ENVIRONMENTAL ASSESSMENT

MANAGING BLACK BEAR DAMAGE TO TIMBER

IN WESTERN OREGON

Prepared By:

UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
WILDLIFE SERVICES

In Consultation With

OREGON DEPARTMENT OF FISH AND WILDLIFE
OREGON DEPARTMENT OF FORESTRY
OREGON DEPARTMENT OF AGRICULTURE
OREGON STATE POLICE – WILDLIFE DIVISION
COOS COUNTY COMMISSION

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SUMMARY

Need for Action

A recent Oregon Department of Forestry survey of the central and northern parts of western Oregon estimated that bears damaged over 55,000 trees each year (Kanaskie et al. 2001). Aerial surveys miss some trees, and, for this reason and others, the authors noted that their calculations are a very conservative estimate of the total amount of recent damage. Complete girdling will kill the tree. Partial girdling does not necessarily kill the tree, but partial damage can slow growth rates and result in fungal infections and decay which discolor wood and reduce wood quality. Injured trees may also attract woodborers and bark beetles, which could further degrade or damage trees (Maser 1967, Kanaskie et al. 2001). In the Oregon Department of Forestry survey of bear damage, approximately one third of the trees had been completely girdled and the remainder had varying degrees of partial girdling (Kanaskie et al. 2001). In another study of bear damage to timber in Western Oregon, bears removed an average of 4.3 square feet of bark from each tree damaged (Noble and Meslow 1998). In a stand of trees, damage can accumulate over the 10-20 year period when trees are most likely to be damaged by bears (Schmidt and Gourley 1992, Kanaskie et al. 2001). Observations of total damage within individual stands range from only a few trees to over 70% of a stand (Pierson 1966, Hartwell and Johnson 1988, Mason and Adams 1987, Schmidt and Gourley 1992). Problems with bear damage are compounded by the extended time it takes to replace damaged trees and the fact that bears have a documented preference for the fastest-growing, healthiest trees, like the trees in stands that have been recently thinned or received fertilizer to improve tree growth (Mason and Adams 1989, Kanaskie et al 1990, Schmidt and Gourley 1992).

Purpose

The purpose of the proposed program is to help reduce black bear damage to timber in Western Oregon. The program should be effective in reducing damage, environmentally sound, and should consider land managers' production objectives. Removal of bears, if selected as an option, should be selective for the individual bears causing damage.

Decision to be Made

Based on the scope of this EA, the decisions to be made are:

- How can WS best respond to the need to reduce black bear damage to timber?
- What are the environmental impacts of implementing various management strategies?
- Does the proposal have significant impacts meriting an EIS?

Location and Scope of Analysis

This analysis is for bear damage management on private and county lands in all counties west of the Cascade ridge.

This EA only evaluates alternatives for WS involvement in bear damage management in Oregon. Oregon law permits resource managers and private contractors to conduct bear damage management programs without involvement by WS. In the absence of a WS program, resource managers would still have legal access to lethal and nonlethal techniques for bear damage management.

This EA analyzes various strategies (alternatives) and methods for reducing black bear damage to timber. The potential methods that may be used and the environmental impacts associated with these methods are described in Chapters 2, 3, and 4.

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LIST OF ACRONYMS AND ABBREVIATIONS USED IN THIS DOCUMENT

APHIS	Animal and Plant Health Inspection Service
BLM	Bureau of Land Management
BO	Biological Opinion
CEQ	President's Council on Environmental Quality
CFR	Code of Federal Regulations
dbh	Diameter at Breast Height
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FY	Fiscal Year
GAO	U.S. Government Accounting Office
IWDM	Integrated Wildlife Damage Management
MIS	Management Information System
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NHPA	National Historical Preservation Act
OAR	Oregon Administrative Rules
ODA	Oregon Department of Agriculture
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish and Wildlife
OFIC	Oregon Forest Industry Council
ORS	Oregon Revised Statutes
OSP	Oregon State Police
sph	Stems per hectare
T&E	Threatened and Endangered
WFPA	Washington Forest Protection Association
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFWS	United States Fish and Wildlife Service
WS	Wildlife Services

CHAPTER 1: PURPOSE AND NEED FOR ACTION

1.0 Introduction

Black bear (*Ursus americanus*) foraging on timber was reported as early as the turn of the century and observations of harvested timber indicate that it occurred prior to this time. However, it wasn't until the increase in intensive forest management in the 1940's that black bear foraging on trees was identified as a problem for timber production (Pierson 1966). Bears damage trees by peeling the outer bark and eating the newly-forming vascular tissues. Bear damage to trees varies from a small patch less than a foot square to the removal of all bark in a ring around the tree (girdling; Pierson 1966). Complete girdling will kill the tree. Partial girdling does not necessarily kill the tree, but partial damage can slow growth rates and result in fungal infections and decay which discolor wood and reduce wood quality. Recorded observations of damage within individual stands range from only a few trees to over 70% of a stand (Pierson 1966, Hartwell and Johnson 1988, Mason and Adams 1987, Schmidt and Gourley 1992). Bear damage is particularly problematical because bears prefer rapidly-growing, vigorous trees like those found in recently thinned stands. In Oregon, most problems with bear damage to timber occur in the Western portion of the state.

The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program has expertise in resolving conflicts between people and wildlife, and has been authorized by Congress to reduce damage caused by wildlife (Animal Damage Control Act of March 2, 1931, as amended (46 Stat. 1486; 7 U.S.C. 426_426c), the Rural Development, Agriculture, and Related Agencies Appropriations Act of 1988 (Public law 100_102, Dec. 22, 1987, Stat. 1329_1331; 7 U.S.C. 426c), and the FY 2002 Agriculture Appropriations Bill). In accordance with this authorization, WS conducts activities to prevent or reduce wildlife damage or threats of damage to agricultural, industrial and natural resources, property, and human health and safety. WS is a cooperatively-funded, service-oriented program that provides assistance to requesting public and private entities when valued resources are lost, damaged, or threatened by wildlife. Responses can be in the form of technical assistance or direct damage management. The degree of WS involvement varies, depending on the complexity of the wildlife problem, and the funding available for the project. WS activities are conducted in accordance with all Federal, State, and local laws.

1.1 Purpose

The purpose of the proposed program is to help reduce black bear damage to timber in Western Oregon. The program should be effective in reducing damage, environmentally sound, and should consider land managers' production objectives. Removal of bears, if selected as an option, should be selective for the individual bears causing damage.

Decision to be Made

Based on agency relationships, and legislative mandates, WS is the lead agency for this EA, and therefore responsible for the scope, content and decisions made. The Oregon Department of Fish and Wildlife (ODFW), Oregon Department of Agriculture (ODA), Oregon State Police – Fish and Wildlife Division (OSP), the Coos County Commission, and the Oregon Department of Forestry (ODF) were consulted during preparation of the EA to ensure an interdisciplinary approach in compliance with NEPA and agency mandates, policies, and regulations.

Based on the scope of this EA, the decisions to be made are:

- How can WS best respond to the need to reduce black bear damage to timber?
- What are the environmental impacts of implementing various management strategies?
- Does the proposal have significant impacts meriting an EIS?

1.2 Need for Action

1.2.1 Timber Production in Oregon

Oregon forests cover approximately 28 million acres, approximately 46% of land in Oregon. The majority of forest land (57%) is owned by the federal government, 38% by private owners, 3% by the state of Oregon, and 2% in other

public ownerships (ODF 1999). Timber production played a vital role in Oregon's history and continues to be an important part of Oregon's economy, culture and customs. The Oregon Forest Practices Act (ORS 527.610 – 527.990, 527.992) states, "Forests make a vital contribution to Oregon by providing jobs, products, tax base and other social and economic benefits, by helping to maintain forest tree species, soil, air and water resources and by providing a habitat for wildlife and aquatic life. Therefore, it is declared to be the public policy of the State of Oregon to encourage economically efficient forest practices that ensure the continuous growing and harvesting of forest tree species and the maintenance of forestland for such purposes as the leading use on privately owned land, consistent with sound management of soil, air, water, fish and wildlife resources and scenic resources within visually sensitive corridors as provided in ORS 527.755 and to ensure the continuous benefits of those resources for future generations of Oregonians".

Table 1-1
2001 Western Oregon Timber Harvest by County[1]
(volume removed in 1,000's of board feet - Scribner log scale)

County	Forest Industry[2]	Other Private	Other Public[3]	Total
Benton	97,502	14,632	111	112,245
Clackamas	59,006	21,398	714	81,118
Clatsop	162,752	3,685	15	166,452
Columbia	189,137	21,684	3,680	214,501
Coos	190,252	14,783	10,119	215,154
Curry	40,144	10,532	0	50,676
Douglas	362,361	29,107	3,296	394,764
Hood River	10,941	531	8,158	19,630
Jackson	90,853	7,006	0	97,859
Josephine	12,901	5,844	953	19,698
Lane	370,364	25,506	45	395,915
Lincoln	76,557	9,766	5	86,328
Linn	173,229	10,189	222	183,640
Marion	53,110	11,095	0	64,205
Multnomah	10,734	3,069	0	13,803
Polk	122,814	6,906	0	129,720
Tillamook	64,948	1,656	0	66,604
Washington	96,547	11,455	635	108,637
Yamhill	68,330	14,620	2,290	85,240
TOTAL	2,252,482	223,464	30,243	2,506,189

1 Data only includes land classes that could be affected by this EA. Data taken from ODF 2001 Western Oregon Harvest Report.

2 ODF defines forest industry lands as holdings with >5,000 acres in timber production.

3 Includes County lands.

The forest products industry is Oregon's largest manufacturing employer, with approximately 65,000 Oregonians working in sawmills, plywood plants, pulp and paper manufacturing, logging and trucking companies, and wood furniture manufacturing facilities (ODF 1999). Forests that are managed for timber production are treated as a commodity crop with an approximately 60 year rotation cycle. In 2001, over 2.84 billion board feet of timber (Scribner log scale) were harvested in Oregon. Seventy six percent of the timber harvested was from forest industry lands, 8% from other private lands, 9% from State lands, 5% from Federal lands, 0.05% from Native American lands, and 0.5% from other public lands (ODF 2002). The proportion of Oregon's timber production derived from private lands has increased substantially since the late1980's when shifts in management objectives on public lands resulted in a decline in timber harvest from BLM and National Forest lands. Oregon timber harvest shifted from an average of 53% federal lands and 43% industrial and private lands during 1986-1990 to an average of 10% federal lands and 81% industrial and private lands during 1997 - 2001(ODF 2001). Table 1-1 provides data on timber production for lands in the Analysis Area for this EA. The Forest Products Society estimates that each American goes through approximately 80 cubic feet of wood in wood and wood products per year (Oregon Forest Resources Institute). Using this estimate and the data from Table 1-1, the timber harvest from private and industrial forests in the Analysis Area provides enough wood to meet the needs of approximately 2,579,000 people.

1.2.2 Measurements of Bear Damage to Timber

In 2000, the ODF conducted an aerial survey of 6.4 million acres of forest in the central and northern parts of western Oregon (Kanaskie et al. 2001). Approximately 29,500 acres were marked as having some recent tree mortality. Ground verification was used to determine the species of tree killed, the cause of mortality, and estimate the number of acres affected by each source of mortality. Six conifer species and multiple hardwood trees were represented in the study plots, however, damage was only recorded on Douglas fir, western hemlock, western red cedar, and Sitka spruce. No peeling of hardwoods was observed in the sample transects although minor peeling of red alder was observed outside of the study plots. Average stand densities (230 trees per acre) were consistent with tree densities in stands that have been precommercially[1] thinned. ODF used a combination of aerial surveys and ground verification to estimate that bears were responsible for 59% of the estimated 426,652 dead or injured trees in their survey. Insects accounted for 23% of dead and injured trees, and other agents were responsible for the remaining 19%. Of the estimated 250,473 trees damaged by bears, approximately 86,446 trees were killed (100% of circumference peeled). Aerial surveys locate injured and dying trees by looking for discolored needles. The time between tree injury/illness and needle discoloration varies, so these data represent damage that occurred over a period of approximately 3 years. The 2000 ODF aerial survey was timed to catch the maximum number of trees damaged during the prior year (1999). Trees damaged in 1998 and earlier were underrepresented because many trees had already lost needles and were not detected. Trees damaged in 2000 were also underrepresented because it was too early for most trees to show discoloration in response to bear damage. Therefore, Kanaskie et al. (2001) only used the data from 1999 to estimate that bears damaged approximately 55,180 trees per year. Thirty five percent (19,350) of the damaged trees were completely girdled (killed). This is damage that occurred with damage management programs in place. This damage estimate is only for the ODF study area and does not include all of the Analysis Area for this EA. Using an average value of $15 per tree for a 25 year old tree, the value of the trees killed annually would be $1,296,690 (Nolte and Dykzeul 2002). There would be additional losses to timber yield from decay and insect damage on trees that were partially damaged. This damage estimate is the value of the timber at the time of damage and is not the value anticipated had the trees reached harvestable age. Kanaskie et al. (2001) note that their calculations are a very conservative estimate of the total amount of recent damage. Aerial surveys miss some trees, and ground crews usually find more damaged trees than surveyors in aircraft (Ziegltrum and Nolte 2001, Kanaskie et al. 1990, 2001). Although annual damage rates may not seem high, it should be remembered that, within a stand, damage accumulates over the 10-20 year period when trees are most likely to be damaged by bears. The damage levels reported by Kanaskie et al. (2001) are lower than those reported for a similar 1998-1999 survey estimating that bears killed or damaged 165,000 trees per year (Kanaskie et al. 1990). Differences in survey methodology explain some, but not all, of the differences between the two surveys. Bear damage control efforts and an increase in problems with Swiss needle cast, a disease of Douglas-fir which reduces tree productivity and which may decrease tree palatability, may also have had an impact on damage levels (Kanaskie et al. 2001)
For the period of FY 1998 – 2001, WS's average annual confirmed loss estimates for counties with programs to manage bear damage to timber were $97,467. This is the damage that occurred before management was initiated and does not reflect the amount of damage that was prevented by management efforts. In general, WS specialists only confirm sufficient damage to determine the nature of the problem, so these figures are lower than actual losses

[1] Forest management practice of reducing the number of trees in young stands, often before trees are large enough to be used or sold as a forest product.

(USDA 1997, Revised). As of FY 2001, WS only has programs in 9 of the 19 counties in the Analysis Area. Seventy-five percent of reported and WS verified timber damage were from County or industrial lands ($\geq$ 5,000 acres, ODF 2002), 11% were from private timber holdings less than 5,000 acres but greater than 500 acres, and 14% were from private timber holdings $\leq$ 500 acres.

In 2000, Nolte and Dykzeul used data from a ODF survey of bear damage to timber in Oregon and an Oregon Forest Industry Council (OFIC) survey of timber producers to estimate that 768,000 trees are killed annually by black bear in Oregon. Assigning a value of $15 per tree resulted in estimated annual loss of $11.5 million. Timber producers in Oregon also reported spending approximately $470,000 annually to manage bear damage to timber (Nolte and Dykzeul 2002). A Hoopa Indian reservation in Northern California estimates annual timber losses to bears of approximately $1-2 million or approximately 15% of their annual timber revenue (Gurnon 2002).

Bear damage to timber is not evenly distributed across the landscape or among timber producers (Giusti 1990, Kanaskie et al. 2001, Ziegltrum and Nolte 2000). Not all bears peel trees and many areas may go without damage. However, in areas where bear damage to timber does occur it can be so severe that timber managers have to cut the remaining trees and replant the site (Schmidt and Gourley 1992). Recorded observations of damage within individual stands range from only a few trees to over 70% of a stand (Pierson 1966, Hartwell and Johnson 1988, Mason and Adams 1989, Schmidt and Gourley 1992). In Oregon, Maser (1967) reported that 60% of the trees from an initial planting had been damaged by bear. In a study conducted in the Oregon Coast Range, Noble and Meslow (1998) reported that, within stands with damage, bears damaged an average of 39 trees/ha (range 2 – 185 trees/ha). In western Washington studies, total stand damage levels ranged from 2 to 52% of the stand with average damage levels of 26 and 28%. Annual damage rates ranged from 4.7 to 16.4% of the stand (Ziegltrum 1994, Ziegltrum and Nolte 2000). Hartwell and Johnson (1988) reported annual damage of 8.5% for a stand in Washington. The sample area with the greatest damage observed by Kanaskie et al. (2001) had 57 damaged trees per acre, but many areas had 10 trees per acre or fewer trees with any form of damage. In thinned stands, even small amounts of damage can reduce stocking of crop trees below the silvicultural optimum and can have a marked impact on stand yield (Kanaskie et al. 2001). Problems with bear damage are also exacerbated by the extended time (15-25 years) required to replace damaged trees, and the fact that most bear damage occurs after timber producers have invested in stand improvements (Nolte et al. 2002, Kimball et al. 1998b, Schmidt and Gourley 1992, Kanaskie et al. 1990, Nelson 1989, Mason and Adams 1989).

1.2.3 Description of Bear Damage to Timber

Bears can damage trees in one of two ways -- by marking trees, and by foraging on trees. The first form of damage, marking trees, is not extensive, and is rarely a management concern. Bears mark trees by clawing, or chewing on the bark. The same tree may be marked on multiple occasions. There are a variety of explanations for tree marking behavior including orientation, territory establishment, and communication. Marked trees are usually found in areas bears frequent like stream beds, ridge tops, and maintained trails, and are normally oriented along the route of travel (Burst and Pelton 1983, LeCount 1986).

Figure 1.1 Black bear damage to Douglas-fir

Bear foraging on trees (tree peeling) is the form of damage which causes problems for timber production. Bears use their teeth and claws to peel large strips of bark from trees and expose the newly forming vascular tissue (Figure 1.1). Bears scrape the cambium and inner bark from the trees with their incisors to get the sugars in the plant tissues (Kimball et al. 1998*a*, Partiridge et al. 2001). Bear damage is characterized by strips of bark located at the base of the tree and vertical tooth marks on the bole. In contrast, rodents remove small chips of bark and will leave short horizontal or diagonal tooth marks. Most tree peeling occurs from April - June (Flowers 1987, Schmidt and Gourley 1992). Bear damage to trees varies from a small patch less than a foot square to the removal of all bark in a ring around the tree (girdling; Pierson 1966). Noble and Meslow (1998) recorded an average of 4.3 sq. ft. of bark removed during bear foraging on trees in Oregon. In the Pacific Northwest, most damage occurs to trees 10-30 years old and 5-12 inches in diameter, but older larger trees are also damaged (Schmidt and Gourley 1992, Ziegltrum 1994, Ziegltrum and Nolte 2001). Most bear peeling occurs within the lower 4 - 6 feet of the bole, but some bears will climb larger trees and feed at the upper boles. The tree bark is

thinner at the upper levels of the tree and easier for young bears to peel. Bear feeding on the upper portions of the tree commonly results in tree girdling (Maser 1967). On rare occasions, bears may peel almost the entire length of the tree (Ziegltrum 1997). In a 2000 survey of bear damage to trees in Oregon, the average distance from the ground to the top of the peeled area was 4.6 feet, but in one instance, peeling extended to 57 feet above the ground (Kanaskie et al. 2001).

Complete girdling will kill the tree. Partial girdling does not necessarily kill the tree, but partial damage can slow growth rates and result in fungal infections and decay which discolor wood and reduce wood quality (Fig. 1-2). Injured trees may also attract woodborers and bark beetles, which could further degrade or damage trees (Maser 1967, Kanaskie et al. 2001). Partially girdled trees may receive additional damage in subsequent years which can eventually result in complete girdling (Pierson 1966). In Washington and Oregon studies, the proportion of all damaged trees that were completely girdled ranged from 18 to 52% (Maser 1967, Hartwell and Johnson 1988, Schmidt and Gourley 1992, Kanaskie et al. 2001). Russell et al. (2001) reported a 52% mortality rate among bear damaged trees in coastal redwood forests. Vulnerability to decay and stain varies depending on tree species, and the size of the injury. Non-resinous species like true fir, western hemlock and Sitka spruce are generally more vulnerable to problems with fungus and decay than resinous species like Douglas-fir and pines (Kanaskie et al. 2001). However, Poelker and Hartwell (1973) reported the average deterioration associated with partial tree damage was 10% for western hemlock, 17.8% for Douglas-fir, 19% for Sitka spruce, and 46.7% for western red cedar. The majority of the deterioration was sound but discolored wood in the early stages of fungus infection. Pierson (1966) reports the findings of a U.S. Forest Service study of the deterioration associated with partial bear damage in a 35 year old stand. Trees with 25-50% of the trunk damaged had an average reduction in yield per tree of 10 board feet or 7% of the merchantable portion of the tree. Trees with >50% damage had an average reduction in yield of 15 board feet or 10% of the merchantable portion of the tree (Pierson 1966). In Oregon and Washington, 20-27% of the trees with partial damage had damage to >50% of the diameter of the trunk (Hartwell and Johnson 1988, Schmidt and Gourley 1992, Kanaskie et al. 2001). In contrast, Maser (1967) did not observe any evidence of rot in partially damaged trees, but did observe wood borer activity in all damaged trees. In 110 year old trees, only 3.5% of wounded trees showed evidence of rot, and cull to rot and borers amounted to <1% of the board foot volume even though 81% of trees showed evidence of bear damage (Childs and Worthington 1955).

Figure 1.2 Effect of bear damage on tree growth and wood quality.

Bear foraging has been reported on a wide variety of conifer species including, Douglas-fir (*Pseudotsuga menziesii*), silver fir (*Abies amabilis*), Sitka spruce (*Picea sitchensis*), white spruce (*Picea glauca*), western hemlock (*Tsuga heterphylla*), subalpine fir (*Abies lasiocarpa*), western redcedar (*Thuja plicata*), western white pine (*Pinus monticola*), coastal redwood (*Sequoia sempervirens*), western larch (*Larix occidentalis*), Port Orford cedar (*Chamaecyparis lawsoniana*), whitebark pine (*Pinus albicaulis*), lodgepole pine (*Pinus contorta*), and grand fir (*Abies grandis*). Bear feeding has also been reported on red alder (*Almus rubra*), aspen (*Populus* spp.), and bigleaf maple (*Acer macrophyllum*). Black bear exhibit a preference for certain tree species. In Western Oregon and Washington, black bear appear to prefer Douglas-fir and western hemlock, but in the redwood forests of Northern California, bear appear to prefer redwoods over Douglas-fir (Glover 1955, Pierson 1966, Schmidt and Gourley 1992, Sullivan 1993, Hosack and Fulgham 1996, Stewart et al. 1999, Kanaskie et al. 2001). In British Columbia, bears preferentially select western redcedar (Sullivan 1993).

Partridge et al. (2001) used scat analysis to determine that tree cambium and inner bark comprised an average of 3% of the diet of western Washington bears living in areas without bear feeders. Using data on bear foraging behavior and the energy content of tree sap, Partridge et al. (2001) estimated that a 220 lb black bear eating a mixed diet containing 3% tree cambium and inner bark would need to forage on approximately 1.2 lbs of cambium and inner bark per day to meet its daily maintenance requirements, or 0.4 lbs of cambium and inner bark/day for a 44 lb bear (cub). Using the average tree damage rate of 4.3 square feet per tree from Noble and Meslow (1998) and an average vascular tissue mass of 0.008 g of dry matter/cm^2 (Kimball et al. 1998*b*), this would equate to approximately 2 trees per day for a 220 lb bear and 0.5 tree per day for a 44 lb bear. The number of damaged trees varies depending on the amount of damage done to each tree and the proportion of cambium and inner bark in the bear's diet. For example, Partridge et al. (2001) estimated that the amount of cambium and inner bark consumed by a 220 lb bear would increase to 28.6 lbs of cambium and inner bark per day (approximately 56 trees) if the bear was meeting all

its energy requirements with carbohydrates from trees. Glover (1955) reported individual bears damaging an average of 20 trees in a 24 hour period with a maximum observation of 40 trees damaged in a 24 hour period. Ziegltrum (1997) documented individual bears damaging 50 - 70 trees in one day. In Washington, one adult bear damaged 693 trees in a pre-commercially thinned plot during the period from April 24 to mid June (Hartwell and Johnson 1988).

Bear damage appears to be highest in stands of trees that are being actively managed to promote timber growth (Giusti 1990). For example, bear damage levels tend to be greater in lower density stands like those that have been recently thinned (Mason and Adams 1989, Kanaskie et al. 1990, Schmidt and Gourley 1992). In Oregon, bear damage levels were 4 times higher in stands that had received urea fertilization than unfertilized stands (Nelson 1989). In contrast, Russell et al. (2001) identified a positive correlation between tree density and bear damage in stands that were not being managed for timber production. However, the only stands in the age class known to be most attractive to bears were also the stands with highest densities, making it difficult to determine if the observed correlation was actually due to tree density or tree age.

Recent research on bear foraging provides insight on black bear tree selection. Data indicate that black bears are sensitive to the amount of carbohydrates and terpenes within each tree and select trees to maximize carbohydrate intake and minimize terpenes (Kimball et al. 1998*a*). Kimball et al. (1998*b*) determined that total sugars were positively correlated with tree diameter and vascular tissue mass. Trees in thinned stands (250-325 stems[1] per hectare (sph)) had greater diameters, vascular tissue mass, and total sugar concentrations than trees in higher density stands (400-700 sph, and 800 - 1400 sph, Nolte et al. 1998). For all stand densities, fertilization increased tree diameter and, for the first year after fertilization, also increased sugar concentrations. In high density stands, urea fertilization also increases vascular tissue mass the first year after fertilization (Kimball et al. 1998*b*). Data from Noble and Meslow (1998) also indicate that damage may be higher in areas where soil and topographic characteristics are favorable for tree growth. Conversely, live canopy pruning decreases tree growth rates, vascular tissue mass, and associated carbohydrate levels, especially in the lower bole of the tree. In a study of a stand where every other tree had been pruned, unpruned Douglas-fir were 4 times as likely to be damaged by bears as pruned trees (Kimball et al. 1998*c*).

It might seem that bear foraging would thin stands and could be considered a natural substitute for thinning by timber managers (commercial thinning). However, in most instances this is not the case. Bears may avoid dense stands and preferential feed on stands with lower timber density (Mason and Adams 1989, Kanaskie et al. 1990, Schmidt and Gourley 1992). Unlike commercial thinning, bear damage is not evenly distributed in a stand. All trees in some patches may be damaged while trees in other areas remain untouched (Giusti 1990, Ziegltrum and Nolte 2000). Bears preferentially feed on the largest, fastest-growing, healthiest trees instead of the slow-growing, damaged or disease-stressed trees that would be removed when a stand is thinned for timber production (Hosack and Fulgham 1996, Kanaskie et al. 2001, Schmidt and Gourley 1992, Sullivan 1993). As mentioned above, the wounds resulting from partial girdling increase the risk of problems with fungus and insects. Therefore, the majority of tree losses to bear damage are likely to be additive to other forms of mortality (insect damage and disease), because these factors are likely to decrease tree growth rates, vascular tissue mass, and carbohydrate concentrations and make trees less palatable to bears.

