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APPENDIX E

Reply To: 8330.1193 (02)
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December 21,2001

To: District Manager, Coos Bay District, Bureau of Land Management, Coos Bay, Oregon (Attn: Larry Mangan, Wildlife Biologist, Coos Bay District)

Assistant Project Leader, Forest Conservation/Endangered Species, Oregon Fish and Wildlife Office, U.S. Fish and Wildlife Service, Portland, Oregon

Forest Supervisor, Siuslaw National Forest, U.S. Forest Service, Corvallis, Oregon

From: State Supervisor/Deputy State Supervisor, Oregon Fish and Wildlife Office, Portland, OR

Subject: Formal Consultation on the Integrated Predator Damage Management Program for the Pacific Coast Population of Western Snowy Plover in Oregon, 2002 to 2007 (1-7-02-F-119)

We have reviewed the November 15, 2001, letter requesting formal consultation and the biological assessment (BA) for the proposed Integrated Predator Damage Management Program for the Pacific Coast Population of Western Snowy Plover in Oregon, 2002 to 2007. This document represents the U.S. Fish and Wildlife Service's (Service) biological opinion regarding the action agencies' determination that the proposed action "*may affect, is likely to adversely affect*" the Pacific Coast population of western snowy plover in Oregon (*Charadrius alexandrinus nivosus*) (snowy plover) in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). Critical habitat has been designated for the snowy plover and the proposed action "*may affect*" designated critical habitat. The action agencies also request concurrence with a *"may affect, is not likely to adversely affect*" determination for the endangered brown pelican (*Pelicanus occidentalis*) and threatened bald eagle (*Haliaeetus leucocephalus*). There is no designated critical habitat for these two listed species.

This biological opinion (BO) is based on information provided in the following sources: the request for initiation of formal consultation, BA (USDI and USDA 2001), Draft Final Environmental Assessment for Predator Damage Management to Protect the Federally Threatened Pacific Coast Population of the Western Snowy Plover (USDA and USDI 2001) dated November 15, 2001; the Western Snowy Plover Pacific Coast Population Draft Recovery Plan (USFWS 2001), the annual snowy plover distribution and reproductive success reports for the Oregon Coast by Oregon Natural Heritage Program (ONHP) personnel (various authors cited in text), discussions with Service, Bureau of Land Management (BLM), and U.S. Department of Agriculture, Animal and Plant Health Inspection Service-Wildlife Services (APHIS-WS) personnel and other sources of literature. The complete administrative record of this consultation is on file at the Service's Oregon Fish and Wildlife Office.

CONSULTATION HISTORY

The Service received the action agencies' letter requesting formal consultation and attached BA for the proposed Integrated Predator Damage Management Program for the Pacific Coast Population of Western Snowy Plover in Oregon November 15, 2001. This biological opinion analyzes the potential effects of the proposed project on the bald eagle. A complete administrative record of this consultation is on file at the Oregon Fish and Wildlife Office in Portland.

Concurrence

The Service concurs with the determination of "*may affect, is not likely to adversely affect*" the brown pelican and bald eagle based on the following information: no suitable habitat will be removed by the proposed action; no known communal brown pelican roosts within 0.25 miles of snowy plover nesting sites; no use of hazing pyrotechnics within 0.5 miles of any bald eagle nest sites or brown pelican roost site; and no use of meat as bait for controlling crows and ravens. If future nest or roost sites are located near snowy plover predator control areas these conservation measures will be followed for both species.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

(summarized from the BA, USDI and USDA 2001)

The objective of the proposed action is to assist in recovery of the western snowy plover (USFWS 2001) by improving plover nesting and fledging success through implementation of an integrated predator damage management plan while recreation and habitat management efforts continue. To best achieve success in reducing predation, the lead and cooperating agencies plan to:

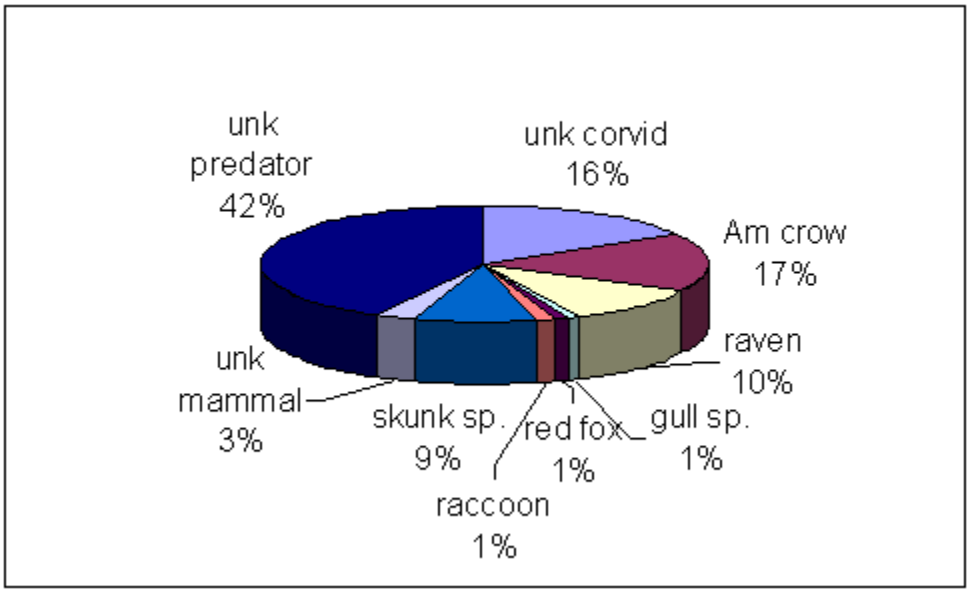
A. expand assessment efforts to all plover breeding and nesting locations to determine predator species responsible for nest, chick and adult predation; and

B. reduce local predator populations where feasible and where the predator species or individual is known.

Snowy Plover Predators

Snowy plover nest and chick predators identified along the Oregon coast include American crow (*Corvus brachyrhychos*), common raven (*Corvus corax*), red fox (*Vulpes vulpes regalis*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), 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*), coyote (*Canis latrans*), mink (*Mustela vison*), short and long tailed weasels (*Mustela erminia* and *M. frenata*), opossum (*Didelphis virginiana*), gray fox (*Urocyon cinereoargenteus*), Norway rats (*Rattus norvegicus*), deer mice (*Peromyscus maniculatus*), spotted skunks (*Spilogale gracilis*), gulls (*Larus spp.*), and raptors. Suspected raptor species include northern harrier (*Circus cyaneus)*, peregrine falcon *(Falco peregrinus)*, merlin (*Falco columbarius*) and American kestrel (*Falco sparverius*); all are known to opportunistically prey on snowy plover (USFWS 2001). Figure 1 shows the percentage of documented snowy plover nest predations in Oregon and Appendix A lists some basic information on known and potential snowy plover predators: their status, when are they a potential problem and what methods may be used to address them.

Figure 1. Percentage of known snowy plover nest predators between 1990 to 2000 (n=155) (Castelein, ONHP, pers. comm. 2001)



Location and Scope of Analysis

The proposed predator control action for snowy plovers will 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, U.S. Forest Service, Oregon Department of Fish and Wildlife (ODFW), Oregon Parks and Recreation Department (OPRD), and Army Corps of Engineers (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.

The need for action to protect the threatened snowy plover from predators will change as the population recovers. Some level of predator damage management is likely to always be needed for the foreseeable future to assist plover population recovery.

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 snowy plover nests, chicks and adults. 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, repellents, or effigies; or electrified or non-electrified exclusionary nest site fencing and electric wired perches (see table 2 in the BA). 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) (see Table 2 in the BA).

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 that are found to pose a threat to plovers could also be targeted with lethal and/or non-lethal methods.

Animals that are trapped live and intended to be killed are euthanized by either lethal injection (sodium phenobarbital), shooting, or carbon monoxide or carbon dioxide gas. While the methods proposed in Table 1 of the BA are all methods that could be used, not all methods would likely be used at each site where work could occur, since different circumstances would render some tools more appropriate than others. See the 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.

Description of Predator Damage Management Methods Available for Use

Table 2 in the BA shows which methods could be used on each target species. The following paragraphs describe these methods in detail. 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.

A variety of methods are used by APHIS-WS personnel in predator damage management. APHIS-WS employ three general strategies to reduce wildlife damage: resource management, physical exclusion, and wildlife management. Each of these approaches is a general strategy or recommendation for addressing predator damage situations. Most predator damage management methods have recognized strengths and weaknesses relative to each damage situation. APHIS-WS personnel can determine for each unique situation what method or combination of methods is most appropriate and effective using the WS Decision Model (Slate et al. 1992) .

