

**Environmental Assessment**

**Predator Damage Management  
To Protect the Federally Threatened  
Pacific Coast Population of the  
Western Snowy Plover**

**Oregon**

**Lead Agencies:**

U.S. Department of Interior  
Fish and Wildlife Service  
Region 1

U.S. Department of Interior  
Bureau of Land Management  
Coos Bay District

U.S. Department of Agriculture  
Siuslaw National Forest

**Cooperating Agencies:**

State of Oregon  
Department of Fish and Wildlife

State of Oregon  
Parks and Recreation Department

**Prepared by**

**Cooperating Agency:**

U.S. Department of Agriculture  
Animal and Plant Health Inspection Service  
Wildlife Services

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## TABLE OF CONTENTS

List of Acronyms and Abbreviations Used in this Document .....	1-iv
CHAPTER 1: PURPOSE AND NEED FOR ACTION .....	1-1
1.0 Introduction .....	1-1
1.1 Purpose .....	1-1
1.2 Need for Action .....	1-3
1.3 Background .....	1-5
1.4 Location and Scope of Analysis .....	1-7
1.6 Summary of Public Involvement Efforts .....	1-13
1.7 Related Environmental Documents .....	1-13
1.8 Authority and Compliance .....	1-16
1.8.1 Authority of Federal and State agencies in wildlife damage management and endangered species protection .....	1-17
1.8.2 Compliance with Federal laws .....	1-18
1.8.3 Oregon State laws .....	1-21
CHAPTER 2: DESCRIPTION OF ALTERNATIVES .....	2-18
2.1 Alternative 1 - Proposed Action - Integrated Predator Damage Management ..	2-18
2.2 Alternative 2 - Current Program (No Action Alternative) .....	2-24
2.3 Alternative 3 - Non-lethal Predation Damage Management Methods Only ...	2-25
2.4 Alternative 4 - Non-lethal Predation Damage Management Methods Before Lethal Damage Management Methods .....	2-25
CHAPTER 3 - ISSUES IMPORTANT TO THE ANALYSIS OF IMPACTS .....	3-1
3.1 Issues Driving the Analysis .....	3-1
3.2 Issues Not Analyzed in Detail with Rationale .....	3-1
3.3 Evaluation Methodology .....	3-3
CHAPTER 4: ENVIRONMENTAL CONSEQUENCES .....	4-1
4.1 Alternative 1 - Proposed Action - Integrated Predator Damage Management ..	4-1
4.1.1 Impact of predator damage management on the target species populations .....	4-2
4.1.1.1 American crows .....	4-2
4.1.1.2 Common ravens .....	4-3
4.1.1.3 Red Foxes .....	4-5
4.1.1.4 Raccoon .....	4-8
4.1.1.5 Striped skunks .....	4-10
4.1.1.6. Impact on other predators .....	4-12

- 4.1.2. Non-target impacts ..... 4-21
- 4.1.3 Humaneness ..... 4-24
- 4.1.4 Effectiveness ..... 4-26
- 4.1.5 Impacts on recreation ..... 4-29
- 4.2 Alternative 2 - Current Program (No Action Alternative) ..... 4-33
  - 4.2.1 Impact of predator damage management on the target species populations ..... 4-33
    - 4.2.1.1 American crows ..... 4-33
    - 4.2.1.2 Common ravens ..... 4-33
    - 4.2.1.3 Fox ..... 4-34
    - 4.2.1.4 Raccoon ..... 4-34
    - 4.2.1.5 Skunk ..... 4-34
    - 4.2.1.6. Impacts on other predators ..... 4-34
  - 4.2.2 Non-target impacts ..... 4-35
  - 4.2.3 Humaneness ..... 4-36
  - 4.2.4 Effectiveness ..... 4-36
  - 4.2.5 Impacts on recreation ..... 4-36
- 4.3 Alternative 3 - Non-lethal Control Only ..... 4-36
  - 4.3.1 Impact of predator damage management on the target species populations ..... 4-36
    - 4.3.1.1. American crows ..... 4-36
    - 4.3.1.2 Common ravens ..... 4-37
    - 4.3.1.3 Fox ..... 4-37
    - 4.3.1.4 Raccoon ..... 4-37
    - 4.3.1.5 Striped skunk ..... 4-37
    - 4.3.1.6. Impacts on other predators ..... 4-38
  - 4.3.2 Non target impacts ..... 4-38
  - 4.3.3 Humaneness ..... 4-39
  - 4.3.4 Effectiveness ..... 4-39
  - 4.3.5 - Impacts on recreation ..... 4-40
- 4.4 Alternative 4 - Non-lethal Control Before Lethal Control ..... 4-40
  - 4.4.1 Impact of predator damage management on the target species populations ..... 4-40
    - 4.4.1.1 American crows ..... 4-41
    - 4.4.1.2 Common ravens ..... 4-41
    - 4.4.1.3 Red fox ..... 4-41
    - 4.4.1.4 Raccoon ..... 4-41
    - 4.4.1.5 Striped skunk ..... 4-42
    - 4.4.1.6. Impacts on other predators ..... 4-42

4.4.2 Non target impacts ..... 4-42  
4.4.3 Humaneness ..... 4-43  
4.4.4 Effectiveness ..... 4-43  
4.4.5 Impacts on recreation ..... 4-43  
4.5 Cumulative Impacts ..... 4-44  
4.6 Summary and Conclusions ..... 4-45

CHAPTER 5 - PREPARERS, PERSONS CONSULTED AND REFERENCES ..... 5-1

APPENDIX A - Federal Register Notice. Determination of Threatened Status of Pacific Coast Population of Western Snowy Plover. March 5, 1993.

APPENDIX B - Predator Damage Management Methods

APPENDIX C - Mitigation in Standard Operating Procedures

APPENDIX D - Pesticide Labels

APPENDIX E - Biological Opinion

## List of Acronyms and Abbreviations Used in this Document

ACEC	Area of Critical Environmental Concern
APHIS	Animal and Plant Health Inspection Service (USDA agency)
BBS	Breeding Bird Survey
BLM	Bureau of Land Management (USDI agency)
BO	Biological Opinion
CBC	Christmas Bird Count
CEQ	President's Council on Environmental Quality
CFR	Code of Federal Regulations
COE	U.S. Army Corps of Engineers
DM	Department of the Interior's Departmental Manual
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
FY	Fiscal Year
GAO	U.S. Government Accounting Office
LRMP	Land and Resource Management Plan
MIS	Management Information System
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NRA	National Recreation Area
OAR	Oregon Administrative Rules
ODA	Oregon Department of Agriculture
ODFW	Oregon Department of Fish and Wildlife
OPRD	Oregon Parks and Recreation Department
ORS	Oregon Revised Statute
USFWS	United States Fish and Wildlife Service (USDI agency)
RMP	Resource Management Plan
TNC	The Nature Conservancy
T&E	Threatened and Endangered
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFS	United States Forest Service (USDA agency)
WS	Wildlife Services (USDA-APHIS program)

## CHAPTER 1: PURPOSE AND NEED FOR ACTION

### 1.0 Introduction

The U.S. Fish and Wildlife Service (USFWS) published a rule, effective March 5, 1993, listing the Pacific coast population of the western snowy plover (*Charadrius alexandrinus nivosus*) (snowy plover or plover) as threatened under the Endangered Species Act of 1973, as amended (ESA) (USFWS 1993a). This plover is threatened throughout its range by loss and disturbance of habitat and nesting sites. The primary threats to the snowy plover are believed to be habitat degradation caused by human disturbance, urban development, introduced European beachgrass (*Ammophila spp.*), and predators (USFWS 1999a). The Pacific coast breeding population of the snowy plover extends from the State of Washington to Baja California, Mexico, with the majority of breeding birds found in California. Wintering areas are primarily in coastal California and Mexico.

The Oregon Fish and Wildlife Commission listed the plover population in Oregon as threatened in 1975. This listing was reaffirmed under the Oregon Endangered Species Act in 1989. The Commission confirmed the species' status as threatened during a 1993 review (ODFW 1994).

### 1.1 Purpose

The purpose of the proposed project is to protect the Federally and State threatened snowy plover in Oregon from predation while measures to protect and restore habitat are ongoing. The Oregon snowy plover population requires immediate action. The purpose of this environmental assessment (EA) is to assess the environmental impacts of conducting a comprehensive predator damage management program to protect the Pacific coast population of snowy plover where predators threaten their survival and reproductive success.

### Objectives

The primary objective of this proposal is to improve the effectiveness of predator damage management to protect snowy plovers from further declines due to predation while recreation and habitat management efforts continue. To achieve success in reducing predation, the lead and cooperating agencies plan to:

- 1) expand assessment efforts to all plover breeding and nesting locations to determine the predator species responsible for predation; and
- 2) reduce predation where the predator species is known.

Snowy plover predators identified along the Oregon coast include American crows (*Corvus brachyrhynchos*), common ravens (*Corvus corax*), red foxes (*Vulpes vulpes*), raccoons (*Procyon lotor*), striped skunks (*Mephites mephites*), and black rats (*Rattus rattus*) (ODFW 1994). Predators that are suspected but not confirmed are included in the analysis because they may be taken if wildlife specialists determine that they are a threat that cannot effectively be controlled with non-lethal means. These include feral cats (*Felis domesticus*), coyotes (*Canis latrans*), mink (*Mustela vison*), short and long tailed weasels (*Mustela spp.*), opossum (*Didelphis virginiana*), gray fox (*Urocyon cinereoargenteus*), Norway rats (*Rattus norvegicus*), deer mice (*Peromyscus maniculatus*), spotted skunks (*Spilogale putorius*), gulls (*Larus spp.*), and raptors<sup>1</sup>. Suspected raptor species include northern harrier (*Circus cyaneus*), peregrine falcon (*Falco peregrinus*), merlin (*Falco columbarius*) and American kestrel (*Falco sparverius*).

### Decision to Be Made

The USFWS along with the U.S. Forest Service, Siuslaw National Forest (USFS) and the Bureau of Land Management, Coos Bay District (BLM) are lead agencies in this proposal. The ESA requires all Federal agencies to use their authorities to enhance the recovery of threatened and endangered (T&E) species, such as the snowy plover. The lead agencies together will address the following questions based on the interdisciplinary analysis in the EA.

- How can the lead agencies and their cooperating agencies best respond to the need to protect snowy plovers from further population declines by predators?
- What will be the environmental effects from implementing various alternative strategies?

Besides the lead agencies, this proposal would require the participation of other agencies that have management authority and expertise related to this project. The Oregon Parks and Recreation Department (OPRD) is responsible for regulating activities on the ocean shore and managing beach parks where some of the snowy plovers are known to nest. The lead agencies, along with the ODFW and the U.S. Army Corps of Engineers (COE) are responsible for managing plover habitat. The ODFW has the authority to manage resident wildlife. The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service, Wildlife Services (APHIS-WS) program is authorized by Federal law to provide leadership and assistance in wildlife damage management. In

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<sup>1</sup>/

addition, the lead agencies would continue to use the expertise of The Oregon Natural Heritage Program to monitor snowy plover nesting success and distribution.

## 1.2 Need for Action

Historic records indicate that nesting snowy plovers were once more widely distributed. Nineteen nesting areas were reported in Oregon in 1974 (Oregon Coast Conservation and Development Commission 1974). Only seven of these areas were used in 1998 (Castelein et al. 1998). In Oregon, the 2000 population was estimated at 109 adults (Castelein et al. 2000b). The 1999 population was estimated at 95 or 96 individuals (Castelein et al. 2000a). This is similar to the 97 plovers counted in 1998, down from 141 in 1997 (Castelein et al. 1997, 1998) but up from 72 in 1993 (Castelein et al. 2000a).

The few remaining coastal nesting areas have high predation risks. Intervention through protection measures is needed to protect adults and young of the remaining coastal snowy plover population until their numbers and the distribution increase. In Oregon, predators have accounted for up to 68 percent of nest losses (Wilson-Jacobs and Meslow 1984, Stern et al. 1991). Between 1990 and 2000, The Nature Conservancy (TNC 2000) found that predation accounted for 155 incidences of nest failures, or 45.7 percent of all snowy plover nest failures along the Oregon Coast. The remaining losses were caused by weather (22.4 percent), biological factors (17.1 percent), unknown causes (12.7 percent) and direct human disturbances (2.0 percent) (TNC 2000). Biologists believe that some of the losses from unknown factors are probably the result of predation. Biologists also note that human disturbance and influences could indirectly be responsible for under recording unknown causes.

Documented causes of nest loss throughout the snowy plover's range include predation by American crows, common ravens, California gulls, foxes, raccoons, coyotes, feral cats, skunks, and black rats (ODFW 1994). Table 1 shows the number of predation events between 1990 and 2000 that caused nest failure on the Oregon coast, where predation was known to occur.

Between 1990 and 2000, corvids (ravens and crows) caused at least 64 nest failures in Oregon (Table 1). In many instances of nest predation, the predator species responsible were not determined. In 2000, there were nine documented cases of corvid predation, 12 cases of unknown predation, one skunk predation incident, and one red fox predation

Table 1. Predators Causing Nest Failures of Snowy Plovers on the Oregon Coast 1990-2000 (TNC 2000)

Predator	Number of nest failures	Percent of nest failures
corvid (crow or raven unknown)	24	16
American crow	25	16
common raven	15	9
gull <sup>2</sup>	1	1
fox	1	1
raccoon	1	1
skunk	13	8
unknown mammal	5	3
unknown predator	62	40
adults predated (unknown predator)	8	5
total	155	100

incident. Also in 2000, avian predators accounted for eight adult plover losses. Of the 62 total causes of nest failure in 2000, 31 (50 percent) of the losses were caused by predators (Castelein et al. 2000).

This proposal includes provisions to: 1) evaluate actual and potential plover losses caused by predators, 2) determine the species responsible, and 3) when to apply appropriate measures to prevent or minimize predation. Nest enclosures work well to protect eggs, however after the eggs hatch, the young leave the enclosures and become highly vulnerable to predation. The young are also difficult to track which makes documentation of predation difficult.

The ODFW (1994) reports that there is a substantial amount of predation at coastal nesting areas in Oregon. On the north coast of Oregon, Anderson and Main (1983) found that 30 percent of egg losses could be attributed to corvids. Nesting gulls (largely opportunistic feeders) became more predatory at Leadbetter Point, Washington, when

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<sup>2/</sup> The lead and cooperating agencies believe that gull species may potentially prey on plovers but the species have not been confirmed. Although the need to control damage by gulls is a possibility, it is not believed to be likely.

their nutritional requirements peak in May and June, which coincides with the plover breeding period (Widrig 1980). Ground predators including striped skunks (Page et al. 1983, Stern et al. 1990, Craig et al. 1992) and raccoons (ODFW 1994) also, have a substantial impact on plovers. On the Oregon coast, mammal predation risk has been exacerbated by greater ground cover from introduced beachgrass encroachment. Increased human use and associated activities (such as picnicking and camping), have generally favored gull and crow populations which have in turn increased predation risk to nesting plovers (ODFW 1994).

In California, red fox predation on snowy plovers was a major reason for the plovers decline on the central coast (USFWS 1993a), and is one of the major threats to the survival of the California least tern and light-footed clapper rail at the Seal Beach National Wildlife Refuge (USFWS and US Navy 1990). The USFWS concluded that red fox are a major factor in snowy plover chick losses in California, based on numerous studies and on comparisons between areas with and without red fox. By reducing the number of red fox in the vicinity of plover breeding areas, the reproductive success of plovers may be dramatically improved (USFWS 1993a).

Encroachment of introduced European beachgrass is a major concern because it has reduced plover nesting habitat and provided cover for predators (USFWS 1993a). Removal of beachgrass is a separate activity that is occurring and will continue regardless of any decision made on direct predator damage management. Habitat and recreation management are being handled separately by the land management agencies (see Section 1.7). Only trash management may need to be improved since accumulation of trash can attract predators.

### **1.3 Background**

The western snowy plover is one of two subspecies of snowy plovers that occur in North America. In Oregon there are two distinct populations of western snowy plovers. The Pacific coast population includes both wintering and nesting individuals that occupy broad sandy beaches and adjacent dry flats from southern Washington to Baja, Mexico. The interior population breeds around alkaline lakes west of the Rocky Mountains and migrates to the coasts of California and Mexico to winter (ODFW 1994). It is the Pacific coast population that has been Federally listed as threatened and is the focus of this effort. The latter is not included in this analysis.

Many changes have occurred along the Oregon coast in recent decades. The establishment of European beachgrass has reduced natural dynamic beach and dune processes resulting in the elimination of much snowy plover habitat. Human developments of many types followed and human disturbance continues to increase. Crows, ravens, foxes and skunks have preyed on plover nests (ODFW 1994, TNC 2000). These combined factors contributed to the decline of the coastal sub-population (ODFW 1994).

To maintain snowy plover populations on the Oregon coast, concurrent actions were proposed to improve the habitat, reduce human disturbance, investigate methods of reducing predation, and undertake further research and surveys. Alleviating human disturbance and using predator exclosures at key breeding locales were the most immediate management tools at hand to assist the low coastal populations. To enable recovery of the coastal population, habitat restoration that enhances both nesting and brood rearing is ongoing; habitat restoration reduces predator cover.

### **History of Snowy Plover Management**

The USFWS, BLM, USFS, COE, ODFW, and OPRD have been working cooperatively along with TNC to manage snowy plover habitat, recreation impacts, and predation impacts on plovers since the early 1990s. Earlier efforts by ODFW and USFWS began in the early 1980s. Recovery efforts to deter predation have included: removing vegetation, erecting exclosures around plover nest sites, and at one site, removing non-native red fox. However, predation will likely remain too high to recover the species without a predator damage management program.

The main efforts of snowy plover management, until 1994 (ODFW 1994), have been population surveys and research into nesting ecology, and control of off-road vehicles in nesting and foraging areas. Survey efforts began in 1972 (Hoffman 1972) and continue to present (Wickham 1981, Anderson and Main 1983, Wilson-Jacobs and Meslow 1984, Wollington 1984, Wilson-Jacobs and Dorsey 1985, Herman et al. 1988, Craig et al. 1992, Casler et al. 1993, ODFW 1994, Castelein et al. 2000a).

Since 1994, the cooperating agencies have collectively restored several hundred acres of snowy plover habitat in the Dunes National Recreation Area, Coos Bay's North Spit and at New River. In addition, each year, the cooperating agencies have signed and marked important plover nesting areas and provided the public with educational information to help conserve the species and these key sites.

The USFWS published management guidelines for the snowy plover for Washington, Oregon, California, and Nevada (USFWS 1984), listed the Pacific coast population as threatened in 1993 (USFWS 1993a), and designated critical habitat in 1999 (USFWS 1999a). The USFWS is also preparing a Recovery Plan for the Pacific coast plover population with the assistance of the Western Snowy Plover Recovery Team. A draft Recovery Plan was released on August 15, 2001. Management documents are in preparation or have been prepared for particular sites by the BLM, USFS, and OPRD. Many coastal habitat areas have been closed to vehicles in recent years by the OPRD (e.g., Coos Bay North Spit, Siltcoos and Sutton estuaries, and Tenmile Creek). In cooperation with USFS, BLM, and ODFW, OPRD has implemented temporary beach closures at known nesting sites since 1994 to protect the plovers from human disturbance.

### **1.4 Location and Scope of Analysis**

Scattered reports from specific beaches prior to 1978 indicate that the Oregon coastal plover population was larger and more widely distributed (ODFW 1994). Breeding plovers historically were scattered along the sandy coastline and at river mouths (e.g., Salmon, Siuslaw, and Rogue Rivers). Now most are concentrated in smaller groups at mouths of a few creeks and rivers, a few beaches, some habitat restoration areas, and one dredged materials disposal site.

