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PLANT HEALTH
INSPECTION
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in
cooperation
with

NEVADA
DEPARTMENT OF
AGRICULTURE

DIVISION OF
RESOURCE
PROTECTION

Nevada Animal Damage Control Program

**FINAL
ENVIRONMENTAL ASSESSMENT:**

**STARLING, BLACKBIRD,
FERAL PIGEON, MAGPIE AND
CROW**

DAMAGE MANAGEMENT

IN NEVADA



JUNE 2006

Final
ENVIRONMENTAL ASSESSMENT

STARLING, BLACKBIRD, FERAL PIGEON,
MAGPIE AND CROW
DAMAGE MANAGEMENT IN NEVADA

Prepared by:

United States Department of Agriculture,
Animal and Plant Health Inspection Service,
Wildlife Services

In Cooperation With:

Nevada Department of Agriculture
Division of Plant Industry
Nevada Department of Wildlife

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ACRONYMS USED

| | |
|-------|---|
| ADC | Animal Damage Control |
| APHIS | Animal and Plant Health Inspection Service |
| AVMA | American Veterinary Medical Association |
| BBS | Breeding Bird Survey |
| BDM | Bird (starlings, blackbirds, pigeons, magpies, and crows) Damage Management |
| BLM | Bureau of Land Management |
| CAFO | Confined Animal Feeding Operations |
| CDC | Centers for Disease Control and Prevention |
| CDFG | California Department of Fish and Game |
| CEQ | Council on Environmental Quality |
| CFR | Codes of Federal Regulations |
| DRP | Division of Resource Protection |
| EA | Environmental Assessment |
| EIS | Environmental Impact Statement |
| EPA | Environmental Protection Agency |
| FDA | Food and Drug Administration |
| FEIS | Final Environmental Impact Statement |
| FIFRA | Federal Insecticide, Fungicide, and Rodenticide Act |

| | |
|--------|---|
| FY | Fiscal Year (Oct. 1-Sept. 30) |
| IWDM | Integrated Wildlife Damage Management |
| MIS | Management Information System |
| MOU | Memorandum of Understanding |
| NAC | Nevada Administrative Codes |
| NADCP | Nevada Animal Damage Control Program |
| NASS | National Agriculture Statistics Service |
| NDOA | Nevada Department of Agriculture |
| NDOW | Nevada Department of Wildlife |
| NEPA | National Environmental Policy Act |
| NRS | Nevada Revised Statutes |
| OSHA | Occupational Safety & Health Administration |
| SOP | Standard Operating Procedure |
| T&E | Threatened and Endangered |
| TB | Tuberculosis |
| TGE | Transmissible Gastroenteritis Virus |
| U.S.C. | U.S. Codes |
| USDA | U.S. Department of Agriculture |
| USFS | U.S. Forest Service |
| USFWS | U.S. Fish and Wildlife Service |
| WS | Wildlife Services |

CHAPTER 1: PURPOSE AND NEED FOR ACTION

1.1 Introduction

The United States Department of Agriculture (USDA) is authorized to protect American agriculture and other resources from damage associated with wildlife. This function is carried out by the USDA, Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program. Wildlife Services' activities are conducted in cooperation with other Federal, state, and local agencies, as well as private organizations and individuals. Wildlife Services cooperates with and supervises the Nevada Department of Agriculture's Division of Resource Protection. The two entities, WS and DRP, form the Nevada Animal Damage Control Program (NADCP) which is the proponent in this Environmental Assessment.

Nevada Animal Damage Control Program is proposing to manage damage from European starling (*Sturnus vulgaris*), blackbird (Subfamily *Icterinae*), feral domestic pigeon (*Columbia livia*), black-billed magpie (*Pica pica*), and American crow (*Corvus brachyrhynchos*) to protect livestock feed, livestock health, crops, property, threatened and endangered (T&E) species and other natural resources, and human health and safety in Nevada. Management of damage by these species is hereinafter referred to as Bird (starling, blackbird, pigeon, magpie and crow) Damage Management (BDM). Blackbirds refers to the blackbird group as described in the FEIS prepared by the WS program (USDA 1997, revised). The blackbird group includes red-winged (*Agelaius phoeniceus*), tricolored (*A. tricolor*), rusty (*Euphagus carolinus*), Brewer's (*E. cyanocephalus*), and yellow-headed blackbirds (*Xanthocephalus xanthocephalus*), brown-headed (*Molothrus ater*) and bronzed cowbirds (*M. aeneus*), and great-tailed (*Cassidix mexicanus*) and common grackles (*Quiscalus quiscula*).

Starlings, feral pigeons, magpies and crows are fairly abundant year-round in Nevada. The red-winged, Brewer's, and yellow-headed blackbirds and brown-headed cowbirds are fairly common to abundant seasonally throughout Nevada. Brewer's blackbirds are common year-round. Red-winged and yellow-headed blackbirds, and brown-headed cowbirds are most common in summer in Nevada. Red-winged blackbirds and some brown-headed cowbirds winter in Nevada, mostly in southern areas of the State. The great-tailed grackle is primarily found in extreme southern Nevada where it is a fairly common year-round resident. The tricolored blackbird is uncommon and found only in northwestern Nevada. The rusty blackbird, common grackle, and bronzed cowbird are rare or have only been seen accidentally in Nevada because their normal summer and winter ranges are well outside the State. Although a potential exists for one to be taken during BDM projects, the chances are extremely low. These three species will not be considered throughout the remainder of the document because they are all very common throughout their normal range and the potential impacts to these species by NADCP would be considered negligible or non-existent.

Starlings and pigeons are unprotected in Nevada because they were introduced species and have a propensity to cause damage. Blackbirds, magpies and crows are managed by the U.S. Fish and Wildlife Service (USFWS) as migratory birds. Under a Memorandum of Understanding (MOU) with USFWS, WS has the responsibility of responding to migratory bird depredation complaints and provides USFWS with reports on activities involving migratory birds. Under an MOU with the Nevada Department of Wildlife (NDOW), NADCP has primary responsibility to respond to complaints involving pigeons, starlings, and migratory birds managed by the USFWS, including blackbirds, magpies and crows.

The analysis in this EA includes substantial effort to consider existing data contained in other National Environmental Policy Act (NEPA) and related documents (see section 1.2). This EA is tiered to Wildlife Service's national programmatic final Environmental Impact Statement (ADC FEIS) (USDA 1997, revised) .

Wildlife Services' mission, developed through a strategic planning process, is to “provide leadership in wildlife damage management for the protection of America's agricultural, industrial and natural resources, and to safeguard public health and safety” (APHIS 1989). This is accomplished through:

- A) training of wildlife damage management professionals;
- B) development and improvement of strategies to reduce economic losses and threats to humans from wildlife;
- C) collection, evaluation, and dissemination of management information;
- D) cooperative wildlife damage management programs;
- E) informing and educating the public on how to reduce wildlife damage; and
- F) providing technical advice and a source for limited-use management materials and equipment such as pesticides, cage traps, and pyrotechnics.

Wildlife Services' Policy Manual reflects the mission and provides guidance for engaging in wildlife damage control activities. NADCP personnel abide by the WS mission and policies. Before wildlife damage management is conducted, an Agreement for Control must be signed by NADCP and the land owner or manager, or a WS Annual Work Plan must be presented to the land management administrator or agency representative for their review to work on public lands. NADCP cooperates with land and wildlife management agencies, when appropriate and as requested, to combine efforts to effectively and efficiently resolve wildlife damage problems in compliance with all applicable federal, state, and local laws and MOUs between NADCP and other agencies. At the State level, NADCP has a current MOU with NDOW that specifies the role and function of each agency. The MOU with NDOW specifically addresses which agency is responsible for the different wildlife species causing damage in Nevada. National level MOUs were signed between WS and the Bureau of Land Management (BLM) in 1995, and between WS and U.S. Forest Service (USFS) in 1998. These MOUs transferred the responsibilities for wildlife damage management and related compliance with NEPA from BLM and USFS to WS for predatory animals. This EA will encompass the responsibility for NEPA and all proposed BDM activities in Nevada under a

Statewide EA. NADCP believes that a comprehensive document would best address all issues and potential cumulative impacts throughout Nevada since birds are highly mobile and BDM activities effect populations statewide. A comprehensive EA would also provide a more usable working tool for coordination with all cooperating agencies and promote a more consistent approach to BDM across the State.

Purpose. This EA analyzes BDM for the protection of livestock feed and health, crops, property, natural resources, and human health and safety in Nevada. Normally, according to APHIS procedures for implementing NEPA, individual wildlife damage management actions maybe categorically excluded (7 Code of Federal Regulations [CFR] 372.5(c), 60 Fed. Reg. 6,000-6,003, 1995). This EA has been prepared to facilitate planning, interagency coordination, and the streamlining of program management, and to clearly communicate with the public the analysis of cumulative impacts. The WS program has determined that preparation of an EA for the program on all land classes in Nevada complies with NEPA, and with the Council on Environmental Quality (CEQ) regulations (40 CFR 1500), and APHIS NEPA implementing regulations (7 CFR 372) to help in determining whether an environmental impact statement (EIS) is required.

Nevada encompasses 110,540 square miles and is comprised of 17 counties: Carson City, Churchill, Clark, Douglas, Elko, Esmeralda, Eureka, Humboldt, Lander, Lincoln, Lyon, Mineral, Nye, Pershing, Storey, Washoe, and White Pine. NADCP personnel receive requests to conduct BDM throughout the various counties on private, federal, state, Tribal, county, and municipal lands. The majority of BDM conducted by NADCP, though, occurs on private lands owned by private individuals and organizations.

1.2 Need for Action

1.2.1 Summary of Proposed Action. The proposed action is to continue the current NADCP BDM activities for the protection of livestock and feed, crops, property, natural resources, and human health and safety. The objective of BDM as conducted in the proposed action is to minimize loss or the risk of loss to the above resource categories from starlings, blackbirds, pigeons, magpies, and crows by responding to all public requests with technical assistance (advice or demonstrations) or direct control. Under the proposed action, NADCP employees would provide technical assistance to resource owners covering a variety of methods that can be used to resolve problems with birds, but only where it is appropriate for the resource owners to resolve the problem themselves. NADCP would also assist resource owners through educational programs on damage identification, prevention, and control, and by providing information on sources of supply for BDM activities such as pyrotechnics and other frightening devices or by temporarily loaning some supplies such as propane cannons and decoy traps.

Direct control support would mostly be provided for situations that require the use of methods and techniques that are illegal, difficult, or dangerous for the public to implement, especially those that involve control measures that result in take. Direct control efforts often require costly expenditures for supplies and staff hours and, therefore, are most often given where cooperative funding is available. Resource owners

that are given direct control assistance are encouraged to use additional management strategies and sound cultural practices, when and where appropriate, to further reduce conflict situations.

Under the proposed action, Integrated Wildlife Damage Management (IWDM) would be implemented which encourages the use of all available legal techniques and methods, used singly or in combination, to meet the needs of the requestors for resolving conflicts with starlings, blackbirds, pigeons, magpies, and crows. Most wildlife damage situations require professional expertise, an organized control effort, and the use of up to several of the available control methods to sufficiently resolve them. Using IWDM effectively is the task of NADCP personnel who are trained professionals and equipped to handle most damage situations. The resource, species, location and the type of damage, and the available biologically sound, cost-efficient and legal methods would be analyzed by NADCP personnel to determine the action taken to correct a conflict with birds.

Several studies have shown that blackbirds and starlings can pose a significant economic threat to agricultural producers (Besser et. al. 1968, Dolbeer et al. 1978, and Feare 1984). To alleviate losses sustained by producers, the current program proposes the continued use of IWDM similar to the one described by Palmer (1976) and Twedt and Glahn (1982). This integrated approach is critical to problem resolution as reported by Dolbeer et al. (1978) who stated that "simplistic management schemes are likely to fail in solving the conflicts and they may even exacerbate them." Control operations as proposed in this alternative could reduce starling depredation at feedlots and other bird damage with minimal impact on the environment.

The current program allows the use of all legal methods for BDM. A wide range of methods is available for resource owners and NADCP personnel. These fall into different categories including cultural practices (e.g. removal of spilled grain), habitat and behavior modification (e.g. exclusion, chemical repellents, and hazing with pyrotechnics), and population management (e.g. decoy traps, toxicants, shooting). The population management techniques used for BDM by NADCP have been primarily used lethally.

Bird Damage Management would be allowed in Nevada under the proposed action when and where requested on private and non-private lands where signed Agreements for Control or the appropriate Annual Work Plans under a Cooperative Agreement are in place. Bird damage management would comply with federal, state, and local laws and current MOUs between NADCP and the various management agencies. NADCP personnel would communicate with other agency personnel as appropriate and necessary.

1.2.2 Need for BDM for the Protection of Property, Agriculture, Human Health and Safety, and Natural Resources. Most starling, blackbird, pigeon, magpie, and crow damage in Nevada is associated with confined animal feeding operations (CAFOs) with direct losses to feed and indirect losses from the transmission of disease to livestock such as coccidiosis, transmissible gastroenteritis virus (TGE), and tuberculosis (TB). These species also can cause extensive damage to property, primarily from their droppings.

Other damages from these species include the loss of crops such as fruit and grain, predation of eggs and chicks at poultry facilities, the transmission of diseases to humans such as salmonella, other human health and safety concerns including jeopardized air safety from aircraft strikes and nuisance from large roosts, and the loss of natural resources such as reduced production of wild songbirds from nest parasitism by brown-headed cowbirds (Dolbeer 1994) and egg and nestling predation by crows and magpies.

1.2.3 Contribution of Agriculture to the Nevada Economy. Agriculture generates nearly \$395 million in annual sales of farm and ranch commodities in Nevada. Livestock production, primarily cattle, sheep, and hogs, is one of the primary agricultural industry sectors in Nevada and accounted for about 64 percent of total farm commodity cash receipts in 2003 (NASS 2005). Livestock production in Nevada, therefore, contributes substantially to local economies. For 2004, Nevada had an estimated 510,000 head of cattle and calves with an inventory value of \$428.4 million and marketed 272,000 head for \$182.7 million in cash receipts (NASS 2005). The average number of milk cows maintained by Nevada's dairy operations was 26,000 head during 2003. Milk production during 2003 was 485 million pounds Statewide (NASS 2005). Producer cash receipts for dairy sales totaled \$53.6 million. Other livestock inventories in Nevada for 2004 included 75,000 sheep and lambs with an inventory value of \$9 million and 5,500 hogs and pigs with an inventory value of \$479,000. Receipts from crops (grains, fruits, vegetables, hay, etc.) in Nevada accounted for 36 percent of all agricultural marketing during 2003 (NASS2005).

1.2.4 Damage Documented by NADCP in Nevada. NADCP personnel respond to reports from resource owners of losses to birds which may or may not have been verified. Verified losses are defined as those losses examined by an NADCP specialist during a site visit and determined to have been caused by starlings, blackbirds, pigeons, crows, or magpies. Confirmation of the species that caused damage is often a vital step toward establishing the need for control and the BDM necessary to resolve the problem. NADCP specialists not only confirm if birds have indeed caused damage, but also record the extent of the damage when possible. Losses that are reported, but not confirmed, are defined as those losses reported by the resource owner to NADCP and not confirmed during a site visit. Some resources such as eggs are completely taken and the NADCP specialists must rely on the cooperator to find out the extent of damage. However, even though these losses are considered reported, the specialist still can determine the species responsible for the damage.

In Nevada during Fiscal Year (FY) 2004 (Sept. 1, 2003 - Oct. 30, 2004), NADCP personnel responded to complaints where reported and verified losses from birds were \$72,558 (Table 1, MIS 2004). Livestock feed losses in FY 04 represented 28 percent of the complaints and 60 percent of the damage value. Damage to buildings represented nine percent of the complaints and 30 percent of the value. Human health and safety concerns represented 21 percent of the complaints. Other losses or damage threats included general property which accounted for 38 percent of the complaints and eight percent of the value. Non-human food items and golf courses round out the damage

summary for FY 04 combined representing five percent of the complaints and two percent of the damages.

Table 1. Starling, blackbird, pigeon, crow, and magpie losses and human health and safety concerns in Nevada reported to or verified by NADCP personnel during FY 04 (MIS 2004).

| Table 1. Starling, Blackbird, Pigeon, Crow and Magpie Damage Losses in Nevada, Fiscal Year 2004 | | | | | | | |
|--|-----------------------|-----------|-----------|----------|----------|------------|-----------------|
| Resource | Number of Occurrences | | | | | | Value |
| | Starling | Blackbird | Pigeon | Crow | Magpie | Total | |
| Livestock | 17 | 10* | 3 | | | 30 | \$43,413 |
| Food/non-human | | | | | 4 | 4 | \$1,000 |
| Property (buildings) | | | 10 | | | 10 | \$21,700 |
| Property (pets) | | | | | | 0 | \$0 |
| Property (other) | 2 | | 39 | | | 41 | \$5,940 |
| Golf courses | | | 1 | | | 1 | \$600 |
| Human health and Safety | 1 | | 13 | 1 | | 23 | \$0 |
| TOTAL | 20 | 10 | 66 | 1 | 4 | 109 | \$72,558 |

*Mixed blackbirds; flocks were mostly red-winged blackbirds and brown-headed cowbirds with a few Brewer's.

1.2.4.1 Livestock Feed Losses. The problem of bird damage to livestock feed has been documented for starlings in France and Great Britain (Feare 1984), and in the United States (Besser et. al. 1968). As the science of raising cattle for slaughter progressed from range to CAFOs, the starling problem intensified. The concentration of larger numbers of cattle eating huge quantities of feed in confined pens provides a tremendous feeding opportunity for starlings, blackbirds, feral domestic pigeons, magpies, and crows. Along with this intensive development in animal husbandry came the concept of the complete diet. A complete diet ration is one that contains all of the nutrients and fiber that cattle need. The various ingredients in this ration are so thoroughly mixed that cattle are unable to select any one at the expense of others. The basic constituent of most rations is silage and the high energy portion is usually provided as barley, which may be incorporated as whole grains, crushed or ground cereal. While cattle cannot select ingredients from that ration, starlings can and do select the barley, thereby altering the energetic value of the complete diet. The removal of this high energy fraction by starlings, is believed to reduce milk yields and weight gains, and is economically significant (Feare 1984). Glahn and Otis (1986) reported that starling damage was also associated with proximity to roosts, snow and freezing temperatures, and the number of livestock on feed.

The economic significance of feed losses to starlings has been demonstrated by Besser et. al (1968) who concluded that the value of losses in feedlots near Denver, Colorado was \$84 per 1,000 birds in 1967. Forbes (1995) reported that starlings consume up to 50

percent of their body weight in feed each day. Glahn and Otis (1981) reported losses of 4.8 kg of pelletized feed consumed per 1,000 bird minutes. Glahn (1983) reported that 25.8 percent of farms in Tennessee experienced starling depredation problems of which 6.3 percent experienced significant economic loss. A large cattle feeding operation in the panhandle of Texas had upwards of 1,000,000 blackbirds and starlings using the facility per day. This estimate was made by trained WS Specialist. The operators had a similar facility that did not have bird damage problems. They reported that, based on a comparison of feed losses, livestock health problems (primarily Coccidiosis), and water trough maintenance costs (continuous labor costs for cleaning bird droppings out of water troughs), bird damage was costing them about \$5,000/day (R. Smith, USDA-APHIS-WS, Canyon District, TX, pers. comm.).

A total of 30 incidences of damage to livestock feed were reported to or verified by NADCP in FY 04 with consumption and contamination losses worth a conservative estimated value of \$43,413. This value is probably well below the actual amount of feed lost throughout the year. NADCP charges cooperators for the DRC-1339 used in these projects. Eight cooperators in Nevada were given direct control support to curb livestock feed losses and damages from starlings, blackbirds, and pigeons during FY 04 (MIS 2004). One of the cooperating producers was given follow-up support for re-infestations of starlings using their dairy. Pigeons were only a primary target at one dairy, but a few were taken concurrently with several projects that targeted starlings. Though difficult to prove conclusively without extensive testing, none of the cooperators reported or documented cases of disease transmission from these species to their livestock. The losses that were reported were the livestock feed losses from consumption and contamination prior to direct control support. Because it is difficult to accurately quantify bird damage in such situations, the losses are determined based on professional “best estimates” by either the cooperator or NADCP employee.

In addition to feed consumption and contamination at feedlots, pigeons and starlings, in particular, often can cause damage to stored feed. Pigeons and starlings often gain access into areas such as warehouses and hay barns where they can damage stored feed or hay bales. Typically, most stored feed damage is related to contamination with fecal matter.

Finally, the pigeons, starlings and blackbirds that are found congregating at feedlots often roost in nearby urban communities. Residents that have a roost on their property or are adjacent to it often request assistance from NADCP to do something to relocate or remove the roost. Responding to the damage at a CAFO, thus, can relieve additional problems associated with roosts which are discussed elsewhere.

1.2.4.2 Livestock Health Losses. Blackbirds, starlings, pigeons, and crows have been implicated in the transmission of livestock diseases such as Coccidiosis, TGE, and TB. Some of these diseases have been linked primarily to migratory flocks of starlings and blackbirds (Gough and Beyer 1982). Estimates of the dollar value of this type of damage are not available. A consulting veterinarian for a large cattle feeding facility in Texas indicated that problems associated with Coccidiosis declined following reduction of starling and blackbird numbers using the facility (R. Smith, USDA-APHIS-WS, Canyon

District, TX, pers. comm.). The only incident of disease transmission reported to NADCP in Nevada in the past 10 FYs came in FY 97 when ostriches were found to have been infected with a disease from starlings and it cost \$100 to treat the flock (MIS 1995-1999). Even though, this was the only reported disease transmission, the potential for disease transmission is real and can have significant economic consequences for the individual producer with the vector of the disease never being identified.