There are various hypotheses on the role of learning in tree peeling behavior. Feeding on cambium and inner bark seems to be a natural technique for bears (WDFW 1996). However, biologists working with bear damage to timber hypothesize that the technique of peeling trees may be taught by sows to their young (Schmidt and Gourley 1992, ODFW 1992, WDFW 1996, Ziegltrum 1994). Observations of bear damage spreading across the landscape from initial isolated areas appear to support this hypothesis. Patterns in bear use of trees also appear to indicate that learning plays a role in tree peeling behavior. Carbohydrate levels appear to be constant at all levels of the tree but terpene levels appear to be lower in the mid to upper levels of the tree. Given that bears appear to be selecting trees with highest level of carbohydrates and the lowest levels of terpenes, it would appear that the cambium and inner bark in the mid to upper portions of the tree might be more desirable. However, bear damage is usually confined to the lower portions of the trunk. Kimball et al. (1998*c*) hypothesize that foraging activity may be confined to the lower bole because fewer animals have experienced foraging higher in the bole.

Male bears generally have larger home ranges than female bears (Fersterer et al. 2001). During the spring breeding season, male bears may travel extensively between female bears. Damage associated with male bears is dispersed over a wider area than damage associated with female bears. Female bears have smaller home ranges and may have

[1] Stems per hectare – the number of trees in a 2.5 acres area

reduced mobility due to the presence of young cubs. Yearling cubs remain with their mothers and may also feed on trees. Consequentially, damage associated with female bears tends to be concentrated in a given location (Flowers 1987, Schmidt and Gourley 1992, Collins 1999). Washington biologists report that most timber damage appears to be caused by young bears who have not been able to establish a territory and the majority of bears taken to stop timber damage in Oregon appear to be young males (ODFW 1992). A study by Collins (1999) provides data that in areas where bears are not given supplemental feed to lure them from foraging on trees, the majority of damage is probably associated with females and subadult males. A Washington study (Stewart et al. 2002) used incisor width to identify the sex of bears causing damage. The majority of damage (90%) was attributed to female bears. However, the study did not compare tooth measurements between yearling males and adult female bears. Yearling bears often remain with adult females and are likely to forage in the same area and on the same foods as adult females. Additionally, the sampling regimen placed an emphasis on areas of concentrated damage and may have been biased for damage cause by females. Partridge et al. (2001) note that it may be difficult for large bears to efficiently meet their energy requirements with tree cambium and inner bark because the increase in tooth size per increase in body weight is not as great as the increase in energy requirements per unit body weight. Consequentially an 80 kg adult female's incisor width for scraping cambium and inner bark relative to her energy requirements is 44% greater than that for a 150 kg male.

1.2.4 Positive Impacts of Bear Foraging

Not all impacts of bear damage to timber are negative. Bear feeding on trees creates snags which support a wide variety of wildlife species. Snags are used by over 100 different birds and mammals including cavity nesting birds, bats, fishers (*Martes pennanti*), and raccoons (*Procyon lotor);* USDA 1979, Brown 1985). Decomposing snags and fallen woody debris provide food and habitat for a wide variety of invertebrates and small animals (USDA 1979, Raphael 1980). In recognition of the importance of snags and fallen timber in forest ecosystems, the Oregon Forest Practices Act requires that 2 snags or two green trees at least 30 feet in height and 11 inches dbh[1] or larger and at least 50% of which are conifer, and two downed logs or 2 downed trees at least 50% of which are conifer, that each comprise at least 10 cubic feet be left after harvest for each acre of harvested land (ORS 527.676). Trees that are killed by bear foraging create open patches in the forest canopy. The resulting increase in sunlight to the forest floor stimulates the growth of a diversity of plant species which provide food and shelter for even more invertebrate and animal species (Brown 1985, Russell et al. 2001).

1.3 Overview of Bear Damage Management Efforts in Oregon

Black bear damage to timber was reported as early as the turn of the century. However, it wasn't until the increase in intensive forest management in the 1940's that black bear damage was identified as a problem for timber production (Pierson 1966). From 1925 to 1940 there were bear harvest restrictions for the Southwest portion of Oregon, but there were no bear harvest restrictions for the rest of the state. During 1941 and 1942 a one month hunting season with a 1 bear bag limit was implemented for the state. There were no restrictions on bear hunting from 1943 – 1961. In 1961, the Oregon legislature gave the Oregon Game Commission authority to declare the bear a game mammal except where damage (timber damage implied) could be expected. As early as 1970 private timber associations in western Oregon were reporting harvest of bears to protect timber. In 1985 the ODFW started offering controlled seasons (limited tag numbers) for black bear as a population management tool in high damage areas including some sections of western Oregon with bear damage to timber (ODFW 1992). WS started receiving requests for assistance with bear damage to timber starting in the mid 1980's. At present, some timber managers (individuals, agencies and associations) choose to do their own bear damage management or contract privately for bear damage management. Other counties and private individuals choose to request assistance from WS. A wide range of techniques for managing bear damage to timber are currently in use including pruning, bear feeding programs, lethal removal of individual bears, and combinations of these techniques. Where permitted by Oregon hunting regulations, timber producers also may work with ODFW biologists to encourage recreational hunting as a means of addressing damage problems (ODFW 1992).

1.4 Location and Scope of Analysis

In Oregon, the majority of black bear damage to timber occurs in the western portions of the state. This analysis is for bear damage management on private and county lands in all counties west of the Cascade ridge. In 2001, WS

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[1] the diameter of a tree measured at breast height (4.5 feet above the ground)

had County agreements to assist with wildlife damage management in 9 of the 19 counties west of the cascade ridge. In the remaining counties, WS specialists may provide operational assistance when funding is provided by the individual or agency with the damage problem. WS also provides technical assistance and information for counties without a WS program on a request basis. All counties west of the Cascade ridge will be included in the EA because bear damage to timber is known to occur in all of these counties and because of the potential for new cooperative agreements to be signed within counties that are not currently in the program. The impact of changes in the Counties participating in the program will be assessed in WS annual monitoring reports.

This EA only evaluates alternatives for WS involvement in bear damage management in Oregon. Oregon law permits resource managers and private contractors to conduct bear damage management programs without involvement by WS. In the absence of a WS program, resource managers would still have legal access to lethal and nonlethal techniques for bear damage management.

This EA analyzes various strategies (alternatives) and methods for reducing black bear damage to timber. The potential methods that may be used and the environmental impacts associated with these methods are described in Chapters 2, 3, and 4.

This EA will remain valid until WS and other appropriate agencies determine that new needs for action or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document may be amended pursuant to NEPA. Review of the EA will be conducted during the annual planning process by WS and each cooperating agency to ensure that the EA is complete. Changes in environmental regulations, program scope and methods, or other variables could also trigger additional NEPA compliance requirements

1.5 Summary of Public Involvement Efforts

Public participation in the National Environmental Policy Act (NEPA) process for this proposal was considered consistent with the lead agencies' NEPA procedures and exceeds NEPA requirements. The public involvement and notification process was threefold:

1) Issues related to the proposed action were identified during agency meetings and through a public outreach process. The public outreach included an information gathering phase wherein potentially interested groups of individuals were contacted (representing conservation groups, local citizens and citizen groups, land owners, land managers, technical experts, Tribal representatives, and government officials). Legal notices were posted in local newspapers covering the proposed project area. Legal notices inviting public participation in the development of the EA were published in the Oregonian (July 16 – 18, 2002), Statesman Journal (July 16, 2002), Register Guard (July 16 – 18, 2002), News Review (July 17 – 19, 2002), Daily Courier (July 17 – 19, 2002), Curry Coastal Pilot (July 17, 2002), and the World (July 18 – 20, 2002). More than 200 letters describing the proposal and preliminary issues and alternatives and inviting public comment were sent to the public via FedEx® or U.S. Postal Service (July 15, 2002). A three week comment period was provided for initial input for the development of this EA. Three hundred and fifteen comments were received from groups and individuals interested in providing input for the development of this EA. The comments were considered in this analysis and substantive and relevant information was incorporated into this document.

2) Legal notices were published in the Oregonian (January 6-8), Statesman Journal (January 16), Register Guard (January 6-8), News Review (January 6-8), Daily Courier (January 6-8), Curry Coastal Pilot (January 6), and the World (January 6-8) soliciting comments on this EA during a 30 day public comment period. All groups or individuals expressing interest during the first public involvement period have been sent a copy of this predecisional EA for review and comment. All written comments received by February 14 will be considered in this EA and accompanying decision.

1.6 Related Environmental Documents

WS Programmatic EIS.

ADC issued a Final EIS on the National APHIS/ADC program (USDA 1994) and published a Record of Decision in 1995 to which this EA is tiered. The FEIS was revised in 1997 (USDA 1997 Revised). Pertinent information from the programmatic EIS has been incorporated in this document.

WS EAs for Wildlife Damage Management in the Northwest and Roseburg Districts

The WS Roseburg and Northwest District offices prepared EAs for ongoing predator damage management programs in southwestern and northwestern Oregon (including all counties in the Analysis Area for this EA)(USDA 1995, USDA 1997).

Oregon's Black Bear Management Plan 1993-1998.

The ODFW black bear management plan describes the biology of black bear in Oregon and identifies goals, issues, and needs for the management of black bear in Oregon. This EA is consistent with ODFW management goals.

1.7 Authority and Compliance

1.7.1 Authority of Federal, State and County Agencies

USDA/APHIS/ Wildlife Services (WS)

WS is the federal agency authorized by congress to protect American resources and human health and safety from damage caused by wildlife. The primary statutory authorities for the WS program are the Act of March 2, 1931, as amended (sometimes referred to as the Animal Damage Control Act) which authorizes WS to reduce damage cause by wildlife in cooperation with other agencies (Animal Damage Control Act of March 2, 1931, as amended (46 Stat. 1486; 7 U.S.C. 426_426c), the Rural Development, Agriculture, and Related Agencies Appropriations Act of 1988 (Public law 100_102, Dec. 22, 1987, Stat. 1329_1331; 7 U.S.C. 426c), and the FY 2001 Agriculture Appropriations Bill).

Oregon Department of Fish and Wildlife (ODFW)

The ODFW has the responsibility to manage all protected and classified wildlife in Oregon, except federally listed threatened and endangered (T&E) species, regardless of the land class on which the animals are found (Oregon Revised Statutes (ORS) 496.012, 496.118). Oregon state law allows a landowner or lawful occupant to take any black bear, cougar, red fox or bobcat that is causing damage without first obtaining a permit from ODFW (ORS 498.012). The law, however, does require the landowner to notify ODFW immediately of the methods used and species and number of animals taken. ODFW also regulates the disposition of bears taken for damage management (OAR 635-002-0008).

In Oregon black bear management is the responsibility of ODFW. However, the current MOU and Cooperative Agreement between the ODFW and WS authorizes WS to independently respond to damage caused by black bear. ODFW and WS receive requests to handle wildlife damage to timber. ODFW may respond to the request or they may refer the problem to WS.

Oregon State Police – Fish and Wildlife Division (OSP)

The purpose of the Fish and Wildlife Division is to ensure compliance with the
laws and regulations that protect and enhance the long term health and equitable utilization of Oregon's fish and wildlife resources and the habitats upon which they depend.

Oregon Department of Agriculture (ODA)

The Oregon Department of Agriculture aids citizens in resolving certain types of conflicts with wildlife. The ODA currently has a MOU, Cooperative Agreement, and Annual Work plan with WS. These documents establish a cooperative relationship between WS and ODA, outline responsibilities, and set forth annual objectives and goals of each agency for resolving wildlife damage issues in Oregon.

Oregon Department of Forestry (ODF)

The ODF has the responsibility to encourage economically efficient forest practices that ensure that Oregon continues to have an abundant supply of timber products while also providing protection for fish, wildlife, air, soil and water resources. Under Oregon Revised Statute 527.335, the State Forester is authorized to conduct surveys and evaluations to determine the cause and extent of tree mortality on forest land. This data is used by timber mangers

and damage management specialists to locate and monitor bear damage areas and focus damage management efforts.

Coos County Commission

The Coos County Commission manages county forests to produce revenue to fund County services, and has requested WS assistance with bear damage to timber. Timber revenue goes to the county general fund and pays for public safety and health programs, and other county functions including the district attorney, county planning, and county assessor.

1.7.2 Compliance with Federal laws.

WS consults and cooperates with other Federal and State agencies as appropriate to ensure that all WS activities are carried out in compliance with all applicable Federal laws.

National Environmental Policy Act

All Federal actions are subject to NEPA (Public Law 91-190, 42 U.S.C. 4321 et seq.). WS follows the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR 1500 et seq.), USDA NEPA implementing regulations (7 CFR 1b), and the APHIS Implementing Procedures (7 CFR 372) as a part of the decision-making process. NEPA sets forth the requirement that Federal actions with the potential to significantly affect the human environment be evaluated in terms of their impacts for the purpose of avoiding or, where possible, mitigating and minimizing adverse impacts. Federal activities affecting the physical and biological environment are regulated, in part, by CEQ through regulations in Title 40, Code of Federal Regulations, Parts 1500-1508. In accordance with CEQ and USDA regulations, APHIS NEPA Procedures, as published in the Federal Register (44 CFR 50381-50384) provide guidance to APHIS regarding the NEPA process.

Pursuant to NEPA and CEQ regulations, this EA documents the analysis of a proposed Federal action's impact, informs decision-makers and the public of reasonable alternatives, and serves as a decision-aiding mechanism to ensure that the policies and goals of NEPA are infused into Federal agency planning and decision making. An EA is prepared by integrating as many of the natural and social sciences as may be warranted based on the potential effects of the proposed action. The direct, indirect, and cumulative impacts of the proposed action are analyzed.

Endangered Species Act (ESA)

Under the ESA, all Federal agencies are charged with a responsibility to conserve endangered and threatened species and to utilize their authorities in furtherance of the purposes of the Act (Sec.2(c)). WS conducts Section 7 consultations with the USFWS to utilize the expertise of the FWS to ensure that, "*Any action authorized, funded or carried out by such an agency . . . is not likely to jeopardize the continued existence of any endangered or threatened species . . .* " (Sec.7(a)(2)). WS conducts formal Section 7 Consultations with the FWS at the National level and informal or formal consultations with the FWS at the local level as appropriate.

Animal Damage Control Act and the Rural Development, Agriculture, and Related Agencies Appropriations Act.

The Acts authorize APHIS-WS to reduce damage caused by wildlife in cooperation with other agencies.

National Historical Preservation Act (NHPA) of 1966, as amended

The NHPA requires Federal agencies to: 1) evaluate the effects of any Federal undertaking on cultural resources, 2) consult with the State Historic Preservation Office regarding the value and management of specific cultural, archaeological and historic resources, and 3) consult with appropriate American Indian tribes to determine whether they have concerns for traditional cultural resources in areas of these Federal undertakings. We have determined that the proposed action is not a Federal "undertaking" as defined by NHPA and would not affect cultural resources.

Executive Order 12898 - Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

Environmental Justice (EJ) promotes the fair treatment of people of all races, income and culture with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Fair treatment implies that no person or group of people should endure a disproportionate share of the negative environmental impacts resulting either directly or indirectly from the activities conducted to execute this country's domestic and foreign policies or programs. EJ has been defined as the pursuit of equal justice and equal protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status.

All WS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898 to ensure EJ. WS personnel use wildlife damage management methods as selectively and environmentally conscientiously as possible. There are not any pesticides available for use to reduce bear damage to timber. The WS operational program, analyzed in this document, properly disposes of any excess solid or hazardous waste. Therefore, it is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority or low-income persons or populations.

Executive Order 13045 - Protection of Children from Environmental Health and Safety Risks

Children may suffer disproportionately from environmental health and safety risks, including their developmental physical and mental status, for many reasons. Because WS makes it a high priority to identify and assess environmental health and safety risks, WS has considered the impacts that alternatives analyzed in this EA might have on children. All WS black bear damage management is conducted using only legally available and approved damage management methods where it is highly unlikely that children would be adversely affected. Therefore, the proposed action would not increase environmental health or safety risks to children.

1.7.3 Oregon State Laws and Administrative Rules

Oregon Revised Statutes

Wildlife Policy (ORS 496.012). "It is the policy of the State of Oregon that wildlife 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….."

Taking wildlife damaging land, livestock or agricultural or forest crops (ORS 498.012).
"(1) Nothing in the wildlife laws is intended to prevent any person from taking any wildlife that is damaging land that the person owns or lawfully occupies or is damaging livestock or agricultural or forest crops on such land. However, no person shall take, pursuant to this subsection, at a time or under circumstances when such taking is prohibited by the State Fish and Wildlife Commission, any game mammal or game bird, fur-bearing mammal or nongame wildlife species unless the person first obtains a permit for such taking from the commission. As used in this subsection "nongame" has the meaning for that term proscribed in ORS 496.375.
(2)(a) Nothing in subsection (1) of this section requires a permit for the taking of cougar, bobcat, red fox, or bear pursuant to that subsection. However, any person who takes cougar, bobcat, red fox or bear must have in possession written authority therefor from the landowner or lawful occupant of the land that complies with subsection 4 of this section. (b) Nothing in subsection (1) of this section requires the commission to issue a permit for the taking of any wildlife species for which a U.S. Fish and Wildlife Service permit is required pursuant to the Migratory Bird Treaty Act (16 U.S.C. ss. 703 to 711), as amended.
(3) Any person who takes, pursuant to subsection (1) of this section, any cougar, bobcat, red fox, bear, game mammal, game bird, fur-bearing mammal or wildlife species whose survival the commission determines to be endangered shall immediately report the taking to a person authorized to enforce the wildlife laws, and shall dispose of the wildlife in such a manner as the commission directs. In determining procedures for disposal of bear and cougar, the commission shall direct the State Department of Fish and Wildlife to first offer the animal to the landowner incurring the damage….."

Taking black bear or cougar using dogs or bait prohibited; damage control and government management exceptions; hunting license suspension for violation (ORS 498.164).
"(1) Except as provided in subsection (2) and (3) of this section, no person shall use bait to attract or take black bears or use one or more dogs to hunt or pursue black bears or cougars.
(2) Nothing in subsection (1) of this section shall prohibit the use of bait or one or more dogs by employees or agents of county, state, or federal agencies while acting in their official capacities.
(3) Nothing in subsection (1) of this section shall prohibit the use of bait or dogs by persons for the taking of black bear or cougars in accordance with the provisions or ORS 498.012.
(4) Any person who violates subsection (1) of this section commits a Class A misdemeanor and, upon conviction, shall in addition to appropriate criminal penalties have his or her privilege to apply for any hunting license suspended for a period of 5 years for a first offense and permanently suspended for any subsequent offense.
(5) For the purpose of this section, "bait" means any material placed for the purpose of attracting or attempting to attract bears [1995 c.4 § 1]."

Oregon Administrative Rules

Disposition of Wildlife Taken on Damage (OAR 635.002.008).
"In accordance with ORS 498.012, any wildlife taken on damage shall be disposed of in the following manner:....
....(2) Black bear taken on damage shall be disposed of in the following manner:
(a) The carcass and hide, including the gall bladder and female reproductive tract, shall be delivered to a location determined by the department.
(b) The department may permit the landowner to retain the carcass and hide including skull, paws, claws, and meat (but not the gall bladder) for personal use. The hide, head, paws, claws, and meat may not be sold or bartered.
(A) If the landowner chooses to retain the carcass he/she must sign a written release provided by the department acknowledging the proper methods of preparation for human consumption, accepting the carcass as-is, and that the meat will not be offered for sale;
(B) If the carcass, including hide, skull, paws, claws or meat is transferred to another person, written documentation must be provided as outlined in OAR 635-065-0765(5).
(c) If the landowner chooses not to retain the carcass, including the hide, skull, paws, claws, and meat, the carcass shall be disposed of as directed in OAR 635-002-0007;
(d) The hide, skull, paws, claws, and gall bladder shall be salvaged and disposed of in a manner determined by the department. Options for disposition include but are not limited to scientific, enforcement, or educational purposes....."

Disposal of Black Bear Carcasses (OAR 635-002-0007)
Carcasses of black bear shall be disposed of in the following manner:
(1) Donated to wildlife rehabilitators licensed by the Department provided those rehabilitators use the meat to feed sick, injured or orphaned wildlife and do not sell the meat.
(2) Donated to persons determined to be eligible because of low income or medical reasons, provided the eligible persons sign a written release acknowledging the proper methods of preparation for human consumption, accepts the carcass as is, consume the meat at their place of residence and do not offer the meat for sale.
(3) Donated to persons or public or charitable institutions who request their name be placed on a waiting list maintained by the Department. These persons or public or charitable institutions will be notified on a first-come, first-serve basis and shall sign a written release acknowledging the proper methods of preparation for human consumption, accepts the carcass as-is, consume the meat at their place of residence and not offer the meat for sale.
(4) Donated to rendering plants, pet food manufacturers or disposed of as specified by personnel of the Department. Department directed disposal of black bear carcasses may include but is not limited to disposal at approved landfill sites; disposal on public or private lands; used in research activities; or for other scientific, enforcement or educational purposes.

Black Bear Management Plan (OAR 635-170-0001). Sets the content and purpose of the black bear management plan.

Black bear hunting seasons (ORS 635-066-0000). Sets rules for the establishment of season dates, bag limits, hunting areas, hunting methods, and other restrictions for hunting black bear.

1.7.4 ODFW Policy

ODFW Wildlife Policy and Procedure WLDF4 Guidelines for Handling Black Bears. Policy provides guidance for ODFW biologists and their representatives when dealing with bear complaints.

ODFW Draft Predator Management Policy. Provides guidance to ODFW staff in managing predators and informs citizens on procedures the agency will use to manage predators and predation.

ODFW Wildlife Damage Policy. Sets department policy for responding to wildlife damage complaints and identifies programs and procedures for helping Oregon citizens manage and prevent conflicts with wildlife.

CHAPTER 2: DESCRIPTION OF ALTERNATIVES

2.0 Introduction

This chapter consists of four parts: 1) an introduction, 2) description of the alternatives considered and analyzed in detail including the Proposed Action (Alternative 1), 3) a description of alternatives considered but eliminated from detailed study, and 4) a discussion of standard operating procedures used by WS. Five alternatives have been identified, developed, and analyzed in detail. Four additional alternatives were considered but not analyzed in detail. The five alternatives analyzed in detail are:

1) **Alternative 1. Continue the Integrated Wildlife Damage Management Program for Bear Damage to Timber (Preferred Alternative/Current Program/No Action Alternative).** This alternative consists of the current program of technical assistance and operational Integrated Wildlife Damage Management (IWDM) by WS on county and private lands under Cooperative Agreement, and Agreements for Control. This option would include the use of lethal and nonlethal management techniques.

2) **Alternative 2. Nonlethal Before Lethal Control Program.** This alternative would require that lethal methods would be available for use only if nonlethal methods are tried first, but fail to meet the timber producer's damage management objectives. Any or all of the nonlethal methods (feeding or silvicultural practices) described under the proposed alternative could be used or recommended, and in theory, any or all of the lethal methods could be used afterwards.

3) **Alternative 3. Only Nonlethal Methods.** Only nonlethal techniques including but not limited to bear feeding programs and recommendations for silvicultural techniques could be used.

4) **Alternative 4. Technical Assistance Program.** Under this alternative, WS would not conduct wildlife damage management in the Analysis Area. The entire program would consist of only technical assistance. Landowners could resolve problems on their own or request assistance from private, state, or county programs.

5) **Alternative 5. No WS Bear Damage Management in the Analysis Areas.** This alternative would terminate the Federal wildlife damage management program within the Analysis Area. Landowners could resolve problems on their own or request assistance from private, state, or county programs.

2.1 Description of the Alternatives

2.1.1 Alternative 1. Continue the Management Program for Bear Damage to Timber: (Preferred Alternative/Current Program/No Action Alternative).

The No Action alternative is a procedural NEPA requirement (40 CFR 1502.14(d)), is a viable and reasonable alternative that could be selected, and serves as a baseline for comparison with the other alternatives. The No Action Alternative, as defined here, is consistent with CEQ's definition (CEQ 1981).

The No Action alternative would continue the current WS program in the Analysis Area. The current program is a collection of cooperative programs with county agencies, and private individuals and associations to manage bear damage to timber. WS personnel in the Analysis Area provide technical assistance, and direct damage management on county and private lands. The program is primarily a fee-for-service program with 83.8% of the funding coming from service recipients.

The Analysis Area for this EA encompasses approximately 30,294 square miles The WS MIS system usually records all lands owned by WS service recipients and not just the area where the damage occurred. From FY 1999 – 2001, the WS annual average acreage in agreements with confirmed or reported bear damage to timber was less than 3.5% of the land in the Analysis Area. However, for most cooperators, bear damage occurs on only a small portion of the property in any given year. Consequentially, the actual area receiving WS activity was much less than the total in the agreements.

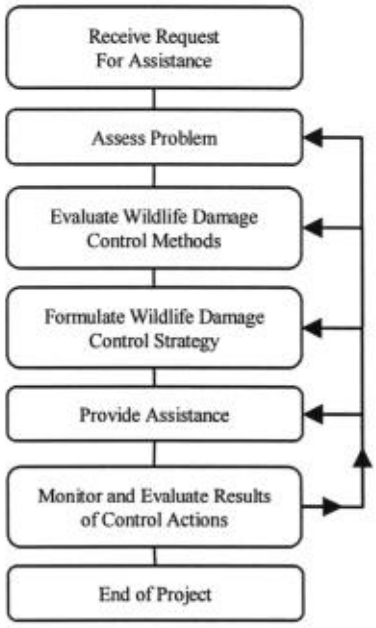
All wildlife damage management is based on interagency relationships, which require close coordination and cooperation because of overlapping authorities, policies, regulations and legal mandates. Prior to the start of each year's timber damage management season, WS meets with service recipients (cooperators) and representatives from ODFW and OSP to review the previous year's activities and plan the upcoming season's work. Before management is conducted on county and private lands, *Agreements for Control on Private Property* (WS Form 12A) or *Agreements for control on non private property* (WS Form 12C) are signed with the landowner or administrator that describe the methods to be used and the species to be managed.

2.1.1.1 Integrated Wildlife Damage Management (IWDM)

During more than 70 years of resolving wildlife damage problems, WS has considered, developed, and used numerous techniques for managing damage problems. These efforts have involved the research and development of new methods, and the implementation of effective strategies to resolve wildlife damage.

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. IWDM is the implementation and application of safe and practical methods for the prevention and control of damage caused by wildlife based on local problem analyses and the informed judgment of professional personnel. The philosophy behind IWDM is to implement effective management techniques in a humane, cost-effective manner while minimizing the potentially harmful effects to humans, target and nontarget species and the environment. IWDM draws from the largest possible array of options to create a combination of techniques appropriate for the specific circumstances. In the case of bear damage to timber, IWDM may incorporate silvicultural practices (i.e., stand management practices), supplemental feeding, the removal of individual offending animals, or any combination of these, depending on the characteristics of the specific damage problem. The WS EIS (USDA 1997, Revised, Chapter 2, pp. 23-34 and Appendix N) describes the procedures used by WS personnel to develop management strategies or methods for specific damage problems.