This EA evaluates potential predator damage management that could occur at or around any or all active or potential breeding, nesting, or foraging sites along the Oregon coast. These currently include Sutton, Siltcoos, Overlook, Tahkenitch, Tenmile, Coos Bay North Spit, Bandon, New River, and Floras Lake. These sites are located on lands managed by the BLM, USFS, ODFW, OPRD, and COE, as well as some private lands. Current sites are located in Lane, Douglas, Coos, and Curry counties. Clatsop and Tillamook counties are also included in the scope of analysis because of new or historic nesting sites. For example, Bay Ocean Spit, a site managed by ODFW and COE in Tillamook County, is historic nesting site, and Necanicum Spit in Clatsop County may be a newly active site. Habitat in Lincoln county has also supported nesting and will be included in the analysis in case of future need. Figures 1-1 through 1-4 show locations where snowy plovers currently nest or have recently nested.

This EA analyses various strategies (alternatives) and methods by which predator damage management could be carried out to protect the snowy plover from predation on and around nesting, breeding, foraging, and wintering grounds along the Oregon coast. The potential methods that may be used and the aspects of the human environment that could be affected are discussed in Chapters 2, 3 and 4. The confirmed predators included in the analysis include American crows and common ravens, red fox, raccoon, and striped skunks. Suspected predators will be included in the analysis because they may be targeted if wildlife specialists determine that they threaten plovers. These include feral cats, coyotes, mink, opossum, weasels, gray fox, rats, raptors<sup>3</sup>, spotted skunks, gulls<sup>4</sup>, feral dogs and mice.

The need for action to protect the threatened snowy plover from predators will change as the population recovers. The pending recovery plan will determine snowy plover population levels and characteristics when protections of the ESA would no longer be

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<sup>3</sup>Regardless of status, non-lethal damage management measures would always be attempted on raptors found to be a threat to plovers. Lethal methods would only be used on raptors when or if non-lethal methods are used and found to be ineffective, and they would not be used on special status raptors such as the peregrine falcon.

<sup>4</sup>/ The lead and cooperating agencies believe that gull species may potentially prey on plovers but the species have not been confirmed. Although the need to control damage by gulls is a possibility, it is not believed to be likely.

necessary. Some level of predator damage management may be further needed for the foreseeable future to maintain plover populations at recovery goal numbers.

### **1.5 Related Snowy Plover Conservation Efforts**

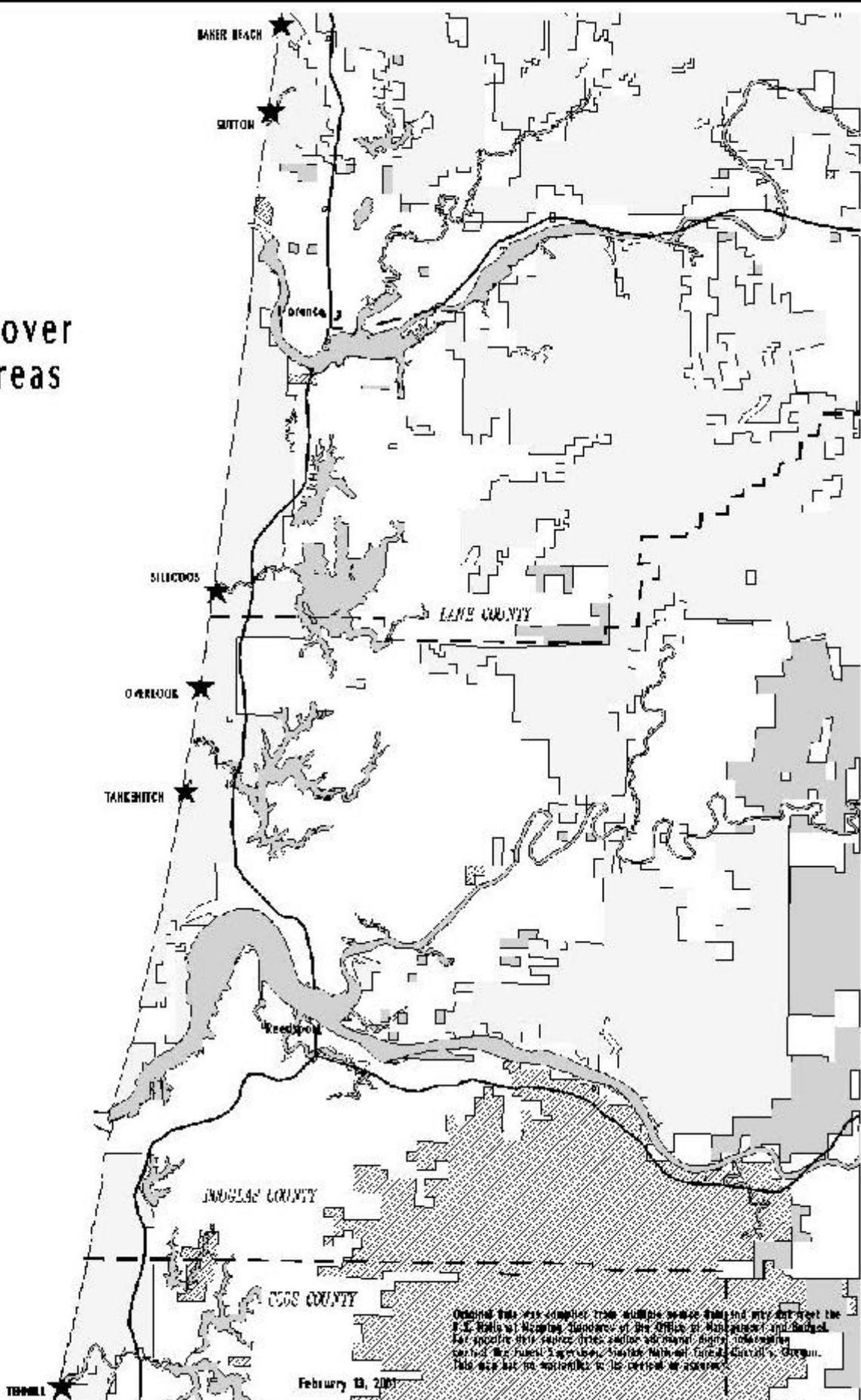
Some predator populations may have expanded due to habitat changes that favored them. The introduction of European beachgrass provides predators with more favorable habitat that previously was scarce. Therefore, land and resource management agencies have been removing beachgrass and other invasive plant species. Another plover recovery effort, recreation management, is conducted to protect breeding and nesting plovers from recreational impacts such as, vehicle use, direct human disturbance, dogs, horses, and other potential disturbances. Managing recreation in recovery areas will continue concurrently with predator damage management alternatives selected from this EA. Habitat improvement and recreation management are being handled by each of the land management agencies along with ODFW and OPRD, and are not part of the detailed analysis in this EA (see Related Environmental Documents in Section 1.7).

The USFWS is preparing a Recovery Plan for the Pacific coast population of the western snowy plover. The Recovery Plan will provide objectives and specific recommendations to further enhance agency efforts and cooperation for snowy plover recovery. The USFWS anticipates publishing a draft of the Recovery Plan and requesting public review and comment in 2001. The recovery plan will incorporate predator damage management and other recovery efforts in a comprehensive multi-agency plan.

# Primary Plover Nesting Areas



- Major Rivers
- Counties
- Forest Service lands
- BLM lands
- State lands
- Nesting Sites



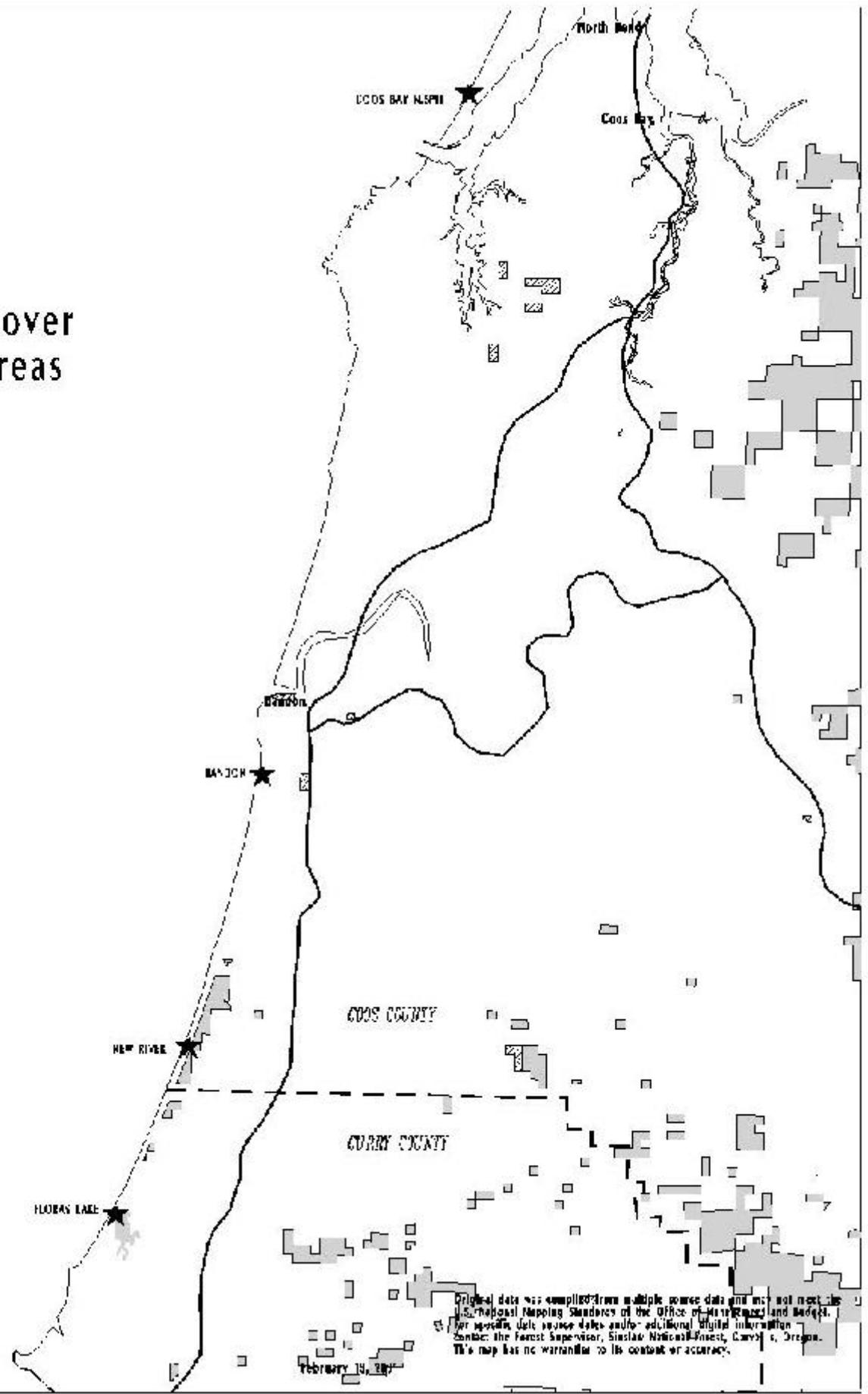
Original data was compiled from multiple sources including the U.S. National Wetlands Inventory, the Office of Management and Budget, and specific state, tribal, and federal agency resources such as the Forest Service, Oregon National Forests, Clatsop National Forest, and Clatsop National Forest. This map has no warranty in its content or accuracy.

February 13, 2007

# Primary Plover Nesting Areas



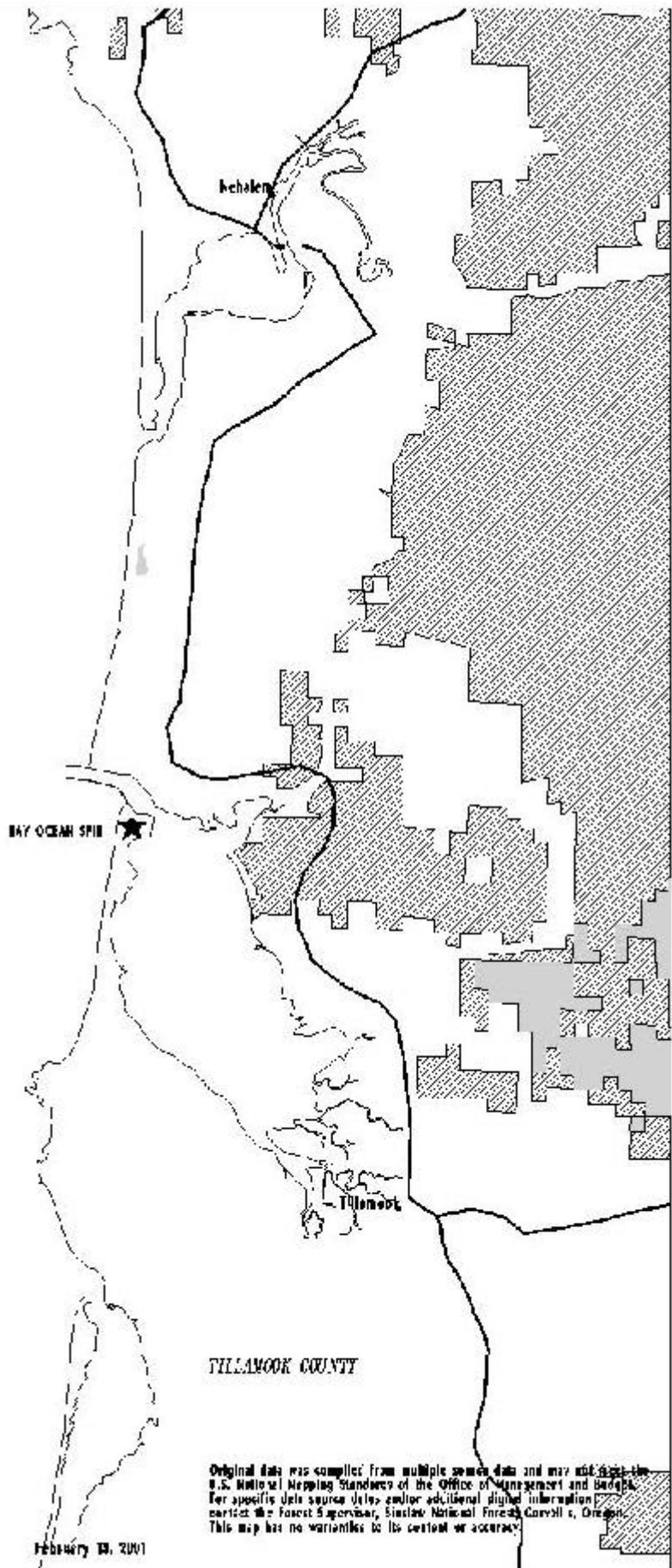
- ▲ Major Highways
- ▲ Counties
- Forest Service lands
- BLM lands
- ▨ State lands
- ★ Nesting Sites



Original data was compiled from multiple source data and may not meet the U.S. National Mapping Standards of the Office of Water, Wetlands and Biodiversity. For specific data source dates and/or additional digital information contact the Forest Supervisor, Siskiyou National Forest, Curry Co., Oregon. This map has no warranty to its content or accuracy.

February 19, 2007

# Primary Plover Nesting Areas

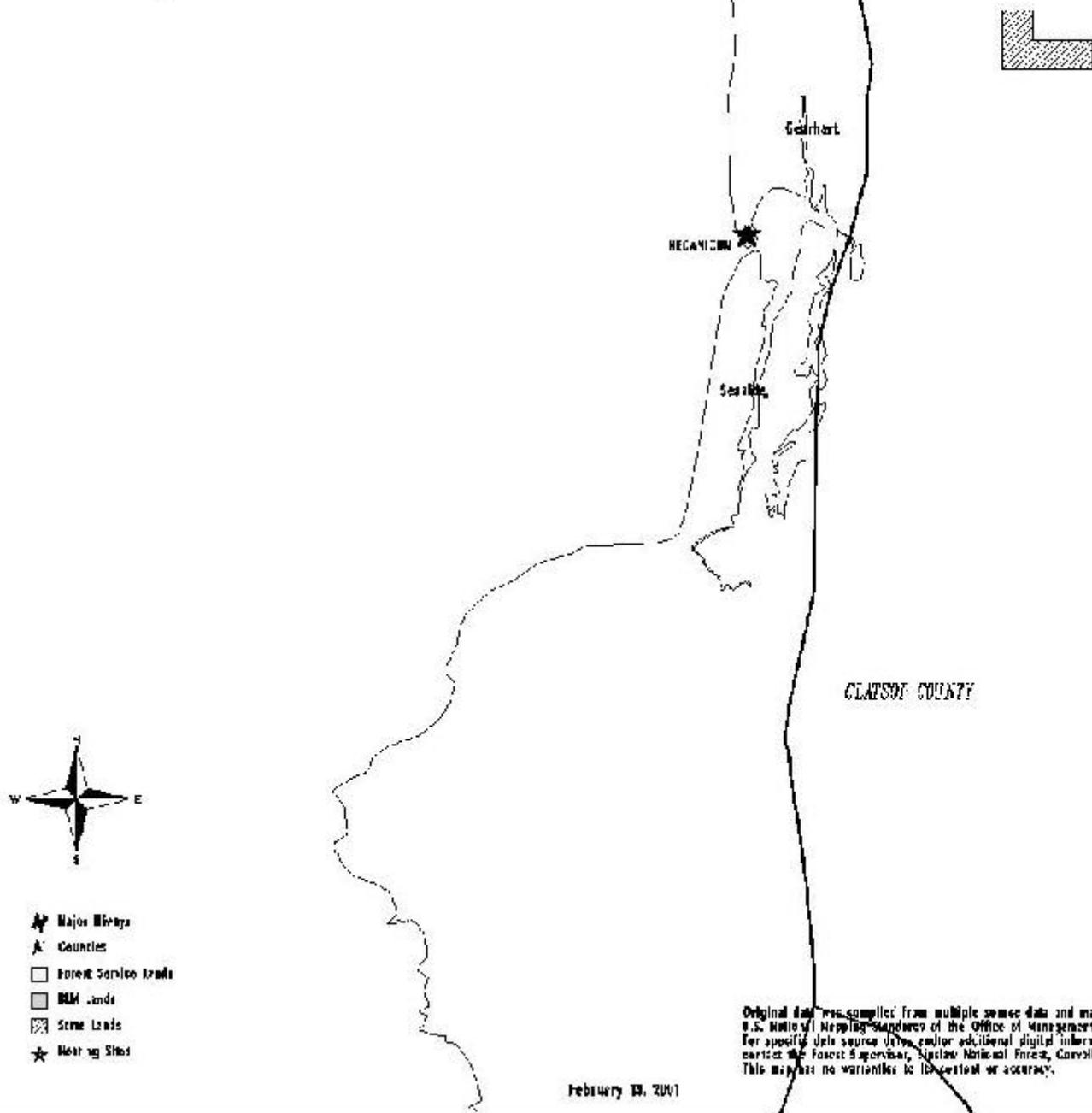


- ★ Major Wetlands
- ▲ Counties
- ▨ Forest Service lands
- ▩ BLM lands
- ▧ State Lands
- ★ Nesting Sites

Original data was compiled from multiple sources and may not meet the U.S. National Mapping Standards of the Office of Management and Budget. For specific data source details and/or additional digital information contact the Forest Supervisor, Siuslaw National Forest, Corvallis, Oregon. This map has no warranties to its content or accuracy.

