ENVIRONMENTAL ASSESSMENT

BIRD DAMAGE MANAGEMENT IN THE UTAH WILDLIFE SERVICES PROGRAM

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UNITED STATES DEPARTMENT OF THE INTERIOR
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Acronyms Used in the EA

APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
AWACS	Airborne Warning and Control System
BA	Biological Assessment
BBS	Breeding Bird Survey
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BO	Biological Opinion
CDC	Centers for Disease Control and Prevention
CDFG	California Department of Fish and Game
CE	Categorical Exclusion
CFR	Code of Federal Regulations
DOJ	Department of Justice
DP	Depredation Permit
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FDA	Food and Drug Administration
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
FY	Fiscal Year
LD	Lethal Dose
IWDM	Integrated Wildlife Damage Management
LRMP	Land and Resource Management Plan
MIS	Management Information System
MOU	Memoranda or Memorandum of Understanding
NEPA	National Environmental Policy Act
NHPA	National Historical Preservation Act
RMP	Rocky Mountain Population
SHPO	State Historic Preservation Office
SOP	Standard Operating Procedure
T/E	Threatened or Endangered Species
UASS	Utah Agricultural Statistics Service
UCA	Utah Code Annotated
UDAF	Utah Department of Agriculture and Food
UDWR	Utah Division of Wildlife Resources
USC	United States Code
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFWS	U.S. Fish and Wildlife Service
WS	Wildlife Services

NOTE: On August 1, 1997, the Animal Damage Control program was officially renamed to Wildlife Services. The terms Animal Damage Control, ADC, Wildlife Services, and WS may be used synonymously throughout this Environmental Assessment.

CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

1.0 INTRODUCTION

Across the United States, wildlife habitat has been altered as human populations expand and land is used for human needs. These human uses and needs often compete with wildlife which increases the potential for conflicting human-wildlife interactions. In addition, certain segments of the public strive for protection for all wildlife. Such protection can create localized conflicts between humans and wildlife. The Final Environmental Impact Statement (EIS) (USDA 1997) for the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program summarizes the relationship in North American culture of wildlife values and wildlife damage in this way:

> *"Wildlife has either positive or negative values, depending on varying human perspectives and circumstances . . . Wildlife generally is regarded as providing economic, recreational and aesthetic benefits . . . , and the mere knowledge that wildlife exists is a positive benefit to many people. However, . . . the activities of some wildlife may result in economic losses to agriculture and damage to property . . . Sensitivity to varying perspectives and values is required to manage the balance between human and wildlife needs. In addressing conflicts, wildlife managers must consider not only the needs of those directly affected by wildlife damage but a range of environmental, sociocultural, and economic considerations as well."*

Wildlife damage management is the alleviation of damage or other problems caused by or related to the behavior of wildlife and is recognized as an integral component of wildlife management (The Wildlife Society 1992). WS uses an Integrated Wildlife Damage Management (IWDM) approach (WS Directive 2.105[1]), commonly known as Integrated Pest Management where a combination of methods may be used or recommended to reduce wildlife damage. IWDM is the application of safe and practical methods for the prevention and reduction of damage caused by wildlife based on local problem analyses and the informed judgement of trained personnel. IWDM includes methods such as localized habitat and behavioral modification to prevent or reduce damage or may require that the offending animal(s) be removed or that local populations or groups be reduced through lethal methods (USDA 1997). Potential environmental impacts resulting from the application of various bird damage management techniques are evaluated in this EA.

Normally, according to the APHIS procedures implementing the National Environmental Policy Act (NEPA), individual wildlife damage management actions considered in this analysis could each be afforded a Categorical Exclusion (CE) (7 CFR 372.5(c)). APHIS Implementing Regulations also provide that all technical assistance furnished by WS is categorical excluded (7 CFR 372.5(c)) (60 Federal Register 6,000, 6,003 (1995)). To evaluate and determine if any potentially significant or cumulative impacts from WS' current and planned damage management program occur, this Environmental Assessment (EA) has been prepared and documents the analysis. This analysis relies on existing data contained in published documents (Appendix A) and USDA (1997) whereby pertinent data are incorporated by reference.

WS is the federal agency directed by Congress to protect American agricultural, industrial and natural resources, property and human health and safety from damage associated with wildlife (Act of March 2, 1931 as amended 46 Stat. 1486; 7 USC 426-426c). In 1988, Congress passes the Rural Development, Agriculture, and Related Agencies Appropriations Act which strengthened the Act of March 2, 1931 (Public Law 100-202). This Act states in part:

> *"That hereafter, 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 private and public 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 such*

[1] The WS Policy Manual provides WS personnel guidance in the form of program directives. Information contained in the WS Policy Manual and its associated directives has been used throughout this Document, but has not been cited in the Literature Cited appendix.

agreement into the appropriation accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities."

In 2001, Congress passed the Fiscal Year 2001 Agricultural Appropriations Bill, which further amends and strengthens the Act of March 2, 1931 and provides that:

"The Secretary of Agriculture may conduct a program of wildlife services with respect to injurious animal species and take any action the Secretary considers necessary in conducting the program. The Secretary shall administer the program in a manner consistent with all of the wildlife services authorities in effect on the day before the date of the enactment of the Agriculture, Rural Development, Food and Drug Administration, And Related Agencies Appropriations Act, 2001."

Therefore, wildlife damage management is not based on punishing offending animals but is a means of reducing future damage and implemented using the WS' Decision Model (Slate et al. 1992). The imminent threat of damage or loss of resources is often sufficient for individual actions to be initiated and the need for bird damage management is derived from the specific threats to resources (U.S. District Court of Utah 1993).

1.1 WILDLIFE SERVICES PROGRAM

WS' mission, developed through its strategic planning process, is: 1) *"to provide leadership in wildlife damage management in the protection of America's agricultural, industrial and natural resources, and 2) to safeguard public health and safety."* This is accomplished through:

- Training of wildlife damage management professionals;
- Development and improvement of strategies to reduce losses and threats to humans from wildlife;
- Collection, evaluation, and dissemination of management information;
- Cooperative wildlife damage management programs;
- Informing and educating the public on how to reduce wildlife damage;
- Providing data and a source for limited-use management materials and equipment, including pesticides (USDA 1999).

WS is a cooperatively funded, service-oriented program. Before any wildlife damage management is conducted, a request must be received and an *Agreement for Control* must be signed by the landowner/administrator for private lands and other comparable documents are in place for public lands. As requested, WS cooperates with land and wildlife management agencies to effectively and efficiently reduce wildlife damage according to applicable Federal, State and local laws (WS Directive 2.210).