All predator damage management methods have limitations which are defined by the circumstances associated with individual wildlife damage problems. APHIS-WS considers a wide range of limitations as they apply the decision making process to determine what method(s) to use to resolve each damage problem (USDA 1997). Examples of limitations which must be considered and criteria to evaluate various methods are presented in USDA 1997 (Appendix N), and in the following discussions. The following discussions are for potential control methods which may be used:

Resource Management. Resource management includes a variety of practices that may be used by resource managers or owners to reduce the potential for predator damage. Implementation of these practices is appropriate when the potential for, or actual damage
can be reduced without significantly increasing a resource manager/owner's costs, or diminishing a person's ability to manage resources pursuant to their goals.

Habitat Management. Just as habitat management is an integral part of other wildlife management programs, it also plays an important role in predator damage management. The type, quality, and quantity of habitat is directly related to the animals attracted to an area and what the habitat can support. Therefore,

habitat can be managed so that it does not produce or attract certain species or it repels them. Limitations of habitat management as a method of controlling wildlife damage are determined by the characteristics of the species involved, the nature of the damage, economic feasibility, and other factors. Removing non native beach grass to discourage predators is an integral part of past, present, and future plover recovery efforts.

Physical Exclusion. Physical exclusion methods restrict the access of wildlife to resources. Nest exclosures are used to protect nesting plovers from predation. The exclosures must encompass the sides and top of the structure, and be buried into the sand to help prevent/limit burrowing, climbing and flying predators from entering the exclosures.

Wildlife Management. Reducing wildlife damage is achieved with many different techniques. The objective of this approach is to alter the behavior or population of the target animal(s), thereby eliminating or reducing the potential for loss or damage.

Frightening Devices. Frightening devices include distress calls, pyrotechnics, propane cannons, flags, and reflective tape. The success of frightening methods depends on the animal's fear of and subsequent aversion to the stimuli. Once animals become habituated to a stimulus, they often resume their damaging activities. Persistent efforts are usually required to consistently apply frightening techniques and to vary them sufficiently to prolong their effectiveness. In many situations animals frightened from one location become a problem at another. Some frightening devices may have negative effects on non-target wildlife, including T&E species. Frightening devices will probably have severe limitations in protecting plovers since they may affect plovers as much as the target species. The use of some frightening devices and techniques may be considered aesthetically displeasing or a nuisance by some people such as the noise from propane cannons. The continued success of these methods frequently requires reinforcement by limited shooting (see shooting).

Pyrotechnics. Pyrotechnics consist of a variety of noise making devices in the form of fireworks. Double shotgun shells, known as shell-crackers or scare cartridges, are 12-gauge shotgun shells containing a firecracker that is projected up to 75 yards before exploding. Noise bombs, whistle bombs, racket bombs, and rocket bombs are fired from 15 millimeter flare pistols. They are used similarly to shell-crackers, but are projected for shorter distances. Noise bombs (also called bird bombs) are firecrackers that travel about 75 feet before exploding. Whistle bombs are similar to noise bombs, but whistle in flight and do not explode. They produce a noticeable response because of the trail of smoke and fire, as well as the whistling sound. Racket bombs make a screaming noise in flight and do not explode. Rocket bombs are similar to noise bombs but may travel up to 150 yards before exploding. These pyrotechnics are often used to frighten birds away from foraging or roosting locations. The shells are fired so that they explode in front of, or underneath, flocks of birds attempting to enter foraging areas or roosts. The purpose is to produce an explosion between the birds and their objective. It is extremely difficult to disperse birds that have already settled in a roost.

A variety of other pyrotechnic devices, including firecrackers, rockets, and Roman candles, are used for dispersing animals. The discharge of pyrotechnics may be inappropriate and prohibited in some area such as urban and suburban communities. Pyrotechnic projectiles can start fires, ricochet off buildings, pose traffic hazards, cause some dogs to bark incessantly, and injure and annoy people. Pyrotechnics may cause fear or alarm in urban areas as the sound of discharge sometimes resembles gunfire.

Propane Exploders. Propane exploders operate on propane gas and are designed to produce loud explosions at controlled intervals. They are strategically located (elevated above the vegetation, if possible, and hidden) in areas of high wildlife use to frighten wildlife from the problem site. Because animals are known to habituate to sounds, exploders must be moved frequently and used in conjunction with other scare devices or reinforced with lethal methods. Exploders can be left in

an area after dispersal is complete to discourage animals from returning. However, propane exploders are generally inappropriate for use in urban areas due to the repeated loud explosions which many people consider an unacceptable nuisance.

Scarecrows. Since personnel is often limited, the use of scarecrows can be effective when people are not present at a field. The human effigy is still one of the best scarecrows available. These work best with eyes on both sides of the head and dressed in clothes similar to the clothes worn by people that are harassing the birds. Other scarecrows are available such as "scare-eye" balloons. As with other techniques, scarecrows work best when the number is varied, a variety of scarecrows are used, and they are moved often.

Flagging. Flags may have limited effectiveness in frightening birds. Anecdotal reports indicate black flagging may be effective at repelling some birds.

Bioacoustics. Distress and alarm calls of various animals have been used singly and in conjunction with other scaring devices to successfully scare or harass animals. Many of these sounds are available on records and tapes. Calls should be played back to the animals from either fixed or mobile equipment in the immediate or surrounding area of the problem. Animals react differently to distress calls; their use depends on the species and the problem. Calls may be played for short (few second) bursts, for longer periods, or even continually, depending on the severity of damage and relative effectiveness of different treatment or "playing" times.

Chemical Repellents. Chemical repellents are compounds that prevent the consumption of food items or use of an area. They operate by producing an undesirable taste, odor, feel, or behavior pattern. Effective and practical chemical repellents should be: nonhazardous to wildlife; nontoxic to plants, seeds, and humans; resistant to weathering; easily applied; reasonably priced; and capable of providing good repellent qualities. The reaction of different animals to a single chemical formulation varies, and for any species there may be variations in repellency between different habitat types. Development of chemical repellents is expensive and cost prohibitive in many situations. Chemical repellents are strictly regulated, and suitable repellents are not available for many wildlife species or wildlife damage situations.

Methiocarb is a taste repellent that has also been proven ineffective in inhibiting overall consumption of feed by birds (Tobin 1985). However, Methiocarb can be useful as an aversive conditioning agent, used in eggs, in reducing raven predation of colonial waterbirds (Avery et al. 1995).

Lethal and Nonlethal Control Methods.

Chemical Immobilizing and Euthanizing Agents. Most APHIS-WS Specialists in Oregon are trained and certified to use drugs for capturing or euthanizing wildlife. Drugs such as sodium phenobarbital derivatives are used for euthanasia. Most drugs, an exception is alpha-chloralose, fall under restricted-use categories and must be used under the appropriate license from the U.S. Department of Justice, Drug Enforcement Agency. The drugs used by APHIS-WS are approved by a Drug Committee panel.

Euthanasia. Captured animals may be euthanized. The euthanasia method used is dependent on whether the animal is going to be processed for human consumption. Animals that are not going to be consumed can be euthanized with a sodium phenobarbital solution such as Beuthanasia-D® or other appropriate method such as cervical dislocation, decapitation, a shot to the brain, or asphyxiation. Carbon dioxide is sometimes used to euthanize animals which are captured in live traps and when relocation is not a feasible option.

Relocation. Most damaging species are common and numerous throughout Oregon, so they are rarely, if ever, relocated because habitats in other areas are generally already occupied. Relocation of damaging species to other areas following live capture generally would not be biologically

sound, effective nor cost-effective. Relocation of wildlife often involves stress to the relocated animal, poor survival rates, and difficulties in adapting to new locations or habitats. Relocation of target animals involved in conflicts is usually not recommended according to State wildlife policy.

Leg-hold traps are used to capture animals such as coyotes, bobcats, fox, mink, raccoon and skunk. These traps are the most effective, versatile and widely used tool available to APHIS-WS for capturing many species. Traps placed in the travel lanes of the target animal, using location rather than attractants, are known as "blind sets." More frequently, traps are placed as "baited" or "scented" sets. These trap sets use an attractant consisting of the animal's preferred food or some other lure such as fetid meat, urine, or musk to attract the animal into the trap.

In some situations, a carcass or large piece of meat (i.e., a draw station) may be used to attract target animals to an area where traps are set. In this approach, single or multiple trap sets are placed at least 30 feet from the draw station. APHIS-WS program policy prohibits placement of traps or snares within 30 feet of a draw station to prevent the capture of non-target scavenging birds. There are only two exceptions to this policy. One is when setting leg-hold traps to capture cougars returning to a kill. In these cases the weight of the target animal allows pan-tension adjustments which preclude the taking of small non-target animals. The second exception is when leg-hold traps are set next to carcasses used to capture raptors under permit with the USFWS.

Two primary advantages of the leg-hold trap are that they can be set under a wide variety of conditions, and that pan-tension devices can be used to prevent smaller animals from springing the trap, thus allowing a degree of selectivity not available with many other methods. Effective trap placement by trained personnel greatly contributes to the leg-hold trap's selectivity. Another advantage of leg-hold traps is that the live-capture of animals permits release if warranted.