Magpies and crows can also directly and indirectly affect poultry and livestock. Magpies and crows will rob poultry nests of hatchlings and eggs. Magpies have the notorious behavior of picking at scabs on the backs of livestock such as those from brands causing larger wounds on and infection to the animal which, if not attended to, could kill it. Magpies, like ravens, will peck the eyes out of young and sick livestock which most often causes death. In FY 02 (MIS 2002) crows were responsible for the predation of one newborn calf valued at \$400.

The Public Health Service activities in the area of milk sanitation began at the turn of the century with studies on the role of milk in the spread of disease. These studies led to the conclusion that effective public health control of milk borne disease requires the application of sanitation measures throughout the production, handling, pasteurization, and distribution of milk. The 1995 Grade A Pasturized Milk Ordinance recommended by the United States Public Health Service and the Food and Drug Administration (FDA) is used as the sanitary regulation for milk and milk products. The Milk Ordinance says “Cows should not have access to piles of manure, in order to avoid the soiling of udders and the spread of diseases among cattle” and it also says manure may not accumulate so as to permit the soiling of udders. Regulations in some States require fowl to be kept out of milking barns, stables, cow yards, and loafing and housing areas for fear of contamination. These regulations have been issued for dairy cattle because the accumulation of bird feces where cattle can lay could potentially contaminate the udder with pathogens and contamination of feed bunks with bird feces could transmit disease. Pigeons, starlings, and blackbirds commonly create these concerns at dairies because of the sheer numbers that can invade feedlots.

1.2.4.3 Property Losses. Birds can damage structures on private property or at public facilities primarily from fecal contamination. Corrosion damage to metal structures and painted finishes of buildings, aircraft, vehicles and other property can occur when concentrations of birds roost on or over such property. Businesses are also concerned about the negative aesthetic appearance of their property caused by excessive droppings, and are sensitive to comments by clients and guests. Costs associated with property damage include labor and disinfectants to clean and sanitize fecal droppings, implementation of non-lethal wildlife management methods, and loss of property use, but these costs are generally not included in damage estimates. In FY 04, pigeons damaged machinery, buildings, and other property with a loss value of \$27,740 in 31 damage occurrences. Starlings were responsible for \$500 damage to buildings in two damage occurrences and magpies for \$1,000 in four damage occurrences. Each year from FY 2002 (MIS 2002-04) damage to property from crows and magpies was recorded. Blackbirds were not reported to have caused damage to property in general but could

reasonably be expected to occur. Great-tailed Grackles had eight reports related to human health and safety issues in FY 04.

Pigeons, blackbirds, starlings, magpies, and crows have also been involved in strikes with aircraft resulting in costly repairs, sometimes in the millions of dollars. Of the bird species struck by civilian aircraft nationwide from 1993-1995, starlings, blackbirds, pigeons and crows were involved in seven percent, five percent, four percent, and three percent resulting in about \$800,000 of damages annually to aircraft and 300 hours of down time for repairs (Cleary et al. 1996). Reno-Tahoe International Airport had five known bird strikes in FY 99 and of the two known species struck, starlings accounted for one of them which resulted in a precautionary landing just after take-off; this strike did not result in direct monetary damage, but did have one hour down time and the expense of a repeated take off.

Pets can be harassed by magpies and crows. This is typically associated with the breeding season when crows and magpies defend their nests. They typically swoop upon pets such as small dogs causing them to bark incessantly. In some rare occasions, they could actually kill smaller pets, especially those that are young or sick. This harassment was reported in 2002 by magpies and crows (MIS 2002).

1.2.4.4 Crop Losses. Wywialowski (1994) reported that 8.7 percent of the field crop producers and 16.6 percent of vegetable, fruit, and nut producers nationwide experienced bird damage, illustrating the extent of bird damage in the United States. These species damage a variety of grains, fruit, and nuts. Starlings typically cause greatest damage to fruit crops and swathed grains. Blackbirds typically cause the most damage to wheat, barley, and other grains after swathing or just prior to harvest (Besser 1985). Crows and magpies damage fruit and nut crops along with seedling and ripening grain. Pigeons are usually less of a problem to crop producers, but they can cause damage where their numbers are significant near grain fields. With the exception of wheat, the National Agriculture Statistics Service (NASS 2005) did not report any yields for other crops in Nevada that are typically damaged by these species because of the relatively small amount produced. However, a few producers in Nevada do grow corn, barley, and other grains, fruits and nuts that these species will damage. Major damage to crops by blackbirds was not reported in the last three FY's. However, apples, barley and other grain have been reported lost to starlings, pigeons, and blackbirds in five FYs (MIS 1994-1998). Crows and magpies were not reported to have damaged crops from FY 02 - FY 04 but did cause damage to and predated trout at aquaculture facilities and to flowers, turf and gardens in those years. (MIS 2002-04).

1.2.4.5 Threats to Human Health and Safety. Threats to human health and safety from starlings, blackbirds, pigeons, crows, and magpies include the threat from bird/aircraft strikes, spread of pathogens or disease, attacks on humans, and others. These threats can be serious and have or could possibly occur in Nevada. Associated costs with human health and safety threats involving these species would include cleaning and sanitizing structures regularly of fecal droppings, contacting and obtaining assistance from public

health officials, implementing non-lethal wildlife management methods, missing connecting flights or departure and arrival times, and personal injuries.

In Nevada, two aircraft/bird strikes with starlings occurred in 1999, and between three pigeon strikes occurred between 2000 and 2005 (FAA 2005). Though these numbers are few compared with national strike numbers, FAA cautions that only 20 percent of strikes are reported.

The potential for a significant strike is demonstrated from these examples from Bird Strike Committee USA (2004). In 1999, a Boeing-757 departing Cincinnati/Northern Kentucky International Airport returned to make an emergency landing after hitting a large flock of starlings. Both engines and a wing received extensive damage. About 400 dead starlings were found on the runway area. In 1997, an MD-80 aircraft struck over 400 blackbirds just after takeoff from Dallas-Fort Worth International Airport. Almost every part of the plane was hit. A substantial damage was found on various parts of the aircraft and the #1 engine had to be replaced. The worst case involving starlings was reported in Boston in 1960 when 62 people were killed in the crash of an airliner which collided with a flock of starlings (Terres 1980).

Airports and public facilities occasionally request NADCP to conduct limited BDM to protect air traffic safety in Nevada. In FY 2003 NADCP received a request from an airport to conduct BDM (MIS 2003) to remove starlings causing a threat to aviation. Starlings were responsible for a strike at a Nevada international airport that resulted in a precautionary landing immediately after take-off.

Feral domestic pigeons and starlings have been suspected in the transmission of 29 different diseases to humans including salmonellosis, TB, histoplasmosis, toxoplasmosis, ornithosis, cryptococcosis, and encephalitis (Weber 1979, Stickley and Weeks 1985, and Davis et al. 1971). Of the diseases, ornithosis or psittacosis is a disease in Nevada that could cause concern and become a public health hazard and a hazard to WS employees who conduct BDM activities. NADCP has no record of employees contracting bird related diseases while conducting BDM, but WS employees in other States have. The threat is always present and precautions are taken to avoid possible exposures as WS employees are encouraged to wear respirators and other personal protective equipment as recommended by the Centers for Disease Control and Prevention (CDC 1997) when working in bird roosts or under conditions which may present threats of airborne diseases. The Occupational Safety and Health Administration (OSHA) sanitation standard 29 CFR 1910.141 (a)(5) Vermin Control states that "Every enclosed workplace shall be so constructed, equipped, and maintained, so far as reasonably practical, as to prevent the entrance or harborage of rodents, insects, and other vermin. A continuing and effective extermination program shall be instituted where their presence is detected." OSHA (1999) reported that a New Jersey manufacturer was fined for "lack of vermin control in the workplace (severe accumulations of pigeon droppings)". Fecal accumulations and potential disease threats have been responsible for a number of requests for assistance in Nevada. In FY 2002-2004 (MIS 2002-04), NADCP had reported or verified 56 disease threats from pigeons, three from starlings, three from

mixed blackbird species and six from crows, primarily where fecal accumulations had been allowed to build up.

In FY 2000, NADCP became a cooperative member of a wildlife disease surveillance group that includes the Nevada State Health Department. NADCP will assist with monitoring for encephalitis in birds. Blood samples will be obtained from birds, primarily corvids (ravens and crows) and waterfowl, but also starlings and cowbirds, taken in BDM activities. These blood samples will be tested for encephalitis titers specifically looking for the West Nile virus.

Some birds are highly territorial during nesting and defend their nest from intruders. Of the species considered in this EA, Brewer's blackbirds, and to a lesser degree crows and magpies, fall into this category and will attack people walking in close proximity to their nest. Their aerial attacks can result in minor cuts to people and traumatic experiences for children. Some people responding to bird attacks could be involved in even greater injuries from falling, falling off bikes, or retreating into oncoming vehicles in a street or parking lot. In FY 99, NADCP received four requests for nesting Brewer's blackbirds that were attacking people near businesses and on one occasion after the birds had injured a customer (wound with minor bleeding). However none have been reported from FYs 2002-2004.

Finally, roosting and nesting birds can pose a general nuisance to people from noise, droppings, and nest debris. Noise associated with a few birds or roosts has been considered a nuisance to some people, especially early in the morning. Crows in the summer and winter roosts usually invoke these concerns. Droppings are considered a nuisance because some people do not enjoy cleaning them up day after day, especially under winter roosts and nesting areas. Increased fire hazards often result from the nest building activity of starlings in cavities where they nest such as those in house attics. In FY 04, NADCP received 49 and two requests for pigeons and starlings that had created a general nuisance, primarily from minor fecal accumulations, roost noise, or nest building in attics (MIS 2004).

1.2.4.6 Natural Resource Losses. Starlings, blackbirds, pigeons, crows and magpies can impact natural resources. Brown-headed cowbirds parasitize the nests of other birds, primarily neotropical songbirds. The neotropical songbirds includes several T&E species in the United States including the southwestern willow flycatcher, a federally endangered species in Nevada that could be impacted by cowbirds. Its range is primarily limited to the Virgin River area in extreme southern Nevada. Nest parasitism by brown-headed cowbirds is listed as a threat to this species in the Clark County Multiple Species Conservation Plan (1999).

Pigeons and starlings could take up residence in areas such as national parks where they could deface natural resources such as cliffs and property. Magpies and crows often rob wild bird nests of eggs and hatchlings which could impact T&E bird populations, especially if the habitat has been changed or reduced so that nests are exposed. Finally,

non-native starlings will often out-compete native cavity nesting birds and mammals for nest sites (Weitzel 1988).

Nevada Wildlife Services program received two reports of damage by starlings to commercial forestry and nursery operations in FY 03 resulting in \$6,100 in damages.

1.3 Profiles of Birds in Nevada. To conduct BDM, it is important to have some knowledge of the species that can cause damage. Full accounts of life histories for these species can be found in bird reference books and field guides. Some background information is given here for each species in Nevada covered by this EA, especially information pertaining to their range in Nevada.

1.3.1 European Starlings. Starlings have been periodically introduced into the United States from Europe since 1850. A successful introduction was made into New York's Central Park in 1890. The birds thrived and exploited their new habitat. In just 50 short years the starling colonized the United States, Canada and Mexico, and 80 years after the initial introduction, had become one of the most common birds in North America (Feare 1984). In Nevada, starlings are abundant throughout the year, but are typically found in close association with man. They are not protected by State or Federal laws in Nevada.

Starlings nest in holes or cavities provided by buildings and houses, trees, nest boxes, cliffs and so on. Females lay 4-7 eggs that hatch about 12 days later. Young leave the nest three weeks later. This short incubation and fledgling period, about one month, allows starlings to often have at least two clutches in a nesting season.

Starlings gather in large communal roosts from late summer until spring and the roosts are often with blackbirds. These roosts are usually near or in urban areas in Nevada where it is relatively warm, or in dense woodland thickets. Dense trees are usually selected as the roost site because of the protection they provide from the elements. Fall flocks and roosts are somewhat small, but as the weather gets colder, the flocks and roosts get much larger.

Starlings are often considered pests because they can cause problems at livestock feeding facilities, in urban roosts or nesting areas, and for agricultural crop producers. At feedlots they can consume and contaminate feed, and often select the highest quality feed to eat (Johnson and Glahn 1994). Urban roosts of starlings are often considered a noise and odor nuisance to those that live nearby. Their droppings at roosts can be quite damaging to the property below and are aesthetically unpleasing to sight and smell. The droppings are also a potential source of disease for people and other animals including livestock. Finally, they often out-compete native cavity nesting birds for nest sites (Weitzel 1988).

1.3.2 Feral Pigeons. The feral pigeon or rock dove was introduced into the United States as a domesticated bird. Many escaped captivity and soon feral populations of pigeons formed. Today, the pigeon can be found throughout the United States, primarily in urban areas, and are considered the most common bird pest species associated with man.

Pigeons depend heavily on man to provide them with food, and nesting and roosting sites. In Nevada, pigeons are abundant in urban and rural areas, but are almost always found in close association with man. Because of their propensity to cause damage, they are not protected by Federal or State laws.

Pigeons usually nest and roost on artificial or natural ledges that are often found under the eaves of houses and buildings, under bridges, in attics, on cliffs, and in caves. Their nests usually consist of twigs where they lay two eggs. Eggs hatch in about 18 days and the young leave four to six weeks later. However, female pigeons will often lay a new clutch of eggs while hatchlings are still in the nest. Most nesting occurs in the spring and fall when water and feed is most available.

Pigeons can create a number of problems for people. Their droppings can deface and accelerate the deterioration of property such as buildings and other structures increasing maintenance costs. Large amounts of pigeon droppings can produce an objectionable odor and kill vegetation. In addition, droppings can be the source of several diseases transmissible to man and livestock such as ornithosis and encephalitis. Pigeons also can consume and contaminate livestock feed and stored foods. Finally, pigeons near airports can be a bird strike hazard.

1.3.3 Red-winged Blackbirds. Red-winged blackbirds are by far the most common member of the blackbird group. Their range extends from Canada to Costa Rica and the West Indies. In Nevada, red-winged blackbirds are abundant in summer and winter, but most abundant in southern Nevada during winter when migratory flocks arrive. These birds are common in marshes, fields, and woods where they consume insects, small fruits, wild seeds, grain, and aquatic life. They nest in marshes and upland vegetation, and the clutch size is usually 3-5 eggs.

Red-winged blackbirds can cause considerable damage to ripening grain crops such as corn and oats in the milk or dough stage of development. They can also cause damage to sprouts. During the winter, roosts can be a nuisance in residential areas as was described for starlings. Red-winged blackbirds also will consume and contaminate feed at CAFOs.

1.3.4 Brewer's Blackbirds. The Brewer's blackbird is found in the western half of the United States and is common year-round in Nevada. They are commonly found in urban areas, prairies, fields, and agricultural lands where they prefer to feed on lawns, pastures, and crops. They feed mostly on grains, weed seeds and insect matter. Their reproductive habits are similar to red-winged blackbirds.

Brewer's blackbirds usually only cause minor damage to crops. They consume livestock feed, but their roost numbers are usually fairly low in comparison to the other species as they tend to stay more spread out during winter. During nesting, Brewer's blackbirds are the most notorious of the blackbirds for attacking people and pets, sometimes causing minor injuries.

1.3.5 Brown-headed Cowbirds. The brown-headed cowbird is the smallest member of the blackbird group. It is common throughout the United States. In Nevada, they are common statewide during the summer months. However, most migrate during the winter, but some overwinter in southern Nevada. This species is commonly found in close association with livestock as their name infers, and are also common in agricultural areas, woodland edges, fields, and suburban areas. Their preferred foods include insects, grains, small fruits, wild seeds, and small aquatic life.

Cowbirds can cause some damage to ripening crops such as millet and sorghum. They consume some livestock feed, but mostly glean waste grain and seed from dung. Their greatest damage is usually associated with their trait of nest parasitism. They often use the nests of wild songbirds including several T&E species for depositing eggs that usually hatch quicker than the eggs in the nests they parasitize.

1.3.6 Yellow-headed Blackbirds. Yellow-headed blackbirds are locally abundant nesters in deep water marshes of the northern Great Plains and western North America, but most winter in Mexico. In Nevada, they are fairly common throughout the summer, but are very uncommon to absent during the winter. They typically migrate south in early fall, before most other blackbirds. They feed in agricultural fields, meadows, and pastures. Their diet typically consists of insects during the nesting season and grains and weed seeds at other times. Their reproductive and survival rates are similar to red-winged blackbirds.

Yellow-headed blackbirds typically only cause minor damage to ripening corn and other grains. Most leave Nevada for the winter, so they are not a problem at CAFOs or in winter roosts.

1.3.7 Great-tailed Grackles. Great-tailed grackles are found in the southwestern United States. In Nevada, they are year-round residents, but only found in the very southern portion of the State. These grackles form loose nesting colonies in shrubs and trees. Their flocks feed around farms, pastures, and parks. They prefer to eat insects, small fruits, grains, and weed seed. Their reproductive and survival rates are similar to red-winged blackbirds.

Great-tailed grackles damage all types of fruit crops from citrus to melons, but normally only to a minor extent. Their nesting colonies and winter roosts can become a nuisance to people because of the noise and droppings.

1.3.8 Tricolored blackbirds. Tricolored blackbirds are found primarily in California and southern Oregon. Their range extends into western Nevada, but they are uncommon year-round. Tricolored blackbirds are highly gregarious and can be found in small flocks year-round. They nest in large colonies in marshes during late spring to summer. Their nests may extend into shrubs, trees or nearby crops. They often forage in wet meadows and pastureland where they feed on wild seeds, grains, small fruits, insects, and small aquatic life. Their reproductive and survival rates are similar to red-winged blackbirds. Tricolored blackbirds will sometimes mix with flocks of other blackbirds. They can

damage crops such as ripening corn, but usually this is minor because of their preferred habitat of wetter areas.

1.3.9 Black-billed Magpies. Magpies are found in western North America east of the Sierra-Cascade range. They are common year-round residents in Nevada. Black-billed magpies are omnivorous and very opportunistic in their feeding habits. Their diet consists typically of 80 percent animal matter (insects, carrion, small mammals) and 20 percent fruits and grains. Magpies are gregarious and form loose flocks throughout the year. They build large nests in trees where females lay six to nine eggs.

Magpies can cause a variety of damage. They damage fruit, nut, and some grain crops when the opportunity exists. Farmers growing alfalfa for seed have found that magpies prey on valuable leaf-cutter bees which are important for their crop. They are also commonly found in close association with livestock where they feed on dung-associated insects. They will feed on livestock feed and, like starlings, choose the high protein ingredients. They will also commonly search for ticks on the backs of livestock; if they find a scab or open wound such as that from a brand, they may pick at it until it creates a much larger wound. These wounds may eventually become infected and, in some instances, kill the animal. Magpies, like ravens, will also peck the eyes out of newborn and stressed livestock. Magpies also rob eggs and nestlings from poultry and wild birds. Finally, their winter roosts, which can number in the hundreds, can be a nuisance, especially when it is close to a residence or business because of the noise and odor from the droppings.

1.3.10 American Crows. American crows are distributed coast to coast from the Yukon Territory, Canada, to Baja, California and Gulf of Mexico. American crows can be found throughout Nevada year-round. They can be found in almost any habitat type in Nevada, but they are most commonly found where there is a mixture of open fields and woodlots. In the Pacific Northwest, crows have adapted well to urban life, with many cities supporting populations of crows (Angell 1978) not unlike Reno and other urban areas in Nevada. Like the magpie, crows are omnivorous and eat a variety of foods and readily adapt to new food sources. However, a crow's diet typically consists of 30 percent animal matter (ie. grubs, insects, carrion, frogs) and 70 percent vegetable or plant matter (e.g. corn, nuts, fruits and grains). Johnston (1961) reported that crows reach their peak abundance in agricultural areas where there are wooded areas, and have increased in numbers where agricultural practices have increased. Crows build fairly large nests primarily in trees where 4-6 eggs are laid. Crows will sometimes have a second-clutch, time permitting.

Crows can cause a variety of damage. They are commonly associated with damaging grain, fruit, and nut crops such as corn, peaches, and almonds. Crows will sometimes congregate at CAFOs and consume and contaminate feed, but usually in smaller numbers than blackbirds. Similar to magpies, crows will also rob wild bird and poultry nests of eggs and young. At a much lesser degree than magpies and ravens, crows will sometimes peck the eyes out of newborn and weak livestock. During the fall and winter, their roosts

which can number in the thousands, can become quite a noise and odor nuisance. Human and livestock diseases are commonly associated with these roosts such as TGE.

1.4 Relationship of This Environmental Assessment to Other Environmental Documents.

WS Programmatic FEIS. Wildlife Services issued an FEIS on the national APHIS-WS program (USDA 1997, revised). This EA is consistent with the Record of Decision signed for the FEIS. Pertinent information available in the FEIS has been incorporated by reference into this EA.

National Level Memoranda of Understanding (MOU). Memoranda of Understanding have been signed between WS and USFWS clarifying responsibilities in regards to migratory bird damage management. WS has signed MOUs with BLM and USFS which recognize WS' responsibilities for wildlife damage management and related compliance with the National Environmental Policy Act on BLM and USFS lands.