Figure 2.1
APHIS WS Decision Model



As depicted in the Decision Model (Figure 2.1), consideration is given to the following factors before selecting or recommending wildlife damage management methods and techniques:

- Species responsible for damage
- Magnitude, geographic extent, frequency, and duration of the problem.
- Status of target and nontarget species, including T&E species
- Potential risks to or impacts on T & E species.
- Local environmental conditions
- Potential legal restrictions
- Potential biological, physical, economic, and social impacts
- Costs of control options (the cost of control may be a secondary concern because of overriding environmental, health and legal considerations)

The WS decision making process is an undocumented thought process for evaluating and responding to damage complaints. WS personnel confirm the nature of the wildlife conflict, and evaluate the appropriateness of strategies and methods in the context of their availability (legal and administrative) and suitability based on biological, economic and social considerations. WS policy directs that nonlethal methods be given preference whenever practical and effective (USDA 1995*a*). Following this evaluation, the methods deemed to be practical for the situation are formed into a management strategy. After the management strategy has been implemented, monitoring

is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for management is ended. Appendix N in WS' programmatic EIS (USDA 1997, Revised) provides detailed examples of how the WS Decision Model is implemented. In terms of the WS Decision Model, most damage management efforts consist of a continuous feedback loop between receiving the request and monitoring the results with the control strategy reevaluated and revised periodically. Two general strategies for bear damage management are available.

Preventive Damage Management is applying wildlife damage management strategies before damage occurs. Most non-lethal techniques for managing bear damage to timber can be used as preventive management techniques. Most preventive management strategies (e.g. silvicultural techniques) are conducted by the timber manager.

Corrective Damage Management is applying management strategies to stop or reduce ongoing losses. Because bears prefer trees in the 15-30 yr age class, some stand management practices (e.g. planting less preferred tree species) cannot be applied in an existing stand with an ongoing damage problem. Other nonlethal techniques like pruning and bear feeding can be used as a preventive or corrective management tool. WS only uses lethal removal of problem individuals as a corrective management technique in areas where verified damage is occurring.

2.1.1.2 Wildlife Damage Management Methods Authorized for Use or Recommended in the Analysis Area

Silvicultural practices

Silvicultural practices are stand management techniques such as pruning, delayed thinning, delaying or canceling plans for fertilization, maintaining stands at higher densities, uneven age stand management, and planting a wide variety of tree species. WS only provides technical assistance on these practices. Actual implementation is left to the timber manager. Some of these practices, like selecting tree species and varieties within species that are less palatable to bears, maintaining stands at higher densities, and delayed fertilization are intended for use in long term plans to reduce the likelihood that damage will occur and minimize the extent of damage. They usually are not applicable for corrective control of an ongoing problem because they are difficult or impossible to apply to an established stand. For example, by the time bear damage occurs (trees are approximately 15-25 yrs old) it is too late to change the mix of species planted in the stand. In contrast, pruning can be used as a means of preventive management and has potential as a means of corrective management because it can be used before the damage occurs or applied to stands after damage has started. However, the utility of pruning as a corrective damage management technique is limited by the logistics of obtaining a crew to prune trees when damage is identified, and the time required for tree chemistry to shift in response to pruning. Most silvicultural techniques require making management decisions that will reduce stand yield, increase timber production costs, and/or increase crop rotation periods (time to harvest)(Adams et al. 1992, Chappell et al. 1992*a*, Schmidt and Gourley 1992, IFR 1979).

Pruning: Pruning may reduce the palatability of trees to bears by altering tree growth rates and the levels of carbohydrates in the cambium and inner bark. Kimball et al. (1998*b*) determined that pruned trees had decreased vascular tissue mass and decreased vascular tissue carbohydrate concentrations. As operationally used by the ODF in Oregon, only the largest most productive trees (trees favored by bears) within a stand are pruned. Pruning of larger more vigorous trees within a stand may deflect damage to less valuable trees and may result in a more even distribution of damage throughout a stand thereby reducing the incidence of localized intense damage creating patches without trees. It may also reduce overall stand damage.

Tree Selection: As discussed in Section 1.2, bears have exhibited preferences for certain tree species. Tree selection to reduce bear foraging would involve selecting for species and varieties within species that are not preferred by bears. Planting a mix of species may reduce overall stand damage and/or it may result in a more even distribution of damage throughout a stand and reduce the incidence of localized intense damage creating patches without trees. Data on tree chemistry indicate that varieties of trees within tree species may also have varying levels of attraction for bears (Kimball et al. 1999). Selection of varieties with low carbohydrate to terpene ratios may also help reduce the likelihood of damage by bears.

Uneven age stand management: Uneven age stand management would reduce the proportion of trees in the stand that are in the age class most vulnerable to timber damage. Uneven age stand management may

diffuse the damage so that the complete loss of trees in localized patches can be avoided and/or it may reduce overall stand damage.

Stand Density: Several studies provide evidence that bear damage is higher in stands with lower tree density (Mason and Adams 1989, Kanaskie et al. 1990, Schmidt and Gourley 1992). Research by Kimball et al. (1998*b*) indicates that this may be attributable to the higher vascular tissue mass and carbohydrate concentrations in trees in thinned stands. Delaying thinning in stands in areas with a history of bear damage may help reduce the incidence of bear damage.

Delaying or Canceling Plans for Fertilization: Fertilization can make trees more appealing to foraging bears. Bear appear to select trees with higher vascular tissue mass and vascular tissue carbohydrate concentrations. Kimball et al. (1998*b*) observed that trees in fertilized stands had greater diameters than trees in unfertilized stands. Fertilization increased vascular tissue carbohydrate concentrations for the first year after fertilization and, in high density stands, fertilization increased vascular tissue mass for the first year after fertilization. Canceling or delaying plans for fertilization, especially in areas where bear damage has been observed in adjacent stands, may reduce the likelihood that bear damage will occur.

Alternative Foods

Bear Feeding Program: In supplemental feeding programs, bears are offered an alternative nutritious feed with a higher carbohydrate content than cambium and inner bark with the intention of luring bears from feeding on trees to feeding on bear pellets. A Washington study of bear feeding indicated that the average diet for bears using feeding stations was 55% bear feed, 7% meat, and 38% plant matter (Partridge et al. 2001). Feeding programs can be initiated in response to observed damage, or they can be placed in stands that are likely to be attractive to bears (e.g. stands that have just been precommercially thinned or fertilized) in an effort to prevent damage from starting. Bear damage to timber and bear use of feeders usually ends in June/July when the vascular tissue begins to harden and summer foods like berries become readily available. Feeders are removed from the forest in June/July when bears discontinue use of the feeders (Nolte et al. 2002).

Managing for Increased Supply of Natural Foods: One possible alternative to the bear feeding program is to manage for increased amounts of natural forage. Bear damage to timber ceases at approximately the same time that other high quality food sources (e.g. berries) become available. (Flowers 1987, Noble and Meslow 1998, Witmer et al. 2000, Partridge et al. 2001, Nolte et al. 2002). Stand management practices that increase the availability of alternative bear foods may decrease the likelihood that bears will forage on trees. Other suggestions have included leaving more down timber in stands to provide additional sources of insects that bears use as food.

Lethal Removal of Problem Individuals

In some cases (e.g. bears that use feeders but still feed on trees), removal of one or two specific animals in the problem area can sometimes provide immediate relief from a damage situation (ODFW 1992). Additionally, although all bears are capable of peeling trees, there is some evidence that learning may be an important factor in the spread of tree peeling behavior (ODFW 1992, Schmidt and Gourley 1992, Ziegltrum 1994, WDFW 1996). Removal of individuals demonstrating this behavior may reduce its occurrence and spread in the population. Tree peeling bears are not relocated. ODFW does not consider live-trapping and relocating tree-peeling bears to be a valid solution, in part, because this may move problem animals to areas where peeling is not occurring. Bears have a remarkable homing ability and tend to return to areas were they were originally trapped (Erickson and Hanson 1987, Hostick 1990, ODFW 1992). Consequentially, timber damaging bears are not released. Table 2-1 shows the proportion of animals taken with each of the listed techniques for FY 1999 – 2001.

Table 2-1 Methods Used by WS to Remove Bears that Damage Timber

	Proportion of All Bears Taken*		
Technique	FY 1999	FY 2000	FY 2001
Cage traps	1%	2%	0%
Leg Snares	90%	88%	89%
Body Snares	1%	1%	1%
Hunting and Shooting with Dogs	7%	7%	10%

Hunting and Shooting without Dogs	1%	2%	0%

* Average annual WS bear take for timber damage management = 119 bears

Cage traps: Cage traps constructed of sections of culvert pipe are sometimes used to capture black bears. Cage traps pose minimal risk to humans, pets and other non-target animals, and they allow for on-site release of nontarget animals. As mentioned above, ODFW does not consider live trapping and relocating tree-peeling bears to be a valid solution, therefore, timber damaging bears captured in cage traps are shot and not released.

Foot Snares: Spring activated foot snares are used as live-capture devices. The snare is pulled up and around the bear's foot when it steps on the triggering mechanism. WS employees reduce the risk to non-target species by using techniques which increase the amount of pressure required to trigger the snare (pan tension devices), thereby reducing the risk to smaller non-target species. Risks of capturing a non-target animal are also reduced through bait selection and careful design of the snare set. Double swivels are used on the snare cables to reduce the potential for leg and foot injuries.

Body Snares: Body Snares are snares that are set in trails used by bears or in artificial corridors created by WS specialists. The animal walks through the snare and it tightens around the animal's body. Risks to non-target species are reduced through careful design and placement of the snare set. This technique poses relatively little risk to small or medium size mammals because they can usually pass through the large loop needed for a bear body-snare without being captured by the device.

Hunting and Shooting: is highly selective for target species. WS specialists may occasionally see and shoot a bear while examining damage on a site, or they may use a call to lure a bear to shooting range. However, in most instances, WS specialists use trained hunting dogs to increase the likelihood of locating specific problem bears.

Sport Hunting: in some areas of Western Oregon, ODFW has established spring bear hunts as a population management tool in high damage areas. Where applicable, WS informs landowners that spring bear hunting is an alternative. The timber manager can choose to use recreational hunting, WS assistance, or a combination of the two to address bear damage to timber.

Chemical Management Methods

No toxicants are registered for use for bear damage management. The only chemicals WS might use in bear damage management are products for immobilization. As per ODFW instruction (see above discussion of lethal techniques), tree-damaging bears captured in snares or cage traps are usually shot. However, it is possible that, under select circumstances, a WS specialist may need to anesthetize and handle or move a bear. Chemical immobilization agents are products registered with the Food and Drug Administration for animal immobilization. Oregon WS personnel that handle bears have received training in the safe use of authorized immobilization chemicals and are certified by WS. This training involves hands-on application of state-of-the-art techniques and chemicals.

2.1.1.3 Techniques not proposed for use in the current program

Some techniques are not proposed for incorporation in the current program because the technique has not been adequately evaluated via formal research and/or because the chemicals needed to achieve the desired result are not available, or because the technique is not practical or is cost prohibitive. WS will continue to monitor development of these strategies. Should additional data or new products become available in the future, WS could consider these techniques among methods to be used. Any additional NEPA analysis deemed necessary will be conducted prior to incorporating the technique into the program.

Damage Management through Birth Control: Under this alternative, black bear populations would be managed through the use of contraceptives (sterilization, immunocontraception, chemosterilants). If delivered to a sufficient number of individuals, local bear populations would be suppressed by a combination of reduced reproduction and natural mortality. Reducing local populations could decrease pressure on food resources and might decrease timber damage. However, tree cambium and inner bark has relatively high levels of sugar and digestible energy and can be a relatively high quality food source (Radwan 1969, Kimball et al. 1998a, Partridge 2001). A reduction in population density may not provide sufficient incentive for select individuals to forgo tree cambium and inner bark as a food source. Sterilized

individuals may continue damaging trees, but any potential spread of the behavior through learning might be reduced by preventing depredating females from producing offspring. Potential environmental concerns with chemical sterilization still need to be addressed, including the safety of engineered vaccines to humans and other wildlife. Unless managed carefully, sterilization could have a greater impact on bear populations than selective removal of depredating bears At this time, chemical sterilization is still controversial among biologists and many others (Curtis et al. 1997, Gill and Miller 1997). At present all discussions of this technique are hypothetical as there are not any data evaluating this strategy, nor are there any chemical or biological contraceptive agents approved for use in bears.

Conditioned Aversion: Conditioned Aversion involves training animals to form an association between a particular food item or place and a negative consequence (e.g. illness, being chased by dogs, being hit by a rubber bullet). Careful selection of aversive stimuli and development of an aversive training program are essential to the success of this technique (Garcia et al. 1985, Gillin et al. 1994). The difficulties associated with the use of this technique are apparent in the mixed success of conditioned aversion programs in reducing other types of bear damage (Dorrance and Roy 1980, Gillin et al. 1994, Ternent and Garshelis 1999). At present, no strategies have been developed for conditioning bears to avoid timber stands and no aversive chemicals are registered for use in training bears not to feed on trees.

Fencing: With this technique, fences would be constructed to exclude bears from stands of vulnerable trees. The economics and logistics of constructing and maintaining a fence around large stands of trees in the rough terrain and thick vegetation of western Oregon would preclude the use of this technique on all but small stands of highly valuable trees (e.g. research plots). Fences designed to exclude bears are also likely to exclude or disrupt the movement patterns of a wide variety of wildlife species. Some animals may be injured in collisions with the fence. Other difficulties may result because animals are trapped inside the fence. Additionally, bears are an important part of a healthy forest ecosystem. Not all bears are associated with timber damage. It is the goal of WS and timber managers to reduce damage, not to eliminate all bears. Because of the impacts on nontarget bears and other wildlife species and cost and logistical impediments, WS is not including this strategy in the analysis.

Repellents: Two types of repellents could be considered for managing bear damage to trees. The first, textural repellents, involves treating the surface of the food item with a mixture of sand and paint or with some other physical deterrent. A mixture of sand and paint has been successfully used to manage beaver damage to trees. However, beaver damage trees with their teeth and forage on the treated material (tree bark). In contrast, bears peel the bark off with their claws and forage on the tree cambium and inner bark. Although this technique is untested with bears, it is unlikely that textural repellents would deter bears from peeling the bark off trees with their feet and claws.

The second class of repellents is chemical repellents. No chemical repellents are currently registered for use to deter bear foraging. Witmer and Pipas (1999) conducted an unpublished study of repellents as a technique for managing bear damage to timber in Montana. Their findings indicated that repellents may reduce bear damage to trees. However, the authors note that a large proportion of the damage was in one control plot and additional data would be needed to reveal the true potential of this technique. Data on the cost effectiveness of the technique and the durability of repellents under the spring weather conditions common in western Oregon would also be needed. Because of the amount of area to be treated and the need to reapply repellent at least once per year for multiple years, repellents are unlikely to be a cost effective alternative to protect timber stands. Repellents have the greatest potential for use to protect individual trees that are especially valuable because of genetic potential or other factors. WS would continue to monitor the development of repellents as a strategy for managing bear damage to timber.

Bear relocation: Tree peeling bears are not relocated. ODFW does not consider live-trapping and relocating tree-peeling bears to be a valid solution, in part, because this may move problem animals to areas where peeling is not occurring. Relocating wildlife also runs the risk of moving diseases and parasites to areas where they might not be located (Center for Disease Control 1990). Bears have a remarkable homing ability and tend to return to areas were they were originally trapped (Erickson and Hanson 1987, Hostick 1990, ODFW 1992). Consequentially, timber damaging bears are shot and not released. If ODFW policy changes or if the District ODFW biologist determines that relocation is merited for a particular situation, WS biologists are trained in the safe and effective use of wildlife immobilization drugs. Bears would be released at sites specified by ODFW.

2.1.2 Alternative 2. Nonlethal Before Lethal Control Program.

Under Alternative 2, nonlethal methods would have to be tried first, and lethal control would only be used if nonlethal techniques are used first but fail to stop damage. Any or all of the nonlethal methods listed under the proposed action could be used or recommended, and in theory, any or all of the lethal methods could be used after non-lethal methods were tried. Timber managers who do not wish to try nonlethal control before lethal control could still do the work on their own, request assistance from state or county agencies, or contract with private damage management specialists. Where permitted by law, timber managers may also work with ODFW to encourage recreational hunting on their property.

2.1.3 Alternative 3. Only Nonlethal techniques

Under Alternative 3, only the nonlethal techniques described under the proposed alternative could be used. Timber managers who wished to conduct lethal control could still do the work on their own, request assistance from state or county agencies, or contract with private damage management specialists. Where permitted by law, timber managers may also work with ODFW to encourage recreational hunting on their property.

2.1.4 Alternative 4. Technical Assistance Program.

Under this Alternative, WS would not conduct any operational management of black bear damage to timber. The entire WS management program for black bear damage to timber would consist of technical assistance with WS providing recommendations on management strategies and advice and guidance on the use of management techniques.

This Alternative would shift the immediate burden of operational management of black bear damage to timber to the timber manager. Timber managers may choose one of several alternatives, 1) not to take action, 2) to manage the problem themselves, 3) request assistance from state or county agencies, or 4) contract with private damage management specialists, or 5) where permitted by law, timber managers may also work with ODFW to encourage recreational hunting on their property. Depending on the alternative selected, damage management methods could be applied by people with limited training and experience, and with no professional oversight or monitoring for effectiveness. It could result in more effort and cost to the timber manager, to achieve the same level of problem resolution, and could result in greater risks to non-target species.

2.1.5 Alternative 5. No WS Wildlife Damage Management in the Analysis Areas.

This program would eliminate all WS programs managing black bear damage to timber (operational and technical assistance). A "No Control" alternative was analyzed in the programmatic EIS (UDSA 1997 Revised), and was determined to be an invalid alternative. However, because of interest in this option, an analysis of this alternative has been included. Timber managers may choose one of the options described in Alternative 4 to resolve their problem. As with Alternative 4, depending on the alternative selected, damage management methods could be applied by people with limited training and experience, and with no professional oversight or monitoring for effectiveness.

2.2 Alternatives Considered but not Analyzed in Detail

2.2.1 Use Sport Hunters to Remove Bears from Damage Sites.

Under this alternative bear damage to timber would be managed exclusively through the use of sport hunters. Technical assistance on the use of sport hunters is a component of the preferred alternative. The jurisdiction for managing resident wildlife rests with the ODFW. The ODFW currently manages black bears as a protected game species. ODFW has authorized special spring hunts to facilitate the use of sport hunting as an option for managing bear damage to timber. However, several factors inhibit the exclusive use of sport hunting in managing bear damage to timber. First, private hunters do not have access to the same range of techniques as State or WS agents. ORS 498.164 bans the use of dogs for sport hunting of bear. Although Table 2-1 shows that hunting with dogs is not the most common technique used by WS to remove bears, the use of well trained hunting dogs can help track bears from damage sites and increases the likelihood of capturing offending bears. In confirmed cases of bear damage to timber, private hunters can use dogs to hunt bear on the property of the landowner with the damage (See Section 1.7.3). However, if the bear crosses the property line, the private hunter would have to discontinue the chase. With the permission of the affected landowners, State, County, and WS personnel can use dogs to pursue

problem bears across property lines. Private hunters do not always have the freedom to immediately respond to a damage situation. Because sport-hunting is a recreational opportunity, it is sometimes difficult to direct hunter efforts to remote and difficult-to-access sites. OAR.635.002.008 stipulates that bears taken on damage complaints must first be offered to the landowner. Lack of surety in obtaining a carcass may have a deterring effect on participation by private hunters. Liability issues and/or negative prior experience with private hunters may make property managers reluctant to seek assistance from private hunters. The Oregon Master Hunter program is designed to help address some of the problems between hunters and private landowners. Sport hunting may not be as selective for depredating bears or as effective in reducing damage as a wildlife damage management specialist (Poelker and Hartwell 1973, Collins 1999, Section 4.2.1.4). Finally, the use of sport hunting would preclude the implementation of supplemental feeding as a damage management alternative because of ORS 498.164 which bans the use of bait in hunting bears.

WS provides professional wildlife damage management services at site specific locations when requested by citizens or timber managers experiencing bear damage to timber. WS specialists have access to the full range of damage management techniques, and training in the most recent, effective, and selective damage management techniques. The mission of WS is to provide federal leadership in managing problems caused by wildlife. Therefore, WS specialists usually have more time, resources, and expertise for work with land managers in developing effective damage management strategies than sport hunters.

2.2.2 Compensation.

The compensation alternative would require the establishment of a system to reimburse timber producers for bear damage to timber. Under this alternative, WS would not provide any direct control or technical assistance. This alternative was evaluated in the WS programmatic EIS (USDA 1997 Revised), and several drawbacks were identified. Issues relating to bear damage to timber include:

1. Compensation programs require larger expenditures of money and manpower to investigate and validate all losses and determine and administer adequate compensation (Section 4.7).
2. Compensation programs would likely cover the value of the tree at the time of damage and not the value of the tree at the time of harvest. Timber producers are unlikely to perceive that they have been compensated for the full value of their loss.
3. Unless carefully designed, compensation programs provide little incentive for producers to limit damage through silvicultural or other management strategies (Wagner et al. 1997).
4. Not all producers may rely completely on a compensation program and lethal control of bears may continue as permitted by state law.
5. Learning is believed to play a role in the spread of tree peeling among bear populations (Section 1.2.3). Exclusive use of compensation would result in escalating costs for the State or Federal agency financing the program as tree peeling behavior spread in the bear population.

In addition the above concerns, WS has no current authority to implement a compensation alternative.

2.2.3 Supplemental Payment.

Under this alternative, private organizations advocating bear protection would establish agreements with timber managers. The organizations would provide financial assistance for nonlethal management techniques to cover the cost difference between legal lethal management programs and more labor intensive nonlethal management programs. This type of program would have to be instituted between private organizations and timber managers and cannot be instituted by WS although WS could serve as a facilitator for this type of project. There are no programs currently available to provide this sort of assistance. The environmental impacts of these programs would be similar to the nonlethal only alternatives. Therefore WS has chosen not to analyze this alternative in detail.

2.2.4 Reducing Bear Populations.

Bear damage and the efficacy of some bear damage management techniques may be related to bear density (ODFW 1992, Nolte et al. 2002). Management of bear populations is the responsibility of the ODFW. The ODFW uses a controlled spring black bear hunting season (limited tag numbers) as a population management tool in high damage areas including some sections of western Oregon with bear damage to timber (ODFW 1992). WS actions for bear damage management focus on individual depredating bears and not on reducing bear populations.

2.3 Standard Operating Procedures

WS uses standard operating procedures to improve the safety and efficacy of WS actions and negate or minimize any risk of undesirable impacts associated with an action. The WS program, nationwide and in Oregon uses many Standard Operating Procedures and these are discussed in USDA (1997, Revised). Some key operating procedures pertinent to the proposed action include:

- The WS Decision Model which is designed to identify effective wildlife management strategies and their impacts. Use of this undocumented thought process helps to minimize unnecessary effects from using ineffective strategies.
- Foot snare trigger tension devices are used to reduce capture of nontarget wildlife that weigh less than bears.
- Nontarget animals captured in snares or culvert traps are released unless it is determined by the specialist that the animal would not survive. Release of large nontarget animals such as lions would be preceded by sedation using chemical immobilization agents administered by trained and certified WS personnel.
- Conspicuous bilingual warning signs alerting people to the presence of snares are placed at major access points when they are set in the field.
- Reasonable and prudent measures or alternatives are identified through consultation with the USFWS and are implemented to avoid adverse impacts on T&E species.
- All WS employees who use restricted chemicals are trained by program personnel or others who are experts in the safe and effective use of these materials.
- WS bear damage management activities are directed towards resolving problems by taking action against individual problem animals.
- WS would assist with the publication of an informational handout for timber producers on nonlethal and lethal alternatives for managing bear damage to timber. Each cooperator requesting assistance with bear damage to timber will receive a copy of this publication.

The following is a summary of additional Standard Operating Procedures that are specific to the issues listed in Chapter 3.

Impacts on Black Bear Populations

- WS bear damage management activities are directed towards resolving problems by taking action against individual problem animals not by attempting to eradicate populations in the entire area or region.
- WS consults with ODFW on management and status of black bear populations and on state game regulations and policies impacting management of bear damage to timber.
- WS will annually monitor the impacts of its program on target and nontarget species populations.
- WS monitors the impact of its programs on wildlife populations by considering "Cumulative Take" which involves comparing all known forms of take against bear population estimates for the Analysis Area. WS also uses ODFW harvest monitoring data to assess impacts of harvest on bear populations.
- Decisions to relocate problem bears are made by the ODFW District Biologist. If the decision is to relocate and WS is requested to assist, WS personnel will relocate the animal into areas designated by ODFW.

Impacts on Nontarget Species including State and Federally listed T&E Species

- WS personnel are highly trained and experienced to select the most appropriate method for taking problem animals and excluding nontarget animals.
- WS consults with ODFW on management of target and nontarget species populations and on state game regulations and policies impacting management of bear damage to timber.
- WS consults with ODFW regarding potential impacts on state listed Threatened and Endangered Species.
- WS consults with the USFWS regarding the potential risk to Federally listed T& E species and will continue to implement all applicable measures identified through consultation with the USFWS to avoid jeopardizing the continued existence of Threatened and Endangered species (Appendix B).
- WS will annually monitor the impacts of its program on target and nontarget species populations.
- WS monitors the impact of its programs on wildlife populations by considering "Cumulative Take" which involves comparing all known forms of take against bear population estimates for the Analysis Area. WS also uses ODFW harvest monitoring data to assess impacts of harvest on bear populations.
- Pan-tension devices would be used to reduce the risk of capturing smaller non-target animals in spring-activated foot snares.
- Lure and bait use would be as selective for bears as possible while still maintaining effectiveness.

- Nontarget animals captured in snares or culvert traps are released unless it is determined by the specialist that the animal would not survive.
- Release of large nontarget animals such as lions will be preceded by sedation using chemical immobilization agents administered by trained and certified WS personnel.

Impacts on T&E Species

The following measures were identified in consultations with the ODFW and USFWS on ways to reduce potential risks to T&E Species

- Within the range of the Columbian white-tailed deer, WS will avoid setting snares in trails and under fences where deer activity is present.
- Within the range of the Columbian white-tailed deer, WS will use snare stops which prevent loops from closing to a diameter smaller than 2 ½ inches.
- Within the range of the Columbian white-tailed deer, WS will place baited sets at least 10 feet from trails to prevent accidental capture of deer using trails.
- Within the range of the Columbian white-tailed deer, WS will only use baits that do not attract deer (e.g. meat or meat by-products). Fruit, vegetable and grain baits will not be used.
- Only hounds trained not to run or harass deer will be used in the capture of bear.
- When bald eagles are in the immediate vicinity of a proposed control program, WS personnel will conduct daily checks for trapped individuals.
- Pan-tension devices would be used to reduce the risk of capturing smaller non-target animals in spring-activated foot snares.
- WS personnel shall contact either the local state fish and game agency or the appropriate region or field office of the Service to determine nest and roost locations of bald eagles.
- The appropriate U.S. Fish and Wildlife Service office shall be notified within 5 days of finding any dead or injured T&E species. Cause of death, injury, or illness, if known, shall be provided to those offices.