1.2 NEED FOR ACTION

1.2.1 Need for Bird Damage Management for the Protection of Agricultural Resources.

Livestock Feeds

Bird damage to agricultural crops costs U.S. farmers more than $100 million annually (Besser 1985) and can pose significant economic threat to agricultural producers (Besser et al. 1968, Dolbeer et al. 1978, Feare 1984). As the science of raising cattle progressed from range to feedlots, bird problems intensified. Cattle in feedlots and dairies and their associated feeding provide a tremendous feeding opportunity for birds. Along with feedlots came the concept of the complete cattle diet. The complete diet contains all of the nutrients and fiber that cattle need to increase weights, milk production, and improve the flavor and texture of meat. The basic constituent of most rations is silage with the addition of barley, corn, or other grains which may be incorporated as whole, crushed or ground grains. The silage/grain mixture is normally combined with hay, or other high fiber roughage. While cattle are unable to select for certain ingredients, starlings and other birds select for grains, or other items, thereby altering the composition and energy value.

Livestock feed losses to starlings (*Sturnus vulgaris*) has been estimated by Besser et al. (1968) in feedlots near Denver, Colorado at $84 per 1,000 birds. Forbes (1995) reported starlings consume up to 50% of their body weight each day. Glahn and Otis (1981) reported consumption of 10.6 lbs of pelletized feed per 1,000 bird minutes. The removal of high energy food ingredients is believed to reduce weight gains, milk yields, and is economically significant (Feare 1984).

Table 1-1. Livestock Feed Losses.

FY	Species	Occurrence	Loss ($)
2001	California Gull	3	600
	Starling	15	4,000
2000	Starling	25	27,500
1999	Starling	29	30,075
1998	Ducks	1	4,000
	Starlings	1	0
	Feral Pigeons	1	40
1997	Starlings	3	4,500

Agriculture is Utah's leading industry and livestock production and products are an important agricultural sector accounting for about 76.2% of total farm marketing/cash receipts (Utah Agricultural Statistics Service (UASS) 2001). During Fiscal Year (FY) 98, 99, 00, and 01 a total of $70,115 in losses to livestock feed from birds was reported to WS from cooperating livestock feeders, dairy farms, and grain storage operators in Utah (Table 1-1). This figure represents only a very small portion of the actual damage which occurs Statewide since WS only conducts bird damage management on a very small percentage of the total number of feedlots and dairies in Utah.

As of January 1, 2003, there were an estimated 880,000 head of cattle and calves in the State (UASS 2003). The average number of milk cows maintained in Utah was 92,000 head during 2002 (UASS 2003) and is relatively stable. Utah's cattle in feedlots for market were 25,000[2] head in 2002, and cattle and calf marketings in 2001 were estimated at 475.6 million lbs of marketable meat, worth $374.4 million in gross income. (UASS 2002).

Crops.

Wywialowski (1994) reported that in 1989, 8.7% and 16.6% of agricultural producers nationwide experienced bird damage to: 1) field crops and 2) vegetables, fruits, and nuts, respectively. Wheat and alfalfa are most susceptible to Canada goose (*Branta canadensis*) and other waterfowl immediately after germination when the plant has emerged above the soil and the root system is not yet firmly established in the soil. Combined with sandy soils and wet conditions, which "loosen" the soil, the entire plant can be pulled out and consumed. Waterfowl (primarily Canada geese and sandhill cranes (*Grus canadensis*)) and blackbirds (*Icteridea*) can cause damage to wheat, barley, and other grains after swathing or prior to harvest (Besser 1985).

Receipts from crops (grains, fruits, vegetables, hay, etc.) accounted for 23.6% of all agricultural marketings in Utah in 2001 (UASS 2002). Approximately 988,000 acres of crops were harvested in 2001 with hay representing 72% of total acres. During FY 97, 98, 99, 00 and 01, bird damage was reported to and verified by WS to field crops, vegetables, fruit, turf, pasture, and hay crops (MIS 1997, 1998, 1999, 2000, 2001) (Table 1-2).

1.2.2 Need for Bird Damage Management for the Protection of Aquiculture Resources.

Bird predation at aquiculture facilities has been recognized as an economic problem for more than 300 years (Mills 1967). Open water areas and large concentrations of fish are natural attractants to fish-eating

[2] Many of Utah's cattle and calves are out-of-state for *finishing* before slaughter.

birds (Salmon and Conte 1981). Birds may also negatively affect aquiculture production by transmitting or transporting diseases, weeds, and parasites (Curtis et al. 1996). Trout raising is an important commercial industry in Utah (UASS 2001). During 2001, the 26 trout operations in Utah marketed 800,000 pounds of fish (all sizes) and sold more than 1.1 million fish (UASS 2002) worth $1.3 million. Predators accounted for 65% of the losses with 183,000 fish lost during 2001.

Table 1-2. Losses to Field and Hay Crops, Vegetables, Fruits, Turf, and Pasture.

FY	Species	Occurrence	Loss ($)
2000	Ravens	1	500
	Starlings	11	1,500
	Sandhill cranes	2	
	Canada geese	1	
1999	Feral Geese	1	60
	Ducks	2	2,000
	Canada Geese	1	300
1998	Canada Geese	2	2,000
	Starlings	1	0
	Feral Ducks	3	1,700
1997	Scrub Jays	1	7,000
	Starlings	1	0
	Feral Ducks	1	300

Predators were defined in the survey as including all predator species (mammals, birds, and other animals) and birds were not separated. During FY 98, aquiculture producers reported to WS that fish-eating birds caused $450 in damages to trout and other fishes. This amount of reported damage represents only a small portion of the actual Statewide damage since WS only conducted bird damage management on a small percentage (7%) of aquiculture facilities in Utah. Additionally, public hatcheries require protection from fish eating birds. In 2001, Utah WS responded to requests from 13 publically owned hatcheries (both cold and warm water). Technical assistance is sometimes the most appropriate action to take, and Utah WS responded with technical assistance for these 13 requests. However, situations may arise whereby "technical assistance only" may not resolve the damage problem and operational assistance is needed to reduce damages.

1.2.3 Need for Bird Damage Management for the Protection of Public Health and Safety, Livestock Health, and Property.

Birds occasionally damage resources other than livestock feed, crops, and aquiculture for which WS is requested to provide bird damage management. These resources include:

Public Health and Safety

Utah WS has been requested to reduce the health risks to the public from birds. Airports managers have requested WS assistance in resolving bird/aircraft strike threats. The risk that birds pose to aircraft is well documented with the worst case reported in 1960 when 62 people were killed in the crash of an airliner that collided with a flock of starlings[3] in Boston (Terres 1980). A more recent crash involving Canada geese occurred in 1995 when 24 military personnel aboard an Air Force Airborne Warning and Control System (AWACS) aircraft were killed after the aircraft's engines ingested geese during take-off (Cleary et al. 1996).

Generally, bird collisions occur when aircraft are near the ground. More than 45% of bird/aircraft collisions occur within 100 feet of the ground and more than 75% occur within 1,500 feet of the ground (USDA 1997). Utah WS has responded to numerous requests from airport officials regarding bird threats to

[3] It is difficult to put a monetary value on public health and safety incidents, especially when human deaths or chronic illnesses occur, and values are underestimated.

aviation safety (MIS 1998, 1999, 2000, 2001) (Table 1-3).

Table 1-3. Threats to Aviation Safety[1].

FY	Species	Occurrence	Loss ($)
2001	Am. White Pelican	1	
2000	California Gulls	3	
1999	California Gulls	16	1,000
1998	Feral Pigeons	1	
	Swallows	2	

[1] It is often difficult to put a dollar value on health and safety and many times personal opinion.