1.5 Decisions to Be Made

Nevada Animal Damage Control Program is the lead agency for this EA, and therefore responsible for the scope, content, and decisions made. Cooperating agencies in the production of this EA are USFWS, NDOA and NDOW. Each of the cooperating agencies were asked to provide input and direction to NADCP to insure that BDM actions are in accordance with applicable regulations and policies, and with the desires of the State of Nevada.

Based on the scope of this EA, the following decisions need to be made.

Should BDM, as currently implemented, be continued in Nevada?

If not, how should NADCP fulfill its legislative responsibilities in Nevada?

Does the proposal have significant impacts requiring preparation of an EIS?

1.6 Scope of this Environmental Assessment

1.6.1 Actions Analyzed. This EA evaluates BDM to protect agriculture, property, natural resources and human health and safety in Nevada.

1.6.2 Federal Lands. Nevada has a large proportion of federal lands and NADCP may be requested to conduct BDM on them for the protection of property, livestock, or other resources. The methods employed and potential impacts would be the same on these lands as they would be on private lands upon which NADCP provides services. Federal agencies requesting BDM from NADCP would be responsible for their own NEPA compliance according to each Federal agencies NEPA implementing procedures. Coordination among cooperating agencies would ensure that BDM is conducted according to land use restrictions, policies, and regulations governing management of the

Federal lands. This EA includes NADCP NEPA compliance for BDM on Federal lands, provided that the particular issues and impacts of BDM activities have been considered in this document.

1.6.3 Period for Which This EA Is Valid. This EA will remain valid until NADCP and other appropriate agencies determine that new actions or new alternatives having substantially different environmental effects must be analyzed. Changes in environmental policies, the scope of the project, or other issues may trigger the need for additional NEPA compliance. At that time, this analysis and document will be amended as necessary pursuant to NEPA. This EA will be reviewed regularly to ensure that it is complete and appropriate for the scope of NADCP BDM activities in Nevada.

1.6.4 Site Specificity. This EA analyzes potential impacts of BDM and addresses NADCP's BDM activities on all lands under Cooperative Agreements or Agreements For Control within Nevada. It also addresses the impacts of BDM on areas where additional agreements with NADCP may be written in the reasonably foreseeable future in Nevada. Because the proposed action is to continue the current program, and because the current program's goal and responsibility is to provide service when requested within the constraints of available funding and manpower, it is conceivable that additional BDM efforts could occur. Thus, this EA anticipates potential expansion and analyzes the impacts of such expanded efforts as part of the current program.

This EA raises substantive environmental issues relating to the scope of activities which are adequate to analyze the effects of the NADCP's BDM program. The issues that arise in BDM generally apply at any given site. A more site-specific analysis of individual wildlife damage management activities in a NEPA document is not always feasible because a rapid response to requests for assistance is needed and it is not always possible to predict where bird damage will occur. NADCP has determined that a more detailed and more site-specific level of analysis would not substantially improve the public's understanding of the proposal, the analysis, or the add information that may change the decision. The undocumented thought process applied through the Decision Model (Slate et al. 1992) (Figure 1), provides a site-specific check to ensure that the content of each individual action is consistent with this EA. Decisions made using the model will be in accordance with standard operating procedures (SOPs) described herein and any other requirements adopted or established as part of the decision. NADCP feels that a state wide analysis of its BDM activities best considers all aspects of the proposal including cumulative impacts, and allows for an informed decision.

1.7 Authority and Compliance

1.7.1 Authority of Federal and State Agencies for Wildlife Damage Management in Nevada.

Wildlife Services and NADCP The USDA is authorized by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authorities for the Wildlife Services program are the Animal Damage Control

Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b) as amended, and the Rural Development, Agriculture, and Related Agencies Appropriations Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c).

The Secretary of Agriculture is authorized, except for urban rodent control, to conduct activities and to enter into agreements with States, local jurisdictions, individuals, and public and private agencies, organizations, and institutions in the control of nuisance mammals and birds and those mammal and bird species that are reservoirs for zoonotic diseases, and to deposit any money collected under any such agreement into the appropriation accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities.

Nevada Department of Agriculture, Division of Resource Protection. Nevada Department of Agriculture, Division of Resource Protection's (DRP) (formerly known as the Predatory Animal and Rodent Committee), mission is to protect Nevada's agricultural, industrial, private and natural resources, and to safeguard public health and safety through cooperative assistance in the control and prevention of damages and diseases caused or vectored by wildlife (Nevada Revised Statutes (NRS) 567.010-090 and 567.100-170). The Division of Resource Protection works in close collaboration with APHIS-WS for the control of predatory animals, crop destroying birds, and rodents within the State of Nevada, and the two programs are collectively called the Nevada Animal Damage Control Program (NADCP).

U.S. Fish and Wildlife Service. USFWS has the responsibility to manage migratory birds (crows, magpies, and blackbirds) and T&E species. NADCP has the responsibility to manage the damage caused by migratory birds. NADCP coordinates projects that target migratory birds with USFWS to determine if the proposed project would conform to the Migratory Bird Treaty Act. In addition, NADCP consults with USFWS on NADCP's potential effects on T&E species from BDM activities.

Section 7 of the Endangered Species Act of 1973, as amended ((ESA) 16 U.S.C. 1531-1543) requires each Federal agency to ensure that its actions will not jeopardize the continued existence of listed species or destroy or modify such species' critical habitat. If one or more protected species are found within the area of a proposed action, then the agency must determine whether and how the action will affect such species. If a "may affect" determination is made, the agency must consult with the USFWS determine whether the action is likely to adversely affect or jeopardize the continued existence of the species and, if so, to avoid or mitigate the action to avoid or minimize adverse impacts.

Based on a consultation initiated by NADCP, the USFWS determined in an informal Section 7 consultation/Biological Opinion in compliance with the ESA (March, 2003 FWS file no. 1-5-03-F-400), that NADCP's BDM activities are not likely to adversely affect T&E species in Nevada. Some BDM activities, though, could benefit T&E species. NADCP continually coordinates program planning with the USFWS to ensure that the program will not jeopardize the continued existence of threatened and

endangered species. A national level Section 7 consultation between the USFWS and the national APHIS-Wildlife Services program is in progress. Any more stringent or protective measures from the national consultation to protect T&E species would be adopted into the selected BDM alternative in Nevada, as applicable.

U.S. Forest Service and Bureau of Land Management. USFS and BLM have the responsibility to manage the resources of federal national forests and Public lands for multiple uses including recreation and wildlife habitat while recognizing the State's authority to manage wildlife populations. Both USFS and BLM recognize the importance of reducing wildlife damage on lands and resources under their jurisdictions, as integrated with their multiple use responsibilities. For these reasons, both agencies have entered into MOUs with WS nationally to facilitate a cooperative relationship. Both agencies recognize WS's expertise in wildlife damage management and rely on WS to determine species causing resource losses and the appropriate methodologies for conducting BDM.

Nevada Department of Wildlife. Nevada Department of Wildlife (NDOW) has the primary responsibility to manage all protected and classified wildlife in Nevada, except federally listed T&E species, regardless of the land class on which the animals are found. Conflicts with Migratory birds are managed under direction from USFWS. NDOW regulates the taking of wildlife. NRS 502.010 allows the take of any unprotected bird to protect persons or property in the immediate vicinity of homes or ranches affected by such species. In addition, NDOW manages State listed T&E species. In an informal letter from NDOW (January 2000), it was determined that NADCP would have no or minimal negative impacts on the listed T&E species in Nevada with BDM methods. To insure that BDM activities will not affect NDOW managed species in the future, NADCP will consult with NDOW on a regular basis.

Nevada Department of Agriculture. Nevada Department of Agriculture provides administrative support to DRP and also regulates the use, sale, distribution, and production of pesticides in Nevada.

1.7.2 Compliance with Key Federal Laws. Several federal laws authorize, regulate, or otherwise affect NADCP BDM activities. NADCP complies with these laws, and consults and cooperates with other agencies as appropriate.

National Environmental Policy Act (NEPA)(Public Law 91-190, 42 U.S.C. 4321 et seq.): NADCP follows Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (40 CFR 1500 et seq.), USDA (7 CFR 1b), and APHIS NEPA Implementing Procedures (7 CFR 372) as a part of the NEPA decision-making process. The National Environmental Policy Act sets forth the requirement that all major Federal actions be evaluated in terms of their potential to significantly affect the quality of the human environment.

Pursuant to NEPA and CEQ regulations, this EA documents the analysis of a proposed Federal actions' impact, informs decision-makers and the public of reasonable

alternatives capable of avoiding or minimizing adverse impacts, and serves as a decision-aiding mechanism to ensure that the policies and goals of NEPA are infused into Federal agency actions. The direct, indirect, and cumulative impacts of the proposed action are analyzed.

Migratory Bird Treaty Act of 1918 (16 USC 703-711; 40 Stat. 755), as amended. The Migratory Bird Treaty Act provides the USFWS regulatory authority to protect species of birds that migrate outside the United States. USFWS issues permits under authority of Act to take damaging species of birds. NADCP obtains the necessary permits to execute wildlife damage management activities. All blackbirds, magpies, and crows targeted in BDM projects are migratory birds. However, starlings and pigeons are not considered migratory birds and are classified as unprotected. NADCP obtains the necessary permits from USFWS to take migratory birds. However, a depredation order (CFR 50, Part 21.43. Depredation order for blackbirds, cowbirds, grackles, crows and magpies.) exempts permit requirements for the take of blackbirds, magpies, and crows "...when found committing or about to commit depredations upon ornamental or shade trees, agricultural crops, livestock, or wildlife, or when concentrated in a manner as to constitute a health hazard."

Bald and Golden Eagle Protection Act. This law provides special protection for bald (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*). Similar to the Migratory Bird Treaty Act, it prohibits any "take" of these species, except as permitted by USFWS. Federal policy interpretations as to whether permit requirements of this law apply to federal agencies are pending.

Endangered Species Act. It is NADCP and Federal policy, under the Endangered Species Act, that all Federal agencies shall seek to conserve T&E species and shall utilize their authorities in furtherance of the purposes of the Act (Sec.2(c)). WS conducts consultations with USFWS, as required by Section 7 of the Endangered Species Act, to use the expertise of USFWS, to ensure that "any action authorized, funded or carried out by such an agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species. . ." (Sec.7(a)(2)). WS obtained a Biological Opinion from USFWS in 1992 describing potential effects on T&E species and prescribing reasonable and prudent measures for avoiding jeopardy (USDA 1997, revised, Appendix F). NADCP has completed an informal consultation and Biological Opinion with USFWS (March 27, 2003) and NDOW (2000) for the proposed BDM program specifically concerning the T&E species in Nevada and these letters are on file. Both agencies concurred with NADCP's determination that the proposed action was not likely to adversely affect T&E species.

Investigational New Animal Drug. The Food and Drug Administration grants permission to use investigational new animal drugs (21 CFR, Part 511). Alpha-chloralose is now classified as an animal drug (21 CFR 510) and cannot be purchased from any source except WS. The FDA authorization allows WS to use alpha-chloralose to capture feral pigeons. FDA acceptance of additional data will allow WS to consider requesting an expansion in the use of alpha-chloralose for more species.

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). FIFRA requires the registration, classification, and regulation of all pesticides used in the United States. All pesticides used or recommended by NADCP are registered with and regulated by the Environmental Protection Agency (EPA) and NDOA. WS uses the chemicals according to labeling procedures as required by EPA and NDOA. Currently, NADCP uses DRC-1339 in BDM to control blackbirds, starlings, and pigeons under three labels. In addition, other pesticides and chemical repellents may be used according to label procedures or recommended by NADCP such as Avitrol®, a chemical frightening agent.

Invasive Species Executive Order 13112. This Order establishes guidance to Federal agencies to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause. The EO, in part, states that each Federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law; 1) reduce invasion of exotic species and the associated damages, 2) monitor invasive species population, provide for restoration of native species and habitats, 3) conduct research on invasive species and develop technologies to prevent introduction, and 4) provide for environmentally sound control, promote public education on invasive species.

The EO also established an Invasive Species Council (Council) whose members include the Secretary of State, the Secretary of the Treasury, the Secretary of Defense, the Secretary of the Interior, the Secretary of Agriculture, the Secretary of Commerce, the Secretary of Transportation, and the Administrator of the EPA. The Council shall be co-chaired by the Secretary of the Interior, the Secretary of agriculture, and the Secretary of Commerce. The Council oversees: 1) the implementation of this order, 2) that Federal agencies activities concerning invasive species are coordinated, complementary, cost-efficient, and effective, 3) the development of recommendations for international cooperation in addressing invasive species, 4) develop, in consultation with the CEQ, guidance to Federal agencies, 5) facilitate development of coordinated network among federal agencies to document, evaluate, and monitor impacts from invasive species on the economy, the environment, and human health, 6) facilitate establishment of a coordinated, up-to-date information-sharing system that utilizes, and 7) prepare and issue a national invasive Species Management Plan.

National Historic Preservation Act of 1966, as amended. National Historical Preservation Act (NHPA) of 1966 as amended requires: 1) Federal agencies to evaluate the effects of any Federal undertaking on cultural resources, 2) consult with the State Historical Preservation Office regarding the value and management of specific cultural, archaeological and historic resources, and 3) consult with appropriate American Indian tribes to determine whether they have concerns for traditional cultural resources in areas of these Federal undertakings.

Each of the wildlife damage management methods described in the EA that might be used operationally by NADCP do not cause major ground disturbance, do not cause any physical destruction or damage to property, do not cause any alterations of property,

wildlife habitat, or landscapes, and do not involve the sale, lease, or transfer of ownership of any property. In general, such methods also do not have the potential to introduce visual, atmospheric, or audible elements to areas in which they are used that could result in effects on the character or use of historic properties. Therefore, the methods that would be used by WS under the proposed action are not generally the types of activities that would have the potential to affect historic properties. If an individual activity with the potential to affect historic resources is planned under an alternative selected as a result of a decision on this EA, then site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary.

There is potential for audible effects on the use and enjoyment of a historic property when methods such as propane exploders, pyrotechnics, firearms, or other noise-making methods are used at or in close proximity to such sites for purposes of hazing or removing nuisance birds or other wildlife. However, such methods would only be used at a historic site at the request of the owner or manager of the site to resolve a damage or nuisance problem, which means such use would be to benefit the historic property. A built-in mitigating factor for this issue is that virtually all of the methods involved would only have temporary effects on the audible nature of a site and can be ended at any time to restore the audible qualities of such sites to their original condition with no further adverse effects. Site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary in those types of situation.

The Nevada Historic Preservation Office has indicated no concerns with NADCP wildlife damage management activities in the State because construction and earth moving activities are not conducted.

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

Environmental Justice has been defined as the pursuit of equal justice and equal protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. Executive Order 12898 requires Federal agencies to make Environmental Justice part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of Federal programs, policies and activities on minority and low-income persons or populations. A critical goal of Executive Order 12898 is to improve the scientific basis for decision-making by conducting assessments that identify and prioritize environmental health risks and procedures for risk reduction. Environmental Justice is a priority within USDA, APHIS, and WS. APHIS plans to implement Executive Order 12898 principally through its compliance with the provisions of NEPA.

WS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898 to ensure Environmental Justice. NADCP personnel use wildlife damage management methods as selectively and environmentally conscientiously as possible. All chemicals used by NADCP are regulated by the EPA through FIFRA, NDOA, by MOUs with Federal land managing agencies, and by WS Directives. Based on a thorough Risk Assessment, APHIS concluded that when WS

program chemicals are used following label directions, they are highly selective to target individuals or populations, and such use has negligible impacts on the environment (USDA 1997, revised, Appendix P). The WS operational program properly disposes of any excess solid or hazardous waste. It is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority and low-income persons or populations.

CHAPTER 2: ENVIRONMENTAL ISSUES

Chapter 2 contains a discussion of the issues, including those that will receive detailed environmental impacts analysis in Chapter 4 (Environmental Consequences), those used to develop mitigation measures and SOPs, and those that will not be considered in detail with rationale. Pertinent portions of the affected environment will be included in this chapter in the discussion of issues used to develop mitigation measures. Additional affected environments will be incorporated into the discussion of the environmental impacts in Chapter 4.

2.1 Issues

The following issues or concerns about BDM have been identified through interagency planning and coordination, from other EAs which preceded this document, and from the FEIS (USDA 1997, revised) as areas of concern that need to be addressed in this EA.

- Effects on Target Bird Species Populations
- Effects on Non-target Species Populations, Including T&E Species
- Humaneness of Control Techniques
- Effects on Public Safety and the Environment
- Effectiveness of NADCP
- Effects on Aesthetics

2.2 Issues used to Develop Mitigation in Standard Operating Procedures

2.2.1 Effects on Target Bird Species Populations. Maintaining viable populations of all species is a concern of the public and of biologists within state and federal wildlife management agencies, including NADCP. A concern of some is that NADCP BDM will adversely affect populations of target species, which, for purposes of this EA are starlings, pigeons, blackbirds, crows, and magpies. To address these concerns, the effect of each alternative on populations for each target species is examined.

2.2.2 Effects on Non-target Species Populations, Including T&E Species. A common concern among members of the public and wildlife professionals, including NADCP personnel, is the possible impact of BDM control methods and activities on non-target species, particularly T&E species. NADCP SOPs include measures intended to reduce the potential for effects of BDM on non-target species populations and are presented in Chapter 3. Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions

or mitigation measures. The results of the biological evaluation and a description of mitigation measures established are presented in Chapter 3.

2.2.3 Humaneness of Methods Used by NADCP. The issue of humaneness, as it relates to the killing or capturing of wildlife is an important, but very complex concept that can be interpreted in a variety of ways. Humaneness is a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. Schmidt (1989) indicated that vertebrate pest control for societal benefits could be compatible with animal welfare concerns, if "... the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process." Suffering has been described as a "... highly unpleasant emotional response usually associated with pain and distress." However, suffering "... can occur without pain ...," and "... pain can occur without suffering ..." (AVMA 1987). Because suffering carries with it the implication of a time frame, a case could be made for "... little or no suffering where death comes immediately ..." (CDFG 1991).

Defining pain as a component in humaneness appears to be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain, and identifying the causes that elicit pain responses in humans would "... probably be causes for pain in other animals ..." (AVMA 1987). However, pain experienced by individual animals probably ranges from little or no pain to significant pain (CDFG 1991). Thus, WS' damage management methods, such as leghold traps, may cause varying degrees of pain in different animal species captured for varying lengths of time. The point at which pain diminishes or stops under these types of restraint has not been measured by the scientific community.

Pain and suffering, as it relates to a review of WS' damage management methods, has both a professional and lay point of arbitration. Wildlife managers and the public would both be better served to recognize the complexity of defining suffering, since "... neither medical or veterinary curricula explicitly address suffering or its relief" (CDFG 1991).

NADCP has improved the selectivity of management devices through research and development such as the use of chemical immobilization and euthanasia procedures that minimize pain. Research continues to improve selectivity, practicality, and humaneness of management devices (USDA 1997, revised). Until such time as new findings and products are found to be practical, a certain amount of animal suffering will occur if BDM objectives are to be met in those situations where non-lethal control methods are ineffective or impractical. Mitigation measures and SOPs used to maximize humaneness are listed in Chapter 3.

2.2.4 Impacts on Public Safety and the Environment. Under some of the alternatives proposed in this EA, NADCP could use firearms, alpha-chloralose, DRC-1339, Avitrol®, chemical repellents, and pyrotechnics. A formal risk assessment of WS methods, including those used for BDM in Nevada, concluded low risks to humans (USDA 1997, revised, Appendix P) including firearms, immobilization drugs, chemical repellents and toxicants, and pyrotechnics. This assessment included potential risks to WS employees,

the public, and non-target animals. While some of the materials and methods used by NADCP have the potential to represent a threat to health and safety if used improperly, problems associated with their misuse have rarely occurred.

2.2.5 Effectiveness of NADCP. NADCP's effectiveness can be evaluated in many ways, but the overall effect is often difficult to ascertain. The effectiveness of the program can be defined in terms of economic losses reduced for agriculture and property, the decreased number of incidences of public health and safety, and the natural resources protected. The effectiveness analysis includes costs of the program to the individual resource owners, the public, states, and other jurisdictions, and direct and indirect impacts, including costs of impacts on the environment.

The effectiveness of NADCP can also be measured by public satisfaction with the BDM program. In a survey that Policy and Program Development of APHIS conducted, it was determined that the satisfaction of the people assisted with wildlife damage management by the WS program nationwide was very high (APHIS 1994).

CEQ regulations (40 CFR 1502.23) do not require a formal cost-benefit analysis to be in compliance with NEPA regulations. Since a major intent of this EA is to assist agency planning and decision making, this EA will compare the relative costs of the alternatives being considered and the relative benefits to livestock operators, property owners, and to the public.

2.2.6 Impact on Aesthetics. Aesthetics is the philosophy dealing with the nature or appreciation of beauty. Therefore, aesthetics is truly subjective in nature and wholly dependent on what an observer regards as beautiful. On the one hand, birds are often regarded as being aesthetic. In addition, birds can provide economic and recreational benefits (Decker and Goff 1987), and the mere knowledge that they exist is a positive benefit to many people. Wildlife populations provide a range of social and economic benefits (Decker and Goff 1987). These include direct benefits related to consumptive and non-consumptive use (i.e. wildlife-related recreation, observation, harvest, sale), indirect benefits derived from vicarious wildlife related experiences (i.e. reading, television viewing), and the personal enjoyment of knowing wildlife exists and contributes to the stability of natural ecosystems (i.e. ecological, existence, bequest values) (Bishop 1987). These positive traits of wildlife generally become incorporated into their overall aesthetic value.

