97-ID-2

USDA

United States
Department of
Agriculture

Marketing and
Regulatory
Programs

Animal and
Plant Health
Inspection
Service

Wildlife
Services

Idaho State Office

9134 W Blackeagle Dr
Boise, ID 83709

(208) 378-5077
(208) 378-5349 Fax

# FINDING OF NO SIGNIFICANT IMPACT
# and
# DECISION
# for
# PREDATOR DAMAGE MANAGEMENT in NORTHERN AND CENTRAL IDAHO

## Introduction and Summary

In 1996, the Idaho Wildlife Services (WS) program completed an Environmental Assessment (EA) (USDA 1996) which addressed the need to conduct Predator Damage Management (PDM) and the potential impacts of various alternatives for responding to predator damage in northern and central Idaho. The analysis area encompasses approximately 23 million acres in northern and central Idaho, including all lands in Adams, Benewah, Bonner, Boundary, Clearwater, Custer, Idaho, Kootenai, Latah, Lemhi, Lewis, Nez Perce, Shoshone and Valley Counties.

After public review, a Finding of No Significant Impact (FONSI) was issued and Decision signed November 4, 1996. In 1997, a monitoring report was prepared which reviewed and compared Fiscal Year (FY) 1996 PDM activities and analysis in the 1996 northern and central Idaho PDM EA and the 1996 southern Idaho PDM EA. An amended FONSI addressing both 1996 EAs was issued on October 2, 1997. In 1999, a Monitoring Report and Supplemental EA (USDA 1999) was prepared which reviewed FY 1998 PDM activities in northern and central Idaho and in southern Idaho and analyzed additional PDM needs. The document determined that the FONSIs and Decisions made in conjunction with both 1996 EAs were still appropriate, and supplemented the original EAs' analyses to address: 1) use of the Livestock Protection Collar (LPC) at the U. S. Sheep Experiment Station at Dubois, Idaho, and 2) PDM to protect sage grouse and sharp-tailed grouse. The document determined that WS' PDM was not causing any adverse impacts to the quality of the human environment. The supplemental analysis enabled WS to use the LPC on the U. S. Sheep Experiment Station and to conduct PDM to protect sage grouse and/or sharp-tailed grouse, most of which would occur in the southern Idaho EA analysis area. A subsequent FONSI was prepared and Decision was signed on August 6, 1999. A notice to the public was published in 7 major newspapers, Statewide on August 13, 1999 informing the public of the availability and public review period for the FONSI and Decision.

Annual monitoring reports for FYs 1999, 2000, 2001, 2002 and 2003 were prepared to review program activities and to determine if the EA was consistent with applicable environmental regulations. Based on those annual reviews, there continue to be no indications that WS' activities are having a significant impact, individually or cumulatively, on the quality of the human environment in the northern and central Idaho analysis area. Therefore, revision of the EA is not deemed necessary. However, a new FONSI and Decision have been prepared in conjunction with this review process.

Copies of the above-mentioned documents are available from the Idaho WS State Office, USDA, APHIS, Wildlife Services, 9134 W. Blackeagle Drive, Boise, ID 83709-1572.

## Background

The WS program responds to a variety of requests for assistance from individuals, organizations and agencies experiencing damage and other related problems caused by wildlife. WS is the Federal program authorized by Congress and directed by law to reduce damage caused by wildlife (Animal Damage Control Act of March 2, 1931, as amended [46 Stat. 1468; 7 U.S.C. 426-426c], and the Rural Development, Agriculture, and Related Agencies Appropriations Act of 1988, as amended [Public Law 100-202, Stat. 1329-1331]). Wildlife damage management is the alleviation of damage or other problems caused by or related to the presence of wildlife, and is recognized as an integral part of wildlife management (The Wildlife Society 1992).

## Purpose

The purpose of this FONSI and Decision is to provide current information regarding WS' PDM activities in northern and central Idaho and to provide an opportunity for public review.