Pigeons (*Columbia livia*), starlings and English sparrows (*Passer domesticus*) have been suspected of transmitting 38 different diseases to humans and pets, including Salmonellosis, Tuberculosis, Histoplasmosis, Toxoplasmosis, Ornithosis, Cryptococcosis, Encephalitis and Newcastle Disease (Weber 1979, Stickley and Weeks 1985). Of those diseases, Ornithosis, Salmonellosis, and Histoplasmosis are the three which WS is probably most concerned about as being a public health hazard and a hazard to WS employees who conduct bird damage management activities where disease transmission may occur. Although Utah WS has no record of employees contracting bird related diseases while conducting bird damage management, the threat is always present and precautions are taken to avoid possible exposures. 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 conditions which may present threats of airborne diseases. Table 1-4 provides information on the number of incidents of disease threat or transmission WS responded to during FY 98, 99, 00 and 01.

Livestock Health

Birds have been implicated in the transmission of livestock diseases such as Transmissible Gastroenteritis Virus, Tuberculosis, and Coccidiosis which have been linked to migratory flocks of starlings and blackbirds (Gough and Beyer 1982). Table 1-4 provides the number of incidents reported to and/or confirmed by WS involving threats or possible disease transmission to the public and livestock, and livestock predation.

Property Damage

WS responded to requests for assistance where pigeons and waterfowl were defacing property and damaging structures from roosting and loafing activities and accumulations of fecal material. Several such incidents occur regularly in the Salt Lake Valley, UT where several hundred pigeons roost inside industrial buildings occupied by people. In addition, in cases where feral waterfowl are loafing, property damage can occur. Property managers and workers are often concerned about possible disease transmission and the costs to clean equipment, machinery and floors where droppings accumulated.

Near Ogden, UT a mineral company contacted WS for assistance in solving a problem with common raven (*Corvis corax*) nests on power/utility poles. The company explained that the nests posed a potential fire hazard, damaging wiring on the poles and disrupting service. Costs for nest removals were $10,000 per visit. During FY97 through 99, birds caused an estimated $2,700, $22,500 and $1,000 in damages to homes and buildings, respectively (Table 1-5). Dollar values were not provided by cooperators for FY 00 or 01.

1.2.4 Nuisances

Birds sometimes congregate in such numbers that their presence can create a nuisance. Examples are urban starling and crow (*Corvus brachyrhynchos*) roosts where excreta accumulates and noises of the birds are annoying, Canada geese loitering in apartment complexes, public parks or food serving areas, gulls

frequenting picnic areas and eateries, or swallows nesting on buildings and structures[4]. WS investigates and helps resolve situations where birds are causing a nuisance. For most nuisance complaints, WS provides technical assistance to resolve the problem.

Table 1-4. Threats to Human and Animal Health[1]

FY	Species	Occurrence		Loss ($)	Loss ($)[1]
2001	Feral Ducks	3		-	
	Canada geese	2	4	HHS	-
	Feral Geese	2	1	HHS	-
	Mallards	2	3	HHS	-
	Feral Pigeon	3	2	Livestock	-
	Ravens	15	1	Livestock	-
	N. Flickers	30	9	Livestock	-
	Magpies		2		-
	Barn Swallows	1	1	HHS	-
	Woodpeckers	2	4	HHS	-
	Starlings	9	1	Livestock	- 2,310
2000	Mourning Doves	2	1	Livestock	- 200
	Feral Geese	35	1	Livestock	- 3,530
	Canada Geese		4		-
	Mallards	3		Zoo	
	Feral Pigeons		6		-
	Feral Ducks	1		HHS	
	Feral Ducks		1		-
	Starlings	4		Livestock	
1999	Starlings		4		1,000
	Ravens	11		Livestock	1,630
	American Kestrel		1		-
	Bald Eagle	1		Livestock	200
1998	Mallards		1		-
	Golden Eagle	7		Livestock	3,000
	Ravens		1		22,000
	Feral Pigeons	4	3	Livestock	500 3,600
1997	Feral Pigeons	12	2	Livestock	2,700 2,900
	Golden Eagle				
	House Sparrows		1		-
	Ravens	12		Livestock	5,490

1 Placing a value on human and animal health and safety is difficult and many times personal opinion.

1.2.5 Natural Resources Protection

Cote and Sutherland (1996) reviewed and analyzed the results of 20 published studies where predation was assessed. Their analysis suggested that removing predators consistently had a large, positive effect on hatching success and significantly increased autumn densities of the target bird species. Their analysis also suggested that predator removal did not consistently result in increased breeding populations in the year following predator removal. They speculated that this might be due to the action of density-dependance on avian populations, but noted that this has yet to be documented and deserves further research. They further suggested the possibility that predator removal does in fact increase breeding populations, but the increased breeding birds emigrate out of the area into nearby areas where population monitoring may not be occurring.

Sage Grouse and Sharp-tailed Grouse

Sage grouse (*Centrocercus urophasianus*) populations have declined throughout much of the western U.S. over the last several decades due to a variety of environmental factors (Connelly and Braun 1997). In addition, sharp-tailed grouse (*Pedioecetes phasianellus*) populations in much of the western U.S. are much lower than historic levels.

Sage grouse populations occupying habitats that are highly fragmented or in poor ecological condition may exhibit relatively low nest success, low juvenile recruitment, and poor adult survival that may be related to increased predation (Gregg 1991). Populations of some of the most important prairie grouse predators have increased dramatically over the last 100 years (see analysis related raven populations in Chapter 4), and

[4] Estimates of the dollar value of this type of damage are very difficult to assess.

even in areas of good habitat, predator populations can be so abundant that habitat alone may not suffice to allow grouse populations to increase (Bergerud 1988). Schroeder and Baydack (2001) suggested that as habitats become more fragmented and populations of prairie grouse become more threatened, it becomes more important to consider predator damage management as a potential management tool. Because damaged sagebrush habitats may take 15-30 years to recover, a predator management strategy that effectively increases nest success and juvenile survival may be useful in offsetting some of the negative effects of poor habitat. This approach might also allow a more rapid recovery of grouse populations following habitat recovery.

In addition, in a survey of U.S. public attitudes regarding predators and their management to enhance avian recruitment, Messmer et al. (1999) found that given information suggesting predators are among the threats to a declining bird population, the public generally supported using predator removal for the protection of bird populations.

Batterson and Morse (1948) documented heavy predation on sage grouse nests in northeastern Oregon and concluded that the greatest single limiting factor for sage grouse populations was nest predation by ravens. Magpies (*Pica pica*), American crows, coyotes (*Canis latrans*) and badgers (*Taxidea taxus*) were also documented as nest predators, but of much less importance than ravens. The authors initiated a raven removal program and subsequently documented a 51% nesting success rate in their treatment area versus a 6% nesting success rate in an area where no ravens were removed. The authors also believed that raven predation on chicks up to 10 days old accounted for the greatest predatory loss of chicks in their study areas. They considered raven removal an essential element of sage grouse management.