On the other hand, aesthetics also includes the environment in which people live including public and private lands. The same wildlife populations that are enjoyed by many also create conflict with a number of land uses and human health and safety. The activities of some wildlife, such as starlings and blackbirds, result in economic losses to agriculture and damage to property. Human safety is jeopardized by wildlife collisions with aircraft, and wild animals may harbor diseases transmissible to humans. Damage by, or to, wildlife species that have special status, such as T&E species, is a public concern. Certain species of wildlife are regarded as nuisances in certain settings. Some people do not enjoy viewing the local environment with excessive bird excrement

covering walkways, lawns and structures. These are negative values associated with birds and some of the damages they can inflict.

Public reaction is variable and mixed because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to manage conflicts and problems between humans and wildlife. The population management (capture and euthanasia) method provides relief from damage or threats to human health or safety to urban people who would have no relief from such damage or threats if non-lethal methods were ineffective or impractical. Many people directly affected by problems and threats to human health or safety caused by birds insist upon their removal from their property or public location when the wildlife acceptance capacity is exceeded. Some people have the view that birds should be captured and relocated to a rural area to alleviate damage or threats to human health or safety. Some people directly affected by the problems caused by birds strongly oppose the removal of the birds regardless of the amount of damage. Individuals not directly affected by the harm or damage may be supportive, neutral, or totally opposed to any removal of birds such as pigeons from specific locations or sites. Some of the totally opposed people want to teach tolerance for bird damage and threats to human health or safety, and that birds should never be captured or killed. Some of the people who oppose removal of birds do so because of human-affectionate bonds with individual birds such as pigeons or magpies. These human-affectionate bonds are similar to attitudes of a pet owner and result in aesthetic enjoyment.

Human dimensions of wildlife management include identifying how people are affected by problems or conflicts between them and wildlife, attempting to understand people's reactions, and incorporating this information into policy and management decision processes and programs (Decker and Chase 1997). Wildlife acceptance capacity is the limit of human tolerance for wildlife or the maximum number of a given species that can coexist compatibly with local human populations. Wildlife acceptance capacity is also known as the cultural carrying capacity and primarily involves the aesthetics of the wildlife being managed. These terms are important in urban areas because they define the sensitivity of a local community to a specific wildlife species. For any given damage situation, there will be varying thresholds by those directly and indirectly affected by the damage. This threshold of damage is a primary limiting factor in determining the wildlife acceptance capacity. Once this wildlife acceptance capacity is met or exceeded, people will begin to implement population control methods, including capture and euthanasia, to alleviate property damage and human health or safety threats related to the accumulation of fecal droppings.

2.3 Issues not Considered in Detail with Rationale

NADCP's Impact on Biodiversity. NADCP wildlife management activities in Nevada are not conducted with the purpose of eradicating a wildlife population. NADCP operates in accordance with international, federal, and state laws and regulations enacted to ensure species viability. Any reduction of a local population or group would be temporary because immigration from adjacent areas or reproduction would replace the animals

removed. The impacts of the current WS program on biodiversity are not significant nationwide or statewide (USDA 1997, revised). NADCP operates on a relatively small percentage of the land area of Nevada and NADCP's take is only a small proportion of the total population of any species as analyzed in Chapter 4.

Losses Should Be an Accepted Cost of Doing Business. Not everyone is faced with economic losses from damage caused by wildlife. Usually only a few individuals are impacted by wildlife damage, but the economic losses to those individuals can be devastating. NADCP is aware of concerns that some people believe that wildlife damage should be an accepted cost of doing business or that federal BDM should not be allowed until economic losses reach an identified threshold of loss or become unacceptable. Although some losses of resources such as property can be expected and are tolerated by most resource owners, NADCP has the legal direction to respond to requests for wildlife damage management, and it is WS policy to aid each requester to minimize losses. In a ruling for Southern Utah Wilderness Alliance, et al. vs. Hugh Thompson, Forest Supervisor for the Dixie National Forest, et al., the U. S. District Court of Utah denied the plaintiffs' motion for preliminary injunction. In part, the court found that a forest supervisor need only show that damage from predators is threatened to establish a need for wildlife damage management (Civil No. 92-C-0052A January 20, 1993). NADCP uses the Decision Model discussed in Chapter 1 to determine an appropriate strategy and considers the existing damage or the potential for damage in the process.

No Wildlife Damage Management at Taxpayer Expense, Wildlife Damage Management Should Be Fee Based. NADCP is aware of concerns that wildlife damage management should not be provided at the expense of the taxpayer or that it should be fee based. NADCP was established by Congress as the agency responsible for providing wildlife damage management to the people of the United States. Funding for NADCP BDM comes from a variety of sources in addition to federal appropriations. Such nonfederal sources include Nevada general appropriations, local government funds (county or city), and resource owner fees and these are all applied toward program operations. Federal, state, and local officials have decided that NADCP needs to be conducted and have allocated funds for these activities. Additionally, wildlife damage management is an appropriate sphere of activity for government programs, since wildlife management is a government responsibility. A commonly voiced argument for publicly funded wildlife damage management is that the public should bear the responsibility for damage to private property caused by "publicly-owned" wildlife.

American Indian and Cultural Resource Concerns. The National Historic Preservation Act of 1966, as amended, requires federal agencies to evaluate the effects of any federal undertaking on cultural resources and determine whether they have concerns for cultural properties in areas of these federal undertakings. In most cases, wildlife damage management activities have little potential to cause adverse affects to sensitive historical and cultural resources. In consideration of cultural and archeological interests, though, NADCP solicited input from the Nevada State Historic Preservation Office. Their response to NADCP was that wildlife damage management activities would have negligible impacts to historic properties in Nevada.

The Native American Graves, Protection, and Repatriation Act of 1990 provides protection of American Indian burials and establishes procedures for notifying Tribes of any new discoveries. Senate Bill 61, signed in 1992, sets similar requirements for burial protection and Tribal notification with respect to American Indian burials discovered on state and private lands. If a burial site is located by a NADCP employee, the appropriate Tribe will be notified. Bird damage management activities will only be conducted at the request of a Tribe and, therefore, the Tribe will have ample opportunity to discuss cultural and archeological concerns with NADCP. However, in consideration of Nevada's Native Americans, NADCP has included all of the recognized Tribes in Nevada on the mailing list for this EA to solicit their comments.

Impacts on the Natural Environment Not Considered. NADCP's BDM activities have been evaluated for their impacts on several natural environmental factors. The FEIS (USDA 1997, revised) concluded that impacts on air quality from the methods used by the NADCP are considered negligible. The proposed action would cause only very minimal ground disturbance and, therefore, impact soils and vegetation insignificantly. In addition, the proposed action does not include construction or discharge of pollutants into waterways and, therefore, would not impact water quality or require compliance with related regulations or Executive Orders. However, WS personnel could recommend habitat management to reduce bird use of an area such as the removal of cattails associated with a wetland at an airport that is attracting a roost of blackbirds that could potentially cause an aircraft strike. Therefore, these types of activities will be addressed further in the text.

CHAPTER 3: ALTERNATIVES INCLUDING THE PROPOSED ACTION

Nevada Animal Damage Control Program's alternatives must encompass the varied and diverse needs of wildlife damage management and be applicable throughout the program. The varied nature and species diversity inherent in the various requests for assistance to manage damages caused by birds requires NADCP to be diverse, dynamic, and flexible. The program, under any selected alternative, must be adaptable to varied situations that can be accomplished in a timely manner. The methods used in BDM are discussed in Chapter 3. Table 2 compares the varied methods that could be used in each alternative.

3.1 Alternatives Considered in Detail

3.1.1 Summary of Alternatives

Alternative 1 - Continue the Current Federal BDM Program. This is the “No Action” alternative as defined by CEQ for ongoing Programs and would allow the current program to continue.

Alternative 2 - No Federal NADCP BDM. This alternative consists of no Federal BDM.

Alternative 3 - Non-lethal Management Only. Under this alternative, NADCP would use only non-lethal BDM tools in attempting to resolve damage complaints.

Alternative 4 - Non-lethal Required before Lethal Control. This alternative would not allow any lethal control by NADCP until non-lethal methods had been tried and found to be inadequate in each depredation situation.

3.2 Detailed Description of Alternatives

3.2.1 Alternative 1 - Continue the Current Federal BDM Program. The “No Action” alternative is a procedural NEPA requirement (40 CFR 1502.14(d)), and is a viable and reasonable alternative that could be selected. It will serve as a baseline for comparison with the other alternatives. In this EA, the “No Action” alternative is consistent with CEQ’s definition and is equivalent to the current program which it will be referred to as.

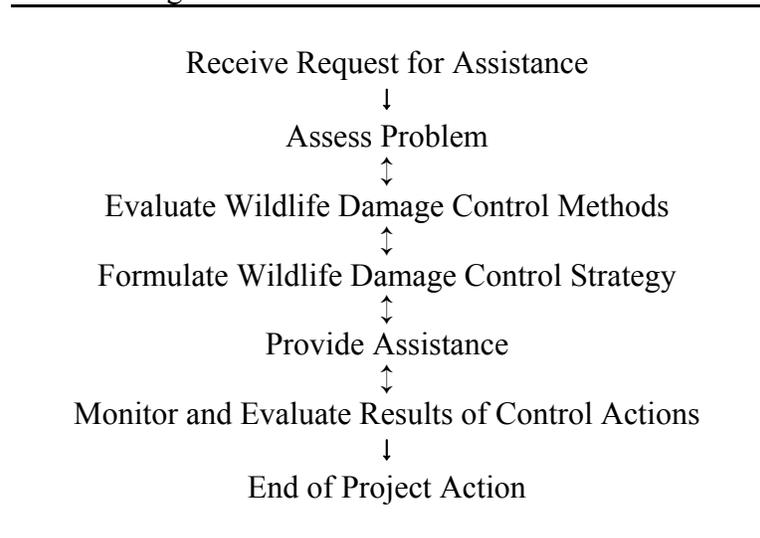
Integrated Wildlife Damage Management and the Decision Making Process. The current program alternative is an IWDM approach and similar to the “current program” which was analyzed and discussed in the FEIS (USDA 1997, revised). It is composed of a variety of methods that are implemented based on the WS Decision Model (Figure 1). The discussion that follows contains further information intended to foster understanding of WS, and ultimately, NADCP.

During more than 70 years of resolving wildlife damage problems, WS has considered, developed, and used numerous methods of managing damage problems (USDA 1997,

revised, P. 2-15). The efforts have involved research and development of new methods and the implementation of effective strategies to resolve wildlife damage.

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. IWDM is the implementation and application of safe and practical methods for the prevention and control of damage caused by wildlife based on local problem analyses and the informed judgement of trained personnel. WS applies IWDM, commonly known as Integrated Pest Management (WS Directive 2.105), to reduce damage through the WS Decision Model (Slate et. al. 1992) described in the FEIS (USDA 1997, revised) and shown below in Figure 1.

Figure 1. APHIS-WS Decision Model



The philosophy behind IWDM is to implement effective management techniques in a cost effective manner while minimizing the potentially harmful effects on humans, target and non-target species, and the environment. IWDM draws from the largest possible array of options to create a combination of techniques appropriate for the specific circumstances. IWDM may incorporate cultural practices (i.e. spilled grain removal), habitat modification, animal behavior (i.e. scaring), local population reduction, or any combination of these, depending on the characteristics of the specific damage problems. The FEIS describes the procedures used by NADCP personnel to determine management strategies or methods applied to specific damage problems (USDA 1997, revised) . The Decision model is an undocumented thought process which also considers the variables as encountered in a case by case basis:

- Species responsible for damage
- Magnitude, geographic extent, frequency, and duration of the problem
- Status of target and non-target species, including T&E species
- Local environmental conditions
- Potential biological, physical, economic, and social impacts
- Legal restrictions
- Costs of control options
- Prevention of future damage

The WS decision making process is a standardized procedure for evaluating and responding to damage complaints. NADCP personnel are frequently contacted only after requesters have tried the available non-lethal techniques and found them to be inadequate for alleviating or reducing damage to an acceptable level. NADCP personnel evaluate the appropriateness of different BDM methods in the context of their availability (legal and administrative) and suitability based on biological, economic and social considerations. The cost of BDM can be secondary in consideration of overriding environmental, legal, human health and safety, animal welfare, or other concerns. Following this evaluation, the methods deemed to be practical for the situation are formed into a management strategy. Once implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for additional management is ended. The FEIS provides detailed examples of how the WS Decision Model is implemented for different scenarios in urban and rural areas and on public and private lands (USDA 1997, revised).

Starling, pigeon, blackbird, magpie, and crow damage can occur whenever they are present at a site where they are not wanted. This continual threat exists because no cost-effective or socially acceptable method or combination of methods is available to permanently stop or prevent bird damage from occurring. When damage continues intermittently over time, the NADCP Specialist or resource owner can monitor and periodically reevaluate the situation. If one method or combination of methods fails to stop damage, a different strategy can be implemented.

Integrated Bird Damage Management Strategies

Technical Assistance Recommendations. Under technical assistance, NADCP recommends strategies to requestors, but implementation is the responsibility of the requestor. NADCP personnel provide information, demonstrations, and advice on many of the available IWDM techniques. Technical assistance includes demonstrations on the proper use of management devices such as propane exploders and pyrotechnics and information and advice on animal husbandry practices, habitat management, and animal behavior modification devices. Technical assistance is sometimes provided by NADCP personnel following an on-site visit or verbal consultation with the requestor. Generally, several management strategies are described to the requestor for short and long-term solutions to damage problems. These strategies are based on the level of risk, the abilities of the requestor, need, and practical application. Technical assistance may require substantial effort by NADCP personnel in the decision making process, but the actual management is primarily the responsibility of the requestor.

Direct Control Assistance. Direct control assistance activities are conducted or supervised by NADCP personnel. Direct control assistance is implemented when the problem cannot effectively be resolved through technical assistance and when Cooperative Agreements or MOUs provide for NADCP direct control assistance. The initial investigation defines the nature and history of the problem and the extent and species responsible for damage. Professional skills of NADCP personnel are often

required to effectively resolve problems, especially if restricted-use drugs or chemicals are proposed, or if the problem is too complex and requires the direct supervision of a wildlife professional. NADCP considers the biology and behavior of the damaging species and other factors using the WS Decision Model (Slate et al. 1992). The recommended strategy(ies) may include any combination of proactive and reactive actions and the use of lethal or non-lethal BDM methods that could be implemented by the requestor, NADCP, or other agency, as appropriate. Two direct control assistance approaches are used by NADCP and the BDM methods may include lethal or non-lethal control.

Proactive Damage Management. Proactive damage management is the application of wildlife damage management strategies prior to damage occurrences, based on historical damage problems. As requested and appropriate, NADCP personnel provide information, conduct demonstrations or take action to prevent these historical problems from recurring. For example, in areas where a new pigeon population arises, but damage of any extent has not occurred, NADCP may provide information about exclusion, live traps, or other techniques, or be requested to conduct operational BDM prior to significant damage occurring. Proactive damage management can take place on most lands without special authorization. NADCP must receive a request from the resource owner or individual that expects damage or has experienced damages historically on all land classes.

Reactive (Corrective) Damage Management. Reactive damage management is the application of BDM in response to an incurred loss with the intent of abating or reducing further losses. As requested and appropriate, NADCP personnel would provide information and conduct demonstrations or, with the appropriate signed agreement, take action to prevent additional losses from occurring. For example, in areas where starling damage is occurring at a feedlot, NADCP may provide information about bird-proof feeders, removal of standing water and spilled grain, night-feeding, and pyrotechnics, and conduct operational BDM with a DRC-1339 treatment to stop current and prevent further losses.

Non-lethal Methods. Resource owner practices consist primarily of non-lethal preventive methods such as habitat and animal behavior modifications. Resource owners are encouraged to use these methods, based on the level of risk, need, and professional judgement on their effectiveness and practicality (USDA 1997, revised). In addition, some methods such as cage traps can be used non-lethally or lethally, often depending on the species involved and the circumstances. Target birds may or may not be relocated, usually it depends on the species, social considerations such as hunting opportunities, and aesthetics. However, translocation of wild animals is discouraged by WS policy (WS Directive 2.501) because of stress to the relocated animal and poor survival rates due to intraspecific strife with established resident animals of the same species, and because of difficulties in adapting to new locations or habitats. Relocation of captured problem animals is also opposed by the American Veterinary Medical Association, the National Association of State Public Health Veterinarians, and the Council of State and Territorial Epidemiologists because of the risk of disease transmission among wild animals. In

addition, Nevada State Law allows the relocation of wild animals only with a permit (Nevada Administrative Codes (NAC) 503.135).

Lethal Methods. Lethal control methods are often most appropriately used by NADCP personnel trained and certified to use them. The public, in general, does not have the proper equipment, capability, access, or necessary training to use lethal techniques such as shooting in an urban area. Fully lethal techniques used in BDM are shooting, and Avitrol® (only for the birds that ingest treated particles) and DRC-1339 applications. However, several other BDM techniques can be used lethally. For example, birds can be captured alive with alpha-chloralose, live traps, decoy traps, cannon nets, and hand capture and then euthanized.

Bird Damage Management Methods Available for Use. A variety of methods are used by NADCP personnel in BDM. Control strategies are based on applied IWDM principles. WS and NADCP employ three general strategies for control of wildlife damage: resource management, physical exclusion, and wildlife management. Each of these approaches is a general strategy or recommendation for addressing bird damage situations. Within each approach, specific methods or tactics are available for BDM, including many that are specific to starlings (Johnson and Glahn 1994), blackbirds (Dolbeer 1994), pigeons (Williams and Corrigan 1994), magpies (Hall 1994), and crows (Johnson 1994). The BDM methods used in the current program include technical assistance recommendations such as exclusion, frightening devices, chemical repellents, and harassment, and direct control methods such as alpha-chloralose, DRC-1339, decoy-traps, live traps, and shooting. Most BDM methods have recognized strengths and weaknesses relative to each specific bird damage situation. NADCP personnel can determine for each BDM request what method or combination of methods is most appropriate and effective using the WS Decision Model (Slate et al. 1992). NADCP conducts direct control activities involving take on private lands only where signed Agreements For Control On Private Property have been executed. NADCP conducts direct control activities on municipal, county or other government lands where Agreements For Control On Non-private Property are in place. These agreements list the intended target animals and methods to be used.

All BDM methods have limitations which are defined by the circumstances associated with individual wildlife damage problems. When NADCP specialists receive a request for assistance, they consider a wide range of limitations as they apply the decision making process to determine what method(s) to use to resolve a bird damage problem (USDA 1997, revised). Examples of limitations which must be considered and criteria to evaluate various methods are presented in the FEIS, Appendix N (USDA 1997, revised) and in the following discussions. Following is the basic list of methods given consideration by NADCP for BDM.

Resource Management. Resource management includes a variety of practices that may be used by resource owners to reduce the potential for starling, blackbird, pigeon, magpie, and crow damage. Implementation of these practices is appropriate when the potential for damage can be reduced without significantly increasing a resource owner's

costs or diminishing a person's ability to manage resources pursuant to their goals. Resource management recommendations are mostly made through NADCP technical assistance efforts.

Habitat Management. Just as habitat management is an integral part of other wildlife management programs, it also plays an important role in BDM. The type, quality, and quantity of habitat is directly related to the birds attracted to an area and that are produced. Therefore, habitat can be managed so that it does not produce or attract certain bird 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. Also, legal constraints may exist which preclude altering particular habitats, especially areas with wetlands or T&E species.

Habitat management is recommended through technical assistance and actual habitat manipulation is done by the property manager. NADCP advises property managers when recommending habitat management to seek guidance from appropriate regulatory agencies for environmental compliance requirements such as compliance with the ESA, MBTA, or CWA. Changes made in habitat such as the removal of a wetland or manipulation in the design of a public space can often help reduce potential bird damage. For example, selecting species of trees and shrubs that deter birds can reduce the likelihood of potential damage to parks, public spaces, or residential areas. Similarly, incorporating spaces or open areas into landscape designs that expose nests can significantly reduce potential problems. Modifying public spaces to remove the potential for wildlife conflicts, though, is often impractical because of economics or the presence of other nearby habitat features that attract wildlife. Most habitat management methods for IWDM are recommended by NADCP at airports to reduce bird aircraft strike problems. Habitat management around airports is aimed at eliminating nesting, roosting, loafing, and watering and feeding sites. The draining of wetlands and retention ponds to eliminate wildlife habitat typically requires a Clean Water Act, Section 404 Permit from the Army Corps of Engineers. The issuance of these permits could be contingent upon costly efforts by resource owners, such as an airport, to mitigate the loss of the wetlands. Habitat management is often necessary to minimize damage caused by blackbirds and starlings that form large roosts during late autumn and winter. Bird activity can be greatly reduced at roost sites by removing all the trees or selectively thinning the stand. Roosts often will re-form at traditional sites, and substantial habitat alteration is the only way to permanently stop such activity (USDA 1997, revised). Some habitat management is also used to reduce nesting and roosting of pigeons and starlings on structures.

Cultural Methods. NADCP may recommend the alteration of agricultural producer and property owner practices to reduce bird damage such as at a feedlot where techniques such as night feeding, indoor feeding, closed barns or corrals, removal of spilled grain or standing water, and use of bird proof feeders are recommended to reduce bird numbers (Johnson and Glahn 1994). Increased feed size may reduce consumption by starlings but may not be cost effective for the producer (Twedt and Glahn 1984). Artificial feeding by people often attracts birds into areas which are not normally good bird habitat and may

sustain more than could be supported on natural food supplies. This overabundance may exacerbate resource damage. If these practices such as leaving spilled grain are modified, resource losses may be reduced. In addition, it may be suggested to producers that they plant different crops or modify their planting schedule to reduce damages, especially in areas with recurring, seasonal damage.