February 19, 2001

# Primary Plover Nesting Areas



## 1.6 Summary of Public Involvement Efforts

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

1) Issues related to the proposed action were identified during interagency meetings and through a public outreach process. The public outreach included an information gathering phase wherein potentially interested groups or 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* (Oct. 18 and 19, 2000), *Siuslaw News* (Oct. 18 and 21, 2000), *Headlight Herald* (Oct. 18, 2000) and *The World* (Oct. 19 and 20). More than 150 letters describing the proposal and preliminary issues and alternatives and inviting public comment were sent to the public via FedEx® or US Postal Service (Oct. 18, 2000). A two week comment period was provided for initial public input. Five letters were received from groups and individuals interested in providing input for the development of this EA. The letters received were considered in this analysis and substantive and relevant information was incorporated into this document.

2) Legal notices were published during the week of May 28, 2001 in the *Siuslaw News*, *Headlight Herald*, *Oregonian*, *the World*, *Corvallis Gazette*, *News Times*, *Cannon Beach Gazette*, *the Daily Astorian*, and *the Register Guard* soliciting comments on this EA during a 30-day public comment period. All groups or individuals expressing interest during the public involvement periods were sent a copy of this predecisional EA for review and comment. All comments received were considered in this Final EA and accompanying Decision

3) After all public comments have been evaluated and considered, the lead agencies expect to finalize the EA and release a decision. Groups and individuals submitting comments will receive a notice of the decision.

## 1.7 Related Environmental Documents

**US Department of Interior (USDI), The USFWS Final Rule (1993). 50 Code of Federal Regulations (CFR) Part 17, Federal Register March 5, 1993.** The final rule determining the threatened status of the Pacific coast population of the western snowy plover was published in the Federal Register on March 5, 1993. The complete rule is contained in Appendix A.

**USDI, The USFWS Final Rule (1999). 50 Code of Federal Regulations (CFR) Part 17, Federal Register December 7, 1999.** This final rule designated critical habitat for the Pacific coast population of the western snowy plover.

**USDI, BLM, Coos Bay District. Final New River Area of Critical Environmental Concern (ACEC) Management Plan, May 1995.** This plan provides multiple resource management guidelines for the New River ACEC, including guidance for managing the western snowy plover.

**USDI, BLM, Coos Bay District. Coos Bay Shorelands Final Management Plan, September 1995.** This provides some guidance for managing the western snowy plover on the North Spit.

**ODFW Draft Predator Management Policy.** The draft predator management policy provides guidance for procedures required before implementation of predator management, special situations that may warrant predator management, and guidance for cooperation with predator management actions by other agencies. Any action implemented as the result of this analysis will conform with the ODFW draft or final predator management policy.

**APHIS-WS EA for Wildlife Damage Management in the Northwest and Roseburg Districts.** The APHIS-WS Roseburg and Northwest District offices prepared EAs for ongoing predator damage management programs in southwestern and northwestern Oregon (including counties in the analysis area of this EA) (USDA 1995, USDA 1997b). General discussions about impacts on predator populations, APHIS-WS responsibilities, guidance, decision-making procedures, and restrictions for various management tools apply to this EA, and therefore are incorporated by reference. Local and cumulative impacts were assessed for red and gray fox, raccoon, striped and spotted skunk, raven, and other predators to reduce predation.

**ADC Programmatic Environmental Impact Statement (EIS).** APHIS-WS (formerly called ADC) issued a Final EIS on the national APHIS-WS program (USDA 1997a, revised). Pertinent and current information available in the EIS has been incorporated by reference into this EA.

**National Forest Land and Resource Management Plans (LRMPs).** The National Forest Management Act requires that each National Forest prepare a LRMP for guiding long range management and direction. The decisions made from this document will be consistent with the Siuslaw National Forest LRMP. The Siuslaw National Forest LRMP contains standards and guidelines developed in accordance with recommendations from USFWS's management guidelines and ODFW's management plan for the snowy plover. Any decisions resulting from this EA would conform with the standards and guidelines set forth in the Siuslaw National Forest LRMP.

**Siuslaw National Forest Record of Decision and Final EIS - Dunes Management Plan, Oregon Dunes National Recreation Area (NRA), July 1994.** The Record of Decision defines the selected alternative approving the Oregon Dunes NRA Management Plan. The EIS that evaluated the plan was developed under the National Forest Management Act and its associated implementing regulations, and satisfied the requirements of the NEPA of 1969, and Council of Environmental Quality (CEQ) regulations. The Dunes Plan provides the USFS with direction for management emphasis and guidelines including snowy plover habitat management. Any decisions resulting from the analysis in this EA must conform with management decisions set forth in the Record of Decision for the Dunes Management Plan. The Record of Decision adopted the preferred alternative which would reduce public use in snowy plover breeding habitat. This was intended, in part, to reduce predation on plovers in closed areas because some predators are attracted by edible refuse left by humans. The proposed alternative adopted a staged approach to reduce human disturbance to critical nesting, foraging and wintering snowy plover habitat, by stating:

*Education and voluntary compliance will be the first step, and actions will become increasingly restrictive (if necessary) to eventually include mandatory closure and perhaps removal of developed access and facilities. These actions will be focused primarily around Tenmile, Tahkenitch, and Siltcoos estuaries.*

**Master Memorandum of Understanding (MOU) between the APHIS and the USFS.** The MOU specifies that all animal damage management programs on National Forest System lands be coordinated with appropriate state and Federal agencies prior to implementation of programs. APHIS-WS shall develop and update animal damage management work plans annually in cooperation with the USFS and other appropriate agencies. Human safety zones and other areas where mitigation or restrictions may be needed to comply with LRMPs will be identified.

**BLM Resource Management Plan (RMP).** The BLM currently uses RMPs to guide management on lands it administers. Any decisions made as a result of this EA process will be consistent with guidance in the Coos Bay District Record of Decision and RMP, May 1995.

**Master MOU between APHIS and BLM.** The MOU specifies that all animal damage management programs on BLM lands will be coordinated with appropriate state and Federal agencies prior to implementation of the programs. APHIS-WS shall develop and update animal damage management work plans annually in cooperation with the BLM and other appropriate agencies. Human safety zones and other areas where mitigation or restrictions may be needed to comply with RMPs will be identified.

**ODFW-Final Oregon Conservation Program for the Western Snowy Plover, March 1994.** This document was approved by ODFW as a recovery plan for snowy plovers

under the Oregon ESA. The Oregon Snowy Plover Conservation Program contains specific information on snowy plovers and their habitats, proposes a variety of actions to protect this species and recommends acquisition of additional information to direct and refine actions to maintain and recover their subpopulations in Oregon.

**USFWS, Region 1, Portland, Oregon, in cooperation with the Pacific Coast Western Snowy Plover Recovery Team, Western Snowy Plover Pacific Coast Population Recovery Plan (in Preparation).** The recovery plan has been released to the public (date and period of time, anticipated final) . When it is finalized, the plan will provide recommended recovery actions for the threatened Pacific coast population of the western snowy plover in California, Oregon and Washington. The ultimate and primary objective of a recovery plan is to remove the species from the List of Endangered and Threatened Wildlife and Plants. The plan will include recovery criteria, which may affect the objectives of this EA by providing more specific guidelines. If the final recovery plan presents objectives or recommended actions related to predator damage management that differ substantially from this EA, this EA may require modification.

## **1.8 Authority and Compliance**

Based on agency relationships, missions, and legislative mandates, the USFWS, BLM, and USFS are the “lead agencies” and “decision makers” for this EA, and therefore responsible for the EA’s scope, content, and outcome. As cooperating agencies, the ODFW, OPRD, and APHIS-WS provided input to this EA and will provide advice and recommendations to the lead agencies on when, where, and how predator damage management could be conducted.

### **1.8.1 Authority of Federal and State agencies in wildlife damage management and endangered species protection**

**USFWS.** The USFWS is charged with implementation and enforcement of the ESA of 1973, as amended and with developing recovery plans for listed species. The USFWS cooperated with the USFS, BLM, COE, APHIS-WS, ODFW, and OPRD by recommending measures to promote the recovery of T&E species. The USFWS also makes recommendations to avoid or minimize take of T&E species. The term “take” is defined by the ESA (section 3(19)) as “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or to attempt to engage in any such conduct.” The terms “harass” and “harm” have been further defined by USFWS regulations (50 CFR section 17.3) as: 1) harass is the intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering; 2) harm is an act which actually kills or injures wildlife. Such acts may include significant habitat

modification or degradation when it actually kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering.

**APHIS-WS.** APHIS-WS is subject to the ESA which requires Federal agencies to use their authorities to conserve T&E species. The primary statutory authorities for the APHIS-WS program are the Animal Damage Control Act of 1931, and the Rural Development, Agriculture, and Related Agencies Appropriations Act of 1988 which authorize APHIS-WS to reduce damage caused by wildlife, in cooperation with other agencies.

**ODFW.** The ODFW has the responsibility to manage all protected and classified wildlife in Oregon, regardless of the land class on which the animals are found (Oregon Revised Statutes (ORS) 496.012, 496.118). ODFW is also authorized to cooperate with APHIS-WS and the Oregon Department of Agriculture (ODA) for controlling predatory animals (ORS 610.020). Oregon State law allows a landowner or lawful occupant to take any red fox that is causing damage without first obtaining a permit from ODFW (ORS 610.105). The law, however, does require the landowner to notify ODFW of the methods used, and species and number of animals taken.

**USFS and BLM.** The USFS and BLM have the responsibility to manage Federal lands under their jurisdiction for multiple uses including livestock grazing, timber production, recreation, and wildlife habitat, while recognizing the state's authority to manage wildlife. Both the USFS and BLM recognize the importance of managing wildlife damage on lands and resources under their jurisdiction, as integrated with their multiple use responsibilities.

**USFS.** The USFS is subject to the ESA which requires Federal agencies to use their authorities to conserve T&E species. Under the Animal Damage Control Act of 1931, as amended, (7 U.S.C. 426-426c), the USFS and APHIS-WS, along with the USFWS and state agencies, cooperate to reduce wildlife damage on National Forest System lands to protect T&E species.

**BLM.** The BLM is subject to the ESA which requires Federal agencies to use their authorities to conserve T&E species. Under the Animal Damage Control Act of 1931, as amended, (7 U.S.C. 426-426c), BLM and APHIS-WS, along with the USFWS and state agencies, cooperate to manage animal damage on BLM lands to protect T&E species.

**COE.** The COE is subject to the ESA which requires Federal agencies to use their authorities to conserve T&E species. In the proposed project, the COE

agrees to cooperate with the USFWS, and cooperating agencies if necessary, to reduce predation on snowy plovers.

**OPRD.** The OPRD administers the 1967 Beach Bill which designated Oregon's beaches as a State recreation area. Under statutory authority, OPRD has jurisdiction on the ocean shore and manages public use of Oregon's 362 miles of shoreline. OPRD regulates the following activities on the ocean shore: improvements, alterations, cables, and pipelines: natural product removal; motor vehicle access/use and public recreational use.

### **1.8.2 Compliance with Federal laws**

Several Federal laws regulate wildlife damage management. The USFWS, BLM, USFS, COE, and APHIS-WS comply with these laws, and consult and cooperate with other agencies as appropriate. The following Federal laws are relevant to the actions considered in this EA:

**NEPA.** Environmental documents pursuant to NEPA must be completed before actions can be implemented. NEPA requires that Federal actions be evaluated for environmental impacts, that these impacts be considered by the decision maker(s) prior to implementation, and that the public be informed.

This EA has been prepared in compliance with NEPA (42 USC Section 4231, et seq.); the President's CEQ Regulations, 40 CFR Section 1500 - 1508; Forest Service Handbook 1909.15 - Environmental Policy and Procedures Handbook, Forest Service Handbook 1909.15 - Environmental Policy and Procedures Handbook, Chapter 40 - Environmental Assessment and Related Documents; BLM Handbook H 1790-1 National Environmental Policy Act Handbook; and Department of the Interior's Departmental Manual (DM) for NEPA compliance, Fish and Wildlife Service (516 DM 6).

**ESA.** It is Federal policy, under the ESA, that all Federal agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the ESA (Sec.2(c)). Section 7 consultations with the USFWS are conducted to use the expertise of the USFWS 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. Each agency shall use the best scientific and commercial data available" (Sec.7(a)(2))

The USFWS will complete consultation pursuant to Section 7 of the ESA regarding the effects of predator damage management on the Pacific coast population of the western snowy plover and other Federally listed species in the

area. The full results of the evaluation will be contained in the final EA. Related compliance is discussed under Chapter 4, Environmental Consequences.

**Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).** FIFRA requires the registration, classification, and regulation of all pesticides used in the United States. The Environmental Protection Agency (EPA) is responsible for implementing and enforcing FIFRA. All chemical methods integrated into any selected program as implemented by APHIS-WS or other cooperating agencies must be registered with and regulated by the EPA and the ODA, and used in compliance with labeling procedures and requirements.

**Migratory Bird Treaty Act.** The Migratory Bird Treaty Act provides the USFWS regulatory authority to protect species of birds that migrate outside the United States. Individuals of these species that do not migrate outside of the United States are also protected. All cooperating agencies coordinate with the USFWS on migratory bird issues. If migratory birds are found to be preying on plovers, the agencies would request a permit from USFWS under the Migratory Bird Treaty Act to "take" these species, if lethal control is determined to be necessary. A depredation permit for crows "*...when found committing or about to commit depredations upon ornamental or shade trees, agricultural crops, livestock, or wildlife, or when concentrated in a manner as to constitute a health hazard*" is not required (50 CFR 21.43). The USFWS Office of Migratory Bird Management, Pacific Regional Office, requires notification prior to use of chemical substances for control of migratory birds that are not covered by the depredation order .

**USFS Organic Act, Multiple-Use Sustained-Yield Act, Federal Land Policy and Management Act, and the National Forest Management Act.** These statutes provide the USFS with direction to rely upon its expertise to manage the lands under its in a manner deemed to best meet the purposes Congress has delineated, including providing for the long-term sustainability of all of the forests' many natural resources, including the diversity of species that inhabit them. They call for interdisciplinary planning coordinated among agencies, and are based on the best available science.

**Animal Damage Control Act and the Rural Development, Agriculture, and Related Agencies Appropriations Act.** The Acts authorize and direct APHIS-WS to reduce damage caused by wildlife in cooperation with other agencies.

**BLM and USFS** receive additional direction through biological opinions (BO) issued by USFWS pertaining to management of plover nesting areas on their lands.

**Coastal Zone Management Act of 1972.** All Federally conducted or supported activities directly affecting the coastal zone must be undertaken in a manner consistent to the maximum extent practicable with approved State coastal management programs.

**Protection of Children from Environmental Health and Safety Risks (EO13045).** Children may suffer disproportionately from environmental health and safety risks for many reasons. Predator damage management as proposed in this EA would only involve legally available and approved damage management methods in situations or under circumstances where it is highly unlikely that children would be adversely affected. Therefore, implementation of the proposed action would not increase environmental health or safety risks to children.

**Invasive Species (EO 13112).** The Invasive Species Executive Order directs Federal agencies to use their programs and authorities to prevent the spread or to control populations of invasive species that cause economic or environmental harm, or harm to human health.

**Migratory Birds (EO 13186).** EO 13186 directs Federal agencies to use their programs and authorities to enter into a Memorandum of Understanding with the USFWS outlining how the agency will promote conservation of migratory birds. Other activities called for include incorporating bird conservation considerations into agency planning, including NEPA analyses, reporting annually on the level of take of migratory birds, and generally promoting the conservation of migratory birds without compromising the agency mission.

### **1.8.3 Oregon State laws**

**ODFW - 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 State. Included in this wildlife policy is maintaining all species of wildlife at optimum levels.

**Oregon Administrative Rules (OAR) for Park Areas and Ocean Shore State Recreation Areas (OAR 736-10-0055 and OAR-736-21-0100 and 0110).** OARs prohibit harassment, trapping, hunting or shooting of wildlife and the discharge of firearms in Oregon State Parks and anywhere on the ocean shore. Any such Federal activity necessary to implement predator damage management to protect the snowy plover would require a Miscellaneous Use Permit for Nontraditional Park Activities from OPRD.

**ORS 390.660 Regulation of Use of Lands Adjoining the Ocean Shores.** The Statute directs OPRD to protect, maintain, and promulgate rules governing the use of ocean shore.

## CHAPTER 2: DESCRIPTION OF ALTERNATIVES

### 2.1 Alternative 1 - Proposed Action - Integrated Predator Damage Management

The proposed action would implement an integrated predator damage management program that first identifies individuals or groups of plover predators. After identification, the most effective, selective, and humane tools available would be used to deter or remove the species that threaten nesting, breeding, or foraging snowy plovers. Predator damage management is based on interagency relationships, which require close coordination and cooperation because of overlapping authorities and legal mandates. The lead agencies, in consultation with ODFW and OPRD, may request that APHIS-WS conduct direct damage management to protect the snowy plovers. The lead agencies may also take action themselves. Upon positive determination of the predator species that threaten plovers in each case, the following tools would be available:

**Non-lethal tools** could include any or all of the following depending upon the circumstances: increased or improved trash management, relocation of live trapped animals; aversive methods that harass or deter predators such as pyrotechnics, electronic calls, repellants, or effigies; or electrified or non-electrified exclusionary nest site fencing and electric wired perches (Table 2). Beachgrass removal to improve plover habitat is underway but is not part of this analysis.

**Lethal tools** could include any or all of the following depending upon field circumstances: shooting; euthanasia in conjunction with cage traps, padded-jaw, leg-hold traps (soft-catch), or nets; snares; denning; DRC-1339 (avicide); egg oiling; snap traps; or zinc phosphide bait (rodenticide) (Table 2).

Damage management would be directed toward individual problem red foxes, ravens, crows, skunks, and raccoons. ODFW (1994) has also identified California gulls and black rats responsible for predation on snowy plovers throughout its range. Feral cats, coyotes, mink, opossum, weasels, gray fox, rats and mice, gulls, or raptors<sup>5</sup> that are found to pose a threat to plovers could also be targeted with lethal and/or non-lethal methods.

Each of the damage management methods listed in Table 2 is described in detail in Appendix B. Animals that are trapped live and intended to be killed are euthanized by either lethal injection (sodium phenobarbital), shooting, or CO or CO<sub>2</sub> gas. *While the methods proposed in Table 2 are all methods that could be used, not all of the methods would be likely to be used in each site where work could occur, since different circumstances would render some tools more appropriate than others.* See the

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<sup>5</sup>/ Regardless of status, non-lethal damage management measures would always be attempted on raptors found to be a threat to plovers. Lethal methods would only be used on raptors when or if non-lethal methods are used and found to be ineffective, and they would not be used on special status raptors such as the peregrine falcon.

discussion below under “Decision Model (Slate et al. 1992) (Figure 2) and “Work Plans” which describe how appropriate methods would be identified in a work plan prior to any work being done.

**Table 2. Available Management Methods for Proposed Action**

Control Method	Fox (red/gray)	Raccoon	Skunk (striped/spotted)	Opossum	Feral cat	Mink/Weasel	Coyote	Mice/Rats	Raven/Crow	Gulls	Raptors
Non-lethal methods											
Electric wired perches									X	X	X
Plover nest exclosures	X	X	X	X	X	X	X		X	X	X
Feral cat management education					X						
Trash mgmt./ clean-up	X	X	X	X	X	X	X	X	X	X	X
Methiocarb (egg bait) <sup>6</sup>									X	X	
Hazing - pyrotechnics, exploders									X	X	X
Distress - alarm calls							X		X	X	X
Patrolling, visual or auditory effigies									X	X	X

<sup>6/</sup> These are conditioning agents that make birds sick resulting in their avoidance of areas with treated baits.