Keister and Willis (1986) suggested that the major factor in determining sage grouse population levels in their study area in southeastern Oregon was loss of nests and chicks during the first 3 weeks after hatching. Coyotes and ravens were suspected as the primary nest predators. Willis et al. (1993) concluded that fluctuation in predator abundance was probably the single most important factor affecting annual productivity of sage grouse in their study area.

In Utah, predation has been identified as a major factor preventing the increase of sage grouse in the Strawberry Valley (D. Mitchell, UDWR, 2003, pers. comm.). In the Parker Mountain research area, 10 of 19 sage grouse nests were destroyed by ravens prior to raven removal efforts. After removal efforts were completed, no nests of monitored sage were depredated by ravens.

Waterfowl

In a study of waterfowl nesting success in Canada, researchers found that eggs in most nests were lost to predators such as red foxes, coyotes, striped skunks (*Mephitis mephitis*), raccoons (*Procyon lotor*), Franklin's ground squirrels (*S. franklinii*), badgers, black-billed magpies and American crows (Johnson et al. 1988). Cowardin et al. (1985) determined that predation was by far the most important cause of nest failure in mallards (*Anas platyrhynchos*) on their study area. On the Sterling Wildlife Management area in southern Idaho, striped skunks, red fox and black-billed magpies were documented as common predators of nesting ducks, with magpie predation identified as the most significant factor limiting waterfowl production (Gazda and Connelly 1993).

Balser et al. (1968) determined that predator damage management resulted in 60% greater production in waterfowl in areas with damage management as compared to areas without damage management. He also recommended that when conducting predator damage management, the entire complex of potential predators should be targeted or compensatory predation may occur by a species not under control, a phenomena also observed by Greenwood (1986). Rohwer et al. (1997) documented a 52% nesting success for upland nesting ducks in an area receiving predator removal, versus only a 6% nesting success in a similar non-treatment area. Garrettson and Rohwer (2001) likewise documented dramatically higher duck nesting success in areas where predators were removed during the nesting season as compared to areas where no predators were removed, and noted that the annual nature of predator removal allowed for greater management flexibility than most habitat management efforts.

1.3 PURPOSE OF THE EA

The purpose of preparing an EA is to comply with NEPA and to determine if this Federal proposal could have a significant impact on the quality of the human environment. This EA evaluates ways by which the bird damage management responsibility of Utah WS would be conducted to resolve bird conflicts. The EA analyzes European starling, English sparrow, domestic feral pigeon (pigeon), blackbird[5], common grackle (*Quiscalus quiscula*), ring-billed gull (*Larus delawarensis*), California gull (*L. californicus*), great blue heron (*Ardea herodias*), black-crowned night heron (*Nycticorax nycticorax*), double-crested cormorant (*Phalacrocorax pelagicus*), American white pelican (*Pelecanus erythrohynchos*), common merganser (*Mergus merganser*), northern flicker (*Colaptes auratus*), American robins (*Turdus migratorius*), great horned owl (*Bubo virginianus*), common raven, American crow, turkey vulture (*Cathartes aura*), black-billed magpie (*Pica pica*), bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), Canada goose, greater sandhill crane, American coot (*Fulica americana*), mallard (*Anas platyrhynchos*), swallows spp. (*Hirundo rustica, Petrochelidon pyrrhonota*), and feral, domestic birds, and exotic bird damage management for the protection of agricultural and natural resources, aquiculture, property, and public health and safety in Utah.

1.3.1 Area of Analysis

Utah encompasses about 82,000 mi^2; during FY 01, WS had 19 *Agreements for Control* to conduct bird damage management on 108,807 acres (0.2% of the land area of Utah). However, WS generally only conducts bird damage management on a small portion of the properties under *Agreement* in any year. In FY 01, bird damage management projects were only conducted on 12 properties covering an area of about 29,516 acres or about 27% of the area under agreement and about 0.056% of the land area of Utah (MIS 2001). Additionally, raven damage management for natural resource protection may occur in selected areas as requested by the Utah Division of Wildlife Resources (UDWR) or other responsible management entities. Although the area worked by WS is relatively small in relation to the State, the projects are considered important to the requesters and WS.

1.3.2 Summary of Proposed Action

The proposed action is to continue the current WS bird damage management program in Utah for the protection of agricultural and natural resources, aquiculture, property, and public health and safety. This service, at a minimum, would be technical assistance or self-help advice, or where appropriate and when cooperative funding is available, direct operational assistance by WS personnel. An IWDM approach would be used, which would consider all legal and appropriate methods either used singly or in combination to meet the requester needs for reducing damage. Non-lethal methods may include, but are not limited to, localized habitat modification, cultural practices, animal behavior modification, lure crops, decoy traps, foot-hold trap, nest destruction, relocation, repellents (i.e., mesurol, lasers), and alpha chloralose (oral tranquilizer). Lethal methods used by WS may include shooting, egg addling or destruction, DRC-1339 and euthanasia using CO or CO_2. Not all methods are used on every project, but rather the WS Decision Model (Slate et al. 1992) is used to determine the most appropriate method(s) from those available to effectively resolve a particular problem. Bird damage management would be allowed in the State, when requested, on private or public property where a need exists and an *Agreement for Control* or other comparable document has been completed. All management actions would comply with Federal, State, and local laws and regulations.

1.4 RELATIONSHIP OF THIS EA TO OTHER MANAGEMENT AND ENVIRONMENTAL DOCUMENTS

1.4.1 WS EIS

[5] The term blackbirds refers to the red-winged blackbird (*Agelaius phoeniceus*), Brewer's blackbird (*Euphagus cyanocephalus*), yellow-headed blackbird *(Xanthocephalus xanthocephalus*), and brown-headed cowbird (*Molothrus ater*).

WS issued an EIS on the national APHIS, WS program (USDA 1997). Pertinent information contained in the EIS has been incorporated by reference into this EA. In addition, this EA will be evaluated for consistency with the EIS and Record of Decision. If inconsistencies are found, the EA would be supplemented pursuant to NEPA.

1.4.2 Public Land Management Plans

WS would only conduct bird damage management on public lands at the request of the resource managing agency or legal lessee for specific public land permits. WS does not anticipate the need to conduct bird damage management in designated wilderness areas.

1.4.3 Executive Order 13186 and MOU between USFWS and WS

Executive Order 13186 directs federal agencies to protect migratory birds and strengthen migratory bird conservation by identifying and implementing strategies that promote conservation and minimize the take of migratory birds through enhanced collaboration between WS and the USFWS, in coordination with state, tribal, and local governments. A National-level MOU between the USFWS and WS is being developed to facilitate the implementation of Executive Order 13186.

1.5 DECISION TO BE MADE

Based on the scope of this EA, the decision to be made is:

- Should bird damage management as currently implemented be continued?
- If not, how should WS fulfill its legislative responsibilities for reducing bird damage?
- Might the proposal have significant impacts requiring preparation of an EIS?

1.6 SCOPE OF THIS ANALYSIS

1.6.1 Actions Analyzed

This EA evaluates bird damage management to protect agricultural and natural resources, aquiculture, property, and public health and safety on private and public property in Utah.