Lure Crops. When depredations cannot be avoided by careful crop selection or modified planting schedules, lure crops can sometimes be used to mitigate the loss potential. Lure crops are planted or left for consumption by wildlife as an alternative food source. This approach provides relief for critical crops by sacrificing less important or specifically planted fields. Establishing lure crops is sometimes expensive, requires considerable time and planning to implement, and may attract other unwanted species to the area.

Physical Exclusion. Physical exclusion methods restrict the access of wildlife to resources. These methods provide a means of appropriate and effective prevention of bird damage in some situations. Physical exclusion methods used or recommended by NADCP are described in the following section.

Barriers, Netting, and Other Methods. Netting consists of placing plastic or wire nets at points where access is eliminated or minimized for birds. Small mesh netting or wire with less than 1-inch openings, secured to wood or pipe frames, can prevent birds from accessing roost or nest sites. Small plastic mesh netting is also used to protect some crops such as blueberries. However, installation and maintenance costs for netting may be cost prohibitive. In addition, exclusion adequate to stop bird movements can also restrict movements of livestock, people and other wildlife (Fuller-Perrine and Tobin 1993). Heavy plastic strips hung vertically in open doorways have been successful in some situations in excluding birds from warehouses (Johnson and Glahn 1994). Plastic strips, however, can prevent filling of the feed troughs at livestock feeding facilities or can be covered up when the feed is poured into the trough by the feed truck. They are not practical for open-air feedlot operations that are not housed in buildings.

Wildlife Management. Controlling wildlife damage through wildlife management is achieved with many different techniques. The objective of this approach is to alter the behavior or population of the target animal, thereby eliminating or reducing the potential for loss or damage. The following are bird management methods that may be used or recommended by NADCP.

Frightening Devices. Frightening and harassment techniques to scare animals are probably the oldest methods of combating wildlife damage and may be used to scare or repel birds that cause loss or damage (Twedt and Glahn 1982, Booth 1994). Frightening devices include distress calls, pyrotechnics, propane cannons, flags, and reflective tape. Scaring devices can be effective but usually only for a short period of time before birds become accustomed and learn to ignore them (Schmidt and Johnson 1984, Bomford 1990, Rossbach 1975, Mott 1985, Shirota et al. 1983, and Arhart 1972). The success of frightening methods depends on the animal's fear of and subsequent aversion to offensive 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. Over time, some animals learn to ignore commonly used scare tactics. 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. The use of some frightening devices and techniques in urban and suburban environments may be considered aesthetically displeasing such as netting over trees or a nuisance by some persons 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 in the air 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 crops, roosting locations, or runways. The shells are fired so that they explode in front of, or underneath, flocks of birds attempting to enter crop fields, roosts, or the air operating area at an airport. The purpose is to produce an explosion between the birds and their objective. Birds already in a crop field or at an airport can be frightened away, but 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. 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. Additionally, birds may habituate to the noise in less than a few weeks.

Scarecrows. Since manpower 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 the "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.

Reflective tape. Reflective tape has been used successfully to repel some bird species from crops when spaced at three or five meter intervals (Bruggers et al. 1986, Dolbeer et al. 1986). Other studies have shown reflective tape ineffective (Tobin et al. 1988, Bruggers et al. 1986, Dolbeer et al. 1986, Conover and Dolbeer 1989).

Flagging. Flags may have limited effectiveness in frightening birds. Mason et al. (1993) and Mason and Clark (1994) have shown white and black plastic flags to be effective at repelling snow geese from pastures when alternative grazing areas were available. Anecdotal reports indicate black flagging may be effective at repelling birds. Mylar flagging has been reported effective at reducing migrant Canada goose damage to crops (Heinrich and Craven 1990).

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. These can be effective for species such as blackbirds and starlings, but not pigeons. 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. Some artificially created sounds also repel birds in the same manner as recorded "natural" distress calls.

Chemical Frightening Agent. Avitrol® (4-Aminopyridine) is often used as a chemical frightening agent (repellent) for blackbirds and starlings and is effective in a single dose when mixed with untreated baits at a 1:99 ratio. Most birds that ingest treated bait particles die (Johnson and Glahn 1994). Avitrol® treated bait is placed in an area where the targeted birds are feeding and usually a few birds will consume a treated bait and become affected by the chemical. The affected birds then broadcast distress vocalizations and display abnormal flying behavior, thereby, frightening the remaining flock away. Avitrol® is a restricted use pesticide that can only be sold to certified applicators and is available in several bait formulations where only a small portion of the individual grains carry the chemical. Any granivorous bird associated with the target species could be affected by Avitrol®. Avitrol® is water soluble, but laboratory studies demonstrated that Avitrol® is strongly absorbed onto soil colloids and has moderately low mobility. Biodegradation is expected to be slow in soil and water, with a half-life ranging from three to 22 months. However, Avitrol® may form covalent bonds with humic materials, which may serve to reduce its bioavailability in aqueous media, is non-

accumulative in tissues and rapidly metabolized by many species (Schafer 1991). Avitrol® is acutely toxic to avian and mammalian species. However, blackbirds and corvids are more sensitive to the chemical than other species. Chronic toxicity has not been demonstrated (Schafer 1991). Laboratory studies with predator and scavenger species have shown minimal potential for secondary poisoning. However, in a field study, magpies and crows may have been affected secondarily (Schafer 1991). A laboratory study showed, though, that magpies which fed on birds killed with two to 3.2 times the lethal dose of active ingredient for 20 days were not affected (Schafer et al. 1974). Similarly, American kestrels that fed on blackbirds which had died from a lethal dose of Avitrol® for seven to 45 days were not adversely affected (Schafer 1991). Therefore, no probable secondary risk is expected for this compound, including pets and the public.

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. Currently, no repellents are available for pigeons, starlings, blackbirds or corvids.

Methyl anthranilate is registered as a bird taste repellent for starlings. Methyl anthranilate is used for grape flavoring in over-the-counter products such as soda pops and may become available for use as a livestock feed additive (Mason et al. 1984, 1989). Naphthalene (moth balls) has proven to be ineffective as a bird repellent (Dolbeer et al. 1988). Methiocarb is a taste repellent that has also been proven ineffective in inhibiting overall consumption of feed by birds (Tobin 1985).

Take Methods. The capture or take of birds may reduce or eliminate damage in the capture area, as well as any migratory path, depending on the population. Several different methods can be used to take birds including lethal and non-lethal. However, take methods used for blackbirds, starlings, pigeons, crows and magpies are typically used lethally. The different methods include hand capture (not discussed), live traps, shooting, toxicants, and immobilization drugs.

Live traps are used commonly in BDM. These traps usually work best when baited with foods attractive to the target bird species. There are some animals that avoid cage traps and others that become “trap happy” and purposely get captured to eat the bait, making the trap unavailable to catch other animals. Cage traps must be checked frequently to ensure that captured animals are not subjected to extreme environmental conditions and non-target species caught can be released. Some animals fight to escape from cage traps and become injured. However, live traps, as applied and used by NADCP, should pose

no danger to pets or the public and if a pet is accidentally captured in such traps, it can be released unharmed.

Clover, funnel, and common pigeon traps are enclosure traps made of nylon netting or hardware cloth and come in many different sizes and designs, depending on the species of birds being captured. The entrance of the traps also vary greatly from swinging-door, one-way door, funnel entrance, to tip-top sliding doors. Traps are baited with grains or other food material which attract the target birds. NADCP standard procedure when conducting pigeon trapping operations is to ensure that an adequate supply of food and water is in the trap to sustain captured birds for several days. Active traps are checked regularly to replenish bait and water and to remove captured birds.

Decoy traps are used by NADCP for preventive and corrective damage management. Most decoy traps are similar in design to the Australian crow trap (Johnson and Glahn 1994 and McCracken 1972). Live decoy birds of the same species that are being targeted are usually placed in the trap with sufficient food and water to assure their survival. Perches are configured in the trap to allow birds to roost above the ground and in a more natural position. Feeding behavior and calls of the decoy birds attract other birds which enter and become trapped themselves. Active decoy traps are monitored as appropriate, to remove and euthanize excess birds and to replenish bait and water.

Nest box traps are used or recommended by NADCP for corrective damage management and are effective in capturing local breeding and post breeding starlings and other targeted secondary cavity nesting birds (DeHaven and Guarino 1969, Knittle and Guarino 1976).

Mist nets are more commonly used for capturing small-sized birds such as house sparrows and finches, but can be used to capture larger birds such as pigeons and starlings. The mist net is a fine black silk or nylon net usually three to 10 feet wide and 25 to 35 feet long. Net mesh size determines which birds can be caught and overlapping “pockets” in the net cause birds to entangle themselves when they fly into the net (Day et al. 1980). Mist nets are monitored usually every hour when used outdoors and any non-target animals, especially T&E species such as spotted bats (*Euderma maculata*), can be released quickly and unharmed. Mist nets are more often used in buildings to capture birds such as starlings.

Cannon nets are normally used for larger birds such as pigeons and waterfowl and use mortar projectiles to propel a net up and over birds which have been baited to a particular site. Birds are taken from the net and disposed of appropriately.

Padded-jaw pole traps are modified No. 0 or 1 coil spring leg-hold traps used to capture a few target birds such as magpies and crows. These are placed on top of poles or typical roosting spots frequented by targeted corvids. The trap is placed on a slide so that once a bird is captured it falls to the ground. The jaws are normally heavily padded with foam rubber or cloth and a spring is removed or weakened to prevent leg injury. When padded-jaw pole traps are used, they are monitored frequently according to permit

conditions imposed by USFWS. The frequency of trap monitoring depends upon environmental factors. This ensures minimal impacts on non-target animals.

Shooting is more effective as a dispersal technique than as a way to reduce bird densities when large number of birds are present. Shooting is a very individual specific method and is normally used to remove a single offending bird. 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, revised). It is selective for target species and may be used in conjunction with the use of decoys and calling. Shooting with shotguns, air rifles, or rim and center fire rifles is sometimes used to manage bird damage problems when lethal methods are determined to be appropriate. The birds are killed as quickly and humanely as possible. NADCP personnel follow all firearm safety precautions when conducting BDM activities and comply with all laws and regulations governing firearms use.

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, NADCP 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). Wildlife Services 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.

Egg, Nest, and Hatchling Removal and Destruction. Egg and nest destruction is used mainly to control or limit the growth of a nesting population in a specific area through limiting reproduction of offspring or removal of nest to other locations. 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 species. Some species such as pigeons may persist in nesting and the laying of eggs, making this method ineffective. Nest and egg destruction may be used to prevent or minimize local population increases of starlings and pigeons, and eliminate territorial attacking behavior of blackbirds and crows.

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

DRC-1339 is the principal chemical method that is used for starling, blackbird, corvid, and pigeon damage management in the proposed action. For more than 30 years, DRC-1339 has proven to be an effective method of starling, blackbird, and pigeon control at feedlots, dairies, airports, and in urban areas (West et al. 1967, Besser et al. 1967, DeCino et al. 1966). Studies continue to document the effectiveness of DRC-1339 in resolving starling problems at feedlots (West and Besser 1976, Glahn 1982, Glahn et al. 1987). DRC-1339 is an effective, selective, and safe means for reducing urban pigeon populations (Blanton et al. 1992). Glahn and Wilson (1992) noted that baiting with DRC-1339 is a cost-effective method of reducing damage by blackbirds to sprouting rice.

DRC-1339 is a slow acting avicide that is registered with the EPA for reducing damage from several species of birds, including blackbirds, starlings, pigeons, crows, and magpies. 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. For example, starlings, a highly sensitive species, require a dose of only 0.3 mg/bird to cause death (Royall et al. 1967). 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, revised). Secondary poisoning has not been observed with DRC-1339 treated baits. During research studies, carcasses of birds which died from DRC-1339 were fed to raptors and scavenger mammals for 30 to 200 days with no observed symptoms of secondary poisoning (Cunningham et al. 1981). This can be attributed to relatively low toxicity to species that might scavenge on blackbirds and starlings 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, revised). Appendix P of USDA (1997, revised) contains a thorough discussion and risk assessment of DRC-1339. That assessment concluded that no adverse effects are expected from use of DRC-1339.

DRC-1339 has several EPA Registration Labels (56228-10, 56228-17, 56228-28, 56228-29, 56228-30 and three SLN labels, NV 040004, NV 020005 and NV 0100006) depending on the application or species involved in the damage reduction project. NADCP has used an average of 1,565 gm (3.5 pounds) of DRC-1339 per year for the past three years (MIS 2002-2004). The highest level of DRC-1339 use in the last three years

came in FY 02 when 1,752 gm were used. Over 90 percent of the use was to reduce damage by starlings, blackbirds, crows and pigeons.

Avitrol®. Avitrol® (4-Aminopyridine) is most often used as a chemical frightening agent (repellent) for blackbirds and starlings, but it can be used as a toxicant at 1:9 ratio for pigeons. Avitrol® treated bait is placed in an area where the targeted birds are feeding and birds that consume treated baits normally die (Johnson and Glahn 1994). Pigeons display abnormal flying behavior after ingesting treated baits, but no distress vocalizations. This is normally not used at airports because the abnormal flying behavior could cause them to fly into the path of airplanes. Further discussion of Avitrol® can be found above.

Chemical Immobilizing and Euthanizing Agents. Several NADCP Specialists are trained and certified to use drugs for capturing or euthanizing wildlife. The only immobilizing drug used in BDM is alpha-chloralose. 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 WS are approved by a Drug Committee panel.

Alpha-chloralose is an immobilizing agent used to capture and remove nuisance pigeons as well as other species of birds not considered in this EA. It has been typically used in industrial and residential areas. Single bread or corn baits are fed directly to target pigeons and those treated are monitored until the drug takes effect. NADCP personnel remain at the application site until all the immobilized birds are retrieved. Unconsumed baits are removed from the site following each treatment. Alpha-chloralose may be used only by WS personnel who have been trained and certified in its use. Pursuant to FDA restrictions, pigeons captured with alpha-chloralose for subsequent euthanasia must be killed and buried or incinerated, or be held alive for at least 30 days, at which time the birds may be killed and processed for human consumption. It is labor intensive and, therefore, not always cost effective (Wright 1973, Feare et al. 1981). Alpha-chloralose is typically delivered as a well contained bait in small quantities with minimal hazards to pets and humans because the single bread or corn baits are fed directly to the target birds. Alpha-chloralose was eliminated from more detailed analysis in USDA (1995) based on critical element screening, therefore, environmental fate properties of this compound were not rigorously assessed. However, the solubility and mobility are believed to be moderate and environmental persistence is believed to be low. Bioaccumulation in plants and animal tissue is believed to be low. Alpha-chloralose is used in other countries as an avian and mammalian toxicant. The compound is slowly metabolized, with recovery occurring a few hours after administration (Schafer 1991). The dose used for immobilization is designed to be about two to 30 times lower than the LD50. Mammalian data indicate higher LD50 values than birds. Toxicity to aquatic organisms is unknown (Wornecki et al. 1990), but the compound is not generally soluble in water and, therefore, probably remains unavailable to aquatic organisms. Factors supporting the determination of this low potential included the lack of exposure to pets, non-target species and the public, and the low toxicity of the active ingredient. Other supporting

rationale for this determination included relatively low total annual use and a limited number of potential exposure pathways. The agent is currently approved for use by WS as an FDA Investigational New Animal Drug (Registration #6602) rather than a pesticide. NADCP has used Alpha-chloralose on pigeons during the last three FY's.

Euthanasia may be used to kill captured birds. The euthanasia method used is dependent on whether the animal is going to be processed for human consumption. Birds 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. CO₂ is sometimes used to euthanize birds which are captured in live traps and when relocation is not a feasible option. Live birds are placed in a container such as a plastic 5-gallon bucket or chamber and sealed shut. CO₂ gas is released into the bucket or chamber and birds quickly die after inhaling the gas. NADCP rarely uses chemical euthanasia for captive birds but is required to on occasion.

Relocation. Since starlings, blackbirds, pigeons, and most other damaging species are common and numerous throughout Nevada, they are rarely, if ever, relocated because habitats in other areas are generally already occupied. Relocation of damaging birds to other areas following live capture generally would not be effective or cost-effective. Relocation of wildlife often involves stress to the relocated animal, poor survival rates, and difficulties in adapting to new locations or habitats. In addition, it is against State law to relocate these species except as authorized by permit.

3.2.2 Alternative 2 - No Federal NADCP BDM. This alternative would consist of no Federal involvement in BDM in Nevada. Neither direct operational management nor technical assistance would be provided from NADCP. Under this alternative, wildlife damage conflicts may potentially be handled by the NDOA, or private resource owners and managers, private contractors, or NDOW and other government agencies. It is possible that many BDM methods would be used unsafely and improperly simply out of frustration by resource owners over the inability to reduce damage losses to a tolerable level. This alternative is discussed in detail in the FEIS (USDA 1997, revised).

3.2.3 Alternative 3 - Non-lethal Management Only. This alternative would allow NADCP to provide technical information and operational assistance with non-lethal control techniques, such as exclusion, frightening devices, chemical repellents, harassment, cultural and habitat modifications, and some use of cage traps where relocation is allowed. NADCP would also loan equipment used for non-lethal control such as propane cannons and decoy traps. Information and training regarding shooting, DRC-1339 or Avitrol®, the only complete lethal control methods for BDM, would not be provided by NADCP. Shooting, Avitrol® or other BDM methods used to take birds could be applied by persons with little or no training or experience. The use of inexperienced or untrained personnel could require more effort and cost to achieve the same level of problem resolution, and could cause harm to the environment, including a higher take of non-target animals. As discussed in 3.2.2, many BDM methods could be used improperly because of the frustration of resource owners.

3.2.4 Alternative 4 - Non-lethal Required before Lethal Control. This alternative would require that: 1) resource owners show evidence of sustained and ongoing use of non-lethal techniques aimed at preventing or reducing damage, prior to receiving the services of NADCP; 2) employees of NADCP use or recommend appropriate non-lethal techniques in response to a confirmed damage situation prior to using lethal methods; and 3) lethal techniques be used only when the use of husbandry or non-lethal techniques had failed to keep damage losses below an acceptable level as indicated by the cooperator. This alternative is analyzed and discussed in the FEIS (USDA 1997, revised). Resource owners or other agencies such as DRP would still have the option of implementing lethal control measures on their own and NADCP would continue to recommend lethal control when and where appropriate.

3.2.5 Summary of Alternatives. The four alternatives would allow the use of different BDM methods. The methods that could be used under the different alternatives are summarized in Table 2.

Table 2. Summary of BDM methods that could be used or recommended by NADCP personnel which would be authorized under each of the alternatives.

| Summary of Bird Damage Management Methods which Could be Authorized | | | | |
|--|---|--|------------------------------------|---|
| Management Method | Alternative 1 Current Program | Alternative 2 No Federal Program | Alternative 3 Non-lethal | Alternative 4 Nonlethal then Lethal |
| Habitat Management | ✓ | No | ✓ | ✓ |
| Lure Crops/Cultural Methods | ✓ | No | ✓ | ✓ |
| Exclusion | ✓ | No | ✓ | ✓ |
| Frightening Devices | ✓ | No | ✓ | ✓ |
| Avitrol ^{®1} | ✓ | No | No | ✓ ⁴ |
| Repellents | ✓ | No | ✓ | ✓ |
| Live Traps | ✓ | No | ✓ ³ | ✓ |
| Shooting | ✓ | No | No | ✓ ⁴ |
| DRC-1339 ^{1, 2} | ✓ | No | No | ✓ ⁴ |
| Alpha-chloralose ^{1, 2} | ✓ | No | ✓ ³ | ✓ ⁴ |
| Euthanasia ¹ | ✓ | No | No | ✓ ⁴ |

1 Only certified applicators could use.

2 Only registered for USDA-APHIS-WS use.

3 All methods would have to be used non-lethally and birds taken relocated.

4 Could only be used by NADCP after non-lethal methods were attempted

3.3 Alternatives Considered but Not Analyzed in Detail

Several alternatives were considered but not analyzed in detail. These were not considered because of problems associated with their implementation as described below.

Compensation for Bird Damage Losses. The compensation alternative would require the establishment of a system to reimburse resource owners for damage. This alternative was

eliminated from further analysis because no federal or state laws currently exist to authorize such action. Under such an alternative, NADCP would not provide any direct control or technical assistance. Aside from lack of legal authority, analysis of this alternative in the FEIS indicates that the concept has many drawbacks (USDA 1997, revised).

- It would require larger expenditures of money and manpower to investigate and validate all losses, and determine and administer appropriate compensation.

- It would be difficult, if not impossible, to assess and confirm losses in a timely manner for all requests, and, therefore, many losses could not be verified and would go uncompensated. Additionally, compensation would most likely be below full market value.

- Compensation would give little incentive to resource owners to limit damages with BDM strategies such as hazing with pyrotechnics and propane cannons.

- Not all resource owners would rely completely on a compensation program and BDM activities including lethal control would likely continue as permitted by state and federal law.

Bounties. Payment of funds for killing birds (bounties) suspected of causing economic losses is not supported by USFWS and Nevada State agencies such as NDOW. Bounties have been commonplace in U.S. history, but have not been supported by most professional wildlife biologists for many years (Latham 1960). NADCP concurs because of the following.

Bounties are generally not effective in controlling damage, especially over a wide area such as Nevada.