Humaneness of Methods

- Research would continue on improvements to the selectivity and humaneness of management techniques and on the development of new management alternatives.
- WS will continue to make current information on non-lethal techniques for bear damage management available to timber producers.
- Nonlethal methods are used and/or recommended whenever practical.
- Euthanasia and chemical immobilization procedures that minimize pain will be used.
- Double swivels are used on snare cables to reduce the potential for leg and foot injuries.

CHAPTER 3: ISSUES IMPORTANT TO THE ANALYSIS

3.1 Issues Driving the Analysis

The EA emphasizes relevant issues as they relate to specific areas whenever possible; however, many issues generally apply wherever wildlife damage and resulting management occur and are treated as such. WS and the cooperating agencies determined, through interagency consultation and through the initial public involvement that the following issues should be considered in the decision making process for this EA to help compare the impacts of the various alternative management strategies

- Efficacy: How effective might the various alternatives be in reducing bear damage to timber? How do they compare in meeting the objectives of the proposal?
- Impact on Bear Populations: What would be the impact on black bear populations? How would the management strategies affect local, statewide, or regional black bear populations?
- Impact on Nontarget Species: What potential nontarget effects, including those on threatened and endangered species, could occur by implementing the various alternatives.
- Impact on Sport Hunting: How would the alternative affect recreational bear hunting?
- Sociological Issues: How do the public and technical experts perceive the humaneness of the various alternatives. How do other sociological issues (e.g. aesthetic values, ethical concerns, etc.) relate to the proposed alternatives?
- Economic Issues: What are the economic impacts of using the various alternatives?

3.2 Issues Not Analyzed in Detail with Rationale

Respondents to the request for public involvement identified concerns or issues that will not be analyzed in detail. Comments on these issues are provided below.

3.2.1 The proposed action is a violation of state law and voter wishes as expressed in Measure 18 (Initiative banning the use of dogs and bait for sport hunting of cougar and black bear).

Nothing in the proposed action is a violation of state law as expressed in the Oregon Revised statutes or Oregon Administrative Rules. Measure 18 allows federal, state, and county employees or agents to use bait or one or more hounds while acting in their official capacities. Measure 18 did not prohibit recreational bear hunting. It only restricted the tools that could be used for recreational bear hunting. Oregon has a fall general season for bear hunting and a controlled spring bear hunt which focuses on areas with high incidence of bear damage complaints. Please see Section 1.7.3 and Appendix C for the language of the relevant regulations and an ODFW interpretation of these regulations.

3.2.2 Fate of Bear Carcasses

Some respondents were concerned that portions of bears taken during damage management would be sold to Asian black markets. Oregon game laws and administrative rules contain provisions which are designed to prevent illegal trade in wildlife parts. Bears taken in response to damage complaints are disposed of as directed by OAR 635.002.008. Key sections of the OAR are provided in section 1.8.3

3.2.3 Impact of Managing Bear Damage to Timber on Snag Dependent Wildlife.

Concerns were expressed that managing bear damage to timber could result in a reduction in the number of snags and down woody debris, thereby resulting in an adverse impact on animals dependent upon these resources. Bear damage to timber is not the only source of snags and down woody debris. Insects, other wildlife species, and disease including Swiss Needle cast which is becoming an increasing problem in Western Oregon, will continue to cause tree mortality. The Oregon Forest Practices Act sets standards for the amount of snags that must be left per

acre for snag dependent wildlife (ORS 527.676). Additionally, any program to manage bear damage to timber will not stop or prevent all damage. A certain amount of damage will occur before the damage is identified and damage management efforts are initiated. Damage management efforts tend to focus on areas where damage is concentrated. A certain level of scattered damage associated with adult males and roaming individuals is likely to be tolerated by timber managers. Further, WS activities to manage bear damage to timber are conducted on only a small portion (< 3.5%) of lands in the Analysis Area (See Section 2.1.1).

As discussed in Chapter 2, management efforts to address bear damage to timber are unlikely to cease if WS is not involved. Therefore, lack of WS involvement in the management of bear damage to timber would not necessarily result in an increase in bear created snags or fallen timber available to wildlife.

3.2.4 Impact on Biodiversity and Ecosystems

When WS uses lethal control to address problems with bear damage to timber, the activities focus on removing specific depredating individuals and are not conducted to eradicate a wildlife population. WS operates according to international, Federal and State laws and regulations enacted to ensure species diversity and viability. Current ODFW data indicate that the black bear population is stable to increasing and that the cumulative sources of bear mortality do not appear to have an adverse impact on the population (See Section 4.1). Consequentially, the impacts of the proposed program on biodiversity are not significant nationwide, statewide, or in the Analysis Area (USDA 1997 Revised).

3.2.5 Bear damage to timber should be a cost of doing business – a threshold of loss should be reached before providing damage assistance.

Some persons feel that timber producers should expect some level of loss as a cost of doing business. Alternatively, others contend that economic losses should reach some threshold level before lethal damage management techniques may be initiated. Although some bear damage can be expected and tolerated by timber producers, WS has a legal responsibility to respond to requests for wildlife damage management, and it is program policy to aid each requestor to minimize losses. Delays in initiating damage management may result in damage escalating to excessive levels before the problem is resolved, and may make it more difficult to remove the bear causing the damage.

3.2.6 Wildlife damage management should not be conducted at taxpayer expense; wildlife damage should be fee based.

During public involvement, some respondents felt that wildlife damage management was a government subsidy and should not be provided at the expense of the taxpayer or that it should be fee based. WS was established by Congress as the Federal agency responsible for providing wildlife damage management to the people of the United States. Funding for this program comes primarily from service recipients (83.8%)(Section 4.7). Federal funds are used for supervision, reporting, and for activities required for compliance with Federal and State laws. Salaries and equipment of staff performing the damage management work are paid for by service recipients.

3.2.7 Impact of bear removals on bear prey populations.

Concerns were expressed that the removal of black bear could result in an increase in the density of prey species including animals like deer and elk which also can cause damage to timber. The proposed action is unlikely to affect populations of bear prey because of the relatively low magnitude of impact on the bear population. WS's program to manage bear damage to timber focuses on individual depredating bears and not on the reduction of bear populations. As noted in Section 4, the proposed program would have a low magnitude of impact on the black bear population in the Analysis Area. Expansion of bear home ranges, immigration by younger bears and reproduction would contribute to repopulation of areas where bears have been removed.

3.2.9 Appropriateness of preparing an EA instead of an EIS.

If a determination is made through this EA that the proposed action would have a significant environmental impact, then an EIS would be prepared. In terms of considering cumulative impacts, one EA covering the entire western Oregon Analysis Area may provide a better analysis than multiple EA's covering smaller zones within the Analysis Area. A more detailed and more site-specific level of analysis would not substantially improve the decision-making process, and pursuing a more site-specific and more detailed analysis might even be considered inconsistent with NEPA's emphasis on reducing unnecessary paperwork (Eccleston 1995).

3.2.10 Why doesn't the EA cover State and Federal lands? If there is no damage on Federal lands then why is there only damage on private lands?

Bear damage to timber is not evenly distributed throughout the state or within a stand (Section 1.2). Some private and public lands may not receive any damage to timber. The USDA Forest Service Pacific Resources Inventory, Monitoring and Evaluation Program has records of bear damage to timber on BLM, National Forest, State, and private lands in Western Oregon (Paul Dunham, USDA Forest Service, Pacific Northwest Research Station, pers. comm.). The Astoria and Forest Grove ODF Districts have bear damage to timber, but conduct their bear damage management programs without direct assistance from the WS program. Because these actions are not being taken by a federal agency, NEPA compliance is not required. WS is aware of plans by the Coos Bay BLM district to initiate a NEPA analysis of bear damage management alternatives for use in District lands south of Hwy 42. Bear damage has been observed in scattered locations at varying levels of intensity throughout the south half of the district with one extreme case of a stand having damage to trees in over 78% of the unit (Coos Bay District BLM Forester, pers. comm.). During the scoping period for this EA, WS received letters from timber managers reporting that bear damage was occurring on Federal lands adjacent to their property and that this unmanaged damage was exacerbating problems with bear damage on their property. Private damage management specialists also report bear damage on Federal lands adjacent to property where they work and that this damage increases the difficulty of addressing damage problems on private lands (Bob Gilman, Forest Management, Albany, OR, pers. comm.). ODF tree mortality surveys show areas of likely bear damage on state and Federal lands. Although only a portion of this tree mortality is bear damage, bear damage to timber has been confirmed by ground crews for sites on the Willamette, and Siuslaw National Forests and on the Salem District of the BLM.

A number of factors influence how bear damage on public lands is perceived and managed. Management alternatives for bear damage to timber vary depending on the objectives of the land management agency. Only a portion of forests in federal lands are managed for timber production. Bear foraging on trees that are not being managed for timber production may not be perceived as damage and may be allowed to continue unhindered. Even in federal lands where timber production is an objective, federal timber managers may have a higher tolerance of damage because of the wide range of values and opinions relating to activities that occur on public lands. Alternatively, the Coos Bay BLM District is beginning to consider damage management in Matrix lands south of Hwy 42 that are being managed for timber production and late-successional resource values. In this case, the BLM is the land management agency and the federal agency initiating the damage management program and is responsible for the associated NEPA analysis. Unlike this EA where WS's ability to institute many nonlethal alternatives is limited to providing technical assistance, it would be possible for the BLM, as the resource manager, to incorporate these alternatives into its management program. Similarly, in Coos County where county forests are managed to provide revenue for county services, the county has requested WS assistance with bear damage management. As stated above, ODF has chosen to conduct its own bear damage management programs in the Astoria and Forest Grove districts.

3.2.11 Risks associated with use of sport hunters for damage management.

During scoping, members of the general public and timber managers expressed concerns about problems related to using sport hunting as a management alternative. Concerns expressed related to risks to human health and safety from unsafe use of firearms, increased risk of pain and suffering to bears resulting from inexperienced hunters, and risk of damage to property and gates by hunters seeking access to closed lands. Landowners have expressed that these concerns about sport hunters are one of many reasons they request assistance from WS for resolving their bear damage problems instead of using sport hunting (See section 2.2.1). Sport hunting is generally used as a means of reducing bear populations in areas where damage problems appear to be associated with bear density. WS role in the use of sport hunting as a management alternative would involve providing technical assistance on the use of sport hunting in bear damage management and referring the timber manager to ODFW for information on hunting opportunities available in their area. ODFW has a variety of regulations and training programs designed to ensure that hunters in Oregon are adequately trained in safe hunting techniques. ODFW has also developed the Master Hunter program which is designed to improve relationships between Hunters and Private Landowners and to increase public hunting access to private lands. The program has the following goals: 1) To increase access to private lands by giving landowners a way to identify hunters who have graduated from the program; 2) To improve the public image of hunters; 3) To develop a pool of ethical and knowledgeable hunters for possible use in sensitive damage control situations in the future; and 4) To offer graduates some quality hunting opportunities.

3.2.12 Impact of Measure 18 on bears and bear damage in Western Oregon.

In 1994, Oregon voters passed measure 18 which banned the use of dogs and bait for recreational bear hunting. Prior to the initiative, hunters who took bears incidentally while hunting other species accounted for 40% of the statewide harvest. Hunters using dogs accounted for 31% of the harvest and hunters who used bait accounted for 14% of the harvest. After the initiative, most bears (89%) are taken incidentally to other hunting, usually deer and elk hunting (ODFW 2002*a*). Although statewide bear harvest has returned to levels similar to those prior to the passage of measure 18, the distribution of the take has shifted. The use of hounds and bait were especially common in the thick vegetation typical of much of Western Oregon. The elimination of these techniques has resulted in a shift in the bear take from the West side of the state to the East side (Boulay et al. 1999). It is logical to conclude that this decrease in harvest might result in an increase in bear populations and an increase in bear conflicts with humans. However, in Western Oregon, bear populations and bear conflicts with humans appear to have been increasing prior to the passage of Measure 18 (J. Toman, ODFW, pers. comm.), making it difficult to determine what portion of the current trend in bear populations and bear damage is attributable to the passage of Measure 18.

3.2.13 Impact of Fire on Black Bear

In 2002 the Biscuit Fire burned over 499,570 acres in Southwestern Oregon and Northwestern California. Appendix D contains a letter from ODFW on the impact of the Biscuit Fire on bear populations. Short term impacts of fires on bears include direct fire-caused mortality, destruction of hiding cover and food sources, and disruption of movement patterns and home ranges. Bear mortality in fires will be determined by the uniformity, severity, size and duration of the fire (Smith 2000). Bear mortality is most likely when fire fronts are wide and fast moving, fires are actively crowning, and thick ground smoke occurs. However, because mortality rates of large mammals are usually low, direct fire-caused mortality has minimal impact on large mammal populations (Smith 2000). Because most fire patterns result in a mosaic of burned and unburned patches, recovery of hiding cover is often rapid. Habitat destruction is likely to result in short-term displacement of bears. This displacement of bears is likely to result in increased conflicts between bears and increased conflicts between bears and humans. However, long term effects of fire tend to be beneficial for a variety of wildlife species including bears (Hayes 1970, Thompson and Smith 1970, Hobbs and Spowart 1984, Hobbs and Swift 1985). Schwartz and Fanzmann (1991) determined that burned areas can have increased value as bear habitat for over 20 years after a burn. WS will continue to work closely with ODFW and will act in accordance with any ODFW plans and regulations pertaining to the impact of the fire on bear populations.

3.2.14 Impact of Bear Feeder Use on Human Health and Safety

Concerns also exist that bears using feeders may be more likely to associate humans with food and that bear feeding programs might increase the risk of bear/human conflicts (Erickson and Hanson 1987). However, observations by ODFW biologists have not provided any evidence that bears generalize knowledge about feeding programs to other associations with humans (Appendix D).

3.3 Issues Outside the Scope of the Analysis

Some issues raised by respondents to the WS request for public involvement are outside the scope of this EA and will not be addressed in this document, including:

Need to reduce consumption of timber products.
Impact of commercial forestry on the environment.
Issues related to the management of bears at campgrounds.
Need for wildlife corridors.
Role of commercial forestry on federal lands.
Viability of timber as a retirement investment.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

4.0 Introduction

Chapter 4 provides information needed for making informed decisions on alternatives for meeting the bear damage management objective identified in Chapter 1. This chapter uses the issues identified in Chapter 3 as the evaluation criteria.

4.1 Environmental Consequences

This section analyzes the environmental consequences using Alternative 1 (Proposed Action/No Action) as the baseline for comparison. Table 4-2 summarizes the five alternatives and the impacts each alternative could have on the issues analyzed in detail as defined in Chapter 3.

The following resources within the Analysis Area would not be adversely affected by any of the proposed alternatives analyzed: cultural resources, soils, geology, minerals, water quality/quantity, flood plains, wetlands, visual resources, air quality, prime and unique farmlands, and aquatic resources. These resources will not be analyzed further.

4.1.1 Social and Recreational Concerns:

Social and recreational concerns are analyzed in the programmatic EIS, (USDA 1997 Revised), in Chapter 3 and in the sections on Sociological Issues (4.6) and Impacts on Sport Hunting (4.5).

4.1.2 Cumulative and Unavoidable Impacts:

Cumulative and unavoidable impacts are discussed in relationship to black bears and other environmental issues analyzed in this chapter. This EA recognizes that the total annual removal of individual animals from wildlife populations by all causes is the cumulative mortality. As discussed in Section 4.3, analysis of the WS expected "take" or kill of black bear, in combination with other mortality indicates that cumulative impacts of the proposed action would not cause declines in populations and would be consistent with ODFW bear management plans. It is not anticipated that the program would result in any adverse cumulative impacts to Federal or State listed T&E species. Wildlife damage management does not jeopardize public health and safety as shown by a formal risk assessment (USDA 1997 Revised, Appendix P).

4.1.3 Irreversible and Irretrievable commitment of resources:

Other than minor uses of fuels for motor vehicles and electrical energy, there would be no irreversible or irretrievable commitments of resources. The program in the Analysis Area produces very negligible impacts on the supply of fossil fuels and electrical energy.

4.2 Efficacy

4.2.1 Alternative 1. Continue the Integrated Wildlife Damage Management Program for Bear Damage to Timber (Preferred Alternative/No Action Alternative).

Differences in the circumstances relating to each damage situation (e.g. timber manager tolerance levels, production goals, habitat characteristics, size of property, other land uses, nature and use of surrounding property, etc.) and variations among bears will influence which methods will be appropriate and effective on a given site. The WS decision model describes the undocumented thought process used by WS specialists in developing a strategy to address a damage problem (Section 2.2.1.1). This alternative is likely to be the most effective in reducing bear damage to timber because it allows for use of the widest range of damage management methods (USDA 1997 Revised).

4.2.1.1 Silvicultural Practices

Silvicultural practices may be recommended by WS (technical assistance) but are conducted by the timber manager. Only one silvicultural practice can be used to address an ongoing damage problem. All others are preventive techniques designed to reduce the likelihood that damage will occur. Silvicultural techniques are recommended

based upon research on patterns in bear damage to timber, and current studies of bear foraging preferences (Schmidt 1987, Mason and Adams 1989, Nelson 1989, Sullivan 1993, Kimball et al. 1998*a b,c*).

Many silvicultural practices involve actions that should make trees less desirable to bears, usually by reducing the foraging benefits that are received from tree peeling. This is accomplished by reducing the ratio of carbohydrates to terpenes in tree sap, the amount of vascular tissue mass per unit area, and/or by decreasing the density of desirable trees and increasing the amount of time and effort required to locate preferred trees. However, an animal's foraging preferences are always relative to the resources available. Bear response to an environment where only less preferred trees are available is uncertain and will probably depend on the availability of alternative resources. Additionally, most silvicultural practices require making decisions that may result in increases in timber production costs, reductions in stand yield, or increases in crop rotation periods (time to harvest) (Section 4.7, Adams et al. 1992, Chappell et al. 1992*a*).

Pruning: Tree pruning is used by the timber industry to increase wood quality (O'Hara 1991, Hanley et al. 1995). Pruning can also be used as a preventive or a corrective technique for managing bear damage to stands. The utility of pruning as a corrective damage management technique is limited by the logistics of obtaining a crew to prune trees when damage is identified, and the time required for tree chemistry to shift in response to pruning (D.L. Nolte, USDA/APHIS/WS/NWRC, Olympia Field Station, pers. comm.). In a study by Kimball et al. (1998*c*), pruned trees were four times less likely to receive damage as unpruned trees, but the study did not compare damage between stands with and without pruning. There are no studies available determining if pruning a portion of trees in the stand reduces overall stand damage or if it just moves damage to unpruned trees and alters the distribution of damage within a stand. Bears did damage some pruned trees in the study by Kimball et al. (1998*c*.) and the response of bears to a stand where all trees are pruned has not been evaluated. No data are available on the rate of tree response to pruning. It is unclear whether sugar content would decrease rapidly in response to pruning or whether there would be a more gradual decline sugar content with greatest impact being observed in the year following pruning (D.L. Nolte, USDA/APHIS/WS/NWRC, Olympia Field Station, pers. comm.). The Oregon Department of Forestry is currently using pruning as one of several methods for reducing bear damage on State lands (David Kaspar and Dale Anders, ODF, pers. comm.). Tree pruning may also have beneficial effects on plant community development and associated wildlife habitat (Hanley et al. 1995).

Delaying or Canceling Fertilization: In an Oregon study (Nelson 1989), damage to trees in stands with urea fertilization was 4 times higher than bear damage in unfertilized stands. Bears appear to select trees with higher vascular tissue mass and vascular tissue carbohydrate concentrations. Kimball et al. (1998*b*) observed that trees in fertilized stands had greater average diameter size than trees in unfertilized stands. Fertilization increased vascular tissue carbohydrate concentrations for the first year after fertilization and, in high density stands, fertilization increased vascular tissue mass for the first year after fertilization. Delaying or canceling fertilization will decrease tree growth rates and increase costs to timber producers. This strategy is designed for use as a preventive control technique where it reduces the likelihood that a stand will be damaged. In a stand that is already experiencing damage, delaying or canceling fertilization might keep damage from getting worse, but it will not reduce the ongoing damage problem. Bear damage has been recorded in stands that have not been fertilized (Nelson 1989, Smith et al. 1992).

Managing stand density: Several studies provide evidence that bear damage is higher in stands with lower tree density (Mason and Adams 1989, Kanaskie et al. 1990, Schmidt and Gourley 1992, Noble and Meslow 1998). Research by Kimball et al. (1998*b*) indicates that this may be attributable to the higher vascular tissue mass and carbohydrate concentrations in trees in low density stands. Delaying thinning in stands in areas with a history of bear damage until trees are large enough to be out of the range preferred by bears might help reduce the incidence of bear damage. It will also decrease tree growth rates and increase costs to producers. As with fertilization, this technique can only be used as a preventive management technique. Bear response to environments where only high density stands are available is uncertain. However bear damage has been observed in relatively dense stands (Russell et al. 2001).

Selecting Tree Species and Varieties Less Attractive to Bear

As discussed in Section 1.2, bears have exhibited preferences for certain tree species. Planting less preferred species and/or a mix of species may reduce overall stand damage or it could result in a more even distribution of damage throughout a stand thereby reducing the incidence of localized intense damage which can result in patches without trees. Bears that choose to search for preferred trees are likely to have lower foraging efficiency in mixed stands than in monoculture stands of preferred trees. Although bears have preferences for certain trees and certain tree

species (Section 1.2), bear foraging has been observed on a wide variety of tree species. Demonstration of a foraging preference does not guarantee that bears will not forage on other species when options are limited. This technique may be useful in reducing the likelihood that damage will occur, but cannot be used to manage an ongoing damage problem. No studies have been conducted on the efficacy of this technique in bear damage management. Many years of research on genetics and tree chemistry will be needed before the selection of tree varieties within species can be effectively used to reduce bear damage to timber, and there is some question as to whether it would be cost effective to invest the research time on this alternative (Kimball et al. 1999, R. Johnson, USDA Forest Service, Pacific Northwest Research Station, Corvallis, OR, pers. comm.). In some areas ecological factors (soil type, moisture, etc.) may limit the types of tree species that are suitable for a site.

Uneven Aged Stand Management: Uneven age stand management would reduce the proportion of trees in the stand that are in the age class most vulnerable to timber damage. Bears that chose to search for preferred trees are likely to have lower foraging efficiency in uneven aged stands than in even aged stands. Uneven age stand management may diffuse the damage so that the complete loss of trees in localized patches can be avoided and/or it may reduce overall stand damage. This technique is intended for use in preventing the occurrence of bear damage and is unlikely to help with an ongoing damage problem. No studies have been conducted on the efficacy of this technique as bear damage management tool. However, studies of uneven aged stand management practices for timber production indicate that although it may be possible to produce near-maximum yields while still retaining old-growth stand characteristics, a number of challenges face this type of timber production (Newton and Cole 1987). Challenges include increased labor and production costs, difficulties with survival and growth of seedlings because of competition from surrounding vegetation and shade intolerance of some of the valuable tree varieties including Douglas-fir, damage to standing trees during harvest, and problems with damage by other wildlife (e.g. browsing by deer)(Brandeis et al. 2001a,b, Brandeis et al. 2002).

4.2.1.2 Alternative Foods

Bear Feeding Bear feeding programs are the primary non-lethal method used for corrective bear damage management. Several studies have demonstrated the efficacy of bear feeding programs (Flowers 1987, Ziegltrum 1994, Nolte et al. 2002). In a Washington study, damage to 6 of 7 stands with feeders was one fifth the damage to stands without feeders and damage was even lower in the second year feeders were available. However, although damage was reduced with feeding programs, it did not necessarily stop and at 1 site damage was not reduced. In precommercially thinned stands without supplemental lethal removal, the remaining damage can still be substantial (Nolte et al. 2002). Biologists involved with the development of the feeding program note that it will probably be necessary to supplement feeding programs with occasional bear removal (Flowers 1987, Nolte et al. 2002). Some bears use feeders but continue to feed on trees. In a study of a bear feeding program in Washington, 20% of bears that were using feeders also had evidence of cambium and inner bark in their diet (Ziegltrum and Nolte 2001). The efficacy and cost-effectiveness of bear feeding programs appears to be linked to bear density, with feeding programs less likely to be successful in areas with high bear densities (Ziegltrum 1994, Nolte et al. 2002). Managers using feeding programs that have tried feeders without supplementary lethal control often report steady increases in the amount of bear food required. At some point, the amount of food consumed and associated labor costs can be prohibitive. WS cooperators and foresters with ODF have reported declines in the efficacy of feeding programs after 3-4 years when used in the absence of supplemental lethal control (David Kaspar, ODF Astoria District, pers. comm.).

Bear feeding programs may require a long-term commitment on the part of the timber producer. Once a feeding program is initiated, it is essential to continue the program until the trees are large enough to be at reduced risk from bear damage (until the trees are approx. 28-30 years old). If the feeding program is discontinued prematurely, bears that have learned to go to a site for feed may turn to the trees at that site as a replacement for the feed (Nolte et al. 2002). Consequentially, managers that initiate bear feeding may need to be willing to commit to a 10-15 year program.

Increase Supplies of Natural Foods One alternative to the bear feeding program is to manage stands for increased supplies of natural bear foods (Noble and Meslow 1998). This practice would be conducted by the timber manager, not WS. The philosophy behind this practice is that bears forage on tree cambium and inner bark because alternative foods are limited, and that by providing alternative foods, bears will cease foraging on trees. Data on this strategy are limited and in some cases, inconclusive. An Oregon study by Noble and Meslow (1998) found higher levels of berries in the scats of bears in areas with relatively low damage to trees and higher levels of forbs in scat of bears in areas with high levels of timber damage. Forbs generally have lower levels of apparent digestable energy than berries or tree cambium and inner bark. The frequency of occurrence of vertebrate and invertebrate animal

matter was similar between the two areas. Bear foraging on timber generally ceases with the ripening of berry crops (Nolte et al. 2002, Flowers 1987). Because the authors did not measure the availability of berries in the two areas, it is unclear whether the observed difference in berries in scat is attributable to lack of berry plants in the high damage area or to environmental factors which may have influenced the timing of berry ripening. The authors also did not obtain information on bear density between the two areas. There appears to be a relationship between bear density and bear damage (Nolte et al. 2002), and this may also have influenced the differences in damage levels observed by Noble and Meslow (1998). Russell et al. (2001) identified a negative correlation between plant community diversity and bear damage to timber. The results of this study were confounded by the fact that plant diversity varied with stand age, with the oldest stands having the highest plant diversity. Only the youngest stands were in age classes most likely to be used by bears making it impossible to determine if differences in bear damage were attributable to plant diversity or stand age.