1.6.2 Resources Not Currently Protected by WS Bird Damage Management

The current bird damage management program operates on a small percentage of properties in Utah as stated on in Section 1.3.1. This EA analyzes impacts not only at the current program level, but at increased program levels should individuals or agencies request assistance. Any increase is anticipated to be small with very few additional impacts.

1.6.3 Period for Which This EA is Valid

This EA would remain valid until WS determines that new needs for action or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document would be reviewed and revised as necessary. WS would also review this EA each year to ensure that it is complete and appropriate to the scope of WS bird damage management needs.

1.6.4 Site Specificity

This EA analyzes potential impacts of bird damage management on private and public lands under *Agreements for Control* in Utah, and on areas where additional agreements may be written in the reasonably foreseeable future (40 CFR 1508.8(b)) (Council on Environmental Quality 1981). Because the proposed action is to continue the current program and because the program's goals and responsibility are to provide

service when requested within the constraints of available funding and personnel, it is conceivable that some additional bird damage management efforts could occur (see Section 1.6.2). This EA anticipates any potential expansion and analyzes the impacts of such expanded efforts as part of the current program. The EA emphasizes significant issues as they relate to specific areas whenever possible. However, the issues that pertain to bird damage management are the same, for the most part, wherever they occur, and are treated as such. The WS Decision Model (Slate et al. 1992) and WS Directive 2.105 are site-specific procedures for determining methods and strategies to use or recommend for individual actions. Decisions made using the model would be in accordance with mitigation and Standard Operating Procedures (SOP) described herein and adopted or established as part of the Decision. The WS Decision Model is used by WS personnel for each individual damage situation to develop the most appropriate strategy to resolve damages for each individual action.

The primary purpose for preparing an EA in compliance with NEPA is to determine if a federal action could have a significant impact on the quality of the human environment. In order to determine significance, WS analyzed the alternatives against the issues that were raised during the interdisciplinary and public involvement processes. These issues were analyzed at levels that are *"site specifically"* appropriate for each and actions would be coordinated with the appropriate federal or State agency responsible for bird management. In determining significance, WS and the multi-agency team looked at the *context* of the issue and *intensity* of the impact. WS and the multi-agency team determined that the analysis was adequate because further site-specific information would not change the analysis, add to the public's understanding of the proposal, or provide additional useful or relevant information to the decision maker (Eccleston 1995).

1.7 PREVIEW OF THE REMAINDER OF THIS EA

The remainder of this EA is composed of three Chapters and three Appendices. Chapter 2 discusses the issues, issues not analyzed in detail, and affected environment. Chapter 3 describes each alternative, alternatives not considered in detail, mitigation and SOPs. Chapter 4 analyzes the environmental impacts associated with each alternative considered in detail. Chapter 5 is a list of preparers, consultants and reviewers. Appendix A is the literature cited, Appendix B discusses the legal authorities of Federal and State agencies in Utah, and Appendix C addresses bird damage management methods available for use in Utah.

CHAPTER 2: ISSUES

2.0 INTRODUCTION

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

The following issues were identified as requiring detailed analysis in Chapter 4 of this EA.

Issue 1 - Cumulative Effects of WS Bird Damage Management on Target Bird Species Populations

Issue 2 - Effects of WS Bird Damage Management on Non-target Species Populations, Including Threatened and Endangered (T/E) Species

Issue 3 - Risks Posed by WS Bird Damage Management Methods to the Public and Domestic Pets

Issue 4 - Efficacy and Selectivity of Bird Damage Management Methods

2.1 ISSUES USED TO DEVELOP MITIGATION MEASURES AND SOPs

2.1.1 Effects of WS Bird Damage Management on Non-target Species Populations, Including T/E Species.

A common concern among members of the public and wildlife professionals, including WS personnel, is the effect of bird damage management on non-target species, particularly T/E species. WS' mitigation measures and SOPs are designed to reduce the effects on non-target species' populations and are presented in Chapter 3.

To reduce the risks of adverse affects to non-target species, WS would select methods that are as target-selective as possible or apply such methods in ways to reduce the likelihood of impacting non-target species. Prior to the application of DRC-1339, for example, pre-baiting is required to monitor for non-target species that may consume treated bait. If non-target species that could consume treated bait are observed, then the use of DRC-1339 would be postponed or not applied. For trapping activities, WS would select trapping locations which are highly used by the target species and use baits which are preferred by the target species.

To avoid jeopardizing T/E species, biological evaluations were conducted to assess potential adverse effects and to establish mitigation measures and SOPs. WS consulted with the USFWS concerning potential impacts of WS methods on T/E species and has obtained a Biological Opinion (BO) (USFWS 1992). Section 7 of the Endangered Species Act (ESA) requires federal agencies to insure that their actions are not likely to jeopardize the continued existence of T/E species. If it is determined that a listed species is likely to be adversely affected by the proposed project, the ESA requires a formal Section 7 consultation. In January 2000, Utah WS prepared a Biological Assessment (BA) of the proposed actions and forwarded it to the USFWS for concurrence of findings. The USFWS concurred with the BA that the proposed action is unlikely to adversely affect listed species in Utah.

2.1.2 Risks Posed by WS Bird Damage Management Methods to the Public and Domestic Pets.

The primary pesticide used and proposed for use by Utah WS is DRC-1339. DRC-1339 is one of the most extensively researched chemicals and causes a quiet, uneventful, and apparently painless death (USDA 1995, 1997). DRC-1339 is regulated by the U.S. Environmental Protection Agency (EPA) through the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), by Utah State Pesticide Laws, and by WS

Directives. Based on a thorough Risk Assessment, APHIS concluded that, when WS program chemical methods are used according to label directions, they are highly selective to target individuals or populations, and such use has negligible impacts on the environment (USDA 1997). The Utah WS program properly disposes of any excess solid or hazardous waste.

Shooting with shotguns, air rifles, and other firearms is selectively used for the target species and helps in reinforcing other bird scaring and harassment efforts. Firearm use is very sensitive and a public concern because of safety issues relating to the public and misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program and a refresher course every 2 years afterwards (WS Directive 2.615). WS employees who carry firearms as a condition of employment are required to certify 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. Safety records indicate that Utah WS has never had a firearms related injury or fatality.

2.1.3 American Indian and Historical 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 to consult with appropriate American Indian tribes to determine whether they have concerns for cultural properties in areas of these federal undertakings. The Native American Graves and Repatriation Act of 1990 provides for protection of American Indian burials and establishes procedures for notifying tribes of any new discoveries.

WS actions on tribal lands are only conducted at the tribe's request and under signed agreement, thus, the tribes have control over any potential conflict to cultural resources on tribal properties. In most cases, wildlife damage management has little potential to cause adverse effects to sensitive cultural resources. In consideration of American Indian cultural and archeological interests, the WS program provided a early copy of this EA to each of the tribes in Utah. Each tribe was requested to identify any cultural concerns related to the proposed WS program: none of the tribes identified any such concerns.