- Circumstances surrounding the take of animals are typically arbitrary and completely unregulated.

- No process exists to prevent paying for animals from outside the damage management area.

- NADCP does not have the authority to establish a bounty program.

Eradication and Long Term Population Suppression. An eradication alternative would direct all NADCP efforts toward total long term elimination of bird species in entire cooperating areas or larger defined areas in Nevada. The eradication of native bird species is not a desired goal of state or federal agencies. Some landowners would prefer that some species of bird be eradicated. This may be a desired goal for starlings and feral pigeons, but would likely be cost-prohibitive and take many years to accomplish, if at all. However, eradication as a general objective of BDM will not be considered by NADCP in detail because:

- NADCP opposes eradication of any native wildlife species.
- NDOW, USFWS, NDOA, BLM, and USFS oppose eradication of any native wildlife species.
- The eradication of a non-native species population would be extremely difficult, if not impossible to accomplish, and cost-prohibitive in most situations.
- Eradication is not acceptable to most members of the public.

Suppression would direct NADCP efforts toward managed reduction of certain problem populations or groups. In localized areas where damage can be attributed to specific species, namely crows, NDOW has the authority to increase hunting seasons within the boundaries of the Migratory Bird Treaty Act and USFWS regulations. When a large number of requests for wildlife damage management are generated from a localized area, NADCP would consider suppression of the local population or groups of the offending species, if appropriate.

It is not realistic, practical, or allowable under present NADCP policy to consider large-scale population suppression as the basis of NADCP. Typically, NADCP activities in Nevada would be conducted on a very small portion of the area inhabited by the problem species, and therefore, eradication or long term population suppression is unrealistic altogether.

3.4 Mitigation in Standard Operating Procedures

Wildlife Services has incorporated mitigation measures into its standard operating procedures that serve to prevent or reduce negative impacts that otherwise might result from that action. The current program, nationwide and in Nevada, uses many such measures. The procedures are discussed in detail in Chapter 5 of the FEIS (USDA 1997, revised).

3.4.1 General Operating Procedures.

National MOUs with the USFWS, and a State MOU with NDOW delineate expectations for BDM. Agreements to conduct BDM activities on any properties would need to be in place before NADCP would implement any actions. The agreement would detail activities, target species, and mitigation measures to be implemented on properties where BDM is needed. This minimizes potential impacts with land and resources uses.

NADCP coordinates with Tribal officials for work on Tribal lands to identify and resolve any issues of concern to Indian Tribes.

The use of BDM methods such as shooting conform to current Nevada rules and regulations administered by NDOW.

The use of chemical pesticides and repellents would conform to rules and regulations set by EPA and NDOA.

3.4.2 WS and NADCP Mitigation in Standard Operating Procedures Specific to the Issues. The following is a summary of measures that are specific to the issues listed in Chapter 2 of this document.

Effects on Target Bird Species Populations

Bird Damage Management is directed toward localized populations or individual offending birds, depending on the species and magnitude of the problem, and not an attempt to eradicate populations in the entire area or region.

Nevada Animal Damage Control Program specialists use specific methods that are conducive for capturing the target animal.

Nevada Animal Damage Control Program's kill is monitored. Consideration of "Total Harvest" and estimated population numbers or trends of key species are used to assess cumulative effects to maintain the magnitude of harvest below the level that would impact the viability of populations of native species (see Chapter 4).

Effects on Non-target Species Populations, Including T&E Species

- Nevada Animal Damage Control Program personnel are highly experienced and trained to select the most appropriate method(s) for taking problem birds with little impact on non-target animals.
- Non-target animals captured in live traps or other method are released at the capture site unless it is determined by NADCP Specialists that the animal is not capable of self maintenance.
- NADCP personnel work with research programs to continue to improve the selectivity of management devices.
- NADCP has completed both informal and formal consultations pursuant to Section 7 of the Endangered Species Act with the USFWS (1992 national level Section 7 consultation as included in USDA 1997, revised, and March 27, 2003 Informal Consultation/Biological Opinion for the Nevada Animal Damage Control Plan (File No. 1-5-03-F-400). A national level consultation is ongoing. NADCP adopts all measures required to preclude jeopardizing the continued existence of any threatened or endangered species. In addition, NADCP provides similar protection measures to species proposed for listing.

- Except as noted below for potential work in desert tortoise habitat, NADCP's BDM activities were found to be not likely to adversely affect listed species or species proposed for listing.
- Should BDM be requested within habitat of the Federally listed desert tortoise, specific terms and conditions implementing reasonable and prudent measures as described in the March 27, 2003 Biological Opinion would be followed.

Humaneness of Control Techniques

- Chemical immobilization and euthanasia procedures that do not cause pain or undue stress are used by certified personnel when practical.
- NADCP personnel attempt to kill captured target animals that are slated for lethal removal as quickly and humanely as possible.
- Traps are set and inspected according to NDOW regulations and WS policy.
- Research continues with the goal of improving the humaneness of BDM devices.

Impacts on Public Safety and the Environment

- A formal risk assessment (USDA 1997, revised, Appendix P) found that hazards to the public from BDM devices and activities are low.
- NADCP Specialists who use restricted use chemicals (i.e., pesticides or drugs) are trained and certified by program personnel, or other experts, in the safe and effective use of these materials under EPA, FDA and NDOA approved programs. NADCP employees who use chemicals participate in continuing education programs to keep abreast of developments and to maintain their certifications.
- Chemical toxicant and repellent use complies with EPA rules and regulations administered by NDOA.
- Drug use complies with FDA, the Drug Enforcement Agency, and EPA rules and regulations.

Effectiveness of NADCP

- The WS Decision Model, which is designed to identify effective wildlife damage management strategies and their impacts, is consistently applied as a professional undocumented thought process.
- Consideration will be given to different values such as selectivity and humaneness as well as overall monetary costs within the constraints of the financial resources available.

Effects on Aesthetics

· BDM activities are directed at taking action against individual problem animals, or local populations to resolve problems associated with them. A dichotomy usually exists among members of the public on their perception of damage and the wildlife causing damage. NADCP considers aesthetics from all sides when resolving problems.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

Chapter 4 provides the information needed for making informed decisions in selecting the appropriate alternative for meeting the purpose of the proposed action. This chapter analyzes the environmental consequences of each alternative identified in Chapter 3 in relation to the issues identified for detailed analysis in Chapter 2.

The environmental consequences of each alternative are compared with the proposed action to determine if the real or potential impacts are greater, lesser or the same. Cumulative and unavoidable impacts to irreversible and irretrievable resources are discussed in relation to the identified issues for each of the alternatives.

Non-significant Impacts. The following resource values within Nevada are not expected to be significantly impacted by any of the alternatives analyzed: soils, geology, minerals, visual resources, air and water quality, prime and unique farmlands, timber, and range. These resources will not be analyzed further.

Irreversible and Irretrievable Commitments of Resources. No irreversible or irretrievable commitments of resources are expected, other than the minor use of fuels for motor vehicles and other equipment, and similar materials. These will not be discussed further.

4.1 Alternative 1 - Continue the Current Federal BDM Program. The methods that would be used to take target birds under the current program are the same as those that have been used or considered in recent years by NADCP. The methods used in each damage situation depend on the species causing the damage and other factors including location, weather, and time of year as discussed in section 3.2. The methods used by NADCP are discussed in 3.2 and include habitat management, cultural practices, exclusion, frightening devices, repellents, and take methods. Take methods include cage traps, decoy traps, net and hand capture, alpha-chloralose, shooting, DRC-1339, Avitrol®, and destruction of eggs and nests. All methods used in Nevada are assessed in the FEIS (USDA 1997, revised).

4.1.1 Effects on Target Bird Populations. Since all of the species' populations that are the targets of BDM projects have remained relatively stable or slightly increasing, it can be assumed that cumulative impacts to these species under the current program and from all other sources is low. The biological carrying capacity is the land or habitat's limit for supporting healthy populations of wildlife without degradation to the animal's health or its environment over an extended period of time (Decker and Purdy 1988). NADCP has historically conducted BDM projects annually in Nevada. The number of each species taken in FY04 is given in Table 3. The primary target species taken annually have been the starling, red-winged and Brewer's blackbird, brown-headed cowbird, and feral pigeon. Crows have been the target of one project in FY 04 (MIS 2004). No other blackbird species have specifically been targeted in Nevada with direct control in the past three years (MIS 2002-04). Of the take, starlings and blackbirds represented 97.3 percent in FY 04. Over the past three years Under the proposed action, NADCP plans to

continue the take of bird species similar to past years. Therefore populations of target bird species are not likely to be affected more than the current rates.

Table 3. Average yearly species take for FY 02 thru 2004.

| Target Starlings, Blackbirds, and Pigeons Killed by NADCP * | | | | | | |
|--|-----------------|----------------------------|--------------|------------------------------|-------------------------|--------------|
| Method | Starling | *Mxd/ Blackbird | Crows | Grackles/ Magpies | Feral Pigeon | Total |
| DRC-1339** | 99,800 | 9,500 | 71 | | 95 | 109,466 |
| Shooting | 19 | | | 2 | 2 | 23 |
| Alpha Chloralose | | | | 3 | 141 | 144 |
| Other | 1 | 2 | 1 | 4 | 220 | 228 |
| Total | 99,820 | 9,502 | 72 | 9 | 439 | 109,861 |

*Includes all other blackbirds not specifically listed in the table.

** Numbers of birds taken with DRC-1339 are estimated results from treatments.

Starling Population Impacts. Starlings (*Sturnus vulgaris*) were introduced into North America in 1890-91 when approximately 100 birds were released into New York City's Central Park (Cornell 2003). The starling is an exotic (invasive) species in North America, listed as an unprotected species by the USFWS. The birds, their eggs, and nests may be removed by any legal method. Starlings are subject to management under Executive Order 13112 (Invasive Species) as an invasive species. Starlings are not in the blackbird family (*Icterid*) but they have close behavioral patterns. They are gregarious (flock forming), especially in winter when they form roosts in the thousands, sometimes mixed with blackbirds.

Precise counts of starling and blackbirds do not exist, but the nationwide starling population has been estimated over 200 million (Cornell 2003). An extensive population survey by Dolbeer and Stehn (1983) showed that in the northwestern United States, the number of breeding starlings tripled between 1968 and 1981.

The BBS trends for starlings in Nevada shows an increase of 4.5 percent from 1980 to 2004 (see Table 5 at end of Section 4.1.1) (Sauer et al. 2005).

Data from Packham (1965) suggests that an average of 57 starlings were killed per pound of DRC-1339 treated bait used at feedlots in Idaho. This report along with field observations suggested that approximately 68 to 74 starlings would be killed per gram of DRC 1339 concentrate applied (USDA 2000, and Tom Hall, pers. comm.). Based on this estimate and MIS reported take for other methods used (MIS 2002- 2005a), WS estimates that it took an average of 114,989 starlings each year from FY 2002 to FY 2005. The actual number of starlings removed may be higher or lower than the estimate since different carriers were used. Research studies and field observations suggest DRC-1339 treatments kill about 75 percent of the starlings at cattle feeding facilities (Besser et al. 1967). Wildlife Services estimates that starling take could potentially increase to as many as 300,000, as in FY 99 (MIS 1999), due to anticipated increases in requests for assistance and due to natural yearly fluctuations in starling numbers. Numbers of birds

removed by members of the public are not known. Increase of take by WS is not expected to contribute to a decline in the starling population. Because the starling is an invasive species, any effect on the population may be considered environmentally desirable.

Homan et al. (2005) developed a model for estimating mortality using bioenergetics. The Nevada WS program is in the process of working with the modelers to determine field applicability and may adopt this model for purposes of calculating take.

Table 4. The estimated number of starlings taken by NADCP with DRC-1339 from FY 2002 - 2005.

| Starlings Taken by NADCP with DRC-1339 from FY 02 to 05 | | |
|--|--------------------------|-----------------------|
| Year | DRC-1339 Used (σ) | Estimated Take |
| FY 02 | 1,637 | 160,500 |
| FY 03 | 1,616 | 86,900 |
| FY 04 | 1,192 | 37,500 |
| *FY 05 | 2,020 | 123,800 |

*FY 05 data incomplete but used to show fluctuations and damage request.

Blackbird Population Impacts. Blackbird species that may be targeted under this program are Brewer’s blackbird (*Euphagus cyanocephalus*), red-winged blackbird (*Agelaius phoeniceus*), and brown-headed cowbirds (*Molothrus ater*). Blackbirds have slender, pointed bills; otherwise their structure is difficult to generalize (Sibley et al. 2001). They have iridescent black feathers and medium length tails.

In Nevada the BBS data from 1980 to 2004 show an estimate in the number for Brewer’s blackbirds increased 1.2 percent, while red-winged blackbird increased 6.3 percent and brown-headed cowbirds increased 5.6 percent (See Table 4 shown at the end of Section 4.1.1). Blackbird populations are healthy enough that the USFWS has established a standing depredation order for use by the public. Under this “order” (50 CFR 21.43), no Federal permit is required by anyone to remove blackbirds if they are committing or about to commit depredations upon ornamental or shade trees, agricultural crops, livestock, or wildlife, or when concentrated in such numbers and manner as to constitute a health hazard or other nuisance. Wildlife Services lethally removed an average of 8,502 mixed blackbirds within a three-year period (MIS 2002-2004). Wildlife Services projects that this level may increase due to a two year increasing take trend of Brewer’s blackbirds and red-winged blackbirds and the anticipated increases in related damages.

Dolbeer et al. (1995) showed that WS kills an average of four percent of the wintering population nationwide had no effect on breeding populations the following spring. Dolbeer et al. (1976) constructed a population model which indicated that a reduction of 15 percent of the wintering blackbird population would reduce the spring breeding population by 20 percent and that a 56 percent reduction in the wintering blackbird population would reduce spring breeding populations by only 33 percent. Given the density-dependent relationships in a blackbird population (i.e., decreased mortality and

increased fecundity of surviving birds) a much higher number would likely have to be removed in order to impact the regional breeding population.

Feral Pigeon Population Impacts. Breeding Bird Survey data indicate that the feral pigeon population has been stable to increasing across the Western BBS Region and in Nevada from 1966 through 2004 (Sauer et al. 2005). Bird damage management involving lethal control actions by NADCP for this species has been restricted to isolated, individual sites. Between FYs 2002 through 2004, NADCP took an average of 439 feral pigeons per year. Pigeons were taken with DRC-1339, alpha chlorolose, cage traps, and shooting. NADCP BDM does not appear to be having an adverse effect on pigeon populations in Nevada feral pigeons, being non-indigenous and having a high potential for negative impacts to people and property, are considered by many wildlife biologists to be an undesirable component of North American wild and native ecosystems. Any reduction in feral pigeon populations in North America could be considered a beneficial impact for the protection of human health and safety and property.

Black-billed Magpie Impacts. Magpie BBS data reflect a slight increase annually between 1966 and 2004 in Nevada, and within the Western BBS region, a decrease in early survey years with an increase in the later time period of 1980 to 2004 (Sauer et al. 2005). Gazda and Connelly (1993) documented a nesting density of 35 active magpie nests/mi² on the Sterling Wildlife Management Area in southeastern Idaho suggesting that they can be fairly dense breeders in suitable habitat such as in northern Nevada. NADCP only removed three black billed magpies on average each year from FYs 2002 through 2004. Magpie populations are apparently healthy enough, and the losses they cause are great enough that the USFWS has established a standing depredation order. Under this “order” (50 CFR 21.43), no Federal permit is required by anyone to remove magpies if they are committing or about to commit depredations upon ornamental or shade trees, agricultural crops, livestock, or wildlife, or when concentrated in such numbers and manner as to constitute a health hazard or other nuisance. NADCP has not contributed to a decline in the blackbilled magpie population.

American Crow Impacts. According to the BBS data, the American crow population has been stable to increasing in Nevada and in the Western BBS region from 1966 to 2004 (Sauer et al. 2005). Crow populations are healthy enough, and the problems they cause great enough, that the USFWS has established a standing depredation order for use by the public. Under this “order” (50 CFR 21.43), no Federal permit is required by anyone to remove crows if they are committing or about to commit depredations upon ornamental or shade trees, agricultural crops, livestock, or wildlife, or when concentrated in such numbers and manner as to constitute a health hazard or other nuisance. NADCP took an average of 72 crows each year between FYs 2002 and 2004 (MIS 2002, 2003 and 2004). With the increasing crow population trend in Nevada (Sauer et al., 2005), it is expected that complaints will increase and potentially take. NADCP has not contributed to a decline in the crow population. Crow population trends in Nevada as estimated from Breeding Bird Survey data are shown in Table 5.

Table 5. Breeding Bird Survey Nevada Population Trends

(from Sauer et al. 2005)

| Nevada Trend Analysis | 1966-2004 | 1980-2004 |
|-----------------------|-----------|-----------|
| European Starling | +4.6** | +4.5** |
| Pigeon | +0.7** | +0.3** |
| Red-winged Blackbird | +5.5** | +6.3* |
| Brown-headed cowbird | +9.0* | +5.6** |
| Brewer's blackbird | +1.6** | +1.6** |
| American Crow | +5.8** | +2.6** |
| Black-billed magpie | +1.8** | +2.0** |
| Great tailed grackle | +47.1* | +20** |

*P value is less than 0.05 and is considered to be statistically significant

**P value is greater than 0.05 and is not considered to be statistically significant

4.1.2 Effects on Non-target Species Populations, Including T&E Species. Mitigation measures in Standard Operating Procedures, as described in Section 3.4, are designed to avoid or minimize non-target impacts. Those mitigation measures have insured that non-target take in Nevada remains at relatively low or nonexistent levels.

Non-target Species Taken Unintentionally While Conducting BDM. NADCP did not take any non-target species in BDM activities between FYs 2002 through 2004. There is at least a potential for taking non-target animals with different BDM methods. For example, DRC-1339 treated baits specifically targeting blackbirds (ungreased baits) could potentially take other granivores such as mourning doves. However, the monitoring of species during prebaiting and during treatments has insured minimal to no non-target take.

Consideration of Impacts on T&E Species in Nevada. The UFWS determined through an informal Section 7 consultation/Biological Opinion (March, 2003 FWS file no. 1-5-03-F-400), that NADCP's BDM activities are not likely to adversely affect T&E species in Nevada, with the exception of the desert tortoise. The desert tortoise was the subject of the Biological Opinion since some program activities in its habitat (mostly those that are designed to benefit the tortoise and are outside of the scope of this EA) could affect the desert tortoise. Specific precatutions related to BDM are indicated below.

Some BDM activities could benefit T&E species. NADCP continually coordinates program planning with the USFWS to ensure that the program will not jeopardize the continued existence of threatened and endangered species. A national level Section 7

consultation between the USFWS and the national APHIS-Wildlife Services program is in progress. Any more stringent or protective measures from the national consultation to protect T&E species would be adopted into the selected BDM alternative in Nevada, as applicable.

Bald Eagle. Bald eagles are generalized predators-scavengers primarily adapted to edges of aquatic habitats. They primarily feed on fish (taken both alive and as carrion), waterfowl, mammalian carrion, and small birds and mammals. Carcasses of birds killed with shooting when accessible are removed and disposed of properly. The avicide DRC-1339 poses little risk of secondary poisoning (USDA 1997, revised). Based on an evaluation and discussion with the USFWS and NDOW, NADCP has concluded that implementation of the proposed action will not be likely to affect the bald eagle.

Desert Tortoise. The desert tortoise is widely distributed throughout the Mojave and Colorado deserts from below sea level to 4,130 feet or higher. It is most common in desert scrub, desert wash, and Joshua tree habitats, but occurs in almost every desert habitat except the most precipitous slopes. In the USFWS Biological Opinion, one reasonable and prudent measure was given to minimize take of the desert tortoise associated with BDM. That is that all vehicles will be confined to roadways in tortoise habitat, observe posted speed limits, and ATV use will be minimized as much as possible. NADCP activity will be limited as much as possible in designated desert tortoise habitat and vehicles, excluding ATVs, will stay on designated roads with drivers on the alert for tortoises on the roadway. The BDM activities proposed herein are not likely to occur in desert tortoise habitat. The USFWS concluded in its March 27, 2003 Biological Opinion that with implementing the Reasonable and Prudent Measures and Terms and Conditions specified in the opinion, that the NADCP (including BDM) would not jeopardize the desert tortoise or its critical habitat.

Southwestern Willow Flycatcher. NADCP is currently not conducting BDM in the areas known to have southwestern willow flycatchers, but is anticipating the potential for such. None of the methods used in BDM are likely to adversely affect the flycatcher. However, brown-headed cowbird control in their nesting areas could have a positive impact on this species and help in their recovery (Clark County 1999).

Spotted Bat. The spotted bat is listed by the State of Nevada as threatened. It is insectivorous, inhabits arid areas, and is fairly solitary. It is found throughout Nevada. It was concluded by NDOW that the only NADCP BDM activity that could affect this species was the use of mist nets. However, NDOW did not believe that mist nets would have any effect on spotted bats as long as mist nets were monitored hourly when used outdoors. In addition, mist nets are usually taken down by nightfall, further reducing the potential for affect. It was concluded that NADCP BDM activities would not affect the bat because of its behavior (ie. nocturnal), and habitat and roost preference.

Natural Resource Impacts from Targeted Species. Some of the species targeted by NADCP BDM have the potential for impacting natural resources. Any BDM activities involving these species has the potential to positively affect the natural resource(s)

involved. Examples of impacts include: starlings are well known for interspecific nest competition with native Nevada species; brown-headed cowbirds are well-known nest parasitizers; magpies and crows have been documented to rob nests of eggs and nestlings; and droppings from roosting birds can deface property in recreation area.