## Scope of Livestock Losses

According to Statewide data compiled during 1998 to 2002 by the Idaho Agricultural Statistics Service (IASS), predation was the single largest cause of death loss for Idaho sheep producers with 30.6% (5-year annual average) of the total death losses attributed to predators (IASS 1999, 2000, 2001, 2002, 2003). An average of 2,620 adult sheep and 9,940 lambs, valued at an average of $1.2 million were reported lost annually to predators from 1998 to 2002 (IASS 1999, 2000, 2001, 2002, 2003). Coyotes were responsible for 77% of that loss, injuring or killing an average of 9,280 head of sheep and lambs annually, valued at $930,370. Predation by domestic and feral dogs, black bears, mountain lions, red foxes, gray wolves, eagles, bobcats (IASS 2003) and common ravens (MIS 2003) accounted for most of the other predator losses. Based on reported sheep inventories and lamb crop, these losses represented a 3.98% annual predation loss for lambs (range of 3.2% to 4.4% during the 5-year reporting period) and a 1.04% loss for adult sheep (range of 0.6% to 1.5%) from 1998 to 2002 (IASS 1999, 2000, 2001, 2002, 2003). These percentages of lamb and adult sheep loss fall within the objectives set in the 1996 EA and were sustained with an integrated PDM program in place. Research results suggest that predation losses in the absence of a PDM program would average about 17% for lambs and 4.5% for adult sheep (USDA 1994).

In response to requests for assistance from livestock producers and the public in the EA analysis area from FY 1999 to 2003, WS personnel documented an average of 103 adult sheep, 229 lambs, 4 adult cattle, 79 calves, 24 goats/kids, 163 fowl (domestic chickens, ducks, geese, turkeys, etc.), 4 horses and 3 bee hives lost, injured or damaged annually by predators (MIS 1999, 2000, 2001, 2002, 2003) with an average estimated total value of $76,284. These losses represent only a fraction of the actual losses that likely occurred, and serve more as an indicator of what kinds of predator damage occurred rather than an indication of damage magnitude.

## Major Issues

Cooperating agencies and the public helped identify a variety of issues deemed relevant to the scope of the 1996 EA. These issues were consolidated into the following 4 primary issues to be considered in detail:

1. Cumulative impacts on viability of wildlife populations.
2. Effectiveness and selectivity of control methods.
3. Risks posed by control methods to the public and domestic pets.
4. Concern about WS impacts on Threatened and Endangered (T/E) species.

*Cumulative Impacts on Viability of Wildlife Populations*

Cumulative effects are the additive impacts on a species population from all causes, including mortality caused by Idaho WS PDM activities. Generally, WS only conducts PDM on species: 1) whose populations are relatively high, 2) only after they have caused damage or where a history of chronic predation is documented, and 3) after a request is received from the resource owner/manager to conduct PDM. WS' take of predator species during FY 1999-2003 did not exceed the annual levels analyzed in the 1996 EA and WS activities are having a low magnitude of impact on those species targeted by WS. Coyote predation continues to be the biggest predator problem in the northern and central Idaho EA analysis area, and more coyotes are taken than any other species. Based on the coyote population estimates used in the 1996 EA and the number of coyotes taken in FY 1999 through 2003, WS removed less than 3.4% of the population, in any given year, in the analysis area. Pitt et al. (2001) used an "individual-based" computer model to mimic natural coyote populations and assess impacts to populations in relation to varying degrees of proportion removed. The model did not observe a population decrease until more than 60% of the population was removed annually (Pitt et al. 2001). Even if WS' total coyote take increased by 3-4 fold, the cumulative take would still fall well within an allowable annual harvest level of 60-70% (Connolly and Longhurst 1975).

*Effectiveness and Selectivity of Control Methods*

Non-target animals killed during FY 1999 to 2003 ranged from 4 to 7 annually, with an average of about 5 non-target animals killed per year. This average represents about 0.7% of the average annual take of 770 animals. This percentage of non-target animals killed falls within the objectives set in the EA and in USDA (1994).

*Risks Posed by Control Methods to the Public and Domestic Pets*

During FY 1999 to 2003, the number of animals killed during PDM by WS in the northern and central Idaho analysis area ranged from 720 to 854 annually, with an average of 770 animals per year. There were no known incidents of domestic pets being harmed or killed, and there were no reports received during that time period of injuries to the public resulting from WS' use of PDM methods. When comparing this information with the total usage of PDM methods, overall risk posed to the pubic and domestic pets is considered extremely low.

*WS' Potential Impact on Threatened and Endangered Species*

A common concern among members of the public and wildlife professionals, including WS personnel, is the potential effect of PDM on non-target species, particularly Federally designated T/E species. To help ensure minimum adverse effects to T/E species, WS consulted with the U. S. Fish and Wildlife Service (USFWS) (USDI 1992, USDA 1996). When preparing the 1999 Supplemental EA, a review of the 1996 Section 7 consultation determined that it was still applicable.