2.1.3.1 Tribes Contacted Related to this EA

Navajo Tribe, Window Rock, AZ
Kaibab Paiute Tribe, Fredonia, AZ
Hopi Tribe, Kykotsmovi, AZ
Paiute Tribes of Utah, Cedar City, UT
San Juan Paiute, Tuba City, AZ
Unitah and Ouray Ute Tribes, Ft. Duchesne, UT
Zuni Tribe, Zuni, NM
Skull Valley Band, Goshute Tribe, Skull Valley, UT

2.1.3.2 SHPO Consultation

The areas where wildlife damage management would be conducted are small and pose minimal ground disturbance. An early copy of this EA was provided to the State of Utah for circulation within State government, including the Utah State Historical Preservation Office (SHPO). WS methods do not constitute *"undertakings"* as defined by the National Historic Preservation Act (36 CFR Part 800). Utah SHPO has also indicated that the potential for bird damage management methods to adversely affect cultural resources is extremely limited and the agency's finding is no effect for cultural resources (J. Dykman, Utah SHPO, pers. comm.1999).

2.1.4 Public's Concern About the Use of Chemicals.

Much of the public concern over the use of chemicals for wildlife damage management is based on an

erroneous perception that WS uses non-selective, outdated chemical methodologies. However, chemical methods used and proposed for use by WS have a high degree of selectivity. Currently, the use of pesticides by WS in all instances is regulated by the EPA through the FIFRA, by Memoranda of Understanding (MOUs) with other agencies, and by WS Directives. All WS personnel in Utah that use pesticides are certified as restricted-use pesticide applicators by the Utah Department of Agriculture and Food (UDAF); the UDAF requires pesticide applicators to adhere to all certification requirements set forth in the FIFRA. No chemicals are used on public or private lands without authorization from the land management agency or property owner or manager.

Based on a thorough Risk Assessment, APHIS concluded that, when WS program chemicals are used according to label directions, they are selective for target individuals or populations, and such use has negligible impacts on the environment (USDA 1997). A decision to ban toxicants is outside the scope of WS' authority. WS could elect not to use toxicants, but those registered for use in Utah are an integral part of IWDM and their selection for use follows criteria in the WS Decision Model (Slate et al. 1992).

2.1.5 Humaneness and Animal Welfare Concerns of Methods Used by WS.

The issue of humaneness and animal welfare, 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. Schmidt (1989) indicated that vertebrate pest damage management 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 is 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 1999), such as shooting.

Defining pain as a component in humaneness of WS methods 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 1999).

Pain and suffering, as it relates to WS damage management methods, has both a professional and lay point of arbitration. Wildlife managers and the public would be better served to recognize the complexity of defining suffering, since *". . . neither medical or veterinary curricula explicitly address suffering or its relief"* (CDFG 1999).

Therefore, humaneness, in part, appears to be a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. The challenge in coping with this issue is how to achieve the least amount of animal suffering with the constraints imposed by current technology and funding.

WS has improved the selectivity and humanness of management techniques through research and development. Research is continuing to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some bird damage management methods are used in situations where non-lethal damage management methods are not practical or effective.

Utah WS personnel are experienced and professional in their use of management methods so that they are as humane as possible under the constraints of current technology, workforce and funding. Mitigation measures/SOPs used to maximize humaneness are listed in Chapter 3.

2.2 ISSUES NOT CONSIDERED IN DETAIL, WITH RATIONALE

2.2.1 WS' Impact on Biodiversity.

No WS bird damage management in Utah is conducted to eradicate a native wildlife species. WS operates according to international, federal, and State laws and regulations enacted to ensure species viability and integrity of wildlife habitat. Several State statutes direct agencies to consider biological sustainability when making management decisions (Utah Code Annotated (UCA) §17A-2-1401, §73-3-3). Utah does not have a formal biodiversity policy, although it has some scattered policies related to wildlife habitat and preservation (Center for Wildlife Law 1996). Any reduction of a local population or group is frequently temporary because immigration from adjacent areas or reproduction can replace the animals removed. Impacts on target and non-target species populations because of WS' lethal damage management are minor. The impacts of the current WS program on biodiversity are not significant nationwide or statewide (USDA 1997). WS operates on a relatively small percentage of the land area of the State (see Section 1.3.1), and WS' take of any wildlife species analyzed in this EA is a small proportion of the total population and insignificant to the viability and health of the total population. Further, critical habitat of any bird species is not affected by WS activities due to their limited scope and duration.

2.2.2 Bird Damage is a Cost of Doing Business - a "Threshold of Loss" Should be Established Before Allowing any Lethal Bird Damage Management.

WS is aware of concerns that federal bird damage management should not be allowed until economic losses become unacceptable. This type of policy would be inappropriate to apply to public health and safety situations. Although some losses can be expected and tolerated by agriculture producers and property owners, WS has the legal responsibility and direction to respond to requests for bird damage management, and it is program policy to aid each requester to minimize losses. The WS Decision Model (Slate et al. 1992) is used to determine an appropriate management strategy.

In a ruling for *Southern Utah Wilderness Alliance, et al. vs. Hugh Thompson, Forest Supervisor for the Dixie NF, et al.*, the United States District Court of Utah denied plaintiffs' motion for preliminary injunction. In part the court found that it was only necessary to show that damage from wildlife is threatened, to establish a need for wildlife damage management (U.S. District Court of Utah 1993).

2.2.3 Bird Damage Management Should Not Occur at Taxpayer Expense, but Should be Fee Based.

Funding for WS comes from many sources besides federal appropriations. Such non-federal sources include State general appropriations, local government funds (County or City), and private funds which are all applied toward program operations. WS was established by Congress as the program responsible for providing wildlife damage management to the people of the United States. Federal, State and local officials have decided that wildlife damage management should be conducted by appropriating funds. 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 responsibility for damage to private property caused by public wildlife. The protection of agricultural and natural resources, property, and public health and safety will always be conducted by someone. A federal WS program provides a service to agricultural producers, protects property, natural resources, and public health and safety, and conducts an environmentally, economically, and biologically sound program in the public's interest.

Currently, livestock producers provide funding to WS for bird damage management at feedlots and dairies through a mandatory collection of $0.25 per head of cattle during brand inspection which occurs at the sale of an animal. Thus, for the primary focus of bird damage management in the State, it is fee based.

2.2.4 Lethal Bird Damage Management is Futile Because 50-65% of Blackbird and Starling

Populations Die Each Year.

Because natural mortality in blackbird populations is 50-65% per year, some persons argue that this shows lethal bird damage management is futile (USDA 1997). However, the rate of natural mortality has little or no relationship to the effectiveness of lethal bird damage management because natural mortality generally occurs randomly throughout a population and throughout the course of a year. Natural mortality is too gradual in concentrations of depredating birds to adequately reduce damage. It is apparent that the rate of mortality from bird damage management in Utah is well below the extent of any natural fluctuations in overall annual mortality and is, therefore, inconsequential to regional populations. The resiliency of bird populations does not mean individual bird damage management actions are not successful in reducing damage, but that periodic bird damage management actions are necessary in many damage situations.