Interspecific nest competition has been well documented with starlings. Miller (1975) and Barnes (1991) reported starlings were responsible for a severe depletion of the eastern bluebird (*Sialis sialis*) population due to nest competition. Nest competition by starlings has also been known to adversely impact American kestrels (*Falco sparverius*) (Nickell 1967, Von Jarchow 1943, Wilmers 1987), red-bellied (*Centurus carolinus*) and Gila woodpeckers (*C. uropygialis*) (Ingold 1994, Kerpez and Smith 1990), and wood ducks (*Aix sponsa*) (Shake 1967, Heusmann et al. 1977, Grabill 1977, McGilvery and Uhler 1971). Weitzel (1988) reported nine native species of birds had been displaced by starling nest competition, and Mason et al. (1972) reported starlings evicted bats from nest holes. Reduction of nest site competition could be a beneficial effect of BDM for some native species. Although such reductions are not likely to be significant, the benefits would probably outweigh any adverse affects from non-target takes.

Interspecific brood parasitism is defined as the laying of an egg or eggs by one species of bird into a host nest of another species of birds. Unsuspecting of the egg laying, the host normally accepts and incubates the egg(s) and raises the young as their own. The brown-headed cowbird is one of five species of cowbirds that are brood parasites (Orians 1985) which have lost the instinct for nest building, egg incubation, and caring for the young (Smith 1977). As a result of the brood parasitism, egg and chick survival of the hosts is jeopardized. In most cases of brood parasitism, the young of the host species die because they are unable to compete with the cowbird chick for food and space inside the nest. Current BDM targeting brown-headed cowbirds in Nevada could be beneficial for neotropical migrants and other birds that are parasitized by cowbirds. In FY 99, a Brewer's blackbird nest was removed to stop the blackbirds from aerial attacking passerbys (the male had drawn blood on one person). In removing the nest it was discovered that cowbirds had actually laid four eggs in the nest. Although, the Brewer's blackbird population is probably not affected by nest parasitism, other bird species in Nevada probably are such as the endangered southwestern willow flycatcher (Clark County 1999).

4.1.3 Humaneness. People concerned with animal welfare often express that they would like to see animal suffering minimized as much as possible and that unnecessary suffering be eliminated. The interpretation of what is unnecessary suffering is the point to debate (Schmidt 1989). Some individuals and groups are opposed to some management actions of NADCP. NADCP personnel are experienced and professional in their use of management methods. This experience and professionalism allows NADCP personnel to use equipment and techniques as humanely as possible within the constraints of current technology. Professional lethal bird control activities are often more humane than nature itself because these activities can produce quicker deaths that cause less suffering. Research suggests that with some methods, changes in the blood chemistry of trapped animals indicate "stress." Blood measurements indicated similar changes in

foxes that had been chased by dogs for about five minutes as those restrained in traps (USDA 1997, revised). However, such research has not yet progressed to the development of objective, quantitative measurements of pain or stress for use in evaluating humaneness.

Bird Damage Management methods that may be viewed as inhumane are methods such as shooting, capture in mist nets, padded-jaw pole traps, cage traps, toxicants, and frightening devices. Of these, shooting, padded-jaw pole traps, and the use of toxicants are usually viewed by some as the most inhumane methods used in BDM. NADCP personnel are trained in firearm use with the purpose of being able to quickly dispatch target animals to minimize pain and suffering.

Humaneness is discussed and assessed in the FEIS (USDA 1997, revised) and in sections 3.4.2.3 and 2.2.3 of this EA. The WS program on a national level has evolved toward using more selective control techniques that reduce unnecessary pain and death. Under this alternative all legal BDM methods would be used and are described in section 3.2. However, some of the methods that would be used under this alternative are viewed by some persons as inhumane. Despite SOPs and mitigation designed to maximize humaneness, the perceived stress and trauma associated with capture methods is unacceptable to some persons. Alpha-chloralose is relatively humane because it minimizes the stress of the birds captured, but it can result, though, rarely, in the death of the animal from overdose. Shooting used to take target animals results in a relatively humane death because the animals die instantly or become unconscious and die within seconds to a few minutes. NADCP personnel are professional and experienced in their use of BDM methods and make every effort to maximize humaneness under the current constraints of technology. Therefore, under the current program, NADCP has the least impacts possible with regards to the issue of humaneness while still meeting the need for action.

4.1.4 Impacts on Public Safety and the Environment. NADCP control methods do not pose a significant potential hazard to employees or the public because all methods and materials are consistently used in a manner known to be safe to the user and the public. A detailed risk assessment analyzed all BDM methods used by WS in Appendix P of the FEIS for their impacts on public safety and the FEIS found low level risks associated with only a few of them (USDA 1997, revised). This assessment included potential risks to WS employees, the public, and non-target animals. While some of the materials and methods used by NADCP have the potential to represent a threat to health and safety if used improperly, problems associated with their misuse have rarely occurred. This favorable record is due to training and certification programs, policies, and procedures. NADCP personnel are trained in the safe use of firearms, pyrotechnics, chemical toxicants, and immobilizing drugs in the performance of their duties. Personnel are given instructional sessions and refresher courses routinely. The use of firearms and pyrotechnics for BDM is regulated by the Nevada Penal and Wildlife Codes, WS Policies, and WS Directives. The use of firearms and pyrotechnics in BDM was concluded to have minimal risks to the public, NADCP personnel, and the environment. The use of chemical drugs by NADCP is regulated by FDA, and WS Policies and

Directives. The use of chemical repellents and toxicants is regulated by EPA, under FIFRA, NDOA, and WS Policies and Directives. Based on the Risk Assessment, WS concluded that, when NADCP chemical methods, including those referenced above, are used in accordance with label directions, they are highly selective to target individuals or populations, and such use has negligible impacts on the environment and do not represent a risk to the public (USDA 1997, revised). The risk to the public is further reduced because most NADCP BDM methods are used in areas where public access is limited and warning signs are prominently posted to alert the public whenever toxic devices or traps are deployed. NADCP coordinates with cooperators or landowners about where and when BDM methods are to be used, thereby decreasing the likelihood of conflicts with the public. The issue of safety was discussed in 2.2.5 and mitigation measures were addressed in section 3.4.

Nevada Animal Damage Control Program's BDM activities are also not likely to negatively affect the public in terms of "Environmental Justice" and "Executive Order 12898" (see section 1.5.2). "Environmental Justice" and "Executive Order 12898" relates to the fair treatment of people of all races, income and culture with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Environmental justice is a priority within USDA, APHIS, and WS. Also, all WS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898 to ensure Environmental Justice.

Public health and safety may be jeopardized by not having a full array of BDM methods for responding to complaints involving threats to human health and safety such as disease transmission and airstrike hazards. Starlings have been struck by aircraft at Reno/Tahoe International Airport, but none of the strikes resulted in a catastrophic accident. However, the potential exists. Firearms or chemical toxicants may be used to take birds to reduce the potential for wildlife strikes. Therefore, BDM methods that may pose a slight public safety risk may be used effectively to reduce the potential for a recognized public safety risk.

4.1.5 Effectiveness of NADCP. The effectiveness of the NADCP program can be defined in many ways such as the economic losses reduced for agriculture and property, the number of incidences of public health and safety decreased, and natural resources protected. Effectiveness can also be defined in terms of how well NADCP Specialists stop or reduce damage to an acceptable level for the cooperator. In resolving a conflict situation, the Specialist must be able to complete BDM projects expeditiously using legal methods in a humane fashion as possible within the limitations of current technology while having the least impacts on non-target animals and the environment. Many of the details concerning the issue of effectiveness were discussed in the FEIS (USDA 1997, revised) where the current program was concluded to be the most effective because the BDM was being conducted professionally. Another method to determine effectiveness is customer satisfaction. An independent group within APHIS conducted a cooperator survey and found that the majority of people assisted by WS were satisfied with the results (APHIS 1994). Lastly, the effectiveness analysis includes costs of the program to the public, states, and other jurisdictions, and direct and indirect impacts, including costs

of impacts on the environment. The current program alternative was compared with the other alternatives in the ADC FEIS and was concluded to be the most effective of the alternatives considered (USDA 1997, revised).

Because of the availability of data and the extensiveness of the projects, NADCP assessed the cost-effectiveness for starling damage management in CAFOs in 1999. NADCP personnel treated 23 dairies or feedlots for starlings and retreated three in FY 99. An estimate of the numbers of starlings using each facility was made one or two days prior to treatment after birds had successfully been pre-baited to target areas. NADCP personnel estimated that about 393,000 starlings were at these feedlots and that 316,600 of these were taken in treatments. Research studies and field observations suggest DRC-1339 treatments at cattle feeding operations generally produce 75 percent mortality (Glahn 1982). However, observations at cooperating feedlots in Nevada showed a slightly higher mortality from DRC-1339 treatments of about 80 percent. Birds seen feeding at the feedlot 48 hours or so following treatment or the number seen feeding on the baits were estimated to determine the number taken. Numbers of starlings feeding at individual feedlots ranged from 2,000 to 50,000, with an average of about 15,000 at each. The majority of starlings came from large winter roosts. This is supported by the fact that significant damage problems do not begin until November each season and end around the first of March coinciding with the formation of roosts throughout Nevada. After early treatments, primarily in November and early December, bird populations typically built back up and a few CAFOs required a second treatment. Bailey (1966) studied the seasonal abundance of starlings at feedlots in Utah and showed that starling numbers doubled at feedlots between November and January. Therefore, it is reasonable to conclude that starling numbers at cooperating facilities would have probably doubled between the time of first early treatments and mid-season second treatments.

The starling population at cooperating Nevada feedlots and dairies was estimated from observations made by NADCP personnel at feedlots that were provided BDM services in FY 1999. In addition, the population that would have inhabited these feedlots, if BDM was not provided, was predicted. This population estimate is based on the assumptions that starling populations double between mid-November and mid-January at feedlots and dairies (Bailey 1966), winter mortality is about five percent every 15 days following the peak in population (Jan.-March), and flocks begin arriving in mid-October and disperse by mid-March (150 days). A comparison of the two population estimates would then provide the information for doing a cost analysis on the effectiveness of NADCP BDM. Basically, this is the difference in the predicted starling population (if BDM was not provided) and the observed estimated population (with BDM provided). Using the assumed total bird numbers, WS estimates estimated that the average number of birds per day at all cooperating feedlots and dairies combined over the course of the wintering period would have been about 314,000 in FY 1999 in the absence of lethal BDM. Besser et al. (1968) calculated starlings and redwing blackbirds cost feedlot operators \$84 and \$2, respectively, per 1000 birds based on observations of feeding habits of banded and color-marked birds at 12 feedlots in Colorado. The differences between the two species were because starlings consumed a greater quantity of feed per bird and selected more expensive components of the feed rations than did red-winged blackbirds. The cost of

the feed consumed by the two species was reported to be \$0.03/lb. for starlings and \$0.015/lb. for blackbirds in 1967. Feed costs for operators in Nevada in 1999 averaged about \$120 per ton or \$0.06/lb. Assuming starlings consume feed ration components that are twice as expensive as the average cost per pound of feed (as indicated by the Besser study), the value per pound consumed by starlings in 1995 was \$0.12/lb or \$.0075/oz.

The Besser et al. (1968) study reported that: (1) starlings obtained 50 percent of the feed they consumed from feed troughs (the rest of the birds' feed consumption is assumed to have been spilled grain which would otherwise not be used by livestock anyway); (2) starlings spent 50 percent of the days during winter at the feedlots; and (3) consumption capacities per bird per day were 28.3 g (\approx 1 oz.) for starlings. NADCP observations at feedlots in Nevada are only of birds that are actually at the feedlots and feeding on a given day. The estimated number of birds prior to treatment is therefore a representative of the average daily bird use for a CAFO for that part of the season. Thus for purposes of calculating consumption at the feedlots, we assume 100 percent of the observed bird-days of use represent feeding and not the 50 percent that the Besser study reported.

Therefore, the value of cattle rations consumed by an average of 314,000 starlings over the 150 day winter season in 1998-99 would be:

$314,000 \text{ ave./day} \times 150 \text{ days} \times 0.5 \text{ (amt. from troughs)} \times 1 \text{ oz./bird/day} \times \$0.0075/\text{oz.} = \$176,625$

Thus the total estimated value of feed that would have been lost without NADCP BDM services would have been about \$177,000 on cooperating feedlots and dairies in FY 1999. To determine the total number of starling use days with NADCP services provided for all cooperating cattle feeding facilities combined was determined for all treatment intervals with the number taken subtracted from the estimated population for the facilities in FY 1999. The estimated number of starlings per day using cooperating Nevada feedlots and dairies was 154,000. Thus for this number of starlings estimated to have consumed feed at cooperating feedlots the losses were:

$127,000 \text{ ave./day} \times 150 \text{ days} \times 0.5 \text{ (amt. from troughs)} \times 1 \text{ oz./bird/day} \times \$0.0075/\text{oz.} = \$86,625$

The value of avoided feed losses then would be the projected feed loss (\$176,625) minus the actual feed loss (\$86,625) or \$90,000. NADCP and cooperating feedlots and dairies spent an approximated \$18,720 to control starling damage at feedlots and dairies during FY 99 (26 application sites x 24 ave. hours for pre-baiting, bait preparation, baiting, and monitoring at about \$30.00/hour including labor and material costs). Therefore, the cost effectiveness of the starling control program was almost five to 1 (\$90,000 feed saved vs \$18,720 spent). This cost ratio does not include the added benefits such as the prevention of disease transmission, restored weight gain performance, and milk yields when BDM services are provided. Higher feed and operating costs today may yield a differing result, however WS expects that benefits far outweigh costs.

Thus given these data, NADCP starling control efforts at CAFOS have been found to be cost effective. Other BDM efforts, such as feral pigeon control, is expected to have similar results. However, the data needed to calculate this information are unknown and NADCP conducts so little BDM for pigeons and other birds, that it is likely cost-effectiveness would be difficult to accurately determine in most situations.

4.1.6 Effects on Aesthetics. The impact on aesthetics from the current BDM program is highly variable and dependent largely on a person's value towards wildlife, the compassion for them, and view of damage. Wildlife can provide direct and indirect benefits to people. Direct benefits are derived from a user's personal relationship to animals and may take the form of direct consumptive use (using up the animal or intending to) or non-consumptive use (viewing the animal in nature or in a zoo, photography) (Decker and Goff 1987). Indirect benefits or indirect exercised values arise without the user being in direct contact with the animal and come from experiences as looking at photographs and films of wildlife, reading about wildlife, or benefitting from activities or contributions of animals such as their use in research (Decker and Goff 1987). Indirect benefits come in two forms: bequest and pure existence (Decker and Goff 1987). Bequest is providing for future generations and pure existence is merely knowledge that the animals exist (Decker and Goff 1987). On the other hand, wildlife can have negative values associated with such as when they cause damage. Some people see the need to manage damage caused by birds, while others strongly oppose it.

Different BDM methods under the current program could be regarded as resulting in an aesthetic outcome or not. Some people object to specific BDM methods, some oppose all BDM methods, others believe that not enough BDM methods exist, and others feel that some methods that have become illegal or outdated should be resurrected. Some people oppose the need for any lethal management or the use of noise-making devices while others feel that they should all be killed. NADCP is concerned with these viewpoints and strives to maintain a middle point while completing the mandated direction.

Under the current program, shooting, toxicants, and tranquilizers, padded-jaw leghold traps, and cage traps would be used and potentially take thousands of birds, mostly starlings. This could impact the viewing opportunity of some species, especially starlings. In addition, the thought or actual sighting of a dead bird can be an inaeesthetic experience for some people. On the other hand, the sight of thousands of birds and their droppings can be an aesthetically displeasing experience for others. NADCP personnel evaluate the appropriateness of different BDM methods, especially those to be used lethally, 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 are formed into a management strategy. This is the standard IWDM approach. Lethal methods are used judiciously as appropriate to reduce the possibility that people will have an aesthetically displeasing experience from seeing a dead bird. Dead birds are retrieved where possible following lethal BDM activities.

Under the current program, noise-making devices such as pyrotechnics, propane cannons, and bioacoustics (e.g. distress call tapes), may also be used in projects such as the dispersal of a blackbird and starling roost in an urban area or the hazing of large flocks of blackbirds from a corn crop. Some people consider the devices used to haze birds as inaeesthetic because of the noise. On the other hand, noise associated with roosts and flocks of birds, especially during the mornings, is also considered aesthetically displeasing. NADCP usually uses noise-making devices over a short time period (ie. 3-5 nights for a roost and 2-3 weeks for crops) and strives to use them minimally enough to resolve the problem. In urban areas, NADCP would normally have neighbors and police dispatchers forewarned of projects so that people can be prepared for the experience. However, during the project, some individuals may find the noise-making devices inaeesthetic. However, those requesting the BDM actions and suffering the damage along with others tolerate BDM activities to resolve the problem and their inaeesthetic experiences of roost noise and associated droppings.

4.2 Alternative 2 - No Federal NADCP BDM. This alternative was discussed in 3.2.2. It does not conform with WS's direction from Congress to provide wildlife damage assistance. However, this alternative was considered in detail in the WS FEIS (USDA 1997, revised) and found to have the potential for significant impacts on target and non-target species, humaneness, public safety, and other resources. It was assumed that without professional oversight, training, and experience, the environmental consequences of a no federal program alternative could be significant. A no federal program alternative in Nevada, though, would probably still retain a State portion of NADCP under the guidance of DRP. Therefore, the impacts that were described in the FEIS for this alternative (USDA 1997, revised) would not be quite the same. The impacts under the no federal NADCP alternative would likely be intermediate between the current program alternative and the FEIS analysis of the no federal program because some professional services would still be available for the public. The primary concern of not having a federal program is that impacts would increase because non-professional private efforts to conduct BDM would likely increase. Many of these individuals would probably be untrained and unlicensed to use certain BDM methods that have the potential for high impacts when improperly used. Because private persons conducting BDM would not be associated with a federal program, accountability, records maintenance, regulatory and policy compliance, and coordination with other agencies would not always be required or adhered to, thus, impacts would have the potential to be much higher than under the current program alternative. Finally, it is hypothetically possible that the inability of some of these private individuals to resolve damage problems would lead to the illegal use of chemical toxicants which could have the greatest potential for significant negative impacts on the environment.

4.2.1 Effects on Target Bird Populations. Under this alternative, NADCP would not have any impact on target species' populations in Nevada. However, private organizations and individuals conducting BDM would likely increase in proportion to the reduction of services, and the State portion of NADCP under DRP would probably still provide some level of BDM, but without federal supervision. These efforts to reduce or prevent depredations would probably result in about similar effects as those of the

proposed action depending on the level of effort expended by DRP and by private persons and organizations. For the same reasons shown in the population impacts analysis, section 4.2.1.1, it is highly unlikely that bird populations would be affected significantly by implementation of this alternative. However, the hypothetical use of illegal chemical toxicants caused by frustration as described in 4.2.2 could lead to unknown, but potentially significant impacts on bird populations. This could be compounded by the fact that DRC-1339 is currently only available for use by WS.

4.2.2 Effects on Non-target Species Populations, Including T&E Species. Under the no federal program alternative in the FEIS (USDA 1997, revised), more non-target animals would likely be affected. Under the no federal NADCP alternative, the federal portion of NADCP would have no impacts on non-target or T&E species. DRP would probably still provide some level of professional direct control assistance with BDM, but without federal supervision, and would continue to take no or minimal numbers of non-target animals, proportionate to the decreased efforts. However, private efforts to reduce or prevent depredations would likely increase which may result in less experienced persons implementing control methods leading to a greater take of non-target wildlife than the under the current program. Private individuals would not be restricted to mitigation measures, therefore, hazards to non-target and T&E species could be greater under this alternative. As described in 4.2.2, the hypothetical use of chemical toxicants could impact non-target species populations, including T&E species. Therefore, it is likely that more impacts would occur under this alternative than the current program as discussed in section 4.2.1.2.

4.2.3 Humaneness of Control Techniques. Under this alternative, the federal portion of NADCP would not employ methods viewed by some persons as inhumane and, thus, have no program effect on humaneness. DRP would probably still provide some level of professional direct control assistance with BDM, but without federal supervision, and would continue to use the BDM methods considered inhumane by some individuals, but at lower levels. State NADCP personnel, though, would no longer receive training from federal sources, nor would the program benefit from federal research focused on improved humaneness, selectivity, and non-lethal methods. However, private individuals, who are no longer provided professional assistance from NADCP and have experienced resource losses, could conduct lethal controls on their own. This could have the potential for increased and unnecessary pain and suffering to target and non-target species. Use of shooting by private individuals would probably increase. This could result in less experienced persons implementing use of BDM methods. Greater take and suffering of non-target wildlife could result. It is hypothetically possible that frustration caused by the inability of resource owners to reduce losses could lead to illegal use of chemical toxicants. The illegal use of toxicants could result in increased animal suffering.

BDM actions taken by individuals would probably be less humane than with a federal program partly for other reasons. NADCP is accountable to public input and humane interest groups often focus their attention and opposition on BDM activities employed by NADCP. Bird damage management methods used by private individuals may be more

clandestine. The people that perceive some BDM methods as inhumane would be less aware of BDM activities being conducted by private individuals but mostly because the private individuals would not be required to provide information under any policies or regulations similar to those NADCP follows. Thus, the perception of inhumane activities would probably be reduced, although the actual occurrence of private BDM activities may increase.