Silvicultural practices that increase plant diversity within a stand are also likely to increase the availability of bear food. The difficulty lies in the fact that cambium and inner bark contains relatively high levels of sugar and digestible energy (Radwan 1969, Partridge et al. 2001). Any alternative natural food likely to lure bears from foraging on cambium and inner bark must have equivalent or higher foraging benefits than cambium and inner bark and be available during the interval when bears damage trees. Berry crops including Devil's club berry (*Oplopanax horridum*), Huckleberry (*Vaccinium parvifolium*), salmonberry (*Rubus spectablilis*), and trailing blackberry (*Rubus ursinus*) meet the criteria of having relatively high levels of sugar and high levels of digestible energy, but they are generally not available until at least part way through the timber damage season. The end of bear foraging on trees generally coincides with the availability of berry crops (Schmidt and Gourley 1992, Partridge et al. 2001, Nolte et al. 2002). Biologists researching bear foraging on timber have reported difficulty in identifying alternative high quality food sources that are available early in spring and suitable to a wide variety of timber sites (D. Nolte, National Wildlife Research Center, Olympia, WA, pers. comm.). Seasonal variations in food availability and bear feeding patterns may also limit the extent to which insect availability can be used to deter bear foraging on timber. In an Oregon study of bear foraging, the frequency of occurrence of insects in bear scats and the average percentage of estimated dietary volume comprised of insects was significantly lower for May and June than for July, August, September and October (Bull et al. 2001). Data from a bear food habits study in Washington show a similar trend in the occurrence of insects in bear diets (Poelker and Hartwell 1973).

In conclusion, although a theoretically sound alternative, efficacy of this method is currently limited by the above difficulties in identifying and provisioning of suitable alternative foods.

4.2.1.3 Lethal removal of problem individuals by WS

Selective removal of depredating individuals is recognized by wildlife biologists as being a viable and effective means of reducing bear damage to timber (Poelker and Parsons 1977, Gourley and Vomocil 1987, ODFW 1992, WDFW 1996). Even proponents of bear feeding programs note that some form of supplemental lethal removal of bears may be necessary for optimal timber protection (Flowers 1987, Nolte et al. 2002).

Formal studies are not available comparing damage between sites with and without lethal removal of problem bears. However, data are available on bear damage in the absence of damage management efforts (Section 1.2). In Washington, one adult bear that was allowed to continue tree foraging unhindered, damaged 693 trees in a pre-commercially thinned plot during the period from April 24 to mid June (Hartwell and Johnson 1988). The Coos Bay BLM District has not managed bear damage in the past, but has just recently completed pruning one stand in efforts to minimize current bear damage activity. Current surveys indicate that, in one stand, bears have damaged over 78% of the trees while in most other affected damage units the figure averages closer to 40% (Coos Bay BLM Forester, pers. comm.). In instances like these, removal of the depredating individual(s) can provide short-term relief of the damage problem. Additionally, although all bears are capable of peeling trees, there is some evidence that learning may be an important factor in the spread of tree peeling behavior (ODFW 1992, Schmidt and Gourley 1992, Ziegltrum 1994, WDFW 1996). Removal of individuals demonstrating this behavior may reduce its occurrence and spread in the population. The duration of the relief from damage will depend on bear densities, site conditions, and individual variations in the tendency of any new bears to peel trees. Because there will be a period of time before a new bear moves into a site, and because all bears do not peel trees, risk of damage is lower if a new bear is allowed to immigrate, than if a known problem bear is allowed to continue tree peeling.

WS focuses its efforts on identifying and removing the specific bear(s) involved in the damage problem. Efforts to identify the depredating bear are facilitated by the fact that black bear usually return repeatedly to a damage site. The techniques available for bear removal vary in their suitability for particular situations and specificity for

individual depredating animals (Section 2.2.1.2). WS sets cage traps and snares and initiates hunting efforts at the site of recent damage, thereby increasing the likelihood of capturing the depredating individual. However, in areas with high bear densities and/or where a highly mobile individual (e.g. adult male) is responsible for the damage, it is possible for these methods to also capture bears that may not be involved in the damage problem. WS specialists use information on the pattern and density of damaged trees, size and spacing of tooth and claw marks, and tracks at the damage site to help identify depredating individuals.

In the absence of studies with conclusions to the contrary, it appears that lethal removal of problem bears, as used by the Oregon WS program, can be an effective strategy for resolving timber damage problems.

Cage traps: Cage traps pose minimal risk to humans, pets and other non-target animals, and they allow for on-site release of nontarget animals. Some bears will not enter cage traps. Because of their size, cage traps are difficult to get to remote sites and to sites with heavy underbrush or rough terrain and, consequentially, are rarely used.

Foot Snares: Foot snares are the technique most commonly used by WS to capture bears that damage timber. Use of foot snares allows the WS specialist control over the location where the animal is captured. A wide variety of options are available in design of snare sets which can be used to decrease risks to nontarget species and accommodate variations in bear behavior and site conditions. WS employees also reduce the risk to non-target species by using techniques which increase the amount of pressure required to trigger the snare (pan tension system), thereby minimizing the risk to smaller non-target species. Double swivels are used in each snare to reduce the potential for leg and foot injuries.

Body Snares: Body snares are snares that are used with trail or log sets. The animal walks through the snare and it tightens around the animal's body. Risks to non-target species are reduced through careful design and placement of the snare set. This technique poses relatively little risk to small or medium size mammals because they can usually pass through the large loop needed for a bear body-snare without being captured by the device. Body snares are generally only used when all other techniques are unsuccessful.

Hunting and Shooting: is highly selective for target species. However, the dense vegetation typical of Western Oregon, and variations in bear movement patterns make the use of hunting without dogs impractical for most situations. The assistance of trained hunting dogs greatly increases the likelihood of locating specific problem bears and increases the types of situations where hunting can be used as a management alternative. Unlike the use of snares, the specialist has less control of the capture location of the bear. Use of this technique necessitates obtaining permission for property access from landowners adjacent to the damage site.

4.2.1.4 Sport Hunting

ODFW uses a spring sport hunt to direct hunter efforts to areas with bear damage problems. When planning a damage management program, WS would make the timber producer aware that this is a management alternative. A timber producer may choose sport hunting as an alternative for removing depredating individuals, either as a replacement for WS actions or as a supplement to WS actions. Sport hunting can reduce local bear densities, but is generally less selective for problem individuals. Consequentially, sport hunting may not be as effective in resolving a damage problem as the services of a damage management specialist (Poelker and Hartwell 1973, Collins 1999). Sport hunters tend to favor large adult males. Although these individuals do damage trees, the majority of damage problems appear to be associated with females and subadult males (Section 1.2)

4.2.2 Alternative 2. Nonlethal Before Lethal Control Program.

Nonlethal damage management techniques are not effective in or suitable for all circumstances. In these instances the timber producer using a WS program may experience more damage than might have occurred if a full range of damage management alternatives were immediately available.

Some timber producers do not believe that nonlethal methods are effective and may switch to alternative sources of lethal bear damage management instead of risking increases in damage while nonlethal methods are tried. At present, these timber producers can chose to do the lethal control themselves, work with ODFW to increase recreational hunting opportunities on their property, seek assistance from a private wildlife damage management program, or go to state and county agencies for assistance. The efficacy of these alternatives is likely to be equal or

less than that of a WS program depending on the type of alternative selected and the experience level of the individual(s) conducting the damage management. For example, an increase in the use of sport hunting as a damage solution is likely to be less selective for individual depredating bears. Use of sport hunting also precludes the use of supplemental feeding as a damage management alternatives because of ORS 498.164 which prohibits the use of bait in sport hunting of bears. Examples of private programs to manage bear damage to timber include one in Oregon which does not emphasize the use of feeding programs (Gourley and Vomocil 1987) and the Washington WFPA program which makes extensive use of bear feeding (Ziegltrum 1994, Nolte et al. 2002). Although there are professional, responsible private bear damage management programs, these services may not be available to or selected by all timber managers. Some individuals conducting lethal control may not have the same access to training, or tools as WS personnel which may result in an increase in labor required and/or the number of bears that are removed before a damage problem is resolved. Most nongovernmental bear damage management programs are not subject to the same regulations, public involvement, or incentives to develop and promote new techniques as a Federal program. The cumulative difference in efficacy between Alternative 1 and Alternative 2 would depend on the number of producers who stick with the WS program, and the methods selected by timber managers who do not use the WS program, but is likely to be equal or lower than Alternative 1.

4.2.3 Alternative 3. Only Nonlethal Methods.

Although nonlethal alternatives have helped reduce bear damage in some situations, nonlethal alternatives are unlikely to resolve all damage problems. For example, users of bear feeding programs without supplemental lethal control often report diminished efficacy over time (Flowers 1987, Nolte et al. 2002, David Kaspar, ODF Astoria District, pers. comm.). In a study by Kimball et al. (1998*b*), pruning reduced but did not stop damage. Consequentially, the WS program for reducing damage to timber would be less effective than for Alternative 1. Because the WS program under this Alternative is likely to be less effective in reducing damage, the majority of WS cooperators are likely to discontinue use of the WS program or supplement the WS program with other forms of lethal control. Efficacy of other sources of bear damage management are as discussed in Alternative 2. Ultimately, the cumulative difference in efficacy between this alternative and Alternative 1 would depend on the methods chosen by timber managers, but is likely to be similar to or lower than in Alternative 1.

4.2.4 Alternative 4 & 5. Technical Assistance Program and No WS Bear Damage Management in the Analysis Areas.

The impacts of these Alternatives are similar and will be discussed together. In both instances, the responsibility for operational bear damage management would fall on the timber producer. Timber producers would deal with the problem on their own or seek assistance from private damage management services, or state or county agencies. As discussed under alternative 2, the degree to which these alternatives emphasize nonlethal techniques for timber damage management varies. Some damage management alternatives are likely to be less effective and less selective for target animals than a WS program. Consequentially, the cumulative difference in efficacy between this alternative and Alternative 1 would depend on the methods chosen by timber managers, but are likely to be similar to or lower than in Alternative 1.

4.3 Impact of Damage Management on Black Bear Populations

4.3.1 Alternative 1. Continue the Integrated Wildlife Damage Management Program for Bear Damage to Timber (Preferred Alternative/No Action Alternative).

4.3.1.1 Current Population Information

Distribution: Black bear generally prefer forested areas and, in Oregon, still occupy most of their original range. The highest black bear densities are found in the Coast Range, Siskiyou, Cascade, Wallowa and Blue Mountains (ODFW 1992). The Oregon black bear management plan classifies forest lands in the Analysis Area as having relatively high bear densities (ODFW 1992).

Reproduction: Breeding season for black bear occurs in June and July. Cubs are born in the den in January or February. Lactating females usually do not breed which explains alternate year pregnancies typical of black bear (LeCount 1983, ODFW 1992). Offspring generally remain with their mother for slightly over 1 year and disperse as yearlings in the spring when the female breeds again. Black bear are usually sexually mature at 3.5 years of age, but some females may not breed until 4.5 years. Age of first reproduction will be higher in areas with limited food supplies and/or high bear densities relative to available foods. Data from Oregon indicate that most bears are

reproductively active at age 3 (Lindzey and Meslow 1977, Trainer and Golly 1992, ODFW 1992). In an ongoing ODFW study in the Central Cascade Mountains, the age of first reproduction ranged from 2.5 to 5.5 (Jackson et al. 1999).

Litter size varies from 1-6 cubs with 2 cubs/litter the most common (Jonkel and Cowan 1971). Nutrition can affect litter size. Decreases in litter size and increases in the proportion of barren females have been observed in years with low food production (Pelton 1982). Data collected from Oregon bears indicate that average litter size ranges from 1.77 to 2.18 (Lindzey and Meslow 1977, Trainer and Golly 1992). In an ongoing ODFW study of black bears in the central Cascades, average litter size for radio collared females was 2.1 cubs and ranged from 1-3 cubs (Jackson et al. 1999).

Survivorship: Once born, cubs have a relatively high rate of survival but can be lost to drowning (in the den before emergence), predation, disease or cannibalism (primarily by adult male bears). Bears are relatively long-lived animals, and, in Oregon, bears 20 years old or older are not uncommon in the harvest (ODFW 1992). The fact that a number of bears reach this age indicates that bear survival rates are relatively high. In one Oregon study, overall annual survival rate was 79.8% (Lindzey and Meslow 1977). The ODFW (1992) bear management plan reports annual survival rates of cubs, yearlings, and 2 year old bears in a hunted population in Oregon of 86.2%, 78.7% and 76.8% respectively. Annual survivorship for radio-collared adult bears in a 1993-1999 ODFW study in the Central Cascade Mountains was 81.5%. Survivorship may be slightly higher for radio-collared bears than for unmarked bears because some hunters may avoid shooting collared bears. Life table analysis using ages of bears obtained from tooth return data resulted in a statewide annual survivorship estimate of 80% for the period of 1993-1998 (Jackson et al. 1999).

Population Status: In the Oregon Black Bear Management Plan, ODFW estimated the current population to be approximately 25,000 animals occupying 40,000 sq. mi. of habitat (ODFW 1992). This population estimate was based on density estimates of 0.9 bears/sq mile in western Oregon and 0.3 bears/sq. mi. for eastern Oregon. Densities of at least 1 bear per square mile have been recorded in Washington, California and Idaho (ODFW 1992). A Hoopa Indian Reservation in Northern California is conducting an intensive study of the bear population and bear damage to timber and reports bear densities > 3 bear per square mile (Gurnon 2002).

In 1996 and 1997, Oregon WS prepared Environmental Assessments for predation management in the Northwest and Roseburg WS Districts (USDA 1995a, 1997). The Analysis Area for this EA falls within Analysis Areas of these two documents. All of the Northwest District (excluding Jefferson and Wasco counties which were administratively transferred out of the District in 1999) is in the Analysis Area for this document. All of the Roseburg District except Deschutes, Klamath and Lake Counties, also is in the Analysis Area for this document. ODFW provided WS with estimates of the bear population in these Districts, 12,200 for the Roseburg District and 8,000 for the Northwest District. All counties that are outside the Analysis Area for this EA are in the Eastern portion of the State. Applying an estimate of 0.3 bears/square mile to the area of the 7 counties from the predator EA's that are not in the Analysis Area for this document (25,923 sq. miles) yields 7,777 bears (Keisling 1999). Subtracting this figure from the bear population estimate for the two districts yields an estimate of 12,423 bears in the Analysis Area. This estimate is probably conservative because not all areas in the excluded counties are suitable bear habitat. Additionally, ongoing ODFW studies of bear density in southwest Oregon indicate that bear densities in some areas may be as high as 2 bear/sq. mile, a density figure higher than the 0.9 bears/sq. mile used in the 1992 ODFW bear management plan (J. Toman, ODFW, pers. comm.).

An annual census of bear densities is not logistically or economically feasible. Therefore, ODFW uses harvest data on bear age, sex ratios, and reproductive status to monitor the cumulative impacts of recreational and damage management harvest on bear populations. ODFW has established the following criterion for determining if Oregon bear populations are being over-harvested (ODFW 1992).

Harvested bears from a stable to increasing bear population will meet at least 3 of the following criterion:

1) Average age of harvested bears is > 3 years,
2) More than 40% of the harvested bears are adults,
3) Less than 30% of the harvested bears are females,
4) More than 30% of the harvested bears are adult males

Ongoing monitoring of bear harvest data by ODFW indicate that bear populations in the Analysis Area meet these criteria. Therefore, current harvest levels, including sport hunting, damage management and losses to other causes, do not appear to be having a detrimental effect on Oregon's bear population (ODFW 2002*a*, 1992).

4.3.1.2 Program Impacts

Impact on Bear Populations: As discussed above, a conservative estimate of the black bear population in the Analysis Area is 12,423 bear. Annual WS black bear take for damage to timber for FY 1999 to 2001 in the Analysis Area was 119 bear or 1% of the bear population in the Analysis Area. WS average annual black bear take for all other programs (livestock predation and human health and safety issues) was an additional 64 bear/year. ODFW records from 1998-2000 indicate an annual average of 88 bears taken in non-WS damage management actions (private or ODFW) or by causes other than sport hunting (e.g. automobile collisions). Annual average number of bears taken during the controlled spring bear hunt and the general season hunt was 69 and 537 bears respectively. These figures yield a cumulative average annual black bear take of 877 bear, or 7.0% of the estimated population. WS has been contacted by the Coos Bay BLM district requesting assistance with the preparation of an EA on the management of bear damage to BLM timber lands south of Highway 42. The BLM has not formally started the EA process nor determined what method of control they will use. It is difficult to predict the number of bears that would be removed to address a bear damage problem, especially in an area where bear foraging on trees has occurred for several years. In general, the number of bears removed during the first year is higher than in subsequent years. If the BLM were to decide to use lethal control, early estimates of take for the first year of the program are not expected to exceed 12 bears annually and are likely to be much lower especially in the second and subsequent years. Using a take of 12 bears as a worst-case-scenario estimate for BLM program impacts yields a cumulative number of bears taken to all causes (hunting, damage management, car accidents, etc.) of 889 bears or 7.2% of the estimated bear population in the analysis area for this EA. The ODFW is conducting a study of the bear population in SW Oregon (ODFW 2002*b*). The population monitoring study is ongoing, but current data indicate a population of approximately 4,268 black bear in a study area of 12,790 square miles including area that is not suitable bear habitat. Extrapolating these data to the entire analysis area yields a bear population estimate of 10,109 bears. Using this population estimate yields an annual cumulative population impact of 8.8%. With either calculation, the level of harvest is well below the allowable harvest level of 20% (USDA 1997 Revised, CDFG 2001) and is therefore considered to be a low magnitude of impact on the bear population. As mentioned above, the ODFW uses harvest data to monitor the health of the black bear population. The ODFW determination of a stable to increasing black bear population is consistent with our determination of a low magnitude of impact on the black bear population (ODFW 2002*a*). WS would continue to work with ODFW to ensure that the most accurate and current bear data are used to assess impacts on bear populations. New information is continually reviewed and incorporated into the program as appropriate.

For purpose of comparison, the Arizona Department of Fish and Game evaluates the impact of harvest on bear populations by evaluating impacts on the female component of the population only (USDA 1998). Applying a 50:50 sex ratio for the population estimate from ODFW (2002*b*) yields 5,054 female bears. In an Oregon study by Kolhmann et al. (1999), 36% of bears captured by sport hunters were female, and 29% of bears taken in damage management (all damage management not just WS) were female. Applying the 36% rate to the sport harvest described above (606 bears), and the 29% rate to the take for damage management and other causes (283) yields an annual average harvest of 300 female bears or 5.9% of the population of female bears. This estimate is below the 8% maximum harvest rate determined to be sustainable by the Arizona Department of Fish and Game.

Users of bear feeding programs report that the number of bears using feeding sites appears to increase over time. Reasons for this increase are unclear but may be related to an increase in the proportion of bears in the area that have learned to use the feeder, or actual increases in bear density (Nolte et al 2002). The bear feeding season coincides with bear breeding season. Bear damage to timber also occurs during a period when naturally available resources may be limited. Because bear productivity is related to food availability, the feeding program might result in an increase in bear populations. However, a Washington study of the impacts of bear feeding indicated that, although bears living in areas with feeders gained more mass while feeding on pellets than those in areas without pellets, there were no age-specific mass and body fat differences (Partridge et al. 2001). Their data suggested that non-feeder bears could compensate for short term differences in spring mass gains with increased foraging later in the year. The authors concluded that supplemental feeding probably does not improve the reproductive fitness of bears. There are no data available on the impact of feeding programs on lactating females. The high energy diet available in feeders may enhance milk production and could influence cub survival (Nolte et al. 2002). Bear feeders concentrate bears in higher densities than might otherwise occur. This increase in bear interactions and bear use of a common site may increase the risk of disease and parasite transmission (Appendix D).

Impact on Home Range Use and Social Structure: Although individual black bears usually confine their movement to a set home range, home ranges are not defended as territories and multiple bears may use the same area (Jonkel and Cowan 1971, Reynolds and Beecham 1980, Koch 1983). However, it is likely that dominant males will exclude subadult males. Removal of adult males has been documented to result in an influx of younger immigrant males (Kemp 1976, 1972; Young and Ruff 1982; Wielgus and Bunnell 1994). Some authors have hypothesized that dispersing subadult males may be responsible for cub killing. Therefore removal of large adult males could result in decreased cub survival and lower recruitment of cubs into the population (LeCount 1993, McLellan 1994). However, no data are available testing this hypothesis (CDFG 2001). As discussed in section 1.1, information from Washington biologists indicate that most tree peelers were young bears who have not been able to establish a territory, and ODFW harvest records indicate that the majority of bears taken on timber damage are young males (ODFW 1992). If true, then actions that increase the number of subadult bears might aggravate timber damage problems. However, lethal removal of bears for timber damage management is not anticipated to have an adverse impact on cub survival or aggravate damage problems for the following reasons: 1) it would result in removal of only a small portion of the bear population; and 2) the majority of bears taken on timber damage in Oregon appear to be females and young males and not adult males (ODFW 1992). Therefore, lethal removal of bears is anticipated to have a low magnitude of impact on bear territories and social structure.

Concerns have been raised that dominant bears may exclude other bears from using feeders, or that females may avoid feeders used by adult males in order to reduce risks to their young cubs. Females and young males appear to be responsible for the majority of damage (see Section 1.1). If these bears are excluded from feeders then it is possible that much of the effort and expense of feeding programs are expended on nontarget bears. Videotaping of bears at feeders indicates that aggressive interactions among bears at stations were minimal and that multiple bears were observed using the same feeder (Nolte et al. 2002). Visits to the feeders were usually short (<20 min). However, the study did provide evidence that supplemental feeding encouraged numerous bears to visit sites with trees most vulnerable to bear damage.

Bear feeding does not appear to influence home range size during the bear feeding season, but bears do appear to adjust their use of space within their home ranges to take advantage of feeders (Fersterer et al. 2001). Feeders concentrate bears in localized areas more than might otherwise occur. However, video tape data of bears at these sites indicates that multiple bears are able to use a feeder with only rare instances of aggressive interactions among individuals.

4.3.2 Alternative 2. Nonlethal Before Lethal Control Program.

Impact on Bear Populations: WS already recommends nonlethal alternatives where practical. Timber managers must conduct the work on silvicultural practices. Selection of this alternative would result in an increase in WS use of bear feeding programs, and might result in an increase in landowner trial and adoption of silvicultural practices. Because these strategies can be effective in some situations, the number of bears number of bears removed by WS for timber damage management is likely to be lower than in Alternative 1. The Washington Forest Protection Association bear damage management program provides some insight as to how a WS program under this Alternative might work. The WFPA program encourages the use of bear feeding programs as a nonlethal alternative, but the WFPA program does not require its members to use or try nonlethal control. During 2001, roughly 300 metric tons (330 short tons – English units) of food were used in approximately 900 feeders. The majority of these feeders were in Washington, but this figure includes some feed which was produced for use by government (including WS) and private programs in Oregon and California (Nolte et al. 2002). Biologists working with WFPA report that the program has resulted in a decrease in the number of bears removed per year (G. Ziegltrum, WFPA, pers. comm.). Because, bear feeding programs often need some form of supplemental control, some critics of the program question whether long term removals for supplemental control are actually lower than the bear removals that would have occurred had feeders not been used. To date there are no data available addressing this issue. Other impacts of bear feeding programs are as discussed in Alternative 1. A reduction in bear removals coupled with a likely increase in the use of bear feeding programs might result in increases in local bear densities, and, possibly, increases in bear damage complaints for a variety of issues not limited to bear damage to timber.

Some timber producers do not believe that nonlethal methods are effective and may switch to alternative sources of lethal bear damage management instead of risking increases in damage while nonlethal methods are tried and fail. At present, these timber producers can choose to do the lethal control themselves, work with ODFW to increase recreational hunting opportunities on their property, seek assistance from a private wildlife damage management

program, or go to state and county agencies for assistance. The impact of these alternatives on bear populations would depend on the type of alternative selected and the experience level of the individual(s) conducting the lethal removal program. For example, an increase in the use of sport hunting as a damage solution is likely to be less selective for individual depredating bears and may result in an increase in the number of bears harvested to resolve damage problems. Examples of private programs to manage bear damage to timber include one in Oregon which does not emphasize the use of feeding programs (Gourley and Vomocil 1987) and the WFPA program which makes extensive use of bear feeding but does not require its members to use or try nonlethal techniques. Although there are professional, responsible, private bear damage management programs, these services may not be available to or selected by timber managers. Some individuals conducting lethal control may not have the same access to training, or tools as WS personnel which could result in an increase in the number of bears that are removed before a damage problem is resolved. Most nongovernmental bear damage management programs are not subject to the same regulations, public involvement, or incentives to develop and promote new techniques as a Federal program. In general, if timber producers seek lethal damage management from a non WS source, bear harvest levels are likely to be equal or higher than with a WS program. Ultimately, the difference in impacts on bear populations between Alternative 1 and Alternative 2 would depend on the number of producers who continue to use the WS program, and the management options selected by timber producers who discontinue use of the WS program.

Impact on Home Range Use and Social Structure: As discussed above, this Alternative is likely to result in higher use of bear feeding programs than Alternative 1. Feeding programs may have an impact on bear interactions and home range use (Section 4.3.1.2). Some lethal alternatives available to timber managers may be less selective for depredating individuals than a WS program. Alternatives like sport hunting could result in increased take of adult male bears which may not be involved in the damage problem. Increases in the removal of adult males may have a higher potential for a disruptive impact on bear social structure (Section 4.3.1.2).

4.3.3 Alternative 3. Only Nonlethal Methods.

Impact on Bear Populations: The WS program would not have a direct impact on the bear population because it would not be removing bears. The cumulative impact of this alternative would depend on how timber managers respond to a restriction in the methods available from WS. Timber managers may choose to stay with WS and shift to only nonlethal techniques, or get WS assistance with nonlethal methods and go to other sources for lethal techniques, or they may choose to seek solutions that do not involve WS. Among timber producers that chose to stay with a WS program, there may be higher use of bear feeders than in Alternative 1. Impacts of feeder use on bear populations are discussed in Alternative 1. However, many participants in WS's current program chose to seek assistance from WS because they know they have access to a full range of damage management alternatives. Selection of a nonlethal only alternative is likely to result in the majority of producers dropping the WS program or supplementing a WS program with other forms of lethal control. Consequences of seeking other sources of lethal bear damage management are as discussed for Alternative 2. In general harvest of black bear under this alternative is likely to equal or exceed harvest levels under alternative one.

Impact on Home Range Use and Social Structure: This alternative might result in higher use of bear feeding programs than Alternative 1. Feeding programs may have an impact on bear interactions and home range use (Section 4.3.1.2). Some lethal alternatives available to timber managers may be less selective for depredating individuals than a WS program. Alternatives like sport hunting could result in increased take of adult male bears which may not be involved in the damage problem. Increases in the removal of adult males may have a higher potential for a disruptive impact on bear social structure (Section 4.3.1.2).

4.3.4 Alternatives 4 & 5. Technical Assistance Program and No WS Bear Damage Management in the Analysis Areas.

Impact on Bear Populations: The impacts of these alternatives are similar and would be discussed together. In both instances, WS would provide no operational assistance and would not remove any bears. The responsibility for operational bear damage management would fall on the timber producer. Timber producers would deal with the problem on their own or seek assistance from private damage management services, or state or county agencies. As discussed under Alternative 2, the degree to which these alternatives emphasize nonlethal techniques for timber damage management varies. As discussed for Alternatives 2 and 3 some damage management alternatives may result in a higher number of animals being removed than a WS program. Consequentially, impacts on bear populations would depend on the methods chosen by timber managers, but are likely to be similar to or greater than in Alternative 1.