Disadvantages of using leg-hold traps include the difficulty of keeping them in operation during rain, snow, or freezing weather. In addition, they lack selectivity where non-target species are of similar size to target species and are abundant. The selectivity of leg-hold traps is an important issue and has been shown to be a function of how they are used. The type of set and attractant used significantly influences both capture efficiency and the risk of catching non-target animals. The use of leg-hold traps in the APHIS-WS program is costly due to the amount of manpower and time involved; however, the technique is indispensable in selectively resolving many animal damage situations.

APHIS-WS program guidelines require warning signs to be posted in the vicinity of control operations. Placement is generally confined to areas not visible to or frequently visited by the public. APHIS-WS personnel are the most vulnerable to hazard exposures (USDA 1997).

Snares. Snares, made of cable, are among the oldest existing wildlife damage management tools. Snares can be used to catch most species. They offer the advantage of being much lighter than leg-hold traps and are not as affected by inclement weather.

Snares are used wherever a target animal moves through a restricted lane of travel (i.e., "crawls" under fences, trails through vegetation, den entrances, etc.). When an animal moves forward into the snare loop, the noose tightens and the animal is held.

Snares can be set as either lethal or live-capture devices. Snares set to capture an animal around the neck can be a lethal use of the device, whereas snares positioned to capture the animal around the body or leg can be a live-capture method. Careful attention to details in placement of snares and the use of slide stops can also allow for the live-capture of neck-snared animals.

The catch pole snare is used to capture or handle problem animals. Catch poles are primarily used to remove live animals from traps without injury to the animal or danger to the APHIS-WS

Specialist.

Human safety hazards associated with snares are similar to leg-hold traps. Risks are minimized by limiting or avoiding use where the public may be exposed, and by program guidelines that require warning signs to be posted in the vicinity of control operations (USDA 1997).

Cage Traps. Cage traps are frequently used to capture skunks, raccoons, cougars, black bears, coyote pups, fox, and dogs. Cage traps capture the animal by mechanical closure of the entry way via the animals actuation of a triggering device. Traps commonly used or recommended by APHIS-WS to capture skunks and raccoons are drop-door wire box traps and are live capture traps that are generally baited with food items.

The use of cage traps allows the release of captured non-target animals or target animals that are to be relocated. Cage traps are frequently recommended to private individuals for capturing skunks and raccoons or used operationally by APHIS-WS personnel in situations where other methods may not be as safe. These devices pose minimal risk to the humans, pets, or non-target animals, and are easily monitored and maintained. However, some animals fight to escape from cage traps and become injured. However, live traps, as applied and used by APHIS-WS pose no danger to pets or the public and if a pet is accidentally captured in such traps, it can be released unharmed.

Shooting Birds. Shooting is more effective as a dispersal technique than as a way to reduce bird densities when large number of birds are present, however, it is a very individual specific method which is typically used to remove a single problem individual. Shooting to supplement harassment typically enhances the effectiveness of harassment techniques and can help prevent bird habituation to hazing methods (Kadlec 1968). In situations where the feeding instinct is strong, most birds quickly adapt to scaring and harassment efforts unless the control program is periodically supplemented by shooting. Shooting can be relatively expensive because of the staff hours sometimes required (USDA 1997). It is selective for target species and may be used in conjunction with decoys and calling. Shotguns, air rifles or rim and center fire rifles are sometimes used to manage bird damage when lethal methods are determined to be appropriate. The birds are killed as quickly and humanely as possible. APHIS-WS personnel follow all firearm safety precautions when conducting bird damage management and comply with all laws and regulations governing firearms use. Also see "Shooting Mammals" for human safety consideration.

Firearm use is very sensitive and a public concern from general safety issues relating to the public to misuse. To ensure safe use and awareness, APHIS-WS 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). WS employees who carry firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

Shooting mammals. Shooting is selective for target individuals but is relatively expensive due to the staff hours required. Shooting is, nevertheless, an essential wildlife damage management method. Removal of one or two problem animals can quickly stop extensive damage. Predator calling is an integral part of ground hunting. Trap-wise predators, while difficult to trap, are often vulnerable to calling. Shooting can be selective for offending individuals and has the advantage that it can be applied in specific damage situations.

The primary human health and safety hazard associated with shooting is related to firearms handling by the user, making APHIS-WS personnel the most vulnerable. Human health and safety risks are minimized by program safety practices which include: extensive training and experience

in safe and effective firearms use; frequent employee evaluations; and use of firearms only at safe distances from human habitations or other activities, and in safe directions only (USDA 1997).

Egg, Nest, and Hatchling Removal and Destruction. Egg and nest destruction is used mainly to reduce or limit the growth of a nesting avian predator population in a specific area through limiting reproduction of offspring or removal of nest. Egg and nest destruction is practiced by manual removal of the eggs or nest. This method is practical only during a relatively short time interval and requires skill to properly identify the eggs and hatchlings of target predator species.

Denning. Denning is the practice of seeking out the dens of depredating coyotes or red fox and eliminating the young, adults, or both to stop ongoing predation or prevent further depredations. The usefulness of denning as a damage management method is proven, however since locating dens is difficult and time consuming, and den usage is restricted to about two to three months of the year, its use is limited to specific, appropriate situations that must be determined by a specialist.

Coyote and red fox depredations often increase in the spring and early summer due to the increased food requirements of rearing and feeding young. Removal of pups will often stop depredations even when the adults are not removed. When the adults are removed and the den site is known, the pups are killed to prevent their starvation. The pups are euthanized in the den with a registered fumigant. Denning is highly selective for the target species responsible for damage. Den hunting for adult coyotes and fox is often combined with other activities (i.e., calling and shooting, etc.).

Den fumigants, also called gas cartridges, are fumigants, or gases, used to manage wildlife. They are highly effective but are expensive and labor intensive to use. In the APHIS-WS program, fumigants are only used in predator dens. The APHIS-WS program manufactures and uses den cartridges specifically formulated for this purpose. These cartridges are hand placed in the active den, and the entrance is tightly sealed with soil. The burning cartridge causes death from a combination of oxygen depletion and carbon monoxide poisoning.

Chemical Toxicants. All chemicals used by APHIS-WS are registered under FIFRA (administered by EPA and ODA) or by the Food and Drug Administration. APHIS-WS personnel that use chemical methods are certified as pesticide applicators by ODA and are required to adhere to all certification requirements set forth in FIFRA and Oregon pesticide regulations. Chemicals are only used on private, public, or Tribal property sites with authorization from the property owner or manager.

DRC-1339. DRC-1339 is a slow acting avicide that is registered with the EPA for use on a number of species (e.g. ravens, crows, pigeons, gulls, blackbirds, and starlings), on various bait carriers, such as grain, meat baits, sandwich bread, and cull french fries. DRC-1339 is only available for use under APHIS-WS program supervision. Under project conditions, DRC-1339 is available for use according to label directions for corvids and gulls (see product label,USDA and USDI 2001, Appendix D). DRC-1339 was developed as an avicide because of its differential toxicity to mammals. DRC-1339 is highly toxic to sensitive species but only slightly toxic to non-sensitive birds, predatory birds, and mammals. Most bird species that are responsible for damage, including starlings, blackbirds, pigeons, crows, magpies, and ravens are highly sensitive to DRC-1339. Many other bird species such as raptors, sparrows, and eagles are classified as non-sensitive. Numerous studies show that DRC-1339 poses minimal risk of primary poisoning to non-target and T&E species (USDA 1997). However to avoid even a remote chance of affecting bald eagles, DRC-1339 will not be used on meat baits. Secondary poisoning has not been observed with DRC-1339 treated baits. This can be attributed to relatively low toxicity to species that might scavenge on birds killed by DRC-1339 and its tendency to be almost completely metabolized in the target birds which leaves little residue to be ingested by scavengers. Secondary hazards of

DRC-1339 are almost non-existent. DRC-1339 acts in a humane manner producing a quiet and apparently painless death.

DRC-1339 is unstable in the environment and degrades rapidly when exposed to sunlight, heat, or ultra violet radiation. DRC-1339 is highly soluble in water, but does not hydrolyze, and degradation occurs rapidly in water. DRC-1339 tightly binds to soil and has low mobility. The half life is about 25 hours, which means it is nearly 100 percent broken down within a week, and identified metabolites (i.e. degradation chemicals) have low toxicity. Aquatic and invertebrate toxicity is low (USDA 1997). USDA (1997, Appendix P) contains a thorough discussion and risk assessment of DRC-1339. That assessment concluded that no adverse effects are expected from use of DRC-1339.

Zinc Phosphide. Zinc phosphide pellets (2 percent) may be used only by certified applicators, or persons under their direct supervision, for Norway rats, roof rats, and house mice (see product label, USDA and USDI 2001, Appendix D). In the project area, the bait must be placed in tamper resistant bait stations or in burrows, since non-target hazards exist to any granivorous birds or mammals that occur in areas where zinc phosphide grain bait is applied (USDA 1997). The Aleutian Canada goose would potentially be affected by zinc phosphide if allowed to consume treated grains. Zinc phosphide poses little secondary risk to non-target wildlife since it breaks down rapidly in the digestive tract of affected animals. Domestic dogs and cats are more susceptible than other animals (USDA 1997).