Control Method	Fox (red/gray)	Raccoon	Skunk (striped/spotted)	Opossum	Feral cat	Mink/Weasel	Coyote	Mice/Rats	Raven/Crow	Gulls	Raptors
Live trap and relocation <sup>7</sup>	X	X	X	X	X	X	X	X	X	X	X
Lethal Control Methods <sup>8</sup>											
Leg-hold traps	X	X	X	X	X	X	X		X	X	X
Snap traps								X			
Cage traps (and euthanasia)	X	X	X	X	X	X					
Neck/body snares	X	X	X	X	X		X				
Foot snares	X	X									X
Destroy nests or eggs, or egg oiling									X	X	
DRC-1339 (avicide)									X	X	
Zinc phosphide								X			
Shooting	X	X	X	X	X	X	X	X	X	X	X <sup>9</sup>

<sup>7</sup>/ Feral cats may be live trapped and transported to nearby animal shelters for adoption or euthanasia. Relocation of other species must be approved by ODFW. ODFW does not generally favor relocation because it does not consider relocation to be humane, and because of concerns with parasites and disease. Relocation of raptors is a viable option that will be considered as a non-lethal option. Raptors may be live trapped with leg-hold traps or foot snares.

<sup>8</sup>/ Non-lethal damage management measures would always be attempted on raptors found to be a threat to plovers. Lethal methods would only be used on raptors when or if non-lethal methods are used and found to be ineffective, and they would not be used on special status raptors such as the peregrine falcon.

<sup>9</sup>/ Lethal control of raptors will not be used until non-lethal methods have been used and found to be ineffective in removing the threat to plovers.

Control Method	Fox (red/gray)	Raccoon	Skunk (striped/spotted)	Opossum	Feral cat	Mink/Weasel	Coyote	Mice/Rats	Raven/Crow	Gulls	Raptors
Denning (gas cartridge)	X Red fox						X				

The proposed action would employ wildlife specialists that use sign, sightings, and specialized methods to locate, study, deter, or capture and dispatch or release the target predators. Predators would be removed if the wildlife specialist in the field determines, on a case-by-case basis, that the predator is a threat to snowy plovers. If any traps, snares, or toxicants are used, conspicuous, bilingual warning signs alerting people to the presence of traps and snares would be placed at major access points.

### Work Plans

Before any wildlife damage management is conducted pursuant to this proposal, Agreements for Control Work Plans or other comparable documents would be developed by the lead and cooperating agencies as appropriate. Wildlife damage management activities would only be conducted after the agreements, work plans or other comparable documents are developed. No lethal wildlife damage management would be conducted in areas during periods known to receive intense human use, or those with legal or policy restrictions that preclude the proposed activities. Work plans developed as a result of this EA would be renewed annually, or when work is requested, and must be consistent with the NEPA decision resulting from this EA.

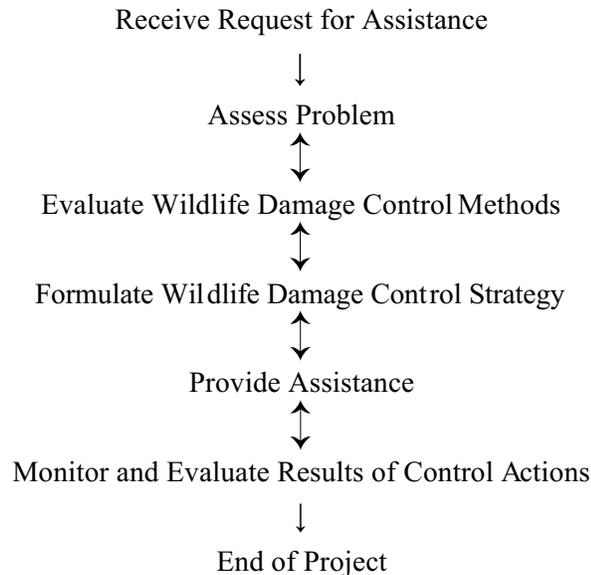
Work Plans will describe the wildlife damage management that would occur. Plans and maps would be prepared which describe and delineate where wildlife damage management would be conducted, which species would be targeted, the methods to be used, and mitigation that would be applied.

### Use of a Decision Model for Implementing Damage Management

The Decision Model (Slate et al. 1992) is adopted from the APHIS-WS decision making process which is a standardized procedure for evaluating and responding to damage complaints.

After consultation with the lead and cooperating agencies, the agency implementing the action would use a formalized Decision Model (Slate et al. 1992) (Figure 2) to determine the site-specific procedure for individual actions, in accordance with guidelines described in this EA. The Decision Model is used to determine the most appropriate implementation strategy to resolve predator damage.

Figure 2. APHIS-WS Decision Model



Agency personnel would evaluate the appropriateness of strategies, and methods are evaluated in the context of their availability (legal and administrative) and suitability based on biological, economic and social considerations. Following this evaluation, the methods deemed to be practical for the situation from the basis of 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 in that particular case, records are kept and reported to the appropriate wildlife management agencies. This proposal would implement safe and practical methods for the prevention and control of damage caused by predators, based on local problem analysis, environmental and social factors, and the informed judgement of trained personnel.

An effective program requires that site specific consideration of the many variables listed above be given to allow the wildlife specialist to select and implement the most appropriate technique to resolve each unique damage situation. Flexibility in the management approach is important because of the high variability found in the natural environment.

In selecting management techniques for specific damage situations, consideration is given to:

- magnitude of the threat;
- geographic extent of threat;
- time of year;

- life cycle of the snowy plover;
- vulnerability to each predator species;
- other land uses (such as proximity to recreational or residential areas);
- feasibility of implementation of the various allowed techniques;
- movement patterns and life cycle of the predator;
- status of target and non-target species (such as protected or endangered);
- local environmental conditions such as terrain, vegetation, and weather;
- presence of people and their pets;
- presence of trash that could attract predators;
- potential legal restrictions such as availability of tools or management methods;
- humaneness of the available options<sup>10</sup>; and
- costs of control options (the cost of control in this proposal may be a secondary concern because of overriding environmental and legal considerations).

### Monitoring

Since 1990, the Oregon Natural Heritage program of TNC has completed intensive surveys for snowy plovers at nesting areas between Florence and Floras Lake/New River.

Program monitoring. The lead agencies, as needed, in coordination with the cooperating agencies, would monitor any program that results from this EA and report those results annually. The impacts discussed in this EA would be monitored and used in two ways:

1) determine if any additional information that arises subsequent to the NEPA decision would trigger the need for additional NEPA analysis compliance. The lead agencies would

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<sup>10/</sup> The lead and cooperating agencies regard humane methods of predator damage management (including the use of lethal methods where allowed) to be those that cause the least pain, suffering, or injury to individual animals under the circumstances. Predator damage management would be accomplished only to the extent necessary to meet defined objectives, such as, aiding plover recovery by reducing predation.

review program results and the EA annually, or as needed, to ensure that the need for action, issues identified, alternatives, regulatory framework, and environmental consequences are consistent with this EA.

2) if work plans for different plover sites need modification based on the findings of the program's effects on plover or other environmental issues. APHIS-WS, in coordination with ODFW and the land management agencies, would monitor impacts on target predator populations through its Management Information System (MIS) database, when APHIS-WS is involved in direct damage management. The MIS information would be used to assess the localized and cumulative impacts of the program on predator populations. Monitoring of the effectiveness of the actions would be done by the land management agencies in coordination with USFWS and APHIS-WS to determine if the program is benefitting plovers or if changes are needed. The lead agencies would use the results of monitoring to develop site specific work plans (annually or as needed) for plover sites, in cooperation with USFWS, ODFW, OPRD and APHIS-WS.

## **2.2 Alternative 2 - Current Program (No Action Alternative)**

This alternative would not change the status quo. No action, in this case, means limited Federal action, which is consistent with the CEQ's definition and requirement for a "no action" alternative. This alternative consists of efforts that are now being made such as erecting nest enclosures to protect nesting plovers and their eggs, some predation assessment and assessing plover distribution and nesting successes. Trash management activities include removal and beach cleanup. An experimental predator removal program was implemented at one plover nest area in 1999, but would not continue under the current program. No predators would be removed under this alternative. Removing beachgrass to reduce cover for predators will be ongoing but is not within the scope of this analysis. This alternative also includes monitoring the effectiveness of current predator damage management efforts. Under the "no action alternative", the Federal lead and cooperating agencies would not take any *additional* action to prevent predation on snowy plovers over the current effort.

## **2.3 Alternative 3 - Non-lethal Predation Damage Management Methods Only**

This alternative would allow only non-lethal methods to prevent or deter predation. Any or all of the non-lethal efforts listed under the proposed action could be used (Table 2).

Alternative 3 was developed to address concerns for the welfare of individual animals. Although individual animals may be harassed or relocated, they would not be killed. The site-specific decision-making process is similar to Alternative 1; and only non-lethal methods would be considered and applied. Evaluating potential and actual predation events, and monitoring the effectiveness of predator damage management would also be included in this alternative.

#### **2.4 Alternative 4 - Non-lethal Predation Damage Management Methods Before Lethal Damage Management Methods**

This alternative would require that non-lethal methods be used first, and lethal methods only be used if non-lethal methods were tried and found to be ineffective or not practical. Any or all of the non-lethal methods listed under the proposed action alternative could be used, and in theory, any or all of the lethal methods could also be used after non-lethal methods were tried. The site-specific decision-making process discussed under Alternative 1 would be used with the condition that non-lethal methods would always be used as a first priority regardless of effectiveness. Evaluating predator threats and monitoring the effectiveness and impacts of predator damage management efforts would also be included in this alternative.

## CHAPTER 3 - ISSUES IMPORTANT TO THE ANALYSIS OF IMPACTS

### 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. The USFWS, BLM, and USFS, 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 alternatives management strategies:

- How effective might the various alternatives be in protecting the snowy plover from predation? How do they compare in meeting the objectives of the proposal? What is the anticipated response of plover populations to the different predator damage management alternatives?
- What would be the impacts on predator populations? How would the management strategies affect local or regional populations of red fox, ravens, crows and other predators?
- What potential non-target affects could occur by implementing the various alternatives? Would any of the strategies adversely affect human safety or pets?
- How do the public and technical experts perceive the humaneness of the various lethal and non-lethal methods?
- What would be the affects of conducting predator damage management on recreational opportunities.
- What would be the direct, indirect, cumulative impacts of the proposal?

### 3.2 Issues Not Analyzed in Detail with Rationale

- **Impacts on aesthetic values of wildlife** - Predator damage management to protect the snowy plover would have little impact on the public's opportunity to view wildlife because most plover sites are remotely located and if accessible, the public is discouraged from accessing them to avoid disturbing plovers. In addition, relative to their overall populations, very few individual predators would be removed. In the long term, predator damage management efforts, if effective in preventing predation and the resultant plover declines, may enhance the chances for the public to view plovers.

- **Impacts on biodiversity** - No wildlife damage management would be conducted to eradicate native or indigenous wildlife populations, or exotic (introduced) species. The impacts on biodiversity from predator damage management have been determined not to be significant nationwide, Statewide, or in Western Oregon (USDA 1995, 1997a revised, 1997b ). The number of individual animals that may be taken is a small number of the total population as analyzed in Chapter 4.
- **Impacts on minority and low income persons or populations (Environmental Justice and Executive Order 12898)** - EO 12898 requires Federal agencies to make Environmental Justice part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of Federal programs, policies and activities on minority and low-income persons or populations. All of the BLM, USFS, USFWS and APHIS-WS activities are evaluated for their impact on the human environment and compliance with EO 12898 to ensure Environmental Justice. Because there are no minority or low-income populations within the proposed project areas, and because the management methods proposed would not pose significant risk to humans or their environment, it is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority and low-income persons or populations.
- **Mesopredator release** (in the absence of large predators, smaller predators such as foxes, raccoons and skunks, can become more abundant, thus increasing predation on plovers). While the phenomena of mesopredator release has been documented in the absence of larger predators, this phenomena would not likely result from the proposed predator damage management efforts. Only a minor portion of the predator population would be removed, to protect plovers, and immigration and natural reproduction contribute to repopulation of areas where predators have been removed.
- **Other resources** - The actions discussed in this EA involve minimal ground disturbance or construction, other than erecting nest exclosures. Therefore, the following resource values are either not affected, or are not expected to be significantly affected by any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, flood plains, wetlands, air quality, prime and unique farmlands, aquatic resources, vegetation, or cultural resources. There are no significant irreversible or irretrievable commitments of resources. These resources will not be analyzed further.

### 3.3 Evaluation Methodology

Each major issue will be evaluated under each alternative and the direct, indirect and cumulative impacts will be estimated where applicable. NEPA describes the elements that determine whether or not an impact is “significant.” Significance is dependent upon the context and intensity of the impact. The following factors were considered to evaluate the significance of the impacts on target predator populations in this EA that relate to context and intensity (adapted from USDA (1995) for this proposal)

- **magnitude of the impact** (size, number, or relative amount of impact) (intensity) - The "magnitude" analysis for this EA follows the process described in USDA (1995). Magnitude is defined in USDA (1995) as ". . . a measure of the number of animals killed in relation to their abundance." Quantitative analysis is used wherever possible as it is more rigorous and is based on allowable harvest levels and the best available population estimates. Qualitative analysis is based on population trends and modeling. Magnitude may be determined either quantitatively or qualitatively;
- **duration and frequency of the impact** (temporary, seasonal impact, year round or ongoing) (intensity);
- **likelihood of the impact** (intensity);
- **geographic extent** (limited to the immediate project area(s), coastal counties, the State of Oregon or beyond) (context); and
- the **legal status** of a species that may be removed, or **conformance with regulations and policies** that protect the resource in question (context).

The target species were selected because they are snowy plover predators that could be removed or deterred to help protect plovers from further decline due to predation. The analysis in Chapter 4 uses the lowest density estimates for target predator species populations (where high and low population density estimates are provided in the text) to arrive at the most conservative impact estimate.

## CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

Chapter 4 provides information needed for making informed decisions on the predator damage management objectives identified in Chapter 1. This chapter uses the issues identified in Chapter 3 as the evaluation criteria. Each of the issues will be analyzed for its environmental consequences under each alternative.

Cumulative impacts are discussed in relationship to each of the key species analyzed in this EA and at the end of this chapter. The smallest unit of analysis for cumulative impacts on target species is the county level. Thus, coastal counties were used as the “analysis area.” Indirect impacts are discussed in the environmental consequences section where applicable.

Impacts on predator populations are analyzed so that a potential “worst case scenario” is presented for the number of predators that may be removed annually. The highest estimated “take” was determined from an estimated range of predators or predator sign observed without the use of additional non-lethal methods at each site. The high estimated “take” was then calculated from the lowest density population estimate that was provided. The estimated adverse effect was calculated this way to err on the conservative side, or to show what the highest impact might be on predator populations, even though this impact is not likely. *For the foreseeable future, the actual impact would probably be lower than what is estimated in this EA for several reasons:*

- it is not likely that all sites would be worked each year because of resource or other limitations;
- fewer predators may be removed than the highest estimate that was used;
- non-lethal methods would likely reduce the need to lethally remove as many predators, for example, improving trash management would likely reduce the number of crows and ravens attracted to a site; and
- the population densities in the coastal counties analysis area may be higher than the lowest density estimates that are used to estimate impact.

Monitoring plans, as discussed under Section 2.1, would be a component of any alternative that might be selected. Monitoring would allow for assessment of the impacts of any implemented alternative. In this way, the effects of the program on plovers, predator species, and any other new or existing environmental issues would be reviewed for consistency with this assessment, and re-evaluated if necessary. Additional predator damage management work, including site evaluations, would provide agency experts more precise information on the number and threats of predators and their effects on plovers. The information would be used to continue or modify the selected alternative.

### **4.1 Alternative 1 - Proposed Action - Integrated Predator Damage Management**

### **4.1.1 Impact of predator damage management on the target species populations**

#### **4.1.1.1 American crows**

Crows were responsible for 25 known nest failures of Oregon coast snowy plovers between 1990 and 2000 (TNC 2000). In addition, unknown corvids (a group that includes crows and ravens) caused an additional 24 nest failures, and crows may also have caused some of the 62 other unknown predation incidents (TNC 2000) during that time. Crows are considered to be a threat to plover eggs and chicks.

#### **About crows**

American crows are distributed north to south from the Yukon Territory, Canada, to Baja California, Mexico and are found from the west coast to the east coast (Johnston 1961). According to the North American Breeding Bird Survey (BBS), the American crow population in Oregon has increased at a rate of 1.5 percent per year from 1966 to 1999, and 2.2 percent per year from 1980 to 1999 (Sauer et al. 2000). Crow populations are healthy enough, and the problems they cause great enough, that the USFWS has established a standing depredation order for use by the public. Under this “order” (50 CFR 21.43), no Federal permit is required by anyone to remove crows if they are committing or about to commit depredations upon ornamental or shade trees, agricultural crops, livestock, or wildlife, or when concentrated in such numbers and manner as to constitute a health hazard or other nuisance.

#### **Impact on crow populations**

With the increasing population of crows, it is expected that crow predation on plovers will increase. Considering their population trend and abundance in Oregon, crow numbers would be expected to continue to increase despite the removal of the estimated 20 to 105 crows under the proposed action. Both ODFW and USFWS concur that removing crows to protect snowy plovers would have little or no effect on the crow population. Trash management activities would include installing predator proof receptacles, improved pickup where needed, and educational efforts to encourage people to remove trash. Increased and improved trash management should help to reduce crow and raven attraction to plover breeding areas, and thus help minimize the number of crows that might need to be removed. Non-lethal methods would have little or no effect on the crow population, but would disperse crows to other areas..

#### 4.1.1.2 Common ravens

Ravens were responsible for 15 known nest failures of Oregon coast snowy plover between 1990 and 2000 (TNC 2000). In addition, unknown corvids (a group that includes crows and ravens) caused an additional 24 nest failures, and ravens could also be responsible for some of the 62 incidences of unknown predation (TNC 2000). Ravens are considered to be a threat to plover eggs, chicks and adults.

##### About ravens

The common raven is widely distributed throughout the Holarctic Regions of the world including Europe, Asia, North America, and extends well into Central America (Goodwin 1986). Ravens generally are a resident species but some wandering and local migration occurs with immature and non-breeding birds (Goodwin 1986). Immature birds, which have left their parents, form flocks with non-breeding adults; these flocks tend to roam and are loose-knit and straggling (Goodwin 1986). The raven is an omnivorous species known to feed on carrion, crops, eggs and birds, small mammals, amphibians, reptiles, fish, and insects (Nelson 1934).

According to the North American BBS, the raven population in Oregon has increased at a rate of 1.4 percent per year from 1966 to 1999, and 3.9 percent per year from 1980 to 1999 (Sauer et al. 2000).

The number of ravens in Oregon and the coastal counties can only be estimated from other research and census studies. Stiehl (1978) reported raven nesting densities in the Harney Basin of Oregon at one pair/16.2 mi<sup>2</sup>. Stiehl (1978) marked 266 ravens during this study and reported individuals as far away as 173 miles from the study area, indicating considerable mobility in the population. Stiehl (1978) also reported that raven densities vary seasonally, peaking in the winter. Knight and Call (1981) summarized a number of studies on common raven territories and home ranges in the west. Nesting territories ranged in size from 3.62 mi<sup>2</sup> to 15.7 mi<sup>2</sup> in Wyoming and Oregon and home ranges varied from 2.53 mi<sup>2</sup> to 3 - 6 mi<sup>2</sup> in Utah and Oregon. Linz et al. (1990) found nest densities of one/1.7 mi<sup>2</sup> in their Camp Pendleton, California study. Raven home ranges overlap considerably and it is believed that a reasonable density estimate of breeding birds in the southwest Oregon is one raven/3 mi<sup>2</sup> (USDA 1995). If we use this lowest density estimate for coastal counties, we arrive at an estimated population of 5,419 ravens in our project analysis area (Table 3).

