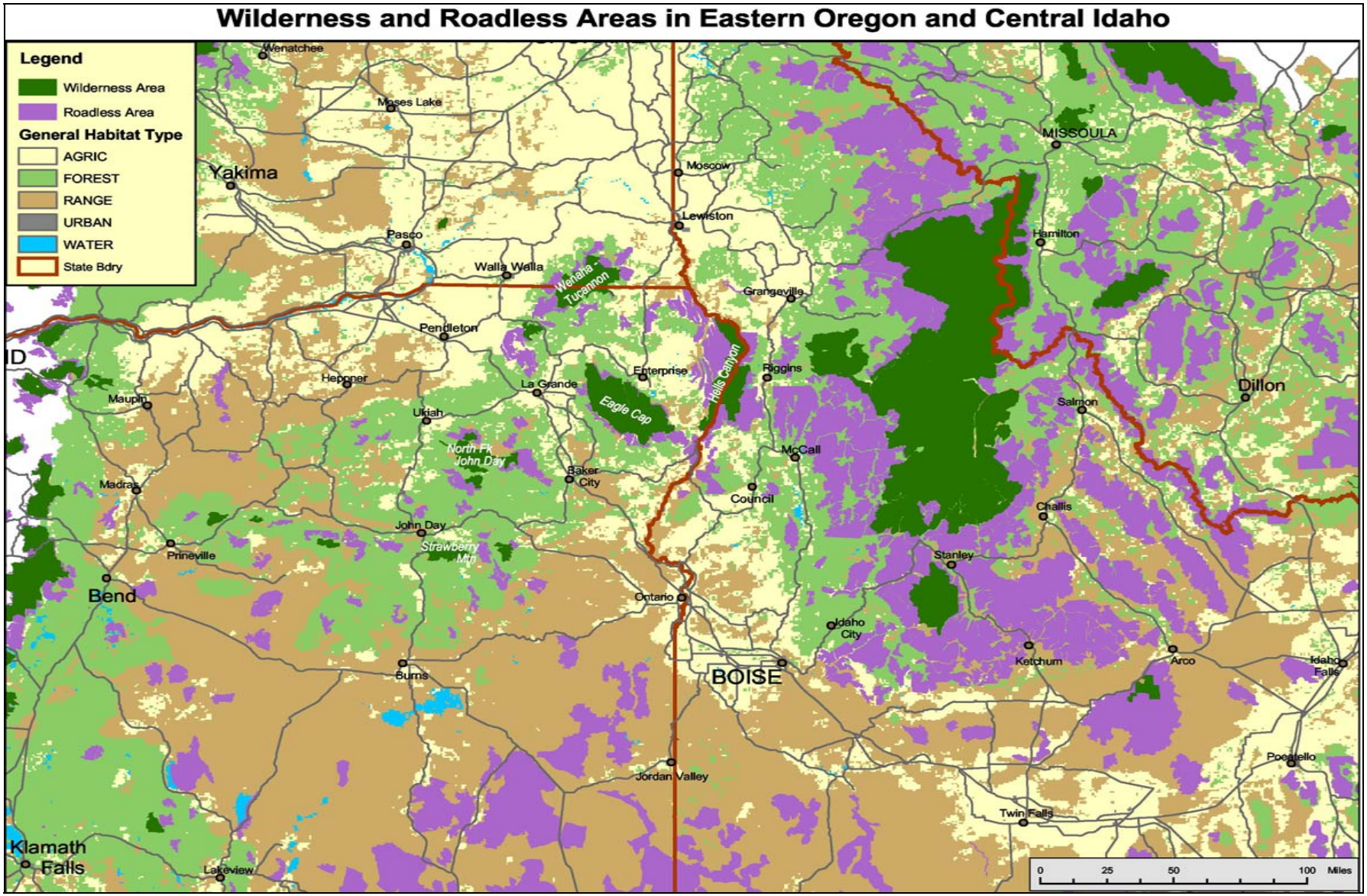

Figure 4. Wilderness and roadless areas in eastern Oregon are smaller and more disjunct than they are in Central Idaho.

Wolves will frequent areas in Oregon that contain abundant deer and elk, rather than specific habitat types. For example, the Rocky Mountain elk population in eastern Oregon is estimated at greater than 60,000, while mule deer numbers are estimated to be 283,000. Some areas of northeastern Oregon have experienced declines in deer and elk populations in recent years. The causes have been attributed to drought, increased predation by cougars and black bears, and to dynamics in carrying capacity that are linked to successional processes in forests and rangelands (Cook et al. 2004). Other locations in the state have higher densities of ungulates, such as southwestern Oregon, and eventually could provide additional area in which wolves could persist. However, these areas are far removed from the Idaho source population, thus extended time periods may be required before wolves can occupy them.

A significant portion of potential wolf habitats in Oregon is occupied seasonally by livestock as well as natural prey. The presence of livestock in wolf habitat can and will sometimes lead to conflict, with wolves choosing livestock as prey. Such conflict will result in non-lethal or lethal control actions to protect livestock (see Chapter III). The locations of livestock on the landscape will influence both distribution and public acceptance of wolves.

It is not the intent of this plan to physically zone the state. However, de-facto zones will exist because management responses will consider habitat suitability factors as defined in footnote 22 (page 16). Management responses to situations of wolf/human conflict are expected to result in some areas that are not suitable for persistent wolf occupation and others where wolf occupation merits encouragement (e.g., den sites, abundant prey, low human activity). While wolves will not be distributed throughout all of their historic range in Oregon, wolf distribution will not be restricted by management actions to only the most secure habitats. Management must recognize that suitable habitat may well exist outside of these areas and provide opportunity for colonization. Allowing wolves access to habitat throughout the state is intended to provide for their long-term survival in the modern Oregon landscape if in so doing social tolerance is not reduced as a result of conflict. Unless wolves are causing conflict with humans or livestock, they will be allowed to persist in areas of their selection. However, it is expected that some depredation on livestock will occur at some point in time in places where wolves and livestock are closely associated with one another.[25] This virtual certainty ensures that management of depredating wolves will be a recurrent theme in managing and conserving the species in order to promote social tolerance. Some areas likely will be more prone to livestock depredations than others, and in some circumstances persistent conflict will preclude survival of some wolf packs. Both non-lethal and lethal control actions will have to be employed to protect livestock (see Chapter III).

Translocation and Relocation

Natural dispersal is the intended means for wolf dispersal across the state. Translocation's primary intent is to help meet conservation objectives in both halves of the state. It may be used only in areas where dispersing wolves is determined to be essential to achieve conservation objectives. Translocation may be used only following a public process, involving public meetings, public testimony and approval by the Commission. Translocation employs a "soft" release[26] and will not consider wolves known or suspected of having depredated on livestock. State wildlife biologists will coordinate and implement the action.

[25] Personal communication with Edward Bangs, USFWS.

[26] "Soft" release means captured wolves will be held at their release site in a holding facility prior to the release.

Relocation differs from translocation in that relocation does not require a public process and is not used to facilitate dispersal. Relocation is available to wolf managers on a day-to-day basis to immediately solve a localized situation or problem. For purposes of relocation only, wolves would be transported and released into the nearest wilderness area. ODFW is authorized to capture and hold wolves where for the purpose of relocation, translocation, or to aid in recovery of an injured wolf.

Prior to conducting any active relocation of wolves within the state by ODFW, the governing body of each county may choose to hold a public hearing regarding such action. The existence of such a hearing shall not be a precondition to ODFW acting to relocate wolves as needed, nor does it in any way limit ODFW's legal authority over wildlife management. The purpose of the hearing is to assist in identification of priority wilderness areas located within the county for purposes of wolf relocation. If the governing body holds such hearings, ODFW shall assist in preparation of the record of the hearing by giving and receiving information relating to identifying wilderness areas located within the county for the purpose of wolf relocation. The record of the hearing shall itself be a part of the criteria for identifying wilderness areas in that county for the purpose of wolf relocation.

B. Management Phases and Population Objectives

Objectives

- Set separate population objectives for two regions of the state: east and west of a line defined by U.S. Highway 97, U.S. Highway 20, and U.S. Highway 395 (see Figure 1: Divide Between East and West Wolf Management Areas).
- Set a conservation population objective for eastern Oregon of four breeding pairs of wolves present for three consecutive years.
- Set a management population objective for eastern Oregon of seven breeding pairs of wolves present for three consecutive years.
- Protect wolves entering western Oregon, following delisting, under a management regime that replicates Oregon ESA protections.
- Set a conservation population objective for western Oregon of four breeding pairs of wolves present for three consecutive years.
- Set a management population objective for western Oregon of seven breeding pairs of wolves present for three consecutive years.

Strategies

- The rulemaking process to consider delisting will be initiated when the conservation population objective for eastern Oregon is met.
- Wolf population status will be expressed as the number of breeding pairs present in a region of the state until the management population objective is achieved in that region. The federal recovery definition for breeding pairs will be used. A breeding pair is an adult male and adult female with at least two pups surviving to the end of December.[27]

[27] USFWS 1994.

- When the management population objective is achieved in a region, wolf population monitoring in that region will transition to counting the number of wolf packs present in the state. A pack is defined as four or more wolves traveling together in winter.
- Three management phases (Phase I, Phase II and Phase III) will be delineated to enable the population objectives to be met.

Management Phases

Phase I management activities will be directed toward achieving the conservation population objective of four breeding pairs of wolves present in eastern Oregon for three consecutive years. During this phase, wolves will continue to be listed under the Oregon ESA. Once the conservation population objective is achieved, the process to consider delisting will be initiated.

A breeding pair of wolves is defined as an adult male and an adult female with at least two pups surviving to the end of December. The number of wolves associated with a breeding pair can vary from six-14 wolves (USFWS 2002, 2003). In Idaho, the number of wolf packs represented by a breeding pair varied between 1.5 - 1.63 packs per breeding pair during the period 2002-2004. The average pack size was reported to be 6.4 - 7.8 wolves per pack. Idaho data applied to Oregon wolf population objectives suggests the following: four breeding pairs equates to 6 - 6.5 packs. This number of packs would be equivalent to 38.4 - 50.7 wolves. Seven breeding pairs equates to 10.5 - 11.4 packs. This number of packs would be equivalent to 67.2 - 89 wolves.

Under the Oregon ESA, either the state may on its own initiate the process to consider delisting, or any entity or person may petition the Commission to consider it. Considering delisting requires a public rulemaking process before the Commission, complete with full public notice, public hearing, and opportunity to submit comments. The law requires the Commission to base any delisting decision on scientific criteria related to the species' biological status in Oregon and to use documented and verifiable scientific information.

If at the end of the process the Commission decides that delisting is justified, the Commission will specify where the conservation population objectives have and have not been met. After delisting and removal of Oregon ESA protections, if western Oregon has not met the conservation population objective, the Commission will continue to manage wolves in that area under a management regime that replicates Oregon ESA protections for individual wolves. Specifically, such a management regime generally will prohibit take of wolves, except as authorized by the Commission for damage and human safety. That management regime will continue until the Commission determines that western Oregon has achieved the conservation population objective, or until this plan is amended through a public rulemaking process. The management regime for western Oregon is based upon the Commission's statutory authority to regulate the take of wildlife. Even when a species is reclassified as a game mammal, the Commission retains the authority to regulate (and, where appropriate, prohibit) take of that species as necessary.

Phase II management activities will be directed toward achieving the management population objective of seven breeding pairs of wolves present in eastern Oregon for three consecutive years. During this phase, the wolf no longer will be listed. This phase provides a buffer whereby management actions would be initiated to prevent an unexpected decline in the wolf population that could necessitate relisting under the Oregon ESA.

Phase III management activities will be directed toward ensuring the wolf population does not decline below Phase II levels and that wolves do not climb to unmanageable levels that cause conflicts with other land uses. This phase provides for maintenance of wolf numbers. Setting a maximum population level for wolves in Oregon during this initial wolf planning effort may be premature. The Phase III management level is not intended as a population cap. As wolves become established in the state, wolf managers will be collecting data on wolf movements, pack home ranges, and other population parameters. This information, coupled with data regarding wolf conflicts, could be used to set maximum population levels in the future, depending on the circumstances at the time. A new planning effort based on wolf information specific to Oregon could be undertaken at that time.

Conservation Population Objective

The conservation population objective for Oregon is defined as four breeding pairs of wolves present for three consecutive years in eastern Oregon. This population objective represents a sufficient number of wolves to ensure the natural reproductive potential of the wolf population is not in danger of failure. This number also represents the point at which the plan recommends initiating the process to consider delisting. In order to ensure four breeding pairs for three consecutive years, additional wolves would need to be present to replace natural losses of breeding adults. ODFW will use the federal definition of a wolf breeding pair because it provides a higher level of certainty in assessing the population status and documenting successful reproduction.

This conservation population objective is based on the prediction that, if the protections of the Oregon ESA are withdrawn when four breeding pairs have been present for three consecutive years in eastern Oregon, a naturally self-sustaining population of wolves would continue to exist in Oregon. This will support the necessary findings on the delisting criteria, justifying a Commission decision to delist the species.

Management Population Objective

Once the conservation population objective is met, management will be directed toward achieving the management population objective of seven breeding pairs present for three consecutive years. The management population objective is intended to ensure maintenance of the wolf population. Achieving this objective will provide a high level of assurance that the wolf population will not decline. Once this population objective has been achieved, further population goals (higher or lower) will be defined through ODFW's normal rule-making process based on available data and public input.

The status of wolves in Oregon will be expressed as the number of breeding pairs until the management population objective is met. After the management population objective is met, monitoring methods will transition to enumerating wolf packs rather than breeding pairs to reduce monitoring costs.

General Discussion of Wolf Population Objectives

One of the main challenges for wolf planners in Oregon has been estimating the number and distribution of wolves sufficient to achieve conservation of wolves in Oregon and satisfy state delisting criteria, while protecting the social and economic interests of all Oregonians. Setting

population goals too high could foster unrealistic expectations and result in social and biological conflict, and uncertainty regarding the capacity of Oregon to support wolves. Because there are no wolf population data available for Oregon, drafters of this plan relied on information from other state plans and the scientific literature to develop wolf population objectives.

Uncertainties surrounding the eventual location of dispersing wolves were considered during development of the plan. One concern was that considerable time could pass before wolves would naturally disperse to western Oregon. In the meantime, wolves would be located primarily in eastern Oregon where human tolerance could be affected as the wolf population increased.

The decision to divide the state into two regions (eastern and western Oregon) with separate but equal population objectives provides the flexibility needed to manage increasing wolf numbers in eastern Oregon while encouraging conservation in western Oregon. The statewide process to consider delisting could be initiated when four breeding pairs of wolves are present for three consecutive years in eastern Oregon. This approach ensures connectivity to the large meta-population of wolves in Idaho, an important factor in achieving conservation of wolves in Oregon.

Because secure habitat is limited in Oregon, biologists predict that fewer wolves will occupy Oregon than are found in similar but much more abundant habitat in Idaho. The federal recovery goal for the Idaho wolf population was 10 breeding pairs in what has been described as the best remaining wolf habitat in the lower 48 states. Oregon, on the other hand, was not selected as a recovery state primarily due to lack of large blocks of contiguous public land habitat.[28]

Research published in 2003 suggested that the smallest viable wolf populations might be two to three adjacent packs with four wolves each, located 40-60 kilometers apart (Fuller et al. 2003). Each pack might cover 117 square kilometers if the ungulate density averaged eight deer per square kilometer. The authors also wrote that such small populations could persist anywhere if the prey density was at average population levels and productivity, and where wolf production exceeded mortality.

Several notable examples of small wolf populations can be found in the scientific literature. The Isle Royale wolf population began from a single pair of wolves in about 1949. The population has fluctuated between 12-90 individuals and currently consists of 29 wolves.[29] This population has persisted for more than 50 years despite being isolated on an island and apparently losing 50 percent of their original genetic diversity. Remnant wolf populations in Europe (i.e., Italy, Spain and Portugal) numbering fewer than 100-200 wolves persisted for decades and have since expanded their numbers and range, and avoided extinction (USFWS 1994).

Based on the proximity of northeastern Oregon to present Idaho packs, dispersing wolves likely will first occupy areas in northeastern Oregon (see Figure 4: Wilderness and Roadless Land in Eastern Oregon and Central Idaho). Wolf breeding pairs in these areas could be considered more secure and stable because of their proximity and connectivity to the Idaho population of wolves. However, other competing factors such as declining ungulate populations, competing carnivore populations and livestock production in those areas will need to be considered. Wolf movement and dispersal between the two populations would allow gene flow between the populations. The large source

[28] Personal communication with Edward Bangs, USFWS.
[29] Personal communication with David Mech.

population of wolves in Idaho would provide a continuing source of dispersing wolves into Oregon.[30] Eventually, the two populations could function as one large population, with the Oregon segment representing an important wolf range expansion in North America.

Oregon's close proximity to a wolf population that numbers more than 400 provides certainty that dispersing wolves will periodically enter Oregon, initially at an unknown rate. Over time, a better knowledge of the dispersal and immigration rates will emerge. Fluctuations in the wolf population in Oregon may be minimized to some extent by the presence of dispersing Idaho wolves. State law does not allow the presence of healthy populations of wolves in adjacent states to satisfy delisting criteria, regardless of their importance to wolves located within the state. The number of breeding pairs and their distribution within Oregon must be sufficient to stand alone in determining whether the delisting criteria are met. However, researchers have noted that the establishment of new populations and maintenance of populations that are heavily controlled or harvested rely extensively on a source population of wolves (Fuller et al. 2003).

Strategies for Addressing Wolf Population Decline/Potential for Future State Relisting

Oregon's wolf population will be monitored over a three-phase adaptive management strategy. When wolves have reached the population objectives for Phase I in eastern Oregon for three consecutive years, ODFW will propose that the Commission institute rule-making to consider delisting the wolf. That public process will include a careful examination of the population data to determine whether the Oregon ESA's delisting criteria have been met. Once delisting occurs, wolves in eastern Oregon will be managed according to Phase II management strategies and continued conservation efforts would strive to achieve Phase III status in this region. Phase I management strategies for western Oregon will continue to be implemented until separate population objectives for this region have been met.

Upon delisting, wolves will continue to be affected by natural and human-caused factors, and the population may remain stable, continue to increase, or exhibit signs of a decline. Following delisting, breeding pair success could slip below the delisting point of four breeding pairs in eastern Oregon. In this event, population level, distribution, health and reproductive status, as well as the causal factors of the population decline would be assessed. The assessment should take into account natural fluctuations in wildlife populations, but also should consider the severity and the basis for the decline.

If one or more of the presumed breeding pairs does not breed, it is critical to understand why they did not. For example, if illegal poaching or lethal control actions were the causes, relisting may not be necessary. Instead, a reduction in lethal control actions and employment of methods to halt illegal poaching would be initiated. These actions could include increased public education and law enforcement efforts, and impose higher penalties for illegal take.[31]

However, if the reason for decline in breeding pairs or population is due to changing habitat conditions, low prey numbers or disease, these would constitute underlying warning signs of a more serious situation that could warrant a request for relisting.

[30] This concept was called the "umbilical cord effect," a term coined by Clint Krebs, a member of the Wolf Advisory Committee.

[31] Personal communication with Douglas Smith, National Park Service.

In the event of a rapid population decline, ODFW may request a status review by the Commission. In the event of a population decline below the conservation population objective at which delisting occurred, but where the decline was not rapid, ODFW would increase monitoring efforts designed to determine the cause. A one-year monitoring effort that finds the population has continued to decline at the end of that year would initiate a status review to determine whether relisting is appropriate action. Conversely, if a one-year monitoring effort showed a population increase at or above the delisting level, no action would be taken. Intensive monitoring would continue for the next two years specifically for the purpose of following the population trajectory.

The Commission's authority to relist a species springs from its authority to initially list any species. This authority lies in the listing/delisting provisions of ORS 496.172 and ORS 496.176. Pertinent sections are as follows:

1. ORS 496.172(1) - requires the Oregon Fish and Wildlife Commission to conduct investigations of wildlife species native to this state and to determine whether any such species is a threatened or endangered species.
2. ORS 496.176(2) – gives commission authority to, by rule, add or remove any wildlife species from either list or change the status of any species on the lists.
3. ORS 496.176(3) – provides the criteria the Commission must use in making its decision.
4. ORS 496.176(5) – allows for any person to petition the Commission to add, remove or change a species' status.
5. ORS 496.176(7) – provides for emergency listing by the Commission when there's a significant threat to the continued existence of the species within the state.

The decision to re-list the wolf will be based upon scientific assessments of biological data. However, decisions to list or delist any species are often contentious. A species as controversial as the wolf makes this a likely scenario if relisting becomes necessary. It will be in the best interest of this species and the citizens of Oregon that the state takes whatever management steps necessary to safeguard wolves from a population decline that would necessitate a relisting decision.

C. Monitoring

Objective

- Determine the status of the wolf population in Oregon through a comprehensive monitoring program.

Strategies

- Radio-telemetry will be the standard monitoring technique used to assess the number of wolf breeding pairs during Phases I and II. ODFW is authorized to capture, immobilize with drugs or other devices, and attach radio-collars to wolves.
- Once Phase III is reached, annual counts of wolf packs will be the method by which the population is assessed annually.
- Oregon will rely on cooperative relationships with adjacent states, other state and federal agencies, tribes, landowners, local governments, and non-governmental entities to effectively monitor breeding pairs or packs.

- In addition to radio-telemetry and field observations, reported sightings by the public and cooperators that are verified will be used to determine the distribution of wolves in Oregon, size and location of wolf pack home ranges, and the extent of wolf range expansion.
- Monitoring methods for wolf packs developed and tested in other states will be evaluated for use in Oregon.
- Field observations using methods such as howling surveys and tracking will be used to assess wolf presence, location and pack activity.
- ODFW will maintain a database on wolf depredation of livestock.
- ODFW will maintain a database on wolf population parameters.

Radio-telemetry will be the main technique used to monitor wolf breeding pairs during Phase I and Phase II. During Phase III, wolf packs will be monitored to determine whether population objectives are being met. Biologists will begin the transition from breeding pairs to packs by concurrently surveying packs during winter and determining the number of breeding pairs as defined during Phase II. A wolf pack will be defined as "four or more wolves traveling together in winter." This methodology is being tested in the Rocky Mountain Recovery Area.[32] Refinements in survey methodology developed in other states will be applied in Oregon when and where appropriate.

Regular radio-telemetry monitoring will provide information regarding other important population parameters such as pack distribution, mortality, dispersal, population trends, wolf den locations, rendezvous sites, winter use areas, and wolf territory boundaries. This information also will provide biologists an increased understanding of suitable habitat for wolves in Oregon.

ODFW will have primary responsibility to monitor the wolf population under this conservation and management plan. Collaboration with tribes, other state and federal agencies, jurisdictions, universities, landowners, local government, and the public is essential to the success of the monitoring program. This coordination will be especially important when monitoring packs near state borders or when packs are located on or near tribal lands.

Phase I – During Phase I, an effort will be made to collar all wolves within reasonable and practical limits with respect to financial, human health, and animal impacts. For known packs, every effort will be made to collar the alpha male and female, and then collar the remaining pack members to the extent feasible. To further improve information gathering and understanding of wolf behavior, each pack will have at least one member collared with a global positioning system (GPS) collar which records geographical movements. At the time collars are attached, blood samples will be taken for health and genetic analysis.

Phase II – Monitoring during this phase will be similar to Phase I. ODFW will continue active collaring on any new packs (once pack activity is identified), with a goal of collaring at least three members of a pack including at least one of the alphas. Ear tagging or tattooing pups would be employed to enable identification and tracking if wolves show up elsewhere. During this phase, data from collaring would be correlated with pack counts (howling surveys, winter track surveys) to enable an informed switch to pack counts in Phase III.

[32] Personal communication with Carolyn Sime, Montana Department of Fish, Wildlife, and Parks.

Phase III – The wolf population will be monitored through counts of wolf packs (i.e., a minimum of four wolves traveling together in winter) to assess wolf numbers and distribution. Collaring will be used in select situations, such as with dispersing wolves that appear in new locations. This will help understand how wolves' behavior modifies according to habitat and situation. Appropriate marking of all wolves would continue to the extent possible. Trained volunteers may be used during this phase to aid in pack counts and other wolf surveys.

D. Coordination with Other Governments and Agencies

Objective

- Develop and implement agreements with other agencies and/or organizations to help achieve wolf conservation.

Strategies

- The expertise of the U.S. Fish and Wildlife Service (USFWS), the U.S. Department of Agriculture's Animal Plant Health Inspection Service's (APHIS) Wildlife Services Program (Wildlife Services), U.S. Forest Service (USFS), Bureau of Land Management (BLM), Oregon Department of Agriculture (ODA), tribal governments and private sector professionals will be used to develop and implement monitoring, research, and depredation response actions.
- Wildlife Services will be the lead agency to respond to reports of wolf depredation.
- The Oregon State Police Fish and Game Enforcement Division will be the lead enforcement agency.
- ODFW will coordinate with other state land management agencies such as the Department of State Lands, Department of Forestry, and Parks and Recreation Department.
- Non-governmental organizations such as Defenders of Wildlife, Oregon Cattlemen's Association, and Oregon Hunters Association will be regularly engaged for input regarding wolf management in Oregon.
- Public and private land managers will be informed of wolf activities on the respective lands as needed.
- County boards of government will be advised of wolf-related activities as needed.

A component of conservation involves coordination with adjacent states, other government agencies, tribes, counties, nongovernmental organizations, and willing landowners to share resources, reduce costs and avoid potential duplication of effort. Implementation of this wolf plan will require close coordination with a number of entities to ensure the success of the wolf program. Similar coordination efforts are a regular part of many current wildlife management activities.

In some instances, memoranda of understanding or cooperative agreements may be needed to ensure certain actions or activities are conducted in a timely manner. For example, close coordination with Wildlife Services will be necessary to respond to wolf damage problems in a timely manner. Details regarding who will respond and what protocols are followed will be essential to successful handling of problem wolves. Agreements with tribes will be needed to spell out roles and responsibilities and coordinate management activities. Close coordination with county governments to secure funding for Wildlife Services also will be necessary.

Coordination with the following agencies and entities will occur:

- U.S. Department of Agriculture APHIS Wildlife Services
- U.S. Fish and Wildlife Service
- Non-governmental organizations such as Defenders of Wildlife, Oregon Cattlemen's Association and Oregon Hunters Association
- Tribal governments in Oregon and Idaho
- U.S. Forest Service
- Bureau of Land Management
- County governments
- Law enforcement entities including the Oregon State Police, U.S. Fish and Wildlife Service, U.S. Forest Service, and county sheriff departments
- Oregon Department of Agriculture and other state agencies

E. Future Legal Status

Objective

- Re-classify the legal status of the gray wolf to "special-status mammal" within the "game mammal" category in ORS 496.004(9).

The status would not preclude the use of controlled take through hunting and trapping in response to management concerns. While listed as an endangered species in Oregon the wolf would be protected consistent with the direction outlined in the plan. Special status mammal classification allows ODFW use of a wide range of management tools to advance the conservation and responsible management of wolves.

Strategy

- ODFW will request through the legislative process that the "game mammal" definition in ORS 496.004(9) be amended to add the gray wolf, additionally labeled as a "special status mammal" within that definition.

Through a public rulemaking process, the Commission shall define the substantive standards governing this classification to include but not be limited to those below.

- Controlled take of wolves would be permitted as a management response tool to assist ODFW in its wildlife management efforts only after the wolf population objectives in the region to be affected have been exceeded and other biological considerations indicate the use of these management tools would not result in the impairment of wolf viability in the region. Controlled take would be authorized as a response to:
    1. chronic livestock depredation problems in a localized region where wolf population levels have grown to beyond stable levels; or
    2. any wild ungulate population is experiencing population or recruitment declines below MOs in a WMU, or locally, that can be attributed to wolf predation.

  These scenarios are designed as management response mechanisms should the condition arise where continued growth of a healthy wolf population has proven to impose unacceptable levels of conflict with livestock and/or wild ungulate populations. The use of

these management tools is designed to respond to the interests of hunters and trappers, as well as the interests of protecting livestock and healthy levels of wild ungulate populations.

- Controlled take would be permitted by ODFW through a license program and targeted at wolves in a specific location experiencing the above-mentioned conditions that warrant a management response.
- A controlled take program for wolves would require: 1) wolf population objectives for the wolf conservation region have been exceeded; and 2) other biological considerations indicate the use of this management tool would not impair wolf viability in the region.
- General season hunts would not be permitted.
- Trapping would be used as a management tool for both lethal and non-lethal management control. Before receiving a license/permit from ODFW, trappers must be certified by ODFW. Where lethal control is the desired management response, such trappers would be permitted to keep the wolves they have trapped under these proscribed circumstances.
- Maximum enforcement of applicable statutes imposing penalties for harming or killing a wolf illegally would be sought by the State. Rewards would exist for citizens who turn in or provide information leading to the conviction of someone who has illegally killed a wolf—such as ODFW's "TIP" (Turn In Poachers) program or those offered by other entities such as Defenders of Wildlife and the Hells Canyon Preservation Council.
- Where consistent with the above, Oregon's wildlife laws, wildlife damage statutes, and other related statutes would otherwise remain applicable to this classification.
- Nothing in this classification would otherwise change legal options available to livestock producers and other citizens under this Plan or other current law aimed at addressing wildlife damage, livestock protection, and protection of human life.

While listed as an endangered species in Oregon, the wolf would be protected consistent with the direction outlined in the Plan and in compliance with the Oregon ESA. Special status mammal classification allows ODFW use of a wide range of management tools to advance the conservation and responsible management of wolves.

Wildlife are managed in Oregon under the Oregon Wildlife Policy (ORS 496.012) which states in part: "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." The policy includes seven co-equal goals for wildlife management by which wolves will be managed after the goals of this plan are achieved and after they are de-listed.

The special status mammal classification recognizes the wolf's distinct history of extirpation and conflict with certain significant human activities, as well as its distinct place in human social attitudes (revered by some but reviled by others) based on experiences and myths that span centuries. This classification is based on Oregon's management successes with respect to other large carnivores (e.g., black bear, cougar) but also recognizes human and wolf behavior factors that make the wolf somewhat distinct from other large carnivores. It provides the most options for long term management by retaining, in addition to protective measures, tools such as responsive hunting and trapping when required for management purposes, although these management tools would not be applied in the same manner as under a traditional game mammal or fur bearer classification. This would serve the interest of adaptive management capability.

Cougar and black bear, as large carnivores, provide a relevant example for wolf conservation discussions. Both species were unprotected in Oregon through the first half of the 20th century. These animals were shot on sight, trapped, or poisoned without restriction. In the case of the cougar, the State offered a bounty payment to citizens that killed cougars and redeemed them for payment. It is well established that ensuring human tolerance for large carnivores requires many tools and strategies.

Populations of both species were reduced to such low levels that citizens and the Oregon State Game Commission (now the Oregon Fish and Wildlife Commission) approached the Legislature to enact laws protecting them from indiscriminant take. Both became classified as game mammals, the same status as deer and elk, and received all the same protections provided by the wildlife laws. Through time, as populations began to increase, limited hunting seasons were authorized in areas experiencing damage. Today, both cougar and black bear species are considered common and widespread in Oregon. Hunting seasons have expanded to statewide general seasons in response to growing numbers and range expansion. Management plans now guide hunting seasons and other actions taken by biologists to protect and manage the species.

While game mammal status has potential for attaining the long term conservation and management goals intended for the wolf in Oregon, certain modifications to the traditional game mammal status approach are appropriate with respect to the wolf: These distinctions, as components of this Plan, will be built into the administrative rule(s) applicable to the special status mammal classification.

This classification is intended to allow ODFW to use existing, stable state and federal funding sources and existing field staff to include wolf management as part of their daily duties. These funding sources include both federal Wildlife Restoration grants (also known as Pitman-Robertson) and fees from the sale of hunting and fishing licenses.

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III. WOLF-LIVESTOCK CONFLICTS

With the return of gray wolves to Oregon, conflicts with livestock[33] are expected (The term "livestock", when used here in relation to response to wolf-related conflict, means those animals listed in footnote 33). Addressing conflicts between wolves and livestock is an essential part of this plan. Many comments received at the town hall meetings centered on concerns related to wolf-livestock conflicts. The ranching and farming industry are important components of the Oregon economy. In some areas of the state, concerns have been raised regarding the effect wolves will have on this important industry. As in other western states with wolf populations, some livestock producers will be affected financially due to direct losses of livestock from wolf depredations. Where and when such depredations will occur will depend on a number of factors, including the number and distribution of wolves and the distribution of livestock in areas occupied by wolves.

Private lands associated with the livestock industry provide important habitat for many wildlife species. Ranches and farms often are located at lower elevation foothills or in large riverine valleys that are seasonally occupied by wintering deer and elk. These private land winter range areas are essential for survival and long-term maintenance of these important ungulate species. Once livestock are gathered in from public lands each autumn, the majority are transferred to private property at lower elevations where they are fed on winter feed grounds. Deer and elk herds generally migrate to lower elevation winter ranges, often in close proximity to livestock, particularly during the more severe winter periods. This close proximity of big game and livestock during winter may increase wolf-livestock interactions as wolves follow deer and elk to winter range.

Meeting the delisting criteria outlined in this plan will necessitate tolerance for wolves on both public and private lands. Therefore, to achieve conservation of wolves in Oregon as required by the state ESA, this plan outlines a range of options for livestock producers to deal with problem wolves. As with other wildlife species, many landowners and livestock producers will choose to work cooperatively with wildlife agencies to achieve the goals outlined in this plan.

A. Livestock Depredation and Other Effects

Livestock Status in Oregon

Records indicate Oregon has approximately 1,360,000 cattle (75 percent in eastern Oregon), 235,000 sheep, and 100,000 horses within its borders.[34] Land ownership in the state is split evenly between private and public lands.

The federal government owns nearly half the land in Oregon and much of that land provides an important part of the support of the cattle industry in Oregon. Approximately 11 percent of all cattle

[33] In this chapter of the Plan, we use "livestock" in a broad sense. We begin with a provision in the state agricultural laws (ORS 609.125) which defines "livestock" to mean: ratites, psittacine, horses, mules, jackasses, cattle, llamas, alpacas, sheep, goats, swine, domesticated fowl and any fur-bearing animal bred and maintained commercially or otherwise, within pens, cages and hutches (ORS 609.125). For purposes of authorizing response to wolf-related conflicts, we add to that definition bison and working dogs (guarding dogs or herding dogs).: .

[34] Oregon Agriculture Statistics Service 2002-2003. The horse estimate was based on an e-mail from Oregon Department of Agriculture. No official records are kept for horses.

forage in Oregon comes from federal land through fee grazing permits issued to local livestock producers. In turn, livestock grazing can benefit the land by reducing fire fuels, increasing plant vigor and conditioning the forage for wildlife.[35] In 1994, the USFS authorized 85,093 cattle to graze on federal lands within Oregon. In eastern Oregon, it is estimated that two-thirds of the beef cattle spend some of the year on federal lands.[36]

Current losses of livestock in Oregon to depredation from coyotes, cougars and bears vary by county depending upon the dominant vegetation, the number of carnivores and the number of livestock. The baseline of current livestock losses attributed to these three carnivores can be found in Appendix J. Coyotes, the most abundant of the three, caused the highest numbers of livestock losses per year from 1996 to 2002, killing an average of 222 cattle and 1,408 sheep. Cougars killed the highest number of horses, averaging 16 per year. Data is lacking on a county by county basis to determine the total losses of livestock by carnivores. Data is not available on losses due to other reasons like weather and disease. Oregon has 22 counties with Wildlife Services agents that respond to coyote, cougar and bear depredation complaints from private landowners. In addition, some landowners have their own privately funded programs that are not recorded by Wildlife Services agents as control actions.[37]

In 1997, a statewide Wildlife Damage Survey was conducted by the Oregon Agricultural Statistics Service for the Oregon Department of Agriculture. Total livestock losses from cougar, black bear, coyote, bobcat, eagles, ravens and dogs for all types of livestock amounted to $1.5 million. Losses for cattle/calves and sheep/lambs was $824,000 and $767,000 respectively. An additional cost to producers for livestock injured by predators was $214,000. The survey also recorded $1.3 million spent by producers on non-lethal predator damage prevention. Prevention expenses included fencing, hazing devices, and guardian animals (Oregon Agricultural Statistics Service 1997).

Wolf-livestock Conflicts

Wolf-livestock conflict continues to be a major problem associated with wolf conservation efforts throughout the world. Wolves prey on domestic animals in all parts of the world where the two coexist (Mech and Boitani 2003). However, Mech and Boitani stated, "we know of no place in North America where livestock compose a major portion of wolf prey, or where wolves rely mainly on livestock to survive." This observation differs from the situation in Europe and Asia where livestock are important components of wolf diets.

Recent data from the Rocky Mountain Recovery Area suggest that individual wolves do not automatically prey on livestock, but members of wolf packs encountering livestock on a regular basis are likely to depredate sporadically (Bangs and Shivik 2001).

The location of livestock depredations varies by state and depends on the distribution of both livestock and wolf packs. In Idaho, about 80 percent and in Wyoming about 50 percent of depredations occurred on public land grazing allotments. In Montana, nearly all confirmed depredations occurred on private lands (USFWS 2003). In Montana, however, where 300,000-

[35] Personal communication with Tim Del Curto, Union Agricultural Research Center.
[36] Oregon Beef Cattle Industry, Impact on the Oregon Economy, 1997.
[37] Personal communication with Dave Williams, State Director, Wildlife Services.

400,000 head of livestock graze public land allotments, wolf depredations are expected to increase as wolf numbers increase and distribution expands over time (Montana Wolf Plan 2003).

An analysis of the potential effects of wolves on livestock was developed when the federal government proposed to release gray wolves into Idaho and Yellowstone National Park (USFWS 1994). The analysis predicted the number of livestock that might be killed or wounded as the gray wolf population expanded and the interaction of domestic livestock and wolves became more common. The developers of the federal EIS to reintroduce wolves to Yellowstone National Park and central Idaho attempted to predict the potential effects of wolves on livestock in the recovery area.

The actual depredation rates observed indicate the extreme difficulty in predicting the behavior of wolves in advance of their arrival. The mean rate predicted for Idaho was an annual loss of 10 cattle and 57 sheep with 100 wolves. Actual observed depredation rates in Idaho for 2003 were six cattle and 118 sheep with 345 wolves (USFWS 2003). The lower-than-predicted rate in Idaho is influenced by the few livestock present in the central Idaho wilderness and the extensive efforts to prevent livestock depredation since reintroduction. In Montana, which has similar winter range land use patterns as Oregon, the actual depredation patterns are higher on both cattle and sheep while the prediction was for a lower depredation rate than Idaho. Actual observed depredation rates in Montana for 2003 were recorded at 24 cattle and 86 sheep with 184 wolves (ibid.).

Where and how livestock are managed and where and how wolves are managed will influence depredation rates. In Alberta, Canada, cattle on heavily forested but less intensively managed grazing allotments suffered three times as many depredation incidents as more intensively managed lease areas having less forest cover. In North America and Europe, untended livestock occupying remote pastures suffered the greatest losses from wolves. Newborn livestock held in remote pastures are more vulnerable to wolf predation. These circumstances are likely to be repeated in Oregon.