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 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, APHIS-WS 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 the EA and BA/BO. The Decision Model is used to determine the most appropriate implementation strategy to resolve predator damage.

Receive Request for Assistance
↓
Assess Problem
↕
Evaluate Wildlife Damage Control Methods
↕
Formulate Wildlife Damage Control Strategy

↕

Provide Assistance

↕

Monitor and Evaluate Results of Control Actions

↓

End of Project

Figure 2. APHIS-WS Decision Model (Slate et al. 1992)

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 form 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; 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 (ONHP) has completed intensive surveys for snowy plovers at nesting areas between Florence and Floras Lake/New River. Current plans are for this monitoring effort to continue through the implementation of the proposed action.

The lead agencies, in coordination with the cooperating agencies, would monitor the proposed action through annual review. This includes program impacts on plovers and other listed species, review of the Biological Opinion, and reconsultation pursuant to Section 7 of the Endangered Species Act, if necessary. Work plans for different plover sites would be modified based on the findings of these monitoring efforts.

APHIS-WS, in coordination with ODFW and the land management agencies, would specifically monitor impacts on target and non-target species 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.

Additional Conservation Measures for Snowy Plovers

As outlined at the end of snowy plover effects section, conservation measures the action agencies felt were necessary in addition to APHIS-WS's standard procedures, or to clarify specific techniques used in this action, were added. These additional conservation measures to minimize disturbance include:

- Visits to plover nests for exclosures, and trap sites near nests, will be limited to minimize potential harassment and to minimize attracting other predators. Installation of exclosures will be conducted in cooperation with biologists monitoring the plover nests to best avoid disturbing incubating adult plovers.

- The distance between trap sites and snowy plover nests will be as great as possible to eliminate (out of sight) or minimize any visual disturbance to nests yet accomplish the specific predator control objective.

- Hazing-pyrotechnics or exploders will be used only beyond 250 feet from known snowy plover nests.

- Bait stations for Methiocarb or use of DRC-1339 will be out of sight of snowy plover nests and beyond 200 feet from known plover nests.

STATUS OF THE WESTERN SNOWY PLOVER (Range-wide)

The Pacific Coast population of the western snowy plover (*Charadrius alexandrinus nivosus*) was listed as a threatened species under the Endangered Species Act in March 1993 (USDI 1993). Poor reproductive success resulting from human disturbance, predation and inclement weather in combination with the loss of nesting habitat attributed to urban encroachment and the establishment of the exotic European beachgrass (*Ammophila arenaria*) were cited as factors contributing to the decline of the Pacific coast population of snowy plovers (USDI 1993; USFWS 2001). A detailed account of the threats, taxonomy, natural history, and population trends are in the Final Rule to list the snowy plover (USDI 1993) and the Western Snowy Plover Pacific Coast Population Draft Recovery Plan (USFWS 2001), which is currently available for public comment.

The Pacific Coast breeding population of snowy plover ranges from Damon Point, Washington south through Oregon and California to Bahia Magdalena, Baja California, Mexico. They are also reproductively isolated from interior populations of western snowy plovers located in eastern Oregon and California as well as other western states (USFWS 2001). Snowy plovers typically nest in flat, open areas with sandy or saline substrate and vegetation

is sparse or absent (Wilson 1980). Figure 3 shows known and recent snowy plover nesting areas along the Oregon Coast. Most nesting along the Oregon coast is initiated from mid-April through mid-July (Wilson-Jacobs and Meslow 1984) with the majority of fledging occurring from June through August. Snowy plovers readily renest after losing a clutch and in California have been documented to double brood. Later nesting (July) and fledging (August) dates are likely from renesting attempts (USFWS 2001).

Recent estimates of Pacific Coast snowy plovers range-wide are approximately 2000 birds in the United States with a recovery goal of a 10-year average of approximately 3000 snowy plovers (USFWS 2001). Within the recovery unit of Oregon and Washington there is a recovery goal of a 10-year average of 250 breeding adults (USFWS 2001).

The proposed action focuses on controlling predation to help increase snowy plover nesting and fledging success, however, many of the factors given in the final rule to list (USDI 1993) and the draft recovery plan (USFWS 2001) are intertwined with, and often compound the effects of predation. For example, encroachment of the beach/dune zone by exotic beach grass has increased cover for mammalian predators; increased human habitation near beaches has increased feral cat and red fox numbers; human presence helps attract and support other predators such as crows and ravens by providing food in the form of litter and direct feeding; power poles and signs have increased nesting platforms and perches for corvids and raptors. Predation is an unavoidable natural phenomenon that plovers have evolved with, and even with a healthy population, predation may have had significant local effects on nesting areas. However, due to incresed predator abundance, introduction of exotic predator species, low snowy plover

abundance and the complex relationship of human/predator interaction, this proposed action is believed to be necessary to help recover the snowy plover (USFWS 2001; Castelein et al 2000).

Critical Habitat

Critical habitat was designated for the Pacific Coast population of the western snowy plover effective January 6, 2000 (USDI 1999). Designated critical habitat units in Oregon include the following areas: OR-1, Bayocean Spit, Tillimook County; OR-2, Heceta Head to Sutton Creek,

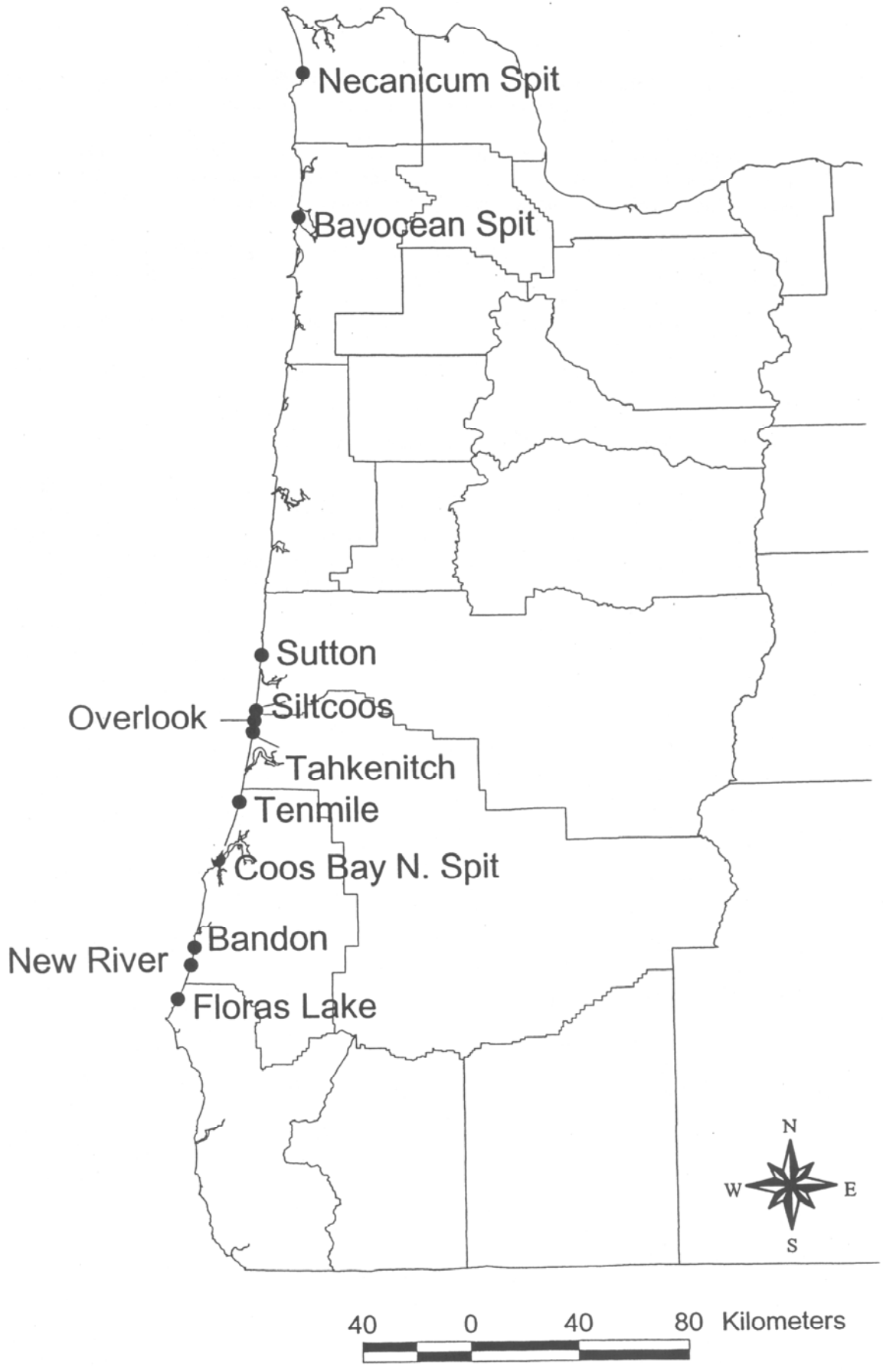


Figure 3. Snowy Plover nesting areas surveyed on the Oregon Coast in 2001.