Canada Lynx. At the time the 1996 Section 7 consultation was initiated by WS, the Canada lynx was not a listed species. However, because of the likelihood that the lynx would soon be listed as Threatened, Idaho WS initiated informal consultation on February 9, 2000. WS' assessment concluded that PDM methods were "unlikely to adversely affect" the lynx in Idaho. The USFWS responded with a March 24, 2000 letter and concurred that WS actions were "unlikely to jeopardize the continued existence" of the lynx and recommended that Idaho WS prepare a biological assessment to analyze WS PDM actions on lynx in Idaho because on that same day (March 24), the USFWS announced that lynx would be listed as Threatened effective April 24, 2000. On May 12, 2000, the National WS program initiated formal consultation on the lynx. That consultation is still pending, however, WS' Western Regional Office

issued "interim policy guidelines for Canada lynx" on May 15, 2000. These interim policy guidelines include measures to help ensure that WS PDM activities do not result in any take of lynx. Idaho WS will continue to operate under these guidelines until a biological opinion or other guidance is issued by the USFWS.

Northern Idaho Ground Squirrel. The northern Idaho ground squirrel was listed as Threatened on April 5, 2000. This species is endemic to west-central Idaho and is only known to exist in Adams and western Valley County (USFWS 2003). Analysis of potential impacts of PDM activities to the northern Idaho ground squirrel in Adams County were adequately conducted in the 2002 Southern Idaho PDM EA (USDA 2002), and therefore will not be duplicated in this review. The informal Section 7 consultation with the USFWS resulted in a letter of concurrence stating that WS' PDM activities are not likely to adversely affect the northern Idaho ground squirrel. The USFWS also concurred that there may be a potential beneficial effect on the northern Idaho ground squirrel from implementation of PDM. However, if WS is requested to conduct PDM activities to protect the northern Idaho ground squirrel in western portions of Valley County, the need for further National Environmental Policy Act analysis will be determined and any required documentation and process completed before those activities are conducted.

Gray Wolf. The USFWS released a final Environmental Impact Statement (EIS) in May 1994 (USDI 1994), which led to a nonessential experimental population Final Rule (50 CFR Part 17.84) for reintroduction of gray wolves in central Idaho. The final rule establishing the nonessential experimental population was published in the Federal Register (59 FR 60252-60281) on November 22, 1994. This rule established regulations allowing management of wolves by government agencies and the public to minimize conflicts with livestock and to address impacts on ungulate populations. The USFWS authorized WS to investigate reported wolf predation to livestock and to implement corrective measures, including nonlethal and lethal actions, to reduce further predation. All wolves located south of Interstate 90 in the analysis area are considered part of the nonessential experimental population, whereas wolves located north of Interstate 90 (Boundary, Bonner and northern half of Kootenai and Shoshone Counties) are afforded full protection under the Endangered Species Act. On April 1, 2003, wolves located north of Interstate 90 were down-listed to Threatened (68 FR 15803-15875).

During FY 1999 through 2003, WS investigated 173 incidents of reported wolf predation to livestock in the northern and central Idaho EA analysis area (Table 1). Of those investigations, 97 (56%) were determined to be confirmed or probable wolf predation. A total of 350 domestic animals (73 cattle, 269 sheep, 1 colt and 7 dogs) were determined to be confirmed/probable wolf kills or injuries (Table 1). All wolf predation investigations, except for one, were conducted south of I-90 in the nonessential experimental population area. The single investigation north of I-90 did not result in confirmed predation and no control action was implemented.

Table 1. Number of wolf predation investigations, investigations that resulted in confirmed or probable wolf predation, livestock and dogs killed or injured and reports from the public concerning their safety by FY.

| Results | FY99 | FY00 | FY01 | FY02 | FY03 | TOTAL |
|---|---|---|---|---|---|---|
| Investigations | 48 | 40 | 23 | 26 | 36 | 173 |
| Confirmed/Probable | 19 | 26 | 17 | 13 | 22 | 97 |
| Cattle Killed/Injured[1] | 14 | 16 | 19 | 15 | 9 | 73 |
| Sheep Killed/Injured[2] | 67 | 32 | 16 | 1 | 153 | 269 |
| Dogs Killed/Injured | 3[3] | 0 | 1[3] | 0 | 3[4] | 7 |
| Colts Killed/Injured | 0 | 0 | 1 | 0 | 0 | 1 |
| Reports of Concerns for Human Safety | 0 | 0 | 1 | 0 | 0 | 1 |

[1] Includes calves and adult cattle.
[2] Includes lambs, ewes and bucks.
[3] Livestock guarding dog(s).
[4] One herding dog, 1 pet and 1 recreational dog (hound).