2.2.5 Live-capture and Relocation (Rather Than Killing) of Problem Birds.

Live-capture and relocation may be appropriate in some situations (i.e., if the problem species' population is at very low levels, there is a suitable relocation site, and the additional dollars required for relocation can be obtained.) However, those species that often cause damage problems (i.e., starlings, blackbirds, Canada geese, gulls, fish-eating birds, woodpeckers, etc.) are relatively abundant in much of the suitable habitat in Utah, and relocation is not necessary for the maintenance of viable populations. Relocation of captured birds has been done on a case-by-case basis and would be part of the Preferred Alternative (Alternative 1). Relocation is currently a requirement for all capture methods used for migratory game birds (except for emergencies at airports) and for raptors, including depredating golden eagles. Any decisions to relocate bird(s) are coordinated with local USFWS and UDWR officials. Although relocation is not necessarily precluded, for most species it would in many cases be logistically impractical.

2.2.6 Appropriateness of Preparing an EA (Instead of an EIS) For Such a Large Area.

Some individuals might question whether preparing an EA for an area as large as 82,000 mi^2 would meet the NEPA requirements for site specificity. As mentioned earlier (Section 1.3.1), Utah WS has agreements to conduct bird damage management on only 108,800 acres in Utah. In any given year, WS only conducts bird damage management on or about 29,000 acres or 0.05% of the land area in Utah. If in fact a determination is made through this EA that the proposed action would have a significant environmental impact, then an EIS would be prepared. In terms of considering cumulative impacts, one EA analyzing impacts for the entire State would provide a better analysis than multiple EA's covering smaller areas.

2.2.7 Human Affections Toward Individual Wildlife and Charismatic and Aesthetic Wildlife Species.

There is some concern that the proposed action or other alternatives analyzed in this EA would result in the loss of aesthetic benefits to the public, resource owners, or neighboring residents. The human attraction to animals has been well documented throughout history and may have prompted the domestication of animals. The American public is no exception and today many households own pets. In addition, some people consider individual wild mammals and birds as *"pets,"* or exhibit affection toward these animals, especially people who come in contact with wildlife such as homeowners and park visitors (i.e., "birders," etc). The pubic's ability to view wildlife would be more limited if the wildlife are removed or relocated. However, immigration of wildlife from other areas could possibly replace the animals removed or relocated during a damage management action. In addition, the opportunity to view or feed other wildlife would be available if an individual makes the effort to visit other parks or areas with adequate habitat.

Public reaction to damage management actions are variable because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to manage conflicts/problems between humans and wildlife. Aesthetics is the philosophy dealing with the nature of beauty, or the appreciation of beauty. Therefore, aesthetics is subjective, depending on what an observer regards as beautiful.

Wildlife generally is regarded as providing economic, recreational, and aesthetic benefits (Decker and Goff 1987), and the mere knowledge that wildlife exists is a positive benefit to many people. These include direct benefits related to consumptive and non-consumptive use (e.g., wildlife-related recreation, observation, harvest), indirect benefits derived from vicarious wildlife related experiences (e.g., reading, television viewing), and the personal enjoyment of knowing wildlife exists and contributes to the stability of natural ecosystems (Bishop 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).

IWDM provides relief from damage or threats to public health or safety to 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 public health or safety caused by animals or wildlife insist upon their removal from the property or public location when they cause damage. Some people have an idealistic view and believe that all wildlife should be captured and relocated to another area to alleviate damage or threats to public health or safety. Some people directly affected by the problems caused by wildlife strongly support removal. Individuals not directly affected by the harm or damage may be supportive, neutral, or totally opposed to any removal of wildlife from specific locations or sites. Some people totally opposed to animal or wildlife damage management want WS to teach tolerance for damage and threats to public health or safety, and that wildlife should never be killed. Some of the people who oppose removal of wildlife do so because of human affections toward individual wildlife. These human-affectionate bonds are similar to attitudes of a pet owner and result in aesthetic enjoyment.

Utah WS only conducts bird damage management at the request of the affected home/property owner or resource manager. If WS received requests from an individual or official for bird damage management, WS would address the issues/concerns and consideration would be made to explain the reasons why the individual damage management actions would be necessary. Management actions would be carried out in a caring, humane, and professional manner.

CHAPTER 3: ALTERNATIVES

3.0 INTRODUCTION

This Chapter consists of four parts: 1) introduction, 2) description of alternatives considered and analyzed in detail, including the No Action/Proposed Action (Alternative 1), 3) alternatives considered but not analyzed in detail with rationale, and 4) mitigation and SOPs for bird damage management techniques. Four alternatives were recognized, developed, analyzed in detail by WS, and reviewed by the USFWS, UDWR, and UDAF. Four additional alternatives were considered but not analyzed in detail.

3.1 DESCRIPTION OF THE ALTERNATIVES

3.1.1 Alternative 1 - Continue the Current Federal Bird Damage Management Program (No Action/Proposed Action).

The No Action alternative is a procedural NEPA requirement (40 CFR 1502), is a viable and reasonable alternative that could be selected, and serves as a baseline for comparison with the other alternatives. The No Action alternative, as defined here, is consistent with the Council on Environmental Quality's (1981) definition.

The No Action/Proposed Action is to continue the current Utah WS bird damage management program for the protection of agricultural and natural resources, property, and public health and safety. A major goal of the program is to minimize bird-related damage/losses. To meet this goal, WS would respond to all requests for assistance with, at a minimum, technical assistance, or, where appropriate and when cooperative funding is available, operational damage management whereby WS personnel conduct damage management actions. An IWDM approach would be implemented allowing for the use of all legally available methods, either singly or in combination, to meet the requester needs for reducing bird damage. Agricultural producers, property owners and others requesting assistance would be provided information regarding the use of effective non-lethal and lethal techniques, as appropriate. Non-lethal methods include, but are not limited to, lure crops, environmental/habitat/behavior modification, decoy traps and other live traps, exclusionary devices, nest destruction, repellents, and alpha chloralose. Lethal methods considered by WS include: shooting, egg addling/destruction, snap traps, DRC-1339, and American Veterinary Medical Association approved euthanasia techniques, such as CO or CO_2. Bird damage management would be allowed in the State, when requested, on private or public property where a need has been documented and an *Agreement for Control* or other comparable document has been completed. All management actions would comply with appropriate laws, orders, policies, and regulations.

3.1.2 Alternative 2 - Non-lethal Damage Management Required Before Lethal.

This alternative would not allow for the use of lethal methods by WS until non-lethal methods have been employed in a given damage situation and found to be ineffective or inadequate. Non-lethal methods selected by requesters could include cultural methods, animal behavior modification, animal husbandry and localized habitat modification methods. Verification of the methods used would be the responsibility of WS. No standard exists to determine producer diligence in applying these methods, nor are there any standards to determine how many non-lethal applications are necessary before the initiation of lethal damage management. Thus, only the presence or absence of non-lethal methods can be evaluated. The mechanical and chemical methods described in Alternative 1 would apply, where appropriate, once the criteria for non-lethal control have been met. No preventive lethal damage management would be allowed. Producers, however, would still have the option of implementing their own lethal damage management measures.