Lane County; OR-3, Siltcoos River North, Lane County; OR-4, Siltcoos River to Tenmile Creek, Lane and Douglas counties; OR-5, Umpqua River to Horsfall Beach, Douglas and Coos counties; OR-6, Horsfall Beach to Coos Bay, Coos County; and OR-7, Bandon Park to Floras Lake, Coos and Curry counties.

The primary constituent elements of designated critical habitat for snowy plovers include, but are not limited to, the following physical and biological features that are essential to the conservation of the snowy plover and may require special management considerations or protection: (1) space for individual and population growth, and for normal behavior; (2) food, water or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for breeding, reproduction, rearing of offspring, and (5) habitats that are protected from disturbance or are representative of historic geographical and ecological distributions of the snowy plover. These primary constituent elements are found in areas that support or have the potential to support intertidal beaches, associated dune systems, and river estuaries. Important components of these sites include sparsely vegetated foredunes, spits, washover areas, blowouts (a cut in a dune caused by storm action), intertidal flats, salt flats, flat rocky outcrops and gravel bars (USDI 1999).

ENVIRONMENTAL BASELINE

Status of the Western Snowy Plover in the Action Area

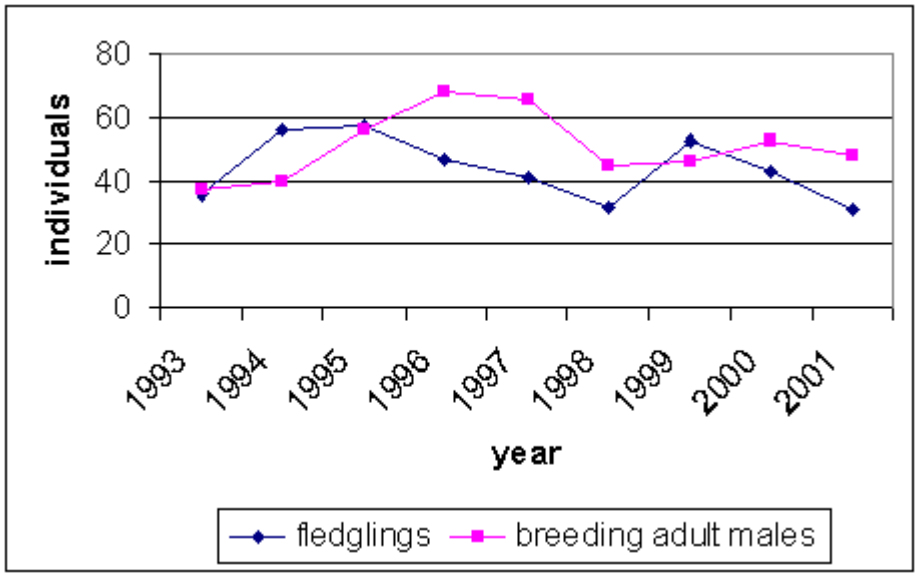
Population Estimates and Trends

As noted previously, Oregon and Washington are considered a recovery unit together, however, the majority of the breeding snowy plovers in this recovery unit are in Oregon and the data used for this BO were from Oregon. The most recent published report on the Oregon snowy plover population by Castelein et al. (In Prep.) reports 79 or 80 breeding adults. This indicates a decline in the population since 1997 when the population viability analysis (PVA) was conducted for the draft recovery plan (USFWS 2001). The PVA modeled different scenarios of Pacific Coast snowy plover metapopulation trends over a 100-year time period (USFWS 2001). Several basic assumptions were made about snowy plovers within the larger metapopulation based on information provided from research on individual subpopulations. Variables which were modeled included: (1) annual adult survival (75 to 77 percent), (2) annual juvenile survival (50 percent with $\leq$ 20 percent dispersal), (3) annual reproductive success (based on a ratio of fledglings to adult males) and (4) management.

Essentially, all models using the status quo data, except for those which showed increased reproductive success under increased management (for the entire metapopulation or at least for the largest subpopulations), showed a significant probability of population decline, with the primary difference being the rate of decline. The authors concluded the most feasible and direct way to increase population size was through increased reproductive success. Productivity of at least a ratio of 1.0 fledglings to adult males was needed to maintain a stable population and a ratio of 1.2 or more fledglings per adult male to increase population size at a moderate rate.
Figure 4 shows the ratio of adult males (based on a 60:40 male to female ratio in the breeding population) to fledged chicks from 1993 to 2000. In the last nine years productivity of at least 1.0 fledglings per adult male was only achieved in three of those years and reproductive success has been lower than predicted for a stable or increasing population in the PVA since the model was completed.

Figure 4. Number of fledglings and adult males (based on the assumed 60:40 ratio from the PVA [USFWS 2001])

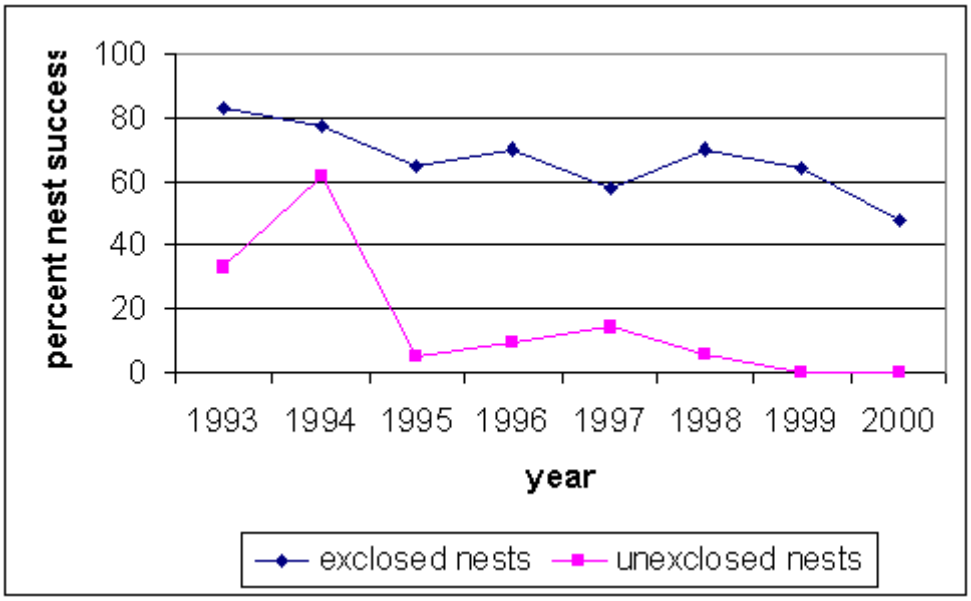
from 1993 to 2001 (Casler et al. 1993; Hallett et al. 1994; 1995; Estelle et al. 1997; Castelein et al. 1997;1998; 2000a; 2000b).



Population trends modeled in the PVA were based on data collected up to 1997 and with the assumption that "current intensive management" would continue (USFWS 2001). Based on review of the annual reports on distribution and nest success from Oregon since 1993, the "intesive management" aimed at increasing snowy plover nest success was the annual use of nest exclosures (Casler et al. 1993; Hallett et al. 1994; 1995; Estelle et al. 1997; Castelein et al. 1997;1998; 2000a; 2000b) and some limited predator control in 1999 (APHIS-WS unpl. data 1999). Figure 5 shows the results of the use of nest exclosures to increase nest success from 1993 to 2000. It is very apparent that nest exclosures contribute significantly to snowy plover nest success, however, the data also suggest nest exclosures are becoming less effective over time with an overall decline in exclosed nest success of approximately 25 percent since 1993.

Increasing nest success is the first objective that must be attained to increase fledging success. The best possible scenario would be to increase the success of first nesting attempts, thus hatch-year birds will be older and fitter going into the winter, potentially increasing overwinter survival the first year. In addition, adults may be able to double brood, which depending on the success rate of secondary broods, could substantially increase the fledgling to adult male ratio. Appendix A gives basic information on when and how specific predator species may be a problem and potential methods and strategies for control.

Figure 5. Apparent snowy plover nest success for exclosed and unexclosed nests along the Oregon Coast from 1993 to 2000 (Casler et al. 1993; Hallett et al. 1994; 1995; Estelle et al. 1997; Castelein et al. 1997;1998; 2000a; 2000b).



EFFECTS OF THE ACTION

The long-term effects from the proposed action to the snowy plover population in Oregon are anticipated to be beneficial since this is an identified recovery action designed to increase nest and brood success at known plover nesting areas. Specific predator control efforts have successfully been used as one aspect of the recovery efforts with other species such as the Aleutian Canada goose (*Branta canadensis leucopareia*), which was recently delisted, California and light-footed clapper rails (*Rallus longirostris obsoletus* and *R. l. levipes*), California least tern (*Sterna antillarum browni*) and western snowy plovers in other areas (USFWS 2001). Introduced arctic (*Alopex lagopus*) and red fox were the primary predators controlled in these instances.