In response to the reported wolf predation investigations, WS initiated 67 wolf damage management actions (Table 2) to reduce further predation. As a result of those actions, 36 wolves were killed (25 shot from a helicopter, 8 trapped and euthanized, and 3 were called and shot) and 35 wolves were captured, radio-collared (1 wolf was too young to radio-collar) and released. All wolf damage management activities were coordinated and authorized by the USFWS prior to WS implementing damage management actions. The percent of wolves killed by WS each FY when compared to the minimum estimated population ranged from 1.9% to 5.2% and averaged 2.4% over the 5-year period. The USFWS determined that WS wolf damage management did not adversely affect wolf populations or recovery.

Table 2. Number of wolf damage management actions and results by FY.

| Results | FY99 | FY00 | FY01 | FY02 | FY03 | TOTAL |
|---|---|---|---|---|---|---|
| Control Actions | 13 | 18 | 12 | 9 | 15 | 67 |
| Wolves Killed | 3 | 10 | 6 | 10 | 7 | 36 |
| Wolves Captured, Radio-Collared and Released | 10[1] | 11[2] | 6[3] | 3[4] | 5[4] | 35 |

[1] Six were trapped and radio-collared (3 were released on site and 3 were relocated) and 4 were aerially darted and radio-collared (2 were released on site and 2 were relocated).
[2] Four were trapped and radio-collared (2 were released on site and 2 were relocated) and 7 were aerially darted and radio-collared (1 was released on site and 6 were relocated).
[3] Five were trapped (4 were radio-collared and 1 was too young to collar) and released on site and 1 was aerially darted, radio-collared and relocated.
[4] Trapped, radio-collared and released on site.

Grizzly Bear. The only activity related to grizzly bears conducted by WS in the analysis area was a single investigation in FY 2003 of an incident of possible grizzly predation on a sheep in northern Idaho. The sheep belonged to a Naples, Idaho rancher and was found dead on private property. The rancher was concerned because he had received numerous reports of 2 young grizzly bears in the area where the dead sheep was found. WS' investigation and field necropsy suggested that the sheep was not killed by a bear or other predator, but had died from an unknown cause. No control action was ever initiated as a result of that investigation.

**New Information Available Since the Completion of the 1996 EA and the 1999 Supplemental EA**

Aerial Hunting Issues. Several environmental and animal protection organizations have expressed concerns about the effects of WS' low-level flights on non-target wildlife, public land and its users, and the environment (i.e., fires and fuel spills). WS conducts relatively little aerial hunting in the northern and central Idaho analysis area. However, to help explain the effects of low-level flight, additional information is being provided in this FONSI and Decision. Some examples of species or species groups that have been studied with regard to these issues and WS' determination of potential impacts from aerial hunting overflights are as follows:

Colonial Waterbirds. Kushlan (1979) reported that low level (390 feet followed by a second flight at 200 feet) overflights of 2-3 minutes in duration by a fixed-wing airplane and a helicopter produced no "drastic" disturbance of tree-nesting colonial waterbirds, and, in 90% of the observations, the individual birds either showed no reaction or merely looked up. WS aircraft are unlikely to be flown over such species in Idaho because aerial hunting occurs in upland areas primarily away from any riparian areas. If a brief overflight of a nesting colony were to ever occur it would be unlikely to cause any significant disturbance.

Greater Snow Geese. Belanger and Bedard (1989, 1990) observed responses to greater snow geese to man-induced disturbance on a sanctuary area and estimated the energetic cost of such

disturbance. They observed that disturbance rates exceeding 2 per hour reduced goose use of the sanctuary by 50% the following day. They also observed that about 40% of the disturbances caused interruptions in feeding that would require an estimated 32% increase in nighttime feeding to compensate. WS aerial hunting flights rarely, if ever, occur over wetland areas and in no way would involve chronic or repeated flights over such areas. Thus, disturbance of snow geese or any other waterfowl should be minimal to nonexistent.