##### Impacts on raven populations

Ravens are a protected species under the Migratory Bird Treaty Act and can only be taken by permit from the USFWS. The cooperating agencies are not aware of any "other take" of ravens. APHIS-WS did not remove any ravens in the project area for depredation in FY 1999. Under the proposed action, the lead and cooperating agencies estimate that between 18 and 95 ravens could be removed annually to protect plovers. The results of this potential impact on the raven population are presented in Table 3.

**Table 3. Impact on Raven Population**

County	Plover project estimated take	Other take*	Total take	Estimated population	Plover project take percent of population	Cumulative take percent of population
Clatsop	0	0	0	281	0	0
Tillamook	0 - 5	0	0 - 5	375	0 - 1.3	0 - 1.3
Lincoln	0	0	0	331	0	0
Lane	4 - 20	0	4 - 20	1540	0.3 - 1.3	0.3 - 1.3
Douglas	4 - 20	0	4 - 20	1690	0.2 - 1.2	0.2 - 1.2
Coos	8 - 40	0	8 - 40	653	1.2 - 6.1	1.2 - 6.1
Curry	2 - 10	0	2 - 10	549	0.4 - 1.8	0.4 - 1.8
Total	18 - 95	0	18 - 95	5419	0.3 - 1.8	0.3 - 1.8

\*No depredation take recorded by APHIS-WS during FY 1999.

According to the data presented in Table 3, removing ravens to protect plovers (using a worst case scenario of lowest population density), would not impact the raven population in the project analysis area since the raven population is increasing at a greater rate. Additionally trash management activities should help reduce attractants to ravens and consequently the number of ravens in the project area. This may reduce the need to remove ravens. Non-lethal methods would have little or no effect on the raven population, but would disperse ravens to other areas.

#### 4.1.1.3 Red Foxes

Foxes were responsible for one known incidence of nest failure of snowy plovers on the Oregon coast sites between 1990 and 2000. Abundant red fox sign has been observed around nest sites at the New River site, and APHIS-WS personnel identified fox tracks chasing plovers at a time when a

fledgling plover disappeared. APHIS-WS continued to observe fox sign around nest exclosures after foxes were removed, indicating that not all depredating foxes were removed from that site (S. Thomas, APHIS-WS, pers. comm. 2000). Fox sign has been observed at some other plover nesting sites on the Oregon coast (S. Thomas and J. Brent, APHIS-WS, 2000 pers. comm.). This may indicate that red foxes may have been responsible for some of the 62 incidences where nest failure was attributed to an “unknown predator” (TNC 2000). Foxes are considered to be a threat during any stage of the plover’s life cycle.

### About red foxes

Red foxes are the most common and well-known species in the genus *Vulpes* and are the most widely distributed nonspecific predator in the world (Voigt 1987). Red foxes are not native to the Oregon coast (Verts and Carraway 1998). Foxes are regarded as nuisance predators in many regions, preying on wildlife and livestock, and have become notorious in many areas of the world as carriers of diseases (Ables 1969, Andrews et al. 1973, Richards 1974, Tabel et al. 1974, Tullar et al. 1976, Pils and Martin 1978, Sargeant 1978, Voigt 1987, Allen and Sargeant 1993). Because of its interest to humans, the red fox has been the subject of much study during the last 20 years. Investigations have revealed that red foxes are extremely adaptive with much diversity in their behavior and habitats. Voigt and Earle (1983) showed that red foxes avoided coyotes but coexisted in the same area and habitats.

The density of red fox populations is difficult to determine because of the species secretive and elusive nature. However, the red fox has a high reproductive rate and dispersal capacity similar to coyotes, and is capable of withstanding high mortality within the population (Allen and Sargeant 1993, Voigt 1987, Voigt and MacDonald 1984, Harris 1979, Pils and Martin 1978, Storm et al. 1976, Andrews et al. 1973, Phillips and Mech 1970). Storm et al. (1976) stated that 95 percent of the females (43.6 percent were less than 1 year old) bred successfully in a population in Illinois and Iowa. Rowlands and Parkes (1935) and Creed (1960) reported that male red fox breed in their first year. Litter sizes averaged about 4.7 for 13 research studies and litters with as many as 14 and 17 offspring have been reported (Storm et al. 1976, Voigt 1987). Ables (1969) and Sheldon (1950) reported that more than one female was observed at the den and suggest that red fox have "helpers" at the den, a phenomena observed in coyotes and other canids. Reported red fox population densities have been as high as over 50/mi<sup>2</sup> (Harris 1977, MacDonald and Newdick 1982, Harris and Rayner 1986) where food was abundant; Ontario population densities are estimated at 2.6 animals/mi<sup>2</sup> (Voigt 1987), and Sargeant (1972) reported 1 fox den/3 mi<sup>2</sup>.

Red fox dispersal serves to replace and equalize fox densities over large areas and over a wide range of population densities. Annual harvests in localized areas in one or more years will likely have little impact on the overall population in subsequent years, but may reduce localized predation (Allen and Sargeant 1993). Phillips (1970) says that fox populations are resilient and in order for fox control operations by trapping to be successful, pressure on the population must be almost continuous. Phillips (1970) and Voigt (1987) further state that habitat destruction that reduces prey numbers, water, and cover will impact fox populations to a greater extent than a short-term overharvest.

In 1980, ODFW estimated that there was 10,716 mi<sup>2</sup> of red fox habitat statewide with a population of about 20,300 animals, and an average density of 1.9 red fox/mi<sup>2</sup> of habitat (USDA 1995). The APHIS-WS southwest District was estimated to have 6,571 mi<sup>2</sup> of habitat<sup>11</sup> and a population of about 7,600 animals; the average density for the District was 1.2 red fox/mi<sup>2</sup> of habitat. The lower density estimate will be used to determine potential fox densities in coastal counties (Table 4).

### Impact on red fox populations

USDA (1997 revised) determined the allowable harvest level for red fox to be 70 percent of the total population. Based on site assessments, from 46 to 95 red foxes could be removed prior to and during plover breeding, nesting and fledging (Table 4, Impacts on Red Fox Population). This represents less than two percent of the population, when added to other forms of known mortality (cumulative impact). This is negligible when compared with the established 70 percent allowable harvest level for red foxes. Non-lethal methods would have little or no effect on the fox population.

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<sup>11</sup>/Potential fox habitat in each county (Clatsop - 50 percent, Tillamook - 67 percent, Lincoln 50 percent, Lane - 45 percent, Douglas - 50 percent, Coos - 80 percent, and Curry - 33 percent, as estimated by APHIS-WS).

Table 4. Impacts on Red Fox Population

County	Plover project estimated take	Other take*	Total take	Estimated population	Plover project percent of population	Cumulative take - percent of population
Clatsop	1 - 5	0	1 - 5	506	0.2 - 1.0	0.19 - 0.99
Tillamook	0	0	0	904	0	0
Lincoln	0	0	0	595	0	0
Lane	0	27	0	2,494	0	1.0
Douglas	0	45	0	3,042	0	1.5
Coos	30 - 65	17	47 - 82	1,564	1.9 - 4.2	3.0 - 5.2
Curry	15 - 25	0	15 - 25	652	2.3 - 3.8	2.3 - 3.8
Total	46 - 95	89	135 - 184	9,757	0.5 - 1.0	1.4 - 1.9

\*Other take includes fur harvest (ODFW Fur Harvest 1999-2000) and depredation take (APHIS-WS MIS FY 1999).

#### 4.1.1.4 Raccoon

Raccoons were only responsible for one known incidence of nest failure on snowy plovers on Oregon coast snowy plover sites between 1990 and 2000. However, raccoons could be responsible for some of the 62 cases where snowy plovers were predated and the cause was attributed to unknown predator (TNC 2000). Raccoon habitat and/or sign was observed at many of the plover nest sites (S. Thomas and J. Brent, APHIS-WS 2000 pers. comm.), and thus raccoons are suspected to be responsible for some of the unknown predation. Raccoons are considered to be a threat to plovers during all life stages, but especially to eggs and chicks prior to fledging. Raccoons can prey on adult birds that are setting on nests during the night (S. Thomas, APHIS-WS 2000 pers. comm.).

#### About raccoons

The raccoon is a member of the family *Procyonidae* that includes ringtails and coatis in North America. Raccoons are one of the most omnivorous of animals, feeding on carrion, garbage, birds, eggs, mammals, insects, crayfish, mussels, other invertebrates, a wide variety of grains, various fruits, other plant materials, and most or all foods prepared for human or animal consumption (Sanderson 1987).

Sanderson (1987) stated that absolute population densities of raccoons are difficult if not impossible to determine because of the difficulty in knowing what percent of the population has been counted or estimated, and the additional difficulty of knowing how big an area the raccoons are using. Twichell and Dill (1949) reported one of the highest densities, with 100 raccoons removed from a winter tree den area on 101 acres of a waterfowl refuge in Missouri during winter. Other studies have found raccoon densities that ranged from 9.3/mi<sup>2</sup> to 80/mi<sup>2</sup> (Yeager and Rennels 1943, Urban 1970, Sonenshine and Winslow 1972, Hoffman and Gottschang 1977, Rivest and Bergeron 1981).

### Impact on raccoon populations

ODFW believes that raccoon populations are cyclic in Oregon and numbers can change considerably from one year to the next due to factors such as distemper and other diseases (USDA 1995). As a result, any population estimate would be for a given point in time and population levels could change rapidly if a disease outbreak occurs. No statewide population estimate was made for raccoons in 1980 as was done for other furbearers. In 1993, ODFW censused raccoon populations for southwest Oregon, but not statewide, and estimated the population at 88,500 animals, a density of 51.9/mi<sup>2</sup> (USDA 1995). If this density is used to estimate the population in coastal counties, the raccoon population would be almost 827,000.

The allowable harvest level for raccoons found in USDA (1997 revised) was established at 49-59 percent of the total population. Based on plover nesting site evaluations, between about 100 and 205 raccoons could be removed prior to and during plover breeding and nesting (Table 6). When fur harvest and depredation take by APHIS-WS are totaled, the total take (cumulative impact) could be about 2,600 raccoons, or less than one percent of the population. This is negligible compared to the 49-59 percent allowable harvest established for raccoons (USDA 1997 revised). Nonlethal methods would have little or no effect on the raccoon population.

Table 6. Impact on Raccoon Population

County	Plover project estimated take	Other take*	Total take	Estimated population	Plover project percent of population	Cumulative take - percent of population
Clatsop	0	121	121	43,752	0	0.28
Tillamook	0	192	192	58,388	0	0.33
Lincoln	0	88	88	51,485	0	0.17
Lane	24 - 50	520	544 - 570	239,778	0.01 - 0.02	0.23 - 0.24
Douglas	24 - 50	436	460 - 486	263,185	0.01 - 0.02	0.17 - 0.18
Coos	42 - 85	998	1040 - 1083	84,545	0.05 - 0.10	1.2 - 1.3
Curry	10 - 20	39	49 - 59	85,531	0.01 - 0.02	0.06 - 0.07
Total	100 - 205	2394	2494 - 2599	826,664	0.01 - 0.02	0.30 - 0.31

\*Other take includes fur harvest (ODFW Fur Harvest 1999-2000) and depredation take from (USDA-APHIS-WS Management Information System FY 1999).

#### 4.1.1.5 Striped skunks

Striped skunk impacts are considered in this analysis. TNC (2000) reported that skunks were responsible for 13 known incidences of nest failure on Oregon coastal snowy plover nesting sites<sup>12</sup>. Skunks are generally a concern from a human perspective in that they cause odor problems around homes, transmit diseases such as rabies to humans and domestic animals, and prey on poultry. Skunks are considered to be a threat to plovers during all life stages, but especially to eggs and chicks prior to fledging. Skunks can prey on adult birds that are setting on nests during the night (S. Thomas, APHIS-WS 2000 pers. comm.).

#### About striped skunks

The striped skunk is the most common member of the *Mustelidae* family. Striped skunks have increased their geographical range in North America with the clearing of forests, however there is no well-defined land type that

<sup>12</sup>/ TNC did not distinguish between striped or spotted skunks, however, the cooperating agencies estimate that striped skunks are more likely than spotted skunks to be a threat to plovers.

can be classified as skunk habitat (Rosatte 1987). Striped skunks are capable of living in a variety of environments, including agricultural lands and in urban areas.

The home range of striped skunks is not sharply defined over space and time, but is altered to accommodate life history requirements such as raising young, winter denning, feeding activities, and dispersal (Rosatte 1987). Home ranges reported in the literature averaged between 0.85 and 1.9/mi<sup>2</sup> for striped skunks in rural areas (Houseknecht 1971, Storm 1972, Bjorge et al. 1981, Rosaette and Gunson 1984). The range of striped skunk densities reported in the literature was from 0.85 to 67/mi<sup>2</sup> (Jones 1939, Ferris and Andrews 1967, Verts 1967, Lynch 1972, Bjorge et al. 1981). Many factors may contribute to the widely differing population densities. Type of habitat, food availability, disease, season of the year, and geographic area are only but a few of the reasons (Storm and Tzilkowski 1982).

### Impact on striped skunk populations

Using the density ranges from the literature, the striped skunk population in coastal counties is estimated to be from 13,600 to more than 1,067,000 (Table 7). Based on plover nesting site evaluations, between about 30 and 100 striped skunks could be removed prior to and during the plover breeding and nesting period. When added to other take (furharvest and WS take), about 115 to 179 skunks could be removed from the population each year. This would be a cumulative impact of approximately one percent of the low population density estimated in coastal counties.

Table 7. Impact on Striped Skunk Population

County	Plover project estimated take	Other take*	Total take	Estimated population (low - high)	Plover project percent of low population	Cumulative take - percent of low population
Clatsop	0	0	0	717 - 56,481	0	0
Tillamook	0	8	8	956 - 75,375	0	0.8
Lincoln	0	0	0	843 - 66,464	0	0
Lane	4 - 20	23	27 - 43	3,927 - 309,540	0.1 - 0.5	0.7 - 1.1
Douglas	4 - 20	32	36 - 52	4,310 - 339,757	0.1 - 0.5	0.8 - 1.2
Coos	20 - 46	10	30 - 56	1,385 - 109,143	1.4 - 3.3	2.2 - 4.0

Curry	6 - 12	8	14 - 20	1,401 - 110,416	0.4 - 0.9	1.0 - 1.4
Total	34 - 98	81	115 - 179	13,569 - 1,067,176	0.2 - 0.7	0.8 - 1.3

\*Other take includes fur harvest (ODFW Fur Harvest 1999-2000) and depredation take (USDA-APHIS-WS Management Information System FY 1999)

chaparral (Orr 1943, Baker and Baker 1975).

#### 4.1.1.6. Impact on other predators

Other predator species are suspected of preying on Oregon coast snowy plovers but such predation has not been confirmed. At this time, the lead and cooperating agencies believe that the following species should be included in the analysis of impacts since there is a potential that they may be adversely affecting plovers. The impact on each of these species is expected to be minor, since they are not confirmed predators of Oregon coast snowy plovers. Removal of any species would first be based on field analysis to determine if they are a threat. Non-lethal methods would have little or no effect on other predator populations.

#### Feral domestic cats

Worldwide, after habitat destruction, cats may be involved in the extinction of more bird species than any other cause. In the United States, cats are contributing to the endangerment of populations of birds such as least terns, piping plovers, and loggerhead shrikes (Coleman et al. 1997). A domestic cat's desire to hunt is not suppressed by adequate supplemental food, so that even when fed regularly by people, they still pose a threat to birds and mammals due to a strong motivation to hunt (Adamec 1976). Feral cats have altered ecosystems and depleted populations of indigenous lizards and birds on mainlands and islands throughout the world (Fitzgerald 1988, Eason and Frampton 1991). Fitzgerald (1988) and Jones (1989) summarize information on feral cats with respect to diet and conclude that cats are opportunistic generalists in their selection of prey items. Remains of mammals are usually present in 50 to 90 percent of cat guts and scat, and on islands, bird remains were present in 51 percent (Fitzgerald 1988). Cats are considered to be a threat to plover chicks and adults.

Fitzgerald, (1988) estimated that roughly 20-30 percent of free-ranging cats' kills are birds. In a 1992 University of Wisconsin study, researchers' estimate of the number of birds killed annually by free-ranging cats in rural Wisconsin was between 7.8 and 219 million (Coleman and Temple 1995). Coleman et al. (1997) estimate the total number of pet and free-ranging domestic cats in the U.S. as probably more than 100 million. We do not

have figures for Oregon, but feral cats are known to exist at some plover nesting areas.

Eradication of cats from some small New Zealand islands has allowed their native bird populations to increase in number (Veitch 1985) and increased the potential to use such islands for relocation/reintroduction of endangered and indigenous animals. Bloomer and Bester (1991) removed cats from Marion Island and showed that night hunting decreased the density of cats based on a catch per unit-of-effort. They also reported that no adult group was particularly vulnerable, however, removal efforts reduced the number of females and litters per female per year, thus reducing fecundity, the most efficient way in which to reduce an animal population (Remfry 1981).

Removing feral cats may be done where cats are found at plover breeding, nesting, and foraging sites. Cat removal would be conducted to remove potential plover predators and return plover habitat to a more natural state. No State law protects feral cats.

Cats would be removed by using cage traps (live trapped), and either released to county or local animal shelters, or euthanized on site, or they may be removed with leg-hold traps, snares, or shooting, depending upon local county ordinances. When live trapped and released to local shelters, cats may be adopted out as pets or euthanized if an adopter can not be found.

Millions of cats are destroyed annually in the United States by humane groups and animal shelters. Considering the high reproductive rates (6 to 30 kittens annually per female) (Fitzwater 1994), their non-native status, and the undesirable effects that feral cats have on local ecosystems, the proposed project would not contribute an undesirable effect on the natural environment. Feral cat removal would likely benefit the natural ecosystem since they are an exotic species. Removing a limited number of individual cats to protect plovers would not alter cats' population status. BLM has entered into an agreement with a local animal shelter to remove feral cats on the North Spit of Coos Bay. The cats are offered for adoption.

Under all alternatives, feral cat removal would likely have the indirect benefit of reducing predation on other species, including mice and other native birds, however, it would not be expected to be substantial since few cats would be removed.

### **Coyotes**

Coyotes would only be targeted if field investigations indicate they pose a direct and immediate threat to specific plovers, chicks, or nests. Under the proposed action, about 15 to 70 coyotes could be removed, if they are found

to be a threat to plovers. APHIS-WS estimated that total take of coyotes in 1998, which included furharvest from hunting and trapping and depredation take, amounted to three percent of the population in northwest Oregon and nine percent in southwest Oregon (unpublished monitoring reports of environmental assessments on predator damage management, APHIS-WS). It is not expected that taking coyotes to protect plovers would add notably to the cumulative take of coyotes. Take is expected to remain well below the established USDA (1995a) 70 percent allowable harvest for coyote. Cumulative mortality of coyotes from coastal counties included 775 coyotes taken from hunting, trapping, and depredation (ODFW 1999-2000 hunting and trapping and USDA MIS for FY 1999). Negligible impacts on the coyote population are expected as a result of plover protection.

### Mink and weasels

Mink have not been identified as plover predators in the project area, but if they are found at active nests, they may be removed since they are known bird predators (Eagle and Whitman 1987). Mink are considered to be a potential threat to plover eggs and chicks. Lead and cooperating agencies estimate that up to 40 mink and weasels may be removed to protect plovers annually. Twenty-one mink were taken by private fur harvest efforts in the coastal counties in Oregon during the 1999-2000 fur harvest season (ODFW 2000). ODFW does not have an estimated mink population, but the trend in harvest data could indicate the population is increasing. When added to other forms of harvest, taking mink to protect plovers would not notably impact the population.