B. Working Dog and Pet Depredation

As wolves expand their range in Oregon, dog owners will need to be aware of the potential risks to their animals. Areas or situations where wolves and domestic dogs encounter each other can result in dog mortality. In some instances, wolves may alter their regular movements or activities to seek out and confront domestic dogs. In Wisconsin, wolf depredation on hounds used for black bear hunting resulted in more compensation payments than for livestock (Treves et al. 2002). In some regions of the world, dogs are an important food source for wolves, to the extent that wolves reportedly have reduced the number of stray dogs in some areas (Mech and Boitani 2003).

Working dogs used to protect livestock are not immune from wolf depredation. The killing of guard dogs by wolves has been documented in the Rocky Mountain Recovery Area. In Minnesota, 25 dogs were reported killed by wolves in 1998 alone (Bangs and Shivik 2001, Mech and Boitani 2003). Guard dogs appear to be more effective and less at risk when an adequate numbers of dogs per herd are present coupled with the presence of trained herders. Livestock producers using working dogs in conjunction with trained herders face added costs to protect their livestock from potential wolf depredation. Working dogs and trained herders may be more effective for protecting sheep flocks than cattle.

In Oregon, some wolves are likely to occupy areas near human habitation or areas used for recreation which could put pets or working dogs at risk. Dogs running at large or dogs working cattle or sheep could be vulnerable in these situations. Bird hunting dogs or hounds used in forested areas occupied by wolves also could be at risk. Public education will be important in preventing wolf/domestic dog interactions.

C. Strategies to Address Livestock Conflict

Objective

- Develop and implement a phased approach based on population objectives for wolves that ensures conservation of the species while minimizing conflicts with livestock.

Strategies

- Implement an adaptive management approach to wolf conflicts for both eastern and western Oregon that: 1) emphasizes non-lethal control techniques while the wolf is in Phase I; and 2) transitions to a more flexible approach to depredation control following delisting.
- Actively educate and equip landowners, livestock producers and the public with tools to implement non-lethal wolf management techniques.
- Working through Wildlife Services, allow individuals flexibility to customize wolf management to their situation (particularly with regard to using non-lethal injurious actions).
- Establish a wolf management specialist position within ODFW to monitor wolf movements and work directly with individuals who experience conflicts with wolves in order to resolve those conflicts.
- Provide wolf monitoring information to landowners, livestock producers and the public as needed to keep them informed of wolf activities and movements.
- Notify land management agencies, landowners, livestock producers, and the public of planned or completed wolf management activities.
- Instill fear of human activities in wolves through non-injurious and injurious actions to keep them appropriately wild and minimize potential for conflict with humans.
- Use lethal controls on packs and/or individual wolves that depredate on livestock under specified circumstances as described elsewhere in this plan.

The intent of these strategies is to resolve wolf-livestock conflicts before they result in losses while ensuring conservation of wolves. While wolves are listed as endangered, non-lethal techniques such as radio-activated guard devices, non-injurious harassment, fladry, husbandry, and others will be the first choice of managers. As the wolf population increases in Oregon, more options for addressing conflicts will be allowed. While multiple non-lethal techniques employed in other states should be used here, adaptations to these techniques and development of new non-lethal techniques will be encouraged as needed to address factors unique to Oregon. In situations where chronic losses are occurring, lethal control actions may be employed to minimize livestock losses regardless of the wolf population status. This combination of strategies is consistent with the conservation of wolves, and is expected to promote delisting efforts. While there are differences in how livestock conflicts are addressed in the three phases, the differences are not great. The plan endeavors to provide as much flexibility to address conflicts as possible while wolves exist in low numbers, while still remaining focused on achieving wolf conservation goals.

This incremental approach based on the current population status of wolves is designed to provide options to wolf managers, livestock producers and the public while promoting the goal of conservation for wolves. Generally, non-lethal techniques should be the first choice when wolf-livestock conflicts are reported, regardless of the wolf population status. When wolf numbers are low, more emphasis is placed on wolf control techniques that do not involve lethal removal of wolves. Wolf managers and livestock producers are not required to exhaust all non-lethal techniques, but instead, a good faith effort to achieve a non-lethal solution is expected. In order to use the widest array of management tools available in any given management phase, livestock producers will be encouraged to employ management techniques to discourage wolf depredation, and agencies will advise and assist in implementing such techniques. Wolf managers working with livestock producers are encouraged to employ management techniques that have the highest likelihood of success to resolving the conflicts and that are reasonable for the individual situation.

When Phase III is reached, non-lethal techniques will remain the first choice of managers in dealing with conflicts. However, more emphasis may be put on lethal control to ensure protection of livestock if it can be demonstrated that non-lethal methods are likely to put livestock at substantial risk. In areas where chronic wolf problems are occurring, wolf managers may seek assistance from private citizens through special permits for controlled take to resolve conflict. In addition, liberalized options for lethal control by livestock producers will be considered in consultation with wolf managers in circumstances where such activities can enhance the probability of relief for the livestock producer.

Table III-1. Matrix of Wolf Conflict Management Options.

		PLAN IMPLEMENTATION PHASES		
		Phase I	**Phase II**	**Phase III**
ACTION	**CURRENT OREGON LAW**	**STATE ENDANGERED**	**DELISTED**	**DELISTED**
Non-injurious harassment	Allowed with a permit if conservation finding can be made.[38]	Allowed without a permit.[39] Reporting required within 48 hours.	Allowed without a permit.[39] Reporting required within 48 hours.	Allowed without a permit.[39] Reporting required within 48 hours.
Non-lethal injurious harassment	Allowed with a permit if conservation finding can be made.[38]	Allowed by permit. Reporting required within 48 hours.	Allowed without a permit on private land and by permit on public land.[39]	Allowed without a permit on private land and by permit on public land.[39]
Lethal take for wolves found 'in the act' of attacking livestock	Allowed with a permit if conservation finding can be made.	***Allowed without a permit on private land and by permit on public land.[40]***	***Allowed without a permit.[40]***	***Allowed without a permit.[40]***
Lethal take for wolves involved in chronic livestock depredation	Allowed by ODFW and/or Wildlife Services if conservation finding can be made.[38]	Allowed by ODFW and/or Wildlife Services only.	Allowed by permit. Reporting required within 48 hours.	Allowed by permit. Reporting required within 48 hours.
Lethal take to defend human	Allowed. See text of plan for details.	Allowed. See text of plan for details.	Allowed. See text of plan for details.	Allowed. See text of plan for details.
Controlled take	None allowed.	None allowed.	None allowed.	Allowed by special permit, for chronic wolf-livestock depredation or wolf pressure on ungulate populations. Reporting required within 72 hours.

[38] While a species is state-listed, harassment or take is allowed only upon a finding that such harassment or take is consistent with conserving the species in Oregon. This Plan provides the necessary conservation finding. Without this Plan, the Commission or ODFW (as appropriate) would need to attempt the conservation finding based upon available data.

[39] Pursuant to new rules in OAR 635, Division 110.

[40] Where indicated with bold italic type, the action requires legislative action before it can be implemented.

These proposed actions are intended to promote conservation of wolves while allowing reasonable responses to conflicts with wolves. Rules and statutes must be amended to allow these actions. A brief summary of Oregon harassment and take law (statute and administrative rules) as they existed at the time this plan was adopted includes:

- The Commission may authorize harassment and take of a listed species only if the Commission finds that such harassment and take is consistent with conservation of the species in Oregon. Thus, so long as it would promote conservation of the species in Oregon, the Commission could include any or all of the following tools: scientific take permits, damage take permits, wildlife removal and holding permits, harassment permits, Federal incidental take statements or state incidental take permits to shield certain activities (e.g., furbearer trapping) from liability for incidentally taken wolves.

- Current harassment rules at OAR 635 Division 043 require a permit be issued by the Commission upon finding that the harassment is consistent with the conservation of the species.

- The damage statute (ORS 498.012) requires a permit for taking game mammals, non-game wildlife, and furbearers (except certain specified species). Take under the damage statutes is subject to certain conditions (i.e., damage is presently occurring, permit is authorized to a landowner or agent, take must be on land where damage is occurring).

As noted elsewhere in this Plan, the Commission calls for amendment of the damage statute to fully implement the harassment and take provisions of this Plan. Also, adoption of this Plan and its associated technical rules automatically amends current administrative rules concerning harassment and take. Table III-1 and the text that follows below summarize the types of harassment and take allowed by this Plan. Consult the associated technical rules (OAR 635-110-0010 through-0030, and 635-043-0096) for precise requirements. In the event of a conflict between this Plan and the technical rules, the technical rules govern.

1. Phase I (0-4 breeding pairs)

Non-injurious harassment of wolves is allowed without a permit by landowners or their designated agents on their own land or by permittees who are legally using public land under valid livestock grazing allotments. Such actions can include scaring off an animal(s) by firing shots into the air, making loud noises or otherwise confronting the animal(s) without doing bodily harm. Non-injurious harassment is allowed only for wolves in the act of harassing, attempting to harass or in close proximity to livestock. For such action to occur, the following criteria apply:

- No permit is required.
- No prior confirmation of wolf activity in the area is required.
- It must not result in injury to the wolf.
- It is authorized only when a wolf is unintentionally encountered.
- It must be reported to ODFW within 48 hours.

Non-lethal injurious harassment (e.g., rubber bullets or bean bag projectiles) of wolves is allowed by permit issued by ODFW to landowners or their designated agents on their own land or by permittees who are using public land under valid livestock grazing permits. The permits will be issued following confirmation of persistent wolf activity or wolf depredation on livestock. The applicant must confer with the agency to determine the most effective tool for harassment. The non-lethal injurious harassment permit shall remain valid for the livestock grazing season in which it is issued provided the livestock operator (on private and public land) is compliant with all applicable laws, including permit conditions. The agency shall inform and assist harassment permit holders (on public and private land) of non-lethal methods for minimizing wolf-livestock conflict, and shall inform permit holders that receiving future lethal control permits will be contingent upon documentation of efforts to use non-lethal methods. For non-lethal injurious harassment to be undertaken, the following criteria apply.

- An ODFW permit is required.
- Wolves may be pursued (without the requirement of an unintentional encounter).
- ODFW will consider locations of known wolf dens before a permit is issued.
- The applicant will work with ODFW to determine appropriate course of action.
- Actions can take place only on private land or public grazing allotment.
- Agencies will assist by providing equipment, staff or both if requested.
- Any incident must be reported to ODFW within 48 hours.
- No unreasonable circumstances exist that are attracting wolf-livestock conflict.

Relocation will occur when a wolf or wolves become inadvertently involved in a situation or are present in an area that could result in conflict with humans or harm to the wolf. Examples could include a wolf caught in a trap set for another animal or a wolf found living within or near communities and causing human safety concerns or killing pets. This action differs from translocation in that the need is more immediate to solve a particular situation. For such action to occur, three criteria must be met:

- The action must be conducted by state personnel only.
- Wolves will be relocated to the nearest wilderness area at the direction of ODFW.
- The action must be taken to prevent conflict with humans or reduce the possibility of harm to the wolf.

Lethal take of wolves will be authorized in two situations regarding conflict with livestock as described below. Threat to human safety is a third situation in which the use of lethal force is allowed, as discussed in Chapter VI of this plan.

1. To stop a wolf in the act of attacking livestock: On private land, landowners or their designated agents may use lethal force to stop a wolf that is in the act of biting, wounding or killing livestock. Following the incident, the landowner must preserve evidence of an animal(s) freshly (less than 24 hours) wounded or killed by wolves and a Wildlife Services or ODFW agent must confirm the wound was caused by wolves. On public land, a permit is required to use lethal force on a wolf in the act of attacking livestock. Such permits are issued only after the agency has confirmed wolves previously have wounded or killed livestock in the area and efforts to resolve the problem have been deemed ineffective.
   - No permit is required on private land, but a permit is required on public land.
   - The wolf must be found in the act of attacking, not testing or scavenging.

- There must be fresh evidence that an attack occurred (e.g., visible wounds, tracks demonstrating a chase occurred).
- The wolf carcass must not be removed or disturbed.
- Any incident must be reported to ODFW or Wildlife Services within 24 hours.
- No unreasonable conditions exist that are attracting wolf-livestock conflict.

2. To stop chronic wolf-related depredation on private and public land: State or federal agents are authorized to use lethal force on wolves on public or private land at a property owner's or permittee request if the property or an adjacent property has had either two confirmed depredations by wolves on livestock or one confirmed depredation followed by up to three attempted depredations (testing or stalking). For such action to occur, the following criteria apply:
   - The action must be conducted by authorized state or federal personnel only.
   - Attempts to solve the situation through non-lethal means must be documented.
   - No unreasonable conditions exist that are attracting wolf-livestock conflict.
   - Evidence does not exist of non-compliance with applicable laws.

Controlled take of wolves is not allowed.

2. Phase II (5-7 breeding pairs)

Non-injurious harassment of wolves is allowed under the same conditions as in Phase I.

Non-lethal injurious harassment does not require a permit on private land, and therefore is allowed by landowners or their designated agents on their own land without permit or preauthorization of any kind. Non-injurious techniques should be attempted initially. A permit is required on public land, and shall be issued to permittees who are legally using public land under valid livestock grazing allotments once persistent wolf activity or wolf depredation on livestock is confirmed. The injurious harassment permit shall remain valid for the duration of the grazing season in which it has been issued provided the grazing permittee is in compliance with applicable laws including permit conditions. For such action to occur, the following criteria apply:

- On private land:
  - no permit is required;
  - agencies will assist by providing equipment or staff; and
- On public land:
  - a state permit is required;
  - the permittee will work with the agency to determine the appropriate course of action; and
  - locations of known wolf dens will be considered before issuing a permit .
- Wolves may be pursued.
- Any action must be reported to ODFW within 48 hours.
- No unreasonable circumstances exist that are attracting wolf-livestock conflict.

Relocation of wolves will be considered under the same circumstances as in Phase I.

Lethal take of wolves will be authorized in two situations regarding conflict with livestock as described below. Threat to human safety is a third situation in which the use of lethal force is allowed, as discussed in Chapter VI of this plan.

1. To stop a wolf in the act of attacking livestock is allowed under the same conditions as in Phase I, except that a permit is not required on public lands.

2. To stop chronic depredation on private and public land – State personnel or agents are authorized to use lethal force on wolves under the same conditions as in Phase I. Private landowners (or their designated agents) on their own land, or permittees who are legally using public land may be issued a permit that provides authorization to take a gray wolf if the following two conditions are met: 1) the property or an adjacent private property or the grazing allotment has had at least two depredations by wolves on livestock that have been confirmed by ODFW or a designated agent; and, 2) ODFW determines that wolves are routinely present on that property and present a significant risk to the livestock. For such action to occur the following criteria apply:
   - A permit is required on private or public land.
   - Wolves taken under these permits are the property of the state and must be reported to ODFW within 48 hours.
   - No unreasonable conditions exist that are attracting wolf-livestock conflict.
   - Evidence does not exist of non-compliance with applicable laws, including permit conditions.
   - Documentation of efforts to use non-lethal methods is provided.

Controlled take of wolves is not allowed.

3. Phase III (7 breeding pairs)

Non-injurious harassment of wolves is allowed under the same conditions as in Phase I.

Non-lethal injurious harassment is allowed under the same conditions as in Phase II.

Relocation of wolves will be considered under the same circumstances as in Phase I.

Lethal take of wolves will be authorized in two situations regarding conflict with livestock as described below. Threat to human safety is a third situation in which the use of lethal force is allowed, as discussed in Chapter VI of this plan.

1. To stop a wolf in the act of attacking livestock on private and public land landowners or owners of livestock may use lethal force to stop a wolf that is in the act of biting, wounding or killing livestock. Following the incident, the landowner must preserve evidence of an animal(s) freshly (less than 24 hours) wounded or killed by wolves, and a Wildlife Services or ODFW agent must confirm the wound was caused by wolves. For such action to occur, the following criteria apply:
   - No permit is required on private or public land.
   - The wolf must be found in the act of attacking, not testing or scavenging.
   - There must be fresh evidence that an attack occurred (e.g., visible wounds or tracks).

- The wolf carcass must not be removed or disturbed.
- Any action must be reported to ODFW or Wildlife Services within 24 hours.
- No unreasonable conditions exist that are attracting wolf-livestock conflict.

2. To stop chronic depredation on private or public land is allowed under the same conditions as in Phase II.

Public/tribal **controlled take** of wolves on public lands by special permit may be authorized in specific areas to address chronic wolf-livestock depredation or wolf-related ungulate population or recruitment declines below management objectives in a wildlife management units, or locally. This approach also may be implemented on private lands. Permit holders would be required to obtain permission to hunt or trap wolves on private lands.

D. Agency Response to Wolf Depredation

Objective

- Develop and implement a proactive and effective wolf depredation response program that minimizes the risk of wolf-livestock conflict.

Strategies

- Respond to reports of wolf-livestock complaints in a timely manner (similar to response protocols for cougars and black bears) to prevent further losses.
- Negotiate an amendment to the Wildlife Services contract in Oregon that would include wolves in their area of responsibility.
- Coordinate with the ODA and Wildlife Services to assess the baseline of livestock losses due to depredation.
- Allow take by landowners under certain conditions authorized under the damage statutes (i.e., damage is presently occurring, permit is authorized to the landowner or to the landowner's designated agent, take must be on or near land where damage is occurring).

Wildlife Services agents respond to coyote, cougar, and black bear depredation complaints in 22 counties in Oregon. In northeastern Oregon, where wolves are expected to establish packs initially, agents are available in Wallowa and Umatilla counties, but no agents are available in Union, Baker and Grant counties due to lack of funding. Black bear and cougar complaints in these counties are reported to the nearest ODFW office. ODFW biologists investigate these complaints and work with the livestock producers to find solutions. ODFW provides $210,000 bi-annually to Wildlife Services ($120,000 from the General Fund and $90,000 from the State Wildlife Funds) through contracts to address cougar and black bear depredation. Counties, private entities, ODA and others also fund Wildlife Services activities at varying levels. A map and budget of Wildlife Services participating counties can be found in Appendix K.

While wolves remain federally listed, the USFWS, working through Wildlife Services, is responsible for investigating reported wolf depredations.

Following federal delisting, ODFW will respond to wolf complaints in a manner similar to the way the agency handles cougar and black bear damage complaints. Livestock owners with a suspected wolf depredation would contact the nearest ODFW, Wildlife Services, or OSP office to initiate the

investigation process. ODFW personnel would advise Wildlife Services agents of the situation and one or both would proceed to the location. If a depredation is determined to have occurred, the scene would be secured and Wildlife Services personnel would lead the investigation. ODFW personnel, Wildlife Services agents, and the livestock producer would work cooperatively to determine the appropriate response, including non-lethal or lethal techniques, to prevent further loss of livestock. The specific response to depredation will depend on wolves' legal status and population levels (see section C of this chapter).

ODFW will seek to amend its current contract with Wildlife Services to include responding to wolf depredations in addition to cougar and black bear. Additional funding will be necessary initially to provide coverage in all counties in northeastern Oregon. Other options will be explored, including creation of an ODFW wolf specialist position. This position would work cooperatively with Wildlife Services personnel during investigations of wolf depredations. Other responsibilities would include radio-collaring wolves, monitoring, education and outreach, research, and working closely with producers operating in areas occupied by wolves.

E. Livestock Producer Assistance

Objective

- Develop and maintain a cooperative livestock producer assistance program that proactively minimizes wolf-livestock conflict and assists livestock producers experiencing wolf-related livestock losses.

Strategies

- Implement a state-managed, wolf-related, livestock depredation compensation program as described in the next section.
- Provide education, outreach and technical assistance to landowners and livestock producers to reduce wolf-livestock conflicts.
- Work with livestock producer organizations, county extension services, ODA, conservation organizations, and other appropriate groups and agencies to develop a comprehensive outreach and educational program regarding depredation prevention (e.g., media materials, workshops, website resources, site reviews and evaluations).
- Provide resources necessary to implement non-lethal wolf control techniques [e.g., fladry, hazing supplies (shotgun and rifle shells, rubber bullets and bean bags), radio-activated guard devices, and electric fences] as needed.
- Provide regular training to state personnel, volunteers and cooperators.
- Provide timely response to wolf-related complaints through ODFW district biologists and local OSP personnel.
- Work closely with Wildlife Services to ensure proper handling and investigation of livestock depredation situations.
- Take appropriate actions to prevent additional losses.
- Work with Defenders of Wildlife, through its Carnivore Conservation Fund, to see if their program of assistance to livestock producers will complement the state program.

- Work with the citizens of Oregon, specifically livestock producers and other entities, to explore alternative funding sources for livestock producer assistance including federal or state appropriations, foundations and other sources.
- Provide landowners and local livestock producers the most current information on areas where wolves are known to be active (e.g., from radio-telemetry).

ODFW has a long history of providing assistance to landowners and citizens affected by the actions of various wildlife species. The department has been granted specific authority by the Oregon Legislature to manage wildlife populations in the state. Guided by the agency's Wildlife Damage Policy, field biologists respond to and provide assistance for a variety of wildlife damage complaints in both rural and urban settings. The type of assistance provided can take many forms including, but not limited to, technical advice, protective barriers, repellants, lethal or non-lethal removal, emergency hunts, hazing permits, kill permits, and forage enhancement programs.

Under Oregon law ODFW is not authorized to use hunting license and tag fee revenue to provide direct compensation (payments) for economic losses resulting from depredations by wildlife. Legislation would be necessary to authorize ODFW to compensate for livestock, working dog and sporting dog losses caused by wolves. Any state-sponsored wolf compensation trust fund, where private donation and state funds are mixed, would require authorization through the Oregon Legislature's Ways and Means budgeting process to expend the accumulated money.

While directed by the Wildlife Policy to manage wildlife populations at optimum levels, the department also must manage populations in a manner consistent with the primary uses of the lands and waters of the state (ORS 496.012). The policy directs that appropriate measures must be taken to assist farmers, ranchers and others in resolving wildlife damage, and that federal, state, county and local government should cooperate in related efforts to control wildlife damage (ORS.610.055). For damage, wildlife is defined to mean fish, wild birds, amphibians and reptiles, feral swine (as defined by the ODA) and other wild mammals (ORS 496.004).

Working proactively with livestock producers to minimize wolf-livestock conflicts will be an important component of a livestock producers assistance program. Sharing new information and techniques related to reducing potential wolf-livestock conflicts and making available the necessary tools and equipment will be essential for a successful program. Every effort will be made to take preventive measures through education to help reduce overall wolf-livestock conflicts. Upon approval from the Oregon Legislature, a livestock, working dog and sporting dog compensation program will be implemented for losses related to wolves.

Providing prevention assistance to livestock producers through timely response to wolf depredations will be achieved through direct contact with ODFW field offices and personnel. ODFW personnel currently are available in all counties of Oregon. Affected livestock producers would contact the nearest office of ODFW, Wildlife Services, or OSP to report a suspected wolf depredation situation. ODFW would notify Wildlife Services and OSP of the situation and then proceed to the complaint location. If a wolf is suspected in a depredation, the scene would be properly secured until Wildlife Services personnel arrived. Wildlife Services and ODFW personnel would assess the situation and recommend appropriate measures to minimize additional losses.

Attaching radio-collars to members of established wolf packs and regularly monitoring the collared wolves will provide important information regarding wolf movements and proximity to areas occupied by livestock. Close coordination between ODFW biologists, Wildlife Services and livestock producers regarding wolf movements will allow wildlife managers to anticipate potential conflict areas and respond appropriately. Livestock producers could make informed decisions regarding changing animal husbandry practices in response to current wolf location information.

F. Compensation Program

Introduction

The return of the gray wolf to Oregon has initiated consideration of management options that previously have not been on the state's menu of available management strategies for native wildlife that cause harm to domesticated animals. The primary concept recommended is to compensate individuals who suffer wolf-caused depredation of livestock, working dogs, and sporting dogs. **The Oregon Legislature must approve a state-sponsored wolf compensation program before such a program can be implemented. The details of legislation to authorize payment for livestock losses are unknown at this time. Therefore, the proposed livestock compensation program described in this document may change as any authorizing legislation proceeds through the review process.**

Recommendation

This plan recommends implementation of state-run and state-guaranteed fund to pay compensation for confirmed and probable livestock losses. The relationship between effective non-lethal control measures and their ability to reduce livestock losses is an important consideration in development of the fund. This fund would be used to pay for all or part of the costs incurred by private individuals associated with implementing non-lethal control measures. It also is recommended that financial losses for lost or missing livestock could be considered as an expense for which a livestock producer could be reimbursed. In this chapter of the Plan, we use "livestock" in a broad sense. We begin with a provision in the state agricultural laws which defines "livestock" to mean: ratites, psittacine, horses, mules, jackasses, cattle, llamas, alpacas, sheep, goats, swine, domesticated fowl and any fur-bearing animal bred and maintained commercially or otherwise, within pens, cages and hutches (ORS 609.125). For purposes of authorizing compensation for wolf-related conflicts, we add to that definition bison, working dogs (guarding dogs or herding dogs), and sporting dogs.

Rationale for Compensation Fund

The recommendation is based on the following rationale: public support for the concept, concerns for fairness, conservation of the species, and existing precedent.

Public Support. Public support for a compensation fund was clearly stated in comments generated during wolf town hall meetings held by ODFW throughout Oregon during 2002-2003. Additionally, a 1999 poll of Oregonians by Davis and Hibbitts demonstrated public support for the return of wolves to the state and for compensation to livestock producers for wolf-caused losses.

Fairness. Many people who support wolf restoration view the payment of compensation as an opportunity to share what they perceive to be a burden they do not wish livestock producers to have to bear alone. Some livestock producers whose parents and grandparents struggled over the last 150 years to eradicate wolves from Oregon strongly object to having to suffer any wolf-caused livestock losses and strongly supported payment for those losses in exchange for allowing the wolf to return.

Conservation. A strong conservation rationale also exists for paying compensation, which can increase human tolerance for wolves among at least some sectors of landowners and livestock producers.

Precedent. Precedent exists in other states for wolf compensation funds including the state-run programs of Minnesota, Wisconsin and Michigan, and the private fund administered by Defenders of Wildlife. The Defenders of Wildlife compensation fund already is available to affected, eligible livestock producers in Oregon, and the organization has expressed its commitment to a wolf compensation fund for the long term and a desire to link this fund with proactive efforts designed to prevent wolf-livestock conflicts. Even so, it is important for Oregon to develop its own compensation fund because at some point in the future, the privately operated Defenders of Wildlife fund may cease to exist. A similar recommendation was included in Montana's state wolf plan, adopted in 2003, though Montana's livestock producers currently are recipients of compensation funds paid by Defenders of Wildlife and will continue to be well into the future, as Montana has not yet developed a source of funding for a state-operated compensation program.

Funding

It is recommended that a state-implemented compensation trust fund be established accepting private donations, grants, federal funds if available, and state funds to create an interest-bearing account. Further, the state should create the trust fund with $200,000 of initial seed money to attract contributions from private sources. The fund will be developed to compensate for livestock depredations, the costs associated with implementing non-lethal control measures, and the loss of working and sporting dogs.

Key Elements

This plan recommends the Legislature codify a compensation program that includes the following key elements:

a. USDA Wildlife Services, U.S. Fish and Wildlife Service, and Oregon Department of Fish and Wildlife will be the lead agencies to investigate livestock depredation. Investigators will identify the cause of depredation, if possible, based on wolf presence in the area and a reasonable determination of the cause of death. Investigations will be conducted within 24 hours upon notice of a depredation incident from the livestock producer. The investigator will make a recommendation regarding compensation to the subcommittee described in section j below.

b. Compensation will be for fair market value using the following formula:
    1. Sires – Compensation at purchase price (sales receipts are required) or average price paid for most recent sires. If sales receipts are unavailable, local market value for animals of same breed and age will be used.
    2. Dams – Compensation will be paid on a dam's individual market value based on available recorded sales of same age and quality of dams from the herd.
    3. Young of the year – Compensation will be based on the average amount received for other young of the year for same gender and similar-aged animals.

c. Compensation will be at market value for wolf-caused injuries to livestock that are, as a result of those injuries, unable to reproduce and have to be destroyed or sold. Producers will be able to recoup veterinary treatment costs for injured animals.

d. Confirmed losses shall be paid at 100 percent of their market value and probable losses shall be paid at no less than 50 percent of their market value. Other verifiable financial losses attributed to wolves can be submitted for consideration of compensation.

e. Compensation shall be paid for wolf-caused depredation on private lands and for livestock grazing legally on federal and state property.

f. Livestock producers are encouraged to employ management techniques that have the highest likelihood of success in resolving conflicts and are reasonable for the individual situation. Whether management techniques to discourage wolf depredations are employed will be taken into consideration in determining compensation for subsequent occurrences.

g. Payments for wolf-caused depredation shall be reduced by the amounts received by the owner's proceeds from an insurance policy covering livestock losses, working or sporting dogs, or from any other source for the same purpose including a federal or private compensation program.

h. Working and sporting dogs shall be compensated for at fair market value based on sales records of similar ages and gender for dogs, not to exceed $2,500 per dog. Sporting dogs include hounds and hunting dogs. Compensation will be paid for sporting dogs killed by wolves only during authorized hunting or pursuit season.

i. Compensation payment will be made in a timely manner upon discussion with the livestock producer to reach agreement when payment would be most beneficial.

j. A Compensation Committee selected by the Fish and Wildlife Commission would be established to refine the Compensation Plan in consultation with ODFW, upon adoption of authorizing legislation. The function of the Compensation Committee would be to recommend administrative steps for filing compensation claims with ODFW, and appeals procedures for contested claims. The Committee would present their recommendations to the Fish and Wildlife Commission for adoption. Upon adoption, the Compensation Committee would be dissolved. Compensation Committee Membership: cattle producer, sheep producer, employee of Oregon Department of Agriculture, a sportsperson (hunter), wolf conservationist.

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IV. WOLF-UNGULATE INTERACTIONS

This chapter focuses on current management of wild ungulate[41] species in Oregon, interactions between wolves and ungulates, and those strategies that will be used to ensure retention of recreational ungulate hunting opportunities and healthy ungulate populations.

Wolves dispersing into Oregon likely will attempt to occupy areas with abundant ungulate prey. Other carnivore species including coyotes, cougars and black bears also will be interacting with prey species, including ungulates, in the same areas. The effect of adding wolves to the mix of carnivores occupying Oregon and the influence this suite of carnivores will have on ungulates is unknown at this time. Each wolf-prey system is unique, and the presence of other carnivores and domestic livestock in addition to ungulates make predictions difficult at best. Separate management plans exist for two other carnivores and a number of ungulate species. The state's capacity to achieve management goals for all of these species will be enhanced if the plans are considered collectively.

Healthy and abundant prey populations will play an important role in achieving wolf conservation in Oregon. They also are important for maintaining hunting opportunities which contribute to many local economies. The status of ungulate populations and resulting hunter opportunity are significant factors in many rural communities, especially in eastern Oregon. As hunting opportunities decline, fewer hunters (many of whom reside in the western part of the state) spend money for excursions into rural Oregon. This loss of visitors and seasonal income stream can be significant for some small communities. For example, from 1995 to 2003, elk hunting opportunities for bull and antlerless elk have declined by 6,750 permits in Wallowa County. The challenge for wildlife managers will be to maintain or improve ungulate populations capable of supporting wolves and other carnivores while maintaining hunting opportunities for the public.

Hunters, along with private landowners and conservation organizations, have been at the forefront of supporting and financing wildlife conservation in Oregon. Through hunting license and tag fee revenues, important wildlife conservation and management activities are made possible in the state.

The effect of wolves on prey populations in Oregon is the subject of many questions and much debate among members of the public. Many Oregonians have expressed concern over the prospect of adding another carnivore to the suite of carnivores that currently exist in the state. Specifically, deer and elk hunters voiced concern for ungulate populations in some areas of eastern Oregon that are experiencing low calf elk and fawn mule deer survival. In some wildlife management units, hunter opportunity has declined significantly in recent years as biologists reduce hunting tag numbers to counteract the low survival of ungulate young and decreased populations.

Much of the concern about wolves expressed by the hunting community may be related to the popular belief that current carnivore populations (coyotes, cougars and black bears) in Oregon are large and expanding. In general, cougar populations have been increasing in number and expanding in geographic range for several decades since they were reclassified as game mammals. ODFW estimates the statewide cougar population to be in excess of 4,000 animals. Black bears also have increased in numbers and range during the same period, although they are not as widespread as

[41] Wild ungulate species in Oregon include elk, deer, pronghorn, bighorn sheep, and mountain goats.

cougars because of different habitat requirements. ODFW estimates the black bear population in Oregon at 25,000-30,000 animals. No statewide estimate of coyotes is available, but they are considered abundant and ubiquitous in Oregon.

There exists an ongoing debate regarding the effects of these carnivores on ungulate resources in Oregon. Deer and elk are the primary prey of cougars in Oregon and elsewhere in the western United States (Hornocker 1970, Murphy 1998, Nowak 1999, Johnson – personal communication). Black bears opportunistically prey on ungulates, taking primarily newborn young or stealing kills made by cougars. Research in Oregon (Trainer et al. 1983) and elsewhere has shown that coyotes prey on young ungulates, primarily deer (Trainer et al. 1975) and pronghorn (Trainer et al. 1983), and to some extent elk calves (Johnson, unpublished). However, there remains uncertainty among experts regarding the degree to which carnivores influence ungulate prey. Ongoing and future research may unravel more of the inherent mystery surrounding this controversial subject.

Reduction of elk hunting opportunities (primarily antlerless) and inability to reach or maintain management objectives in some northeast Oregon wildlife management units is believed to be the result of increasing predation pressure by cougars, and to some extent black bears. Other mortality factors (e.g. disease, starvation, winter loss) also affect these elk populations. Data from current research on elk nutrition/cougar predation in northeastern Oregon has shown cougar predation to be the main mortality factor for elk calves in the study area. However, recent research indicates that recurrent nutritional deprivation may be implicated in low calf recruitment in forest landscapes (Cook et al. 2004). An ongoing study by Idaho wildlife researchers has revealed higher than expected predation on elk calves by black bears.[42]

Current cougar management strategies have been ineffective in managing cougar numbers and directing cougar harvest in areas where cougar predation is suspected to be affecting elk productivity. The current 10-month open season, statewide open area and unlimited tag numbers have resulted in opportunistic harvest of cougars by hunters, primarily during deer and elk hunting seasons. The resulting harvest is much more random across the landscape than occurred in the past with hound hunting strategies. Strategies to manage cougar and black bear numbers in areas occupied by wolves could be hampered by this situation and may be changed in the future.

A. Wolf Predation of Ungulates

In eastern Oregon, where wolves are predicted to establish first, mule deer and Rocky Mountain elk represent the most abundant prey species. To a lesser extent, white-tailed deer, pronghorn, Rocky Mountain bighorn sheep, California bighorn sheep and mountain goats could potentially be prey for wolves on the eastside. Mule deer likely would be the preferred wild prey in high desert habitats of southeastern Oregon. Wolves that migrate into areas of western Oregon would find populations of black-tailed deer, Roosevelt elk and, potentially, Columbian white-tailed deer.

Ungulate populations are composed of prime age animals and more vulnerable animals including young of the year, older animals, and diseased and injured individuals. Wolves tend to exploit the more vulnerable, less fit individuals. Heavily pregnant female ungulates also are prime targets for wolves. Prey species have evolved defensive techniques such as alertness, speed, herding behavior,

[42] Personal communication with Pete Zager, Idaho Fish and Game

swamping, spacing, migration and retreating into water, all of which tend to reduce probability of a kill by wolves. Because of these defense mechanisms, the majority of hunts initiated by wolves are unsuccessful. Hunting success of wolves is variable and can be influenced by terrain, weather, snow, time of day, prey species, age and condition vulnerability, experience and other factors (Mech and Peterson 2003).

Much has been written in the scientific literature regarding the interaction and effects of wolves on prey numbers, but few common conclusions have been drawn. Wolf researchers Mech and Peterson (2003) suggest three reasons why scientists have been unable to reach agreement regarding the significance of wolf predation on the dynamics of prey populations. These are: 1) each predator-prey system studied had ecological conditions that were unique; 2) wolf-prey systems are inherently complex; and 3) population data for wolves and their prey are imprecise and predation rates are variable.

The question of whether mortality caused by wolves is considered "compensatory" or "additive" has generated much debate among researchers and the public. Wolf predation is considered compensatory when it takes the place of other mortality factors, such as when wolves kill prey that would have died anyway from starvation or disease. Additive mortality occurs when wolves kill prey that were not necessarily destined to die of other causes in the short term. These theories are somewhat unclear when describing the nature of wolf predation involving young animals (calves and fawns). It is unlikely that all young killed by wolves were predisposed to die at a young age. In this example, some wolf mortality on young would be considered additive. More research and application to Oregon of research that has been done elsewhere is needed if biologists are to understand the role wolves play in influencing prey numbers.

As wolves enter Oregon and biologists radio-collar individual wolves, monitoring data will reveal more specifics regarding wolf-prey interactions. Some biologists predict wolf-prey interaction in Oregon will be analogous to that in Idaho because of the similarities in prey and habitats. Wolves in Idaho prefer elk as the primary prey species. A winter study of predation by wolves and cougars in central Idaho during 1999-2001 documented 120 ungulate kills by wolves. Mule deer accounted for 23 percent (28 animals) of the total, while elk accounted for 77 percent (92 animals).[43] Elk are predicted to be the preferred prey in the Wallowa, Blue and Ochoco mountains of central and northeastern Oregon.

Mech and Peterson wrote in 2003 that predation rates calculated for various prey species have been measured many times and are highly variable.[44] Predicting preferred ungulate prey and predation rates for wolves in Oregon would be difficult at best. Where wolves become established and at what population level will play an important role in attempting such predictions. In Oregon, where three sub-species of deer and two sub-species of elk are found, predictions become even more tenuous.

[43] Curt Mack, Nez Perce Tribe wolf biologist, presentation to Wolf Advisory Committee, January 2004.
[44] See Mech and Peterson (2003), Table 55 (p.144), "Wolf kill rates during winter."

B. Big Game Wildlife Management Units and Management Objectives

ODFW established Wildlife Mangement Units (WMUs) and management objectives (MOs) to manage deer and elk populations and hunter numbers. WMUs were established to allocate harvest and distribute hunters rather than delineate big game species herd ranges. WMUs are long standing geographic areas with boundary descriptions and maps printed in the annual Oregon Big Game Regulations pamphlet. MOs are the number of deer and elk that ODFW strives to maintain in each WMU in the state (see Figures 5 and 6 for maps of WMUs).

There are two types of MOs for each WMU. MOs for deer and elk are set for both the population size and the desired ratio of bucks to 100 does (buck ratio) and bulls to 100 cows (bull ratio). Annual herd composition information, including buck, bull, and spring fawn and calf to adult ratios, are used to monitor the adult male population segment and the recruitment of young animals into the population. Management strategies are designed to maintain population characteristics near MOs.