Impact on Home Range Use and Social Structure: The impact of these alternatives would depend on the damage management options selected by the timber mangers. Producers could use a program like the one in Washington which emphasizes the use of bear feeders (Nolte et al. 2002). In this case, use of bear feeding programs could be higher than in Alternative 1. These feeding programs may have an impact on bear interactions and home range use (Section 4.3.1). Another option is for a program like the one described by Gourley and Vomocil (1987) which does not emphasize feeder use. Some lethal management options like sport hunting could result in increased take of adult male bears which may not be involved in the damage problem. Increases in the removal of adult males may have a higher potential for a disruptive impact on bear social structure (Section 4.3.1.2).

4.4 Impact on Non-target Species including Threatened and Endangered Species

4.4.1 Alternative 1. Continue the Integrated Wildlife Damage Management Program for Bear Damage to Timber (Preferred Alternative/No Action Alternative).

The size and behavior of black bears is different from most of the other wildlife species using timber habitats, making a variety of strategies available to reduce risk to nontarget animals including snare placement and design, bait selection, and pan tension systems. Consequentially, WS take of nontarget species during programs to manage bear damage to timber has been very low, averaging less than 1 animal per year. Most of these nontarget animals have been released. Activities to manage black bear damage to timber over the period of FY 1996-2001 resulted in a total nontarget species take of 3 mountain lion (snares – released), 1 dog (culvert trap – released), and one opossum (dogs – killed). Therefore, WS concludes that this alternative has a very low magnitude of impact on nontarget species populations. The WS program in Oregon has not taken any T&E species in its program for timber damage management.

WS has consulted with the USFWS and the ODFW to identify any potential risks to state and federally listed endangered species (Appendix C). In instances where methods may pose a potential risk to a T&E species, WS works with the USFWS and ODFW to identify measures to reduce potential risks. These measures are listed in Section 2.3 and Appendix C. The proposed action is not likely to adversely affected any listed T&E species.

4.4.2 Alternative 2. Nonlethal Before Lethal Control Program.

Under this alternative there may be a decrease in WS use of lethal management techniques. Because the risk to nontarget species from Alternative 1 is very low, it is unlikely that this would result in a measurable decrease in WS capture of nontarget species. However, selection of this alternative might result in an increase in timber producers seeking alternative sources of bear damage management. The risk to nontarget species from these alternative methods would depend on the alternative selected by the timber producer and the experience and training of individuals conducting the damage management (Section 4.2.2). In some instances, this may result in an increase in the risk to nontarget species.

4.4.3 Alternative 3. Only Nonlethal Methods; Alternative 4. Technical Assistance Program; Alternative 5. No WS Bear Damage Management.

Under each of these alternatives, WS would not use any bear capture techniques. Consequentially there is likely to be no risk to nontarget species from WS actions under these alternatives. However, timber producers are likely to increase use of alternative sources for bear damage management. The risk to nontarget species from these alternative methods would depend on the alternative selected by the timber producer and the experience and training of individuals conducting the damage management. In some instances, this may result in an increase in the risk to nontarget species.

4.5 Impact on Sport Hunting

4.5.1 Alternative 1. Continue the Integrated Wildlife Damage Management Program for Bear Damage to Timber (Preferred Alternative/No Action Alternative).

WS take for bear damage to timber is currently 14% of all known bear harvest in the Analysis Area. Sport hunting accounts for 68% of all known harvest. Insofar as bears killed by WS are not available for hunters to capture, this alternative does have some impact on sport hunting. However, the number of bears taken by WS is a very small proportion of the bear population (<1%). ODFW data indicate that black bear populations in Western Oregon are stable to increasing and that all known forms of take are not having an adverse impact on black bear populations

(Section 4.2.2, ODFW 2002*a*). The lack of WS involvement in lethal predator removal does not guarantee that more bears or hunting opportunities would be available to sport hunters. Even if bears are not removed by WS for timber damage management, they may still be removed by private, state, or county programs. Some timber managers are reluctant to use sport hunting (Sections 2.3. and 3.2.11), and there is no guarantee that timber managers would choose to replace a WS program with sport hunting. Therefore, we conclude that WS involvement in lethal removal of bears to reduce damage to timber has a low magnitude of impact on sport hunting of bears.

Measure 18 banned the use of bait in bear hunting. Consequentially the use of bear feeding programs is incompatible with sport hunting. Areas with feeding programs would not be available to hunters during the spring bear hunt. This may restrict the number of sites available for spring season hunters in western Oregon. The impact of feeder use on sport hunting would depend on the number of timber managers selecting bear feeding programs that had previously made their land available to sport hunters.

4.5.2 Alternative 2. Nonlethal Before Lethal Control Program.

The WS program may take fewer bears than in Alternative 1(Section 4.3.2). However, the cumulative impact of this alternative would depend on the proportion of timber managers that chose to stay with the WS program. If a large proportion of timber producers stay with a WS program then WS removal of bears, and subsequent impact on sport hunting is likely to be lower than Alternative 1. If a large proportion of timber producers switch to other damage management alternatives, then the impact on bear populations and sport hunting would depend on the management options selected by the timber managers (Section 4.3), but could be similar to or higher than Alternative 1.

WS use of bear feeding programs is likely to be higher than in Alternative 1. Areas with feeding programs would not be available to hunters during the spring bear hunt. Ultimately, the impact of feeder use on sport hunting would depend on the number of timber managers selecting bear feeding programs that had previously made their land available to sport hunters.

4.5.3 Alternative 3. Only Nonlethal Methods.

Under this alternative, WS would not remove any bears, so the WS program would not remove bears that could have been taken by sport hunters. Many WS cooperators may not care for the restriction in services available and would chose to switch to other options for bear damage management. In this case, the cumulative impact on bear populations and sport hunting would depend on the alternatives selected by timber managers (Section 4.3), but could be equal to or higher than in Alternative 1.

WS use of bear feeding programs would be higher than in Alternative 1. However, because the majority of timber producers are anticipated to discontinue use of the WS program, the overall impact on sites available for timber producers is likely to be minimal. If timber producers chose a management alternative like the WFPA program, which emphasizes the use of feeders, but also offers lethal management options, then the impact on the area available for spring hunters would be similar to Alternative 2.

4.5.4 Alternative 4 & 5. Technical Assistance Program and No WS Bear Damage Management in the Analysis Areas.

Under this alternative, WS would not provide any operational assistance with bear damage to timber. The cumulative impact on bear populations and sport hunting would depend on the alternatives selected by timber managers (Section 4.3), but could be equal to or higher than in Alternative 1.

4.6 Sociological Issues

WS's mission is to address situations in which differing human interests and values, involving wildlife and humans, come into conflict. From WS's perspective, there are many ways to address such situations. The program considers many factors in determining appropriate control strategies. The process that WS follows in determining a recommended course of action to address such conflicts is presented in Chapter 2. While the ideal goal is to prevent losses of resources and threats to human health and safety with no losses of wildlife, APHIS ADC recognizes that responsible wildlife management includes the removal of individual animals or reduction of local populations.

4.6.1 Alternative 1. Continue the Integrated Wildlife Damage Management Program for Bear Damage to Timber (Preferred Alternative/No Action Alternative).

4.6.1.1 Humaneness

The issue of humaneness, as it relates to the killing or capturing of wildlife is an important but very complex concept that can be interpreted in a variety of ways. Humaneness is a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. People concerned with animal welfare are concerned with minimizing animal suffering as much as possible, or eliminating unnecessary suffering. The determination of what is unnecessary suffering is subject to debate (Schmidt 1989). WS personnel are experienced and professional in their use of management methods that are as humane as possible. The lead and cooperating agencies have determined that management actions are necessary to resolve problems with bear damage to timber on private and county lands.

Animal welfare organizations are concerned that some methods used to manage wildlife damage expose animals to unnecessary pain and suffering. Research suggests that with methods such as restraint in foothold traps, changes in the blood chemistry of trapped animals indicate "stress." Blood measurements of fox indicate that this is the case for fox that have been held in traps and chased by dogs (USDA 1997, Revised). The situation is likely to be similar for bears caught in snares or chased by dogs. However, research has not yet progressed to the development of objective, quantitative measurements of pain or stress for use in evaluating relative humaneness of capture techniques.

The challenge in coping with this issue is how to achieve the least amount of animal suffering with the constraints imposed by current technology. WS personnel are concerned about animal welfare. WS is aware that techniques like snares and hunting with dogs are controversial, but also believes that these activities are being conducted as humanely and responsibly as practical. To ensure the most professional handling of these issues and concerns, WS has numerous policies giving direction toward the achievement of the most humane wildlife damage management program possible (Section 2.3). WS and the National Wildlife Research Center are striving to bring additional nonlethal damage management alternatives into practical use including research on bear feeding programs (Nolte et al. 2002), the relationship between tree chemistry and bear foraging preferences (Kimball et al. 1998a), the impact of silvicultural practices on tree chemistry and associated patterns in bear damage (Kimball et al. 1998*a*,*b*,*c*; 1999), and repellents to deter bear foraging on trees (Witmer and Pipas 1999). Research continues to improve the selectivity and humaneness of management devices. Until new findings and products are found practical, a certain amount of animal suffering could occur when some methods are used in situations when non-lethal damage management methods are not practical or effective.

Selectivity of wildlife damage methods is related to the issue of humaneness in that greater selectivity results in less potential suffering of nontarget animals. Methods vary in their selectivity for nontarget animals. The selectivity of each method is augmented by the skill and discretion of the WS specialist applying the technique, and on specific measures and modifications designed to reduce or minimize nontarget captures. All WS specialists are trained in techniques to minimize the risk of capturing nontarget wildlife. As discussed in Section 4.4.1, the WS program for managing bear damage to timber has a very low risk of capturing nontarget animals (<1 nontarget animal per year and most nontarget animals released).

WS supports the most humane, selective, and effective damage management techniques, and would continue to incorporate advances into program activities. WS field specialists conducting bear damage management are highly experienced professionals, skilled in the use of management methods and committed to minimizing pain and suffering.

The project related effects on individual animal welfare may include: Bears pursued by dogs may suffer anxiety, fear, and stress; bears in snares may experience anxiety, fear, and stress and some bears in snares may be injured. Dogs used to pursue bears may also be injured or killed.

Effects of Various Methods of Take

Few premises are more obvious than that animals can feel pain (AVMA 1987). Determining whether an animal is experiencing pain or suffering is difficult. Despite this difficulty, many manifestations of pain are

shared by many animal species (AVMA 1987). The intensity of pain perceived by animals could be judged by the same criteria that apply to its recognition in human beings. If a condition causes pain in a human being, it probably causes pain in other animals. Suffering is a much abused and colloquial term that is not defined in most medical dictionaries. Neither medical nor veterinary curricula explicitly address suffering or its relief. Therefore, there are many problems in attempting a definition. Nevertheless, suffering may be defined as a highly unpleasant emotional response usually associated with pain and distress. Suffering is not a modality, such as pain or temperature. Thus, suffering can occur without pain; and although it might seem counter-intuitive, pain can occur without suffering (AVMA 1987). The degree of pain experienced by animals that are shot probably ranges from little to no pain to significant pain depending on the nature of the shot and time until death. Since the connotation of suffering carries with it the connotation of time, it would seem that there is little or no suffering where death comes immediately. WS personnel are trained professionals experienced in the placement of shots that result in quick death and minimize pain and suffering.

It is possible for the techniques listed below to kill sows with newborn cubs. However, because of differences in foraging behavior and habitat use, sows with young cubs are usually not involved in timber damage. WS programs target specific depredating animals, and sows with young cubs are rarely captured by the WS program. For example, during the period of FY 1999-2001 no sows with young <1 year old were taken by the WS program. ODFW has directed WS to treat offspring of depredating bears in the same manner as depredating bears.

Use of Dogs: Although theoretically possible, risk of a bear being caught and killed by dogs is extremely low. No bears have been killed by dogs used by the Oregon WS program. While smaller bears have the greater potential for being injured by dogs, data suggest that smaller bears are more likely to climb trees to escape the dogs (Elowe 1991). Larger bears may be more likely to stop and fight. In this instance, the dogs are at greater risk of injury than the bear (Elowe 1991). However, serious injuries to dogs are rare (CDFG 2001).

Being pursued by dogs may cause an animal to suffer anxiety, fear and stress. Anxiety is generally defined as an unfocused response to the unknown (AVMA 1987). Fear is a focused response to a known object or previous experience (AVMA 1987). Stress is commonly defined as the effect of physical, physiologic, or emotional factors that induce an alteration in an animal's homeostasis or adaptive state. Two forms of stress and its subsequent responses are relevant to the pursuit of bears with dogs. These are 1) neutral stress - this form of stress is not intrinsically harmful and evokes responses that neither improve nor threaten the animal's well being; and 2) distress - stress that creates a state in which the animal is unable to adapt to an altered environment or to altered internal stimuli (AVMA 1987). Neutral stress would be exhibited by an animal fleeing from pursuing dogs and would probably continue to the point at which the pursuit ended. Presumably, the pursuit would end when the animal evaded its pursuers or was shot by the hunter. A pursued animal could experience some degree of distress. The distress could become more acute if the animal were cornered or otherwise became unable to successfully flee. If the stress-inducing stimuli are short-term, the animal's responses should not result in long-term harmful effects. The duration of the period of bear anxiety, fear and stress is likely to be shorter with the use of hounds than with the use of snares.

Snares: Being caught in a snare may cause an animal to suffer anxiety, fear and stress as described above. Having a foot restrained in a snare may also result in pain and suffering. The duration of these effects would vary depending on when the animal is captured. WS uses double swivels on snare cables to reduce the potential for leg and foot injuries.

Cage Traps: Because cage traps involve the confinement of an animal, it is likely that the use of cage traps would cause an animal to suffer anxiety, fear and stress. It is also possible for an animal to become injured while fighting to escape a trap.

4.6.1.2 Impact of bear removal on the public's aesthetic enjoyment of bears.

Many members of the public are attracted to wildlife, as is evidenced by the large proportion of households that feed birds or observe wildlife. Some people may also want to have more wildlife in their immediate environment. Other people feel they have a spiritual bond with wild animals. Conversely, some people have no emotional attachment to wildlife and some may fear the presence of wild animals in their vicinity

and demand their immediate removal. Consequentially, public opinion about the best ways to reduce conflicts between humans and wildlife is highly variable, making the implementation and conduct of damage management programs extremely complex. Ideas about how these programs are implemented and conducted are as unique as the almost infinite combinations of philosophies, psyches, aesthetic values, personal attitudes, and opinions found in humans. These differences in opinion result in concerns that the proposed action or the alternatives would result in the loss of aesthetic benefits to the general public and resource owners. The mere knowledge that wildlife exists is a positive benefit to many people (Decker and Goff 1987). Some members of the public have expressed concerns that bear damage management could result in the loss of aesthetic benefits to the public, resource owners, or local residents.

Wildlife populations also provide a range of direct and indirect social and economic benefits. Direct benefits are derived from a user's personal relationship or direct contact with wildlife and may include both consumptive (e.g. hunting), or nonconsumptive (e.g. observing or photographing bears). Indirect benefits, or indirect exercised values arise without a human being in direct contact with an animal and are derived from experiences such as looking at pictures or videos of wildlife, reading about wildlife, or benefiting from activities or contributions of animals such as their use in research (Decker and Goff 1987). According to Decker and Goff (1987), two forms of indirect benefits exist; bequest and pure existence. Bequest benefits arise from the belief that wildlife should exist for future generations to enjoy, pure existence benefits accrue from the knowledge that the animals exist in the human environment (Decker and Goff 1987), or that they contribute to the stability of natural ecosystems (e.g. ecological, existence, bequest values; Bishop 1987).

Under the proposed alternative some bears may be lethally removed. WS programs for managing bear damage to timber focus on individual problem bears and not on bear populations. The proposed action has a low magnitude of impact on the bear population in the Analysis Area. Dispersal from adjacent areas typically contributes to repopulation of a site, depending upon the level of removal and bear population levels in the surrounding sites. Black bear population levels in the analysis area are relatively high, but bears are not commonly observed because of their secretive and nocturnal behavior. The likelihood of seeing a black bear in some localized areas could be temporarily reduced as a result of WS activities. However, because there is already a very low likelihood of seeing a black bear, this temporary local reduction in public viewing opportunity would probably not be noticeable in most cases.

4.6.1.3 Wildlife Values and Ethical Perceptions of Bear Damage Management

Ethics can be defined as the branch of philosophy dealing with values relating to human conduct, with respect to the rightness or wrongness of actions and the goodness and badness of motives and ends (Costello 1992). Individual perceptions of the ethics of wildlife damage management and the appropriateness of specific management techniques would depend on the value system of the individual. These values are highly variable (Schmidt 1992, Teel et al. 2002), but can be divided into some general categories (Kellert and Smith 2000, Kellert 1994 Table 4.1). An individual's values on wildlife may have components of various categories and are not restricted to one viewpoint. The tendency to hold a particular value system varies among demographic groups. For example, one major factor influencing value system is the degree of dependence on land and natural resources as indicated by rural residency, property ownership and agriculture or resource dependent occupations (Kellert 1994). People in these groups tend to have a higher tendency for utilitarian and dominionistic values. Socioeconomic status also influences wildlife values with a higher occurrence of naturalistic and ecologistic value systems among college educated and higher income North Americans (Kellert 1994). Age and gender also influence value systems with a higher occurrence of moralistic and humanistic values among younger and female test respondents (Kellert 1980, 1994).

Table 4.1 Basic wildlife values. Table taken from Kellert and Smith (2000) and Kellert (1994).

Term	Definition
Aesthetic	Focus on the physical attractiveness and appeal of large mammals
Dominionistic	Focus on the mastery and control of large mammals
Ecologistic	Focus on the interrelationships between wildlife species and natural habitats
Humanistic	Focus on emotional affection and attachment to large mammals
Moralistic	Focus on moral and spiritual importance of large mammals
Naturalistic	Focus on direct experience and contact with large mammals
Negativistic	Focus on fear and aversion of large mammals
Scientific	Focus on knowledge and study of large mammals
Utilitarian	Focus on material and practical benefits of large mammals

Two philosophies on human relationships with animals are commonly considered relative to ethical perceptions of wildlife damage management techniques. The first philosophy, Animal Rights, asserts that all animals, humans and nonhumans, are morally equal. Under this philosophy, no use of animals, e.g. for research, food and fiber production, recreational uses such as hunting and trapping, zoological displays and animal damage management, etc. should be conducted or considered acceptable unless that same action is morally acceptable when applied to humans (Schmidt 1989). The second philosophy, Animal Welfare, does not promote equal rights for humans and nonhumans, but focuses on reducing pain and suffering in animals. Advocates of this philosophy are not necessarily opposed to utilitarian uses of wildlife but they are concerned with avoiding all unnecessary forms of animal suffering. However, the definition of what constitutes *unnecessary* is highly subjective (Schmidt 1989). In general, only a small portion of the U.S. population adheres to the Animals Rights philosophy, but most individuals are concerned about Animal Welfare.

In general, North Americans perceive bears as being highly intelligent, evolutionarily similar to humans, and very aesthetically appealing. There is a well established cultural and historic relationship between bears and people of Native American and European heritage (Kellert 1994). There is also evidence of a positive attitude toward black bears and their conservation despite the potential for human injury and property damage. However, as might be expected, tolerance for bear conflicts is lower among agriculturalists than among the population as a whole (Kellert 1994).

Alternative 1 would be unacceptable to Animal Rights advocates, individuals with strong Humanistic and Moralistic values, and to others with strong emotional or spiritual bonds with bears including some Native Americans because it permits lethal removal of depredating bears (Kellert 1994, Gurnon 2002). Some individuals assert that killing the offending animal is not the response of a moral or enlightened society. Response of other individuals and groups would vary depending on individual assessments of the need for damage management, risk to black bear populations, risk to nontarget species and individuals, the degree to which efforts are made to avoid or minimize the pain and suffering associated with the various management techniques, and the perceived humaneness of individual methods. For example, although referenda in Oregon and Washington have demonstrated public sentiment that bait and hounds are unacceptable methods for sport hunting of bears, the referenda allowed for the use of these techniques in damage management. One possible interpretation of this dichotomy is that some techniques are tolerable when used by a trained professional to address a specific 'need', but are not acceptable for recreation. Individual perceptions of the status of bear populations would also influence public evaluation of the ethics of the bear damage management alternatives. In New England and New York where bears are considered rare or endangered, there is substantial support for black bear conservation, but in Colorado, a majority of individuals considered carefully monitored black bear hunting to be an acceptable method of population management and animal damage control (Kellert 1994). The analysis in section 4.3 indicates that Oregon has a large healthy bear population and that Alternative 1 would not pose a threat to the viability of the Oregon bear population. Some people question the ethics of feeding a wild animal (Postrel 1992). Timber resource managers are likely to consider this Alternative 1 acceptable because it provides for access to a wide range of legally available damage management techniques from trained, accountable, professionals. However, it is important to note that not all timber managers consider lethal methods to be an acceptable option.

An additional category of ethical concerns does not just relate to the impact of the program on bears but also to the use of public funds and resources (Section 3.2.6). During the initial public involvement period

several individuals expressed opposition to the use of public funds to preserve resources or enhance profits for private individuals, especially at the cost of the public's wildlife. Congress has established WS as the Federal agency responsible for providing assistance with wildlife damage management to the people of the United States and has allocated pubic funds for wildlife damage management via the Rural Development, Agriculture, and Related Agencies Appropriations Act of 1988 (Public law 100_102, Dec. 22, 1987, Stat. 1329_1331;7 U.S.C. 426c) and the FY2001 Agriculture Appropriations Bill. Nonetheless, many individuals continue to object to this use of public resources.

4.6.2 Alternative 2. Nonlethal Before Lethal Control Program.

4.6.2.1 Humaneness.

A WS program conducted under this alternative is likely to be perceived by some people as more humane than Alternative 1 because it guarantees that WS cooperators wwould try nonlethal method(s) before lethal alternatives are used. However, some producers do not believe that nonlethal alternatives are effective and may switch to alternative sources for legal lethal methods of bear damage management (Sections 4.2.2, 4.3.2, 4.4.2). The perceived humaneness of non WS efforts to manage bear damage to timber would depend on the type of alternative selected and the experience level of the individual(s) conducting the lethal removal program. Some of these individuals and options might result in increases in the number of wounded bears, the number of bears killed, and risks to nontarget species.

4.6.2.2 Impact of bear removal on the public's aesthetic enjoyment of bears.

Under this alternative, there may be a reduction in the number of bears removed by WS than in Alternative 1. However, as discussed in Alternative 1, there already is a very low likelihood of seeing a black bear, and the temporary local reduction in public viewing opportunity associated with Alternative 1 would probably not be noticeable in most cases. It is unlikely that there would be a discernable difference in bear viewing opportunities between Alternative 1 and 2.

4.6.2.3 Wildlife Values and Ethical Perceptions of Bear Damage Management.

Alternative 2 would still be unacceptable to Animal Rights advocates and to many individuals with strong Humanistic and Moralistic values because it permits lethal removal of depredating bears. A larger number of Animal Welfare advocates would find this alternative acceptable because it provides an assurance that bears would not be killed unless a nonlethal alternative has been tried. However, the anticipated rise in the use of bear feeding programs would cause additional concerns for people who question the ethics of feeding wild animals (Postrel 1992). Timber producers may perceive this alternative as an unethical imposition of additional cost of timber production (Section 4.7.2), and, potentially, additional timber losses (Section 4.2.2) on private landowners by individuals who do not have to bear the economic consequences of this alternative. Individuals concerned about the use of public resources to enhance private profit are unlikely to perceive this alternative as much of an improvement over Alternative 1.

4.6.3 Alternative 3. Only Nonlethal Methods.

4.6.3.1 Humaneness.

The WS portion of this Alternative may be perceived as being more humane because WS will not be involved in the lethal removal of bears. However, because the WS program is likely to be less effective in reducing damage than in Alternative 1, the majority of WS cooperators are likely to discontinue their WS program or supplement the WS program with other forms of lethal control. The impact of these alternatives on the perceived humaneness of efforts to manage bear damage to timber would depend on the type of alternative selected by the timber manager and the experience level of the individual(s) conducting the lethal removal program. Some of the options available to timber mangers may result in increases in the number of wounded bears, the number of bears killed, and risks to nontarget species.

4.6.3.2 Impact of bear removal on the public's aesthetic enjoyment of bears.

WS would not remove any bears under this alternative. However, because many timber producers would find alternative sources for lethal bear damage management, overall impacts on the bear population are

likely to be similar to or greater than in Alternative 1. Overall, this alternative is likely to have a similar or greater impact on bear viewing opportunities than Alternative 1

4.6.3.3 Wildlife Values and Ethical Perceptions of Bear Damage Management.

The WS portion of this Alternative would be more acceptable to Animal Rights activists and to a wider range of animal welfare advocates because WS would not be involved in the lethal removal of bears. Some individuals may still object because this Alternative involves the use of artificial feeding programs to manipulate bear behavior. WS use of bear feeing programs would continue to be of concern to people who question the ethics of feeding wild animals (Postrel 1992). Timber managers are likely to perceive this as an unethical restriction of their access to legally available lethal damage management techniques from professional, accountable WS specialists. Timber managers may also perceive this Alternative as an imposition of additional costs of timber production (Section 4.7.2), and, potentially, additional timber losses (Section 4.2.2) on private landowners by individuals who do not have to bear the economic consequences of this alternative. People concerned about the use of public resources to reduce damage (e.g. enhance profit) on private lands may find this alternative preferable to Alternative 1 because the WS program would have lower costs in terms of the number of public bears affected. However, it would still use Federal funds for supervision, reporting, and compliance with state and Federal regulations. As discussed in Section 4.3.2 and 4.3.3 total cost to the public in terms of lives of public bears may be equal or higher than in Alternative 1 depending on the Alternatives selected by timber managers.

4.6.4 Alternative 4 & 5. Technical Assistance Program and No WS Bear Damage Management in the Analysis Areas.

4.6.2.1 Humaneness

Similar to Alternative 3. A technical assistance program (Alternative 4) could reduce concerns about the humaneness of producer implemented damage management alternatives by directing timber managers to alternatives with higher efficacy and lower risks to bears and nontarget species. However, the extent to which timber managers would use this program is uncertain, but likely to be low.

4.6.2.2 Impact of bear removal on the public's aesthetic enjoyment of bears

Similar to Alternative 3

4.6.2.3 Ethical Considerations

Similar to Alternative 3. Individuals concerned with the use of public resources may prefer Alternatives 4 and 5 because they would require less (Alternative 4) or no (Alternative 5) Federal funds to operate the program. However, as discussed in Section 4.3.2 and 4.3.3 total cost to the public in terms of lives of public bears may be equal or higher than in Alternative 1 depending on the Alternatives selected by timber managers.

4.7 Economics

4.7.1 Alternative 1. Continue the Integrated Wildlife Damage Management Program for Bear Damage to Timber (Preferred Alternative/No Action Alternative).