Cote and Sutherland (1997) reviewed 20 published studies on predator control for bird populations and found that they increased significantly the nesting and brood success within these populations, however, they were much less consistent in significantly increasing population size. They found this may be due to the inherent characteristics of bird population regulation, ineffective predator control or inadequate monitoring of the bird population. Mammalian predators documented as a predator of snowy plover nests are discussed in depth in the environmental assessment (USDA and USDI 2001). However, red fox and striped skunks are of particular concern. Harding et al. (2001) examined the effectiveness of controlling red fox on California clapper rail populations in central California and reported that control efforts had contributed significantly to the growth of the local clapper rail population. They found the trapping effort, which was aimed at the local adult foxes, was effective in the short-term (annual nesting cycle), but to achieve longer-term success, they needed to better target juvenile and immigrant foxes.

Active control techniques directed at mammalian predators include: nest exclosures, distress/alarm calls, live trap and relocation, leg-hold traps, snap traps, cage traps, neck/body snares, zinc phosphide, shooting, and denning (gas cartridges). As discussed in the baseline section, nest exclosures are already being used by ONHP personnel (acting as the State's agent under Section 6 of the ESA), and in 2000 they documented 13 percent of snowy plover nesting attempts were abandoned. Even if some small portion of that 13 percent abandonment can be attributed to researcher disturbance from installing nest exclosures and/or human activity, exclosed nests have had a significantly higher rate of success in 2000 as well as over the last 10 years (1990 to 1999). Exclosed nests have a mean Mayfield

success rate of approximately 67 percent (46 percent in 2000) compared to 19 percent (2 percent in 2000) for unexclosed nests from 1990 to 1999 (Castelein et al. 2000b). While nest exclosures have demonstrated their effectiveness in increased nest success over the last 10 years, the decline in success for 2000 may indicate they are becoming less effective for some predator species or individuals. Since chicks are highly mobile, documenting brood success can be much more difficult than documenting nest success, therefore figures for predation on broods much less conclusive. However, it is likely they follow the same trends as nest predation.

Snowy plover monitoring data in 2000, found that the majority (at least 41 percent of the total and 69 percent of the known nest predations) of nest predations were by American crows and common ravens. Both crows and ravens are intelligent, highly mobile, and visually observant, opportunistic nest predators. Corvid species are well known to observe human or other animal behavior and to take advantage of prey exposed by an unwitting accomplis. They are also known to develop a search image for anthropogenic items which they associate food. Observations by Castelein et al. (2000) in past years have noted that predation for a given plover nesting area may be very high for an individual year or time period and not elsewhere. This may be due to a corvid developing a search image or foraging pattern that favors locating plover nests. Crows and ravens are abundant along the Oregon coast. They frequent beaches because of the abundance of food brought in by the ocean and by humans leaving refuse. Because of their abundance and highly mobile nature, controlling crow and raven numbers along the coast is not possible, therefore local crow and raven populations near plover nesting areas and problem individuals will be targeted for control. Active techniques to be used to control crows and ravens include: nest exclosures; electric wired perches; methiocarb (egg baits); hazing-pyrotechnics, exploders; patrolling, visual or auditory effigies; distress-alarm calls; live trap and relocation; leg-hold traps; destroying corvid nests or eggs, or egg oiling; use of DRC-1339 (avicide); shooting.

As discussed in the PVA for the draft snowy plover recovery plan (USFWS 2001), there are a couple variables in which snowy plover population trends can be positively influenced. These are: adult survival from breeding season to breeding season; juvenile survival the first winter; and increased reproductive success (the fledgling to adult male ratio). Predators affecting these different variables will vary depending on the method and season in which they forage. Appendix A lists the potential snowy plover predators, their seasonal status, primary snowy plover predation point and the likely methods and situations predators would need to be controlled. Based on these control activities the amount of potential disturbance and period of disturbance can be inferred. The majority of potential predators impact nesting and brood rearing which in turn, dictate fledging success. As noted in the PVA this is the point where the most change can be exerted on population trend. Figure 4 tends to corroborate this by showing a corresponding adult male increase after years in which fledging was near or above 1.0 per adult male.

Indirect Effects

Potential disturbance by human presence and activity may occur in association with most of the active control techniques described for mammalian and avian predators. Disturbance would be possible primarily during deployment and monitoring of the traps/sites, effigies, or pyrotechnics. There is also a fine line between proximity needed to effectively control the target individual without disturbing the plovers to the level of harassment. Proximity to nest site, timing within the nesting cycle, duration and frequency of visits are all important factors as to whether an individual is disturbed to the level of harassment, or ultimately, caused to abandon a specific nesting attempt. Birds are generally most likely to abandon nests early in the nesting cycle, before they have invested much energy in a particular nest. They are also much more likely to be harassed the longer the duration or the more frequent the disturbance. Keeping an incubating plover off the nest too long can also lead to eggs becoming chilled or potentially providing and opportunity for another predator. Castelein et al. (2000b) noted that installing nest exclosures with hot wires took approximately 45 minutes which could have increased the likelihood of abandonment or egg loss. However, none of the nests were abandoned, and only one was lost to predation, possibly due to its hot wire not working. Removing nest predators prior to the nesting season could theoretically minimize some need for predator control during the nesting period and thus could minimize disturbance to nesting plovers from control activities during nesting. However, due to the continual dispersal of juveniles of some predator species and the mobility of others, some level of predator control will likely be needed throughout the plover nesting season. Nest exclosures will continue to be used once nests have been initiated, therefore some risk of harassment is possible.

Direct Effects

Direct effects to adult snowy plovers from the proposed action is not anticipated due their mobile behavior of avoiding humans by running or flying away from perceived danger. Castelien et al. (2000) documented one instance of the remains of an adult plover hanging on the wires of an exclosure, however, it was undetermined how the plover may have died and become caught on the exclosure.

The potential for the direct effect to a nest is more likely. Since APHIS-WS control agents will be operating in and around nesting areas installing exclosures and hot wires, deploying and monitoring traps and effigies, there is the potential to step on or otherwise accidentally crush an unknown/unexclosed nest. Close coordination with ONHP personnel monitoring nests will be necessary to minimize any direct affects to snowy plover nests or broods.

Designated Critical Habitat

The final rule designating critical habitat for the snowy plover (USDI 1999), does not specifically discuss predator control activities but does discuss those activities that have lead to higher predator numbers or predator problems. The Service stated in the final rule that actions that would promote unnatural rates or sources of predation may adversely modify critical habitat by reducing its functional suitability to support nesting snowy plovers.

The final rule also states that projects or management activities that cause, induce, or increase human-associated disturbance on beaches may reduce the functional suitability of nesting, foraging, and roosting areas and that walking and other various human activities within protected nesting areas may adversely modify critical habitat. The extent to which such activities may need to be restricted will vary on a site-by-site basis.

On a very literal basis, the latter statement and the proposed action may appear to be mutually exclusive in regard to designated critical habitat and predator control activities since APHIS-WS agents will clearly need to walk in and around snowy plover nesting areas to deploy and monitor control activities. However, it has been shown and discussed in the PVA, as well as annual population monitoring, that under the current conditions, the snowy plover population in Oregon will likely continue to decline without some response to predation. Current nesting success levels would be much lower without the use of nest exclosures, for example, and by all accounts we are already in a situation where we are experiencing high rates of predation which has reduced the functional suitability of snowy plover nesting areas according to the criteria in the final rule (USDI 1999).

With the use of APHIS-WS control agents, properly trained in minimizing disturbance to nesting plovers, and close coordination with the species experts from ONHP who are conducting annual nesting and population monitoring, the benefits from predator control efforts should increase nest success and the functional suitability of nesting habitat for the snowy plover in Oregon. This action has been strongly recommend as a tool for recovery of the snowy plover by both the Service (USFWS 2001) and the State of Oregon (ODFW 1994).

Cumulative Effects

Cumulative effects are those effects of future State, local, or private actions that are reasonably certain to occur within the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The OPRD, as a cooperating agency in this proposed action, will be likewise conducting predator management activities on adjoining State Parks and State Beach Easement lands along the Oregon coast. Oregon Parks and Recreation Depart ment will also be restoring plover habitat in Bandon Beach State Park. In addition, OPRD will continue to rope and sign nest sites and continue to use on-site staff to assist with visitor compliance of closures, dogs, and educating the public through interpretive exhibits, evening programs and one on one contacts. The OPRD is currently working with the USFWS to develop and implement a Habitat Conservation Plan for the snowy plover on the lands it administers along the coast.

Although snowy plover habitat occurring on private land within Oregon's ocean shore zone [ORS 390.605(1)] is protected from development and alteration by the Oregon Beach Bill, over the next five years, it is likely that visitor

use to private and state lands will increase.