When ODFW determines MOs for deer and elk in a WMU, a variety of factors are considered. These include landowner tolerance, habitat, land ownership, winter range, carrying capacity and public access. How each factor influences the final MO varies by species and the unique circumstances of each management unit. The primary consideration for each MO is the department's statutory obligation to prevent the serious depletion of indigenous wildlife, provide optimum recreational and aesthetic benefits, and maintain populations at levels compatible with the primary uses of the land. In areas where deer and elk winter primarily on private lands, damage to private property is a critical factor influencing MOs.

- **Elk Population Information**

  Appendix L displays MOs for elk populations for each WMU in the state. Statewide, most populations and bull ratios are close to the desired MO. Where populations are below the MO, particularly in some northeastern Oregon units, calf-to-cow ratios show a downward trend since 1965. Factors contributing to the decline include predation, nutrition (habitat condition) and human-caused factors. The statewide population of Rocky Mountain and Roosevelt elk is estimated to be 120,000. (Figure 5 maps 2004 elk population estimates by WMU.)

  Historic records indicate both subspecies of elk were numerous and widely distributed in Oregon prior to the arrival of early settlers. Settlers hunted elk as a primary food source and hunting by market hunters was unregulated until the early 1900s. Concern was expressed by Oregonians about the scarcity of elk by the 1880s. Hunting was closed by the Oregon Legislature in 1909, and elk populations began a slow recovery in remote areas of eastern and western Oregon. Elk hunting was again allowed by 1933. In the 1940s modern techniques for managing wildlife allowed elk numbers to increase until the 1980s, when MOs with population numbers were adopted. Elk populations have remained stable throughout the state since that time.

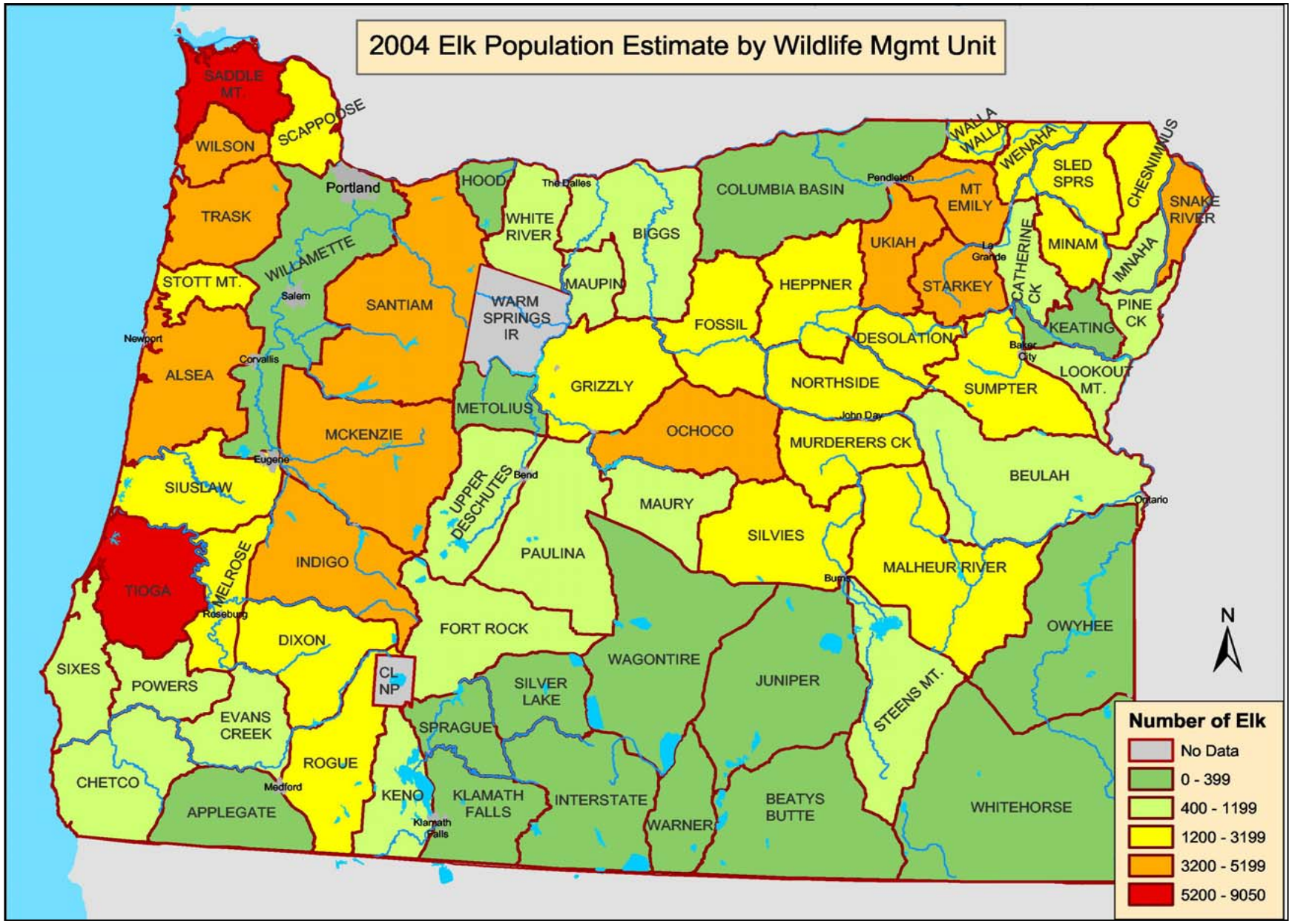

Figure 5. Elk population estimates (2004) by Wildlife Management Unit (Source: ODFW).

Roosevelt elk populations are stable or increasing in western Oregon (see Appendix L for a list of MOs for each WMU). Most Roosevelt elk populations are near both bull ratio and population MOs. Habitat changes resulting from changes in timber management practices may be contributing to an apparent shift in the population from federal forestlands to private timber and agricultural lands in some areas. Predation by cougars may be contributing to local declines or maintaining populations at current levels. The Roosevelt elk population for Oregon is estimated at approximately 60,000 animals.

Total Rocky Mountain elk numbers have been stable the last six years. While some areas have declined, other portions of the state are seeing elk numbers expand. With the change in bull management strategies in the mid-1990s the ratio of bulls to cows has increased. More mature bulls are now observed at elk viewing sites and in the hunter bag limit. Timber harvest declines during the past 10 years on federal lands have caused slight distribution changes throughout private and public land. Elk nutrition plays significant role in survival during the winter months (Cook et al. 2004). Drought in eastern Oregon the last several years has resulted in poor body condition. Cougar and black bear predation also are major factors for localized declines in elk recruitment and overall production. The current Rocky Mountain elk population is estimated to be approximately 60,000.

- **Mule Deer Population Information**

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 the mid-1950s, mid-1960s and mid-1970s. The estimated spring population in 1990 was 256,000 animals, 19 percent below the established statewide management objective of 317,400 as listed in the Oregon Mule Deer Plan (ODFW 1990). The estimated 2001 population was 266,050 and continues to remain below established management objectives.

Fluctuations in mule deer populations can be attributed to several factors that directly or indirectly affect 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 dominated by shrubs and forage species that were more favorable for deer, 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 (ODFW 2003).

Many mule deer ranges no longer will 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. Appendix L contains tables of mule deer MOs and mule deer

population estimates for each WMU with mule deer. The estimated mule deer population for Oregon is approximately 240,000 animals (ibid.). Figure 6 maps 2004 mule deer population estimates by WMU.

- **Black-tailed Deer Population Information**

  Black-tailed deer populations are declining in many areas of western Oregon. Habitat changes (resulting from changes in timber management practices including dramatic reductions in timber harvest on federal property), diseases (particularly deer hair loss syndrome) and predation (bobcats, coyotes and cougars) are factors contributing to recent declines. There are no MOs for black-tailed deer. In 1998 the black-tailed deer population was estimated at approximately 387,000. Current black-tailed deer population trend information is not available for all areas; available information indicates the population has declined since that time. The current black-tailed deer population for Oregon is estimated at approximately 320,000 animals. It is estimated that approximately 54 percent of the population (173,000 deer) occurs in southwest Oregon in the Melrose, Tioga, Sixes, Powers, Chetco, Indigo, Dixon, Applegate, Evans Creek and Rogue WMUs.

- **White-tailed Deer Population Information**

  The Idaho white-tailed deer inhabits portions of northeastern Oregon. Populations have been expanding geographically as well as numerically during the past 25 years. Preferred habitats include low elevation riparian areas, low elevation forested areas and agricultural areas. The most abundant populations are located along the western edge of the Blue Mountains in Umatilla county as well as in portions of Union and Wallowa counties. No population estimates are available at this time.

  Two populations of Columbian white-tailed deer exist in Oregon, one in southwestern Oregon near Roseburg and the other on a series of islands and the mainland in the lower Columbia River. There have been no formal MOs adopted for this sub-species of white-tailed deer. Columbian white-tailed deer were listed as endangered by the federal government in 1973 and were included on the original state endangered list in 1987. Populations have been increasing to the degree that the Roseburg population was removed from the state endangered species list in 1995 and federally delisted in 2003. The lower Columbia River population remains listed under the federal ESA but populations are increasing to the point where a downlisting to threatened or delisting is being considered. Population estimates for the two populations are approximately 6,000 animals in the Roseburg population and 400-600 animals in the Columbia population, which includes animals found in Washington. Major threats to the population include disease (adenovirus and deer hair loss syndrome), predation, habitat loss and major flooding in the Columbia River area. Trapping and transplanting is a major activity to repopulate historic range and to secure the populations' survival in case of a catastrophic event.

- **Pronghorn Population Information**

  Oregon's pronghorn population has increased during the last 25 years, with the majority of the animals occupying the arid sagebrush/grasslands of southeastern Oregon. Short-term fluctuations in population levels and recruitment have occurred during this time period. These fluctuations were primarily attributed to changes in coyote abundance and winter weather severity. The long-term population increase has been aided by development of irrigated alfalfa on private land, which has expanded and improved pronghorn habitat in many areas. The estimated pronghorn population for Oregon is 24,000 animals.

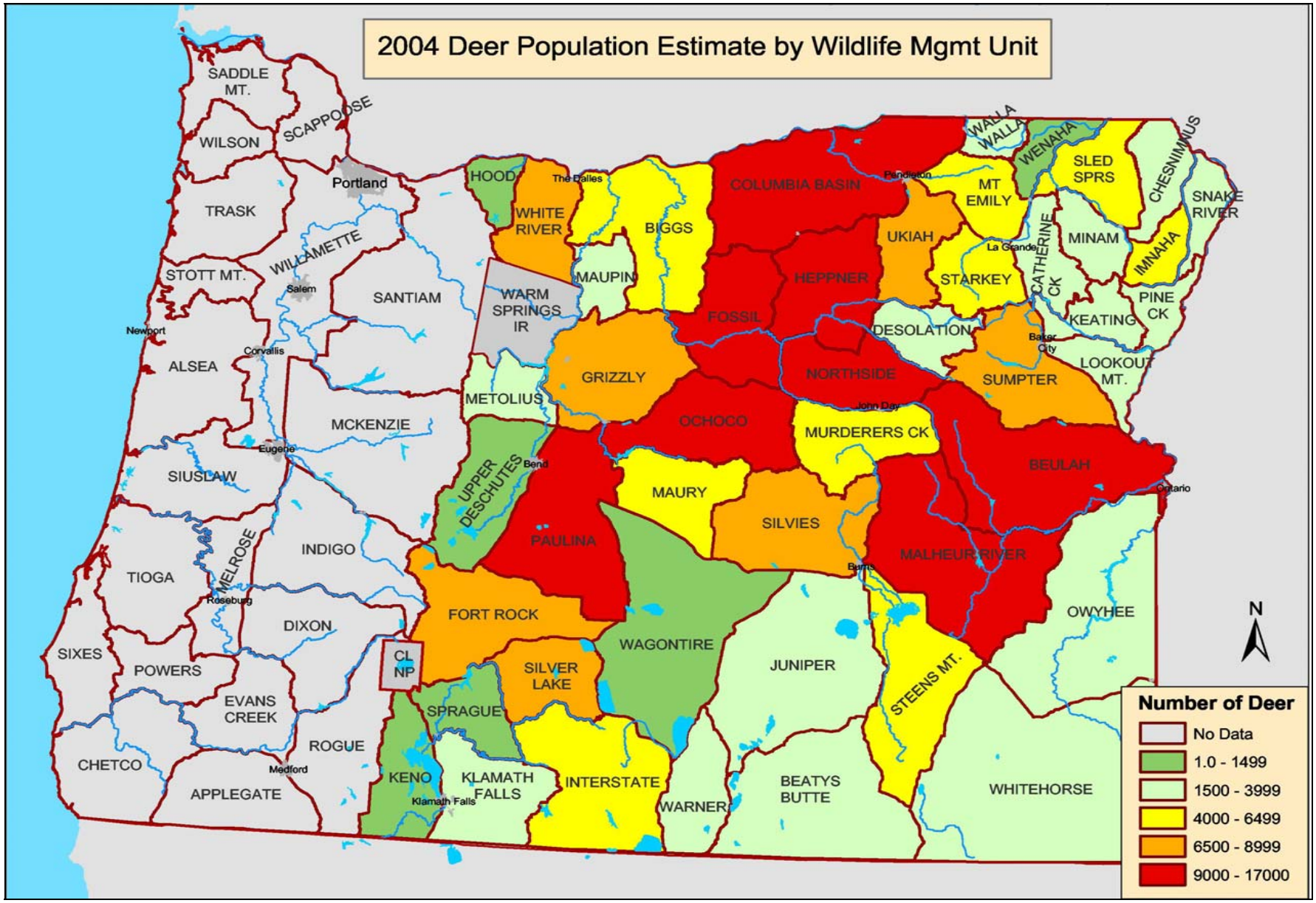

Figure 6. Mule deer population estimates by management unit. Black-tail deer estimates are not available for Westside units (ODFW).

- **California Bighorn Sheep Population Information**

  California bighorn sheep were extirpated in Oregon by 1912. All 30 current herds were reestablished through transplants since 1954. Most herds in the state are stable to increasing. Factors affecting the four herds experiencing recent declines are thought to be predation (cougar and eagle), habitat issues (juniper encroachment and noxious weeds) and disease. California bighorn are susceptible to pasteurella pneumonia outbreaks, but most of the range does not have domestic sheep allotments, therefore the potential for infection is lower than in Rocky Mountain bighorn sheep populations. The current California bighorn sheep population in Oregon is estimated to be 3,700.

- **Rocky Mountain Bighorn Sheep Population Information**

  Rocky Mountain bighorn sheep were reintroduced in 1971 after being extirpated from the state in the 1940s. A tri-state, multi-agency and private conservation group effort to reestablish bighorn sheep in Hells Canyon was started in 1997 (Hells Canyon Bighorn Restoration Initiative). Ongoing research indicates disease (pneumonia) from domestic sheep and goats is the primary cause of mortality followed by cougar predation on adults. The population estimate in 2004 was 900 animals (660 in Oregon) in 16 herds or subpopulations. This project area includes 5.6 million acres in the Snake River drainage in Oregon, Idaho and Washington. Population growth rates have been about 7 percent annually, with only two herds numbering more than 100 animals.

  Some herds have "patchy" habitat (e.g., Wenaha) where they move from cliff face to cliff face through grassland where they would be vulnerable to wolf predation. Most sheep herds have low population numbers and may need additional protection from wolf predation.

- **Rocky Mountain Goat Population Information**

  Rocky Mountain goats indigenous to the north central Cascades and northeast Oregon likely disappeared prior to European settlement. Restoration efforts began in 1950 with a release of five goats in the Wallowa Mountains. More recently, successful reintroductions have occurred in the Elkhorn Mountains and Hells Canyon. Populations have exhibited good production and recruitment. Pioneering of vacant habitats has occurred in the Vinegar Hill, Mount Ireland and Strawberry Mountains areas. Future management will be focused on restoration efforts in suitable habitats. Oregon currently has an estimated 480 mountain goats.

  Because mountain goats primarily inhabit rugged cliff type habitat, wolf predation is not expected to be a concern. However, for some goat herds in Alberta, wolf predation has caused considerable declines in kid recruitment.

C. Strategies to Address Wolf-Ungulate Interactions

Objective

- Develop and implement adaptive management strategies to achieve conservation goals for wolves while meeting management objectives for ungulate species.

Strategies

- Provide wolf population and monitoring information to ungulate managers annually to assess potential impacts of wolves on all ungulates.
- When predation is determined to be the primary cause of ungulate population or recruitment decline locally or in a WMU, ensure carnivore-focused management actions.
    - If the primary predator species is unknown and wolves are:
        - a state-listed species, initiate management actions that manage other carnivore populations to achieve ungulate population goals before considering actions involving wolves.
        - not a state-listed species, initiate actions to manage appropriate carnivore populations to achieve ungulate goals.
    - If wolves are determined to be the cause of ungulate population or recruitment decline and are:
        - a state-listed species, consider capturing and relocating wolves to other suitable habitat.
        - not a state-listed species, use translocation, relocation or controlled take to reduce wolf numbers.
- Active management (e.g., non-lethal or lethal removal) of wolves will be initiated in areas where ungulate species have been transplanted to supplement or expand their historic range, if wolves are determined to be affecting the success of the transplant goals and the Commission determines that such take of wolves would be consistent with conservation of wolves in Oregon. Lethal removal of wolves will be an option only following delisting.
- Active management of wolves may be initiated in important ungulate winter ranges or winter feeding sites that serve to draw ungulates away from agricultural lands. These sites may attract wolves and could cause ungulates to abandon them in some circumstances.

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V. WOLF INTERACTIONS WITH OTHER SPECIES

This chapter describes the potential wolf interactions with other carnivores, hybrid wolves, ESA-listed species, and the potential ecosystem response. Strategies to address these types of interactions are educational in nature because the research on these types of interactions is relatively new and untested in Oregon and because ODFW does not have authority to manage some of the effects.

With the prospect of wolves entering Oregon close at hand, much of the discussion and concern has centered on the interactions of wolves with livestock and ungulate species. However, wolves in the Oregon landscape also will interact with a host of other species including other carnivores such as cougars and coyotes, as well as with mammal and bird species. Many of these interactions will have immediate implications for either the wolf or the species in question. Other interactions, such as those with vegetation, may be more subtle and difficult to directly relate to wolves by any measurement.

A. Carnivore-Carnivore

Wolves in North America and elsewhere have shared habitats and co-existed for centuries with the full suite of carnivore species found in the variety of habitats occupied. How different carnivore species interact with wolves varies depending on habitat, environmental conditions and other factors. A 2003 literature review found examples where wolves were reported to have eliminated certain carnivores (such as coyotes) locally, but found no evidence of long-term spatial partitioning of resources within an area (Ballard et al. 2003).

To date, no definitive research exists on the effects wolves cause on carnivore community structure or populations (ibid., and USFWS 1994). Information regarding the interactions between other carnivores and wolves is primarily observational and subject to interpretation when attempting to make predictions at the population or community level. Because wolves are wide-ranging and many carnivores are secretive in nature, collecting data on the interactions of the two is very problematic.

In Oregon, wolves will share habitats occupied by a variety of other carnivores including coyotes, cougars, black bears, bobcats, red foxes, gray foxes, river otters, minks, pine martens, fishers, ringtails, weasels, skunks, wolverines, badgers and raccoons. Direct interactions almost certainly will occur as wolves begin to occupy habitats within their historic range in Oregon and establish packs.

A review of the scientific literature offers a glimpse of what may occur in Oregon when wolves interact with the carnivore species noted above. Large carnivores such as cougars and black bears occupy mountain habitat similar to habitat occupied by wolves. In a 2003 summary of wolf-black bear interactions in North America, researchers found wolves sought black bears in their dens and often killed them but did not always consume them. They reported only one observation of a black bear killing a wolf (Ballard et al. 2003).

Cougars and wolves both rely on ungulates as their main food source, but use different hunting techniques. Wolves hunt in packs and generally course or test prey while cougars are solitary hunters and rely on ambush of unsuspecting prey. Few observations of wolf-cougar interactions have been reported, but the two species do sometimes kill each other. During winter, wolves and cougars often

occupy the same winter range as ungulates. Wolves seeking out and taking over cougar kills may increase kill rates of cougars as they attempt to replace lost prey (Murphy 1998, Kunkel 1997, Hornocker and Ruth 1997). This scenario may have implications for ungulate management in Oregon due to the existing large cougar population, which is estimated to be more than 4,000.

Reported observations of interactions between wolves and coyotes are more common in the scientific literature than with other carnivore species. Reports of wolves killing coyotes are common.[45] In Yellowstone National Park, one study reported that most wolf-coyote interactions occurred around wolf kills when coyotes attempt to scavenge ungulate carcasses. The biologists noted several short-term changes in coyote populations in the Lamar Valley following wolf reintroduction: 25-33 percent of the coyote population was killed each winter; coyote numbers declined by 50 percent; and coyote pack size reduced from six to 3.8. In addition, coyotes denned closer to roads and reduced the frequency of vocalizations, presumably to avoid detection (Crabtree and Sheldon 1999).

The presence of wolves in Oregon likely will change the distribution of other carnivores as they attempt to avoid direct interactions with wolves. Such changes could favor some carnivore species over others (e.g., red foxes may benefit from coyote-avoidance responses). It is unlikely that wolves will adversely affect the overall numbers or distribution of other carnivores species in Oregon, but they may cause localized reductions.

B. Hybrids

Wolf hybrids are regulated as domestic dogs in Oregon. This plan has no jurisdiction over wolf hybrids. Authority to regulate the breeding, raising and holding of wolf hybrids lies with individual Oregon counties. Some Oregon counties have adopted ordinances that regulate the possession of captive wolves and wolf hybrids. For example, Union County prohibits breeding of captive wolves, keeping wolves within the county and release of a predatory animal. Efforts will be made to ensure counties are aware of the plan and coordinate their actions with ODFW as appropriate.

Wolves are capable of hybridizing with other canid species. Documented hybridization has occurred with coyotes, domestic dogs and feral dogs. In some instances the hybridization may be limited to a single event or result in the evolution of a group of wolves suggested to be a distinct species (Wilson et al. 2000). Generally, behavioral differences between wolves and wolf hybrids, coyotes and dogs keep the populations distinct.

The possession of wolves or hybrids as pets is discouraged because of the potential threat to human safety. "Hybrids and tame wolves have little fear of humans, are less predictable and manageable than dogs, and are considerably more dangerous to people" (Fritts et al. 2003).

Because wolf hybrids can be difficult to distinguish from wild wolves, negative encounters between humans and hybrids often are attributed to wild wolves. The potential does exist for the genetic pollution of wild wolf populations, but the risk is low considering hybrid wolves released into the wild have a low survival rate.

[45] See Seton 1929, Young and Goldman 1944, Munro 1947, Stenlund 1955, Carbyn 1982, Paquet 1991, Thurber et al. 1992 as reported in Ballard et al. 2003.

C. ESA-listed Species

Some Oregonians have expressed concern regarding the fate of other listed species when gray wolf populations become established in the state. The federal and state threatened and endangered fish and wildlife species in Oregon can be found in Appendix M.

Wolves in Oregon are not likely to have a measurable adverse impact on any species currently listed as threatened and endangered in the foreseeable future. Species that could be affected by wolves include wolverines, kit foxes, Washington ground squirrels, Columbian white-tailed deer, and bald eagles. Two of these species, the Columbian white-tailed deer and the Washington ground squirrel, are listed as endangered; the others are threatened.

The Washington ground squirrel is found only in the Columbia Basin Province of Oregon, a highly modified region that would be considered poor habitat for wolves. In the unlikely event wolves were to disperse into this area, the risk to ground squirrels would be minimal. This species is subject to predation by mammalian and avian predators, and the addition of wolves would be predicted to have little if any effect. Loss of habitat for the ground squirrel remains the most pressing problem for this species.

The Columbian white-tailed deer population found along the lower Columbia River in Oregon and Washington in northwestern Oregon is federally listed as endangered. The Columbian white-tailed deer populations are small and generally located near human habitation. Wolves are not expected to successfully disperse to western Oregon and establish packs for a considerable time period. If wolves were to establish a pack near one of the Columbian white-tailed deer population areas, managers could consider relocating them.

Two other mammalian species, the kit fox and wolverine, potentially could interact with wolves in the future, although the likelihood is remote at best. No known populations of wolverines exist in Oregon at this time. The two species occupy similar habitats in mountainous regions and could interact in the future if wolverine populations become established. The kit fox is found in far southeastern Oregon and is not likely to interact with wolves in the near future. If wolves disperse to the high desert areas of Oregon, their impacts on the local coyote population could serve to enhance the situation for kit foxes.

Bald eagles, although abundant, are still a state and federally listed species. They may derive a benefit from the presence of wolves in that bald eagles are a common scavenger at ungulate kills and at carcasses of winter-killed animals. Wolves tend to kill ungulates in more open terrain and therefore carcasses may be more detectable by eagles. As wolves become established in Oregon, additional carcasses may be available for eagles to scavenge. However, additional food sources have not been suggested as a limiting factor for eagle survival or population increases.

D. Vegetation and Other Ecosystem Responses

In a discussion of the ecosystem effects of wolves, Mech and Boitani wrote that wolves influence other ecosystem components and processes like other species, but they do it in a more conspicuous way. The researchers listed five primary effects of wolves on ecosystems. These were sanitation (culling of less fit individuals); control or limitation of prey numbers; stimulation of prey productivity; increase in food for scavengers; and predation on non-prey species. They wrote that these "primary effects" cascade through the ecosystem causing other changes (indirect effects), about which little is known or understood the further away they are from the direct effect of wolves (Mech and Boitani 2003).

Examples mentioned by Mech and Boitani in Yellowstone Park include observed reductions in coyote numbers that could lead to an increase in red fox populations which are subject to predation by coyotes in the absence of wolves. Reduced coyote numbers could cause an increase in coyote prey species, which may influence other small carnivore populations. However, with more wolf-killed carrion available, other small carnivore populations could benefit unrelated to the direct killing of coyotes by wolves. More small carnivores could lead to reduced prey populations for these species, which ultimately may affect small carnivores in different ways.

Recently, two different research projects documented the influence of wolves on bird and insect species. These effects were attributed to the presence of wolf-killed carrion and the interaction of small carnivores and their prey.[46]

Another indirect effect attributed to wolves involves reported effects on vegetation in Yellowstone Park (Ripple et al. 2001; see also Beschta 2003). Preliminary data suggests recruitment of aspen and cottonwood was greatly reduced following removal of wolves from the Yellowstone early in the last century. This allowed elk to browse in riparian zones unaffected by the presence of wolves. With the return of wolves to Yellowstone, vegetation growth and recruitment has been documented, presumably due to the interactions between wolves and elk.

E. Strategies to Address Wolf Interactions With Other Species

Objective

- Build awareness of the effects of wolves on other species.

Strategies

- Support research conducted by other organizations that will provide information about wolf interactions with carnivores, hybrids, ESA-listed species and the long-term ecosystem response.
- Cooperate with counties and ODA on the regulation of hybrids.

[46] Stahler (2000) and Sikes (1994) as reported in Mech and Peterson 2003.

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VI. WOLF-HUMAN INTERACTIONS

Many Oregonians attending the wolf town hall meetings in 2002 and 2003 expressed concern or asked questions related to wolves and public safety. The most commonly asked question was, "Do wolves attack people?" Because wolves have been absent from Oregon for so long, most people are unfamiliar with wolves and wolf behavior. Addressing public safety concerns and providing information on wolf behavior are important steps in achieving conservation and tolerance of wolves by citizens.

Compared to other wildlife-human interactions, attacks by wolves on humans are quite rare. There currently are an estimated 10,000-20,000 wolves in Europe, 40,000 in Russia and 60,000 in North America (Boitani 2003). Despite these high numbers of wolves, records can be found for only four people being killed in Europe, four in Russia, and none in North America by non-rabid wolves during the last 50 years. In the same time period, where rabies was a factor, only five, four and zero cases, respectively, could be found (Linnell et al. 2002). In contrast, during the 20th century brown/grizzly bears have killed 36 people in Europe, 206 in Asia, and 71 in North America (Swenson et al. 1996). An estimated 25 attacks by black bears occur each year in North America, with one being fatal every third year (Conover 2001). From 1890 to 2001, in North America, there have been 17 fatal and 72 non-fatal verified attacks by cougars (Beier 1991, Fitzhugh unpublished, Linnell et al. 2002). Domestic dogs in America are responsible for 4.7 million bites and 15-20 fatalities per year[47] (Centers of Disease Control 1997; Sacks et al. 1996). Domestic dogs also are the single most important vector for transmission of rabies to humans (Moore et al. 2000). See Conover, 2001, for an overview of other species attacks, bites or stings on humans.

Fatal wolf attacks on humans in North America have been relatively rare when compared with Europe and Asia (Mech and Boitani 2003, Linnell et al. 2002). This appears to be strongly correlated with the much higher incidence of rabies in regions other than North America. In those parts of the world where attacks by rabid wolves have occurred, wolves are not a major source of rabies, but rather contract it from contact with other wildlife that do harbor the disease. Historically, attacks on humans by rabid wolves occurred during what is known as the "furious phase" of the disease. In this phase, a rabid wolf would run through a village and bite anyone it encountered, wounding some and killing others. Untreated surviving victims often died within five weeks from having contracted rabies from the wolf. Given the severity of these sporadic episodes, it is likely they contributed to a perception brought to this country by European settlers that all wolves are violently dangerous animals. However, in North America, such episodes have rarely occurred due to the low overall incidence of rabies on this continent (Linnell et al. 2002).

By far the majority of attacks by wolves on humans worldwide have involved wolves infected with rabies (ibid.). Other incidents involved wolves that had been kept in captivity, healthy wild wolves that became habituated to humans providing the wolves with food, territorial attacks by wolves on pet dogs where the dog owner attempted to intervene, defensive attacks by wolves when trapped or cornered or when den sites with pups were threatened, wolves acting as predators under unique circumstances (i.e., in India where conditions have deprived wolves of all wild prey and livestock is heavily guarded), and wolf-dog hybrids.

[47] www.dogbitelaw.com 2004.

In the last decade an increase in reports of bold behavior in North America by wolves has been documented. McNay (2002) reviewed 80 incidents where wolves exhibited what he termed "fearless behavior" toward humans during the period 1900-2001 in Canada and Alaska. The recent increase in fearless behavior toward humans was believed to be related to increased protections for wolves, higher wolf populations, and a greater number of humans visiting parks and other areas inhabited by wolves. As with any wildlife species, this scenario provided many more opportunities for wolves to become habituated to humans and conditioned to human foods.

Generally, attacks by healthy wild wolves on humans are an uncommon event, and fatal attacks are even more uncommon. However, as large carnivores, wolves are fully capable of inflicting serious harm to humans. As such, wolves should be respected for their capabilities and humans should avoid close contact at all times. In defense of human life, the federal ESA provides that a person is not liable for take of a listed species if the person takes the animal based on a good faith belief that the person is acting to protect someone from bodily harm. The Oregon ESA does not address defense of human life. However, Oregon's criminal code provides a defense that may justify an otherwise illegal take if the act was necessary to avoid imminent, grave injury to a person (ORS 161.200).

A. Hunters

In Oregon, licensed big game hunters, upland bird hunters, and trappers may be more likely to come into contact with wolves than other citizens. To ensure compliance with laws protecting endangered wolves, it is essential that these groups be well informed regarding the presence of wolves in areas of the state and what to do if wolves are encountered. A well planned information and education effort directed by ODFW working directly with organized hunting and trapping groups, as well as with the general hunting population, will be needed.

Since the arrival of wolf B-45 in 1999, ODFW has taken steps to inform big game hunters of the possible presence of wolves through printed information and graphics in the annual big game hunting synopsis. This page has appeared each year with an update on the wolf situation in Oregon and other pertinent information. Included is information regarding laws protecting wolves and any recent changes in the legal status of wolves.

To assist hunters with identification of wolves, drawings of the relative size of a coyote and a wolf are displayed along with depictions of a typical footprint of each. Hunters are asked to report sightings of wolves to the USFWS by calling a phone number provided. Finally, hunters are reminded that identification of the intended quarry is the responsibility of the individual hunter and mistaken identity is not grounds for avoiding prosecution. As it relates to human safety, hunters can take appropriate action to protect themselves.

In the future, presentations to organized hunting groups regarding wolves will be essential to achieving conservation goals for wolves in Oregon. In addition, articles in hunting magazines, newspapers, ODFW hunting regulations and radio spots will help reach the majority of hunters in the state. Flyers or posters displayed at license vendors across the state also could aid in reaching other hunters with information about wolves.

B. Trappers

Licensed trappers are another user group who may come into contact with wolves inadvertently through legal trapping efforts. Wolves can be attracted to traps set for other species, especially those set for coyotes. Several incidents in other states have involved incidental capture of wolves in traps set for coyotes. In one instance, the informed trappers knew exactly what to do and whom to contact. Authorities were able to reach the trap site in a short time period and radio-collar and release the animal. The trappers subsequently were given an award for their efforts.

As with the hunting community, trappers will need to be informed regarding wolf issues in Oregon. The plan recommends using information pages in the ODFW trapping regulations similar to the hunting regulations. Licensed trappers also could be contacted by mail and provided pertinent information regarding what to do if a wolf is inadvertently captured. Presentations at organized trapping groups and information flyers at fur auctions would aid in reaching the trapping community. Trapping clinics put on by wolf specialists demonstrating ways to avoid accidental wolf capture would be especially helpful.

C. Others

Other groups of people who have a high likelihood of coming in to contact with wolves in the wild include, but are not limited to, livestock managers, rural residents, recreationalists, guides and packers, and forest workers/contractors. Some members of these groups may welcome seeing wolves and would seek them out, while others could view wolves as problematic to their activities. Regardless, each group must be educated about wolf behavior and the actions they should take to protect themselves if safety becomes a problem and to maintain wolves' natural fear of humans.

Methods to educate each of these groups include association meetings, neighborhood meetings, brochures at USFS offices, and newsletter articles sent to members of organizations. In addition, the strategies developed in other chapters, such as Chapter VII, Information and Education, will serve to educate these groups about protecting human safety and the wolf population.

D. Illegal, Incidental, and Accidental Take

Federal and state laws generally distinguish take that is permitted and take that is prohibited. The federal ESA provides that the federal listing agencies may prohibit the take of species listed under that law, and the federal agencies generally have chosen to make take illegal at the time of listing. The federal ESA does include provisions that allow the federal agencies to authorize take of a listed species even after they have generally prohibited take. This usually is done through an "incidental take permit" (issued with a habitat conservation plan) or through an "incidental take statement" (issued in connection with a federal agency's own action or an action the federal agency funds or authorizes). Federal law defines incidental take as take that results from, but is not the purpose of, an otherwise lawful activity. Incidental take is take that is a foreseeable consequence of otherwise lawful actions, such as pumping water for irrigation from a stream that is known to contain smolts at the time of pumping. If the take is a foreseeable consequence of the otherwise lawful activity, under certain circumstances, a person may obtain a permit or statement that authorizes the incidental take. State law similarly authorizes ODFW to grant an incidental take permit for species listed under the

state ESA. (ORS 496.172). Neither federal nor state law define "accidental" take, but presumably it would include situations where the take is not reasonably foreseeable by a person carrying out an otherwise lawful activity (such as an individual, lawfully driving a car, who strikes and kills wildlife).

Illegal Take

A person who kills a wolf can expect OSP and (provided the wolf is federally listed) federal law enforcement officers to investigate the incident and collect evidence. Depending upon the circumstances, the information collected may be used to proceed with a civil or criminal action.

Illegally killing any wildlife (including a wolf) is a Class A misdemeanor. (ORS 161.635). The first conviction could result in imprisonment of up to one year, and a fine of up to $6,250. Subsequent convictions for taking game mammals illegally within a 10-year period following the first conviction can be prosecuted as a Class C felony, elevating the consequences to up to 5 years in prison and up to $100,000 in fines. A conviction for illegal take as a misdemeanor or a felony requires a showing that the act that led to the take was done intentionally, knowingly, recklessly or with criminal negligence. (ORS 496.992; 161.085). Hunters have the responsibility to identify their target. Killing a wolf as a result of mistaking it for another species may still be considered intentional, knowing, reckless or criminally negligent take, subject to criminal penalties. If the act cannot be shown to have been done intentionally, knowingly, recklessly or with criminal negligence, then the act may be treated as a Class A violation, subject to a base fine of $150 for nongame mammals, and $299 otherwise. (ORS 153.018; 496.951). Criminal prosecution for violations of the state wildlife laws normally is done by district attorneys.

In addition to criminal penalties, ODFW may obtain civil penalties and damages for take of wildlife without a permit, or in violation of the terms of a permit, license or tag. Civil damages are defined by statute, and are $800 for each game mammal; $1,000 for each specimen of wildlife listed as threatened or endangered; and $50 otherwise. Persons convicted of violating the wildlife laws also may lose hunting privileges for a period of 24, 36, or 60 months, (ORS 497.415(5)), and may be subject to forfeiture of property used in the commission of violating the wildlife laws (subject to limitations on forfeitures). (ORS 496.680).

Incidental Take

Neither federal nor state law distinguish between incidental and illegal take for purposes of determining criminal or civil sanctions. If the take is not authorized, it is illegal whether it occurs purposefully or as an expected consequence of otherwise lawful action. If an incidental take permit has been issued under federal or state law, and a person violates the terms of that permit, that violation could be an additional basis for civil or criminal sanction.

Under state law, the Oregon Fish and Wildlife Commission may authorize incidental take of state-listed species through an incidental take permit. However, ORS 496.172(4) prohibits the Commission from issuing an incidental take permit for a species that is federally listed.

Accidental Take

If the person did not intend to kill the animal (or act recklessly or with criminal negligence) then, under the Oregon wildlife laws, misdemeanor and felony penalties generally would not apply. Civil sanctions, including damages, could be sought. However, as a practical matter, civil sanctions are rarely if ever sought in accidental situations. The law does provide reporting requirements, even for accidental take.

Practical Applications

The following information describes how these legal principles concerning incidental and accidental take would apply to two potential situations. These situations are not exclusive; in careful compliance with the Oregon ESA and the wildlife laws, the Commission will address other situations that may arise concerning incidental or accidental take of wolves.

1. Damage trapping for cougar, bear, and coyote. Annually, ODFW and federal Wildlife Services negotiate an Inter-agency Agreement that authorizes Wildlife Services to trap cougar, bear, and coyote in response to damage complaints from landowners. Upon adoption of this wolf plan, ODFW will work with Wildlife Services to amend the Inter-agency Agreement to address potential incidental take of wolves by Wildlife Services while trapping cougar, bear, and coyote. Because there is the foreseeable possibility of taking a wolf while trapping cougar, bear, or coyote, the Commission (when statute allows) will consider issuing an incidental take permit to cover Wildlife Services' trapping efforts. As noted above, the Commission may issue such a permit if it finds that take of wolves would be minimized and that any such incidental take would be consistent with conservation of wolves in Oregon. To enable the Commission to make the "minimal take" finding, damage trapping by Wildlife Services would be subject to a protocol designed to minimize take of wolves. ODFW staff will work directly with Wildlife Services in developing this protocol. ODFW and Wildlife Services will work together to develop trapping protocols that will minimize incidental take of wolves while maintaining as many of the tools and methods needed to address livestock depredation throughout the state.