4.7.1.1 General Information

Nolte and Dykzeul used data from an ODF survey of bear damage to timber in Oregon and an Oregon Forest Industry Council (OFIC) survey of timber producers managing 4,520,000 acres of timber lands to estimate that 768,000 trees are killed annually by black bear in Oregon. Assigning a value of $15 per tree resulted in estimated annual loss of $11.5 million with a damage management program in place. Timber producers in Oregon also reported spending approximately $470,000 annually to manage bear damage to timber (Nolte and Dykzeul 2002). A Hoopa Indian reservation in Northern California which was just starting a damage management program estimated annual losses to timber of approximately $1-2 million or approximately 15% of their annual timber revenue (Gurnon 2002). Schreuder (1976) created a model for economic decision making in black bear damage management using data provided by aerial surveys. This model requires site specific data

and cannot be used to evaluate the overall WS program. However, data from Shreuder's model did indicate that bear damage management programs could be economically justified.

4.7.1.2 WS program

WS averages 678,580 acres in agreements per year for management of bear damage to timber. This figure usually represents all timber lands owned by the cooperator, and only a portion of this land is likely to be in the age class most vulnerable to damage by bears. If the land is being managed on a 60 year rotation and evenly distributed among all age classes, then approximately169,644 acres are in the 15 year age class most vulnerable to bear damage. Noble and Meslow (1998) conduced a random survey for bear damage in stands vulnerable to bear damage in the area west of Corvallis, Oregon. One area they surveyed had a history of low bear damage and the other area had a history of higher bear damage. In the low damage area, 15% of the areas sampled had bear damage to timber. In the high damage area, 67.5% of the areas sampled had bear damage. These values were considered appropriate to apply to WS cooperator lands because cooperators would not be participating in the program if they did not have at least a low level of bear damage to timber. Applying these percentages to the estimate of WS cooperator stands in the 15-30 year age class yields a range of 25,447 – 114,510 acres with damage (Table 4-2). In the ODF survey of bear damage to timber (Kanaskie et al. 2001), average tree density in stands with damage from their ground surveys was 230 stems/acre. Applying this to the acreage estimates yields a range of 5,852,810 -26,337,300 trees in stands with damage. The studies by Noble and Meslow (1998) and Kanaskie et al. (2001) do not provide annual rates of damage within a stand, nor do they provide any information on the damage management history of the sites. Nolte et al. (2002) provide an estimate of annual damage rate in stands without a bear damage management program of 4% per year or 234,112 - 1,053,492 trees. The magnitude of impact on tree growth and yield will depend on the extent of the damage and the species of the tree (Section 1.2). Trees that are completely girdled will die. Kanaskie et al. (2001) report a 2:1 ratio of partially peeled trees to completely peeled trees in their survey of bear damage to timber in Northwestern Oregon. Using this ratio yields a total of 77,257 '– 347,652 trees killed by bears. Nolte and Dykzeul (2002) provided a value of $15 per 25 year old tree. Assigning this value to the trees killed by bears yields an estimate of annual losses to bear damage to timber, in the absence of damage management of $1,158,855 - $5,214,785.

Table 4-2
Estimation of Timber Losses to Bear Damage Without a Bear Damage Management Program

	Damage Intensity	
	Low	High
Total WS acres under agreement	678,580	678,580
Acres in 15-30 year age class	169,644	169,644
Acres with damage	25,447	114,510
Trees on acres with damage	5,852,810	26,337,300
Trees with damage	234,112	1,053,492
Trees completely girdled	77,257	347,652
Estimated value of trees killed by bear	**$1,158,855**	**$5,214,785**

The estimate provided above is probably a conservative estimate because it does not include impacts of partial damage on tree growth, e.g. increases in vulnerability to disease and insects, and losses in timber volume and quality associated with fungal infections and decay at the wound site. Pierson (1966) studied timber yield losses to partial damage in a 35 year old stand. Butt rot was observed in 12% of injured trees but not uninjured trees. 82% of trees were damaged > 50% of diameter and had a 10% loss of yield volume: 16% of trees had 25-50% girdling and had 7% loss of yield volume. In 110 year old trees, only 3.5% of wounded trees showed evidence of rot and the amount of culling because of rot and borers amounted to <1% of the board foot volume even though 81% of trees showed evidence of bear damage (Childs and Worthington 1955). The difference in impact on stand yield between the two studies may relate to the age of the trees sampled. In Oregon, stands are generally maintained on a 60 year rotation cycle.

The average annual cost of the WS program to manage bear damage to timber for FY 2000 and 2001 is approximately $101,000. This amount does not include the cost of bear feed which is paid for separately by cooperators. Funds used to pay for vehicles, equipment, and salaries for the WS specialists conducting the damage management come from private individuals and corporations (71.8%) and cooperating counties (12%). Federal funds (16.2%) are used for supervision, reporting, and for other activities required for compliance with Federal and State laws. For the period of FY 1998 – 2001, WS's average annual confirmed loss estimates for

counties with programs to manage bear damage to timber were $97,467. This is the damage that occurred before management was initiated and damage that occurred until control efforts stopped damage and does not reflect the amount of damage that was prevented by management efforts. This number is an underestimate of total damage because WS specialists usually only confirm sufficient damage to determine the nature of the problem (USDA 1997, Revised). The amount of damage prevented can be estimated by subtracting the average annual damage confirmed by WS from the lower estimate of bear damage to timber ($1,158,855 - $97,467 = $1061388) for a cost benefit ratio of 1:10.5.

4.7.2 Alternative 2. Nonlethal Before Lethal Control Program.

Under this alternative, there is likely to be an increase in WS use of bear feeding programs. Ziegltrum (1994) reported that up front costs (feed, feeders, etc.) may be higher for feeding programs than for other alternatives, however there are no data comparing the costs of different damage management alternatives. Because feeding programs often require a long term investment and commitment on the part of the timber producer, an increase in the use of feeding programs may require more staff time over a period of several years than Alternative 1. Federal funds only pay for supervision, reporting, administration, and compliance with state and Federal regulations, so the majority of the increase in costs would be passed on to cooperators and would not be paid with Federal funds. Ziegltrum (1994) and Nolte et al. (2002) provide evidence that bear feeding programs are an economically viable alternative for managing bear damage to timber. However, WS specialists, cooperators, and ODF biologists, and research biologists report steady increases in the amount of feed required over time and, in the absence of supplemental lethal control, problems with decreases in the efficacy of feeding programs (D. Kaspar, ODF Astoria district, pers. commun., Nolte et al. 2002). If true, then at some point the cost of feeding programs may exceed the benefits. This may explain why some WS cooperators and ODF Districts have chosen to discontinue feeding programs. In instances where nonlethal alternatives are not effective, the timber manager may sustain increased damage (cost) than might have occurred under Alternative 1.

Selection of this alternative may also increase timber producer use of silvicultural practices to reduce damage. WS only provides technical assistance on these methods, so costs of implementing silvicultural practices would only be borne by timber producers. When silvicultural practices are effective, there would be less need for feeders or lethal damage management and lower WS expenses. Silvicultural practices which involve reducing or discontinuing the use of fertilization or thinning can result in a marked reduction in stand yield (McMahon 1992, Anderson et al. 1994,). Tree response to fertilization depends upon a variety of factors, but when used properly, can result in marked increases in stand yield (Dangerfield and Brix 1979, Harris and Farr 1979, Miller et al. 1979, Olson et al. 1979, Strand and DeBell 1979, van der Driessche 1979). Voelker (1979) used data from the University of Washington Regional Forest Nutrition Research Project to predict increases in stand yield of 200 – 300 cubic feet per acre per application of 200 lb nitrogen fertilizer per acre for unthinned stands, 240-280 cubic feet per acre for thinned stands with thinning starting at age 30 or 40. Chappell et al. (1992*b*) predict that approximately 70% of coastal Douglas-fir stands will respond favorably to fertilization. Volume growth after fertilization can increase 16-18% in unthinned stands and 20-22% in thinned stands for 8-10 years after treatment. Mason and Adams (1989) predicted that thinned stands will yield more timber than unthinned stands even if up to 50% of the stand is damaged and 25% of the stand is killed.

Pruning is one of the silvicultural practices that may result in increased wood value and decreased bear damage to timber. However, these benefits usually come with an increase in timber production costs and a decrease in tree growth rates. Long term feasibility of pruning in timber production would depend on a number of factors including anticipated market demand for pruned lumber, labor costs, global supply of timber, and logistics associated with pruning trees on large parcels of land (Gee 1995, Maguire and Petruncio 1995, Mitchell 1995, Oliver et al. 1995). Pruning would not be a suitable management alternative for all sites and all tree species (Briggs 1995, Oliver et al. 1995). Fight and Bolon (1995) predicted that pruning Douglas-fir in the Pacific Northwest could result in an approximate 9% increase in before-taxes real rates of return. Cut boughs from pruning programs can be sold to offset pruning costs (Gee 1995). Pruning may also improve understory plant community development and reduce risk of bear damage to timber by decreasing the ratio of carbohydrates to terpenes within trees. Kimball et al. (1998*c*) concluded that pruning could be a cost effective means of reducing bear damage to timber, in stands that had 50% of the trees pruned, and that the efficacy of pruning a higher percentage of trees needed further investigation. Pruning all trees in a stand is advocated as a means of reducing problems with slower growing pruned trees being overtopped by unpruned trees (Oliver et al. 1995). Additional data would also be needed to determine how combinations of pruning and other silvicultural practices affect bear foraging. For example, thinning in conjunction with pruning has also been recommended as a means of offsetting losses in growth rate in pruned trees (Oliver et al. 1995).

Some producers may discontinue use of the WS program because they do not feel that nonlethal alternatives would adequately address damage problems. The cost to producers of shifting from a WS program to other damage management options would depend on the alternative selected. Timber producers may not have to pay sport hunters, but may incur additional costs in facility maintenance (e.g. gates and road maintenance) and staff time for people management. Costs of private damage management specialists can vary, as can their experience level and efficacy in addressing the damage problem. Private damage management programs that are less effective or efficient than a WS program would result in increased costs to the timber producer.

In conclusion, selection of this alternative would result in a slight increase in Federal funds needed for the WS program and could result in increases in cost for timber producers who chose to use a WS program. Costs to timber producers who chose to drop the WS program may be similar to or higher than in Alternative 1 depending upon the management technique(s) selected.

4.7.3 Alternative 3. Only Nonlethal Methods.

As discussed in Sections 4.2.3 and 4.3.3, the majority of current WS program cooperators are anticipated to shift to alternative sources for assistance with bear damage to timber. Producers choosing to stay with WS would probably incur increased costs for damage management. Nolte and Dykzeul (2002) used industry surveys and data on the costs of damage management materials to estimate the difference in cost associated with a shift from a primarily lethal program to an all nonlethal program. They estimated omission of lethal forms of bear damage management would result in a 332-400% increase in damage management costs. This does not include any increases in losses that might occur because these methods are generally not as effective as Alternative 1 (Section 4.2). The majority of the increase in costs would be in materials and staff time of field personnel. These costs are primarily borne by program cooperators. For any individual project, Federal funds needed for program administration, reporting, and supervision would also probably increase, but to a lesser extent than for timber producers. However, because many cooperators are anticipated to drop out of a nonlethal only damage management program, the total WS cost of the program may be lower. In general, the amount of federal and cooperator funds required for this alternative would be higher than for alternatives 1 and 2, and, because this alternative is not as likely to be as effective as Alternative 1. Costs in terms of timber lost to bear damage may also be higher.

Many WS cooperators are likely to discontinue use of the WS program if Alternative 3 is selected (Section 4.7.3). The financial impact on timber producers who chose to discontinue the WS program would vary depending on the management technique selected, but is likely to be similar to or greater than Alternative 1.

4.7.4 Alternative 4. Technical Assistance Program

Under this alternative, WS would only provide technical assistance and not conduct any bear damage management. Consequentially the WS program would be much less expensive than in Alternatives 1-3. Producer use of the program is also anticipated to be relatively low, which should also reduce WS program costs. The majority of a technical assistance program is likely to be paid for with Federal dollars, with small amounts of state and county funds being used in Counties which pay for a general WS program.

Producers would have to bear all costs of operational bear damage management. Costs to producers would be similar to costs to producers who do not choose WS assistance in Alternatives 2 and 3.

4.7.5 Alternative 5. No WS Bear Damage Management in the Analysis Areas.

WS would not be involved in bear damage management. Producers would assume all costs of operational bear damage management. Costs to producers would be similar to costs to producers in Alternative 4.

4.8 Summary

In Oregon, timber producers have legal access to bear damage management alternatives that do not involve the WS program. This table summarizes the impacts of alternatives on two scales. The first scale analyzes the impact of the Wildlife Services program. The second scale analyzes the impact of the WS program and the anticipated impacts of producers who may be dissatisfied with the WS alternative (Cum.). This table compares the impacts of selecting different alternatives using the current management practice (Alternative 1) as the basis for comparison.

Table 4-3 Summary of Program Impacts

Issue	Scale	Alternative				
		1) Current Program/ Proposed Action	2) Nonlethal before Lethal	3) Only Nonlethal	4) Only Technical Assistance	5) No Federal Program
Efficacy	WS	Most effective alternative for reducing bear damage to timber due to flexibility to use lethal and nonlethal techniques where needed.	Less effective than Alt. 1 because in instances where nonlethal techniques do not work, producers may sustain more damage than in Alt. 1.	Less effective than Alts. 1 and 2 because nonlethal methods are not always effective and there is no recourse to lethal methods.	WS would not reduce bear damage to timber.	WS would not reduce bear damage to timber.
Efficacy	Cum.	Same as above.	Lower efficacy than Alt. 1. The amount of reduction would depend on the number of producers who leave the WS program and the options they select.	Lower efficacy than Alt. 1. Many timber producers would drop WS program, so the magnitude of reduction in efficacy would depend on the options they select.	Timber managers would probably use other sources of direct control and are unlikely to use WS technical assistance. Efficacy would depend on options selected by producers.	Efficacy of program would depend on options selected by timber producers
Impact on Bears: Population	WS	Selective removal of depredating bears would have low impact on bear population.	Where nonlethal is effective, impact on bear density may be lower than Alt. 1.	No bears removed, so no negative impact on bear density.	No bears removed, so no negative impact on bear density.	No bears removed, so no negative impact on bear density.
Impact on Bears - Population	Cum.	Low impact on bear population.	WS would take fewer bears, but some producers may shift to non-WS options with similar or greater impacts than Alt. 1.	WS would not kill bears, but many producers would shift to non-WS options with similar or greater impacts than Alts. 1 and 2.	Impact would depend on options selected by producers, but is likely to be similar or greater than Alts. 1 and 2.	Impact would depend on options selected by producers, but is likely to be similar or greater than Alts. 1 and 2.
Impact on Bears - Population	Cum.	Low impact on bear population.	WS would take fewer bears, but some producers may shift to non-WS options with similar or greater impacts than Alt. 1.	WS would not kill bears, but many producers would shift to non-WS options with similar or greater impacts than Alts. 1 and 2.	Impact would depend on options selected by producers, but is likely to be similar or greater than Alts. 1 and 2.	Impact would depend on options selected by producers, but is likely to be similar or greater than Alts. 1 and 2.

Issue	Scale	Alternative				
		1) Current Program/ Proposed Action	2) Nonlethal before Lethal	3) Only Nonlethal	4) Only Technical Assistance	5) No Federal Program
Impact on Bears – Home Range and Social Structure	WS	Low impacts from bear removals and feeder use.	Low impacts from bear removals, slightly higher, but still low impacts from feeder use.	No impact from bear removal. Higher impacts from increased feeder use.	Very low impact	Very low impact
Impact on Bears – Home Range and Social Structure	Cum.	Low impacts from bear removals and feeder use.	Slightly higher impacts than Alt. 1. Magnitude of disruption would depend on options selected by producers who do no chose the WS program	Higher impacts than Alts. 1 and 2. Magnitude of difference would depend on options selected by producers who do no chose the WS program	Variable impacts depending on options selected by timber producers, but likely higher than Alt. 1	Variable impacts depending on options selected by timber producers, but likely higher than Alt. 1
Impact on Nontarget Species	WS	Very low impacts on nontarget species	Very low impacts on nontarget species	No impact on nontarget species	No impact on nontarget species	No impact on nontarget species
Impact on Nontarget Species	Cum.	Very low impacts on nontarget species	Slightly higher risk to nontargets than Alt. 1 depending on options selected by producers who drop the WS program	Higher risk to nontargets than Alts. 1 and 2. Degree of risk would depend on options selected by producers who drop the WS program	Similar to Alt. 3	Similar to Alt. 3
Impact on Sport Hunting	WS	Low impacts from bear removal and feeder use. Feeder use incompatible with OR spring bear hunt. Some areas with feeders would not be open to hunting even if feeders not in use.	Lower impacts from bear removal than Alt 1, but higher feeder use than Alt. 1. Low overall impact	No bear removal but higher use of feeders than Alts. 1 and 2. Low overall impact	No impact on sport hunting	No impact on sport hunting

Issue	Scale	Alternative				
		1) Current Program/ Proposed Action	2) Nonlethal before Lethal	3) Only Nonlethal	4) Only Technical Assistance	5) No Federal Program
Impact on Sport Hunting	Cum.	Same as WS Program	Higher impact than Alt 1. Magnitude of disruption would depend on options selected by producers who drop the WS program.	Magnitude of impact would depend on options selected by producers who drop the WS program.	Magnitude of impact would depend on options selected by producers who drop the WS program.	Magnitude of impact would depend on options selected by producers who drop the WS program.
Sociological Issues – Humaneness	WS	Unacceptable to some because of lethal control. Concerns over good faith use of nonlethal options. Concerns over pain and suffering with some techniques and wellbeing of hunting dogs.	Unacceptable to some because of lethal control. Fewer concerns over good faith use of nonlethal options Concerns over pain and suffering with some techniques and wellbeing of hunting dogs.	Likely to be perceived as more humane than Alts. 1 and 2. Still may be unacceptable to some animal rights group because of use of artificial feed.	Likely to be perceived as more humane than Alts. 1- 3.	Likely to be perceived as more humane than Alts. 1-3.
Sociological Issues – Humaneness	Cum.	Same as WS program	Same as WS program with increased concerns over options selected by producers who drop the WS program	WS actions may be more acceptable, but there may be more total concerns over options selected by producers who drop the WS program	Low concerns about WS, but possibly more concerns over options selected by producers who drop the WS program	No concerns about WS, but possibly more concerns over options selected by producers who drop the WS program
Sociological Issues – Aesthetic Values	WS	Low impact on bear viewing opportunities.	Slightly lower impact on bear viewing opportunities.	No impact on bear viewing opportunities.	No impact on bear viewing opportunities.	No impact on bear viewing opportunities.
Sociological Issues – Aesthetic Values	Cum.	Low impact on bear viewing opportunities	Declines in impact probably offset by increased risk from some options selected by producers who drop the WS program	Impact variable depending upon the options selected by producers who drop the WS program, but probably higher than Alts. 1 & 2	Impact variable depending upon the options selected by producers who drop the WS program, but probably higher than Alts. 1 & 2	Impact variable depending upon the options selected by producers who drop the WS program, but probably higher than Alts. 1 & 2

Issue	Scale	Alternatives				
		1) Current Program/ Proposed Action	2) Nonlethal before Lethal	3) Only Nonlethal	4) Only Technical Assistance	5) No Federal Program
Sociological Issues – Ethics	WS	Unethical to some because of lethal control, others concerned about specific tools or proof of need for lethal options. High approval from most producers.	Still unethical to some because of lethal control or because of specific tools. Less problem with proof of need for lethal options. Producer concerns about outside imposition of increased production costs.	Few problems with animal welfare or animal rights except as relates to feeding bears. Strong producer objection to restriction of access to legal methods of control	No problems with animal welfare or animal rights. Strong producer objection to restriction of access to legal methods of control	No problems with animal welfare or animal rights. Strong producer objection to restriction of access to legal methods of control
Sociological Issues – Ethics	Cum.	Same as above	Same as above with increased concerns over accountability for and impact of options selected by producers who drop the WS program.	Same as above with higher concerns over accountability for and impact of options selected by producers who drop the WS program than Alts 1 and 2.	Same as above with higher concerns over accountability for and impact of options selected by producers who drop the WS program than Alts 1, 2 and 3.	Same as above with higher concerns over accountability for and impact of options selected by producers who drop the WS program than Alts 1, 2 and 3.
Economics	WS	Program is cost effective	Program is more expensive than Alt. 1. The majority of the increase would be paid by WS cooperators	More expensive than Alts. 1 and 2. The majority of the increase would be paid by cooperators. Many producers may leave program.	Less expensive because no WS operational control	No WS expenditures for bear damage management
Economics	Cum.	Program is cost effective	Program is more expensive than Alt. 1. The magnitude of the difference would depend on options selected by producers who drop the WS program	Because most producers are anticipated to drop the WS program, costs would depend on the options selected by producers.	Costs would depend on the options selected by producers.	Costs would depend on the options selected by producers.

APPENDIX A:

LIST OF PREPARERS AND PERSONS CONSULTED

Dale Anders	Reforestation Forester, Oregon Department of Forestry, Forest Grove District,
Jeff Brent	Supervisory Wildlife Biologist, USDA/APHIS/ Wildlife Services, Salem, OR.
Jeff Davis	Forester, USDI/BLM/ Coos Bay District, Coos Bay, OR
Dustin Gray	MIS Data Technician, USDA/APHIS/ Wildlife Services, Portland, OR.
John Griffith	Commissioner, Coos County, Coquille, OR.
Shannon Hebert	Environmental Coordinator, USDA/APHIS/ Wildlife Services, Portland, OR.
Rodger Huffman	Administrator of Animal Programs, Oregon Department of Agriculture, Salem, OR.
Alan Kanaskie	Forest Pathologist, Oregon Department of Forestry, Salem, OR.
David Kaspar	Reforestation Forester, Oregon Department of Forestry, Astoria District, Astoria, OR.
Sgt. Walt Markee	Fish and Wildlife Division, Oregon State Police, Salem, OR.
Dale Nolte	Station Leader, USDA/APHIS/WS National Wildlife Research Center, Olympia, WA.
Rick Schultz	Forester, USDI/BLM/ Coos Bay District, Coos Bay, OR.
Stan Thomas	Supervisory Wildlife Biologist - USDA/APHIS/ Wildlife Services, Roseburg, OR.
John Toman	Supervisory Fish and Wildlife Biologist, Oregon Department of Fish and Wildlife, Charleston, OR.
Kimberly Wagner	Staff Biologist - USDA/APHIS/ Wildlife Services, Portland, OR.
Don Whittaker	Assistant Staff Biologist, Oregon Department of Fish and Wildlife, Portland, OR.
Dave Williams	State Director - USDA/APHIS/ Wildlife Services, Portland, OR.

APPENDIX B

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APPENDIX C

ENDANGERED AND THREATENED SPECIES CONSULTATIONS

USDA United States Department of Agriculture
Animal and Plant Health Inspection Service
Wildlife Services
Oregon State Office
6135 NE 80th Avenue
Suite A8
Portland, OR 97218
TEL 503.326.2346
FAX 503.326.2367

July 24, 2002

Kemper McMaster
Field Supervisor
USDI, Fish and Wildlife Service
Portland Field Office
2600 S.E. 98th Ave., Suite 100
Portland, OR 97266

Dear Mr. McMaster

This letter initiates our request for an informal Section 7 consultation for the USDA/APHIS/WS EA, "Managing Black Bear Damage to Timber in Oregon". The following analysis was conducted using endangered species lists received from the Service on June 20, 2002. We request the Service's concurrence on our determination on Columbia white-tailed deer. The determination for bald eagles is from the Service's 1992 Biological Opinion and the Service's consultation on the WS Roseburg District Predation Management Program (June 7, 1994 (reference 1-7-94-I-296)), and is provided here as a reference

Project Area and Summary

The purpose of the proposed project is to help reduce black bear (*Ursus americanus*) damage to timber in Western Oregon private and County lands. The proposed program would be conduced in Benton, Clackamas, Clatsop, Columbia, Coos, Curry, Douglas, Hood River, Jackson, Josephine, Lane, Lincoln, Linn, Marion, Multnomah, Polk, Tillamook, Washington, and Yamhill Counties. Work to manage bear damage to timber is only conducted from April - July

Proposed Action - Specific Methods Used

Damage management efforts would be targeted at specific offending black bear. The specific control methods and techniques that could be used are as follows:

1. Silvicultural practices:

Silvicultural practices are non-lethal preventive methods such as pruning, delayed thinning and fertilization, maintaining stands at higher densities, and planting a wide variety of tree species. These techniques are recommended based upon research on patterns in bear damage to timber, and current data on bear foraging preferences. Silvicultural techniques are used by the resource manager and are not conduced by WS personnel.

2. Bear Feeding Program:

Bear damage to timber occurs in the spring and early summer when alternative food supplies are relatively limited. In bear feeding programs, bears are offered an alternative nutritious feed with a higher sugar content than tree cambium with the intention of luring bears from feeding on trees to feeding man-made bear feed. The bear feed contains no ruminant animal proteins and therefore does not pose a risk of transmission of BSE. Feeding programs are generally initiated in response to observed damage. Bear damage to timber and bear use of feeders usually ends in June/July when summer foods like berries become readily available (Zeigltrum 1994, Partridge et al. 2001).

3. Lethal Removal of Problem Individuals: In some cases, it may be necessary to remove offending individuals. Removal of one or two specific animals in the problem area can provide immediate relief from a damage situation. ODFW does not advocate the relocation of timber damaging bears (ODFW 1993). Therefore, all bears removed from depredation sites are euthanatized, usually via gunshot. WS complies with all state regulations on bear carcass disposition.

The following techniques are used to capture bears that damage timber.

Cage traps: Cage traps constructed of sections of culvert pipe are sometimes used to capture black bears. Cage traps pose minimal risk to humans, pets and other non-target animals, and they allow for on-site release or relocation of animals. Disadvantages of cage traps are that, because of their size, they are difficult to get to remote sites and to sites with heavy underbrush or rough terrain. As mentioned above, timber damaging bears captured in cage traps are euthanatized and not released.

Foot Snares: Spring activated foot snares are used as live-capture devices. The snare is pulled up and around the bears foot when it steps on the triggering mechanism. WS employees reduce the risk to non-target species by using techniques which increase the amount of pressure required to trigger the snare (pan tension devices), thereby reducing the risk to smaller non-target species. Risks of capturing a non-target animal are also reduced through bait selection and careful design of the snare set. There are 5 general types of snare sets used to capture bears that damage trees; baited sets, walk-around sets, log sets, trail sets, and pipe sets (Flowers 1977). Baited sets use brush, logs, trees, and shrubs to create a V-shaped enclosure that directs bear movement to a bait or lure. An alternative form of the baited set is the walk-around set. A walk-around set involves placing a meat bait high in the branches of a tree, near the trunk. Snares are set around the base of the tree. Brush and logs may be used to direct foot placement on snare triggers. Pipe sets are similar to baited sets. With a pipe set, an approximately 5 inch diameter and 9 inch long pipe is set vertically into the ground so that the top of the pipe is flush with the surface of the ground. A notch is cut in the side of the pipe for the trigger mechanism. The spring for the snare is set into the ground so that the trigger mechanism fits in the notch in the pipe and

is located 6 inches down from the top of the pipe. The lure or bait is set at the bottom of the pipe, below the trigger. The pipe is covered with a rock or piece of plywood smeared with bacon grease or some other lure. Bears trigger the snare when they remove the rock or log and reach into the pipe to get the bait. Trail sets are sets placed on travel routes so that bears using the trail will place their foot in the set. Similarly, log sets are sets created on logs used by bears as travel corridors.