Mule Deer. Krausman et al. (1986) reported that only 3 of 70 observed responses of mule deer to small fixed-wing aircraft at 150 to 500 feet above the ground resulted in the deer changing habitats. The authors believed that the deer may have been accustomed to overflights because the study area was near an interstate highway which was followed frequently by aircraft. Mule deer are frequently seen from WS aircraft and are sometimes temporarily disturbed as evidenced by their running and avoidance behavior. However, adverse effects from this type of disturbance are minimal. WS aerial hunting personnel frequently observe deer and antelope standing apparently undisturbed beneath or just off to one side of the aircraft.

Raptors. Andersen et al. (1989) conducted low-level helicopter overflights directly at 35 red-tailed hawk nests and concluded their observations supported the hypothesis that red-tailed hawks habituate to low-level flights during the nesting period. Their results also showed similar nesting success between hawks subjected to such overflights and those that were not. White and Thurow (1985) did not evaluate the effects of aircraft overflights, but showed that ferruginous hawks are sensitive to certain types of ground-based human disturbances to the point that reproductive success may be adversely affected. However, military jets that flew low over the study area during training exercises did not appear to bother the hawks, and neither were they alarmed when the researchers flew within 100 feet in a small fixed-wing aircraft (White and Thurow 1985). White and Sherrod (1973) suggested that disturbance of raptors by aerial surveys with helicopters may be less than that caused by approaching nests on foot. Ellis (1981) reported that 5 species of hawks, 2 falcons, and golden eagles were "incredibly tolerant" of overflights by military fighter jets, and observed that, although birds frequently exhibited alarm, negative responses were brief and never limiting to productivity. These studies indicate that overflights by WS aircraft would have no significant adverse effects on nesting raptors.

The following information was obtained from Mr. Norm Wiemeyer, Chief, Denver Field Office of the National Transportation Safety Board (NTSB, the agency that investigates aviation accidents) regarding potential aviation-related environmental concerns:

Major Ground or Forest Fires: Mr. Wiemeyer stated he had no recollection of any major fires caused by government aircraft since he has been in his position beginning in 1987. In addition, there are no reports of fires caused by WS aircraft in Idaho or any other state. The period of greatest fire danger typically occurs during the summer months, but WS ordinarily conducts few, if any, aerial hunting operations during the summer months.

Fuel Spills and Environmental Hazard from Aviation Accidents: The NTSB stated that aviation fuel is extremely volatile and will evaporate within a few hours or less to the point that even its odor cannot be detected (N. Wiemeyer, NTSB, pers. comm. 2000). Jet A fuel also does not pose a large environmental problem if spilled. This is because a straight chained hydrocarbon with little benzene present and microbes would quickly break-down any spill by aerobic action (J. Kuhn, Montana Department of Environmental Quality, pers. comm. 2001). The quantities potentially involved in aircraft used by WS are relatively small (52 gallon maximum in a fixed-wing aircraft and 91 gallon maximum in the helicopters used by WS) and less than many vehicles traveling Idaho highways. In addition, during much of each flight the amount of fuel on

board would be considerably less than these maximum amounts and in some cases, not all of the fuel would be spilled.

Oil and Other Fluid Spills: For privately-owned aircraft, the aircraft owner or his/her insurance company is responsible for cleanup of spilled oils and other fluids if required by the owner or manager of the property on which the accident occurred. In the case of U. S. Bureau of Land Management (BLM), U. S. Forest Service (USFS) and National Park Service lands, the land managing agency generally requires soil to be decontaminated or removed and properly disposed. With the size of aircraft used by WS, the quantities of oil (6-8 quarts maximum for reciprocating engines) capable of being spilled in any accident are small and insignificant with respect to the potential for environmental damage. Aircraft used by WS are single engine models, so the greatest potential amount of oil that could be spilled in one accident would be about 8 quarts.

Petroleum products biodegrade through volatilization and bacterial action, particularly when exposed to oxygen (EPA 2000). Thus, small quantity oil spills on surface soils can be expected to biodegrade readily. Even in subsurface contamination situations involving underground storage facilities which would generally be expected to involve larger quantities than would ever be involved in a small aircraft accident, U. S. Environmental Protection Agency guidelines provide for "natural attenuation" or volatilization and biodegradation in some situations to mitigate environmental hazards (EPA 2000). Thus, even where oil spills in small aircraft accidents are not cleaned up, the oil does not persist in the environment or persists in such small quantities that there is no problem. Also, WS' accidents generally would occur in remote areas away from human habitation and drinking water supplies. Thus, the risk to drinking water appears to be exceedingly low or nonexistent.