2. Trapping by trappers and landowners. Incidental take of wolves is possible by licensed trappers trapping for furbearers and landowners trapping for predatory animals. To deal with this, the Commission (when statute allows) will consider issuing incidental take permits for these situations. Conservation and "minimal take" findings would be necessary to authorize such permits. Through issuance of either individual or blanket incidental take permits, the Commission would impose conditions to ensure that such trapping would minimize take of wolves and would be consistent with conservation of wolves in Oregon. Also, ODFW staff will educate licensed trappers and landowners about techniques and equipment for avoiding the take of wolves, proper handling of trapped wolves, and whom to notify if a wolf is caught.

E. Strategies to Address Wolf-Human Interactions

Objective

- Minimize the potential for wolf-human interactions through development and implementation of a comprehensive public education program.

Strategies

- Develop and implement a comprehensive education program that prepares citizens to co-exist with wolves.
- Wolves found living within or near communities and causing human safety concerns or killing pets shall be considered candidates for relocation.
- Inform the public about ways to avoid wolf interactions and appropriate responses to encounters with wolves.
- Share information regarding wolf locations or movements with the public as appropriate.
- Ensure agencies respond to reported wolf-human interactions in a timely manner and develop response protocols for reported wolf-human conflicts similar to those used for human interactions with cougars and black bears.
- Discourage activities that lead to habituation of wolves to humans. These include especially the leaving out of food or feeding wolves at campsites, work stations or other locations where wolves and humans share the landscape, including on private property or leased lands. Approaching wolves to obtain photographs or to hunt for suspected den sites also should be discouraged.
- Inform and educate the public regarding the importance of keeping pets vaccinated against rabies.
- Inform and educate the public about staying away from and immediately reporting suspected rabid wildlife to wildlife and animal control authorities.

Reports of wolf-human interactions will receive a high priority and will be investigated by Wildlife Services and ODFW, and evaluated on a case by case basis. Prior to reaching conservation population objectives, reported wolf-human safety concerns will be investigated and verified before control actions are initiated unless circumstances necessitate immediate action including lethal control. Protocols similar to those used in responding to cougar and black bear human safety concerns will be implemented. Non-lethal methods will be deployed initially unless the situation dictates a more aggressive response.

A comprehensive education program will be initiated to provide citizens an opportunity to become more informed regarding interacting with wolves (see Chapter VII). Emphasis will be placed on the proper response in the unlikely event of a wolf attack and upon encouraging precautionary behavior by humans.

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VII. INFORMATION AND EDUCATION

This chapter describes some of the methods that will be used to inform and educate people with an interest in wolves about wolf behavior and wolf management in Oregon. Developers of this plan believe that implementation of the strategies in this chapter provides a cornerstone to long-term success for the rest of the plan and strongly recommend adequate funding for this purpose.

A. Communications Plan

In several of the preceding chapters, strategies are directed at a strong information and education program. They include the following.

- Actively educate livestock producers about non-lethal wolf management techniques (see Chapter II, Section C).
- Provide wolf monitoring information to livestock producers as needed to keep them informed of wolf activities and movements (see Chapter II, Section C).
- Educate livestock producers to prevent or reduce wolf-livestock conflicts (see Chapter II, Section D).
- Work with livestock producers, landowners living near wolves, livestock producer organizations, county extension services, ODA and others to develop and deliver a comprehensive educational program to prevent depredation (see Chapter II, Section E).
- Inform and educate the public regarding appropriate responses to encounters with wolves (see Chapter VI, Section A).
- Develop and implement a comprehensive education program that prepares citizens to co-exist with wolves (see Chapter VI, Section A).

Oregonians require and deserve to have access to information about wolves and wolf management from wildlife managers. Wildlife managers need information from Oregonians on sightings, depredation events and wolf behavior to effectively manage wolves. Without a process to create and support two-way communications, implementation of the entire Wolf Conservation and Management Plan will fall short of success; neither managers nor Oregonians will have needed information to make appropriate decisions and evaluate achievement of plan objectives.

Two-way communication depends on a public that is educated about wolves and informed about ongoing management activities. In some cases, two-way communication also will require some people to alter their behavior.

An effective plan for communication will require consideration of all groups of people who may be interested in wolves and wolf management. Each group, or audience, may desire or require a slightly different method of communication. The following are some of the audiences that could have an interest in wolf management issues and the implementation of a wolf conservation and management plan. In cases where most of the audience resides in Oregon, it is noted with (OR).

- Livestock owners (OR)
- Hunters who hunt in Oregon (OR)

- Trappers who trap in Oregon (OR)
- Pet owners in areas with wolves (OR)
- Teachers
- Students (i.e., the next generation)
- The Wildlife Society, Oregon Chapter (OR)
- OSP (OR)
- Wildlife Services
- ODFW staff (OR)
- Reporters
- County governments (OR)
- Legislators (OR)
- USFWS
- Federal land managers
- Large Oregon timberland managers
- Native American tribes
- Wolf advocacy groups and individuals
- Fish and wildlife agencies in Idaho, Washington, Montana, California and Nevada
- Wildlife viewers
- Backcountry recreationalists
- People with an interest in wolves
- People who own wolf hybrids

Communication plans often are written to describe the tools to use to reach specific audiences and achieve desired communications goals; such a plan would be appropriate for wolf management. The wolf communications plan should include at a minimum the communications goals, the audiences to reach, the tools to reach each audience, and the messages to be communicated. Some of the tools chosen will meet an immediate need, while others should be selected or designed to meet long term or future communication needs. For example, efforts need to be taken to educate elementary aged children so they have knowledge about another of Oregon's native species when they become adults. Some of the specific tools suggested for inclusion in a wolf communications plan include the following:

- Maintain, as a permanent fixture, the ODFW wolf Web site and some of the pertinent documents (e.g., the Wolf Conservation and Management Plan).
- Create an annual report on management activities that is distributed through the Web site, mail, Commission meetings, and information meetings.
- Develop teacher lesson plan kits that include a classroom set of materials and ideas for educating students about wolves, wolf management and wolf management challenges.
- Develop posters with information on what to do if people need to report wolf depredation or sighting.
- Organize a speakers' bureau after the Wolf Conservation and Management Plan is adopted to explain the contents of the plan, distribute written materials and educate attendees about wolf biology at meetings hosted by other organizations (e.g., Oregon Hunters Association local chapters, county commissions, fraternal organizations).

- Include information on wolf identification in *Oregon Big Game Regulations* and *Oregon Furbearer Trapping and Hunting Regulations*.

Because the wolf management strategies throughout the rest of the Wolf Conservation and Management Plan must be adaptive, the information and education strategies also should be adaptive. The chosen strategies, or communication tools, should allow flexibility and be based on ongoing management activities and available funding.

B. Strategies for Information and Education

Objective

- To have an informed and educated population to prompt two-way communication between wildlife managers and others with an interest in wolves.

Strategies

- Develop and implement a comprehensive communications plan to meet the following goals:
  - Inform interested parties about ongoing wolf management activities;
  - Educate interested parties about the biology and behavior of wolves as a species in Oregon;
  - Inform domestic livestock and pet owners how to prevent and react to cases of depredation;
  - Inform rural residents, hunters and back country recreationalists about avoiding human safety threats and what to do if human safety is threatened by a wolf;
  - Inform hunters and trappers how to avoid targeting wolves during legal harvest seasons;
  - Receive and provide wolf sighting information to aid with wolf surveillance; and
  - Receive comments on implementation of the Wolf Conservation and Management Plan for adaptive management purposes.
- Coordinate information and education efforts with other agencies and non-governmental organizations to ensure that accurate information is disseminated to interested parties and that costs are kept to a minimum.
- Develop written materials for distribution and Web-dissemination on wolves and the wolf management program.
- Ensure that members of the public and media have access to the most current information on wolf management through written materials, Web site content, oral presentations and news releases.
- Create a "bulletin board" weekly notice on the Web or elsewhere that describes: "This is the situation now." It would contain monitoring results from radio-tagged animals.

VIII. EVALUATION AND REPORTING

Because of the intense interest in wolves and the implementation of this plan, an annual report will be written that summarizes all the activities and results of wolf conservation and management in Oregon. This chapter focuses on methods to monitor, evaluate and report the effectiveness of the implementation of the Oregon Wolf Conservation and Management Plan. The first report will be written one year following adoption of this plan, even if no wolves are confirmed to be present in the state at that time. The annual report will be made available to the Commission, elected officials and any others who request it to keep them informed about Oregon's results. Upon request, the Oregon Fish and Wildlife Commission and Oregon Legislature shall be briefed and updated regarding the plan's implementation.

The Commission will evaluate the effectiveness of implementation every five years, similar to other conservation plans, with the first review expected in 2010.[48] Two events could trigger a formal evaluation before 2010: delisting of the wolf at the federal level or statutory changes to the Oregon ESA. Either event could lead to changes in state or federal law that may have an effect on Oregon's conservation and management of wolves. The completion of any formal evaluation could result in a decision by the Commission to enter into rulemaking and amend the plan.

The ultimate goal of this plan is to conserve wolves and minimize conflict with existing activities. In order to achieve that balance, measurements of positive outcomes for wolves and negative outcomes for others must be identified, compiled and compared to a standard. Tracking the status and trend of various measurements against a standard will indicate whether the implementation of the plan is meeting its goals. Much is left to be learned about wolf conservation and management in Oregon. This is why an adaptive management approach will be used and why measurable objectives must be part of the feedback mechanism.

Oregon has a national reputation for measuring outcomes of social, economic, and environmental conditions via the Oregon Benchmarks. While there are no benchmarks that specifically measure endangered species conservation, it is essential to identify measurable conditions and set desirable outcomes to measure the effectiveness of this plan. While benchmarks measure results, not effort, monitoring those results can help determine whether to modify program objectives or management practices. The Commission may consider forming a committee to evaluate the effectiveness of wolf conservation and management in Oregon. An evaluation would include measuring how well each portion of the plan has been implemented. This evaluation will depend on the measurable objectives that have been set to measure achievement of wolf conservation and conflict avoidance.

Measures that track progress toward meeting the plan's objectives have been incorporated to evaluate the effectiveness of implementation and identify the need for adaptive management. As described in the monitoring section of Chapter III, efforts to conduct a wolf census that monitors wolf population and distribution will begin as soon as wolves are known to be present in Oregon. These efforts will provide an understanding of progress toward wolf population and distribution objectives. In addition, other measures of the effects of wolves will be monitored. For instance, the ungulate census that ODFW regularly conducts should be evaluated to determine whether wolves

[48] The Oregon ESA requires the Commission to review the status of listed species at least once every five years. ORS 496.176(8).

are impacting ungulate population numbers. Wolf-human interaction will be tracked in part by recording the number of wolf sightings and conflicts. Similarly, conflicts with livestock and the resulting management actions taken will be recorded. These measurements will aid in evaluating where the plan is succeeding and where improvement is needed as implementation progresses.

A. Strategies for Evaluation and Reporting

Objective

- Document and report the annual activities related to wolf conservation and management, and evaluate program effectiveness toward meeting the plan's goals and strategies and maintaining consistency with state and federal laws.

Strategies

- Annually develop and distribute a report that describes the activities related to implementation of the Wolf Conservation and Management Plan.
- Every five years, the Commission will undertake an effort to formally assess the effectiveness of the plan's implementation.
- Develop measures to track progress toward meeting the objectives of the Wolf Conservation and Management Plan.

IX. RESEARCH AND INFORMATION MANAGEMENT

Development and implementation of an ongoing research and information management program is an essential component of any successful wildlife conservation plan. Such a program should be strategically focused on questions that will affect management decisions, both short- and long-term, by providing information that can facilitate adaptive management and process improvement over time. Future management actions will depend on accurate and complete data related to a broad range of biological and social elements of the affected areas. Systematic long-term data collection is needed for direct management applications to not only determine the number and status of wolves, but both positive and negative impacts on affected resources and human activities.

Extensive wolf-related research has been conducted for decades and continues to be conducted throughout North America and the world.[49] More than 30 research projects currently are being conducted just within the western states (Appendix N). Information from those projects already has contributed and will continue to contribute to wolf conservation and management in Oregon.

Spatial mapping information also was collected during development of this plan in cooperation with the USFWS La Grande field office. This information was entered into a geographic information system (GIS) that enabled statewide maps to be presented and discussed in development of the plan. Information includes land ownership at a state and regional scale (multiple states), road systems, wilderness and roadless areas, ungulate populations, livestock allotments, and Idaho wolf pack ranges. This GIS information will provide a strong base for the information system required for future monitoring and research.

To define and mitigate for future impacts it is essential to document the status quo before wolf-related impacts are realized. This requires establishment of baseline data related to such things as current wildlife populations, viewing, hunting and livestock depredation. For example, site-specific characteristics make depredation predictions based on data from other states uncertain. Oregon will require reporting and well-defined protocols to determine the number of losses, confirmed and unconfirmed, by animal type (both carnivore and livestock), age or stage, area (or region) and value. There also is a need for data regarding Wildlife Services and rancher costs associated with avoiding and control of depredation. This information is needed to provide depredation estimates specific to wolves and shifts of the larger system such as changes in depredation levels resulting from coyotes or cougars. Similar concerns need to document changes in use and values of other wildlife activities and economic systems at the appropriate spatial level. Implementation of this plan by ODFW will involve strong support of and coordination with Wildlife Services' research program as it relates to wolves and livestock depredation.

During the course of development of the plan, more than two dozen topics that likely would require additional research were identified. These topics generally fall into categories that include wolf monitoring (i.e., survey techniques); home range and movements of packs and individuals, food habits, habitat use, prey population composition and dynamics, economics, livestock depredation deterrence, non-lethal control methods, and human dimensions (i.e., the relationship between people and their environment). Specific, long-range research objectives that will be crucial to the

[49] Mech and Boitani 2003; USFWS 2003 Rocky Mountain Recovery Area Annual Report

plan's success include: 1) describing and evaluating the relative importance of specific factors that determine the ability of wolves to persist in the Oregon landscape; 2) defining factors that influence confirmed and total depredation rates in the Oregon landscape; 3) quantifying mechanisms and cumulative effects of interactions between wolves and other carnivore species as regulators of wild ungulate populations and livestock depredation rates; and 4) a refinement of cost-benefit relationships based on Oregon data. This research should be initiated as wolves enter Oregon and are captured and radio-collared. Such efforts will clarify the state's understanding of wolves in relation to their habitat use and impacts to wild ungulate populations and livestock, and will guide development of longer term, area specific management objectives for wolves.

In anticipation of wolves moving into Oregon in the near future, a preliminary research and data collection framework will be developed in the first year of plan implementation together with a detailed monitoring plan (see Chapters II and VIII). This process will include establishing a research committee, reviewing literature and ongoing research, initiating conversations with potential cooperators and landowners/managers, collecting background data for likely research topics, establishing an information system with GIS capabilities, identifying equipment needs, and developing preliminary budgets. Once wolves are present in the state and some have been radio-collared, initial research likely will focus on habitat use, movements, pack ecology, and interactions with prey species and livestock. Support for priority research activities and provision of appropriate oversight would be assisted by the issuance of scientific take permits as currently allowed under OAR 635-043-0000 through 635-043-0045. The research committee will assist the department in reviewing the merit of requests to capture or take wolves for scientific purposes.

X. TIMELINE AND BUDGET ESTIMATES FOR IMPLEMENTATION

This chapter focuses on the cost of wolf conservation and management in Oregon and suggests several potential funding sources. A secure funding source is necessary to implement the Commission-adopted plan.

The states of Idaho and Montana both received federal funding assistance for wolf management and plan development because they were part of the experimental release of gray wolves. In fiscal year 2003, Idaho received $248,000 for plan implementation and Montana received $30,000 for plan development. As federal ESA restrictions are loosened with the anticipated delisting of wolves, USFWS is expected to decrease its monetary support. ODFW developed a federal contract totaling $456,000 to aid in development of the Oregon Wolf Conservation and Management Plan. Approximately 75 percent of these funds were federal funds and 25 percent came from the state's General Fund.

The reintroduction of wolves into Idaho and Yellowstone National Park has led to the point where expanding populations are anticipated to disperse into Oregon. Wolves were reintroduced as a federally sponsored action to satisfy the federal ESA. The federal government has a stake in the outcome of Oregon's Wolf Conservation and Management Plan by creating another subpopulation of wolves outside of the Northern Rocky Mountain Recovery Area. Migration of wolves from Oregon back to Idaho will help ensure greater stability of the population. The federal government should share in the fiscal responsibility of wolf management in Oregon because the state is contributing to the success of the federal ESA. Oregon expects to have to spend an estimated $400,000 to $500,000 annually to manage this species.

A. Implementation Timeline

Implementation of the Wolf Conservation and Management Plan will begin upon adoption by the Oregon Fish and Wildlife Commission. Upon approval of the plan, and assuming the wolf is still listed on the federal ESA, ODFW will coordinate wolf-related activities with USFWS.

Three key legislative changes are necessary to fully implement the content of this plan: change in legal status; development of a livestock compensation program; and "take" of an endangered species without a permit. The ODFW staff will work through the Governor's Natural Resources Office to develop these three legal concepts into legislative bills. Support of the bills by the interested stakeholders involved in development of the plan shall be a key element for raising the highest opportunity for passage of the three legislative changes. If the legislative bills fail to pass into law, ODFW staff will review the Plan to realign the document with current statute and administrative rules.

In the 05-07 biennium, ODFW plans to fund a half time wolf biologist position using State Wildlife Grant (SWG) federal grant funds. The SWG funds are provided at a 75 percent federal to 25 percent state cost share. As wolf numbers increase, ODFW will evaluate the need to increase the budget for the halftime position and funding wolf management. The first Annual Report is scheduled for release July 1, 2006.

B. Potential Budget Items

Once Oregon's Wolf Conservation and Management Plan is adopted by the Commission, ODFW will begin the implementation phase. The plan will focus on allowing wolves to increase to sufficient numbers where protection under the state ESA and at Phase I and II conditions no longer are required. Monitoring of wolf breeding pairs will be critical for obtaining data on breeding success and location, and for determining when conservation objectives have been met. Research will have to be undertaken to address many basic questions about the species and their impacts (see Chapter IX). As the number of breeding pairs increases, the costs associated with monitoring will increase. Costs are expected to increase over time if the recolonization of wolves into Oregon is successful. Direct costs will accelerate either for compensation for depredation of livestock or for measures to control wolves, and for loss of ungulates or control of wolves.

The potential line items associated with implementing the Wolf Conservation and Management Plan are listed in Table X-1.

Table X-1. Potential Line Item Costs Associated with Implementation of the Wolf Conservation and Management Plan

Line Item	Comments	Estimated Cost
Senior field biologist (NRS 4)	Annual salary plus benefits. Project manager.	$86,654
Technician	Annual salary plus benefits. Would assist project manager with radio tracking and collaring.	$42,299
Vehicle/mileage	Annual cost.	$9,300
Radio collar	Cost per collar is $400. Initial purchase of 10 collars.	$4,000
GPS radio collar	Cost per collar is $5,000. Initial purchase of six collars.	$30,000
Lab fees	Annual cost for blood tests, etc.	$8,000
Training	Annual cost and as needed.	$1,000
Office equipment	Computer, printer, etc. One-time cost.	$10,000
Wildlife Services assistance	Annual cost.	$125,000
Flight time (for radio tracking)	Annual cost for 150 hours at $250/hr.	$37,500
Public information officer	Annual cost. Likely would be 0.25 – 0.50 FTE plus associated benefits, supplies and travel.	$25,000 - $50,000
Outreach materials	Annual costs for printing and design. Costs could decrease over time.	$15,000 - $30,000
Research	Cost will depend on research topics, cooperators and state role.	$250,000

Implementation would require one full-time employee with a travel and supply budget sufficient to monitor wolf breeding pairs. This person will be responsible for administering all aspects of wolf management including depredation management, monitoring and research activities. The person also will serve as a liaison with the USFWS, Wildlife Services, county governments, tribal representatives, livestock producers and hunter groups. As the numbers of wolves increase, further evaluation of personnel costs will be completed. One-time expenses would include office equipment and equipment necessary to handle and collar wolves ($44,000). Wildlife Services also will incur costs. While the actual cost is unknown, Wildlife Services estimates that annual expenses could total $125,000 based on information from Idaho and Montana.[50]

C. Possible Funding Sources

The Wolf Advisory Committee reviewed and discussed several possible sources for implementing Oregon's Wolf Conservation and Management Plan. These included the federal government, state government, tribal governments and private organizations. A summary of each of these potential sources is listed below.

1. Federal Grant:

Description: Development of Oregon's Wolf Conservation and Management Plan currently is being funded by the federal State Wildlife Grant (SWG) program. Congress created the SWG program in 2001 to provide funding to assist states in addressing unmet wildlife conservation programs for priority species with the greatest conservation need. Wolves currently are classified as endangered on Oregon's ESA. Congress made federal funding available on a 75 percent federal to 25 percent state match ratio. Oregon's 25 percent match funds are coming from the Wildlife Diversity income tax check-off funds. Currently no hunter license or tag fees are being used to fund the development of a state wolf plan. Other federal grants potentially could be available now or in the future for wolf conservation.

Is a statute change necessary? No.

Potential for success: The SWG program was intended to provide funds for wildlife species without a funding source for management. Wolves migrating into Oregon meet all federal criteria for SWG funding. However, once a plan is in the implementation phase the match requirement would increase to 50 percent of the total project cost. Oregon's allocation for the SWG program is limited.

2. Special Federal Appropriation:

Description: A special Congressional appropriation to allocate funds for wolf conservation and management in Oregon could be approved. The states of Idaho, Montana and Wyoming have banded together to request a Congressional appropriation for managing both wolves and grizzly bears under state jurisdiction. All three states have large tracts of undisturbed mountainous habitat for wolves and grizzly bears to occupy while minimizing potential

[50] Personal communication with Dave Williams, State Director, Wildlife Services.

conflicts. Idaho, Montana and Wyoming have requested $1,531,500, $1,095,000 and $715,000 respectively for wolf management in FY 05.

Is a statute change necessary? No.

Potential for success: Several state and nationally led agriculture organizations are asking Congress to appropriate funds for Oregon to manage wolves once the animals are delisted from the federal ESA. If federal funding were awarded, approval to spend those funds consistent with the federal and state mandates would be sought through the Legislature and Governor's Office.

3. Oregon Legislative Appropriation:

Description: Before the start of each legislative session, all state agencies develop budget proposals for any new programs or additions to existing programs. Funding a Wolf Conservation and Management Plan could be an agency-initiated or Governor's Office proposal. The proposal could suggest a range of alternatives including the use of state income taxes (General Fund), recreational license and tag fees (Other Funds), donations to the Wildlife Diversity Program and/or Federal Funds. The use of matching federal funds must meet the federal funding requirements. Hunters have expressed concern regarding the use of ODFW's recreational license and tag fees to pay for the development and implementation of the Wolf Conservation and Management Plan because it diverts funding from other game programs and gray wolves are not a species that can be hunted.

The Legislature also can identify a funding source through the Ways and Means process. A variety of funding sources could be used, including the General Fund, Other Funds, donations and/or Federal Funds.

Is a statute change necessary? No.

Potential for success: The Legislature would hold public hearings on any potential funding plan for the implementation of a Wolf Conservation and Management Plan. If there were broad support for funding the plan, the Legislature could direct funds in that manner. However, any appropriation from the General Fund would compete with appropriations to education, law enforcement and health care, and is not likely to succeed. Current income tax revenue estimates indicate Oregon will face up to a $1 billion shortfall in income tax revenues during the 2005-2007 biennium.

4. Sales Tax on Goods or Services:

Description: A portion of a sales tax could be dedicated to the funding of the Wildlife Diversity program. The state of Missouri has dedicated a portion of their sales tax to fund their Wildlife Diversity Program. This funding mechanism could be legislatively driven or approved by the voters.

Is a statute change necessary? Yes.

Potential for success: Oregonians historically have rejected any attempt to approve a sales tax, making implementation of this funding mechanism unlikely. In addition, there are many competing needs for funding that could reduce use of this source.

5. Private Funding:

Description: Donations or a privately funded grant could be dedicated to funding a wolf management program. This type of funding mechanism would work best if a trust fund or wolf conservation foundation were developed to provide ODFW with an annual budget based on the interest generated from an endowment. Such a trust or foundation would need to maintain a balance of $4-5 million to be self-sufficient and generate about $270,000 in interest payments annually. Another possible scenario is a trust fund managed by the state to fund a Wolf Conservation and Management Plan. This scenario would require legislative authorization to spend the designated funds. ODFW will continue to examine other potential sources of funding to assist in managing wolves including private donations, grants from foundations, assistance from non-governmental organizations, and funding partnerships with other interested entities.

Is a statute change necessary? No. Donations to fund agency programs are accepted generally under a long-term contract with the funding entity.

Potential for success: A private outside group would have to conduct a campaign to collect necessary revenue for funding a self-sustaining wolf conservation and management plan.

6. Initiative Petition:

Description: Another option to fund a Wolf Conservation and Management Plan would be to explore the initiative petition process. This process would be driven by a group outside of ODFW. State agencies and employees are prohibited from using official positions or state resources to support or oppose any ballot measure. However, ODFW can provide information upon request, provided the information is presented in an objective and neutral manner. The initiative would identify the proposed funding source (i.e., the Lottery Fund or General Fund).

The last major natural resource initiative petition process in Oregon was the passage of Ballot Measure 66 in 1998 to fund fish and wildlife enforcement, salmon enhancement, and parks operations by dedicating a portion of Oregon Lottery revenues to natural resources. Contained within Ballot Measure 66 was a statutory and Oregon Constitution change that dedicated a funding source and described the type of expenditure appropriated.

Is a statute change necessary? Probably.

Potential for success: The effort to dedicate Ballot Measure 66 dollars took five years to reach a point at which a vote could take place. Thus, an initiative petition would require multiple years to be put on a ballot and may or may not succeed in generating revenue.

7. User Fees/Other Approaches:

Description: A fee charged to the user of a particular service is a user fee. The price hunters and anglers pay for a hunting or fishing license is a user fee. The fee is used to fund the management of wildlife in the state. License fee revenues could be used to fund wolf management, but as indicated earlier, there is not much support for this among members of the hunting community. Another type of user fee could be a parking permit at a viewing area to see wolves or some type of "ecotourism" fee where interested parties could have the opportunity to view wolves.

Is a statute change necessary? Possibly.

Potential for success: The ODFW Sauvie Island Wildlife Area currently has a parking fee charge dedicated to law enforcement of the parking program. Developing a user fee system would take several years to develop the support base of businesses, groups and individuals to agree a fee dedicated to wolf management is appropriate. A private outside group may have more success to conduct a support based fee program for funding wolf management in Oregon.

8. Other Available Public Funding Sources:

Other potential funding sources that have not been used in Oregon in the past for natural resource programs include a property tax, corporate income tax, motor fuel tax, cigarette tax, alcohol excise tax, and luxury excise tax. Other approaches that might be explored include wolf stamps, license plates, and a tax check-off. More research would be needed to assess whether any of these funding options would be acceptable to the public.

D. Volunteers

One option to offset the cost of staff assigned to implement the Wolf Conservation and Management Plan is to use volunteers. ODFW has an extensive history of encouraging the use of volunteers to accomplish fish and wildlife management tasks. Volunteers could be used to conduct howling surveys, collect den site information and assist with public education efforts. The use of volunteers also can serve as an in-kind contribution for federal funding match requirements. ODFW would work through agency volunteer coordinators to train and record the contributions of volunteers.

E. Tribal Operations Funding

Tribal wildlife managers with responsibilities to protect and manage treaty-reserved wildlife resources in the state of Oregon may prioritize tribal wildlife operation funds as necessary to meet wolf management needs in their areas of interest and influence. Tribal staff trained in wolf identification and handling are available to provide support as needed to state and federal managers responding to wolf activities within the tribe's aboriginal territories and will take the lead on addressing on-reservation wolf management needs. Tribal wildlife managers will work with other

tribal, state and federal managers, and non-governmental organizations to secure additional funding to support full implementation of the Wolf Conservation and Management Plan.

F. Other Contracts

Another possible source of funds for wolf management and research could be universities, wildlife cooperatives and professional wildlife societies. These organizations have access to foundations for grants to conduct research and improve the understanding of wolf-related social science issues. The use of graduate students sponsored by universities potentially could be used to collect data for improving wolf management techniques. ODFW staff would work with the organizations and apply for funding assistance.

XI. ECONOMIC CONSIDERATIONS

This chapter focuses on economic values and impacts associated with wolf conservation and management. Its main objectives are to describe and assess tradeoffs among different sectors and activities, to evaluate impacts to specific sectors and to explore issues related to incentives and approaches as wolves become re-established in Oregon.

Values of wildlife are reflected in social attitudes and actions associated with wildlife use and management. Until recently the negative economic impacts of wolves such as livestock depredation and wild game losses dominated social perceptions of the species. Yet, economic activities and their relative importance change as social norms and practices change. The reintroduction and subsequent reestablishment of wolf populations in the western United States is an example of a significant shift in society's approach to wildlife management.

Economic frameworks and methods can provide additional structure and information as policy and management decisions are debated. These approaches have the capacity to frame the problem with recognition of competing policies and uses. Within this analysis, tradeoffs among economic sectors and public preferences can be compared. Assessment and analysis of economic values can assist in shaping policies and management approaches, and in predicting outcomes.

A. Types of Economic Analysis

Economic values are used to evaluate this basic question: Will society be better or worse off if a specific policy is implemented? In other words, will the gains to those benefiting from a policy be greater than the losses to those who are made worse off by the policy. The analysis usually compares the status quo to various policy alternatives in order to choose the option that provides the greatest net benefit. Cost-Benefit analysis often is employed to investigate this type of question. The method compares the total economic value or benefits to the opportunity costs of using productive resources. The difference is defined as net benefits, which consist of: 1) producer surplus less the opportunity cost of inputs; and 2) consumer surplus, i.e., consumer benefits less the amount paid for the good in question. Net benefits are forecasted over time, discounted, and summed. Cost-Benefit analysis compares the level of net benefits for each alternative and on the basis of economic efficiency favors the alternative with the highest level of net benefits.

Another type of economic analysis involves the financial activity associated with the money people spend or the sales in a particular region. For example, it might include the goods and services people purchase during recreational trips or the sales of commodities such as cattle. Purchases initiate cash flows with direct and indirect effects on businesses and, through the multiplier process on income, employment and the general level of business activity.

The two measures of economic effects (economic impact and economic values associated with Cost-Benefit analysis) are different dimensions of the economic importance of fish and wildlife. These measures must be kept separate when evaluating the economic importance of fish and wildlife, or when being used to improve resource policy decisions. Impact analysis is not a measure of efficiency because it measures financial effects on the economy without consideration of net benefits. Usually it is a snapshot at a specific point in time that ignores future economic conditions. However, it can be valuable to administrators who are concerned with a specific sector, linkages between sectors of

the economy, and impacts on local employment and business. In contrast to valuation used to undertake Cost-Benefit analysis, economic impacts are used to estimate the relationship of wildlife-related activities to the financial economy (business revenues, jobs, personal income) of a local community, county, multi-county region or state. Economic impact models completely ignore consumer surplus, but instead rely on the costs to participate in recreational activities.

A Cost-Benefit analysis is especially useful for considering the tradeoffs among activities in order to explore the most socially efficient outcomes. Often both analyses can provide information to policy-makers. For example, policy-makers may be interested in the number of jobs created as well as efficiency, and may be willing to consider less efficiency for more jobs, especially in regions with relatively few economic opportunities. Each type of analysis is reviewed in the following sections.

B. Valuation Considerations and a Cost-Benefit Framework for Wolves

The results of cost-benefit analysis depend on a number of model assumptions and parameters. Therefore, the absolute results often are less important than the organization and framework the method provides when approaching an issue. However, the definition of net benefits is carefully defined by criteria rooted in economic theory. The analysis attempts to determine the change in net benefits discounted and summed over the life of the project or a specific timeframe. The analysis may be undertaken on the state, regional or national level. Given data limitations such as likely wolf population growth over time and long-term wolf population levels, this study provides annual snapshots related to benchmark wolf population levels cited in the plan, regions of the state and different sectors.

Since wolf-related impacts will take place in the future and available information is imperfect, uncertainty also is an issue. In order to assess costs and benefits there is a need for biological and economic information, much of which may not be known. For example, the growth and eventual future wolf population sizes are unknown. The lack of detailed data from other regions with wolves and site-specific factors related to Oregon add to uncertainty related to potential impacts on livestock and ungulate populations. Finally, the eventual spatial distribution of wolves relative to these potential concerns is unknown. In the following section, basic assumptions and sources of uncertainty are identified and ranges of specific parameters considered. Although Cost-Benefit analysis may not provide a direct answer to this issue, it provides information regarding its dimensions and the tradeoffs that society faces.

C. Livestock Values

The two main costs associated with livestock include the direct costs of livestock losses to producers, and costs to private individuals, counties, ODFW and Wildlife Services for non-lethal and lethal management actions to avoid depredation[51]. Losses associated with wolves in other regions are small in proportion to the total industry, but with potentially serious consequences for specific areas or individual ranches where chronic problems occur (USFWS 1994). Although depredation rates generally increase with the size of the wolf population, without more detailed information accurate predictions of potential losses in Oregon are uncertain. Another source of

[51] Losses of other domestic animals such as working dogs and family pets are another potential cost, although these are difficult to quantify due to data constraints.

uncertainty is associated with undiscovered losses. It has been documented that wolves may carry away or completely consume some carcasses, and that the actual losses exceed confirmed losses, particularly in remote, forested landscapes (Oakleaf, et al. 2000). As part of this plan's implementation, Wildlife Services and the Oregon Department of Fish and Wildlife (ODFW) should monitor unexplained losses and document changes as predator populations change.

The USFWS Wolf Environmental Impact Statement (USFWS 1994) provides a theoretical model to predict potential depredation, but its efficacy is hampered by its lack of other relevant variables such as wild prey availability, detailed spatial overlap of wolves and livestock, and methods used by ranchers to avoid wolf interactions. The following information is used to predict depredation levels:

- The ratio of the potential Oregon wolf population to the population size in other regions;
- Depredation rate associated with the wolf population size; and
- The number of livestock in the region in question.

Estimates of Oregon losses are obtained by multiplying the number of livestock in a given region, the likely wolf population scaled by the wolf population size in the region of known depredation and the depredation rate per thousand livestock. The depredation rate per thousand from other regions is used to calculate depredation in Oregon by scaling it to the number of livestock in the region of concern. The relative number of wolves in the two regions modifies this result up or down. Depredation rates used from different regions are based on confirmed losses. The formula is:

# of livestock lost = (thousands livestock) X (depredation rate expressed as livestock lost per thousand) X (ratio of wolf populations)

Cattle depredation rates ranging from .09 per thousand in Idaho to .91 in Alberta, Canada, were used to provide a range of likely losses. Depredation rates for sheep generally were higher with a range from .44 per thousand in the Yellowstone region to 3.3 per thousand in Alberta Canada. The most recent data from northwest Montana, Idaho and Yellowstone are composed of wolf numbers and depredation levels averaged over the last three years (USFWS et al. 2004). An additional estimate for the entire state of Montana is included, which assumes similar landscape and ranching practices to those found in Oregon (Riggs 2004). Seven different regions are applied to three potential wolf population levels and three corresponding ranges in Oregon. Corresponding livestock numbers were used for each region including northeast Oregon, eastern Oregon and the entire state.

The Montana estimate was one of several predictive models that were developed to forecast depredation levels in Oregon from experiences in other western states (Riggs 2004). Although only one explanatory variable, the number of wolves, is available to explain changes in the number of livestock lost, a significant relationship between the number of wolves and depredation level was found for most regions. The analysis also provided guidance with respect to the bounds on likely outcomes for the region being considered. However, direct application to Oregon requires the same assumption used above, that biological elements of the system, ranching practices and the spatial configuration of wolf populations and cattle are similar in the areas being compared.

Although highly variable, it was assumed that the wolf population in Oregon will consist of 14.2 animals for each breeding pair. This assumption is based on minimum fall wolf population by recovery region and the number of breeding pairs in the Northern Rocky Mountain states (USFWS

et al. 2004). In the Northern Rocky Mountain States, the population size per breeding pair has increased over time as the wolf population level increased. For the periods documented for each region, the number of wolves per breeding pair ranged from approximately 10 to 17 per breeding pair. The overall average for all three areas during the last three years was 14.2 wolves per breeding pair. This estimate was used because it falls near the middle of the range for all Rocky Mountain areas, and it conforms to the time periods used to determine depredation per thousand in these regions.

Table XI-1. Wolf depredation rates from different regions. Montana, Idaho and Yellowstone levels are the average of the last three years through 2003. Livestock numbers are the approximate levels in regions where wolves are present. (USFWS, Nez Perce Tribe, USDA 2004, USFWS 1994)

Region	Cattle	Sheep	# of Wolves	Cattle Losses #/000	Sheep losses #/000
Alberta	257,941	10,000	1,500	0.91	3.3
British Col.	587,750	48,000	1,500 to 6,300	0.37	0.54
Minnesota	229,065	23,719	1,625	0.12	2.11
NW Montana	75,000	11,000	95 *	0.10 *	0.64 *
Idaho	182,925	223,523	286 *	0.05 *	1.02 *
Yellowstone	146,000	265,000	263 *	0.23 *	0.63 *

* three-year average

Table XI-2. Estimated annual losses of numbers and value of cattle in Oregon based on different regional depredation levels, wolf populations and numbers of livestock. Northeast Oregon includes Baker, Umatilla, Union and Wallowa counties. The eastern region includes the northeast, and counties in the Blue Mountains and adjacent areas. The Riggs 2004 Montana estimate is based on the predicted 95 percent upper bound values for livestock losses across a range of minimum wolf populations.

Region compared	NE Oregon 245,000 cattle 4 pairs 57 wolves		Eastern Oregon 561,000 cattle 7 pairs 99 wolves		OR Statewide 1,360,000 cattle 14 pairs 199 wolves	
Alberta	(8)	$6,080	(34)	$25,840	(164)	$124,640
British Columbia	(3)	$2,280	(14)	$ 10,640	(67)	$ 50,920
Minnesota	(1)	$ 760	(4)	$ 3,040	(20)	$ 15,200
NW Montana	(15)	$11,400	(59)	$44,840	(285)	$216,600
Idaho	(2)	$1,520	(10)	$ 7,600	(47)	$ 35,720
Yellowstone	(12)	$9,120	(49)	$37,240	(236)	$179,360
MT (Riggs 2004)	(11)	$8,360	(16)	$ 12,160	(31)	$ 23,560

Table XI-3. Estimated annual losses of numbers and value of sheep in Oregon based on different regional depredation levels, wolf populations and numbers of livestock. The (Riggs 2004) Montana estimate is based on the predicted 95 percent upper bound values for livestock losses across a range of minimum wolf populations.