Therefore, this alternative would likely result in more negative impacts with regard to humaneness than the current program. This is primarily due to the fact that more private individuals would attempt to alleviate bird damage without professional training and guidance.

4.2.4 Impacts on Public Safety and the Environment. The federal portion of NADCP would have no effect on public safety, the environment, or “environmental justice and executive order 12898” issues under this alternative. DRP would probably still provide some level of BDM without federal supervision and their effects would be similar to those discussed under section 4.2.1.6, except these would be comparatively less. Compared to the current program alternative, private individuals would likely have more significant negative effects on the environment and human safety. This would result from untrained and unlicensed individuals using BDM methods and toxicants, legal and illegal. As discussed in section 4.2.2.1, it is hypothetically possible that frustration caused by the inability to reduce losses could lead to illegal use of chemical toxicants which could lead to unknown impacts on public safety. In addition, private individuals are not accountable and can conduct BDM for unprotected species year-round and without many of the policies, regulations, and restrictions that NADCP personnel must follow. Of the alternatives, this one would have the greatest potential for negative impacts on public safety and the environment.

4.2.5 Effectiveness of NADCP. The loss of the federal component of the cooperative program would reduce the program's workforce by approximately half and reduce the area receiving BDM services. Bird damage to resources and human health and safety would increase proportionately. For example, feed losses at CAFOs in Nevada could be expected to be at least two times higher than under the current program alternative in those areas that no longer received BDM services. Therefore, the effectiveness of the no federal program alternative would be comparatively less than the current program (USDA 1997, revised).

4.2.6 Effects on Aesthetics. Under this alternative, the WS portion of NADCP would not impact those that feel the use of lethal and noise-making BDM methods are aesthetically displeasing. However, DRP would probably still provide some level of professional direct control assistance with BDM, but without federal supervision, and would continue to use the BDM methods considered in aesthetically by some individuals, but at lower levels. Private individuals, that have experienced resource losses, but are no longer provided professional assistance from NADCP, could conduct BDM on their own and use the methods considered aesthetically displeasing. This could be exacerbated by the fact that a few resource owners would conduct BDM without regard for those that

find particular methods inaeesthetic. On the other hand, with the decreased levels of BDM, more resource owners and others that feel bird roosts and associated droppings are aesthetically displeasing, would have to tolerate the bird damage.

4.3 Alternative 3 - Non-lethal Management Only. This alternative was discussed in 3.2.3. The non-lethal control only alternative is a modification of the current program alternative wherein no lethal technical assistance or direct control would be provided or used by NADCP. Both technical assistance and direct control would be provided in the context of a modified IWDM that administratively constrains NADCP personnel to use non-lethal strategies to resolve wildlife damage problems (methods allowed in Table 2). Similar to Alternative 2, this alternative could have negative environmental consequences where individuals implement lethal control without professional oversight, training, and experience.

4.3.1 Effects on Target Bird Populations. Under this alternative NADCP would be limited to using non-lethal methods, whereas other agencies, organizations, or individuals would be free to carry out necessary lethal control work to resolve wildlife damage. Since non-lethal controls alone do not always prevent or reduce wildlife damage to acceptable levels, other government agencies, private organizations, and individuals would likely assume responsibility for implementing lethal controls necessary to adequately deal with these problems. Therefore, NADCP would have no impact on target bird species populations directly under this alternative. As under Alternative 2, DRP would probably provide some level of direct control assistance with bird damage problems but without federal supervision, and private efforts to reduce or prevent depredations would likely increase which would result in impacts on those populations. For the same reasons shown in the population impacts analysis in section 4.2.1.1, it is highly unlikely that bird populations would be impacted significantly by implementation of this alternative. Impacts and possible risks of illegal chemical toxicant use under this alternative would probably be about the same as those under Alternative 2, especially since DRC-1339 is currently available only for WS.

4.3.2 Effects on Non-target Species Populations, Including T&E Species. Alternative 3 would not allow any NADCP direct operational lethal BDM in Nevada. NADCP BDM would, therefore, have no impact on non-target or T&E species from this alternative. Technical assistance or self-help information would be provided on lethal BDM when requested to agricultural producers, property owners, or others. Although technical assistance could lead to more selective use of BDM methods by private entities than that which would occur under Alternative 2, private efforts to reduce or prevent damage could result in less experienced persons implementing BDM methods and lead to a greater take of non-target wildlife. It is possible that, similar to Alternative 2, frustration from the resource owner due to the inability to reduce losses could lead to illegal use of toxicants, or other non-specific damage management methods could lead to unknown impacts to non-target species populations, including T&E species. Potential hazards could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals, especially since DRC-1339 would not be available for use.

4.3.3 Humaneness of Control Techniques. Non-lethal control techniques are generally considered more humane by animal welfare groups. However, non-lethal control techniques such as cage traps and netting must be used in a proper fashion. For example, cage traps can be potentially inhumane if the trap is not attended to regularly and a caught animal is exposed to the elements such as being left out in the sun. The effects of this alternative with regards to the issue of humaneness would be most similar to those under Alternative 2. However, these effects would not be as great because some service recipients would be successful with non-lethal control techniques while others would tolerate the bird damage and not do anything about the situation. However, some NADCP service recipients may not be successful and conduct lethal controls on their own resulting in similar effects as described in section 4.2.2.3.

4.3.4 Impacts on Public Safety and the Environment. Most BDM methods with the potential for negative impacts on the physical environment or public safety, such as chemical toxicants, firearms, and traps, would not be used by NADCP under this alternative. Since lethal controls would no longer be used, except minimally for bird complaints involving human health and safety, NADCP would not have an effect on public safety. DRP, though, would still probably provide lethal BDM services at some reduced level. However, as discussed in section 4.2.1.4, the effects of these services would likely be negligible. Private individuals would increase their use of lethal BDM methods. As discussed in Alternative 2, many of these individuals might use registered toxicants incorrectly or illegal toxicants and these could adversely impact the environment and public safety. In addition, traps and firearms used by novices could have more adverse effects on public safety and the environment as discussed in 4.2.2.4. NADCP non-lethal BDM activities would not be likely to have a negative effect on the public concerning “environmental justice and executive order 12898” issues. NADCP would not be able to respond to bird complaints with lethal BDM for incidences involving human health and safety and, therefore, human health and safety hazards from birds would increase, though to a lesser extent than under Alternative 2.

4.3.5 Effectiveness of NADCP. This alternative would not be consistent with the WS Decision Model (Slate et al. 1992) which provides a mechanism for selecting the most effective methods that would be appropriate to the individual damage situation. Thus, resource losses would likely be higher than the current program alternative since no lethal control by NADCP would be allowed. NADCP, in many damage situations, would not be considered the most “professional” source of BDM because NADCP would be limited to one facet of BDM, the non-lethal control techniques. Non-lethal control is not always effective as the sole management method because it does not always address the factors necessary to resolve the depredation problem. For example, lethal shooting has been found to effectively enhance a hazing program where birds have habituated to sound-scare devices such as pyrotechnic. Since NADCP would not be able to provide customer satisfaction, producers could opt to use lethal control methods themselves. The use of lethal BDM methods by private individuals has greater likelihood, as has been discussed under Alternative 2, for adverse impacts and a lesser probability of success. Therefore,

NADCP effectiveness under this alternative would likely be close to that described under the no federal NADCP BDM alternative.

4.3.6 Effects on Aesthetics. The effects under the non-lethal control program for those that oppose lethal control of birds would be similar to that discussed under 4.2.2.6. However, the use of hazing methods would likely increase, and therefore, those that feel these BDM methods are inaeesthetic would be dissatisfied even greater. In addition, resource losses could be expected to increase and incidence that involve unacceptable results for the owners and others would be effected even greater.

4.4 Alternative 4 - Non-lethal Required before Lethal Control. This alternative could affect NADCP's ability to quickly address wildlife threats and damage problems by limiting control actions to non-lethal control methods prior to the use of lethal measures. Under this alternative, agricultural and property resource losses would be more than under the current program alternative due to the restrictions placed on this management alternative.

4.4.1 Effects on Target Bird Populations. Under this alternative, NADCP take of target bird species would probably be somewhat less than that of the proposed action because lethal actions by NADCP would be restricted to situations where the requestor or, possibly, NADCP had attempted non-lethal controls without success. No proactive lethal control actions would be taken by NADCP. For many individual damage situations, this alternative would be similar to the current program because many producers, prior to contacting NADCP, have attempted one or more non-lethal methods such as scarecrows and sound-scare devices, or have considered them and found them to be impractical in their particular situations. Without NADCP conducting proactive control activities, it is likely that private efforts at proactive control would increase. These increased private BDM activities would lead to potentially similar cumulative impacts as those described under the current program alternative. For the same reasons shown in the population impacts analysis in section 4.2.1.1, it is highly unlikely that bird populations would be significantly affected by implementation of this alternative. Impacts and hypothetical risks from illegal chemical toxicant use under this alternative would probably be less than those under Alternatives two and 3, but more than under Alternative 1. Any reductions in targeted wildlife by NADCP as a result of this alternative would have no major adverse impact on the species involved. Therefore, the effects on target species populations would probably be insignificant, similar to that described under the current program alternative.

4.4.2 Effects on Non-target Species Populations, Including T&E Species. The non-lethal before lethal control alternative would not consistently allow NADCP to respond to bird threats quickly or adequately. However, if NADCP was restricted to implementing non-lethal damage management prior to lethal damage management, efforts by agricultural producers, property owners or others such as DRP to reduce or prevent damage could increase. This could result in less experienced persons implementing BDM, which could lead to greater take of non-target species. As described elsewhere, it is hypothetically possible that frustration caused by the inability to reduce losses could lead to illegal use

of toxicants which could further lead to unknown impacts to non-target species populations, including T&E species. The impacts of persons implementing control would be similar to those described in Alternatives two and 3. Additionally, this alternative is not supported by the FEIS and Record of Decision (USDA 1997, revised) and WS Directive 2.101, which addresses NADCP's policy for applying IWDM. Under this alternative, NADCP take of non-target animals would probably be a little less than that of the current program because no preventive lethal control actions would be taken by NADCP. Mitigation measures to avoid T&E impacts were described in Chapter 3 and they would insure that adverse impacts are not likely to occur on T&E species by implementing Alternative 4.

4.4.3 Humaneness of Control Techniques. The amount of suffering by target and non-target wildlife under this alternative would likely be less than under the proposed action since proactive preventive control activity by NADCP would not be allowed. However, some private individuals would increase their use of padded-jaw leghold pole traps, toxicants, and shooting for preventive control activities, especially where NADCP could not resolve a damage problem in a timely manner because non-lethal control measures needed to be implemented first. This could result in similar, but lesser, effects as those described for Alternatives 2 and 3, but more than those under the current program.

4.4.4 Impacts on Public Safety and the Environment. NADCP would not have an adverse effect on public safety, the environment, or the public concerning "environmental justice and executive order 12898." NADCP would not be able to respond to bird complaints with initial lethal BDM for incidences involving human health and safety and, therefore, would have the same effect as under the current program Alternative 2 and 3, initially. The effects of the use of toxicants and other BDM methods are discussed in detail in the current program alternative section and the FEIS (USDA 1997, revised), but these would probably be used to a lesser extent because of timeliness. Because NADCP could not necessarily resolve problems in a timely manner, some cooperators would resort to tactics described in section 4.2.2.4. Effects under this alternative would be greater than the current program alternative, but less than the non-lethal alternative.

4.4.5 Effectiveness of NADCP. The full array of management tools would be available, but non-lethal methods would be used first, regardless of whether or not they were determined to be the most effective or appropriate choice using the WS Decision Model (Slate et al. 1992). Thus, the use of non-lethal methods first may delay effective BDM and the protection of livestock feed and health, property, human health and safety, and natural resources. The current program uses or recommends non-lethal methods in instances in which they are considered likely to be effective. Mandating non-lethal methods as a first option when they are unlikely to resolve a damage situation would reduce the effectiveness of BDM. Under the IWDM approach, NADCP always considers if non-lethal methods would be effective before contemplating the use of lethal methods. Therefore, this alternative would be less effective than the current program, but more effective than the no federal program and non-lethal only alternatives. In addition, as discussed under the no federal program alternative, cooperators may choose to resolve the problems lethally prior to contacting NADCP because of this stipulation. The

application of lethal BDM methods by inexperienced applicators could result in impacts similar to those, but to a lesser degree, discussed in the no federal program alternative.

4.4.6 Effects on Aesthetics. The effects under the non-lethal before lethal alternative for those that oppose lethal control of birds would fall somewhere between Alternative 1 and 3. However, the use of hazing methods would likely increase, negatively affecting the aesthetic sensibilities of some people. . In addition, resource losses and incidences that involve increased damages for the resource owners and other people could be expected to continue or increase resulting in less acceptable results than under the current program.

4.5 Cumulative Effects

Cumulative impacts are impacts on the environment that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions.

Natural mortality in blackbird/starling populations (adult and juvenile) is over 50 percent of the population each year, regardless of human-caused control operations (USDA 1997, revised, Feare 1984). The northwest and southwest regional population of the blackbird/starling group has been estimated to be about 140 million (Meanley and Royall 1976). Estimated natural mortality of the blackbird group in the western region should therefore be about 70 million birds annually. An in-depth analysis of cumulative impacts to blackbirds and starlings can be found in the programmatic EIS ch.4 pp. 64-68 (USDA 1997, revised).

Invasive or nonnative species are known to damage the environment in a variety of ways. Johnson and O'Neil (2001) state that the effects of nonnative species may take hundreds of years to become evident. The effects can be to the physical environment, the flora, the fauna, humans directly, or more often, to a combination of these ecosystem elements (Johnson and O'Neil 2001). Under Alternative 1, no cumulative impact on target invasive species (European starlings, pigeons, house sparrows) has been observed or intended. However, in the case of invasive species an attempt to impact may be desirable (or required under EO-13112) at some point in the future. Over the past 200 years, several thousand foreign plant and animal species have become established in the United States. About one in seven has become invasive, leading to problems that, according to figures provided by Cornell University, cost the United States more than \$138 billion each year (USDA 1999).

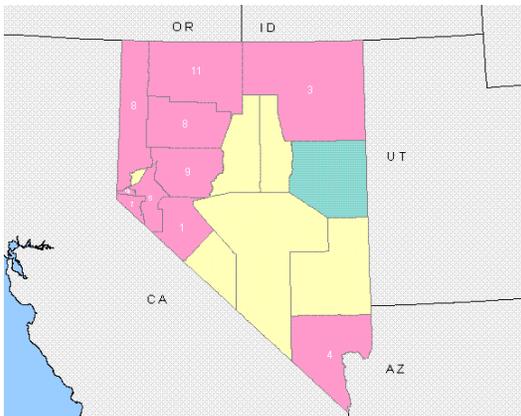
Cumulative impacts of public actions to control depredating birds in the absence or reduced presence of WS can only be speculated upon. However, it is reasonable to expect that as governmental assistance in resolving wildlife conflicts decreases, independent actions increase. The environmental desirability of these actions would be dependent upon the individuals who implement them. Many such actions may be poorly monitored, and public accountability would likely be low. For these reasons, cumulative impacts to the environment may be expected to increase as WS assistance decreases.

The scope of this proposal and the number of depredating birds that might be removed by WS under any of the alternatives would result in no notable cumulative direct or indirect impacts. Wildlife Services maintains ongoing contact with USFWS and NDOW to assure local, state and regional knowledge of wildlife population trends or issues. Wildlife Services would have no cumulative impact on non-target species, or sensitive and protected species. This finding is also made on a national level in the programmatic EIS (USDA 1997, revised).

Impacts of West Nile Virus on Bird Populations West Nile Virus (WNV) has emerged in recent years in temperate regions of North America. Since 1999 the Virus has spread across the United States and was reported to occur in 45 states and the District of Columbia (Center for Disease Control 2005). As of August 2, 2005, avian, animal or mosquito WNV infections have been reported to CDC ArboNET from 38 states in 2005 (CDC 2005a).

In 2005, 68 dead birds tested positive for West Nile virus in Nevada (Figure 2 and Table 6). In 2004 there were 48 cases of West Nile virus in birds and horses and two humans cases in Nevada.

Figure 2. Counties with dead birds testing positive for WNV in Nevada (USGS 2005).



From USGS (2005)

Table 6. Cumulative Dead Bird WNV Infections in Nevada, 2005.

| County | Number of Birds |
|-----------------|-----------------|
| Carson City | 13 |
| Churchill | 9 |
| Clark | 4 |
| Douglas | 7 |
| Elko County | 3 |
| Humboldt County | 11 |
| Lyon County | 5 |
| Mineral County | 1 |
| Pershing County | 8 |
| Washoe County | 8 |
| TOTAL | 69 |

From USGS (2005)

West Nile Virus is typically transmitted between birds and mosquitoes. Mammals can become infected if bitten by an infected mosquito, but individuals in most species of

mammals do not become ill from the virus. The most serious manifestation of WNV is fatal encephalitis in humans, horses, and birds. A total of 284 species, including the target species discussed in this EA have been reported to CDC's WNV avian mortality database from 1999 to present (CDC 2005). Although birds, particularly crows and jays, can become ill or die if infected with the virus, most survive (CDC 2004). In 2002, WNV surveillance/monitoring programs revealed that corvids accounted for 90 percent of the dead birds reported with crows representing the highest rate of infection (CDC 2002). According to US Geological Survey, National Wildlife Health Center (USGS 2003), information is not currently available to know whether or not WNV is having an impact on bird populations in North America.

Wildlife Services' continual monitoring procedures and coordination with bird management agencies (USFWS and NDOW) would ensure that its program would not contribute to significant declines of any bird species.

4.6 Summary and Conclusion

The environmental impacts of implementing BDM correspond with those raised and discussed in detail in Chapter 4 of the FEIS (USDA 1997, revised). Impacts associated with activities under consideration here are not expected to be "significant." Based on experience, impacts of the BDM methods and strategies considered in this document are very limited in nature. The addition of those impacts to others associated with past, present, and reasonably foreseeable future actions, as described in the ADC FEIS (USDA 1997, revised), are not expected to result in cumulatively significant environmental impacts. Monitoring the impacts of the program on the populations of both target and non-target species will continue. All bird control activities that may take place will comply with relevant laws, regulations, policies, orders, and procedures, including the Endangered Species Act, Migratory Bird Treaty Act, and Federal Insecticide Fungicide and Rodenticide Act. A summary of the overall effects of the BDM alternatives relative to the issues is given in Table 7.

Table 7. A summary of the environmental consequences of each program alternative relative to each issue.

| A Relative Comparison of the Overall Effects on Species and Issues as Related to the Alternatives | | | | | |
|---|-----------------------|-------------------------------|----------------------------------|--------------------------|--|
| Issue No. | Issues/ NADCP Impacts | Alternative 1 Current Program | Alternative 2 No Federal Program | Alternative 3 Non-lethal | Alternative 4 Non-lethal before Lethal |
| 1 | Starling | 0 | 0 | 0 | 0 |
| | Pigeon | 0 | 0 | 0 | 0 |
| | BH Cowbird | 0 | -/0 | 0 | 0 |
| | Red-winged BB | 0 | 0 | 0 | 0 |
| | Brewer's BB | 0 | -/0 | 0 | 0 |

| | | | | | |
|---|---------------|-----|-------|-------|-----|
| | Other | 0 | -/0 | 0 | 0 |
| | Magpie | 0 | -/0 | 0 | 0 |
| | Crow | 0 | -/0 | 0 | 0 |
| 2 | Non-target | 0 | - - | - - | - |
| | T/E Species | 0/+ | - | - | 0/+ |
| 3 | Humaneness | -/+ | -/0 | -/0 | -/+ |
| 4 | Public safety | -/+ | - -/0 | - -/+ | -/+ |
| 5 | Effectiveness | ++ | - | - | + |
| 6 | Aesthetics | -/+ | -/+ | -/+ | -/+ |

Summary ratings for impacts are: "- -" = High Negative; "-" = Low Negative; "0" = None; "+" = Low Positive; and "++" = High positive.

Note: While a control action or removal might have a negative effect on that individual animal or issue, removing the individual bird could also have a positive effect on a T&E species.

5.0 CHAPTER 5 - PREPARERS AND PERSONS CONSULTED

5.1 Preparers

Thomas C. Hall, Environmental Coordinator, Former Supervisory Wildlife Biologist/Asst. State Director, Reno, NV, USDA-APHIS-WS

Shannon Hebert, Environmental Coordinator, Portland, OR, USDA-APHIS-WS

Robert Beach, Wildlife Biologist Assistant Regional Disease Coordinator, Former State Director, Reno, NV, USDA-APHIS-WS

Kevin C. Lansford Wildlife Biologist/ District Supervisor, Ely, NV, USDA-APHIS-WS

Mark Jensen, State Director, Reno, NV, USDA-APHIS-WS

Jack Spencer, Wildlife Biologist/District Supervisor, Reno, NV, USDA-APHIS-WS

5.2 List of Persons and Agencies Consulted

Don Henderson, Director, Nevada Department of Agriculture Reno, NV

Gary McCuin, Rangeland Specialist, Nevada Department of Agriculture Reno, NV

John O'Brien, Administrator for Plant Industry, Nevada Department of Agriculture Reno, NV

Russ Mason, Chief, Game Bureau, Nevada Department of Wildlife, Reno, NV

Jonathan LaCombe, Staff Biologist, USDA-APHIS-WS, Reno, NV

Tara Zimmerman, Director, Region 1 Migratory Bird Office, USFWS, Portland, OR

Robert Williams, Field Supervisor, Ecological Services, USFWS, Reno, NV

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