For these reasons, the risk of ground fires or fuel/oil pollution from aviation accidents is considered low. In addition, based on the history and experience of the program in aircraft accidents, it appears the risk of significant environmental damage from such accidents is exceedingly low.

WS' aircraft accidents have never harmed anyone other than the individuals actually occupying the aircraft. The impacts to those employees that were injured or killed in aircraft accidents are certainly significant. But there has been no impact to overall public health and safety in regards to any injuries or harm to any other persons, or to any recreational activities, let alone a *significant* impact.

**Compliance and Monitoring**

WS' PDM activities have been conducted in a manner consistent with all applicable environmental regulations, including the Endangered Species Act and the National Environmental Policy Act. APHIS, WS representatives will continue to meet at least annually with cooperating local officials from the BLM, USFS, USFWS, The Nez Perce Tribe, Idaho Department of Fish and Game and Idaho State Animal Damage Control Board, if applicable, regarding conduct of PDM activities. Substantial changes in the scope of work or changes in relevant guidance documents or environmental regulations may trigger the need for further analysis.

## Finding of No Significant Impact

The analysis in the 1996 EA and 1999 Supplemental EA, along with subsequent annual monitoring information, indicates that there will not be a significant impact, individually or cumulatively, on the quality of the human environment as a result of this proposed action. I agree with this conclusion and therefore find that a new EA or EIS need not be prepared. This determination is based on the following factors:

1. Predator damage management, as conducted by WS in the northern and central Idaho analysis area, is not regional or national in scope.

2. The proposed action would pose minimal risk to public health and safety. No injuries to any member of the public are known to have resulted from WS activities in the analysis area.

3. There are no unique characteristics such as park lands, prime farm lands, wetlands, wild and scenic areas, or ecologically critical areas that would be significantly affected.

4. The effects on the quality of the human environment are not highly controversial. Although there is some opposition to predator control, the expected environmental effects associated with implementing this proposed action are not controversial among experts, or controversial in terms of size, nature or effect.

5. Based on the analysis documented in the EA, the Supplemental EA, annual monitoring reports and the accompanying administrative files, the effects of the proposed predator damage management program on the quality of the human environment would not be significant. The effects of the proposed activities are not highly uncertain and do not involve unique or unknown risks.

6. The proposed action would not establish a precedent for any foreseeable future action with significant effects.

7. No significant cumulative effects were identified through this assessment. The number of animals taken by WS, when added to the total known other take of all species, falls well within allowable harvest levels.

8. The proposed activities would not affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places, nor would they likely cause any loss or destruction of significant scientific, cultural, or historical resources.

9. An informal Section 7 consultation with the USFWS confirmed that the proposed action would not likely adversely affect any T/E species.

10. The proposed action would be in compliance with all Federal, State, and local laws imposed for the protection of the environment.

## Decision

I have carefully reviewed the EA and the input provided during the public involvement process. I believe implementation of Alternative 2, the Proposed Action, will continue to provide the best overall compromise in addressing the issues identified in the EA while also providing for a PDM program which will best meet the needs of cooperating agencies, organizations and individuals who may request WS' assistance. Implementation of Alternative 2 will involve the use of no additional control methods beyond what are being used in the current program.

For additional information regarding this decision, please contact George Graves, USDA, APHIS Wildlife Services, 9134 W. Blackeagle Drive, Boise, ID 83709, telephone (208) 378-5077.

Mark D. Collinge

Mark D. Collinge, State Director
Idaho WS Program

10/6/04
Date

## Literature Cited


Anderson, D. E., O. J. Rongstad, and W. R. Mytton. 1989. Response of nesting red-tailed hawks to helicopter overflights. Condor 91:296-299.

Belanger, L., and J. Bedard. 1989. Response of staging greater snow geese to human disturbance. Journal of Wildlife Management 53:713-719.

Belanger, L., and J. Bedard. 1990. Energetic costs of man-induced disturbance to staging snow geese. Journal of Wildlife Management 54:36-41.