Region Compared	NE Oregon 14,800 sheep 4 pairs 57 wolves		Eastern OR 35,400 Sheep 7 pairs 99 wolves		OR Statewide 235,000 sheep 14 pairs 199 wolves	
Alberta	(2)	$ 186	(8)	$ 744	(103)	$ 9,579
British Columbia	(0)	$ 0	(1)	$ 93	(17)	$ 1,581
Minnesota	(1)	$ 93	(5)	$ 465	(61)	$ 5,673
NW Montana	(6)	$ 558	(24)	$2,232	(315)	$29,295
Idaho	(3)	$ 279	(13)	$1,209	(167)	$15,531
Yellowstone	(2)	$ 186	(8)	$ 744	(112)	$10,416
MT (Riggs 2004)	(21)	$1,953	(43)	$4,000	(105)	$ 9,760

Lost value can be calculated by multiplying the number of losses by the market value of the animals lost (Duffield and Neher 1996). The average sale prices are provided in the publication "Oregon Agriculture Statistics 2002-2003" with an average price of $760 per head for cattle and $93 per head for sheep. In some cases wolves prey on calves and lambs more frequently than adult livestock, with approximate ratios of one adult to two young (USFWS 1994). However, since the likely Oregon ratio is unknown, the adult price has been used for all potential lost animals.

Tables XI-2 and XI-3 provide a range of possible depredation levels based on other regions in North America. For the case of four breeding pairs in northeastern Oregon, losses are predicted to be relatively low ranging from one to 15 cattle and zero to 21 sheep. The cattle prediction is similar to the levels reported in neighboring states. The sheep prediction is scaled to the relatively low number of animals in northeastern Oregon. The highest predicted level of 21 sheep is associated with an estimate that is not scaled by the number of livestock. As expected, the number of losses increases with increases in the number of wolves and the number of livestock in a given region. Statewide predictions increase markedly for cattle, 20 to 285, and sheep, 17 to 315, in part because it is assumed that all state livestock become vulnerable to wolf depredation. Additional losses of household pets, guard dogs and other livestock also are likely, but calculations were not attempted due to uncertainties related to the relatively small numbers of losses in other states.

General examination of depredation over time in different regions provides several insights. First, there is significant variability among regions, and annually within the same region. For example, in Alberta from 1974 to 1990 annual cattle and sheep losses ranged from 22 to 217 and from 1 to 127 respectively, and more recently in the Wolf Recovery Area of the Northern Rocky Mountain states from 1997 to 2003 annual cattle and sheep losses ranged from 21 to 64 and 12 to 211 respectively. The highest cattle losses per thousand of any region were for the Simonette River, Alberta where an average of 5.88 cattle per thousand were lost during between 1976 and 1981. The pastures were characterized as small remote wooded grazing leases with no wolf control during the first four years (USFWS 1994). For the Alberta cases and the northwest Montana region, the levels of depredation leveled off or fell over time. In northwest Montana, depredation decreases were attributed to animal control, with the direct taking of problem animals (personal communication with Ed Bangs, USFWS, 2004).

For those areas that incur wolf depredation, farm level costs may increase because avoidance, harassment and other methods will be used to decrease depredation levels. Farm-level costs also may increase because remote areas become too risky for use. These areas also are likely to lose value for livestock leasing although changes in practices and values in other regions have been difficult to quantify (ibid.). According to a 2002 Oregon Cattlemen's Association survey, 58 percent of respondents answered that their cattle are pastured on range not closely attended during part or all of the year. Wolves also may test, chase or wound cattle. Additional costs may be incurred because of effects on animal health and losses in weight gain because of stress.

Control methods are potentially costly depending on the need and specific situation. Non-lethal methods used to prevent loss include guard dogs, exclusion fencing, herding and night penning. Lethal methods and services are provided by government agencies such as Wildlife Services. Many of these methods currently are employed for carnivores such as coyotes, mountain lions and bears. It is not possible to provide the additional costs of control that will be solely attributable to wolves. Initially one of the largest additional agency costs in northwest Montana was for investigations of potential wolf-related losses (ibid.). Expenditures related to both private and governmental efforts should be included in the cost estimates if not included under management costs.

Wolves will be part of a much larger system that includes interactions among a number of carnivore and prey species. Coyotes currently are the cause of the majority of damage by carnivores to livestock operations. Of the approximately 1,700 average annual sheep losses in Oregon, 1,400 were lost due to coyote depredation (Wildlife Services 2003). Of nearly 300 cattle lost annually in Oregon, 220 were lost to coyotes (Wildlife Services 2003). Wolf populations may interact with, and compete with coyote populations. Wolf-coyote interactions appear to depend on three factors.

1) Coyotes benefit from scavenging on the carcasses resulting from wolf kills.
2) Wolves tend to kill coyotes, but do not consume them.
3) Coyotes may space themselves away from wolves (Ballard, Carbyn and Smith 2003, p. 267).

Short-term changes in the Yellowstone region indicate that coyote populations may decrease in the presence of wolves (ibid.). If so, coyote depredation could decrease because wolves would take their place in the ecosystem. It is likely that the greatest impact would be on sheep operations. These changes also may affect the costs of Wildlife Services operations or result in a shift of some operations from targeting coyotes to wolves.

D. Hunting Values

Whether on public or private land, the public asserts its implied rights under the Public Trust Doctrine for fisheries and wildlife protection. In essence, this doctrine assigns the rights to most fish and wildlife not to the landowner, but to the citizens of the state (Loomis 1993, p14). Rights to use or appreciate these resources are controlled by state and federal agencies, and are not often bought and sold in a competitive market. However, private landowners often restrict access to resources on their property. Although recreational days are not obtained at a market price, hunting and viewing

experiences may be highly valued.[52] No market prices exist to indicate how society values resources, or to signal society, as a resource producer, how much should be supplied. Yet these non-market values are embodied in people's choices such as time spent, and expenditures on travel, lodging and related goods. Choices also are made among many recreational possibilities depending on individual preferences.

License fees and expenditures capture only a portion of the total value of the experience. Hunters are willing to pay at least as much or a greater amount to hunt than the total paid for the hunting permit and associated costs of travel and equipment. Economists use the term "willingness to pay" to explain the benefit that consumers gain from the use of goods or experiences. The difference between the willingness to pay and the amount that consumers actually pay is termed consumer surplus or net benefits. It might be conceptualized as the amount that consumers save by buying at the price they paid instead of the greatest price they would be willing to pay. Many techniques have been devised to assess these values indirectly by using travel cost (the distance traveled to the recreational site), contingent valuation (the hypothetical question of how much the participant is willing to pay for the activity), and discrete choice (how people trade this experience against other experiences that can be valued monetarily).

Wolf predation on elk and deer may have negative impacts on related hunting activities. Hunting benefits are measured in terms of hunting days. The demand and associated value for hunting days is dependent on a number of factors such as expected success rate, congestion in the hunting area, quality and type of animal, location of the hunting area, and other characteristics of the experience. Therefore, the value of a hunting day will change as characteristics of the experience change.

Even more basic is the availability or supply of hunting opportunities if the allowable harvest of animals decreases. Although there is a decreasing trend in the number of hunting licenses sold as a proportion of total population, the demand for big game hunts in eastern Oregon generally is greater than the opportunities supplied by ODFW. As elk and deer populations change, tag numbers and other management measures or regulations adjust to control harvests. More stringent game management will translate into fewer hunter days in the field and a loss in net economic benefits directly related to the loss of hunter days. These changes can be examined with a bioeconomic analysis that considers both the biology and economics with the following relationships:

Wolf population growth → Impacts on prey populations → Decrease in allowable hunter harvest → Change in the number and or quality of hunter days → Change in the net benefits of hunting

If one can make a biological forecast of changes in prey populations, it becomes possible to estimate the change in the number of hunter days according to past experiences with resource fluctuations. As a starting point, the analysis assumes that the kill rate will be 17.3 kills per wolf per year, the average of early and late winter kills per wolf of which 90 percent were elk (Phillips and Smith 1997, Smith 1998). The ratio of major prey items included in this total depends on the relative vulnerability and availability of prey. The following analysis assumes that the wolf diet in Oregon will consist of approximately equal proportions of elk and deer. The deer portion will include nearly three times the number of elk due to their relative biomass value (Fuller 1989), resulting in the consumption of 7.8 elk and 23.4 deer per wolf per year.

[52] Private hunting and fishing operations and guide services attempt to capture a portion of this value relative to public hunting opportunities.

The number of days in the field in the Blue Mountains region was plotted as a function of the number of annual kills in deer and elk hunts. A significant linear relationship was defined for the range of available data from 1992 to 2002. Deer hunting days increased by a factor of 3.2 for each additional deer taken in the preceding year, and elk hunting days increased by a factor of 7.5 days for each additional elk taken in the preceding year. Wolf kills are assumed to result in a direct loss in hunter success. The loss in number of rifle and bow hunting days in the field for each species then can be calculated and related to the net benefits associated with elk and deer hunting in Oregon.

In 2001 the average net economic value of elk hunting in Oregon was $76 dollars per day (USFWS 2003a). For example, a loss of 1,000 hunter days would result in a net economic loss to society of $76,000. This is likely to be an overestimate if hunters can substitute a hunt in another location, albeit one they do not value as highly. For general hunts it also may be an overestimate of losses because some hunters will continue to hunt at lower success rates. As noted earlier, changes in the characteristics of the hunting experience will change the demand and associated value of a hunting day. Although uncertainty exists with regard to the level of reduction in the number of hunting days and hunting day values, the most difficult challenge is defining and quantifying the sources of prey population fluctuations.

Table XI-4. Potential hunting losses in the Blue Mountains region associated with wolves without consideration of likely compensatory mechanisms. As stated in the previous section, the number of wolves in the population per pair may vary ranging up to 50 percent higher than the following estimates.

Number of wolves	Deer and elk taken by wolves	Loss in hunting days	Net benefits per hunting day	Total loss in hunting net benefits
4 pairs 57 individuals	1,334 deer 445 elk	4,269 deer 3,338 elk	$56/day deer $76/day elk	$239,000 $253,700
7 pairs 99 individuals	2,317 deer 772 elk	7,414 deer 5,790 elk	$56/day deer $76/day elk	$415,200 $440,000

Table XI-5. Averages for total hunting activity in the Blue Mountains region for 1992 to 2002. CI represents the 95 percent confidence interval for average days in the field given the level of variation during the time period.

Hunt	Number of hunters/yr	Animals taken/yr	Average days in the field/yr	Total net benefits/yr
Deer archery/ rifle	52,357	20,408	282,688 CI = +/- 11,053	$15.8 million
Rocky Mt Elk archery/rifle	68,583	14,345	398,528 CI=+/- 21,300	$30.3 million

Total big game net benefit losses of $492,700 for four wolf pairs is approximately one percent of $46.1 million, the average net economic benefits of big game hunting for deer and elk in the Blue Mountains region during the last 12 years. The higher loss estimate for seven pairs is $855,200, approximately 1.8 percent of the total net value of deer and elk hunting in the region. When compared to the variation in days hunted during the last 12 years as shown in table XI-5, potential

losses related to wolves appear to be relatively small. No consideration of the potential value of wolf hunting is considered if wolves are classified as game animals and hunted sometime in the future.

The preceding model assumes that wolf-related mortality is additive and that the number of wolf kills can be directly subtracted from the number of animals taken by hunting. This is likely to be an overestimate because of relationships among sources of mortality. Wolves are part of a much larger system in which interactions will occur among a number of species. Mountain lions and other carnivores are believed to impact elk populations in specific regions. Researchers question whether wolf predation on these prey species will be additive, or whether there will be compensation associated with competition among carnivores.

E. Wildlife Watching

Wildlife watching is a recreational activity that could increase net social benefits as wolves become re-established in Oregon. In 2001, the net economic value of wildlife viewing in Oregon was $34 per participant per day and $267 per participant per year (USFWS 2003a). The value reported by the U.S. Fish and Wildlife Service is highly aggregated and includes a variety of wildlife, but does not include trips to zoos, circuses, aquariums, museums and scouting game (USFWS 2003a). The trips identified by survey respondents were characterized by respondents as taken solely for the purpose of viewing wildlife.

In 2001 there were nearly 1.7 million wildlife viewers in Oregon, with a total value of approximately $450 million (USFWS 2003b). The addition of wolves could increase wildlife viewing days or the quality of a viewing day. For example, in Yellowstone National Park from 1995 to 2000, 70,000 visitors observed wolves in a nonforested part of the park (Fritts, Stephenson and Boitani 2003). According to Mech (1995), opportunities to see wolves without professional assistance are rare and limited to areas of open terrain.

Quantifying the level of potential benefits from wolf viewing is similar to that of hunting. The average net value per day is multiplied by the number of wolf viewing days to provide the total value of wolf viewing. The net value of a viewing day is likely to depend on a variety of factors such as the probability of actually viewing a wolf, the duration of viewing, proximity of wolves, substitute activities and other characteristics of the experience. Even with detailed data from other areas, the direct applicability in Oregon is limited by site-specific characteristics. If areas exist where there are high probabilities of wolf viewing, the potential exists for significant benefits. For example, a relatively small increase in wildlife viewing days in Oregon such as 20,000 days at a value of $34 per day would be nearly equal to potential losses to deer and elk hunting.

F. Existence Values

Another broad category of value involves nonuse values or "existence value". Existence value is the benefit that people gain from knowing that something exists, even in cases where they may never visit and benefit directly (Krutilla 1967). These values often are associated with a historical place or building, a natural area or preservation of a species. Two reasons why people might hold values unrelated to their current use are the preservation of options for future use and bequeathing natural resources to one's heirs (Krutilla 1967). Economists use terms such as existence, bequest,

generational, preservation and intrinsic values for this general category. Although difficult to assess, these values are reflected in expressions of social and cultural values. There is broad agreement among economists that these values exist and that ignoring them could lead to serious errors and resource misallocations (Freeman 1993). However, there also is disagreement regarding appropriate terminology and how to measure these values empirically (Freeman 1993). These values usually are investigated by asking hypothetical questions regarding the individual's willingness to pay for the existence of the subject in question.

It has been shown that the greatest benefits associated with wolves at the national and regional levels are nonuse or existence values (USFWS 1994, Duffield and Nehr 1996, Chambers and Whitehead 2003). These are the values people place on knowing that wolves exist in the wild. Individuals may never see or hear a wolf and may not even consider this to be desirable, but still value wolves' existence. Minnesota and Yellowstone National Park studies provide evidence of both use (viewing) and nonuse (existence) values. In the Yellowstone case, Duffield and Nehr (1996) estimated a one-time willingness to pay, nearly $23 for wolf recovery. The total value then was aggregated over the number of households in the study area. Even when corrections are made for the ease with which hypothetical payments may be made, the total values were calculated in the millions. In Minnesota, Chambers and Whitehead (2003) found a willingness to pay for a wolf management plan of $4 to $21 depending on the region. This translated into a lump sum of $665,131 at the county level and approximately $27.5 million at the state level (Chambers and Whitehead 2003).

It also should be noted that there is a willingness to pay for wolf exclusion. This value will be partially captured in the hunting and depredation losses cited in previous sections. Without doubt there also are individuals who do not directly incur damage, who would be willing to pay to keep wolves out of Oregon. These feelings or beliefs are likely to be related to fear of a wolf encounter, perceived and actual impacts on local economies and resistance to external control and regulation. Generally, rural inhabitants place a high value on their way of life and attributes related to independence and self-sufficiency. Many of these elements are not directly related to wolf establishment, but involve a larger set of social concerns and perceptions.

In order to calculate these values, a study specific to Oregon would have to be undertaken. Survey design and a sufficient sample size are two of the most important elements of such a study. Other regional studies indicate two important factors. First, there is public support and potentially large net benefits associated with wolf conservation in the United States. Second, with the right mechanisms, this potential willingness to pay may translate into significant program financing.

The following table provides the relative level of uncertainty in each case and estimates of the likely magnitude of economic impacts. These estimates are somewhat speculative and in some cases include additions for intangible concerns that could not be directly calculated such as the loss of pets and predator control. A detailed explanation of calculations and factors related to these estimates can be found in Appendix O, Economic Assumptions and Estimates.

Table XI-6. Economically affected sectors, associated uncertainty and the general magnitude of potential costs or benefits associated with wolf re-establishment in Oregon. Values are given to provide general magnitudes that include difficult to quantify elements rather than specific values for each sector. The ecological sector is related to potential compensatory relationships among predators that will decrease costs to the livestock and hunting sectors.

Sector group	Type of value/activity	Level of uncertainty	Magnitude of aggregate annual cost or benefit
Gov./ Wildlife Services /ODFW	Management	Low	Moderate (cost) (several hundred thousand)
Livestock	Market-direct loss	Low/Mod.	Low to moderate (cost) ($10,000 to $300,000)
Livestock	Predator control and impact on operations	Moderate	Low to moderate (cost) (several hundred thousand)
Hunting	Recreational	Moderate	Moderate (cost) ($450,000 to $850,000)
Viewing	Recreational	High	Moderate (benefit) (hundreds of thousands)
General Public	Existence	High	High (benefit) (several million)
Mixed	Ecological	High	Low to moderate (benefit) (several hundred thousand)

G. Economic Impact Studies and Input-Output (I/O) Models

Impact studies using input/output models can be constructed using surveys of state or regional economies. The U.S. Forest Service originally developed a computer system called IMPLAN which can be used to construct county or multi-county I/O models for any region in the United States. The regional I/O models are derived from technical coefficients of a national I/O model and localized estimates of total gross outputs by sectors. IMPLAN adjusts the national level data to fit the economic composition and estimated trade balance of a chosen region.

The output (sales) multiplier calculates how much money is "stirred up" in an economy, but it does not mean that someone in the local area is making a wage or profit from this money. The differences between output multipliers and income coefficients often are confused, leading to misuse. It is important for decision-makers to know and understand what type of multiplier or coefficient is being used in the assessment of the economic impact of proposed policy decisions. A more useful measure of the contribution of a sector's activity is the amount of personal income, salaries and wages that is directly and indirectly generated from an increase (or decrease) in sales.

The size of the personal income coefficient largely is determined by the amount of personal income generated by the first round of expenditures. In an industry that is very labor intensive, the output (sales) multiplier may not be very large, while the income coefficient is above average. On the other hand, if the industry goes through several transactions but is not very labor intensive throughout the process, the output (sales) multipliers may be large and the income coefficient small.

The amount a hunter (or wildlife viewer) spends in order to take part in a hunting trip also has an impact on state or regional economies as well as local economies. For example, expenditures related to hunting in northeast Oregon also generate income outside the area for several reasons. First, a portion of area nonresidents' hunting trip expenditures are made near hunters' homes and en route to the hunting destination, and thus generate income for those areas. Second, income also is generated outside of the area because of "leakages" or purchases from the larger state and regional economies. Thus, the hunter who hunted in northeast Oregon made expenditures that generated personal income in the state.

The purpose of this section is to provide examples of economic impacts on livestock ranching and wildlife-related recreation, with a geographical focus on Wallowa County in eastern Oregon. Analysis of the impacts on Wallowa County personal income can be accomplished using the IMPLAN (input-output) model along with data specific to livestock ranching, big game hunting and wildlife viewing. This section also provides perspective regarding some of the important economic aspects of the potentially affected sectors.

Some 29,000 head of beef cows were in inventory in Wallowa County as of January 1, 2002 (Oregon Agricultural Statistics Service 2001-2002). Including the bulls and cull cows associated with cow/calf operations, each cow/calf unit consumes an average of about 15 Animal Unit Months, (AUMs) annually, or about 435,000 AUMs in total. This enables ranchers to produce calves at an average of 530 pounds that sell for approximately $0.90 per pound. Total sales per cow amount to about $496 annually, including some of the bull and cull cow sales.

The economic contribution in personal income terms is estimated at $20.15 per AUM used in beef production. About $8.45 of that is generated directly by the livestock industry, $6.55 is generated in the supply industry (indirect impact), and $4.63 is generated (induced impact) in the general regional economy. The beef cow industry in Wallowa County thus generates about $8.8 million in total personal income. Since there are 15 AUMs per animal, the loss of 10 head will result in a loss in 150 AUMs. Given the loss estimates (based on depredation levels in northwest Montana, as shown in Table XI-2) of 15 cattle for northeast Oregon and 59 cattle for eastern Oregon, the loss in personal income would total approximately $4,500 and $19,000 per year, respectively. In addition, costs related to the need for additional depredation control, loss of other animals such as pet or guard dogs and modification of operations are likely to be much greater, perhaps increasing economic impacts by an order of magnitude. IMPLAN economic impact estimates for sheep ranching were not available.

Deer and elk hunting also produce personal income in Wallowa County. Hunters spend money in the county during their hunting trips. Table XI-7 provides estimates of the expenditures of hunters during hunts on the Starkey Experimental Forest in 1989-1991. A portion of those hunters came from western Oregon. Therefore, hunter expenditures and associated impacts on total personal income were partitioned into statewide and eastern Oregon impacts. Using the eastern Oregon income impact estimates, updated to 2003 dollars, it is possible to approximate the personal income impact of deer and elk hunting in eastern Oregon wildlife management units.

Table XI-7. Starkey Experimental Forest Elk and Deer Hunter Average Hunter Day Expenditures and Associated Impacts on Total Personal Income.

Hunt period	Usable responses	Average total trip expenditures (per hunter day)	State level income impacts	Average eastern Oregon expenditures (per hunter day)	Eastern Oregon income impact
ELK HUNTS					
1989	37	$ 48.95	$ 36.55	$ 18.49	$ 8.58
August 1990	129	$ 46.40	$ 35.23	$ 26.32	$ 12.95
December 1990	37	$ 71.13	$ 54.31	$ 42.81	$ 21.56
August 1991	138	$ 51.18	$ 38.44	$ 27.17	$ 12.38
December 1991	95	$ 60.46	$ 45.68	$ 31.22	$ 14.25
WEIGHTED AVERAGE	436 total	$ 53.29	$ 40.25	$ 28.39	$ 13.41
WEIGHTED AVERAGE (2003 $)		**$ 66.67**	**$ 50.35**	**$ 35.52**	**$ 16.78**
DEER HUNTS					
1989	68	$ 46.29	$ 35.05	$ 21.25	$ 9.03
October 1990	20	$ 48.09	$ 34.12	$ 20.95	$ 8.25
October 1991	19	$ 57.18	$ 42.98	$ 36.82	$ 17.48
WEIGHTED AVERAGE	107 total	$ 48.56	$ 36.28	$ 23.96	$ 10.38
WEIGHTED AVERAGE (2003 $)		**$60.75**	**$45.39**	**$29.97**	**$12.98**

Source: ODFW unpublished data from Chris Carter, former staff economist.

Applying the eastern Oregon impact per hunter day estimates from Table XI-7, the total and potential changes in income impacts of deer and elk hunting for the Blue Mountains region are provided in the following tables.

Table XI-8. Total impact of elk and deer hunting expanded from Wallowa County data for the Blue Mountains region and the state of Oregon. Assumes that local impacts are likely to be the same as those for the original study area. ($ in millions)

Hunt	Total days	Regional expenditure	Regional personal income	State expenditure	State personal income
Deer archery and rifle	282,688	$8.5	$3.7	$17.2	$12.8
Elk archery and rifle	398,528	$14.2	$6.7	$26.6	$20.1

Table XI-9. Changes in impacts including expenditures and personal income for the Blue Mountains region and the state of Oregon. Assumes that local impacts are likely to be the same as those for the original study area.

Hunt	Losses in days	Regional loss expenditure	Regional loss personal income	State loss expenditure	State loss personal income
Deer archery and rifle 4 pairs	4,268	$127,900	$55,400	$259,300	$193,800
Elk archery and rifle 4 pairs	3,338	$118,600	$56,000	$222,500	$168,100
Deer archery and rifle 7 pairs	7,414	$222,200	$96,200	$450,400	$336,500
Elk archery and rifle 7 pairs	5,790	$205,700	$97,200	$386,000	$291,500

With respect to wildlife viewing, there are no available data on numbers of wildlife viewing trips or related estimates of trip expenditures and personal income impacts per wildlife viewing day in eastern Oregon. Statewide information based on Oregon wildlife viewing from the 2001 National Survey of Fishing, Hunting and Wildlife-Associated Recreation (USFWS 2003b) estimate average expenditures per individual at $35 per day.

H. Additional Economic Elements of the Issue

When markets do not exist for wildlife or damages, the public sector often is called on to sort out the resulting confusion, controversy and inefficiencies. The creation of markets or a mechanism for exchange can lead to solutions that are both efficient and acceptable to concerned parties. This is potentially true of the wolf issue in Oregon for several reasons. The initial units of a resource such as the first wolves to move into the state are highly valued by many members of the public. Yet, the harm caused to other sectors is likely to be concentrated and spread across a relatively small number of individuals. Economist Ronald Coase, a Nobel Prize winner, surmised that given the right conditions and the opportunity to bargain, mutually beneficial arrangements can be achieved. Both groups are made better off than in the absence of an agreement. Initially, the willingness to pay exhibited by environmental interests and members of the general public will be greater than the damages associated with wolf reestablishment. If this accurately describes the situation in Oregon, then a mutually beneficial outcome may be reached.

Unfortunately these outcomes are hampered by the difficulties in bringing all parties to the table, termed by economists as transaction costs. When the cost of organizing and providing venues for all interests to interact becomes too great, agreement will not be reached. Although the number of people in favor of wolf reestablishment may be large, their individual willingness to pay may be small, and a mechanism by which payments can be realized could be difficult to implement. Therefore the challenge is to provide mechanisms by which the willingness to pay for wolf existence can be translated into funds that can be transferred to those who will be negatively affected. The Defenders of Wildlife program is similar to this in nature, and takes advantage of these differences in benefits and costs.

A difficult to quantify but potentially important element of wolf re-establishment involves changes to the associated ecosystem. As mentioned earlier in this chapter, it is likely that wolves will affect other predator populations. For example, related economic sectors such as sheep ranching may benefit if there are decreases in coyote populations. Many other changes are possible such as shifts in wildlife populations that feed on wolf-killed carcasses, and shifts in elk distribution that may affect vegetation types and cover. These impacts will vary by region, but general system characteristics such as diversity and resilience are likely to change as the wolf population increases. These changes may affect economic values of wildlife and the environment. For example, shifts in abundance might provide a greater variety of wildlife viewing opportunities or stream habitat improvements might be linked to changes in vegetation type or cover adjacent to streams. The biological nature, timing and magnitude of these changes are difficult to predict, but they are likely to impact the economic and social environment.

The level of compliance with laws and regulations is an essential component of any attempt to manage human activities. Often managers assume perfect compliance or ignore the role of noncompliance when considering how to reach management objectives. Research in this area indicates that compliance is at least in part dependent on the individual's calculation of potential costs and benefits. If the individual is assumed to be maximizing welfare, then non-compliance can be predicted given several factors in the following order:

- The probability of being caught;
- If caught, the probability of the case going to court and being sanctioned;
- If sanctioned the size of the fine; and
- The level of the fine in relation to the anticipated benefit of breaking the law as calculated by the conditional probabilities and the size of the fine.

However, it has been shown that other factors dictate compliance as well. Moral suasion, the tendency for people to try to do the "right thing," has a powerful influence on compliance. It is often the product of several factors such as the perceived fairness of the rules and regulations and the process by which the regulations are promulgated. Another factor involves peer pressure, as it is less likely that an individual will break the law if his or her peers follow the law.

It may not be necessary to do a formal analysis of compliance and enforcement, although enforcement activities will incur costs and some indication of the added burden should be taken into account for. Perceptions of the process as the plan moves forward and recourse in the face of individual hardships are factors that will affect incentives related to compliance with wolf-related regulations.

I. Conclusion and Future Considerations

Costs associated with likely delisting criteria, although potentially significant on the individual or regional level, are not large in comparison to current predation or fluctuations in big game populations due to weather and other carnivores. In addition, management alternatives are likely to be much more constrained during the early phases of wolf reestablishment. The largest economic and social impacts and concerns may revolve around more general positive and negative existence values associated with wolf re-establishment.

However, as is the case in Minnesota, there is a possibility of significant long-term increases in the size of the wolf population. The growth in cougar populations illustrates the possible consequences of unintended impacts on big game populations. It appears that without proper planning, costs in the more distant future could be significant. Given the future timing of significant impacts, all parties can benefit from recognition that the largest challenges may be several decades removed from the present.

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APPENDIX A: GLOSSARY OF TERMS

Breeding pair: an adult male and an adult female wolf that have produced at least two pups that survived to December 31 of the year of their birth, during the previous breeding season.

Chronic livestock depredation: situation where two livestock depredations have been confirmed by ODFW or Wildlife Services, or one depredation followed by up to three attempted depredations (testing or stalking).

Confirmed loss: a depredation loss where there is physical evidence that an animal was actually attacked and/or killed by a wolf.

Controlled take: management action that allows members of the public or tribes to kill a wolf by special permit (on public or private lands) to address chronic wolf-livestock conflicts or for wolf population management.

Delist: to remove a species from the list of endangered or threatened species.

Depredation: an incident or event that results in the confirmed injury or death of lawfully present livestock on federal, state, tribal, or other public lands, or private lands by one or more wolves. Working dogs or sporting dogs killed by one or more wolves is considered a depredation under this plan.

Dispersal: generally refers to the natural movement of an animal from one area to another.

Fladry: a method of non-lethal wolf control that involves attaching numerous strips of flagging material along a fence or other device for the purpose of keeping wolves out of an area occupied by livestock.

Fur-bearing mammal: as defined by Oregon law, beaver**,** bobcat, fisher, marten, mink, muskrat, otter, raccoon, red fox, and gray fox [ORS 496.004(8)].

Game mammal: as defined by Oregon law, antelope, black bear, cougar, elk, moose, mountain goat, mountain sheep and silver gray squirrel [ORS 496.004(9)].

Gray wolf: according to the official list of State Endangered and Threatened Species at OAR 635-100-0125, the species is defined as *Canis lupus*.

Guard dog: any dog actively used to defend livestock from depredation.

Lethal take: management actions resulting in the death of a wolf or wolves. Lethal take may be initiated under the following circumstances: threat to human safety, to stop a wolf in the act of attacking a domestic animal or to stop chronic wolf depredations on private or public lands.

Management Objective: a specific population level of animals for management purposes; for this plan, wolf population objectives are defined by the number of breeding pairs of wolves present in the population.

Northern Rocky Mountain Wolf Recovery Plan: a document prepared by a team of individuals with expertise regarding the biological and habitat requirements of the wolf, outlining the tasks and actions necessary to recover the species within parts of its former range in the Rocky Mountain Region. The original plan was completed in 1980. The revised Recovery Plan was approved August 3, 1987.

Oregon Endangered Species Act: law passed by the Oregon Legislature in 1987 that provides for listing and protection of threatened and endangered fish and wildlife species (ORS 496.171-192).

Pack: a group of wolves, usually consisting of a male, female and their offspring from one or more generations. For purposes of monitoring, a pack may be defined as a group of four or more wolves traveling together in winter. Ongoing and future wolf research may refine this definition for monitoring purposes.

Persistent wolf activity: situation where a wolf or wolves are loitering, testing, worrying, or otherwise disrupting livestock during a 48 hour period.

Pursuit: for purposes of this plan, pursuit of wolves is limited to pursuing adult wolves (greater than six months old) on foot, horseback, non-motorized or motorized vehicle (without approaching closer than 20 feet); discharging firearms or other projectile launching devices in proximity to but not in the direction of wolves; throwing objects in the general direction of but not at wolves; or making any loud noise in proximity to wolves.

Soft release: the release of wolves from a temporary confinement facility where they were held to acclimate them to the general area of the release, to a free-ranging situation. "Soft" release is a relative term depending largely on the duration of holding at the release site and the freedom of the wolves to conduct basic (minimum) biological activities.

Species: as defined by Oregon law, any species or subspecies of wildlife [ORS 496.004(15)].

Sporting dog: any dog used to aid a hunter in the legal pursuit of wildlife during an authorized hunting season.

State endangered species: any native wildlife species determined by the Commission to be in danger of extinction throughout any significant portion of its range within this state; and any native wildlife species listed as an endangered species pursuant to the federal Endangered Species Act of 1973 (P.L. 93-205, 16 U.S.C. 1531), as amended [ORS 496.004(6)].

State threatened species: any native species the Commission determines is likely to become an endangered species within the foreseeable future throughout any significant portion of its range within this state; and any native wildlife species listed as a threatened species pursuant to the federal Endangered Species Act of 1973 (P.L. 93-205, 16 U.S.C. 1531), as amended [ORS 496.004(17)].

Suitable habitat: (e.g., high, medium, low suitability) for purposes of this plan, is defined by factors including availability of natural prey, level of human occupation, level of livestock activity and density of open roads.

Take: as defined by Oregon law, to kill or obtain possession or control of any wildlife [ORS 496.004(16)].

Ungulate: any of the species deer, elk, bighorn sheep, pronghorn and mountain goat.

Wildlife: as defined by Oregon law, fish, shellfish, wild birds, amphibians and reptiles, feral swine as defined by Oregon Department of Agriculture rule, and other wild mammals [ORS 496.004(19)].

Wildlife Management Unit (WMU): a geographic unit used in managing Oregon's big game animals. The state has been divided into 77 different units each with a name and a number for reference purposes.

Wolf Conservation Region: for purposes of wolf conservation and management in Oregon, two regions, one east and one west of a line defined by U.S. Highway 97, U.S. Highway 20 and U.S. Highway 395 were created. Each region has separate population goals for wolves.

Working dog: any dog used to actively aid in the herding or protection of livestock (guard dogs, herding dogs).

APPENDIX B: WOLF BIOLOGY AND ECOLOGY

NOTE: This section was adapted from the Montana Gray Wolf Conservation and Management Plan August 2002 with permission.

WOLF ECOLOGY IN THE NORTHERN ROCKIES

Physical Characteristics

Male gray wolves in Montana weigh 90-110 pounds, and females weigh 80-90 pounds. Wolves in the Greater Yellowstone Area (GYA) are slightly heavier. Smith et al. (2000) reported that in 1999 winter-captured adult females averaged 108 pounds, while female pups averaged 96 pounds. Male pups averaged 107 pounds. About half of the wolves in Montana are black and the remainder gray. Both color phases may be found in a pack or in one litter of pups. White wolves, usually old animals, are occasionally seen. Tracks are normally 4.5 to 5.5 inches long (Harris and Ream 1983).

Wolves may resemble coyotes, particularly when wolves are young. Wolves also may be confused with some large domestic dog breeds. Wolves are distinguished from dogs by their longer legs, larger feet, wider head and snout, narrow body, and straight tail. Other distinguishing characteristics require closer examination than is possible in field settings with live animals. In many instances, behavior distinguishes between wild wolves, wolf-dog hybrids and domestic dogs (Boyd et al. 2001, Duman 2001).

Pack Size

The gray wolf is a highly social species that lives in packs. Packs are formed when male and female wolves develop a pair bond, breed and produce pups. The pack typically consists of a socially dominant breeding pair (alphas), their offspring from the previous year and new pups. Other breeding-aged adults may be present, but they may or may not be related to the others. Cooperatively, the pack hunts, feeds, travels and rests together. The pack also shares pup-rearing responsibilities, including hunting and tending pups at the den or at a series of rendezvous sites. Pack size is highly variable (USFWS et al. 2001). In northwest Montana, it ranges from 2 to 11, and averages 5-7. In the GYA, pack sizes range from 5 to 27 and average 9.3. Average pack size is larger inside Yellowstone National Park (YNP) (14.6 individuals) than outside (5.8 individuals) (Smith et al. 2000).

Reproduction

Wolves normally do not breed until at least 22 months of age (Mech 1970). Breeding usually occurs only between the dominant male and female in a pack. In the northern Rockies, the breeding season peaks in mid- to late February (Boyd et al. 1993). Wolves localize their movements around a den site and whelp in late April, following a 63-day gestation period. Wolves may be sensitive to human disturbance during the denning season. After the pups are about eight weeks old, they are moved to a series of rendezvous sites. In northwest Montana, maximum litter size averaged 5.3 (range 1-9) from 1982 to the mid 1990s. By December, average litter size declined to 4.5 (Pletscher et al.1997). In central Idaho, average litter size was 5.1 from 1996-1998 (Mack and Laudon 1998).

Pup survival is highly variable and is influenced by several factors, including disease, predation and nutrition (Mech and Goyal 1993, Johnson et al. 1994). In northwestern Montana from 1982-1995, 85 percent of pups survived until December, though survival varied year to year (Pletscher et al.

1997). Pup mortality in the first eight months of life was attributed to human causes (8 of 20 mortalities, 40 percent), unknown causes (2 of 20, 15 percent), and disappearance (9 of 20, 45 percent). In YNP, during the first four years, 133 pups were born in 29 litters and 71 percent were believed to still be alive in 1998 (Bangs et al. 1998). Pup survival varied between 73 and 81 percent from 1996-1998. However, canine parvovirus was strongly suspected as a contributing factor in the low pup survival (45%) in 1999. In 2000, pup survival rebounded to 77% (Smith et al. 2000). In central Idaho, 92-99 pups were produced between 1995 and 1998 (Mack and Laudon 1998).

Occasionally, more than one female in a pack may breed, resulting in more than one litter per pack (Ballard et al. 1987). This phenomenon has been documented in YNP (Smith et al. 2000, USFWS et al. 2000, USFWS et al. 2001). In 1999, one pack had two litters. In 2000, 13 wolf packs produced 16 litters. Occasionally this phenomenon leads to the formation of a new pack (Boyd et al. 1995).

Food Habits

The gray wolf is an opportunistic carnivore and is keenly adapted to hunt large prey species such as deer, elk and moose. Wolves may scavenge carrion or even eat vegetation. In Montana white-tailed deer, mule deer, elk and moose make up the majority of wolf diets. In northwestern Montana white-tailed deer comprised 83 percent of wolf kills, whereas elk and moose comprised 14 percent and 3 percent, respectively (Kunkel et al. 1999). However, 87 percent of wolf kills in YNP during 1999 were elk (Smith et al. 2000). In central Idaho elk (53 percent) and deer (42 percent) were the most frequently detected species in scat samples collected in summer 1997 (Mack and Laudon 1998). Ungulate species compose different proportions of wolf diets, depending on the relative abundance and distribution of available prey within the territory.

Wolves also prey on smaller species such as rabbits or beaver. Wolf scat collected in YNP in 1998 contained voles, ground squirrels, snowshoe hares, coyotes, bears, insects and vegetation (Smith 1998). Earlier work in northwestern Montana also documented non-ungulate prey species such as ruffed grouse, ravens, striped skunks, beavers, coyotes, porcupines and golden eagles (Boyd et al. 1994).

Wolves also scavenge opportunistically on vehicle- or train-killed ungulates, winterkill and on kills made by other carnivores, particularly mountain lions. Wolves in northwestern Montana scavenge the butchered remains of domestic livestock or big game animals at rural bone yards or carcass disposal sites. Wolves also may kill and feed upon domestic livestock such as cattle, sheep, llamas, horses, or goats. They also may kill domestic dogs but usually do not feed on the carcass.

Movements and Territories

A pack establishes an annual home range or territory and defends it from trespassing wolves. From late April until September pack activity is centered at or near the den or rendezvous sites, as adults hunt and bring food back to the pups. One or more rendezvous sites are used after pups emerge from the den. These sites are in meadows or forest openings near the den, but sometimes are several miles away. Adults will carry small pups to a rendezvous site. Pups travel and hunt with the pack by September. The pack hunts throughout its territory until the following spring.