Body Snares: Body Snares are snares that are used with trail or log sets (see descriptions under foot snares). The animal walks through the snare and it tightens around the animals body. Risks to non-target species are reduced through careful design and placement of the snare set. This technique poses relatively little risk to small or medium size mammals because they can usually pass through the large loop needed for a bear body-snare without triggering the device.

Shooting is highly selective for target species. WS specialists may occasionally see and shoot a bear while examining damage on a site, or they may use a call to lure a bear to shooting range. However, most bears are tracked from the site of recent damage with the assistance of trained hunting dogs. The use of trained hunting dogs greatly increases the likelihood of locating specific problem individuals.

"No Effect" Species

Although not required by the ESA to consult on "no effect" species, we have included the following synopsis of our evaluation as a courtesy. In USFWS's 1992 BO on the APHIS-WS nationwide program, it indicated that it did not believe that fish, clams, crustaceans, sea turtles, and plants would be adversely impacted by any aspect of the APHIS-WS program (USDA 1997 Revised). No new methods have been proposed that would change this determination. In addition, the proposed program does not affect habitat. Therefore, it is my professional determination that the proposed APHIS-WS program for managing black bear damage to timber would have no effect on the following species:

Reptiles and Amphibians

Loggerhead sea turtle	*Caretta caretta*
Green sea turtle	*Chelonia mydas*
Leatherback sea turtle	*Dermochelys coriacea*
Olive Ridley sea turtle	*Lepidochelys olivacea*

Fish

Chinook salmon	*Oncorhynchus tshawytscha*
(Upper Willamette River, Lower Columbia River Snake River Spring/Summer/Fall Runs)	
Chum salmon (Lower Columbia River)	*Oncorhynchus keta*
Coastal Cutthroat Trout	*Oncorhynchus clarki clarki*
(SW Washington/Lower Columbia River	

Coho salmon	*Oncorhynchus kisutch*
(Oregon Coast, S. Oregon/N. Calif. Coast)	
Steelhead	*Oncorhynchus mykiss*
(Upper Willamette River, Snake River Basin, Lower & Middle Columbia Rivers)	
Sockeye Salmon	*Oncorhynchus nerka*
(Snake River, Salmon River tributary to the Snake River)	
Bull trout (Columbia River Basin pop)	*Salvelinus confluentus*
Oregon chub	*Oegonichthys crameri*

Plants

Macdonald's rockcress	*Arabis macdonaldiana*
Western lily	*Lilium occidnetale*
Kincaids lupine	*Lupinus sulphureus* var. *kincaidii*
Rough popcorn flower	*Plagiobothrys hirtus*
Golden Indian paintbrush	*Castilleja levisecta*
Willamette daisy	*Erigeron decumbens* var. *decumbens*
Howellia	*Howellia aquatilis*
Bradshaw's lomatium	*Lomatium bradshawii*
Nelson's checker-mallow	*Sidalcea nelsoniana*
Gentner's fritillary	*Fritillaria gentneri*
Large flowered meadowfoam	*Limnanthes floccosa* spp. *Grandiflora*
Cooks lomatium	*Lomatium cookii*

Invertebrates

Fender's blue butterfly	*Icaricia icarioides fenderi*
Vernal pool fairy shrimp	*Branchinecta lynchi*
Oregon silverspot butterfly	*Speyeria zerene hippolyta*

Marine mammals

Right whale	*Balaena glacialis*
Sei whale	*Balaenoptera borealis*
Blue whale	*Balaenoptera musculus*
Finback Whale	*Balaenoptera physalus*
Humpback whale	*Megaptera novaeangliae*
Sperm Whale	*Physeter macrocephalus*

Western snowy plover (*Charadrius alexandrinus nivosus*), brown pelican (*Pelecanus occidentalis*), short-tailed albatross (*Phoebastria albatrus*), Steller sea lion (*Eumetopias jubatus*): This program would not be conducted in areas where the Western snowy plover, brown pelican, short-tailed albatross, or Stellar sea lion could be affected. Therefore, the APHIS-WS program for managing black bear damage to timber would have **no effect** on the Western snowy plover, brown pelican, short-tailed albatross, or Stellar sea lion.

Northern spotted owl (*Strix occidentalis caurina*) marbled murrelet (*Brachyramphus marmoratus*), Canada lynx (*Lynx canadensis*): It is our determination that the techniques used

by WS for managing black bear damage to timber in Oregon pose no risk to Northern spotted owls, marbled murrelets or Canada lynx. It is my professional determination that the proposed action will have **no effect** on the Northern spotted owl, marbled murrelet, or Canada lynx.

Proposed Action and "May Affect" Species

The primary potential for impacts to any listed species would be associated with accidental injury or death of a nontarget listed species during efforts to manage black bear damage to timber. None of the activities associated with the program will result in habitat modification. During the period from 1996 – 2001, the only non-target species captured during programs to manage black bear damage to timber were 3 mountain lion (leg snares), one domestic dog (culvert trap), and an opossum (dogs). All animals except the opossum were released.

A detailed analysis of the specific risks associated with all tools except the bear feeding program is provided in the USFWS 1992 Biological Opinion for the APHIS/ADC Programmatic EIS. The Service provided further analysis of all bear capture strategies in its consultations on the predation management programs for Oregon (June 7, 1994 (reference 1-7-94-I-296); February 9, 1996 (I-7-96-SP-91); April 9, 1996 (I-7-96-I168); and April 9, 1996 (I-7-96-I-188)). With the exception of the bear feeding program and technical advice on silvicultural practices, all techniques used to manage bear damage to timber are identical to the techniques used for bear damage management in the predation management programs. Consequentially, we have referenced the Service's comments for our predation management programs where applicable.

Columbian white-tailed deer (*Odocoileus virginianus leucurus*)

In its 1992 biological opinion, the Service concluded that although Wildlife Services suggested that leg-hold traps and neck snares might affect Columbian white-tailed deer, the Service concluded that Columbian white tailed deer were not likely to be adversely affected by traps and snares. However, the Service listed the following measure for reducing risks to Columbian white-tailed deer in its April 9, 1996 informal consultation letter for Predator Damage Management in the Northwest District.

> "1) The additional measures proposed by ADC [WS] to further reduce the likelihood of capturing a Columbia white-tailed deer with a leghold traps or neck snares should also be implemented. As stated in your supplemental letter, ADC will a) avoid setting foot and neck snares in trails and under fences where deer activity is evident; b) avoid using snares from 1 June through 1 October; c) use "break away" snares when they become available; and d) modify snare lock loop holes to limit diameter of snare."

Provisions b & c were intended for use with traps and snares set for small predators and cannot be applied to programs managing bear damage to timber. WS proposes the following measures for reducing risks to Columbian white-tailed deer from programs to reduce bear damage to timber.

a) WS will avoid setting snares in trails where deer activity is evident

d) Modify snare lock loop holes to limit diameter of snare closure to 2 1/2 inches.

No Columbian white-tailed deer has been affected by the Wildlife Services Program, except that they may have benefited from removing predators. Wildlife Services will implement these measures in Clatsop, Columbia, Douglas, Lane and Multnomah Counties where Columbian white-tailed deer may be present. Based on the Service's previous concurrence for similar activities, we conclude that the Wildlife Services program is **not likely to adversely affect** the Columbian white-tailed deer.

Bald Eagle (*Haliaeetus leucocephalus*)

The 1992 Biological Opinion and the Service's consultation on the WS Roseburg District Predation Management Program (June 7, 1994 (reference 1-7-94-I-296)) provide reasonable and prudent measures and terms and conditions for reducing risks to bald eagles. WS proposes using the same terms and conditions and reasonable and prudent measures in the bear damage management program.

The USFWS 1992 biological opinion lists the following reasonable and prudent measure relevant to the WS program for managing black bear damage to timber.

> 1) When bald eagles are in the immediate vicinity of a proposed control program, ADC [WS] personnel must conduct daily checks for trapped individuals.

The USFWS 1992 opinion supplemented by the 1994 consultation with the Portland State Office for the WS Roseburg district stipulated the following terms and conditions:

1. ADC [WS] personnel shall contact either the local state fish and game agency or the appropriate regional or field office of the Service to determine nest and roost locations.
2. Pan tension adjustments shall be set which will preclude the taking of lighter non-target animals.
3. The appropriate U.S. Fish and Wildlife Service office shall be notified within 5 days of the finding of any dead or injured bald eagle. Cause of death, injury, or illness, if known, should be provided to those offices.

The Oregon WS program has never captured a bald eagle. Based on the Service's previous concurrence for similar activities, we conclude that the proposed Wildlife Services program for managing bear damage to timber is **not likely to adversely affect** the bald eagle.

When the bald eagle is delisted, the WS program will conduct operations in accordance with the Migratory Bird Treaty Act and the Bald and Golden Eagle Act.

If you have questions, you may contact me or Kim Wagner in my office at (503) 326-2346. If we do not receive a response from your office within 30 days from the date of this letter, we will assume that the USFWS concurs with our findings

Sincerely,

David E. Williams
State Director

cc Dave Peterson

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Roseburg Field Office
2900 NW Stewart Parkway
Roseburg, Oregon 97470
541/957-3474 FAX: 541/957-3475

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Reply to: 8330.9974 (02)
File name:WS-bear.EA.wpd
Log Number: 1-15-02-I-997
Xref: 1-7-94-I-296
TS#: 02-6918

August 29, 2002

Dave Williams, State Director
Animal and Plant Health Inspection Service
Wildlife Services, Suite AB
6135 NE 80th Avenue
Portland, OR 97218

Subject: Request for informal consultation and concurrence on effects determinations for the USDA/APHIS/WS Draft Environmental Assessment, "Managing Black Bear Damage to Timber in Oregon".

Dear Mr. Dave Williams:

On July 24, 2002, you requested informal consultation and written concurrence from the U.S. Fish and Wildlife Service (Service) that the subject proposed action "may affect, not likely to adversely affect" the endangered Columbian white-tailed deer (deer) *Odocoileus virginianus leucurus*. Your determination is based on the analysis of the proposed action and methods to be used in your draft Environmental Assessment (EA) "Managing Black Bear (bear) (*Ursus americanus*) Damage to Timber in Oregon. Your request was received in this office on July 30, 2002. This consultation is being conducted pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 153 et seq.), as amended, and is based on information provided to the Service in your request letter noted above and telephone conversations between Dave Peterson, Service biologist and Kim Wagner of your staff.

Information provided on the proposed action included descriptions of the bear management methods to be used, and their possible affects on the deer. The EA has not been finalized at this time, and if changes are made that differ from the proposed action described in your request letter re-initiation of this consultation may be required.

Consultation History

A programmatic Biological Opinion was issued by the Service on July 28, 1992, regarding Wildlife Services'(previously Animal Damage Control) nationwide actions. The Service's Oregon State Office (now Oregon Fish and Wildlife Office) in its June 7, 1994 letter (1-7-94-I-

296) concurred with Wildlife Services' Roseburg District that use of leghold traps "may affect, not likely to adversely affect" the threatened bald eagle (*Haliaeetus leucocephalus*). The Service's Concurrence was based on Wildlife Services agreement to prevent the incidental take of eagles by incorporation of additional safeguards included in the 1994 consultation.

The Service's April 9, 1996 (1-7-96-I-168) letter of concurrence was mentioned in the July 24, 2002 consultation request letter, but it applied only to proposed actions by the Wildlife Services' John Day District. These proposed actions are outside of the deer's present and historical range.

In 1996, informal consultation was concluded regarding the addition of four measures (relative to the proposed actions covered in the 1992 Biological Opinion) to reduce the risk to non-target species from the Wildlife Services' Predator Damage Management Program for the Northwest Oregon District. The Service concurred (April 9, 1996 letter of concurrence (1-7-96-I-188)) that the four additional measures proposed by Wildlife Services would not likely adversely affect the deer.

Proposed Action

According to information provided to the Service, Wildlife Services proposes to assist in reducing bear damage to timber in western Oregon on private and county lands. Work to manage bear damage to timber is conducted only from April through July. Damage management efforts are targeted at specific bears causing timber damage.

The proposed action is scheduled to occur in the following Oregon counties; Benton, Clackamas, Clatsop, Columbia, Coos, Curry, Douglas, Hood River, Jackson, Josephine, Lane, Lincoln, Linn, Marion, Multnomah, Polk, Tillamook, Washington, and Yamhill. This sub-species of deer is only known to presently occur in portions of Clatsop, Columbia, and Douglas counties. Therefore, this consultation will only apply to the present range of the deer in these three counties (current deer range maps enclosed).

Methods and Possible Affects

There are three general methods used to reduce bear damage to timber: 1) Providing technical advise on silvicultural practices; 2) operational programs and technical advise on bear feeding programs, and 3) lethal removal of problem individuals.

Silvicultural practices are used only by resource managers and are not conducted by Wildlife Services. Silvicultural practices are non-lethal preventive methods such as pruning, delayed thinning, fertilization, higher density timber stands, and planting of a wide variety of tree species.

The bear feeding method is used to supplement the bear's diet and reduce the potential for damage when the bears are using tree cambium as a food source. The bear food used contains no ruminant animal proteins, which will prevent any risk of transmission of Bovine Spongiform Encephalopathy (mad cow disease) to deer if they consume any of the feed.

Lethal removal of individual problem bears is accomplished by four basic techniques. These techniques are; hunting with and without the use of hounds, cage traps, foot snares, and body snares. Hunting without hounds is highly selective for the target species and would have no affect on the deer. If young or only partially trained hounds are used as part of the hunting technique they could pose a threat to deer. However, if only hounds trained to not run or harass deer are used, there would be little danger of an adverse effect on deer. The use of cage traps, made of culvert pipe, is a live trapping technique and poses minimal risk to deer. Wildlife Services believes that it is extremely unlikely that deer would be caught in a cage trap. Deer would have to jump up into the culvert and approach the meat bait closely to trigger the release of the trap door. Careful choice of bait types that are not attractive to deer also reduces any potential risk. The minimal risk is further reduced as cage traps are rarely used in timber damage management programs. The three year average of bears taken by the use of cage traps is only one percent of bears taken by all methods. Non-target species, if captured in cage traps, can be released immediately on site, thereby reducing the likelihood of accidental injury.

Foot and body snares do have the potential to adversely affect the deer if certain restrictions in their use are not observed. The risk to the deer from foot and body snares are minimized by the Wildlife Services' proposal to use the following prevention techniques. A) Increasing the amount of pressure required to trigger the snare (pan tension devices), thereby reducing the risk to deer and other non-target species. (B) The use of bait materials with snares that will not attract deer, and the careful design of snare sets to avoid accidental capture of deer. There are five general types of snare sets used for bear; baited sets, walk around sets, log sets, pipe sets, and trail sets (Flowers 1977).

Baited sets involve using natural materials, such as logs, trees, brush, and scrubs to create a V-shaped enclosure. A bait is placed at the closed end of the V to attract bears into the enclosure where the snare is placed. When properly constructed and a non-deer attractive bait is used, there is very little chance of capturing a deer.

An alternative form of the baited set is the "walk-around" set. A walk-around set involves placing a meat bait high in the branches of a tree, near the trunk, with one or more snares set around the base of the tree. Brush and logs may be used to direct foot placement of bear on snare triggers.

A snare log set is placed on logs that bear use as travel corridors. It is unlikely to harm a deer as long as it is not placed in conjunction with a deer trail that may require deer to jump onto or over the log near a snare set to continue on its trail.

The pipe set consists of a five inch diameter pipe nine inches long which is buried into the ground with the top of the pipe set flush with the surface of the ground. The snare trigger device is placed six inches below the top of the pipe with a non-deer attractive bait placed at the bottom of the pipe below the trigger devise. The top of the pipe is covered with a heavy rock or piece of wood smeared with a lure such as bacon grease. In order to trigger the snare an animal must first

be attracted to the lure, then has to remove the cover from the top of the pipe and reach down into the pipe and contact the trigger before the snare device is activated. It is highly unlikely that this type of set will accidently catch a deer.

Trail sets have the greatest potential to adversely affect the deer, but accidental deer captures are unlikely to occur if the prescribed safety measures are followed. When a body snare is used instead of a foot snare, smaller and medium non-target species are unlikely to be captured as the large snare loop required for bear will allow them to pass through the loop without being caught. Trail sets will not be used when deer use of the trail is evident.

In the April 9, 1996 informal consultation (1-7-96-I-188) on Predator Damage Management for Wildlife Services' Northwest Oregon District, four additional measures were proposed by Wildlife Service to reduce risks to non-target species:

a) implementation of Wildlife Services' proposed policy to avoid setting foot and neck snares in trails and under fences where deer activity is evident;
b) avoid the use of snares from June 1 through October 31;
c) use "break away" snares when they become available; and
d) modify snare lock loop holes to limit diameter of snare closure to 2 1/2 inches.

In this current consultation request, Wildlife Services has committed to adoption of the following modifications to the 1996 consultation measures in its bear timber damage program. The use of measure (a) all year will make measure (b) unnecessary. Measure (c) would allow the escape of larger animals if captured accidentally in sets for smaller predators. This measure cannot be applied in programs designed to capture bear. Measure (d) will help protect smaller non-target species, including deer, when set properly. Wildlife Services has proposed that measures (a) and (d) be included in the EA to reduce risk to the deer under the proposed bear damage control program.

Wildlife Services proposes to implement the applicable terms and conditions, as well as the conservation measures, contained in the previously mentioned consultations to reduce any possible risk to deer under the proposed bear damage control program. Wildlife Services' records cited in their consultation request letter indicate that no Columbian white-tailed deer have been affected by their program since 1982, with the exception that they may have benefitted from the removal of predators.

No suitable deer habitat loss or degradation is anticipated with this proposed action. Therefore, the extent of the impacts from the proposed action are limited to possible accidental death or injury to deer that may result from some of the proposed methods to prevent bear damage to timber. With the inclusion of measure (a) and (d), the Service concurs with the determination that the project, "may affect, but is not likely to adversely affect" the deer.

This concludes informal consultation on the proposed action. If any changes to the proposed action occur or new information becomes available, reinitiation of consultation may be required.

Additionally, in conversations between Kim Wagner and Dave Peterson, the following recommendations were discussed that may further reduce the likelihood of impacts to deer. Kim and Dave agreed that the Service would provide these recommendations for consideration by Wildlife Services and possible inclusion in Wildlife Services' final EA. These recommendations would only apply to proposed actions carried out under Wildlife Service's program within the current range of the deer in Clatsop, Columbia, and Douglas counties.

1) Trail sets of leghold traps and snares use should be avoided whenever possible within the present range of the deer to avoid possible accidental captures, even when there is no evidence of deer use.
2) Baited set should be placed at least 10 feet from trails to prevent accidental capture of deer that may use the trails.
3) Snare loop locks should be modified to prevent a snare loop from tightening to less then two and one- half inches in diameter.
4) Only baits that do not attract deer should be used, meat or meat by-products are preferred baits. Fruit, vegetables, or grain would not be acceptable bait material.
5) Only hounds (dogs) trained not to run or harass deer should be used to assist in the capture of bear.

The Service's Roseburg office has coordinated this response letter with staff of the Julia Butler Hansen National Wildlife Refuge. The Refuge has management responsibility for the Lower Columbia River sub-population of deer which occurs in Clatsop and Columbia counties.

If you have any questions, please contact David Peterson at 541/957-3471 or myself.

Sincerely,

Craig A. Tuss

Craig A. Tuss
Field Supervisor

Enclosures (range maps):

cc w/o enclosures: Office Files, FWS-OFWO, Portland, OR (e)
Rollie White, FWS-OFWO, Portland, OR (e)
Al Clark, FWS, JBHNWR, Cathlamet, WA (e)
Terry Farrell, ODFW, Roseburg, OR (e)
Tom Thornton, ODFW, Sauvie Island, OR (e)

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Oregon
John A. Kitzhaber, M.D., Governor

Department of Fish and Wildlife
Wildlife Division
2501 SW First Avenue
PO Box 59
Portland, OR 97207
(503) 872-5260
FAX (503) 872-5269

December 17, 2002

RECEIVED
DEC 24 2002

Dave Williams
State Director
USDA Wildlife Services
6135 NE 80th Ave.
Suite A8
Portland, OR 97218

Dear Dave:

This letter is in respond to your letter of October 28, 2002 regarding potential impacts that western Oregon bear damage management might have on state listed Threatened or Endangered Species. In reviewing your letter we would concur with the comments you provided on the several listed species (i.e., peregrine falcon, Aleutian Canada goose, wolverine). I might add that there are only a few peregrine nesting sites know on private lands in Oregon. Most are found on federal and state lands. Since peregrine usually nest on tall cliff areas, we would not expect bear management activities to affect an active nesting area unless it was immediately above or below the cliff site. Birds would likely be disturbed only if human activities were highly visible to the birds and/or noisy.

I would add one additional species to the list and that would be the bald eagle which is found throughout the Analysis Area all year. Bald eagles in western Oregon usually nest in large mature or old-growth conifers or mature cottonwoods in close proximity to rivers, lakes and coastal estuaries. They would not likely be nesting in the immediate areas of potential bear damage because the size and age class of the trees that bears are seeking would be much younger. If access to these areas includes older aged forest stands or residual large old-growth trees, a small potential exists for nesting birds to be present. Information on known nest sites is available upon request.

If you have any additional questions about T & E species relative to this planning effort please contact me.

Sincerely, Charles Bruce

Charles R. Bruce
Wildlife Diversity Program

APPENDIX D

CONSULTATIONS WITH THE

OREGON DEPARTMENT OF FISH AND WILDLIFE

Oregon
John A. Kitzhaber, M.D., Governor

Department of Fish and Wildlife
Charleston District Office
63538 Boat Basin Drive
PO Box 5430
Charleston, OR 97420
(541) 888-5515
FAX (541) 888-6860

August 20, 2002

Kimberly K. Wagner
USFWS, APHIS, WS
6135 NE 80th Ave., Suite A-8
Portland, OR 97218

Subject: Laws regarding bear damage control

Dear Ms Wagner:

Following is clarification on Oregon laws regarding bears and damage control efforts.

ORS 498.164: "Taking black bear or cougar using dogs or bait prohibited; damage control and government management exceptions; hunting license suspension for violation."

Subsection (2) exempts employees or agents of county, state, or federal agencies while acting in their official capacities.

Subsection (3) exempts taking of black bears or cougars in accordance with the provisions of ORS 498.012.

ORS 498.012: "Taking wildlife damaging land, livestock or agricultural or forest crops."

ORS 498.012 allows landowners or their assigned agent to take certain wildlife damaging land, livestock or agricultural or forest crops. This statute pertains to land that the person owns or lawfully occupies. Bears are included in the wildlife covered by the statute. The person who owns or lawfully occupies the land may assign an agent to aid with the control work and will provide the agent with written authority as outlined in the statute. Under this statute, the control work by the landowner or private agent is limited to the land owned or lawfully occupied. A permit is not required for the damage control work. If a bear is taken, the person taking the animal "shall immediately report the taking to a person authorized to enforce the wildlife laws…"

ORS 498.166: "Bears or cougars posing threat to human safety."

ORS 498.166 allows a person to take a bear that poses a threat to human safety. The statute includes reporting requirements and animal behavior that would constitute "threat to human safety" as used in this statute.

I hope this is helpful in clarifying statutes relating to taking bear causing damage.

Sincerely,

John V. Toman

John V. Toman
Wildlife Biologist
Umpqua Watershed District

Oregon
John A. Kitzhaber, M.D., Governor

Department of Fish and Wildlife
Charleston District Office
63538 Boat Basin Drive
PO Box 5430
Charleston, OR 97420
(541) 888-5515
FAX (541) 888-6860

August 20, 2002

Kimberly K. Wagner
USFWS, APHIS, WS
6135 NE 80th Ave, Suite A-8
Portland, OR 97218

Subject: Providing alternate food source for bears pealing trees

Dear Ms Wagner:

The Oregon Department of Fish and Wildlife (ODFW) does not have an adopted position on providing of alternate food source for bears that peel trees. However, the ODFW generally discourages providing food as a technique to reduce damage. I am familiar with the technique and worked with land managers using the technique. Providing an artificial, alternate food source is a technique that has been used with some success. As with most techniques relating to wildlife damage, it is not a solution when used as the sole method to reduce damage. It appears that for the technique to be effective, some level of bear removal is still required. Removal may be by higher harvest levels by hunters or by removal by damage control agents.

There are other concerns with providing alternate food sources.

1. Providing the food changes the foraging behavior of the animal. This could effect normal seasonal use of the bear's home range.
2. The concentrated food source can change bear distribution. It is unknown what effect this may have on social behavior.
3. Bears become more concentrated at the food source than under normal conditions. Any time animals become more concentrated, the opportunity for spread of disease and parasites increases.
4. Providing of food may cause bears to become "human habituated" or "food conditioned." If this were true, there would be an increased chance of bear/human conflict. At this point, this has not been demonstrated as a problem with the technique.
5. Providing food limits some spring hunting opportunity due to the statute restricting baiting to attract bears.
6. It is not clear what the effect of artificial feeding has on the reproductive ecology and survival for the locally fed bear population. Increased reproduction and survival could lead to increased populations and increased damage, with resultant increased need to feed or remove damage-causing bears.

Sincerely,

John V. Toman

John V. Toman
Wildlife Biologist
Umpqua Watershed District

Oregon Department of Fish and Wildlife

P.O. Box 5430 Charleston, Oregon 97420
(541) 888-5515

Date: August 20, 2002
To: Kimberly K. Wagner
From: John Toman
Subject: Bears, Biscuit Fire

The actual effect of the Biscuit Fire on the bear population in the immediate area will depend on intensity of burn, pattern of burn, and actual acres burned out of the gross acres of the fire area. The full extent of impacts will not be known until the fire is out and rehabilitation efforts are mostly complete. It would be expected that the short term impacts on the bear population would be negative due to loss of food and cover. There is likely to be some displacement of bears. Displacement of bears or expansion of their home range to find adequate food and cover is also likely to put stress on bear populations in the vicinity of the fire. Conflicts between bears and humans could increase in the short term. Ideally, the bear population would be reduced in the short term to be in balance with existing food supplies. A reduced bear population would be in a better position to increase as the food supply increases with recovery after the fire. However, due to the remote nature of the area, it is unlikely that harvest by hunters will reduce the bear population to the desired balance.

In the longer term, the bear population should benefit from the resulting improved food supply created by the fire. Very few bears are harvested in the Kalmiopsis Wilderness Area due to the remote nature of the area. The bear population will mirror and follow development of forage and cover.