CONCLUSION

After reviewing the current status of the Pacific Coast population of western snowy plover, the environmental baseline for the action area, the effects of the proposed predator control program, and the cumulative effects, it is the Service's biological opinion that the Integrated Predator Damage Management Program for the Pacific Coast Population of Western Snowy Plover in Oregon, as proposed, is not likely to jeopardize the continued existence of the western snowy plover and will not destroy or further adversely modify designated critical habitat. Critical habitat for this species has been designated in portions of action area, however, this action does not affect the constituent elements of designated critical habitat.

The Service reached this conclusion based on (1) predator control being an identified recovery action in the draft recovery plan (USFWS 2001); (2) data from Oregon showing that current limited predator management (nest exclosures) is becoming less effective; (3) low reproductive success of snowy plovers in Oregon, a significant amount of which is due to predation; and (4) the potential level of harassment due to disturbance from the proposed action is being minimized and the anticipated benefits should far surpass the anticipated level of harassment.

INCIDENTAL TAKE STATEMENT

Sections 4(d) and 9 of the Act, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Under the terms of section 7(b)(4) and section 7(a)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

AMOUNT AND EXTENT OF TAKE

The Service anticipates two snowy plover nests may be directly taken, over the five year life of this BO, due to accidental destruction. Additionally, the Service anticipates a small number of plover nests, not to exceed two percent of the known annual nest attempts, will be taken annually via harassment to adult nesting plovers leading to nest abandonment as a result of the additional predator control activities proposed in the BA. In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the Pacific Coast population of the western snowy plover.

Upon location of a dead, injured, or sick endangered or threatened species specimen, initial notification must be made to the Service Law Enforcement Office in Wilsonville, OR at (503)682-6131. Care should be taken in handling sick or injured specimens to ensure effective treatment and care or the handling of dead specimens to preserve biological material in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered species or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

REASONABLE AND PRUDENT MEASURES

The measures described below are non-discretionary. They must be implemented so that they become binding

conditions in order for the exemption in section 7(a)(2) to apply. The Service has the continuing duty to regulate the activities covered in this incidental take statement. If you fail to require cooperators to adhere to the terms and conditions of the incidental take statement, or fail to retain the oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

We believe the following reasonable and prudent measures are necessary and appropriate to minimize harassment of snowy plovers and to maximize the positive benefits of the proposed recovery action:

1. Establish a snowy plover predator team which would be able to respond quickly to predator control situations.

2. Work plans for snowy plover nesting areas will be completed by the predator team prior to predator control efforts and will develop comprehensive predator control strategies and involve action agency, APHIS-WS, and SPWG species expert personnel.

3. Further minimize any disturbance to nesting snowy plovers.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Service must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. The following terms and conditions will implement reasonable and prudent measure one.

1.1) A snowy plover predator control program team will be established to provide consistent and timely oversight to predator and control method situations/issues.

1.2) The predator control team should be the same throughout the coast and can be the same as the teams designing work plans. This team will, at the least, be comprised of at least one species expert (ONHP personnel), one Service biologist, at least one biologist from either of the two Federal land management action agencies (i.e., BLM or FS) and an APHIS-WS representative.

2. The following terms and conditions will implement reasonable and prudent measure two.

2.1) Work plans for snowy plover nesting areas will be completed prior to predator control efforts beginning.

2.2) Work plans will evaluate and propose passive predator management measures to help reduce predator abundance or foraging efficiency near plover nesting areas such as changes to trash management, raptor perch availability, and habitat management as a function of predator cover (i.e., not necessarily snowy plover habitat restoration which is already being addressed).

2.3) Work plans will evaluate and propose proactive control measures to be used to address anticipated predators (i.e., aversion training or lethal control necessary to reduce local predator numbers prior to the nesting season).

2.4) Work plans will establish a rapid response procedure to deal with immediate predator activity/problems identified once the nesting season begins (i.e., problem species or individuals depredating adults, nests or chicks). These will identify the APHIS-WS agent responsible for the specific areas, the FWS, ONHP and land management agency personnel involved and how/where to contact them.

2.5) Work plans will identify who will be responsible for providing the results of annual predator control

activities and the effectiveness of the activities (including observed or suspected incidences of harassment). 2.6) Reports will be sent to: State Supervisor, Oregon Fish and Wildlife Office, 2600 S.E. 98th Ave., Suite 100, Portland, OR 97266. These reports will be sent in on an annual basis prior to the next years control activities beginning.

Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. The term "conservation recommendations" is defined as suggestions from the Service which will identify: 1) discretionary measures a Federal agency can take to minimize or avoid the adverse effects of a proposed action on listed species or designated habitat; 2) studies, monitoring, or research to develop new information on listed or proposed species, or designated critical habitat; and 3) include suggestions on how an action agency can assist species conservation as part of their action and in furtherance of their authorities under section 7(a)(1) of the Act.

1. Additional Analysis/Monitoring: Currently ONHP personnel, via section 6 funding to the State, are conducting annual population and reproduction monitoring of snowy plovers along the Oregon Coast, and APHIS-WS will be providing an annual report of numbers and species controlled. The two cooperating groups (ONHP and APHIS-WS), and/or the action agencies, will need to analyze the data and observations to provide some level of overall effectiveness monitoring of this action. Ultimately, the action agencies will be responsible for providing monitoring results when they reinitiate consultation at the end of five years, however, this should be provided to the Service on an annual basis to better track the success of these activities and identify and adapt to predation changes or trends.

2. The Service recommends that proactive predator control (that used to reduce local predator populations prior to a specific problem) for resident mammalian predators be limited to within a maximum 0.5 mile radius around snowy plover nesting areas. This may be extended if specific situations call for greater distances to be more effective.

3. The Service recommends that coyotes only be controlled if they have been identified as depredating snowy plover nests (i.e., no proactive control of coyote populations). Research suggests that the presence of coyotes can depress red fox numbers (Voigt and Earle 1983; Major and Sherburne 1987; Harrison et al. 1989), which are more likely to be nest predators (Johnson et al. 1989; Sovada et al. 1995).

To be kept informed of actions that either minimize or avoid adverse effects or that benefit listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

This concludes formal consultation on the actions outlined in the request. As required by 50 CFR Part 402.16, reinitiation of formal consultation is required if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations that are causing such take must be stopped, and formal consultation must be reinitiated.

If you have questions regarding this biological opinion, please contact David Leal or Laura Todd at (503) 231-6179.

cc:

T. Zimmerman, USFWS, R1
S. Hebert, USDA, APHIS-WS
Newport Field Office

Literature Cited

Avery, M. L., M. A. Pavelka, D. L. Bergman, D. G. Decker, C.E. Knittle, and G. M. Linz. 1995. Aversive conditioning to reduce raven predationon California least tern eggs. J. Col. Waterbird Soc. 18:131-138

Castelein, K.A., D.J. Lauten,, R. Swift and M.A. Stern. 1997b. Snowy plover distribution and reproductive success along the Oregon coast - 1997. A report submitted to the ODFW, Coos Bay District BLM, and Oregon Dunes NRA. 32 pp.

Castelein, K.A., D.J. Lauten,, R. Swift, M.A. Stern and K.J. Popper. 1998. Snowy plover distribution and reproductive success along the Oregon coast - 1998. A report submitted to the ODFW, Coos Bay District BLM, and Oregon Dunes NRA. 34 pp. plus maps.

Castelein, K.A., D.J. Lauten, K.J. Popper, J.A. Fukuda and M.A. Stern.. 2000a. Snowy plover distribution and reproductive success along the Oregon coast - 1999. A report submitted to the ODFW, Coos Bay District BLM, Oregon Dunes NRA, and USFWS, 43 pp.

Castelein, K.A., D.J. Lauten, K.J. Popper, D.C. Baily and M.A. Stern. 2000b. The distribution and reproductive success of the western snowy plover along the Oregon coast - 2000. A report submitted to the ODFW, Coos Bay District BLM, Oregon Dunes NRA, and USFWS, 51 pp.

Castelein, K.A. 2001. Oregon Natural Heritage Program. Personal Communication

Castelein, K.A., D.J. Lauten, L. Renan, S. Pixley, and M.A. Stern. In Prep. The Distribution and Reproductive Success of the Western Snowy Plover Along the Oregon Coast - 2001. Unpublished report submitted to the ODFW, Coos Bay District BLM, Oregon Dunes NRA, and USFWS.

Casler, B.R., C.E. Hallett, M.A. Stern and M.A. Platt. 1993. Snowy Plover Nesting and Reproductive Success Along the Oregon Coast - 1993. A report submitted to the ODFW, Coos Bay District BLM, and the Oregon Dunes NRA. 21 pp.

Cote, I. M. and W. J. Sutherland. 1997. The effectiveness of removing predators to protect bird populations. Conservation Biology. Vol. 11: 395-405.

Estelle, V.B., C.E. Hallett, M.R. Fisher and M.A. Stern. 1997a. Snowy plover distribution and reproductive success along the Oregon coast - 1996. A report submitted to the ODFW, Coos Bay District BLM, and Oregon Dunes NRA. 28 pp.