Weasels are suspected in plover predation (Oregon Natural Heritage Program, public involvement). Long tailed weasels (*Mustela frenata*) and short tailed weasels (*Mustela erminea*) may be found in the project area. Few weasels are expected to be removed under the proposed program, and only if they are found to be immediately need active nests, since they are considered to be a threat to plover eggs and chicks. ODFW (2000) reports that two weasels were harvested in the counties encompassing the proposed project during the 1999-2000 fur harvest season. The ODFW does not have population estimates for long and short tailed weasels. However, few weasels are expected to be removed and no notable impact to the population would occur from the proposed action.

### Opossum

Opossums are not native to the western United States, however populations have been established in Oregon. Population estimates for opossum are not available, but the opossum population trend in Oregon is thought to be increasing (USDA 1997a, revised). Opossum are considered to be a

potential threat to plover eggs and chicks, but can prey on nesting adult birds (S. Thomas, APHIS-WS 2000 pers. comm.). However, few opossum are expected to be removed under the proposed program. Opossum are not native to the western United States. During the 1999-2000 fur harvest season, private harvest removed 149 opossum from coastal counties. The lead and cooperating agencies estimate that 10 to 65 opossum would be added to the cumulative mortality, and that it would not likely affect the overall population trend of opossum.

### Gray fox

Foxes were responsible for one known incidence of nest failure on snowy plovers on the Oregon coast snowy sites between 1990 and 2000. Whether the fox was a red or gray fox was not documented, however, gray fox sign has been observed around some plover nest sites on the Oregon coast (S. Thomas and J. Brent, APHIS-WS 2000 pers. comm.). Gray foxes may be responsible for some of the 62 incidences of nest failures over the last ten years from unknown predators (TNC 2000). Gray foxes are considered to be a threat to plovers at all life stages.

Gray foxes inhabit brushy and wooded areas, and have omnivorous feeding habits, eating birds, rabbits, eggs, insects, carrion, fleshy fruits, and grains. Gray foxes reach reproductive maturity at about 1 year of age and litters average four pups after a 2-month gestation period (Nowak and Paradiso, 1983). Their densities can range between 3.1 and 5.4/mi<sup>2</sup> (Trapp 1978). Gray foxes have been reported to live up to 15 years, but annual mortality may be as high as 60 percent (Seton 1929, Lord 1961). In 1980, ODFW estimated 6,429 mi<sup>2</sup> of gray fox habitat in Oregon with a population of about 14,600 animals and an average density of 2.3 gray fox/mi<sup>2</sup> of habitat. Gray fox habitat information in coastal counties is not available, therefore, no quantitative population estimates can be made for this analysis. Gray fox observations during other survey work, and from conflicts with humans, showed an increase starting in 1994. These indicators remain at a level above the previous years, suggesting that gray foxes are at a cyclical population high (J. Toman, ODFW 2001 pers. comm.).

The estimated impact from removing gray foxes to protect plovers would add few individuals to the cumulative mortality (Table 5). Non-lethal methods would have little or no effect on the fox population.

**Table 5. Impact on Gray Fox Population**

County	Plover project estimated take	Other take*	Total take
Clatsop	0	0	0

Tillamook	1 - 5	0	1 - 5
Lincoln	0	0	0
Lane	4 - 20	44	48 - 64
Douglas	4 - 20	20	24 - 40
Coos	2 - 10	2	4 - 12
Curry	0	20	20
Total	11 - 55	86	97 - 141

\*Other take includes fur harvest (ODFW Fur Harvest 1999-2000) and depredation take (APHIS-WS Management Information System FY 1999).

### Rodents

The sailing ships of European explorers provided a vehicle for black rats to spread rapidly to six continents and thousand of islands (Clark 1981). Black rats can occupy all available vegetated habitats, from desert scrub to lush montane forests (Clark 1981). They commonly nest in trees and black rats (Atkinson 1985) can potentially prey upon almost any bird's nest. Black rats are omnivorous with plant foods comprising an average of 80 percent of sampled stomach contents, however, animal food occurred in at least 81 percent of the rats examined on the Galapagos Islands (Clark 1981).

The Norway rat (*Rattus norvegicus*), also called house rat, sewer rat, warf rat, brown rat, and gray rat, was also introduced into North America by sailing ships from Europe (Timm 1994). Norway rats have not specifically been identified as predators of Oregon coast plovers, however they can prey on bird eggs and are not ruled out, and they may be targeted if found near plover nesting sites.

The predominantly nocturnal habits of rats make both their identification and observation of their predatory behavior difficult, and the incidence of rat predation is probably higher than realized (Atkinson 1985). Clark (1981) stated that introduced black rats are likely to have many severe effects on the Galapagos flora and fauna, and that even infrequent predation on vertebrates by black rats could have a significant impact. As pointed out by Bourne (1981) and Moors and Atkinson (1984), even a low frequency of rat predation can have a severe effect if, for other reasons, there are few birds. Applicability to mainland avian species is not confirmed.

Rodents are considered to be a potential threat to plover eggs and newly hatched chicks.

Black rats (Marsh 1994) and Norway rats (Timm 1994) are not protected by law and can be controlled any time with mechanical or chemical methods. Deer mice are native, nongame mammals, and are not protected under Oregon law. Control is allowed when necessary. The proposed program would remove rats and deer mice around plover nesting areas.

Rats and mice would be controlled using zinc phosphide in tamper resistant bait stations or burrows, live-capture cage traps or plover-proof snap traps. Rats and mice would be removed around plover nests to the maximum extent possible, prior to and during the plover breeding season at plover nesting sites that have been active within the past year. As with all pesticides, rodenticides must be registered by authorities and used in accordance with label directions.

It is difficult to estimate the number of rodents that could be taken under this alternative, but the overall impacts on rodent populations would not be significant since rodents would only be targeted at active plover nesting areas if rodent sign is identified. A low intensity impact is expected.

### Spotted skunks

The geographical range of the western spotted skunk extends from central Mexico through the western United States to British Columbia (Rosatte 1987). Few studies have been published on the home range, population density and mortality of spotted skunks. Crabb (1948), however, found that the western spotted skunk in Iowa occupied a home range of about 160 acres at densities of 5.7/mi<sup>2</sup>. He also stated that spotted skunks are nomadic, traveling up to 3 mi/night, do not occupy a home range, and do not defend a territory.

There are no ODFW population estimates for spotted skunks. "Other take" included 176 spotted skunks removed by fur harvest trapping and hunting (ODFW 1999-2000 Fur Harvest). Few or no spotted skunks are expected to be taken under the proposed action. Wildlife biologists believe that "the current take" is not impacting the spotted skunk population when compared to the total population. The magnitude of impact is considered low (USDA 1995). Non-lethal methods would have little or no effect on the spotted skunk population.

### Gulls -

Gulls (*Larus spp.*) are considered to be a potential threat to plover eggs and chicks. One gull has been documented in Oregon as preying on plovers (TNC 2000), however, the species of gull has not been identified. According to the North American BBS, the western gull population in Oregon has decreased at a rate of 2.6 percent per year from 1066 to 1999,

and decreased less than one percent per year from 1980 to 1999 (Sauer et al. 2000). The California gull population in Oregon has increased at a rate of 2.6 percent per year from 1966 to 1999, and decreased four percent per year from 1980 to 1999 (Sauer et al. 2000).

These species have not been confirmed as a threat to plovers, and although the need to control damage by gulls is a possibility, it is not believed to be likely. Nest exclosures would continue to be the primary method for reducing gull predation at plover nest sites. Monitoring would determine if additional methods should be used, or if nest exclosures should be modified. Gulls are protected under the Migratory Bird Treaty Act. Any gull that would be targeted for lethal removal under the proposed action would be taken under permit issued by the USFWS.

### Raptors

Raptor species such as northern harrier (*Circus cyaneus*), peregrine falcon (*Falco peregrinus*), merlin (*Falco columbarius*) and American kestrel (*Falco sparverius*) may possibly be found to threaten plover chicks and adults.

Non-lethal damage management measures would always be attempted on raptors found to be a threat to plovers. Lethal methods would only be used on raptors when or if non-lethal methods are used and found to be ineffective, and they would not be used on special status raptors such as the peregrine falcon. Under the proposed action, raptors that are considered an immediate threat to plovers may be removed on a case-by-case basis, and only during the nesting season and until plovers have fledged.

Peregrine falcons would not be lethally removed, therefore, there would be no effect on the population. Raptors are protected under the Migratory Bird Treaty Act and can only be taken by permit from the USFWS. Thus, the USFWS acts as a monitoring agent to help minimize adverse impacts on raptor species. Oregon trend data from the Breeding Bird Survey show the Northern Harrier to be increasing at 2.8 percent per year from 1966 to 1999, and 1.9 percent per year from 1980 to 1999 (Sauer et al. 2000). The Breeding Bird Survey data show American Kestrels to be declining at the rate of one percent per year from 1966 to 1999, and 1.2 percent per year from 1980 to 1999 in Oregon (Sauer et al. 2000). United States BBS data for Merlins shows an 11.1 percent increase per year from 1966 to 1999 (Oregon data are not available) (Sauer et al. 2000). Lacking precise population data for raptors, the lead agencies may begin a monitoring program to ensure that any impacts on the raptor populations could be assessed more precisely. Program monitoring would also reveal more information on the extent of threats that raptors pose on plovers.

Raptor damage management would not be expected to adversely affect raptor populations due to the following factors: Lethal removals are unlikely, but if they do occur, they would occur only in isolated circumstances. The cooperating agencies estimate that in the worst case scenario, only up to several raptors may be removed per year. Any take would be closely monitored and coordinated with USFWS. No special status raptors would be targeted for lethal removal. The cooperating agencies are not aware of any other take of raptors, therefore, cumulative impacts from possible removals is not expected to have a measurable impact on the raptor population.

As plover numbers increase and the plover population stabilizes, raptors would be allowed a more natural interaction with plovers.

#### **4.1.2. Non-target impacts**

The philosophy behind integrated wildlife damage management is to implement effective management techniques, while minimizing the potentially harmful effects to humans, target and non-target species, and the environment. The methods that may be used under the Proposed Action (Alternative 1) are selective for target species. Mitigation in standard operating procedures (Appendix C) and wildlife damage management methods (Appendix B) describe limitations on activities that contribute to program safety and reduce the likelihood that non target animals or humans would be affected.

Under Alternative 1, APHIS-WS could use shooting, DRC-1339, pyrotechnics, traps, snares, zinc phosphide, nest and egg destruction, and denning. A formal risk assessment of APHIS-WS methods, including those proposed for use in this EA, concluded low risks to humans (USDA 1997 revised, Appendix P). This assessment included potential risks to APHIS-WS employees, the public, and non-target animals. While some of the materials and methods used by APHIS-WS have the potential to represent a threat to health and safety if used improperly, problems associated with their mis-use have rarely occurred, and the greatest risk is to the user.

Impacts on non-target animals and humans are expected to be extremely low for several reasons: lethal management methods proposed for use are highly target specific, and this specificity is enhanced by employing experienced wildlife specialists skilled in effective placement and use of these tools; wildlife specialists look for target animal sign (tracks, scat, trails and other signs) that show where target animals occur in relation to plover sites, then set equipment such as traps or snares according to where and when target animals are likely to enter a very specific area. When soft-catch traps are used to capture predators, they are equipped with a pan-tension device that excludes animals of lighter weight than the targeted animal. Shooting is highly target specific and does not pose a risk to non-target animals

when conducted by wildlife specialists trained in firearm use and to identify target and non-target species.

The APHIS-WS program has a record of non-target take of less than one percent of target take in each of its Districts that encompass coastal counties (APHIS-WS, unpublished Monitoring Reports, 2000). In 1999, APHIS-WS caught one turkey vulture in a padded leg-hold trap while removing plover predators at a New River nesting site. The vulture was the only non-target animal caught, and it was released unharmed.

There is a possibility that free-roaming dogs may be captured by leg-hold traps and snares. Although plover nesting areas are marked off-limits to humans and their pets and signs dictate that dogs must be on leash, these restrictions are sometimes not followed and are difficult to enforce. As with human use, if dogs are expected to be in the area proposed for predator damage management, the use of tools would be adapted to the particular risk to dogs. Most nesting sites are remotely located with little chance of encounter by humans or their pets. In cases where humans or pets could encounter equipment, personnel setting equipment can use cage traps for some species, or may set equipment at night, and keep it covered during the day to reduce the chance of affecting people or domestic dogs. In addition, equipment in areas where the public may have access (although unauthorized), will be checked daily, to reduce the risk to any non-target animal that may encounter equipment.

All capture and removal methods allow for positive identification of target species. The toxicant, DRC-1339, proposed for use for crows, ravens and gulls, would be used in accordance with EPA label requirements (Appendix D) to minimize both primary and secondary hazards to non-target animals. Snap traps, if used for mice or rats, would be housed to prevent the take of non-target species, including plovers.

Records would be kept on all target and non-target animals removed by method. Those records would be used to assist in routine monitoring of the effects of the program. Little or no non-target effects are expected from implementing this proposal.

Under all alternatives, predator removal, especially non-native predators such as feral cats, rats, and red foxes, could indirectly benefit other native birds, however, it would not be expected to be substantial since few predators would be removed when compared to their overall populations.

### Threatened and Endangered Species

Predator damage management activities are proposed to occur in and around plover nesting areas. It is possible that implementation of some of the proposed predator damage management measures may affect the plovers using these habitats. For example, the presence of APHIS-WS personnel in the immediate vicinity of plovers and their nests may result in disturbance that disrupts plover incubation, brood

rearing, or foraging. Pyrotechnics and other auditory or visual aversive measures could also disturb nesting and brooding plovers and their chicks. All efforts would be made to avoid these types of impacts. However, there may be situations in which predator damage management measures could not proceed without some level of disturbance to plovers. In such cases, APHIS-WS, USFWS, ODFW, and the appropriate land management agency would confer to determine:

- What measures can be taken to minimize any unavoidable impacts, and
- If the benefits to plovers from implementing the necessary predator management measures outweigh the associated impacts to plovers.

Implementation of predator damage management measures would only proceed when the expected net effect is beneficial to plovers.

At the current plover population level, the lead and cooperating agencies expect that reducing predation would benefit plovers by removing some of the threats that have contributed to keeping numbers low. Thus, plovers may be able to recruit individuals into the population at more natural levels with increased nest success, and juvenile and adult survival. Predator damage management is expected to enhance other ongoing management, such as recreation management and habitat improvements, to increase benefits to plovers.

The USFWS has completed consultation pursuant to Section 7 of the ESA to evaluate the potential impacts on Federally listed T&E species. The USFWS's biological opinion (BO) is contained in Appendix E. The Reasonable and Prudent Measures and Terms and Conditions described in the BO have been included in the proposed action. These include establishing a snowy plover predator team, completion of work plans for snowy plover nesting areas, and minimizing disturbance to nesting plovers. The Reasonable and Prudent Measures, and the Terms and Conditions that implement the measures are described in detail in Appendix E. The USFWS anticipates that two snowy plover nests may be directly taken, over the five year life of the BO due to accidental destruction. Additionally, the USFWS anticipates a small number of plover nests, not to exceed two percent of the known annual nest attempts, would be taken annually via harassment of adult nesting plovers leading to nest abandonment as a result of the additional predator control activities. The USFWS concluded that the level of anticipated take is not likely to result in jeopardy to the Pacific Coast population of the western snowy plover, and that the long-term direct, indirect and cumulative effects from the proposed action to the snowy plover population in Oregon are anticipated to be beneficial (Appendix E).

Bald eagles and brown pelicans, Federally listed as threatened and endangered respectively, also use habitats in the vicinity of the proposed project. Pyrotechnics or other auditory or visual aversive measures could disturb eagles hunting along the beach, eagles perched in nearby trees, and pelicans loafing on adjacent beaches.

Since these species are easy to detect and identify, these types of impacts can be avoided. The USFWS has agreed with the action agencies' determination that the proposed action is not likely to adversely affect the brown pelican or the bald eagle (Appendix E).

The Aleutian Canada goose and the American peregrine falcon have been removed from the Federal List of Endangered and Threatened Wildlife (Federal Register, 50 CFR 17) (USFWS 2001 and USFWS 1999b). The USFWS has made a "no effect" determination on the Stellar sea lion (*Eumetopias jubatus*) since it is not likely to be encountered by project activities.

### 4.1.3 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, in part, is a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. Some individuals and groups are opposed to some predator damage management actions and some are opposed to any predator damage management actions. APHIS-WS personnel are experienced and professional in their use of management methods so that they are as humane as possible. Professional predator damage management activities are said to be more humane than nature because they result in less suffering. However, people concerned with animal welfare are concerned with minimizing animal suffering as much as possible, or eliminating unnecessary suffering. The interpretation of what is unnecessary suffering is the point to debate (Schmidt, 1989). The lead and cooperating agencies have determined that predator damage management is necessary to prevent further decline of the threatened snowy plover.

In a national survey conducted by an independent research firm in 1997, 68 percent of all respondents, and 60 percent of cat owning respondents, felt that stray cats should be humanely removed from areas set aside for wildlife (American Bird Conservancy 2000).

Animal welfare organizations are concerned that some methods used to reduce wildlife damage and manage wildlife populations, in general, expose animals to unnecessary pain and suffering. Research suggests that with some methods, such as restraint in leg-hold traps, changes in blood chemistry of trapped animals indicate stress. Blood measurements indicated similar changes in foxes that had been chased by dogs for about five minutes as those restrained in traps (USDA 1997a, revised). However, such research has not yet progressed to the development of objective, quantitative measurements of pain or stress for use in evaluating humaneness.

The decision-making process involves tradeoffs between the above aspect of humaneness, and the responsibility of federal agencies under the ESA to protect a T&E species from further decline. An objective analysis of this issue must consider

not only the welfare of a wild animal caught in a leg-hold trap, snare or killed by shooting, but also the welfare of the plover that may be killed if the actions are not being taken. The challenge in coping with this issue is how to achieve the least amount of animal suffering with the constraints imposed by current technology. To insure the most professional handling of these issues and concerns, APHIS-WS has numerous policies giving direction toward the achievement of the most humane wildlife damage management program possible (Appendix C, Mitigation in Standard Operating Procedures).

APHIS-WS and the National Wildlife Research Center have improved the selectivity of management devices through research and development of pan-tension devices, break-away snares, and chemical immobilization/euthanasia procedures. Research continues to improve the selectivity and humaneness of management devices. Pain and suffering are minimized, avoided, or mitigated by using methods considered more humane than other legally available methods. For example: 1) Shooting an animal in a cage trap is a method of quick kill and may be considered humane by some, 2) Where traps are proposed, padded jawed leg-hold traps that minimize trauma and with fitted pan-tension devices avoid capturing smaller animals would be used, 3) Traps are checked regularly to remove predators that could suffer if not euthanized, 4) Where shooting from a distance is necessary, personnel are instructed to shoot only when they have a clear view and can make a “clean kill.”<sup>13</sup> 5) Where toxicants are proposed, only EPA registered toxicants would be used.

The lead and cooperating agencies’ criteria for selection among alternatives is to employ the most humane methods possible in controlling individual predatory animals. The lead and cooperating agencies regard humane methods of predator damage management (including the use of lethal methods) to be those that cause the least pain, suffering, or injury to individual animals under the circumstances and that predator damage management be accomplished only to the extent necessary to meet defined objectives, such as in this instance, aiding plover recovery by reducing predation. Because this alternative is determined to be the most effective in preventing predation on plovers, it can also be considered more humane for the plovers.