Pack boundaries and territory sizes may vary from year to year. Similarly, a wolf pack may travel in its territory differently from one year to the next because of changes in prey availability or distribution, intraspecific conflict with nearest neighbors, or the establishment of a new neighboring pack. Because the attributes of each pack's territory are so unique (elevations, land use, land

ownership patterns, prey species present and relative abundance), it is difficult to generalize about wolf territories and movements.

After recolonizing the Glacier National Park (GNP) area in the 1980s, individual wolves dispersed and established new packs and territories elsewhere in western Montana. Wolves demonstrated a greater tolerance of human presence and disturbance than previously thought characteristic of the species. It previously was believed that higher elevation public lands would comprise the primary occupied habitats (Fritts et al. 1994). While some packs have established territories in backcountry areas, most prefer lower elevations and gentle terrain where prey is more abundant, particularly in winter (Boyd-Heger 1997). In some settings, geography dictates that wolf packs use or travel through private lands and co-exist in close proximity with people and livestock. Since the first pack established a territory outside the GNP area in the early 1990s, packs in northwestern Montana negotiated a wide spectrum of property owners and land uses. These colonizers also settled across an array of rural development.

With the exception of GNP packs, wolves in northwest Montana move through a complex matrix of public, private and corporate-owned lands. Landowner acceptance of wolf presence and the use of private lands is highly variable in space and time. Given the mobility of the species and the extent to which these lands are intermingled, it would not be unusual for a wolf to traverse each of these ownerships in a single day. Land uses range from dispersed outdoor recreation, timber production or livestock grazing to home sites within the rural-wildland interface, hobby farming/livestock, or full-scale resort developments with golf courses.

Private land may offer habitat features that are especially attractive to wolves so the pack may use those lands disproportionately more often than other parts of their territory. Land uses may predispose a pack to conflict with people or livestock, although the presence of livestock does not make it a forgone conclusion that a pack will routinely depredate. Domestic livestock are present year round within the territories of many Montana packs. For example, since the late 1980s, the Ninemile and Murphy Lake packs encountered livestock regularly, but caused conflict only sporadically.

The earliest colonizing wolves had large territories. Ream et al. (1991) reported an average of 460 square miles. In recent years average territory size decreased, probably as new territories filled in suitable, unoccupied habitat. In the Northwest Montana Recovery Area during 1999 the average territory size was 185 square miles for eight packs. Individual territories were highly variable in size, with a range of 24-614 square miles (USFWS et al. 2000).

Territories in the GYA were larger, averaging 344 square miles with 11 packs. Individual pack territories ranged from 33 to 934 square miles. Central Idaho wolf packs had the largest average territory size of 360 square miles with 13 packs, with individual pack territories ranging from 141 to 703 square miles (USFWS et al. 2000).

Dispersal

When wolves reach sexual maturity, some remain with their natal pack while others leave, looking for a mate to start a new pack of their own. These individual wolves are called dispersers. Dispersal may be to nearby unoccupied habitat near their natal pack's territory or it may entail traveling several hundred miles before locating vacant habitat, a mate, or joining another pack. Animals may disperse preferentially to areas occupied by conspecifics (Ray et al. 1991). This appears true for the gray wolf,

a species that uses scent marking and howling to locate other wolves (Ray et al. 1991). Boyd and Pletscher (1999) indicated that the dispersers in their study moved toward areas with higher wolf densities than found in their natal areas, in this case northward towards Canada. This has important implications for wolves in Montana, which now have conspecifics to the south and west in central Idaho and YNP. Dispersal already has resulted in the formation of several new packs in Montana (Fig. 2) (Boyd et al. 1995, USFWS et al. 2001). Wolves probably will continue dispersing from the core areas and slowly occupy landscapes between the Canadian border, central Idaho and northwestern Wyoming (USFWS et al. 2000).
Ultimately this will yield a meta-population capable of genetic exchange across the northern Rocky Mountains (Forbes and Boyd 1996, 1997).

Boyd and Pletscher (1999) studied wolf recovery in northwestern Montana from 1979 to 1997. Male wolves dispersed at an average age of 28.7 months and traveled an average of 60 miles from their natal territory before establishing a new territory or joining an existing pack. Females averaged 38.4 months old at dispersal and traveled an average of 48 miles. Males and females, combined, traveled an average of 60 miles (range 10 -158 miles). A captured sample of males and females dispersed at rates proportional to their occurrence. There were two peaks of dispersal: January-February (courtship and breeding season) and May-June.

The Yellowstone Wolf Project documented 36 dispersal events (18 females and 18 males) from 1995to 1999 (Smith et al. 2000). Males dispersed an average of 54 miles and females dispersed an average of 40 miles. The longest recorded dispersal of a Yellowstone wolf to date was 221 miles. This Yellowstone-born male ultimately settled in central Idaho.

Increasingly, dispersal is being documented among and between all three recovery areas in the northern Rockies (Bangs et al. 1998, Mack and Laudon 1998, Smith et al. 2000). Combined, there were 21 known dispersal events in 2000 and 19 in 1999 (USFWS et al. 2000). Dispersal paths crossed international boundaries, state boundaries, public and private land boundaries, different land uses, and agency jurisdictions.

Mortality
Wolves die from a variety of causes, usually classified as either natural or human-caused. Naturally caused mortalities result from territorial conflicts between packs, injuries while hunting prey, old age, disease, starvation or accidents. In an established Alaskan wolf population largely protected from human-caused mortality, most wolves were killed by other wolves, usually from neighboring packs (Mech et al. 1998). However, in the northern Rockies, natural mortality probably does not regulate populations (USFWS 2000). Humans are the largest cause of wolf mortality and the only cause that can significantly affect populations at recovery levels (USFWS 2000). Human caused mortality includes control actions to resolve conflicts, legal and illegal killings, and car/train collisions.

Pletscher et al. (1997) studied survival and mortality patterns of wolves in the GNP area. Total annual survival for this semi-protected population was a relatively high 80 percent. The survival rate for resident wolves was even higher (84 percent), but dispersers had a 64 percent chance for survival. Despite the high survival rates, humans accounted for the vast majority of wolf deaths. Of the 43 deaths investigated from 1982 to 1995, 88 percent were human-caused (56 percent legal, 32 percent illegal). Three wolves died of natural causes and two died of unknown causes.

More recent mortality data are available from the USFWS et al. (2001). In the Northwest Montana Recovery Area, there were at least 18 mortalities in 2000. Cause of death was known for 15. At least seven wolves were illegally killed, four died in agency control actions, and four died from vehicle /train collisions. In the GYA, at least 20 wolves died in 2000, and the cause of death is known for 15. Nine wolves died due to human causes (six control actions, two vehicle collisions, one illegal) and six died from natural causes. Five additional mortalities were documented, but the causes were not readily apparent. These either were classified as unknown or unresolved pending further investigation. In the Central Idaho Recovery Area, 17 human-caused mortalities were documented in 2000. Control actions removed 10. One wolf died of natural causes and five more died from unknown causes.

Genetics

In recent years the application of genetic techniques to the study of wildlife populations has permitted managers to address issues of genetic diversity and population viability with increased confidence. These techniques have yielded information relevant to wolf conservation and management in the northern Rockies. Wolf recovery in the northern Rockies advanced from the combination of recolonization of northwestern Montana by relatively few wolves from Canada and the reintroduction of wolves into YNP and central Idaho. In northwestern Montana the founding population was small enough that inbreeding among closely related individuals was possible. Fortunately, the genetic variation among the first colonizers was high (Forbes and Boyd 1996). The combination of high genetic variation among colonizers and ongoing natural dispersal to and from Canadian populations was adequate to ensure long-term population viability, provided that genetic exchange continued.

Similar concerns existed for the relatively small founding population reintroduced to YNP and central Idaho. But wolves were trapped from two distinct source populations in Canada. The genetic variation among reintroduced wolves (and the source populations from which they came) also was high (Forbes and Boyd 1997). Overall, heterozygosity was similar among samples of natural recolonizers, reintroduced individuals, and the Canadian source populations. Field studies of wolf dispersal and migration distances supported the genetic results (Ream et al. 1991, Boyd et al. 1995, Boyd and Pletscher 1999). Wolf populations in the northern Rockies should not suffer from inbreeding depression.

An underlying tenant of the wolf recovery and restoration program is that each state's wolf population is functionally connected so that genetic material can be exchanged among all three. In isolation, none of the three populations could maintain its genetic viability (USFWS 1994a, Fritts and Carbyn 1995).

Population Growth

Wolf populations increase or decrease through the combination and interaction of wolf densities and prey densities (Keith 1983, Fuller 1989). Actual rates of change depend on whether the wolf population is pioneering vacant habitat (as in YNP and central Idaho) or whether the population is well established (as in northwestern Montana). The degree and type of legal protection, agency control actions, and regulated harvest also influence population trends. Once established, wolf populations can withstand as much as 45 percent mortality from all sources (National Academy of Sciences 19XX), with some studies indicating that established populations may withstand as much as 28-35 percent mortality from humans exclusive of natural mortality factors (Keith 1983, Fuller 1989).

If protected, low density wolf populations can increase rapidly if prey is abundant. Keith (1983) speculated that a 30 percent annual increase could be the maximum rate of increase for any wild wolf population. Once densities were high enough, social interactions probably intensify. Intraspecific conflict and increased competition for food eventually cause the population to level off or decline (Keith 1983, Fuller 1989).

Wolf populations in the GNP area (northwestern Montana and southeastern Alberta) increased an average of 23 percent annually from 1986 to 1993 (Fritts et al. 1995). After 1993 the population leveled off (Pletscher et al.1997). Those packs produced dispersers that eventually colonized vacant habitats in western Montana (USFWS unpubl. data). Some packs which formed in the Northwestern Montana Recovery Area since the early 1990s persisted, but others did not. Packs have been lost due to illegal mortality, control actions where livestock depredation was chronic, and for unknown reasons.

The average annual rate of increase from 1992 to 2000 in northwestern Montana was 4.7 percent (USFWS et al. 2001). In 1992 the minimum mid-winter count (including pups) was 41 wolves. Sixty-two wolves were counted in 2000. The highest count was 70 wolves at the end of 1996. The population grew in some years, but declined in others. Some of the variation probably reflects true changes wolf numbers, but some variation may be due to monitoring inaccuracy or decreased monitoring effort.

Prey populations influenced recent wolf population dynamics in northwestern Montana. White-tailed deer populations expanded from the late 1970s through the mid 1990s, in part precipitating and sustaining increases in wolf numbers and distribution. However, the winter of 1996-1997 was exceptionally severe, and white-tailed deer populations declined significantly (Sime, unpubl. data). Other prey populations also declined, with poor recruitment attributed to winterkill. The USFWS believes the significant decline in natural prey availability led to the record high number of livestock depredations and subsequent lethal control. Wolf depredations on livestock in 1997 alone accounted for 50 percent of all depredations in northwestern Montana between 1987 and 1999. Smaller prey populations likely translated to decreased wolf pup survival in 1997 and 1998, compared to 1996. Ungulate populations rebounded in recent years and the wolf population also is nearing its 1996 level.

Wolf populations in the GYA and central Idaho areas exceeded all expectations for reproduction and survival (Bangs et al. 1998). Populations became established in both areas within two years, rather than the predicted three to five years. Pup production and survival in the GYA has been high. The average annual growth rate for the GYA from 1996 to 2000 is 35 percent, based on the minimum count as of December 31 and including pups (USFWS et al. 2001). However, population growth in the GYA slowed in 1999 after the rapid increase in the first three years post-reintroduction (Smith et al. 2000). The average annual growth rate for this population is 36 percent, based on minimum counts on December 31 and including pups (USFWS et al. 2001).

It is likely that population growth rates will slow for both the core Yellowstone and central Idaho populations because of declining availability of suitable, vacant habitat. However, these populations will be a source of founders for new packs outside YNP, central Idaho, Wyoming and Montana. While population growth slows or levels off in core areas, wolf numbers and distribution outside

core areas are expected to increase rapidly in the next few years as wolves born in the initial pulse sexually mature and disperse to colonize vacant habitats elsewhere.

Pack membership typifies the predominant manner in which a wolf exists in the wild. The pack is the mechanism by which wolves reproduce and populations grow. However, in most wolf populations, some lone, nomadic individuals exist as dispersers -- looking for vacant habitat, waiting to be found by a member of the opposite sex within a new home range, or searching for an existing pack to join. Up to 10-15 percent of a wolf population may be comprised of lone animals.

This is a temporary transition. Wolves in northwestern Montana usually found other wolves in an average of 66 days (range 2-202 days) (Boyd and Pletscher 1999). Occasionally, lone wolves get into conflict with people and/or livestock, ultimately being lost to the population through legal or illegal means. For a wolf to make a contribution to the population, it must affiliate with other wolves. Until they affiliate with a pack, lone wolves generally are counted separately or omitted from population counts altogether because they do not contribute to population growth.

APPENDIX C: INTERIM RESPONSE STRATEGY FOR REPORTED GRAY WOLF ACTIVITY IN OREGON

This document is included as an appendix solely for the purpose of illustrating wolf-response protocols put in place prior to adoption of the Oregon Wolf Conservation and Management Plan. Some provisions of the Strategy do not reflect the new authorities implemented by the Plan, or the January 31, 2005 federal court decision in *Defenders of Wildlife v. Norton*. It is important to consult current federal law and the Oregon Wolf Plan and its associated technical rules to determine the legal requirements now applicable to wolves in Oregon.

INTERIM RESPONSE STRATEGY
FOR
REPORTED GRAY WOLF ACTIVITY
IN OREGON

Coordinating Agencies:

U.S. Fish and Wildlife Service

Oregon Department of Fish and Wildlife

APHIS – Wildlife Services

January 2004

Prepared by:
John Stephenson
La Grande Field Office
U.S. Fish & Wildlife Service

Information on Oregon State law provided by the Assistant Attorney General, Natural Resources Section, Oregon Department of Justice.

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Purpose and Need

This is <u>not</u> a wolf management plan or recovery strategy. It is not a plan for establishing wolves in Oregon, nor a strategy for keeping them out of the State. The sole purpose of this document is to prepare for a coordinated and effective response to possible situations that may arise as gray wolves (*Canis lupus*) move, under their own power, into Oregon from adjacent states.

This response strategy is a cooperative effort between Federal and State wildlife agencies. It emphasizes close coordination with all affected and responsible parties and a common understanding of specific roles and responsibilities. As long as gray wolves are federally-listed as threatened or endangered under the Endangered Species Act of 1973 (Act), the U.S. Fish & Wildlife Service (FWS) has overall lead responsibility for wild wolves in Oregon. The other agencies with responsibilities for addressing wolf issues in Oregon are: APHIS-Wildlife Services which investigates livestock depredations and implements animal control actions when necessary, and the Oregon Department of Fish & Wildlife (ODFW) which is the State agency responsible for managing wildlife resources in Oregon. In addition, tribal governments are responsible for managing wildlife on their reserved lands and they also maintain certain hunting and fishing rights on ceded lands in the State.

Absent from Oregon wildlands for over half a century, gray wolves have recently begun to reappear in eastern parts of the State. In March 1999, a radio-collared female was captured near John Day and returned to Idaho. In May 2000, a collared wolf was struck and killed by a vehicle on Interstate 84 south of Baker City, and in October 2000, an uncollared wolf was found shot to death between Ukiah and Pendleton. All three animals were confirmed to be migrants from Idaho.

The Federal gray wolf recovery program in the northwestern United States is focused on maintaining populations in parts of Idaho, Montana, and Wyoming. There are no federally-sponsored plans to promote wolf recovery in Oregon and no Federal funds for wolf management are allocated to FWS's Oregon Fish and Wildlife Office.

Despite Oregon's sideline role in Federal wolf recovery efforts, experts predict that wolves will continue to move into the State from the expanding Idaho population and it is possible that packs could become established. There have been numerous, unconfirmed wolf sightings in Oregon over the past few years. Consequently, the FWS, ODFW, and Wildlife Services must be prepared to respond to incidents involving wolves in Oregon.

LEGAL STATUS OF WOLVES IN OREGON

The legal status of gray wolves in Oregon is influenced by the following factors:

1. Gray wolves were extirpated from Oregon over 50 years ago, so there is no resident population in the State (wolf hybrids have no Federal legal status).
2. The three confirmed wild gray wolves found in Oregon in recent years were all traced back to the Central Idaho experimental population and that population is the most likely source of future migrants to the State.

3. Pursuant to a final rule published in the Federal Register on April 1, 2003:
    a. Oregon is within the boundaries of the federally-designated Gray Wolf Western Distinct Population Segment (Western DPS);
    b. the Western DPS is reclassified from endangered to threatened status; and
    c. a special regulation under 4(d) of the Act is now in effect that provides a wider range of options for responding to wolf-human conflicts.
4. The gray wolf is listed as endangered by the State of Oregon and thus receives certain protections, as stipulated in the State Endangered Species Act (State ESA).

The Central Idaho wolf population was established in 1995 as a "nonessential experimental population" pursuant to Section 10(j) of the Act. Special regulations apply to the management of this experimental population (50 CFR 17.84(i)). The experimental rules 7(iii)(A-D) recognized lone wolves would disperse outside the geographic boundaries of the Central Idaho Nonessential Experimental Population Area (the Idaho state line is the boundary) and gave the FWS legal authority to actively manage them.

The Federal "4(d) rule" now in effect for the Western DPS is similar in nature to the existing 10(j) regulations that guide management of the Central Idaho experimental population. It identifies actual or perceived conflict situations between wolves and human activities, and provides the regulatory authority for implementing response actions to address those situations (including lethal control when necessary). See Attachment A for a summary of response measures authorized by the 4(d) rule and the specific circumstances under which they apply.

In Oregon, some provisions of the Federal 4(d) rule are in apparent conflict with legal protections for State-listed endangered species. The State ESA prohibits 'take' of an endangered species, which is defined in that statute as killing or capturing an animal. Exemptions to this State prohibition are possible through ODFW issuance of a variety of 'take' permits. The State Fish and Wildlife Commission has begun a process to develop a wolf management plan that could authorize issuance of such permits. The State recently appointed a 14-member Wolf Advisory Committee and is currently working with that committee to develop a management plan. Until a State plan is completed and adopted, the Federal 4(d) rule provisions that conditionally allow private individuals to kill problem wolves are not consistent with State law. Once a State wolf management plan is in place, ODFW may receive the authority from the State Fish and Wildlife Commission to issue 'take' permits to authorize the response measures described in the 4(d) rule (Assistant Attorney General, Natural Resources Section, Oregon Dept. of Justice, pers. comm., 2004).

Until the State is able to issue their 'take' permits, the FWS agrees to not issue Federal lethal take permits to private individuals in Oregon. However, the FWS and its designated agents (e.g., Wildlife Services) have 4(d) rule authorities to capture or kill wolves in Oregon, as needed, to control problem animals and/or monitor individuals or packs.

Overview of Potential Situations

Discussed below are situations that might arise in Oregon and an overview of our response strategy for each situation. Clearly, each incident will have a unique context and our response will likely vary from case to case to account for individual circumstances. The availability of resources also could affect our response.

If wolf activity is discovered within or immediately adjacent to tribal lands, we will initiate government-to-government discussions with the affected tribe prior to taking any management action.

1. UNCONFIRMED REPORTS OF WOLF ACTIVITY (TRACKS) OR SIGHTINGS

FWS and ODFW regularly receive reports from people who have observed either large tracks or large animals that they think may be wolves. The current response procedure is for FWS personnel (John Stephenson) to interview these people and fill out a questionnaire that documents the specific observations and where they occurred. These observations are also mapped and stored in a database. The FWS will continue this procedure and when warranted conduct follow-up field investigations to see if wolf activity can be verified. ODFW and Wildlife Services personnel will continue to forward wolf sighting reports to FWS.

2. VERIFIED WOLF ACTIVITY (NOT INVOLVING A DEPREDATION OR CONFLICT)

Wolf activity in Oregon will be considered verified only when a professional wildlife biologist from the FWS, ODFW, or Wildlife Services has been able to see and conclusively confirm the presence of a wild wolf. If there is uncertainty about the identification, wolf experts may be brought in to assist in the confirmation process. When current, highly credible reports are received from other sources, appropriate personnel will be sent out to try to verify those reports.

If wild wolves are confirmed to be present in Oregon and the animal(s) has not been implicated in a livestock depredation or other problem incident, FWS and ODFW will collaborate to monitor wolf activity to the best of our ability given available resources. Tribal wildlife agencies may also participate in monitoring activities. In addition, we will immediately coordinate with livestock producers in the local area to provide information on what type of actions are allowable under the 4(d) rule (see Attachment A) and what steps to take if they suspect a wolf depredation (see checklist on pg 8).

The preferred monitoring approach is to capture and radio-collar an animal to facilitate regular tracking of movements. However, this can be difficult to accomplish with a lone wolf that is roaming across wide areas. Therefore, we will likely wait until there are multiple observations of wolf activity in an area - indicating the presence of one or more resident animals - before initiating a concerted effort to capture and collar a wolf. A potential alternative approach is to do periodic surveillance from the ground and air to document tracks and any observed wolf activity.

The purpose of monitoring wolf activity, once verified, is several-fold. First, it will be important to determine what areas are being used by wolves. Second, by keeping tabs on the

animal(s) we may be able to anticipate problem situations and utilize non-lethal harassment techniques (e.g., shooting rubber bullets) to possibly head-off or reduce conflicts. Finally, if problem situations do occur, the presence of radio-collared animals will increase the efficiency of subsequent actions.

3. REPORT OF WOLF-CAUSED DEPREDATION ON LIVESTOCK OR OTHER DOMESTIC ANIMALS

When a report is received implicating a wolf in the attack of livestock (cattle, sheep, horses, or mules) or other domestic animals, our response will include the following elements:

- Wildlife Services investigates. Keys to a successful response include:
    - Wildlife Services personnel are rapidly notified and respond promptly;
    - coordination with the affected livestock producer to secure the scene;
    - prompt notification of key individuals in various agencies;
    - coordination between agencies to plan possible follow-up actions.

- If the investigation determines that a wolf was involved in the depredation of livestock or dogs, some type of response action will be initiated. The 4(d) rule provides the regulatory authorization and conditions for implementing a variety of non-lethal measures or lethal control measures on problem wolves. Site-specific circumstances will dictate the approach used (See Appendix A for description of actions allowed under the rule). Response actions will become more aggressive, if needed, until depredations cease in the area.

- Carter Niemeyer (FWS-Boise) will be called in to oversee initial wolf response efforts, in conjunction with Wildlife Services' specialists in Oregon and with assistance from local FWS and ODFW personnel. Wildlife Services is the lead Federal agency for wildlife damage management and, when authorized by FWS, will implement wolf control actions.

4. UNINTENTIONAL WOLF CAPTURE

Wolves may be inadvertently caught in traps or snares set for other animals. Such an incident occurred in northern Utah in late 2002. If an accidentally-captured wolf is healthy, the FWS will consult with partner agencies and other affected parties prior to initiating an action. Site-specific circumstances will influence how such captures are handled, however, a rapid response will be necessary to ensure the health and well-being of the animal.

Factors which will be considered when responding to the unintentional capture of a wild wolf in Oregon include the following:

- Given the current size and distribution of Idaho's wolf population, the FWS does not see any biological utility in relocating stray wolves back to Idaho. If there is no history of wolf problems in the area where the animal is captured, the preferred approach is on-site release. Research will be done to determine if there have been any reported wolf problems in the area prior to making a decision to release on-site.

- The Federal 4(d) rule stipulates that female wolves with pups captured on public lands will be released prior to October 1, unless there have been repeated depredations.

- If an on-site release is being considered, the animal's health should be carefully evaluated prior to release.

- If the animal is collared and released, the FWS, in conjunction with partner agencies, will monitor its movements at least once a month (the same minimum level of monitoring effort that is required for collared wolves in Idaho).

- If the decision is made to hold the animal, the animal will be kept in an appropriate kennel facility and veterinary care will be arranged if needed.

5. REPORT OF A DEAD OR INJURED WOLF

Given the potential for intentional harm of wolves, FWS Law Enforcement and/or Oregon State Police (OSP) personnel will be called in to investigate reports of dead or injured wolves. The FWS is responsible for investigating cases that involve unauthorized take of a federally-listed species. The OSP is responsible for investigating violations of State wildlife laws.

When an injured or dead wolf is found, our response will include the following elements:

- FWS Law Enforcement and OSP will be immediately notified and they will handle any type of criminal investigation. Keys to a successful response include:
    - law enforcement officers are rapidly notified and respond promptly;
    - the scene where the animal was found is effectively secured.

- If the situation involves a dead wolf, FWS Law Enforcement and/or OSP officers will immediately take over the investigation and they will determine all subsequent aspects of the response.
- If an injured wolf is found, actions will be taken immediately to stabilize its condition and provide appropriate veterinary care. Inter-agency coordination will be initiated to determine what should be done with the animal. Depending on the severity of the injury, a decision will be made on whether or not to release the animal.

Response Strategy

INSTRUCTIONS FOR RECEPTIONISTS AND OTHERS WHO RECEIVE AN INITIAL CALL

Handling Calls Involving a Reported Wolf Incident in Oregon

WHEN A CALL COMES IN ABOUT A POTENTIAL WOLF INCIDENT, PLEASE DO THE FOLLOWING:

1. Write down caller's name and phone number (where he/she can be reached at that moment);
2. Connect caller up with one of the designated wolf coordinators:

John Stephenson (FWS)	**Gary Miller** (FWS)	**Mark Henjum** (ODFW)
(541) 312-6429 office	(541) 962-8509 office	(541) 963-2138 office
(541) 786-3282 cell	(541) 786-3648 cell	(541) 975-4228 cell
(541) 322-6192 home	(541) 568-4292 home	(541) 963-0472 home

If one of these individuals does not work in your office, ask the caller to remain by the phone for a return call, then immediately phone one of the coordinators and pass on the information.

SITUATION-SPECIFIC RESPONSE CHECKLISTS

Response checklists have been developed for each type of potential wolf situation to facilitate a smooth and organized response:

1. **Unconfirmed report of wolf activity (e.g., tracks) or sightings**: The person making the report will be interviewed (John Stephenson is the lead) and the information will be recorded on a questionnaire form and the location plotted on a map. Follow-up field investigations will be conducted when warranted, particularly when multiple credible reports come in from the same geographic area.
2. **Verified wolf activity, without a problem incident**: See response checklist, page 7.
3. **Report of possible wolf-caused livestock depredation**: See response checklist, page 8.
4. **Report of an inadvertent (accidental) wolf capture**: See response checklist, page 10.
5. **Report of an injured or dead wolf**: See response checklist, page 11.

Response Checklist:

VERIFIED WOLF ACTIVITY, WITHOUT A PROBLEM INCIDENT

If the presence of wild wolves is confirmed, and there has not been a livestock or domestic animal depredation or other problem incident, we will respond as follows:

☐ **Document specific location(s) where activity has been observed.**

☐ **Notify the following individuals** (see phone directory in Attachment B, pg 15):

FWS: Kemper McMaster, Gary Miller, Phil Carroll, Ed Bangs, Carter Niemeyer
ODFW: Ron Anglin, Craig Ely, Mark Henjum
Wildlife Services: Dave Williams or Mark Jensen
Tribal: Carl Scheeler (Umatilla), Keith Lawrence or Curt Mack (Nez Perce)
Forest Service & BLM: Contact units that are near the location of wolf activity.

☐ **Refer media inquiries** to Phil Carroll (FWS) and Anne Pressentin Young (ODFW).

☐ **Determine need for tribal government consultations**; if wolf activity is within or immediately adjacent to an Indian Reservation, government-to-government discussions with the affected tribe shall be initiated.

☐ **Provide information updates to livestock producers in the area** and describe what they can legally do to discourage wolves from frequenting their property or grazing allotment (see Attachment A, pg 13, for information on allowable actions).

☐ **Conduct reconnaissance, either by ground or air,** to determine if animal(s) is radio collared. Coordinate with Curt Mack on radio frequencies of wolves in Idaho. Wildlife Service's plane in Pendleton or Burns is equipped with a receiver & antenna.

☐ **Monitor wolf activity**, using some combination of the following three approaches:

1. Compile location information from incidental sightings of animals and tracks.
   - Compile and map information received on animal and track sightings.
2. Conduct periodic ground surveys (i.e., scat and track surveys, howling surveys) and/or flyovers to monitor wolf activity.
   - Personnel from participating agencies and organizations would be trained to assist in regular ground surveys;
   - Flights would be coordinated between FWS, ODFW, & Wildlife Services.
3. Use radio-telemetry to regularly track collared animal(s).
   - Carter Niemeyer would initially lead animal capture and collaring efforts.
   - Tracking flights would occur at least monthly (use same radio-tracking procedures currently in effect in Idaho).
   - Ground-based tracking would be done by FWS and ODFW to the degree it is warranted and feasible.

Response Checklist:

REPORT OF WOLF-CAUSED DEPREDATION ON LIVESTOCK OR OTHER DOMESTIC ANIMALS

INITIAL ACTIONS:

☐ **Get detailed description of the incident location from the caller**. Ask about specific directions on how to reach the scene (street names, landmarks, gates, etc…).

☐ **Provide caller with following instructions on protecting the scene:**

- Avoid walking in and around the area;
- Keep dogs and other animals from the area to protect evidence;
- Place tarp over carcass;
- If possible, use cans or other objects to cover tracks and scats that can confirm the depredating species;
- Inform caller that a Wildlife Services investigator will be notified of the incident.

☐ **Contact Wildlife Services**. Relay information provided by the caller and request that an investigator be dispatched to the scene.

Dave Williams
Office: (503) 326-2346 Cell: (971) 404-6717

☐ **Continue coordination with Wildlife Services and the livestock owner** to ensure someone responds and that the owner is kept informed.

☐ **Notify the following individuals** (see phone directory in Attachment B, pg 15):

FWS: Kemper McMaster, Gary Miller, Phil Carroll, Ed Bangs, Carter Niemeyer
ODFW: Ron Anglin, Craig Ely, Mark Henjum
OSP: Southern Command Center, Randy Scorby
Tribal: Carl Scheeler (Umatilla), Keith Lawrence or Curt Mack (Nez Perce)
Forest Service & BLM: Contact units that are near the incident location.

☐ **Refer media inquiries** to Phil Carroll (FWS) and Anne Pressentin Young (ODFW).

☐ **Dispatch a FWS and/or ODFW biologist to the scene**.

WHILE WILDLIFE SERVICES INVESTIGATES:

☐ **Request Carter Niemeyer's assistance** to assist with capture and/or response measures.

☐ **Determine need for tribal government consultations**; if the wolf activity is within or immediately adjacent to an Indian Reservation, government-to-government discussions with the affected tribe shall be initiated.

Livestock or Domestic Animal Depredation Report Checklist (continued)

- ☐ **Consult with Ed Bangs, the FWS Region 1 Directorate, and ODFW Directorate** on possible response actions if a wolf is implicated.
- ☐ **Assess efficacy of non-lethal measures** and document that process.
- ☐ **Determine the appropriate response measure**, consistent with the 4(d) rule.

F INVESTIGATION CONCLUDES A WOLF WAS INVOLVED:

- ☐ **Receive authorization for a course of action** from McMaster and Bangs.
- ☐ **Initiate response efforts**, headed by Niemeyer and Wildlife Services' specialists.
- ☐ **Provide information updates to livestock producers in the area** and describe what they can legally do to discourage wolves from frequenting their property or grazing allotment (see Attachment A, pg 13).

Response Checklist:

REPORT OF AN ACCIDENTAL WOLF CAPTURE

INITIAL ACTIONS:

☐ **Get detailed description of the incident location from the caller**. Ask about specific directions on how to reach the scene (street names, landmarks, gates, etc…).

☐ **Provide caller with instructions on what to do until someone arrives** and inform them that FWS or ODFW personnel will respond to the scene immediately.

☐ **Send FWS and/or ODFW biologist to confirm that captured animal is a wolf.**

☐ **Notify the following individuals** (see phone directory in Attachment B, pg 15):

FWS: Kemper McMaster, Gary Miller, Phil Carroll, Ed Bangs, Carter Niemeyer
ODFW: Ron Anglin, Craig Ely, Mark Henjum
Wildlife Services: Dave Williams or Mark Jensen
OSP: Southern Command Center, Randy Scorby
Tribal: Carl Scheeler (Umatilla), Keith Lawrence or Curt Mack (Nez Perce)
Forest Service & BLM: Contact units that are near the location of wolf activity.

☐ **Refer media inquiries** to Phil Carroll (FWS) and Anne Pressentin Young (ODFW).

☐ **Determine need for tribal government consultations**; if wolf activity is within or immediately adjacent to an Indian Reservation, government-to-government discussions with the affected tribe shall be initiated.

SECONDARY ACTIONS:

☐ **Consult with Ed Bangs, the FWS Region 1 Directorate, and ODFW Directorate** on what to do with the animal.

☐ **Call a veterinarian to the scene to evaluate the animal's condition**.

☐ **Have radio transmitter brought to scene**. If the animal is to be released in Oregon it will be fitted with a radio collar.

☐ **Receive authorization for a course of action** from McMaster and Bangs.

☐ **If decision is to hold or relocate, make necessary arrangements to transport and kennel the animal**.

☐ **If decision is to release on site, provide information updates to livestock producers in the area** and describe what they can legally do to discourage wolves from frequenting their property or grazing allotment (see Attachment A, pg 13)

Response Checklist:

REPORT OF A DEAD OR INJURED WOLF

INITIAL ACTIONS:

☐ **Get detailed description of the incident location from the caller**. Ask about specific directions on how to reach the scene (street names, landmarks, gates, etc…).

☐ **Provide on-site person with the following instructions on protecting the scene**:

- Treat area as a potential crime scene;
- Do not touch anything and keep all people and animals from the area;
- A tarp can be placed over the wolf carcass;
- Cans or other items can be placed over footprints and animal tracks.

☐ **Contact FWS Law Enforcement and Oregon State Police**. Relay information provided by the caller and request that an officer be sent to the scene.

Chris Brong (FWS, Wilsonville)	(503) 682-6131	Cell: (503) 866-0456
Randy Scorby (OSP, Baker City)	(541) 523-5848 x4070	Cell: (541) 519-5372
Craig Tabor (FWS, Boise)	(208) 378-5333	Cell: (208) 850-1085

IF THE WOLF IS DEAD: Law enforcement personnel will take over the investigation and determine all subsequent aspects of the response.

IF THE SITUATION INVOLVES AN INJURED WOLF:

☐ **Arrange for immediate veterinary care (if needed)**

☐ **Dispatch a FWS or ODFW biologist to the scene**, and continue coordination with LE agent and person on-site.

☐ **Notify the following individuals** (see phone directory in Attachment B, pg 15):

FWS: Kemper McMaster, Gary Miller, Phil Carroll, Ed Bangs, Carter Niemeyer
ODFW: Ron Anglin, Craig Ely, Mark Henjum
Wildlife Services: Dave Williams or Mark Jensen
Tribal: Carl Scheeler (Umatilla), Keith Lawrence or Curt Mack (Nez Perce)
Forest Service & BLM: Contact units that are near the incident location.

☐ **Refer media inquiries** to Phil Carroll (FWS) and Anne Pressentin Young (ODFW).

SECONDARY ACTIONS (FOR RESPONSE TO INJURED ANIMAL):

☐ **If treatment is required, the animal will be transported to a veterinary facility**.

☐ **If the animal has only minor injuries, a decision will be made on whether to release it** (see secondary actions on page 9).

Equipment Inventory

Radio Telemetry Equipment

Radio transmitters – 6 Telonics Mod-500s (MS6 mortality sensor, CLM collar, Cast-1)

- 5 were shipped on 12/13/2001, 1 shipped on 3/15/2002 – magnets have not been removed from transmitters since they were received.

Handheld Receivers – 2 Communication Specialist R-1000s (216-220 Mhz)

- with folding 3-element yagi antennas (AF Antronics)

Plane-mounted Receiver (ATS R2000, 216-220 Mhz, with folding yagi antenna)

- on Wildlife Service's Super Cub plane based in Pendleton, OR (541-276-8563)

Capture Equipment

Capture poles – 2

Y-poles – 2

Syringe poles -- 2

Leg-hold traps – Wildlife Services has 17 McBride #7 w/ beaded jaws & 12 ft chain.

Action Items

- Identify and acquire the additional equipment needed to capture, hold, and process a wolf.
- Identify and acquire the equipment needed to implement response measure.
- Acquire a transportable holding crate for short-term, on-site holding and animal transport.
- Designate one or more acceptable holding facilities in eastern Oregon.
- Coordinate schedules to ensure that one of the three primary contacts -- John Stephenson, Mark Henjum, Gary Miller -- is always reachable by phone. When a situation arises where none of the three will be reachable, designate an alternate and leave clear instructions for how to contact the designated individual.
- Distribute this response strategy to the eastern and central Oregon field offices of all Federal, State, Tribal, and local natural resource management agencies. Make sure receptionists (and anyone else likely to receive a wolf report) at these offices know what to do and who to contact when a wolf report is received.
- Consider creating refrigerator magnet placards with information on who to contact for distribution to livestock producers and other potentially affected parties.
- Determine training needs for FWS, ODFW, and Wildlife Services personnel to effectively implement this strategy and pursue those training needs.
- Determine if radio transmitters should be traded to the Nez Perce Wolf Program so they can be used immediately (since they have been sitting on the shelf for a while).

Attachment A: Summary of the 4(d) Rule for the Western Gray Wolf DPS
(with clarification on how rule implementation in Oregon is affected by State law)

The Federal 4(d) rule for the Western Gray Wolf DPS identifies certain specific circumstances where take of gray wolves is allowed. "Take" is defined in the Federal ESA as: "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

Some allowable forms of take are applicable to private individuals whose interests are being (or could potentially be) adversely affected by wolves. Other forms of take can be implemented only by the U.S. Fish & Wildlife Service (FWS) or its designated agents (other Federal, State, or tribal agencies). Finally, the rule includes a provision covering accidental take, and defines the conditions under which a take is considered accidental.

WOLF RESPONSE ACTIONS AVAILABLE TO PRIVATE INDIVIDUALS

The following actions are identified in the 4(d) rule as ones that affected private individuals may take in response to wolf-related problems. Some of these actions require a permit from the FWS, others do not. Each action is authorized only within a specific set of conditions, which are listed below. The Federal ESA allows for more restrictive state laws to apply to private individuals. Therefore, any harassment or control of wolves by private individuals must comply with Oregon wildlife laws. As previously mentioned, **until the State Fish and Wildlife Commission authorizes ODFW to issue "take permits," it is illegal under State law for private individuals in Oregon to kill or capture a wolf.**

Opportunistic harassment – When chance encounters occur, landowners on their own land or permittees who are legally using public land under valid livestock grazing allotments may harass wolves in a non-injurious manner. Such actions can include scaring off an animal(s) by firing shots into the air, making loud noises, or otherwise confronting the animal(s) without doing bodily harm.

- No Federal permit is needed; currently a State wildlife harassment permit is required;
- Must not result in injury to the wolf;
- Is authorized only when a wolf is unintentionally encountered;
- Prior confirmation of wolf activity in the area is not required;
- Opportunistic harassment must be reported to the FWS within 7 days.