Hallett, C.E., B.R. Casler, M.A. Stern, M.A. Platt, and H. Voght. 1994. Snowy Plover Distribution and Reproductive Success Along the Oregon Coast - 1994. A report submitted to the ODFW, Coos Bay District BLM, and the Oregon Dunes NRA. 36 pp.

Hallett, C.E., B.R. Casler, M.A. Platt, and M.A. Stern. 1995. Snowy Plover Distribution and Reproductive Success Along the Oregon Coast - 1995. A report submitted to the ODFW, Coos Bay District BLM, and the Oregon Dunes NRA. 40 pp.

Harding, E.K., D.F. Doak and J.D. Albertson. 2001. Evaluating the effectiveness of predator control: the non-native red fox as a case study. Conservation Biology. Vol. 15: 1114-1122.

Harrison, D.J., J.A. Bissonette and J.A. Sherburne. 1989. Spatial relationships between coyotes and red foxes in eastern Maine. J. Wildl. Manage. 53:181-185.

Johnson, D.H., A.B. Sargeant and R.J. Greenwood. 1989. Importance of individual species of predators in nesting success of ducks in the Canadian Prairie Pothole Region. Can, J. Zool. 67:291-297.

Kadlec, J. A. 1968. Bird reactions and scaring devices. Append. 1. Fed. Aviation Advis. Circ. 150-5200-9.

Major, J.T. and J.A. Sherburne. 1987. Interspecific relationships of coyotes, bobcats, and red foxes in western Maine. J. Wildl. Manage. 51:606-616.

ODFW. 1994. Oregon Conservation Program for the western snowy plover. Final Draft. 56pp

Slate, D.A., R. Owens, G. Connolly, and G. Simmons. 1992. Decision making for wildlife damage management. Trans. N. Am. Wildl. Nat. Res. Conf. 57:51-62

Sovada, M.A., A.B. Sargeant and J.W. Grier. 1995. Differential effects of coyotes and red foxes on duck nest success. J. Wildl. Manage. 59:1-8

Stern, M.A., J.S. McIver, G.A. Rosenberg. 1991. Nesting and reproductive success of snowy plovers along the south Oregon coast, 1991. Unpublished report for the Oregon Department of Fish and Wildlife-Nongame Program, Portland and the Coos Bay District Bureau of Land Management, Coos Bay.

Tobin, M. E. 1085. Cues used by European starlings for detecting methiocarb-treated grapes. J. Wildl. Manage. 49:1102-1108.

USDA. 1997. Revised Final Environmental Impact Statement, Animal Damage Control Program. USDA APHIS WS-OSS.

USDA and USDI. 2001. Final Draft Environmental Assessment, Predator Damage Management to Protect the Federally Threatened Pacific Coast Population of the Western Snowy Plover, Oregon. Prepared by USDA, APHIS, Wildlife Services Program and the Siuslaw National Forest, USDI, Fish and Wildlife Service and Bureau of Land Management, and in cooperation with the Oregon Department of Fish and Wildlife, and Oregon Parks and Recreation Department. Portland, Oregon.

USDI and USDA. 2001. Biological Assessment, Integrated Predator Damage Management Program for the Threatened Pacific Coast Population of the Western Snowy Plover in Oregon, 2002 to 2007. Prepared by USDI, Bureau of Land Management and Fish and Wildlife Service, USDA, APHIS, Wildlife Services Program and the Siuslaw National Forest, and in cooperation with the Oregon Department of Fish and Wildlife, and Oregon Parks and Recreation Department. Portland, Oregon.

USDI. 1993. Endangered and threatened wildlife and plants; determination of threatened status for the Pacific coast population of the western snowy plover; final rule. Federal Register 58(42): pp 12864-12874.

USDI. 1999. Endangered and threatened wildlife and plants; Designation of Critical Habitat for the Pacific Coast Population of the Western Snowy Plover; Final Rule. 50 CFR Part 17, Federal Register, December 7, 1999. Pages 68507-68544.

USFWS. 2001. Western Snowy Plover (*Charadrius alexandrinus nivosus*) Pacific Coast Population Draft Recovery Plan. Region 1. USFWS. 228 pp. plus appendices.

Voigt, D.R. and B.D. Earle. 1983. Avoidance of coyotes by red fox families. J. Wildl. Manage. 47:852-857.

Widrig, R.S. 1980. Snowy Plover at Leadbetter Point: An opportunity for wildlife management? Prepared for the U.S. Fish and Wildlife Service, Willapa NWR, Ilwaco, WA. 14 pp

Wilson-Jacobs, R and E.C. Meslow. 1984. Distribution, abundance, and nesting characteristics of snowy plovers on the Oregon coast. Northwest Science 58:40-48.

Appendix A. Basic information regarding known and potential snowy plover predators as adapted from the BA Table 2.

Predator species	Status	Primary snowy plover life stage depredated	Chronologic season to target	Likely control methods [1]	Likely control situation[2]	Reference Literature
American crow (*Corvus brachyrhychos*)	Resident	egg	pre-nesting, nesting	aversion, hazing, lethal control, carcass removal	Early aversion training of local populations and control of problem individuals	Castelein et al 2000b
Common raven (*Corvus corax*)	Resident	egg	pre-nesting, nesting, pre-fledging	aversion, hazing, lethal control, carcass removal	Early aversion training of local populations and control of problem individuals	Wilson-Jacobs and Meslow 1984
gull sp.	Resident & wintering	egg, chick	pre-nesting, nesting, pre-fledging	aversion, hazing, lethal control, carcass removal/control	Near gull colony or roost and problem individuals	Widrig 1980
red fox (*Vulpes vulpes regalis*)	Resident	egg, chick, adults	pre-nesting, nesting, pre-fledging	lethal control	early season control of local adult populations and problem individuals and winter control of juveniles and immigrants	Castelein 2000b
gray fox (*Urocyon cinereoargenteus*)	Resident	egg, chick	pre-nesting, nesting, pre-fledging	lethal control		
raccoon (*Procyon lotor*)	Resident	egg, chick	pre-nesting, nesting, pre-fledging	lethal control	early season control of local population and problem individuals	Stern et al. 1991; Castelein et al. 2000b
striped skunk (*Mephitis mephitis*)	Resident	egg	pre-nesting, nesting, pre-fledging	lethal control	early season control of local population and problem individuals	Castelein 2000b

black rat (*Rattus rattus*)	Resident	egg	pre-nesting, nesting	lethal control	early season control of local population and problem individuals	
spotted skunk (*Spilogale gracilis*)	Resident	egg	pre-nesting, nesting, pre-fledging	lethal control	early season control of local population and problem individuals	USFWS 2001
coyote (*Canis latrans*)	Resident	egg, chick	pre-nesting, nesting, pre-fledging	lethal control	early season control of local population and problem individuals	USFWS 2001
opossum (*Didelphis marsupialis*)	Resident	egg	pre-nesting, nesting	lethal control	early season control of local population and problem individuals	USFWS 2001;
feral cats (*Felis domesticus*)	Resident	egg, chick, adults	pre-nesting, nesting, pre-fledging, non-breeding	lethal control	early season control of local population and problem individuals	USFWS 2001; Stern et al. 1991
mink (*Mustela vison*)	Resident	egg, chick, adults	pre-nesting, nesting, pre-fledging	lethal control	early season control of local population and problem individuals	
long-tailed weasel (*Mustela frenata*)	Resident	egg, chick	pre-nesting, nesting, pre-fledging	lethal control	early season control of local population and problem individuals	USFWS 2001
ermine (short-tailed weasel) (*Mustela erminia*)	Resident	egg, chick	pre-nesting, nesting, pre-fledging	lethal control	early season control of local population and problem individuals	
Norway rat (*Rattus norvegicus*)	Resident	egg	pre-nesting, nesting	lethal control	early season control of local population and problem individuals	USFWS 2001

merlin (*Falco columbarius*)	wintering	adults	pre-nesting, nesting, wintering areas	relocation, hazing, aversion	problem individual	USFWS 2001; Castelein et al. 2000b
peregrine falcon (*Falco peregrinus*)	Resident & wintering	adults, chicks	pre-nesting, nesting, pre-fledging, wintering areas	relocation, hazing, aversion	problem individual	USFWS 2001
American kestrel (*Falco sparverius*)	Resident & wintering	chicks	nesting, pre-fledging,	relocation, hazing, aversion	problem individual	USFWS 2001
northern harrier (*Circus cyaneus*)	Resident & wintering	chicks	nesting, pre-fledging	relocation, hazing, aversion	problem individual	USFWS 2001

[1] The likely control methods noted for specific predators are the "primary" ones anticipated and does not limit the use of alternative methods if necessary. Passive aversion/control methods such as nest exclosures and litter control will also be used for all nesting areas.

[2] As with likely control methods, the likely control situation only denotes when control is most likely but is not necessarily the only situations where control efforts may be needed.