Selectivity of wildlife damage management methods is related to the issue of humaneness in that greater selectivity results in less perceived suffering of non-target animals. The selectivity of each method is based, in part, on the skill and discretion of the wildlife specialist applying such methods, and also on specific measures and modifications designed to reduce or minimize non-target captures.

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<sup>13/</sup> Lead and cooperating agency employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within three months of their appointment and a refresher course every three years afterwards (WS Directive 2.615).

The lead and cooperating agencies support the most humane, selective, and effective damage management techniques, and would continue to incorporate advances into program activities. Field wildlife specialists employed to identify and reduce plover predation would be experienced professionals, highly skilled in the use of management methods and committed to minimizing pain and suffering.

**4.1.4 Effectiveness**

The effectiveness of the program can be defined in terms of plover losses potentially reduced or prevented. Effectiveness can be further defined by how well wildlife specialists identify the species causing a problem and then stop or reduce the damage to an acceptable level. The specialist must be able to complete wildlife damage management expeditiously, within limitations to minimize harm to non-target animals and the environment, and in the lawful use of each method, while at the same time, using methods as humanely as possible within the limitations of current technology. The U.S. Government Accounting Office (GAO) (1990) concluded that APHIS-WS, while not impacting target predator populations or the environment including the public, was overall effective in preventing and reducing wildlife damage. Many of the details on effectiveness were discussed in the USDA (1997a, revised) where integrated wildlife damage management was concluded to be the most effective.

The effectiveness of the methods, given that they are used by trained professionals, will affect the overall effectiveness of each alternative. Table 8 provides a description of the effectiveness and limitations of each major category of methods that could be used for the confirmed plover predators. Relative effectiveness of each method is provided on a scale of zero to five, where five is the most effective method and zero the least.

**Table 8. Summary of Effectiveness of Selected Management Methods**

Effectiveness 0 = no effectiveness, 5 = most effective

Confirmed Species	Relative Effectiveness	Method
		Nest Enclosure

Confirmed Species	Relative Effectiveness	Method
Crow/ Raven	3-4	Some predation occurred through exclosures <sup>14</sup> . Have been effective in reducing nest predation by crows and ravens with modifications (Castelein et al. 2000a). No protection of plovers outside of exclosures. May provide perches for birds, thus acting as attractant. Other limitations due to maintenance, cost, remote sites, and electric fencing in saline environment (USFWS 1993b).
Red fox	3	Fox can burrow under fencing, therefore, fences must be set into substrate. May deter fox, however, red fox may focus on exclosures and prey on adults as they come and go from exclosures (J. Warriner, pers. comm. as cited in USFWS 1993b). No protection of plovers outside of exclosures <sup>15</sup> . Other limitations as above.
Striped skunk/ Raccoon	3	No protection of plovers outside of exclosures, limitations as above.
<b>Auditory Aversion</b>		
Crow/ Raven	2	Birds have been shown to acclimate to adverse sounds and this method may not be effective in the long-term. It may have a deleterious effect on plovers.
Red fox	2	Experimental data collected on San Clemente Island indicates that fox will tolerate loud sounds if food is available (USDA 1998).
Striped skunk/ Raccoon	2	Limited effectiveness (Bogges, 1994, Knight 1994).
<b>Olfactory Aversion</b>		
Crow/ Raven	0	No known scent deterrents that have proven effective. None are registered (USDA 1998).
Red fox	0	No known scent deterrents that have proven effective. None are registered (USDA 1998).
Striped skunk/ Raccoon	0	None are registered (Bogges 1994, Knight 1994).
<b>Taste Aversion</b>		
Crow/Raven	2	Ravens are known to avoid a food source if it makes them ill. Would require that the predator associates illness with plover eggs. If this method worked, it would only protect eggs, not chicks or adults. Methiocarb treated eggs may have some application as an aversive agent (Avery 1995).

<sup>14/</sup> The effectiveness of using nest exclosures around plover nests has been studied by ODFW (1994) and Castelein, et al.(2000a and 2000b). The exclosures were designed and erected to keep avian and mammalian predators away from nests with clutches. The 10-year average nest success rate for exclosed nests was 67 percent, while the success rate for unexclosed nests averaged 19 percent (Castelein et al. 2000b). The exclosures were successful in protecting eggs from predation so that an average of one chick per successful nest hatched, thus providing a boost to the existing population. Obviously, the exclosures do not protect fledglings or adults away from the nests.

<sup>15/</sup> USFWS (1993a) found that exclosures protected nests but failed to enhance fledging since snowy plover chicks leave the nest within hours after they hatch.

Red fox	1	Effectiveness is unknown. Would need to ensure that the predator associates illness with consuming eggs. Would not protect chicks or adults. Not registered.
Striped skunk/ Raccoon	1	None registered (Boggess, Knight 1994).
		<b>Relocation</b>
Crow/Raven	0	Relocation of ravens and crows is neither practical nor desirable. Homing abilities would prevent success.
Red fox	NA	Relocation is inadvisable due to disease, parasites, and nuisance (Craven et al. 1998), not favored by ODFW.
Striped skunk/ Raccoon	NA	Relocation is inadvisable due to disease, parasites, and nuisance (Craven et al. 1998). Relocation is not favored by ODFW.
		<b>Poison</b>
Crow/Raven	0-5	DRC-1339 has proved effective in reducing the number of ravens and crows prior to the breeding season. Limitations for use in recreation areas
Red fox	0	No predicides would be practical under project field conditions.
Striped skunk/ Raccoon	0	No toxicants are registered for skunks or raccoons (Boggess 1994, Knight 1994).
		<b>Trapping and Euthanasia</b>
Crow/Raven	1	These predators may be trapped by a variety of methods. However, trapping would be labor intensive and birds would learn to avoid traps.
Red fox	0-5	Padded jaw leg-hold traps are one of the most effective tools in capturing problem wildlife. Snares would also be an effective tool used in limited applications. Fox readily enter cage traps. Cage traps may be less feasible in remote locations. Cage traps preferred in high use areas if traps are used. Leg-hold traps and snares would not be used in high recreational use areas where humans and their pets could encounter them.
Striped skunk/ Raccoon	0-5	Cage traps, leg-hold traps and snares are very effective and widely used in controlling skunks and raccoons (Boggess 1994, Knight 1994). Cage traps may have some limitations in remote locations. Leg-hold traps and snares would not be used in high recreational use areas where humans and their pets would be likely to encounter them.
		<b>Shooting</b>
Crow/Raven	3-4	Shooting of avian predators is target specific and effective when personnel are on site. Limited due to personnel abilities to remain on site. Safety limitations in recreation areas.
Red fox	3-4	Shooting is an effective and selective technique when personnel are on site. Limited due to personnel abilities to remain on site. Safety limitations in recreation areas.
Striped skunk/ Raccoon	3-4	Shooting is very effective and selective when personnel are on site (Boggess 1994, Knight 1994). Limited due to personnel abilities to remain on site. Safety limitations in recreation areas.

Other methods that could be used include destroying eggs of predators, patrolling or using effigies, and denning. Egg destruction may not reduce immediate

predation but is intended to prevent population growth. This method is done manually and only practical during a relatively short time interval and requires skill to properly identify the eggs and hatchlings of target species. Patrolling is limited by personnel. Denning can reduce fox, skunk, and coyote predation by reducing food requirements of predators. The management methods that may be used under the proposed action provide the wildlife specialist with the most flexibility to use methods that are determined, on a case-by-case basis, to be the most effective. The effectiveness of the proposed action would be dependent upon numerous factors such as the skill of the specialists, and cooperation of the affected agencies and project personnel. Some factors that may influence effectiveness cannot be predicted, such as weather, predator movement patterns, and snowy plover locations.

Potential or actual raptor predation would be managed using non-lethal methods only (as in the case of special status species such as the peregrine falcon), or non-lethal methods as a first effort before lethal methods could be used as a last resort. This condition can reduce the efficiency of the program, making it more labor intensive and probably less effective than lethal methods. The cooperating agencies do not believe that threats from raptors are substantive, therefore, raptor control should not measurably impact on the program's overall effectiveness. The effectiveness of the proposed action alternative would be rated as the highest of the alternatives, because it allows for the most options and flexibility.

#### **4.1.5 Impacts on recreation**

Plover nesting areas are generally posted off limits to recreationists during the nesting season (March 15 through Sept. 15). Plovers currently nest at several sites on the Siuslaw National Forest within the Dunes NRA: Sutton, Siltcoos, Overlook, Tahkenitch and Tenmile Creek (Figure 1). Public recreational use is relatively high in some of these areas. BLM recreation sites include Coos North Spit (managed also by ODFW and COE), and New River ACEC. Bandon State Park is managed by OPRD.

Applying the Decision Model (Slate et al. 1992) (Figure 2), and during the development of work plans, the USFS, BLM, and cooperating agencies would give consideration to public use patterns and the time of year when predator damage management would be proposed. Where people are likely to be exposed to methods that would be used to protect plovers, preference would be given to non-lethal and non-invasive methods. Lethal tools may be omitted in recreation areas to minimize the potential of affecting members of the public and their pets. Leg-hold traps or snares, or spotlight shooting may be considered for use at night if the public does not have access during those times. In this case, tools would be removed or covered during hours of public use. In high use areas, predator damage management may occur in late winter prior to plover nesting, if this is determined effective. With the arrival of visitors, emphasis would be placed on

education and using tools that would not harm the public. Although this could reduce the effectiveness, human safety is a very high priority for all of the agencies concerned.

### Description of recreational use and predator damage management actions

Following is a brief description of recreational use at the Dunes NRA, and BLM sites, with potential mitigation that could be used to avoid harm to humans and their pets. Final work plans would be developed prior to any direct predator damage management that might occur (see Section 2.1 describing Proposed Action which includes the development of work plans and use of the Decision Model (Slate et al. 1992) to select appropriate methods.

Siltcoos: This recreation area receives approximately 232,000 visitors each year, with 70 percent of visitation occurring from May through September. Day use recreational activities and overnight use of campgrounds would preclude the use of most lethal methods, day and night. Non-invasive and non-lethal methods would be used when the public is on site. Preferred methods would include nest enclosures and sight aversion to deter avian predators, limited cage trapping to remove foxes, skunks, and raccoons, only if they are found to be an excessive threat, and increased educational efforts. Trash management to remove attractants is a vital component of management in recreational areas. Padded-jaw leg-hold traps, shooting, toxicants, and pyrotechnics would not be used during periods of high recreational use, Memorial Day through Labor Day, but are not necessarily limited to that time period if users arrive at other times, or residents frequent the area. Calling and shooting, and using traps, snares and toxicants may be used in some limited situations prior to plover nesting and prior to arrival of summer recreationists. Conspicuous bilingual warning signs would be posted at all access sites when lethal methods are used.

Sutton and Overlook: Sutton recreation area receives approximately 75,000 visitors each year, and Overlook beach area receives approximately 70,000 visitors each year. Eighty percent of use occurs between May and September. Sutton and Overlook are day use areas only. Non-invasive and non-lethal methods would be used when the public is on site. Preferred methods would include nest enclosures and sight aversion to deter avian predators, limited cage trapping to remove foxes, skunks, and raccoons, only if they are found to be an excessive threat, and increased educational efforts. Padded-jaw leg-hold traps, shooting, toxicants, and pyrotechnics would not be used during periods of high recreational use, Memorial Day through Labor Day, but are not necessarily limited to that time period if users arrive at other times, or residents frequent the area. Calling and shooting, and using traps, snares and toxicants may be used in some limited situations prior to plover nesting and prior to arrival of summer recreationists.

Conspicuous bilingual warning signs would be posted at all access sites when lethal methods are used.

Tahkenithch and Tenmile Creek: are also located in the Dunes NRA, but these areas are remote enough that recreation would not be a major concern. Still, if signs of human use are present, application of the Decision Model (Slate et al 1992) would preclude methods that could harm humans or their pets.

Coos Bay North Spit: managed by BLM, receives relatively low to moderate use at approximately 26,000 visitors each year with the majority of visitation occurring from May through September. Major recreational activities at this site include fishing, crabbing, clamming, off-highway vehicle riding, and horseback riding. Most recreational use on the North Spit occurs during the day. Night use occurs only intermittently. On an annual basis night use is limited but during the summer months camping occurs on the bayside on a fairly regular basis. Plover nests in this area are remote enough that recreation would not be a major concern. Still, if signs of human use are present, application of the Decision Model (Slate et al. 1992) would preclude methods that could harm humans or their pets.

Bandon State Natural Area (SNA): managed by OPRD, receives high recreational use. Bandon SNA is 878.81 acres in size, located approximately 4 miles south of Bandon and includes 4 miles of beach. The site contains several day use areas with picnic, restroom, and parking facilities and receives approximately 313,488 visitors annually. This area is popular with tourists and local residents alike. The majority of the recreation activity occurs along the north end of Bandon SNA adjacent to the public access and parking areas. Recreation activities along the beach include picnicking, walking, hiking, fishing and horseback riding. Non-invasive and non-lethal methods would be used when the public is on site. Application of the Decision Model (Slate et al. 1992) would preclude methods that could harm humans or their pets. ODFW will assist OPRD to determine appropriate predator control measures for Bandon SNA.

New River ACEC: managed by BLM, receives variable recreational use. The ACEC is adjacent to Boice Cope County Park and Floras Lake, where beach use is relatively high from May through September. Visitor numbers are only available for campers at Boice Cope. Annually, 7,371 campers stay at this campground, and many others use this location for day use activities. The rest of the area is fairly inaccessible and therefore receives low use. Windsurfers often access the beach at Floras Lake. Other activities include horseback riding, hiking, hunting and fishing. The area is closed to off-highway vehicles. Little recreational activity takes place at night in the ACEC.

Day use recreational activities and overnight use of campgrounds at Floras Lake would preclude the use of most lethal methods, day and night. Non-invasive and non-lethal methods would be used when the public is on site. Preferred methods

would include nest exclosures and sight aversion to deter avian predators, limited cage trapping to remove foxes, skunks, or raccoons and increased educational efforts. Trash management to remove attractants is a vital component of management in recreational areas. Padded-jaw leg-hold traps, shooting, toxicants, and pyrotechnics would not be used during periods of high use, which are normally from Memorial Day through Labor Day, but are not necessarily limited to that time period if users are present at other times, or residents frequent the area. Calling and shooting, and using traps, snares and toxicants, may be used in some limited situations prior to plover nesting and prior to arrival of summer recreationists. Conspicuous bilingual warning signs would be posted at all access sites where lethal methods would be used. Plover nests in other portions of the ACEC are remote enough that recreation would not be a major concern. Still, if signs of human use are present, application of the Decision Model (Slate et al. 1992) would preclude methods that could harm humans or their pets.

### Effects on recreation

Impacts on recreationists would be primarily visual in nature. Some visitors may view plover nest exclosures, avian predator sight deterrents, and educational or warning signs. These visual impacts, temporary in nature, would occur in limited areas near plover nest sites, and are small in magnitude compared to the total recreation area available for their use. The public is not likely to encounter lethal methods, and auditory deterrents would not be used in high recreational use areas. Local residents would be advised of any proposed direct control so that they are aware of the specific activities prior to implementation. Some recreationists and residents may benefit through education and with the knowledge that efforts are being made to protect snowy plover from predation. Because of the limited areas where plovers nest compared with the total area available for public use, exposure to the public is expected to be minimal and temporary. As plovers expand nesting areas, exposure may increase relative to the number of nesting sites requiring protection.

Because this proposal would use non invasive or non-lethal methods in high use areas, visual impacts would be minor, and predator damage management would not contribute to beach closures, cumulative impacts on recreational activities is expected to be low.

Potential impacts on pets and human safety is discussed under Section 4.1.2, Non-target Impacts.

## **4.2 Alternative 2 - Current Program (No Action Alternative)**

### **4.2.1 Impact of predator damage management on the target species populations**

#### **4.2.1.1 American crows**

##### **Impact on crow populations**

With the increasing crow population, it is expected that problems associated with crows would increase. Under the current program, crows are deterred with plover nest enclosures but are not removed lethally. Trash management was also improved at a number of sites to remove attractants. Considering their population trend and abundance in Oregon, it is expected that the crow population and the population trend would continue to increase. The current program would have no effect on the crow population, since none would be removed.

#### **4.2.1.2 Common ravens**

##### **Impact on raven populations**

Ravens are deterred with plover nest enclosures and would not be lethally removed under this alternative. Therefore, there would be no impact on the population.

#### **4.2.1.3 Fox**

##### **Impact on red fox populations**

Under the current program, no foxes would be removed. During the experimental predator removal program in 1999, 17 red fox were removed from plover nesting sites at New River ACEC (USDA 2000). This rate of fox removal had a negligible effect on the fox population, because fox reproduce and recruit into areas where removal occurred. Only nest enclosures and trash management would be used to reduce predation on snowy plovers.

#### **4.2.1.4 Raccoon**

##### **Impact on Raccoon populations**

Thirteen raccoons were removed as part of the experimental program in 1999 at the New River ACEC (USDA 2000). When added to total “other take” in coastal counties (fur harvest and depredation take by APHIS-WS), the total take was 855 raccoons, or 0.1 percent of the estimated population. This is negligible compared with the 40 percent allowable harvest (USDA 1997a revised). Under the current program only nest

exclosures and trash management would be used to reduce predation on snowy plovers.

#### **4.2.1.5 Skunk**

##### **Impact on striped skunk populations**

The experimental program at the New River ACEC removed six skunks in 1999 (USDA 2000). When added to total other take (fur harvest and depredation take), only 36 skunks were removed from the population. This is negligible and less than the proposed action. Under the current program only nest exclosures and trash management would be used to reduce predation on snowy plovers.

#### **4.2.1.6. Impacts on other predators**

No population impacts would occur on coyotes, mink, weasels, opossum, gray fox, mice, rats, spotted skunks, gulls, or raptors under the current program because none would be removed. Only nest exclosures and trash management would be used to reduce predation on snowy plovers.

##### **Feral cats**

##### **Impacts on feral cats**

The current program may remove several feral cats annually. Cats could be killed on site, or relocated to shelters where they may be adopted, but most would likely be euthanized. In 1999, two feral cats were removed during an experimental program at the New River ACEC to protect plovers. This alternative would remove fewer cats than the other three alternatives.

#### **4.2.2 Non-target impacts**

Analysis of recent data (USDA 2000) reveals that the experimental predator damage management program had negligible impacts on non-target species. In 1999, APHIS-WS caught one turkey vulture in a padded-jaw leg-hold trap while removing plover predators at the New River ACEC. The vulture was the only non-target animal caught, and it was released unharmed.

Non-target impacts from the current program alternative would not be expected since only nest exclosures would be used. Humans and pets would not be affected.

### Threatened and endangered species

Current predator damage management measures are limited to placement of exclosures around plover nests, and trash management. The Oregon Natural Heritage Program places nest exclosures as part of an ongoing monitoring and nest protection program. Oregon Natural Heritage Program's activities are authorized by the USFWS through a Section 10(a)(1)(A) Recovery Permit. Disturbance to incubating plovers is unavoidable during exclosure construction. In consideration of the expertise of the plover biologists erecting the exclosures, the measures taken to minimize adverse impacts to plovers and their nests, and the higher hatch rates of exclosed versus unexclosed nests, the USFWS has determined that the net result is beneficial to plovers. However, as discussed in 1.2 (Need for Action), other forms of predation not addressed by nest exclosures continue to limit recruitment into the population and adult survival. Continuing the current program will not help nest success, recruitment, and fledgling and adult survival to reach more natural levels.