Non-lethal injurious harassment – If persistent wolf activity is confirmed on privately owned land or on a public land grazing allotment, a landowner or permittee may by issued a 90-day permit from the FWS and provided with rubber bullets or bean bag projectiles to harass wolves in a potentially injurious manner. Such projectiles are designed to be non-lethal.

- Requires a Federal 10(a)(1)(A) permit; currently a State harassment permit is required;
- Wolves can be pursued, so it doesn't have to be an unintentional encounter;
- Can occur only on private land or on a public land grazing allotment.

Lethal force – The Federal 4(d) rule conditionally authorizes private individuals to use lethal force against a wolf in three specific situations: (1) in defense of human life, (2) to stop a wolf that is in the act of attacking livestock or dogs, and (3) to stop chronic depredation on private land (once a Federal permit has been issued). However, at the present time ODFW lacks authorization to issue take permits for these situations, so under State law it is illegal for private individuals to use lethal force on a wolf in Oregon (although there are legal provisions for situations where human life is at risk) (Assistant Attorney General, Natural Resources Section, Oregon Dept. of Justice, pers. comm.. 2004). Although not currently allowed in Oregon, the situations where lethal force by private individuals is permitted under the Federal 4(d) rule are described below to provide a complete description of what this rule contains. Once a State wolf management plan is in place, ODFW may receive the authority to issue 'take' permits to authorize the lethal control actions described in the 4(d) rule.

In defense of human life – The 4(d) rule says any person may use lethal force on a wolf in a situation where that wolf represents an immediate and direct threat to a human life. The Oregon ESA does not address defense of human life, however, Oregon's criminal code does provide a defense that may justify an otherwise illegal act that was necessary to avoid imminent, grave injury. See Oregon Revised Statutes 161.200.

- No permit is needed;
- Can be done at any time and location where there is an immediate and direct threat to human life;
- The incident must be reported to the FWS within 24 hours and the wolf carcass must not be disturbed.

To stop a wolf that is in the act of attacking livestock or dogs – On private land, the Federal 4(d) rule allows for a landowner to use lethal force on a wolf that is in the act of biting, wounding, or killing livestock, dogs, or other domestic animals. After the incident, the landowner must provide evidence of an animal(s) freshly (less than 24 hours) wounded or killed by wolves, and the FWS or its designated agent need to confirm that the animal(s) was wounded or killed by wolves. On public land, the FWS can issue a 45-day permit to an appropriate individual that authorizes that individual to use lethal force to stop an ongoing attack on livestock or guard dogs. Such permits are normally issued only after the FWS has confirmed that wolves have previously wounded or killed livestock in the area and agency efforts to resolve the problem have been completed and were ineffective.

- This 4(d) rule provision is currently inconsistent with State law as ODFW is not authorized to issue damage take permits for wolves. The Oregon Fish & Wildlife Commission may grant ODFW that authority by adopting a State Wolf Management Plan that includes such a measure;
- No Federal permit is required when on private land, however, a Federal 10(a)(1)(A) permit is required on public land (FWS has agreed to not issue Federal permits to private individuals in Oregon for this activity until ODFW has authorization to issue equivalent State take permits);
- There must be fresh evidence that an attack occurred (i.e., visible wounds);
- On public lands, a Federal 10(a)(1)(A) permit will not be issued for pet dogs; it is only permissible if the dog(s) is guarding or herding livestock;

- The incident must be reported to the FWS within 24 hours and the wolf carcass must not be disturbed.

To stop chronic depredation on private land – Under the Federal 4(d) rule, a private landowner can be issued a limited-duration permit that provides authorization to take a gray wolf on the landowner's private land if this property or an adjacent private property has had at least two depredations by wolves on livestock or dogs that have been confirmed by the FWS or our designated agent and the FWS determines that wolves are routinely present on that property and present a significant risk to their livestock or dogs

- Requires a 10(a)(1)(A) permit (FWS has agreed to not issue Federal permits to private individuals in Oregon for this activity until ODFW has authorization to issue equivalent State take permits);
- Only applies to private lands.

WOLF RESPONSE OPTIONS AVAILABLE TO FWS PERSONNEL OR ITS DESIGNATED AGENTS

The following actions are identified in the 4(d) rule as ones that the FWS, or other Federal, State, or tribal agencies at FWS direction, may implement to respond to problem wolves. The FWS and its designated agents have the authority to implement these measures in Oregon.

Removal of wolf to protect human safety – The FWS or its designated agent may promptly remove any wolf that the FWS or its designated agent determines to be a demonstrable but non-immediate threat to human life or safety. This could include a wolf that has become habituated to the presence of humans and readily approaches them (e.g., frequents campgrounds) or a wolf that exhibits aggressive behavior towards people. Removal is defined as either killing the animal or capturing and placing it in captivity.

- This measure requires FWS written authorization, but can be carried out by other appropriate Federal, State, or tribal agencies; Wildlife Services is the lead Federal agency for wildlife damage management and they are a designated agent of FWS for wolf control in Oregon.

Take of problem wolves – The FWS or its designated agent may carry out adverse conditioning, non-lethal measures, relocation, permanent placement in captivity, or lethal control of problem wolves. A problem wolf is one that attacks livestock or that twice in a calendar year is involved in attacks on domestic animals other than livestock. To determine the status of problem wolves, the following factors will be considered:

(a) Evidence of wounded livestock or other domestic animals or remains of a carcass that shows that the injury or death was caused by wolves;

(b) The likelihood that additional loses may occur if no action is taken;

(c) Any evidence of unusual attractants or artificial or intentional feeding of wolves; and

(d) Evidence that, on public lands, approved allotment management plans and annual operating plans were being followed.

- These actions require FWS authorization, but can be done by other appropriate Federal, State, or tribal agencies; Wildlife Services is the lead Federal agency for wildlife damage management;

- If response measures occurring on public lands result in the capture, prior to October 1, of a female wolf showing signs that she is still raising pups of the year (e.g., evidence of lactation, recent sightings of pups), whether or not she is captured with her pups, then she and her pups may be released at or near the site of capture. Female wolves may be removed if continued depredation occurs.

Take in response to wild ungulate impacts – If wolves are causing unacceptable impacts to wild ungulate populations, a State or tribe may capture and move wolves to other areas within the State. In order for this provision to apply, the State or tribe must develop and formally adopt a wolf management plan that defines such unacceptable impacts, describes how they will be measured, and identifies possible mitigation measures.

- Before wolves can be captured and moved, the FWS must approve the wolf management plan and determine that such actions will not inhibit wolf population growth toward recovery levels.

ACCIDENTAL TAKE OF A WOLF

Under the Federal 4(d) rule, take of a gray wolf is allowed if the take was accidental and incidental to an otherwise lawful activity and if reasonable due care was practiced to avoid such taking. Some situations that this would cover include: accidentally striking a wolf while driving on a road or the accidental capture of a wolf in a trap or snare that was legally set for other animals. Under the 4(d) rule, incidental take is not allowed if the take is not accidental or if reasonable due care was not practiced to avoid such taking; the FWS may refer such taking to the appropriate authorities for prosecution.

- This 4(d) rule provision covers accidental take by Federal agents in Oregon. However, under State law, it is illegal for private individuals to kill or capture a gray wolf even if the take is accidental. The Oregon Fish & Wildlife Commission may address accidental take in the State Wolf Management Plan;
- Shooters have the responsibility to identify their target before shooting. Shooting a wolf as a result of mistaking it for another species is not considered accidental.

Attachment B: Key Contacts Phone Directory

U.S. FISH AND WILDLIFE SERVICE

John Stephenson (OR Wolf Coordinator, La Grande) ……..(541) 312-6429 (office)
-- stationed in Bend, OR (541) 786-3282 (cell)
(541) 322-6192 (home)

Gary Miller (Field Supervisor, La Grande)……. (541) 962-8509 (office)
(541) 786-3648 (cell)
(541) 568-4292 (home)

Kemper McMaster (State Office Supervisor, Portland)……. (503) 231-6179

Phil Carroll (Public Affairs, Portland)…….... (503) 231-6170

Carter Niemeyer (Idaho Wolf Recovery Coord., Boise)…… (208) 378-5639 (office)
(208) 484-4875 (cell)

Ed Bangs (National Wolf Recovery Coord., Montana)…… (406) 449-5225 x204

Joe Fontaine (Assist. Wolf Recovery Coord., Montana)…… (406) 449-5225 x206

Mike Jimenez (Wyoming Wolf Recovery Coord.) …… (307) 332-7789

U.S. FWS LAW ENFORCEMENT

Chris Brong (Resident Agent in Charge, Wilsonville) …….. (503) 682-6131 (office)
(503) 866-0456 (cell)

Craig Tabor (Resident Agent in Charge, Boise) …… (208) 378-5333 (office)
(208) 850-1085 (cell)

WILDLIFE SERVICES

Dave Williams (State Director, Portland) …… (503) 326-2346 (office)
(971) 404-6717 (cell)

Mark Jensen (Assistant State Director, Portland) …… (503) 326-2346 (office)
(503) 319-3519 (cell)

Ken Mitchell (Wildlife Services Specialist, Umatilla Co.) …. (541) 276-8563 (shop)
(541) 969-6759 (cell)

Marlyn Riggs (Wildlife Services Specialist, Wallowa Co.) … (541) 519-7260 (cell)

Greg Jones (Wildlife Services Specialist, Malheur Co.) …… (541) 212-6260 (cell)

OREGON DEPARTMENT OF FISH & WILDLIFE

Mark Henjum (Wolf Coordinator, La Grande) ..... (541) 963-2138 (office)
(541) 975-4228 (cell)
(541) 963-0472 (home)

Craig Ely (Northeast Region Manager, La Grande) ..... (541) 963-2138

Ron Anglin (Wildlife Division Administrator, Portland) ..... (503) 947-6312

Anne Pressentin Young (Public Information Officer) ..... (503) 947-6020

OREGON STATE POLICE

Southern Command Center ..... (541) 523-5866

Randy Scorby (Lieutenant, Baker City) ..... (541) 523-5848 x4070
(541) 519-5372 (cell)

TRIBAL GOVERNMENT CONTACTS

CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION
Carl Scheeler (Wildlife Program Manager) ..... (541) 966-2395 (office)
(541) 969-3117 (cell)

NEZ PERCE TRIBE
Keith Lawrence (Wildlife Program Director) ..... (208) 843-7372
Curt Mack (Gray Wolf Coordinator) ..... (208) 634-1061

U.S. FOREST SERVICE & BLM

WALLOWA-WHITMAN NATIONAL FOREST
Karyn Wood (Forest Supervisor) ..... (541) 523-6391
Tim Schommer (Forest Wildlife Biologist) ..... (541) 523-1383

UMATILLA NATIONAL FOREST
Jeff Blackwood (Forest Supervisor) ..... (541) 278-3716
Charlie Gobar (Forest Wildlife Biologist) ..... (541) 278-3814

MALHEUR NATIONAL FOREST
Roger Williams (Forest Supervisor) ..... (541) 575-3000
Larry Bright (Endangered Spp. Coord.) ..... (541) 575-3000

VALE DISTRICT, BLM
Dave Henderson (District Manager) ……..... (541) 473-3144
Dorothy Mason (Endangered Spp. Coord.) …….. (541) 523-1308

OREGON DEPARTMENT OF AGRICULTURE

Rodger Huffman (Animal Health & Identification)…….. (503) 986-4680

VETERINARIANS

Terry McCoy (Animal Health Center, La Grande) …… (541) 963-6621

Mark Oman (Country Animal Clinic, La Grande) …… (541) 963-2748

AIRCRAFT SERVICES

Eagle Cap Aviation (La Grande) …… (541) 963-0809

Spence Air Service (Enterprise) …….. (541) 426-3288

State Police (Baker City) …… (541) 523-5848
- shared plane with ODFW, contact Randy Scorby or Mark Henjum

HARDY MYERS
Attorney General

PETER D. SHEPHERD
Deputy Attorney General

DEPARTMENT OF JUSTICE
GENERAL COUNSEL DIVISION

MEMORANDUM

DATE: January 31, 2003

TO: Fish and Wildlife Commissioners

FROM: William R. Cook, Assistant Attorney General
Natural Resources Section

SUBJECT: Commission authority to conserve and manage wolves in Oregon

As requested, this memo summarizes in lay terms the legal parameters for the Commission in addressing conservation and management of wolves in Oregon. "Conservation" is what the Oregon ESA requires for listed species. "Management" is the term of art that describes how the Commission regulates wildlife populations.

Interaction with federal law. The federal government lists the gray wolf as "endangered" in Oregon under the federal Endangered Species Act. In July 2000, the U.S. Fish and Wildlife Service (Service) proposed to downlist the wolf to "threatened" and adopt special "4(d) rules" that would relax federal protections for wolves in Oregon under the federal ESA. However, the Service has not yet adopted final rules, and it is unclear what form any final 4(d) rules might take. So long as the wolf remains federally endangered, the federal ESA drives wolf protection in Oregon. If the Service downlists the wolf to threatened and adopts 4(d) rules, the federal protections likely would set the floor for wolf conservation and management in Oregon. The Service also has proposed to delist the wolf eventually under the federal ESA. If that occurs, Oregon law likely would provide the primary legal requirements governing the management of wolves in Oregon.

Commission obligation under Oregon Endangered Species Act. The gray wolf is listed as endangered under the Oregon ESA. The Oregon ESA requires the "conservation" of listed species, and defines "conservation" as "the use of methods and procedures necessary to bring a species to the point at which the measures provided under ORS 496.171 to 496.182 [the Oregon ESA] are no longer necessary. Such methods and procedures include, but are not limited to, activities associated with scientific resource management such as research, census taking, law enforcement, habitat acquisition and maintenance, propagation and transplantation." ORS 496.171(1)[1]. Thus, so long as the wolf remains listed under the Oregon ESA, the Commission

[1] By rule, the Commission added "habitat protection and maintenance" to the exemplary list of conservation methods and procedures. OAR 635-100-0100(2). Any such habitat protections would only be obligated on public land, however, since "nothing in [the Oregon ESA] is intended, by itself, to require an owner of any ***private land to take action to protect a threatened species or an endangered species, or to impose additional requirements or restrictions on the use of private land." ORS 496.192(1).

1515 SW Fifth Ave, Suite 410, Portland, OR 97201 Telephone: (503) 229-5725 Fax: (503) 229-5120 TTY: (503) 378-5938

must conserve the species in Oregon. The law provides an array of management options from which the Commission may choose when determining how to conserve the species.

Conservation and management options. Within the context of the conservation mandate, consistent with the federal ESA and to the extent allowed by wolf biology, the Commission has authority to develop a plan for wolves in Oregon.

In 1995, the legislature amended the Oregon ESA to add two new requirements for conserving listed species: survival guidelines, which are usually adopted by the Commission at the time of listing a species; and endangered species management plans, which are usually required of state agencies that own or manage land within a certain number of months after a species is listed as endangered. In 1999, the Commission adopted administrative rules implementing the 1995 statutory amendments. Under those rules, the requirements for survival guidelines and endangered species management plans do not apply to species (such as the wolf), that were listed before the 1995 statutory amendments. OAR 635-100-0130(1). Therefore, although the Commission may choose to adopt survival guidelines or endangered species management plans for the wolf, its rules do not require it to do so[2].

Some of the most important wolf conservation tools available to the Commission may be those that regulate "take" of wolves. The Oregon "take" prohibition (which bans killing or obtaining possession or control) is less restrictive than the federal "take" prohibition, which bans killing, wounding, harming, harassing, pursuing, hunting, shooting, trapping, collecting or capturing an endangered species. 16 U.S.C. §1532(19)[3]. Several statutes authorize the Commission to regulate the take of any, including listed, species. These statutes govern human interaction with wildlife generally.

Even before the Oregon ESA was enacted in 1987, ORS 498.002 prohibited angling, hunting, trapping, or possessing any wildlife and assisting another in any of those activities in violation of the wildlife statutes and administrative rules. ORS 497.075 generally prohibited any person from angling for, hunting or trapping any wildlife and assisting another in those activities without a license, tag, or permit. The relevant exemption to this provision essentially allowed a person to hunt on his or her own property, unless the wildlife laws (including administrative rules) required a tag or permit. ORS 496.162 authorized the Commission to establish by rule the seasons for, the amount of, and the manner of taking wildlife, and the requirement to get a permit. In short, the Commission has long-standing authority to prohibit or regulate the taking of wolves.

What the Oregon ESA did was limit the Commission's authority to issue licenses and permits to kill or capture any listed species. When it enacted the Oregon ESA, the legislature amended ORS 498.026 to prohibit, with certain exceptions, any person from taking or attempting

[2] The Commission's determination of which agencies would have a role to play in conserving the species would trigger the requirement that other agencies adopt endangered species management plans.
[3] By case law, habitat destruction can also constitute "take" under the federal ESA. *Babbitt v. Sweet Home Chapter of Communities for a Great Oregon*, 515 US 687, 115 S Ct 2407, 132 L Ed2d 597 (1995).

to take any threatened or endangered species. This prohibition applies to any person and to all lands in Oregon (both public and private). [4]

However, the legislature also indicated that it expected the Commission to use its regulatory authorities to permit take of listed species when appropriate. ORS 498.026(3) provides that "Nothing in this section [the take prohibition] is intended to prevent the taking, importation, transportation or sale of any threatened species or endangered species in such manner as may be authorized in ORS 496.172 [portion of the Oregon ESA, authorizing scientific and incidental take permits], 497.218 to 497.238 [wildlife statutes regulating fur dealers, wildlife propagation and taxidermy], 497.298 [wildlife statute governing scientific take permits] or 497.308 [wildlife statute regulating wildlife removal and holding]."

Moreover, ORS 498.012 (commonly known as the "wildlife damage statute") authorizes the Commission to permit any person to take wildlife that is damaging land that the person owns or lawfully occupies or is damaging livestock or agricultural or forest crops on such land. Subsection (3) specifically requires anyone taking an endangered species under such a permit to immediately report the taking to a person authorized to enforce the wildlife laws, and to dispose of the wildlife as the Commission directs. Reading this statute together with the Oregon ESA statutes, we believe that the Legislature intended that the Commission may permit "damage takes" of listed species when the Commission determines that such takes are consistent with the conservation obligation and when they are authorized under the federal ESA and ORS 496.172(4).

Finally, the Commission has the legal authority to adopt a wolf plan. The authority to do so comes from statutes including, but not limited to, ORS 496.012, 496.138, 496.146, and 496.172. Thus, ***so long as it would promote conservation of the species in Oregon***, the Commission could include any or all of the following tools in a wolf plan:

- **Scientific take permits** to permit take of wolves for research purposes. ORS 496.172(4).
- **Damage take permits** to regulate take of wolves that prey on livestock. ORS 498.012 and 496.172.
- **Wildlife removal and holding permits** to permit capture and translocation of wolves. ORS 497.308.
- **Harassment permits** to permit hazing of wolves[5]. ORS 498.006.

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[4]To clarify: while the Oregon "take" prohibition applies to all lands, key elements of the Oregon ESA are limited in their application. As noted on the following page, survival guidelines apply only on lands owned or leased by the state or where the state holds an easement; endangered species management plans govern only state lands and the roles of state agencies.

[5] As noted above, Oregon's "take" prohibition does not extend to harassment of listed species. However, another Oregon wildlife statute, (ORS 498.006) provides that "except as the State Fish and Wildlife Commission may provide otherwise, no person shall chase, harass, molest, worry or disturb any wildlife except when engaged in

- **Survival guidelines** to protect individual wolves and wolf habitat on state lands. ORS 496.182(2).

- **Endangered species management plans** to govern management of wolves on state lands and the roles of other state agencies to conserve wolves. ORS 496.182(7) and (8)(a).

- **Federal incidental take statements or state incidental take permits** to shield certain activities (for example, furbearer trapping) from liability for incidentally taking wolves. ORS 496.172(4).

Depending upon the tools selected, among the planning strategies available to the Commission are those that would:

---"zone" the state and aim to manage wolves to minimize wolf presence in certain zones (for example, areas dominated by private agricultural lands) and maximize wolf presence in other zones (for example, areas dominated by public lands); or

---include a menu of wolf management prescriptions similar to the special "nonessential, experimental population" rules used by the U.S. Fish and Wildlife Service to manage wolves in the federal reintroduction area in Idaho.

However, certain options are not available to the Commission:

- The Oregon ESA's conservation mandate prevents the Commission from requiring that all wolves migrating to Oregon from Idaho be captured and returned to Idaho.

- Similarly, both the Oregon ESA's conservation mandate and the ORS 498.026 take prohibition prevent the Commission from selecting a "no protection" alternative that would allow wolves to be freely killed and/or captured in Oregon.

Procedural requirements. Many elements of a wolf plan would need to be adopted by the Commission through a public rulemaking process involving public notice, hearing and opportunity for public comment.

GENE3951

cc: Richard Whitman, Steve Sanders, Shelley McIntyre DOJ

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lawfully angling for, hunting or trapping such wildlife." This authorizes the Commission to regulate harassment (hazing) of wildlife, including listed species.

Appendix E: Wolf Advisory Committee Roster

Committee Members

Ms. Sharon Beck
Livestock Producer
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Mr. Ben Boswell
County Commissioner
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Mr. Brett Brownscombe
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Economist
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1917 Jackson Avenue
La Grande, OR 97850

Mr. Ivan Sanderson
Hunter
1826 Icabod Street NE
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Ms. Amaroq Weiss
Wolf Conservationist
PMB 510, 2305C Ashland Street
Ashland, OR 97520

Mr. Kurt Wiedenmann
Public Lands Manager
3502 Highway 30
La Grande, OR 97850

(During the course of plan development, two Committee members were replaced due to other obligations which took precedence over their participation. They were Dan Edge, Educator representative, and Meg Mitchell, Public Lands Manager representative.)

Oregon Department of Fish and Wildlife Staff

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La Grande, OR 97850

Mr. Mark Henjum
Wolf Coordinator
107th 20th Street
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Ms. Anne Pressentin Young
Information Services Manager
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Salem, OR 97303

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Senior Mediator
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Dana Gunders
Associate
720 SW Washington Street
Portland, OR 97205

APPENDIX F: RESOURCE ROSTER

Wolf Technical Committee

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Wolf Recovery Coordinator
US Fish and Wildlife
1387 South Vinnel Way, Rm 368
Boise, ID 83709

Curt Mack
Project Leader/ Rare Species Coordinator
Nez Perce Tribe
PO BOX 365
Lapwai, ID 83501

Doug Smith
Yellowstone Wolf Project, Leader
National Park Service
P.O. Box 168
Yellowstone National Park, WY 82190

Harry Upton
Economist
Oregon Department of Fish and Wildlife
3406 Cherry Ave. NE
Salem, OR 97303

Adrian Wydevan
Wisconsin DNR
Mammalian Ecologist
Park Falls Service Center
875 South 4th Avenue
Park Falls, WI 54552

Rick Williamson
Wolf Management Specialist
USDA APHIS Wildlife Services
P.O. Box 465
Arco, ID 83213

U.S. Fish & Wildlife Service

John Stephenson
U.S. Fish and Wildlife Service Biologist
Bend, OR
Cell: (541) 786-3283 (Please use cell phone for wolf sightings only.)

APPENDIX G: RESOURCES PROVIDED TO THE WOLF ADVISORY COMMITTEE

State Wolf Management Plans

Idaho:
- http://www2.state.id.us/fishgame/info/mgmtplans/wolf_plan.pdf

Michigan:
- General: http://www.michigan.gov/dnr/0,1607,7-153-10370_12145_12205-32569--,00.html
- Plan: http://www.michigandnr.com/publications/pdfs/huntingwildlifehabitat/wolf_mgmtplan.pdf
- USFWS Summary: http://midwest.fws.gov/wolf/wgl/miplnsum.htm

Minnesota:
- http://www.dnr.state.mn.us/mammals/wolves/mgmt.html
- USFWS Summary: http://midwest.fws.gov/wolf/wgl/mn-plnsum.htm

Montana:
- http://www.fwp.state.mt.us/wildthings/wolf/wolfmanagement.asp

Wisconsin:
- http://www.dnr.state.wi.us/org/land/er/publications/wolfplan/toc.htm
- USFWS Summary: http://midwest.fws.gov/wolf/wgl/wiplnsum.htm

Wyoming:
- http://gf.state.wy.us/wildlife/wildlife_management/wolf/

U.S. Fish and Wildlife Service Wolf Information Sites

- http://westerngraywolf.fws.gov/annualrpt03/ (Rocky Mountain Wolf Recovery 2003 Annual Report)
- http://westerngraywolf.fws.gov/ (Rocky Mountain Wolf Recovery Program)
- http://midwest.fws.gov/wolf/ (USFWS Region 3 Gray Wolf Recovery)
- http://midwest.fws.gov/wolf/west/index.htm (Western Distinct Population Segment)
- http://gf.state.wy.us/downloads/pdf/wolf_peer_review.pdf (Peer Review of Three Western State Plans) – ***please note downloading this document can take a very long time***

Wolf Biology and Ecology [January 12-13, 2004 Meeting]

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Smith, Douglas W., Rolf O. Peterson, Douglas B Houston. 2003. Yellowstone After Wolves. BioScience, April 2003 Vol. 53 No. 4

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Mech, L. David. 1995. The challenge and opportunity of recovering wolf populations. Conservation Biology 9(2):270-278. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. http://www.npwrc.usgs.gov/resource/2000/cowolf/cowolf.htm
See "Wolf Management Zoning" Chapter

Wolf – Domestic Animal Interactions [March 18-19, 2004 Meeting]

Oakleaf, et al. Effects of Wolves on Livestock Calf Survival and Movements in Central Idaho. Journal of Wildlife Management 2003. 67(2):299-306

Mech, L. David and Luigi Boitani. 2003. Wolves: Behavior, Ecology, and Conservation University of Chicago Press Chicago, IL. pp 305-312, 106, 108, 111, and Figure 4.1 p 106

Montag, Jessica M. et al. Political and Social Viability of Predator Compensation Programs in the West. University of Montana, School of Forestry www.forestry.umt.edu/pcrp/

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APPENDIX H: WOLF ADVISORY COMMITTEE MEMBER SUGGESTED RESOURCES

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See "Wolf Management Zoning" Chapter

Video – Interview with sheep herder and sheep owner where 90 sheep were killed by wolves in one nights attack in 2003, Idaho. (23 minutes)

Video – ODFW Town Hall Meeting, January 8, 2003, Enterprise, OR. (More than two hours)

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APPENDIX I: PLAN DEVELOPMENT PROCESS

Oregon State Wolf Management Plan: Planning Process

Adopted April 11, 2003

Updated February 18, 2004

Background

With the growth of the Idaho wolf population, biologists expect wolves to eventually establish a permanent population in Oregon. No wolves are confirmed to exist in Oregon at this time. The Oregon Fish and Wildlife Commission initiated a public process in 2002 to become informed about wolf issues and enable the department to prepare for wolves' arrival in Oregon. That process included 15 town hall meetings in late 2002 and early 2003. In February and March 2003, the Commission received: 1) a review of the written comments received from the public during the wolf town hall meetings; 2) a summary of other states' wolf management plans and how those plans address the concerns and comments heard during Oregon's town hall process; 3) strategies to provide livestock owners with flexibility to address wolf depredation; and 4) a legal analysis of the Commission's wolf conservation requirements. At the March 20, 2003, meeting, the Commission decided to initiate a process to develop an Oregon state wolf management plan. At the April 11, 2003, meeting, the Commission adopted a planning process, goal statement and draft plan framework.

1. Planning Process

ODFW staff looked to a combination of the experiences of other states that developed wolf plans and past ODFW projects to develop a recommended planning process that was adopted by the Commission.

Lessons Learned from Previous Public Processes

Several lessons were gleaned from the review of other public involvement processes. First, political turmoil complicates the public process and strengthens divisions among wolf interests, which in turn hides the common ground that does exist. Second, extensive public involvement and outreach is necessary to successful plan development. Third, citizen advisory groups working directly with agency staff have proved to be extremely successful. Fourth, the hiring of a professional, independent facilitator greatly enhances the ability of the committee to reach a successful conclusion. Fifth, both a management plan and a process that includes flexibility are essential for management and public acceptance.

Similar to other species management plans, the wolf management plan must address the conservation of the species as per legal advice received from the Oregon Department of Justice; result in the eventual removal of the species from the Oregon endangered species list; provide short- and long-term management direction; direct control of the population if wolves become too numerous in selected areas; provide methods to minimize conflicts with various land uses, humans and other resources; and seek to keep partners and the public informed and engaged.

Step One: Oregon Fish and Wildlife Commission

Having already established the need for a management plan, the Commission adopted a goal statement and guiding principles to direct the planning process. The Commission also approved a public involvement plan that identifies the composition and role of a wolf advisory committee, timelines for progress reports and strategies to inform Oregonians about the ongoing planning effort. See Attachment 1 "Wolf Planning Process for Oregon" for a flow chart illustrating the eight step planning process.

Wolf Planning 'Working' Goal Statement:

"The goal of this management plan is to ensure the long-term survival and conservation of gray wolves as required by Oregon law while minimizing conflicts with humans, primary land uses and other Oregon wildlife."

Oregon Fish and Wildlife Commission Guiding Principles for Wolf Planning:

1. Commission provides direction to write a wolf management plan based on "conservation" of wolves, as required by state law.
2. Commission will select a "Wolf Advisory Committee" to advise the Commission on wolf issues and a draft wolf management plan.
3. Ideas from wolf management plans produced by other states will be considered.
4. The themes and concerns expressed by the public through town hall meetings and written comments must be considered and incorporated in the final plan.
5. Active re-introduction of wolves will not be considered. Natural dispersal of wolves from the Idaho population will be accepted.
6. The final plan will be consistent with the Oregon Endangered Species Act (ORS 496.171-496.192) and the Wildlife Policy (ORS 496.012).
7. A final plan will strive for flexibility in managing wolf populations while providing needed protections for wolves.
8. A final plan will seek relief for livestock producers from expected wolf depredation.
9. The Committee and the final Wolf Management Plan will maintain its focus on wolves and will not address public land grazing or other public land management issues.
10. A final plan will address impacts to prey populations, including deer and elk.

Wolf Advisory Committee: Stakeholder Representation:

Based on the concerns of Oregonians communicated during the town hall meeting process, the following stakeholder groups will participate in the Wolf Advisory Committee. The full Commission appointed the members of the Wolf Advisory Committee.

- Livestock producer
- Hunter
- Trapper
- Eastern Oregon county commissioner
- Wolf advocate
- Range/forest land conservationist
- Educator
- Wildlife biologist/researcher
- Economist
- Two at-large representatives
- Rural Oregon resident
- Public land manager
- Tribal representative

Selected participants reside in both eastern and western Oregon in order to best represent the interests of all Oregonians.

Wolf Technical Committee:

The following organizations and technical experts have been asked to provide assistance to the Oregon wolf planning effort:

- U.S. Fish and Wildlife Service representative
- U.S. Department of Agriculture Wildlife Services representative
- Tribal wolf scientist
- Wolf scientists currently managing or researching wolves in other states
- ODFW economist

ODFW Staff:

Craig Ely, Special Projects Coordinator, Mark Henjum, Wolf Coordinator, and Anne Pressentin Young, Information Services Manager, will serve as staff to the Committee. Other ODFW staff will assist as necessary. Legal questions that need to be addressed will go through ODFW staff.

Facilitation Staff:

Paul De Morgan, a professional, independent facilitator from the firm RESOLVE, has been hired using the state-approved contracting process to facilitate the meetings

of the Wolf Advisory Committee. Dana Gunders, also of RESOLVE, will assist with facilitation.

Step one is complete.

Step Two: Wolf Advisory Committee

The Commission appointed 14 members to a committee to represent the various interests surrounding the wolf issue. The Committee will use some form of a consensus-based process, agreed upon by the members, to make recommendations on two documents: a plan framework and a draft management plan. The final framework would be used to develop the draft management plan.

During the discussions, the Committee members will use the goal and guiding principles approved by the Commission. A professional, independent facilitator has been hired to assist the Committee with its work. In addition, the Committee will have assistance from ODFW staff who attend all meetings to serve as wildlife experts, researchers and copywriters. The Committee also may request the assistance of wolf technical experts. These technical experts may be consulted in writing or via conference call to answer questions about the latest wolf research. The technical experts may include wolf managers from the six states that currently have gray wolves, federal wolf experts, ODFW's natural resource economist or others.

All meetings of the Committee will be open to members of the public and will be held in various locations throughout Oregon. The meeting agendas and pertinent documents will be posted to ODFW's Web site.

Step Three: Draft Framework

After the Committee has reached agreement on a framework for the plan, the Commission will vote to approve or modify it. Once the framework is finalized, the Committee will continue its work on a draft plan.

Step Four: Draft Wolf Plan

Using the finalized framework, the Committee will work with the facilitator, ODFW staff and the technical experts to recommend the wording for a draft plan. After the Committee reaches agreement on a draft management plan, the Commission will vote to approve its release for public review. The Commission may amend the draft plan before approving it.

Step Five: Public Review

Given the tremendous interest in wolves, ODFW staff will take the lead in organizing a public review and comment effort. It is likely that news releases will be issued and several open houses held. In addition, the Commission will hold a public hearing as part of the normal rule-making process in advance of a vote on the draft management plan.

Step Six: Revised Draft Wolf Plan

Based on public comment, the Committee and ODFW staff will revise the draft plan.

Step Seven: Commission Adoption

The Commission will vote on a revised draft wolf plan. Members of the public will have one additional opportunity to comment on the revised draft plan at the public hearing associated with the vote. The final wolf management plan will be incorporated into Oregon Administrative Rules, similar to other species management plans. If the Commission chooses to reject the revised draft management plan, the planning process would re-start pending direction from the Commission.

Step Eight: Implementation

ODFW staff will begin implementing the final wolf management plan.

Timeline to complete a draft plan:

Using a professional facilitator and significant time by ODFW staff, the Wolf Advisory Committee is be expected submit its final draft to the Commission by early fall 2004. The advisory committee will meet monthly. Agency staff will provide periodic updates to the Commission, with the first update expected in January 2004 to present the committee-recommended plan framework.

Once the draft management plan is finalized, it will be undergo a public review in fall 2004. Final adoption of a wolf plan is expected to occur in early 2005.

2: Framework of Plan Components

The Commission adopted a draft 'framework' of a wolf management plan that uses components of other state wolf plans, Oregon's big game species management plans and the concerns of Oregonians. This framework does not suggest a course of action in advance of the advisory committee process. The advisory committee, however, is be expected to begin its work based on the 'framework.'

I. Introduction
   i. Preamble: Background of why Oregon undertook this effort, legal analysis and how the goal statement was chosen.
   ii. Goal statement
   iii. Guiding principles
   iv. Planning objectives
II. Wolf plan development
   i. Commission workshops
   ii. Town hall meetings
   iii. Legislation

iv. Wolf Advisory Committee

III. Wolves in Oregon
  i. History
  ii. Legal status

IV. Wolf biology and ecology
  i. Biological description
  ii. Social structure
  iii. Reproduction and mortality
  iv. Food habits
  v. Habitat use, including habitat availability and suitability analysis
  vi. Relationships to other species

V. Wolf issues in Oregon
  i. Concerns of Oregonians

VI. Wolf conservation and management
  i. Distribution
  ii. Population objectives
  iii. Population management
  iv. Monitoring plan
  v. Coordination with states and agencies

VII. Wolf-livestock conflicts
  i. Livestock depredation
  ii. Wildlife services response
  iii. Landowner assistance
  iv. Management strategies to address conflicts

VIII. Wolf-human interactions
  i. Wolf-human encounters
  ii. Management strategies to address human safety threats

IX. Prey populations
  i. Predator-prey interactions
  ii. Big game management objectives
  iii. Status of elk, deer, sheep and pronghorn populations
  iv. Management strategies to address declines in prey populations

X. Research Needs
  i. Home ranges and movement
  ii. Food habits
  iii. Habitat use
  iv. Other

XI. Information and Education
  i. Strategies to gain and disseminate information

XI. Evaluation and reporting

XII. Budget for wolf management program

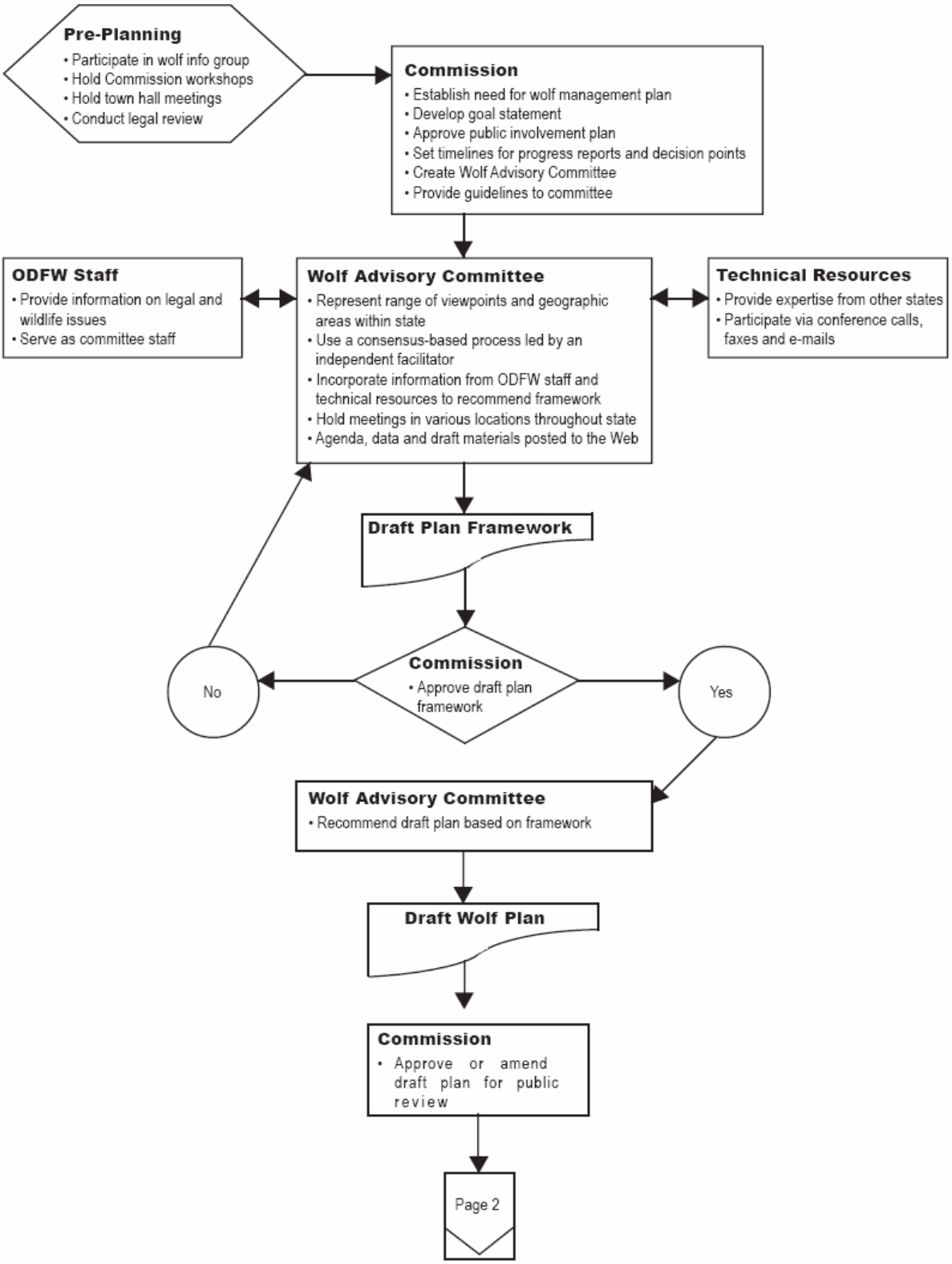
XIII. Economic impacts (e.g. license sale revenue, ODFW programs, private sector businesses, communities, tourism)

XIV. Literature Cited

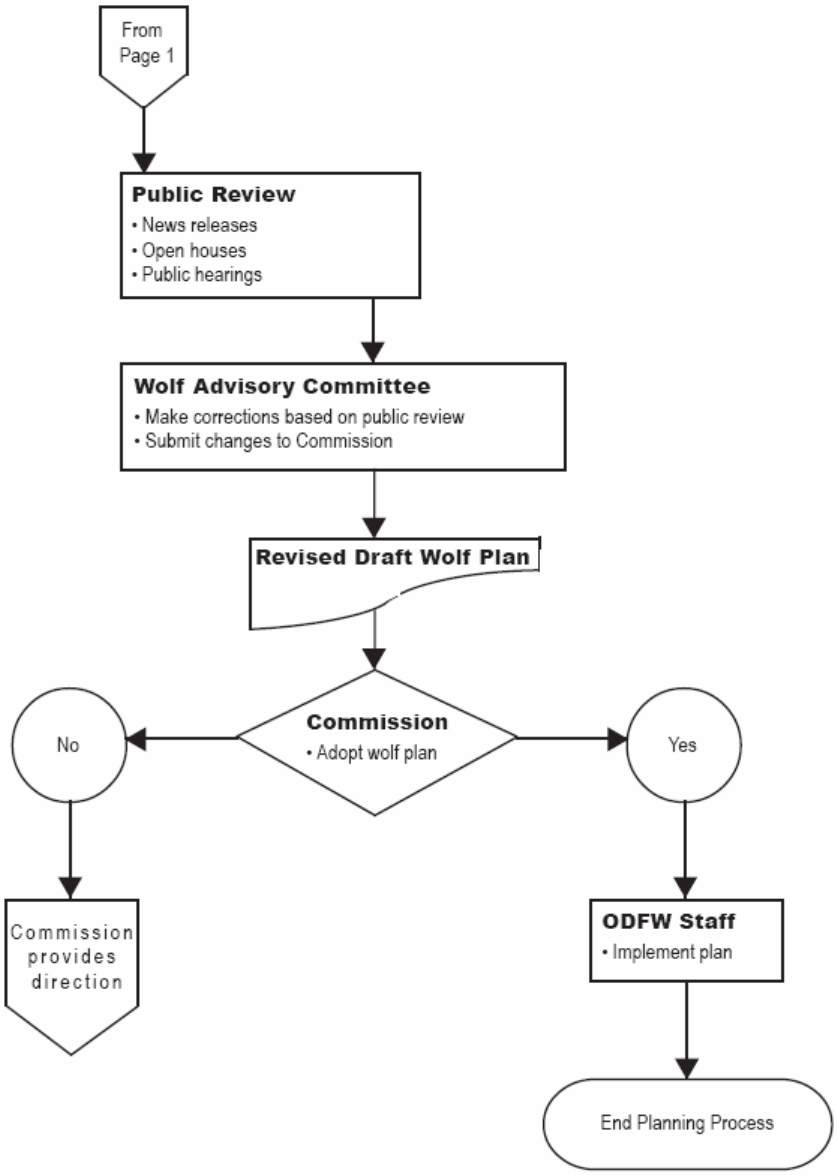
XV. Appendices and maps as needed

February 18, 2004

Adopted Wolf Planning Process for Oregon



Adopted Wolf Planning Process for Oregon, cont.