Connolly, G. E., and W. M. Longhurst. 1975. The effects of control on coyote populations. Division of Agricultural Sciences, Bulletin 1872. University of California, Davis, USA.

Ellis, D. H. 1981. Responses of raptorial birds to low-level jet aircraft and sonic booms. Results of the 1980-81 joint U.S. Air Force-U.S. Fish and Wildlife Service Study. Institute for Raptor Studies, Oracle, Arizona, USA.

EPA. 2000. How to evaluate alternative cleanup technologies for underground storage tank sites: A guide for corrective action plan reviewers. Publication obtained from http://www.epa.gov/cgi-bin/claritgw.

IASS. 1999. 1999 Idaho agricultural statistics. Idaho Agricultural Statistics Service. 2224 Old Penitentiary Road, Boise, Idaho, USA.

IASS. 2001. 2001 Idaho agricultural statistics. Idaho Agricultural Statistics Service. 2224 Old Penitentiary Road, Boise, Idaho, USA.

IASS. 2002. 2002 Idaho agricultural statistics. Idaho Agricultural Statistics Service. 2224 Old Penitentiary Road, Boise, Idaho, USA.

IASS. 2003. 2003 Idaho agricultural statistics. Idaho Agricultural Statistics Service. 2224 Old Penitentiary Road, Boise, Idaho, USA.

Krausman, P. R., B. D. Leopold, and D. L. Scarbrough. 1986. Desert mule deer response to aircraft. Wildlife Society Bulletin 14:68-70.

Kushlan, J. A. 1979. Effects of helicopter censuses on wading bird colonies. Journal of Wildlife Management 43:756-760.

MIS. 1999. Idaho WS program statewide overview reports for FY1999. United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, Idaho WS State Office, 9134 W. Blackeagle Drive, Boise, Idaho, USA.

MIS. 2000. Idaho WS program statewide overview reports for FY2000. United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, Idaho WS State Office, 9134 W. Blackeagle Drive, Boise, Idaho, USA.

MIS. 2001. Idaho WS program statewide overview reports for FY2001. United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, Idaho WS State Office, 9134 W. Blackeagle Drive, Boise, Idaho, USA.

MIS. 2002. Idaho WS program statewide overview reports for FY2002. United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, Idaho WS State Office, 9134 W. Blackeagle Drive, Boise, Idaho, USA.

MIS. 2003. Idaho WS program statewide overview reports for FY2003. United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, Idaho WS State Office, 9134 W. Blackeagle Drive, Boise, Idaho, USA.

Pitt, W. C., F. F. Knowlton, and P. W. Box. 2001. A new approach to understanding canid populations using an individual-based computer model: preliminary results. Endangered Species Update 18:4.

The Wildlife Society. 1992. Conservation policies of The Wildlife Society: A stand on issues important to wildlife conservation. The Wildlife Society, Bethesda, Maryland, USA.

USDA. 1994. Animal damage control program, final environmental impact statement. USDA-APHIS-ADC Operational Support Staff, 6505 Belcrest Road, Room 820, Federal Building, Hyattsville, Maryland, USA.

USDA. 1996. Environmental assessment. Predator damage management in northern and central Idaho. United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, Boise, Idaho, USA.

USDA. 1999. Supplemental environmental assessment and monitoring report for predator damage management conducted by wildlife services in Idaho and finding of no significant impact/decision. United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, Boise, Idaho, USA.

USDA. 2002. Environmental assessment. Predator damage management in southern Idaho. United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, Boise, Idaho, USA.

USFWS. 2003 Recovery plan for the northern Idaho ground squirrel (*Spermophilus brunneus brunneus*). United States Fish and Wildlife Service, Region 1, Portland, Oregon, USA.

USDI. 1992. Biological opinion [July 28, 1992]. United States Department of the Interior, United States Fish and Wildlife Service, Washington, D.C., USA.

USDI. 1994. Final environmental impact statement. The reintroduction of gray wolves to Yellowstone national park and central Idaho. United States Department of the Interior, United States Fish and Wildlife Service, Washington, D.C., USA.

White, C. M., and S. K. Sherrod. 1973. Advantages and disadvantages of the use of rotor-winged aircraft in raptor surveys. Raptor Research 7:97-104.

White, C. M., and T. L. Thurow. 1985. Reproduction of ferruginous hawks exposed to controlled disturbance. Condor 87:14-22.