The current program has no effect on other T&E species.

#### **4.2.3 Humaneness**

The current program is probably considered by some people to be more humane to target species than the proposed action because lethal damage management would not be used. (The experimental predator removal component used in 1999 would not be continued.) Some people would consider this alternative (Alternative 2) to be less humane for plovers since it would afford less protection from predators.

#### **4.2.4 Effectiveness**

The current program alternative is not expected to be as effective as the proposed action since it limits available methods to nest exclosures. Habitat improvements and trash management would continue, as under all of the alternatives, but habitat management is not within the scope of analysis of this EA. Thus, effective methods for reducing predation from some species and protecting plovers away from nest exclosures would not be available under this alternative. Integrated wildlife damage management was determined to be the most effective in resolving predation by USDA (1997a revised). This alternative also does not allow predator damage management in all areas with nesting plovers, and would not expand intensive site investigation to better determine species responsible for preying on plovers.

#### **4.2.5 Impacts on recreation**

Under the current program, no additional predator damage management over current nest enclosures, recreation and trash management would occur. Therefore, this alternative would not affect current recreational use patterns, or contribute to adverse cumulative impacts.

### **4.3 Alternative 3 - Non-lethal Control Only**

#### **4.3.1 Impact of predator damage management on the target species populations**

Any or all of the non-lethal management methods listed in Table 2 could be used under this alternative.

##### **4.3.1.1. American crows**

###### **Impact on crow populations**

With the increasing crow population, it is expected that problems associated with crows would increase. Under the non-lethal methods only alternative, crows would be deterred with plover nest enclosures, hazing methods, effigies, trash management or other non-lethal methods listed in Table 2. They would not be removed lethally, therefore, this alternative would have no impact on the crow population.

##### **4.3.1.2 Common ravens**

###### **Impact on raven populations**

Ravens would be controlled with the same methods as crows. No ravens would be lethally removed from the population under this alternative, therefore no impacts to raven populations would occur.

##### **4.3.1.3 Fox**

###### **Impact on red fox populations**

Red fox predation on nesting plovers would be controlled with nest enclosures. No red fox would be lethally removed under this alternative, thus there would be no impact on red fox populations.

##### **4.3.1.4 Raccoon**

###### **Impact on raccoons populations**

There would be no impact on the raccoon population since none would be removed. Nest exclosures and trash management may deter raccoons from nesting plovers.

#### **4.3.1.5 Striped skunk**

##### **Impact on striped skunk population**

No skunks would be removed under this alternative, and therefore there would be no impacts on skunk populations from this alternative. Nest exclosures and trash management would be used to control skunk predation on snowy plovers.

#### **4.3.1.6. Impacts on other predators**

Other potential predators of plovers include coyotes, mink, short and long-tailed weasels, opossum, gray fox, mice, rats, gulls and raptors. There would be no impact on any of these species since none would be removed.

##### **Feral cats**

The Federal lead and cooperating agencies would not destroy any feral cats. Feral cats could be live trapped and relocated to humane groups or shelters. If willing groups or shelters are found, this could reduce the feral cat population to the same level as the proposed action. Hopefully, some feral cats could be adopted, however, most would probably be euthanized since feral cats are numerous and difficult to adopt due to their wild nature, and since other cats needing homes are usually abundant. Other methods to manage feral cat predation on snowy plovers include nest exclosures and trash management. This alternative could essentially have the same impact on feral cats as the proposed action alternative.

#### **4.3.2 Non target impacts**

Implementation of some non-lethal damage management methods would occur near plover nesting areas and some non-target animals may be disturbed. The disturbances would be minimal and most species would acclimate to the disturbance rather quickly. Therefore, the non-lethal methods only alternative would have no impact on non target species.

##### **Threatened and endangered species**

Implementation of some non-lethal predator management measures could occur in and around plover nesting areas and thus may disturb plovers using these habitats. As discussed with respect to the proposed action, APHIS-WS, USFWS, ODFW, and the appropriate land management agency will confer to determine what measures can be taken to minimize impacts to plovers and if the benefits of implementation would outweigh any unavoidable adverse effects to plovers. Implementation of the predator management measures available under this alternative would only proceed when the expected net effect is beneficial to plovers.

Because this alternative would constrain the tools available for predator damage management, it is not anticipated to be as effective as the proposed action. As a result, this alternative is not expected to provide the same degree of improvement in plover recruitment and survival as the proposed action. Pyrotechnics or other auditory or visual aversive measures could disturb eagles hunting along the beach, eagles perched in nearby trees, and pelicans loafing on adjacent beaches. Since these species are easy to detect and identify, these types of impacts can be avoided. Terms and conditions of the biological opinion that would minimize harm to T&E species would be built into this alternative if selected.

#### **4.3.3 Humaneness**

This alternative is often considered to be the most humane and preferred by some groups and individuals who advocate animal rights. Most people would probably agree that non-lethal damage management is preferable to killing an individual animal if it accomplishes the goals intended.

Under this alternative, feral cats could be removed live and provided to animal shelters or humane groups for adoption. The cooperating agencies would not destroy cats, however, the cats ultimate fate would be up to the shelter or group receiving the cats, and their ability to find homes for the feral cats. It is likely that most of these cats would ultimately be destroyed. Relocating and holding feral cats that will ultimately be euthanized would add unnecessary stress to those cats and could be considered less humane than immediate lethal control on site.

In a national survey conducted by an independent research firm in 1997, 68 percent of all respondents, and 60 percent of cat owning respondents, felt that stray cats should be humanely removed from areas set aside for wildlife (American Bird Conservancy 2000).

#### **4.3.4 Effectiveness**

This alternative has some effectiveness, especially for nesting plovers if nest

exclosures were erected around all nests. It would be expected to be more effective than the current program alternative since additional non-lethal methods would be available. Trash and habitat management would continue, and would provide some benefit by reducing attractants and cover for predators.

The effectiveness of this alternative in protecting the snowy plovers from potential predation would be lower than the proposed action since it may deter predators from predation but would not remove their threat. The effectiveness in protecting plovers from predators would depend entirely upon nest exclosures and other non-lethal methods as presented in Table 8. Relocating feral cats would be as effective as euthanizing them on site since they would be removed from the local population.

#### **4.3.5 - Impacts on recreation**

Impacts on recreation under the Non-lethal Methods Only Alternative would be similar to the proposed action where public use would affect the methods that would be used. Cage traps, would not be used if the intent were to euthanize trapped animals. Like the proposed action, impacts would be visual in nature with the use of nest exclosures around nests, some use of visual avian predator deterrents, and educational or warning signs in limited areas around plover nest sites. The public would not encounter lethal methods since they would not be allowed under this alternative. Auditory deterrents would not be used in high recreational use areas due to the potential to disturb users. Local residents would be advised of proposed damage management methods that could affect them. Some recreationists and residents may benefit through education and with the knowledge that efforts are being made to protect the snowy plover from predation. Because of the limited areas where plovers nest compared with the total area available for public use, exposure to the public is expected to be minimal. As plovers expand nesting areas, exposure may increase relative to the number of nesting sites.

Mitigation to avoid impacts on human safety are built into the proposed action through use of the Decision Model (Slate et al. 1992) (Figure 2), and work plans would detail specific methods. Safety concerns and limitations for use are detailed in Appendix B, Wildlife Damage Management Methods. It is not anticipated that any adverse cumulative impacts would result to recreational users from implementing this alternative.

### **4.4 Alternative 4 - Non-lethal Control Before Lethal Control**

#### **4.4.1 Impact of predator damage management on the target species populations**

The impact on target species populations under this alternative would be similar, (the same or slightly less), to the proposed action. Under the proposed action, prior to applying any management method, the wildlife specialist considers which strategy, whether lethal or non-lethal, or a combination thereof, would be the most effective and appropriate in each situation to prevent damage. Non-lethal damage management is always selected if the specialist believes it will be effective. Based on their expertise, they can determine which types of damage management methods are most effective and appropriate for preventing damage. If a determination is made to use lethal methods first, or in combination with non-lethal methods, it is because they believe that non-lethal control would not in itself be sufficient for resolution. Thus, if they are *required* to use non-lethal control first (as in alternative 4), but would not have otherwise made that choice, then it will likely be followed by lethal control, and the effect on the predators would be similar to the proposed action. In summary, the effects on target species would be similar to the proposed action alternative because non-lethal control is always given first consideration under the proposed action.

#### **4.4.1.1 American crows**

##### **Impact on crow population**

The non-lethal methods first alternative would be expected to have similar impacts on the crow population as the proposed action alternative for the reasons described under Section 4.4.1

#### **4.4.1.2 Common ravens**

##### **Impact on raven populations**

The non-lethal methods first alternative would be expected to have similar impacts on the raven population as the proposed action alternative for the reason described under Section 4.4.1.

#### **4.4.1.3 Red fox**

##### **Impact on red fox populations**

The non-lethal methods first alternative would be expected to have similar impacts on the red fox population as the proposed action alternative for the reasons described under Section 4.4.1.

#### **4.4.1.4 Raccoon**

### Impact on raccoon populations

The non-lethal methods first alternative would be expected to have similar impacts on the raccoon population as the proposed action alternative for the reasons described under Section 4.4.1.

#### **4.4.1.5 Striped skunk**

### Impact on striped skunk populations

The non-lethal methods first alternative would be expected to have similar impacts on the skunk population as the proposed action alternative for the reasons described under Section 4.4.1.

#### **4.4.1.6. Impacts on other predators**

Impacts on other predators would be expected to be similar or slightly less than those under the proposed action for the reasons described under Section 4.4.1.

### Feral cats

The impact on the local feral cat population would be expected to be similar to the proposed action and the non-lethal only alternative because cats would be either provided to animal shelters and/or destroyed on site, thus effectively “removing” them from the project area.

## **4.4.2 Non target impacts**

Impacts on non-target animals could theoretically be less than the proposed action. In reality, non-target impacts would probably be similar to the proposed action, since lethal methods would only be used under the proposed action if non-lethal methods were considered and rejected as ineffective.

### Threatened and Endangered Species

Selection of this alternative would be expected to result in the same types of disturbance to plovers as would the proposed action. Impacts on plovers may be slightly higher than the proposed action from the increased disturbance that could occur if ineffective nonlethal damage management methods were implemented and then followed by lethal methods. These impacts and the approach that would be taken to ensure the net effect would be beneficial to plovers are discussed in more detail in section 4.1.2. Because this alternative is

not expected to be as effective as the proposed action, the expected benefits to plovers are not as great as anticipated for the proposed action.

This alternative is expected to have the same impacts on bald eagles and brown pelicans as would the proposed action and discussed in section 4.1.2. Terms and conditions of the BO that would minimize harm to T&E species would be built into this alternative if selected.

#### **4.4.3 Humaneness**

This alternative was proposed by animal advocate groups to improve the humaneness of the proposed action by exhausting non-lethal methods before lethal methods could be used. The intent is to protect the welfare of individual animals and minimize lethal damage management to only those instances where it is determined to be absolutely necessary.

Under the proposed action, non-lethal methods would be *considered* first, and used if, when, and where professional, experienced wildlife specialists believe they would be effective. Thus, the real difference between the non-lethal control methods first alternative and the proposed action can actually be an added component of non-lethal damage management of some type. This alternative could be considered to be slightly more humane if the non-lethal method is effective when it may not have otherwise been selected. The lead and cooperating agencies consider this alternative to be slightly less humane due to its probability of increasing the amount of control actions necessary to resolve each damage situation.

#### **4.4.4 Effectiveness**

Under this alternative, non-lethal methods would be required to be used first, regardless of effectiveness. Reduced effectiveness would add extra effort, time, and expense in cases where lethal control is believed to be warranted as a first step. This reduced efficiency could preclude predator damage work in other areas to protect plovers. Predation may be higher than the proposed action alternative due to the time required to try non-lethal methods. For these reasons, this alternative would be expected to be less effective than the proposed action, and more effective than the non-lethal only program.

#### **4.4.5 Impacts on recreation**

Impacts on recreation under the non-lethal before lethal methods alternative are expected to be similar to the proposed action alternative since methods used would likely be similar. Applying the Decision Model (Slate et al. 1992) (Figure 2), during the development of work plans, USFS, BLM, and cooperating agencies would give consideration to the public use patterns and

times of year at which predator damage management might be proposed. Where people are likely to be exposed to any methods that might be used to protect plovers, preference would be given to non-lethal, non-invasive methods, and lethal methods may be omitted altogether to minimize the potential of affecting members of the public and their pets. Leg-hold traps or snares, or spotlight shooting may be considered for use at night if the public does not have access during those times, and if non-lethal methods that were applied first were not effective in reducing threats of predation. In this case, tools would be removed or covered during hours of public use. In high recreational use areas, predator damage management may occur in late winter months prior to plover nesting, if this is determined effective (depending upon the predators that are present). With the arrival of visitors, emphasis would be placed on education and using methods that would not harm the public. Although this could reduce the effectiveness of predator damage management, human safety is a very high priority for all of the agencies concerned. As under the proposed action, work plans indicating the specific methods that could be used at each site would be developed prior to any predator damage management that might occur (see Section 2.1 Proposed Action which includes the development of work plans and use of the Decision Model (Slate et al. 1992) to select appropriate methods).

Like the proposed action, a minor impact on recreation is expected to occur from the non-lethal before lethal alternative. It would be primarily visual in nature with the use of nest exclosures around nests, some use of visual avian predator deterrents, and educational or warning signs in limited areas around plover nest sites. The public is not likely to encounter lethal methods if they are used, and auditory deterrents would not be used in high use areas. Local residents would be advised of any proposed direct control so that they will be aware of the specific activities prior to implementation. Some recreationists and residents may benefit through education and with the knowledge that efforts are being made to protect the snowy plover from predation. Because of the limited areas where plovers nest compared with the total area available for public use, exposure to the public is expected to be minimal. As plovers expand nesting areas, exposure may increase relative to the number of nesting sites.

Mitigation to avoid impacts on human safety are built into this alternative through use of the Decision Model (Slate et al. 1992) (Figure 2) and development of site specific work plans. Safety concerns and limitations for use are detailed in Appendix B, Wildlife Damage Management Methods. Potential impacts on pets is discussed under Section 4.4.2, Non-target impacts. Cumulative impacts would be similar to the proposed action alternative.

#### **4.5 Cumulative Impacts**

Cumulative impacts on target species were discussed under the environmental consequences sections for each species. The worst case scenarios as discussed in this

EA, would contribute to low cumulative impacts on species populations. Non-target impacts are expected to be low to none.

The cumulative effects on plovers would be most beneficial under the proposed action alternative since it rated highest for effectiveness in protecting plovers. All of the alternatives would enhance other measures already place to protect plovers (habitat management, trash collection and education). These other measures are expected to continue in the foreseeable future.

The cumulative effects on plovers and other T&E species will be assessed in more detail in the USFWS BO which will be issued following receipt of public comments on the public draft EA. All measures to minimize harm to plovers, bald eagles and brown pelicans would be adopted into the final decision and are expected to result in low or no negative effects on these species. Some harassment to plovers may occur from implementing predator control since the work would be done in plover habitat. The USFWS anticipates that no harm would be done to T&E species.

Predator damage management activities would not contribute to beach closures. Predator damage management could be considered negative by some recreationists, however the actions would be temporary and isolated. Recreationists may benefit from predator damage management by an awareness of and education in plover management activities, and by an enhanced potential to see plovers if the various management actions are successful in promoting population growth and stabilization. For these reasons, the cumulative effects on recreation are expected to be low.

**4.6 Summary and Conclusions**

Table 9 presents the conclusions drawn from the analysis. The effectiveness of the alternatives, given no significant impact in any of the other evaluation criteria, is probably the most important evaluation criteria (issue) in this assessment because greater effectiveness means greater protection to the snowy plover. The effectiveness of any of the alternatives would determine the likelihood that the alternative would help to prevent further decline of the snowy plover, while other measures are ongoing to recover the species.

**Table 9. Summary of Impacts**

Issue	Proposed Action (Alt. 1)	No Action (Alt. 2)	Non-lethal Control Only (Alt. 3)	Non-lethal Before Lethal (Alt. 4)
Red fox	Removal of low numbers of individuals would have negligible effects on the population.	No impact on fox population.	No impacts on fox population.	Removal of low numbers of individuals would have negligible effects on the population.

Issue	Proposed Action (Alt. 1)	No Action (Alt. 2)	Non-lethal Control Only (Alt. 3)	Non-lethal Before Lethal (Alt. 4)
Crow/Raven	Removal of low numbers of individuals would have negligible effects on the population.	No impacts on crow or raven populations.	No impacts on crow or raven populations.	Removal of low numbers of individuals would have negligible effects on the population.
Raccoon/Striped skunk	Removal of low numbers of individuals would have negligible effects on the population.	No impacts on raccoon and skunk populations.	No impacts on raccoon and skunk populations.	Removal of low numbers of individuals would have negligible effects on the population.
Other Predators (coyotes, mink, weasels, opossum, gray fox, rodents, spotted skunks, gulls, raptors)	Removal of low numbers of individuals would have negligible effects on the population	No impacts on other predators.	Feral cats removal would have similar effects as Alt. 1 and 4 if willing recipient shelters could be located. No impact on other predator populations.	Removal of low numbers of individuals would have negligible effects on the population.
Effectiveness	Most effective alternative in protecting snowy plover from predators due to flexibility to use lethal and non-lethal methods where necessary.	May not be sufficient to prevent further decline. No protection for plovers away from nest exclosures.	Low effectiveness in protecting birds away from nest and where non-lethal methods alone are not adequate. May not be sufficient to prevent further decline, but probably more effective than Alt. 2.	Likely to be effective in protecting plovers in some situations. Limitations may allow more predation than Alt. 1. More effective than alternatives 2 & 3.
Non-target Species	Low impacts on non-target species	No impacts on non-target species	No impacts on non-target species.	Low impacts on non-target species
T&E Species <sup>16</sup>	Most likely to benefit snowy plover by enhancing recruitment and adult survival. Impacts on brown pelicans and bald eagles would be avoided or minimized through procedures built into the program.	Minimal benefits to plovers, but maintaining current hatch rates. No effect on brown pelicans and bald eagles.	Some benefit to plovers where non-lethal methods are effective. Impacts on brown pelicans and bald eagles would be minimized through procedures built into the program.	Would likely benefit plover by enhancing recruitment and adult survival to some degree. Impacts on brown pelicans and bald eagles would be minimized through procedures built into the program.

<sup>16/</sup> Terms and conditions of the biological opinion that would minimize harm to T&E species would be built into any alternative that may be selected.

Issue	Proposed Action (Alt. 1)	No Action (Alt. 2)	Non-lethal Control Only (Alt. 3)	Non-lethal Before Lethal (Alt. 4)
Humaneness	Some people opposed to capture and killing of any wildlife. Methods used to minimize pain and suffering while maximizing effectiveness	This alternative may be considered humane by some people since no lethal control is used. Since this alternative would be the least effective in protecting plovers, if is not desirable for plovers.	Some consider this preferable. Most would agree Alt. 3 is preferable if effective. Feral cats may be subject to undue stress if not adopted.	Some may consider this more humane than Alt. 1. Lead and cooperating agencies consider this to be somewhat less humane than Alt. 1.
Recreation	Would have minor visual impact on some recreationists in high use areas such as at Dunes NRA BLM sites.	No impact on recreationists over current use of nest exclosures and trash management.	Impacts similar to proposed action since lethal or invasive methods would be minimized or not used in high use areas.	Impacts similar to proposed action
Cumulative	Low	Low	Low	Low

## CHAPTER 5 - PREPARERS, PERSONS CONSULTED AND REFERENCES

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