APPENDIX J: TABLES ON LIVESTOCK DEPREDATION LOSSES

Data source: *Resource Losses Reported to Wildlife Services Program*, 1996-2002

Table J-1: COUGAR

Depredation losses attributed to cougar in Oregon, Idaho, and Montana from 1996-2002

OREGON

Species	1996	1997	1998	1999	2000	2001	2002	Ave./Yr.
Cattle	76	43	46	42	71	62	67	58
Sheep	145	227	225	126	286	305	191	215
Horses	11	5	14	23	19	21	19	16

IDAHO

Species	1996	1997	1998	1999	2000	2001	2002	Ave./Yr.
Cattle	21	27	37	33	37	22	24	29
Sheep	276	437	124	95	231	115	83	194
Horses	20	13	4	2	11	23	2	11

MONTANA

Species	1996	1997	1998	1999	2000	2001	2002	Ave./Yr.
Cattle	14	71	33	34	42	28	17	34
Sheep	10	679	82	127	212	79	308	142
Horses	7	36	12	8	33	13	9	17

Table J-2: COYOTE

Depredation losses attributed to coyote in Oregon, Idaho, and Montana from 1996-2002

OREGON

Species	1996	1997	1998	1999	2000	2001	2002	Ave/Yr.
Cattle	340	234	169	218	303	170	117	222
Sheep	1508	1188	1034	1663	1404	1235	1822	1408
Horses	2	12	4	1	1	1	1	3

IDAHO

Species	1996	1997	1998	1999	2000	2001	2002	Ave/Yr.
Cattle	165	293	265	198	243	320	196	240
Sheep	2057	1680	1431	1225	1346	1067	903	1387
Horses	2	1	0	2	0	1	0	0.89

MONTANA

Species	1996	1997	1998	1999	2000	2001	2002	Ave/Yr.
Cattle	602	647	625	687	581	459	1005	658
Sheep	7010	5294	4926	4326	3340	3832	4617	4764
Horses	1	2	1	2	0	2	6	2

Table J-3: BLACK BEAR
Depredation losses attributed to bear in Oregon, Idaho, and Montana from 1996-2002

OREGON

Species	1996	1997	1998	1999	2000	2001	2002	Ave./Yr.
Cattle	3	8	3	14	3	11	5	7
Sheep	87	41	54	126	95	44	28	68
Horses	0	0	1	0	0	0	0	0.14

IDAHO

Species	1996	1997	1998	1999	2000	2001	2002	Ave./Yr.
Cattle	3	3	1	2	4	1	5	3
Sheep	764	273	279	241	135	96	159	278
Horses	0	5	0	0	1	2	0	0.86

MONTANA

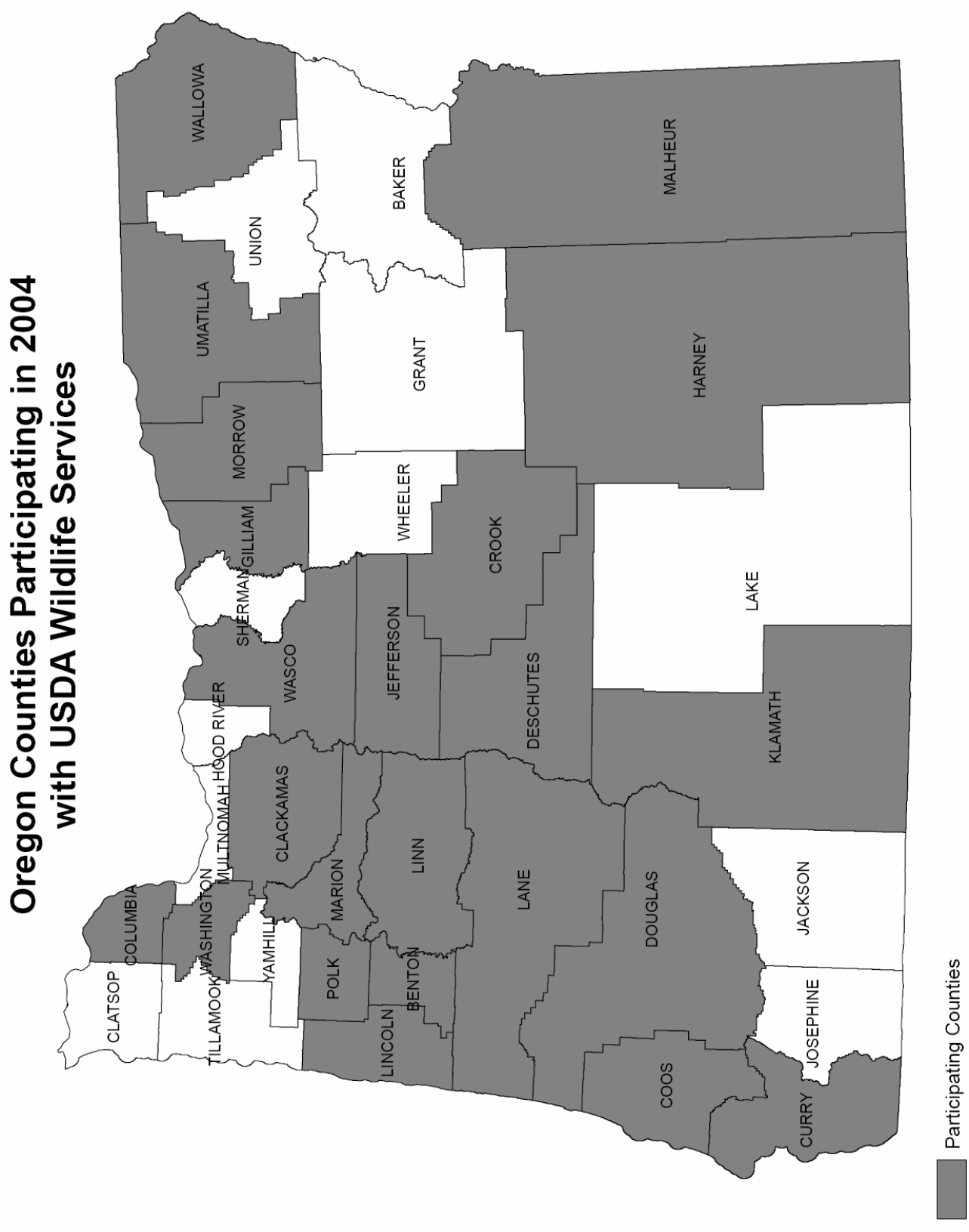
Species	1996	1997	1998	1999	2000	2001	2002	Ave./Yr.
Cattle	6	7	23	11	29	29	21	18
Sheep	254	25	141	320	175	94	328	191
Horses	0	0	2	1	2	2	1	1.14

APPENDIX K: USDA WILDLIFE SERVICES PARTICIPATING COUNTIES OF OREGON

Table K-1: Oregon Wildlife Services Funding

	FY 2002	FY 2003	FY 2004
USDA-APHIS-WS	$880,149	$1,052,840	$1,129,998
Counties	$677,130	$751,439	$738,822
ODA	$324,744	$104,881	$209,623
ODFW	$105,000	$109,887	$105,000
Other Coordinators	$324,520	$371,411	$308,475
Total	$2,311,543	$2,380,458	$2,491,918

See Map of Participating Counties on Following Page.


Oregon Counties Participating in 2004
with USDA Wildlife Services
WALLOWA
UNION
BAKER
MALHEUR
UMATILLA
GRANT
HARNEY
MORROW
WHEELER
GILLIAM
CROOK
SHERMAN
LAKE
WASCO
JEFFERSON
HOOD RIVER
DESCHUTES
KLAMATH
CLACKAMAS
MULTNOMAH
COLUMBIA
WASHINGTON
MARION
LINN
LANE
DOUGLAS
JACKSON
CLATSOP
TILLAMOOK
YAMHILL
POLK
BENTON
LINCOLN
COOS
JOSEPHINE
CURRY
Participating Counties

APPENDIX L: UNGULATE DATA

Oregon Department of Fish and Wildlife 2001-2004 Ungulate Population Estimates

TABLE L-1
2001-2004 MULE DEER POPULATION ESTIMATES *

UNIT	WATERSHED DISTRICT	POPULATION ESTIMATE				
		2001	2002	2003	2004	MO
MINAM	GRANDE RONDE	3,300	3,400	3,500	3,500	5,000
IMNAHA	GRANDE RONDE	4,700	1,800	4,800	4,800	5,300
CATHERINE CR	GRANDE RONDE	1,800	1,750	1,700	1,500	4,300
KEATING	GRANDE RONDE	2,900	2,850	3,400	2,700	4,600
PINE CR	GRANDE RONDE	2,200	2,150	2,200	2,100	2,500
LOOKOUT MT	GRANDE RONDE	3,300	3,850	3,750	3,000	3,200
WALLOWA ZONE		**18,200**	**15,800**	**19,350**	**17,600**	**24,900**
SNAKE RIVER	GRANDE RONDE	2,600	2,600	2,600	2,600	6,400
CHESNIMNUS	GRANDE RONDE	3,500	3,500	3,500	3,500	3,600
SLED SPRINGS	GRANDE RONDE	4,700	4,700	4,800	4,800	5,000
WENAHA	GRANDE RONDE	1,200	1,200	1,200	1,300	1,500
WALLA WALLA	JOHN DAY	1,600	1,800	1,850	1,850	1,900
MT EMILY	JOHN DAY	4,800	4,600	4,100	4,200	5,000
WENAHA-SNAKE ZONE		**18,400**	**18,400**	**18,050**	**18,250**	**23,400**
STARKEY	GRANDE RONDE	4,500	4,400	4,350	4,500	3,000
UKIAH	JOHN DAY	6,750	6,350	7,200	8,500	6,700
SUMPTER	GRANDE RONDE	6,800	6,100	6,800	6,700	7,000
DESOLATION	JOHN DAY	2,200	2,000	2,150	2,400	2,500
HEPPNER	JOHN DAY	12,850	11,500	10,800	9,450	13,500
FOSSIL	JOHN DAY	11,900	10,500	9,800	9,800	14,000
COLUMBIA BASIN	JOHN DAY	12,000	10,000	9,500	9,000	1,000
UMATILLA-WHITMAN ZONE		**57,000**	**50,850**	**50,600**	**50,350**	**47,700**
NORTHSIDE	JOHN DAY	13,950	13,950	12,400	12,400	15,500
MURDERERS CR	JOHN DAY	4,950	5,700	6,050	5,700	9,000
BEULAH	MALHEUR	11,300	11,500	10,500	9,500	13,700
MALHEUR RIVER	MALHEUR	11,800	11,750	10,950	10,700	13,700
SILVIES	MALHEUR	9,800	9,300	8,250	7,800	11,800
OCHOCO	DESCHUTES	18,300	18,300	17,800	17,000	20,500
GRIZZLY	DESCHUTES	8,500	8,700	8,900	8,500	8,500
MAURY	DESCHUTES	4,500	4,700	4,500	4,800	5,200
OCHOCO-MALHEUR ZONE		**83,100**	**83,900**	**79,350**	**76,400**	**97,900**
NORTHEAST AREA TOTAL		**176,700**	**168,950**	**167,350**	**162,600**	**193,900**

TABLE L-1 CONTINUED
2001-2004 MULE DEER POPULATION ESTIMATES *

UNIT	WATERSHED DISTRICT	POPULATION				
		2001	2002	2003	2004	MO
BIGGS	DESCHUTES	6,500	5,650	5,200	5,000	5,300
MAUPIN	DESCHUTES	3,050	3,050	2,700	2,500	3,000
HOOD	DESCHUTES	1,400	1,400	1,250	1,250	400
WHITE RIVER	DESCHUTES	8,100	7,300	7,300	7,000	8,100
COLUMBIA ZONE		**19,050**	**17,400**	**16,450**	**15,750**	**16,800**
METOLIUS	DESCHUTES	5,300	4,300	4,500	3,700	6,200
PAULINA	DESCHUTES	15,400	15,400	14,300	13,800	16,500
UPPER DESCHUTES	DESCHUTES	1,900	1,500	1,500	1,300	2,200
FORT ROCK	KLAMATH	9,000	7,850	6,700	8,050	11,200
SILVER LAKE	KLAMATH	6,100	7,200	7,100	7,850	10,300
SPRAGUE	KLAMATH	300	300	300	300	2,200
KLAMATH FALLS	KLAMATH	3,400	3,300	3,300	3,300	6,200
KENO	KLAMATH	1,550	1,200	1,200	1,050	3,200
INTERSTATE	KLAMATH	6,900	6,800	6,250	6,000	14,800
WARNER	KLAMATH	4,250	3,450	3,000	2,600	5,500
SOUTH-CENTRAL ZONE		**54,100**	**51,300**	**48,150**	**47,950**	**78,300**
CENTRAL AREA TOTAL		**73,150**	**68,700**	**64,600**	**63,700**	**95,100**
WAGONTIRE	DESC/KLAM/MAL	1,250	1,200	1,000	1,000	1,400
BEATYS BUTTE	KLAM/MAL	1,700	1,700	1,600	1,500	1,900
JUNIPER	KLAM/MAL	1,500	1,600	1,600	1,500	2,300
STEENS MT	MALHEUR	6,200	5,900	5,600	5,500	11,000
E WHITEHORSE	MALHEUR	1,500	1,400	1,200	1,000	3,200
TROUT CR MTS	MALHEUR	1,300	1,150	1,000	1,000	2,300
OWYHEE	MALHEUR	2,750	2,700	2,450	2,250	5,000
SOUTHEAST AREA TOTAL		**16,200**	**15,650**	**14,450**	**13,750**	**27,100**
CENTRAL/SE AREA TOTAL		**89,350**	**84,350**	**79,050**	**77,450**	**122,200**
NORTHEAST AREA TOTAL		**176,700**	**168,950**	**167,350**	**162,600**	**193,900**
MULE DEER GRAND TOTAL		**266,050**	**253,300**	**246,400**	**240,050**	**316,100**

***Numbers are Best Estimates Based on Available Information**

TABLE L-2 2001-2004 ROOSEVELT ELK POPULATION ESTIMATES *						
UNIT	**WATERSHED DISTRICT**	**POPULATION**				
		2001	**2002**	**2003**	**2004**	**MO**
SCAPPOOSE	N. WILLAMETTE	2,100	2,000	1,900	2,000	1,000
SADDLE MOUNTAIN	N. WILLAMETTE	7,700	7,500	7,500	7,300	7,800
WILSON	N. WILLAMETTE	5,400	5,200	4,900	4,000	3,200
TRASK	N. WILLAMETTE	5,200	5,100	5,100	4,200	5,200
STOTT MT.	S. WILLAMETTE	1,250	1,500	1,600	1,500	1,500
ALSEA	S. WILLAMETTE	4,100	4,400	4,700	5,500	BM
SIUSLAW	S. WILLAMETTE	1,500	1,500	1,500	2,500	4,000
WILLAMETTE	S. WILLAMETTE	100	100	200	300	EDA
NORTH COAST		**27,350**	**27,300**	**27,400**	**27,300**	**22,700**
TIOGA	UMPQUA	8,800	7,300	9,000	9,050	8,000
SIXES	UMPQUA/ROGUE	2,850	1,300	2,250	1,050	2,500
POWERS	ROGUE	1,350	500	1,000	1,000	3,000
CHETCO	ROGUE	1,000	1,000	900	800	2,500
APPLEGATE	ROGUE	100	100	100	100	EDA
MELROSE	UMPQUA	1,400	1,400	1,400	1,400	EDA
SOUTHWEST		**15,500**	**11,600**	**14,650**	**13,400**	**16,000**
KENO/W. SPRAGUE	KLAMATH	400	450	450	450	700
UPPER DESCHUTES	DESCHUTES	700	500	500	500	700
METOLIUS	DESCHUTES	300	200	200	250	200
SANTIAM	N.WILL/S.WILL	4,500	4,400	4,200	5,200	5,900
MCKENZIE	S.WILLAMETTE	5,200	5,000	4,800	5,000	5,200
INDIGO/W. FT. ROCK	UMPQUA/S.WILL	4,000	4,000	4,000	4,600	4,700
DIXON	UMPQUA/ROGUE	2,300	1,800	2,400	1,600	3,750
EVANS CREEK	ROGUE	600	600	600	600	900
ROGUE/S. FT. ROCK	ROGUE/KLAMATH	3,300	3,000	3,000	2,900	3,800
CASCADE		**21,300**	**19,950**	**20,150**	**21,100**	**25,850**
ROOSEVELT ELK TOTAL		**64,150**	**58,850**	**62,200**	**61,800**	**64,550**
BM=Number is a benchmark						
No MO=No Formal Management Objective (MO) Adopted						
EDA=Elk De-Emphasis Area (No MO)						
*** Numbers are Best Estimates Based on Available Information**						

TABLE L-3 2001-2004 ROCKY MOUNTAIN ELK POPULATION ESTIMATES *						
UNIT	**WATERSHED DISTRICT**	**POPULATION**				
		2001	**2002**	**2003**	**2004**	**MO**
MINAM	GRANDE RONDE	1,800	1,800	2,000	2,000	2,000
IMNAHA	GRANDE RONDE	950	950	1,000	1,100	800
CATHERINE CR	GRANDE RONDE	500	600	450	450	700
KEATING	GRANDE RONDE	250	200	200	260	400
PINE CR	GRANDE RONDE	450	400	500	650	400
LOOKOUT MT	GRANDE RONDE	400	350	450	440	300
WALLOWA ZONE		**4,350**	**4,300**	**4,600**	**4,900**	**4,600**
SNAKE RIVER	GRANDE RONDE	3,100	3,000	3,350	3,400	No MO
CHESNIMNUS	GRANDE RONDE	2,400	2,900	2,900	3,000	3,500
SLED SPRINGS	GRANDE RONDE	2,000	2,100	2,150	2,100	2,750
WENAHA	GRANDE RONDE	1,300	1,150	1,400	1,350	4,250
WALLA WALLA	JOHN DAY	1,500	1,500	1,500	1,450	1,800
MT EMILY	JOHN DAY	5,400	4,800	4,600	4,300	5,700
WENAHA-SNAKE ZONE		**15,700**	**15,450**	**15,900**	**15,600**	**18,000**
STARKEY	GRANDE RONDE	4,750	4,700	5,300	4,900	5,300
UKIAH	JOHN DAY	5,500	5,100	5,000	4,800	5,000
SUMPTER	GRANDE RONDE	2,000	2,000	2,050	1,650	2,000
DESOLATION	JOHN DAY	1,900	1,600	1,350	1,200	1,300
HEPPNER	JOHN DAY	3,100	2,800	2,650	2,500	2,800
S. FOSSIL	JOHN DAY	1,800	1,800	1,800	1,800	400
N. FOSSIL	JOHN DAY	450	400	400	400	300
UMATILLA-WHITMAN ZONE		**19,500**	**18,400**	**18,550**	**17,250**	**17,300**
NORTHSIDE	JOHN DAY	3,400	2,950	2,300	2,000	2,000
MURDERERS CR	JOHN DAY	2,250	2,150	1,800	1,800	1,700
WEST BEULAH	MALHEUR	700	700	700	600	1,300
EAST BEULAH	MALHEUR	800	600	600	400	EDA
MALHEUR RIVER	MALHEUR	1,600	1,500	1,400	1,500	1,500
SILVIES	MALHEUR	2,500	2,400	2,300	2,200	2,200
OCHOCO	DESCHUTES	5,200	4,800	4,600	4,000	2,600
GRIZZLY	DESCHUTES	1,800	1,500	1,500	1,500	1,500
MAURY	DESCHUTES	1,300	1,200	950	900	1,100
OCHOCO-MALHEUR ZONE		**19,550**	**17,800**	**16,150**	**14,900**	**13,900**
PAULINA/E. FT ROCK	DESC/KLAM	1,000	1,100	1,100	1,300	1,600
HOOD	DESCHUTES	100	100	100	100	150
WHITE RIVER	DESCHUTES	1,100	1,100	1,100	1,100	1,000
MAUPIN/BIGGS/COL. BASIN	DESC/JOHNDAY	1,250	1,200	1,200	1,200	EDA

TABLE L-3 (Continued) 2001-2004 ROCKY MOUNTAIN ELK POPULATION ESTIMATES *						
WARNER	KLAM/MAL	150	150	150	150	300
SOUTH CENTRAL**	KLAMATH	1,300	1,500	1,500	1,300	3,000
HIGH DESERT***	KLAM/MAL	1,400	1,300	1,300	1,200	1,000
HIGH DESERT REGION TOTAL		**6,300**	**6,450**	**6,450**	**6,350**	**7,050**
ROCKY MOUNTAIN ELK TOTAL		**64,400**	**62,400**	**61,650**	**59,000**	**60,800**
No MO=No Formal Management Objective (MO) Adopted						
**** South Central includes: Silver Lake, Interstate, Klamath and Sprague MUs**						
**** High Desert Includes: Steens, Owyhee, Whitehorse, Beatys Butte, Juniper, Wagontire, and S. Malheur MUs**						
EDA=Elk De-Emphasis Area (No MO)						
*** Numbers are Best Estimates Based on Available Information**						

APPENDIX M: OREGON LIST OF THREATENED AND ENDANGERED FISH AND WILDLIFE SPECIES

Table M-1 Oregon List of Threatened and Endangered Fish and Wildlife Species

COMMON NAME	*SCIENTIFIC NAME*	CATEGORY
Fishes		
Hutton Spring Tui Chub	*Gila bicolor* ssp.	*T
Borax Lake Chub	*Gila boraxobius*	*E
Foskett Spring Speckled Dace	*Rhinichthys osculus* ssp	*T
Warner Sucker	*Catostomus warnerensis*	*T
Snake River Chinook Salmon (Spring/Summer)	*Oncorhynchus tshawytscha*	*T
Snake River Chinook Salmon (Fall)	*Oncorhynchus tshawytscha*	*T
Lower Columbia River Coho Salmon	*Oncorhynchus kisutch*	E
Lahontan Cutthroat Trout	*Oncorhynchus clarki henshawi*	*T
Lost River Sucker	*Deltistes luxatus*	*E
Shortnose Sucker	*Chasmistes brevirostris*	*E
Amphibians and Reptiles		
Green Sea Turtle	*Chelonia mydas*	*E
Leatherback Sea Turtle	*Dermochelys coriacea*	*E
Loggerhead Sea Turtle	*Caretta caretta*	*T
Pacific Ridley Sea Turtle	*Lepidochelys olivacea*	*T
Birds		
Short-tailed Albatross	*Diomedea albatrus*	*E
Brown Pelican	*Pelecanus occidentalis*	*E
Aleutian Canada Goose	*Branta canadensis leucopareia*	E
Bald Eagle	*Haliaeetus leucocephalus*	*T
American Peregrine Falcon	*Falco peregrinus anatum*	E

Arctic Peregrine Falcon	*Falco peregrinus tundrius*	E
Western Snowy Plover	*Charadrius alexandrinus nivosus*	T (*T)1
California Least Tern	*Sterna antillarum browni*	*E
Marbled Murrelet	*Brachyramphus marmoratus*	*T
Northern Spotted Owl	*Strix occidentalis caurina*	*T
Mammals		
Gray Wolf	*Canis lupus*	*E
Kit Fox	*Vulpes macrotis*	T
Sea Otter	*Enhydra lutris*	*T
Wolverine	*Gulo gulo*	T
Sei Whale	*Balaenoptera borealis*	*E
Blue Whale	*Balaenoptera musculus*	*E
Fin Whale	*Balaenoptera physalus*	*E
Gray Whale	*Eschrichtius robustus*	E
Black Right Whale	*Eubalaena glacialis*	*E
Humpback Whale	*Megaptera novaeangliae*	*E
Sperm Whale	*Physeter macrocephalus*	*E
Washington Ground Squirrel	*Spermophilus washingtoni*	E

***Denotes those species listed by the federal government**
T= Threatened
E= Endangered
1 - Coastal Population only

Table M-2 FISH AND WILDLIFE SPECIES LISTED IN OREGON UNDER THE FEDERAL ENDANGERED SPECIES ACT BUT ***NOT*** UNDER THE OREGON ENDANGERED SPECIES ACT

COMMON NAME	***SCIENTIFIC NAME***	**CATEGORY**
Oregon Chub	*Oregonichthys crameri*	E
Columbia River Chum	*Oncorhynchus keta*	T
Oregon Coast Coho	*Oncorhynchus kisutch*	T
Southern Oregon Coho	*Oncorhynchus kisutch*	T
Oregon Coast Coho	*Oncorhynchus kisutch*	T
Upper Willamette River Steelhead	*Oncorhynchus mykiss irideus*	T
Lower Columbia River Steelhead	*Oncorhynchus mykiss irideus*	T
Middle Columbia River Steelhead	*Oncorhynchus mykiss gairdneri*	T
Snake River Steelhead	*Oncorhynchus mykiss gairdneri*	T
Snake River Sockeye salmon	*Oncorhynchus nerka*	E
Upper Columbia River Spring Chinook	*Oncorhynchus tshawytscha*	E
Lower Columbia River Chinook	*Oncorhynchus tshawytscha*	T
Upper Willamette River Chinook	*Oncorhynchus tshawytscha*	T
Bull Trout	*Salvelinus confluentus*	T
Northern (Steller) Sea Lion	*Eumetopias jubatus*	T
Columbian White-tailed Deer (Lower Columbia River Population Only)	*Odocolieus virginianus leucurus*	E

APPENDIX N: CURRENT WOLF-RELATED RESEARCH

Northwestern Montana Wolf Recovery Area

- Effects of wolf removal on livestock depredation in Montana, Idaho and Wyoming.
- Evaluating wolf translocation as a non-lethal method to reduce livestock conflicts in the northwestern United States.
- Assessing factors related to wolf depredation of cattle ranches in Montana and Idaho.

Greater Yellowstone Wolf Recovery Area

- Wolf-prey relationships.
- Wolf-carnivore interactions.
- Wolf-scavenger research.

Collaborative Research

- Adult cow elk seasonal distribution and mortality post-wolf reintroduction in Yellowstone National Park, Wyoming.
- Habitat selection by elk before and after wolf reintroduction in Yellowstone National Park, Wyoming.
- A behavioral analysis of the effect of predator and prey densities on wolf predation.
- Wolf-cougar interactions.
- Wolf-coyote interactions.
- Wolf-bear interactions.
- Wolf-scavenger relationships.
- Wolf-elk relationships.
- Wolf-elk calf mortality.
- Wolf-pronghorn.
- Wolf-willow.
- Wolf-aspen.
- Wolf-trophic cascades.
- Wolf predation.
- Wolf survival.

Research in Wyoming outside Yellowstone National Park

- Wolf-elk relationships on state-managed feed grounds and adjacent national forests in Wyoming.
- Interspecific competition between recolonizing wolves and coyotes: implications for pronghorn persistence in Grand Teton National Park.

Research in the Montana portion of the Greater Yellowstone Recovery Area.

- Factors affecting wolf-elk interactions in the Greater Yellowstone Area.

Central Idaho Recovery Area

- Winter predation and interactions of cougars and wolves in the Central Idaho Wilderness.
- Wolf den site selection in the northern Rockies (Idaho, Montana and Canada).
- Literature review of worldwide wolf monitoring techniques.
- Developing monitoring protocols for the long-term conservation and management of gray wolves in Idaho.

Oregon

- Predicting wolf habitat using GIS (OSU), Tad Larsen.
- How humans relate to wolves and nature (PSU), Laura Nobel.
- Oregon wolf plan public involvement process (SUNY), Joe Dadey.

Appendix O: Economic Assumptions and Estimates

The most detailed estimates of potential costs associated with wolf re-establishment in Oregon are included the sections related to livestock depredation and big game hunting. In both cases several basic assumptions are made to derive estimates of costs. The general overriding assumption is that experiences in other states and regions can be used to provide estimates of likely outcomes in Oregon. Without doubt site-specific factors associated with Oregon's environmental and social environment will modify wolf interactions with these sectors. However, other regional experiences provide the relative magnitudes of likely impacts.

For the cattle and sheep depredation estimates the following assumptions were made:

Livestock losses in seven other regions were used to provide losses per thousand livestock. For the Minnesota, Alberta, Canada and British Columbia cases, averages were used from the U.S. Fish and Wildlife Service, Environmental Impact Statement (USFWS, 1994). For the Yellowstone, Northwest Montana and Idaho cases, wolf numbers and livestock depredation per thousand averaged over the last three years were used (USFWS et al., 2004). The most recent information from these regions was assumed to be the most relevant to potential outcomes in Oregon.

Because the Wolf Advisory Committee considered wolf population benchmarks in terms of breeding pairs, it was necessary to convert breeding pairs into potential numbers of wolves to scale Oregon to other regional wolf populations. The average of 14.2 wolves per breeding pair from the last three years across the three western regions was used. This time period also conformed to the averages of depredation rate and wolf numbers used from these regions.

Three different sizes of wolf population and three regions were then considered with three different cattle populations. The first case assumed four breeding pairs in the Northeastern region with a cattle population of 235,000. The second case, considers a larger wolf population of seven pairs spread across a larger area and a larger cattle population of 561,00, and the last case considers the entire state with a population of 14 breeding pairs and a cattle population of 1.36 million. These scenarios were repeated for sheep ranching.

The Montana estimate (Riggs, 2004) was one of several predictive models that were developed to forecast depredation levels in Oregon from experiences in other western states (Riggs, 2004). The model assumes that depredation in Oregon will occur at the same rates as other states. The linear relationship between wolf and depredation numbers is used to match potential livestock losses to wolf numbers. In this case, the upper bound values based on the 95 percent level of statistical confidence for Montana statewide data, 1987-2003, were used. The levels of depredation based on Montana used in the table are taken directly from the relationship and not scaled to the regional Oregon livestock number. (See last estimate in Table XI-2 and 3.)

Actual calculations are illustrated as follows:

Start with the number lost per thousand from another region, for example Yellowstone at 0.23 cattle lost per thousand cattle in the region where wolves are present. The loss rate was calculated by taking the average losses over the last three years, 33.3 cattle per year and dividing by the number of cattle in the region, 146,000 individuals.

To find the number of cattle that would be lost in Oregon multiply the number of losses per thousand in Yellowstone by the thousands of cattle in the region of concern in Oregon.

For example, (.23 cattle lost per thousand) x (235 thousand cattle in Northeast OR)
= 54 cattle lost

This number should then be scaled in proportion to the potential number of wolves in the Northeast region of Oregon relative to the number of wolves in the Yellowstone Region.

For example, four pairs of wolves in Oregon will equal 57 wolves, assuming 14.2 wolves per breeding pair. The average number of wolves in the Yellowstone region over the last three years was 263 wolves. Therefore, the estimate is scaled by the relative number of wolves by multiplying 57/263 by the number of losses, 54, to get the predicted number of losses in Northeast Oregon.

For example, (.22 wolf scaling factor) x (54 cattle losses per year) = 12 losses NE OR

Economic losses were then assumed to be equal to the market price multiplied by the number of animals lost.

Calculations for the potential hunting losses associated with wolves were estimated as follows:

The main assumption of this section is that losses are directly related to the kill rate per wolf per year. Available data includes only early and late winter kills and varied across years and seasons. The annual number of kills was calculated by averaging the early and late winter kills from Yellowstone Park studies undertaken in the 1990s. This average was 17.3 kills of which 90 percent were reported to be elk. The other 10 percent was composed of other mammals including an unknown number of deer. Other studies have shown that the proportion of small mammals in the wolf diet increases during the summer months (Mech et al., 2003). Therefore, it is assumed that 90 percent of the annual wolf diet is composed of ungulates.

Assuming that these studies can be used to consider potential impacts in Oregon, the ungulate portion of total annual kills per year is equal to 15.6 kills per year (90 percent of 17.3 kills). The wolf diet may vary widely depending on prey availability. It is likely that mule and white tail deer will make up a portion of these losses. As a starting point, it was assumed that wolves would take equal proportions of deer and elk biomass.

Total annual kills would be composed of 7.8 elk (one half of 15.6 kills per year) and 23.4 deer (3 times 7.8 elk kills per year). A larger number of deer would be killed because one elk is equal to approximately three deer in biomass equivalence. Therefore, each wolf is assumed to kill 7.8 elk and 23.4 deer annually. (The actual ratio of deer to elk that will be taken in Oregon is unknown, but some studies indicate that more elk may be taken than deer.)

The next main assumption is that this amount of predation is subtracted directly from the sustainable production of deer and elk populations, and that this amount will not be available to hunters. This is likely to be an over estimate because wolves will compete both directly and indirectly with other predators.

The same assumption used in the livestock example of 14.2 wolves per breeding pair is used resulting in 57 and 99 wolves for the four and seven pair cases. Therefore, total deer and elk loss is assumed to be directly proportional to the number of wolves and the predation rate per wolf.

For example: (57 wolves) x (7.8 Elk per wolf per year) = 445 elk lost to hunting per year

A linear relationship between the number of days in the field and the number of hunting kills in the preceding year was defined for both elk and deer hunts in the Blue Mountain Region. In the elk case, hunters spent 7.8 more days in the field for each additional kill in the preceding year. The model assumes that the 445 elk amounts to 445 fewer kills by hunters.

For example: (445 fewer kills) x (7.8 days lost per kill) = 3,471 fewer days in the field

The lost number of days in the field is then multiplied by the net economic benefits of a day of elk hunting that has been estimated at $76.00 per day.

Ranges found in Table XI-6 Economically affected sectors

This table provides a general overview of the relative magnitude of impacts on different sectors because of the uncertainties associated with the estimates.

Direct livestock losses only include losses directly attributable to wolves. Total losses for four breeding pairs ranged between $760 and $13,400, seven breeding pairs $3,100 and $48,800 and fourteen breeding pairs $16,800 and $256,000. Given these ranges and additional possible losses of household pets and other animals, the general range of $10,000 to $300,000 was provided in Table XI-6.

Each of these ranges is a snapshot of a specific wolf population size and impact. It is likely that impacts will increase with wolf population size over time as indicated by each range that is associated with a higher wolf population, expansion of the wolf range and more associate livestock.

Predator control costs were not modeled, but since Wildlife Services' costs were budgeted at $125,000, it was considered likely that private control in problem areas could result in costs of several hundred thousand dollars.

Hunting losses were estimated to range between $450,000 for four pairs and $850,000 for seven pairs of wolves in the Blue Mountain region. The Yellowstone Park wolf kill estimates used for the analysis are uncertain because they may not be valid for the entire year. Estimates may be high because of the assumption that wolf kills will translate into direct losses of animals available to hunters, and the degree to which other big game hunting opportunities may be substituted. It is not possible to determine the degree of potential bias at this time.

Viewing benefits are likely, but an actual range is not possible to quantify at the present time. Given the level of tourism and wildlife viewing in Oregon, net economic benefits are assumed to be significant with a likely magnitude in the hundreds of thousands of dollars.

Existence values are also important elements of this analysis, but no data are available that are specific to Oregon. Other national and regional studies indicate a willingness to pay in the million of dollars.

Ecological elements and characteristics of the system are likely to affect costs calculated in other sectors. For example, interactions with wolves may result in lower levels of other predators that cause livestock damage or impact ungulate populations such as coyotes, bears and mountain lions. Therefore it is possible that the hunting and livestock losses may decrease by several hundred thousand dollars if these interactions take place. In addition, wolves may provide other beneficial ecological impacts that are not possible to identify at this time.