3.1.3 Alternative 3 - Technical Assistance Only.

This alternative would only provide technical assistance and make recommendations when requested and eliminate WS operational bird damage management in Utah. Producers, property owners, agency personnel, or others could conduct bird damage management using traps**,** shooting, Avitrol, or any non-lethal method that is legal. Avitrol could only be used by State certified pesticide applicators in Utah. Currently, DRC-1339 and alpha-chloralose are only available for use by WS employees. Therefore, use of these chemicals by private individuals would be illegal.

This "*technical assistance only*" alternative would place the immediate burden of operational damage management on State agencies, individuals and requesters. Individuals experiencing bird damage would, independently or with WS recommendations, carry out and fund damage management activities. Individual producers could implement bird damage management as part of the cost of doing business, or a State or other federal agency could assume a more active role in providing operational damage management assistance.

If Alternative 3 was selected, operational bird damage management would be left to State or other federal agencies and individuals. Some agencies or individuals may choose not to take action to resolve wildlife damage. Other situations may warrant the use of legally available management methods because of public demands, mandates, or individual preference. Methods and devices could be applied by people with little or no training and experience, and with no professional oversight or monitoring for effectiveness. This in turn 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 nontarget animals; illegal use of pesticides could be greater than present.

3.1.4 Alternative 4 - No WS Bird Damage Management.

This alternative would eliminate federal WS involvement in bird damage management in Utah. WS would not provide operational or technical assistance and requesters of WS services would have to conduct their own bird damage management without WS input. However, other federal, State and county agencies, and private individuals could conduct some bird damage management. In some cases, methods applied by non-agency personnel could be used contrary to their intended or legal use, or in excess of what is recommended or necessary; illegal use of pesticides could increase. Information on bird damage management methods development would still be available to producers and property owners. DRC-1339 and alpha-chloralose are only available for use by WS employees. Therefore, use of these chemicals by private individuals would be illegal. Avitrol could be used by any State certified restricted-use pesticide applicator.

3.2 BIRD DAMAGE MANAGEMENT STRATEGIES AND METHODOLOGIES AVAILABLE TO WS IN UTAH

The strategies and methodologies described below are common to Alternatives 1 and 2. Under Alternative 3 WS personnel would only make technical assistance recommendations and conduct demonstrations. Alternative 4 would terminate both WS technical assistance and operational bird damage management in Utah. The methods used or recommended by WS would be supported by the WS Decision Model (Slate et al. 1992).

3.2.1 Integrated Wildlife Damage Management (IWDM).

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously and/or sequentially. The philosophy behind IWDM is to implement effective management methods in a cost-effective[6] manner while minimizing the potentially harmful effects on humans, target and non-target species, and the environment. IWDM draws from an array of options to create a combination of methods for the specific circumstances. IWDM may incorporate cultural practices (e.g., animal husbandry),

[6]The cost of management may sometimes be secondary because of overriding environmental, legal, human health and safety, animal welfare, or other concerns.

localized habitat modification (e.g., exclusion, tree pruning), animal behavior (e.g., scaring), local population reduction, or any combination of these, depending on the characteristics of the specific damage problem. In selecting management techniques for specific damage situations consideration is given to:

- Species responsible
- Magnitude of the damage
- Geographic extent of damage
- Duration and frequency of the damage
- Prevention of future damage
- Presence of non-target species

3.2.2 The IWDM Strategies That WS Employs.

Technical Assistance Recommendations. The implementation of technical assistance damage management is the responsibility of the requester, however, WS personnel provide information, demonstrations, and advice on available and appropriate damage management methods. Technical assistance includes demonstrations on the proper use of management devices (i.e., propane exploders, exclusionary devices, cage traps, etc.) and information on animal husbandry, localized habitat management, and animal behavior modification that could reduce damage. Technical assistance is generally provided following consultation or an on-site visit with the requester. Generally, several management strategies are described to the requester for short and long-term solutions to damage problems; these strategies are based on the level of risk, need, and practical application.

Direct Operational Damage Management Assistance. This is the conduct or supervision of damage management by WS personnel. Direct operational damage management assistance is initiated when the problem cannot effectively be resolved through technical assistance, and when *Agreements for Control* or other comparable documents provide for WS operational damage management. The initial investigation defines the nature, history, extent of the problem, species responsible for the damage, and methods that would be available to resolve the problem. Professional skills of WS personnel are often required to effectively resolve problems, especially if restricted pesticides are proposed, or the problem is complex requiring the direct supervision of a wildlife professional. WS considers the biology and behavior of the damaging species and other factors. The recommended strategy(ies) may include any combination of preventive and corrective actions that could be implemented by the requester, WS, or other agency personnel, as appropriate. Two strategies are available: 1) preventive damage management and 2) corrective damage management.

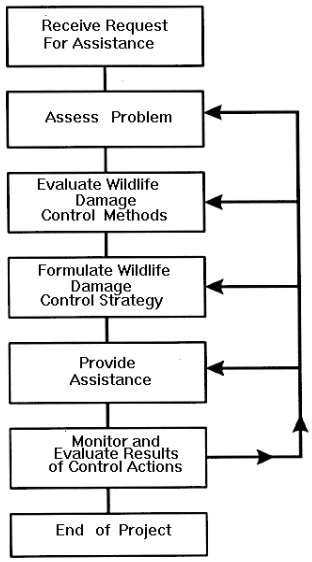
Preventive Damage Management is the practice of applying wildlife damage management strategies before damage occurs, based on historical problems and the probability of the damage recurring and an imminent threat of public health or disease transmission. As requested and appropriate, WS personnel provide information and conduct demonstrations or take action to prevent historical losses from recurring. Examples would be applying bird-proof netting over fruit trees before the fruit becomes attractive to birds and the removal of a bird(s) from a food processing plant, restaurant, waterfowl nesting areas, or feedlot before the bird(s) has caused damage or threat to public or livestock health.

Corrective Damage Management is applying wildlife damage management to stop or reduce current losses. As requested and appropriate, WS personnel provide information and conduct demonstrations, or with the appropriately signed *Agreement for Control* or other comparable document, take action to prevent additional losses. For example, in areas where birds are consuming livestock feed, WS may provide information to the resource owner about exclusionary methods, animal husbandry, mechanical scare devices and pyrotechnics, or conduct operational damage management to reduce losses.

3.2.3 WS Decision Making.

The WS Decision Making process[7] (Slate et al. 1992) is a procedure for evaluating and responding to damage complaints (Figure 3-1). WS personnel are frequently contacted after requesters have tried non-lethal methods and found them to be inadequate for reducing damage to an acceptable level. WS personnel evaluate the appropriateness of strategies, and methods are evaluated for 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 developed into a management strategy. After the management strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for management is ended. In terms of the WS Decision Model (Slate et al. 1992), most damage management efforts consist of continuous feedback between receiving the request and monitoring the results of the damage management strategy.

Figure 3-1. WS Decision Model



3.2.4 Bird Damage Management Methods Available for Use. (Appendix C further describes Bird Damage Management Methodologies)

3.2.4.1 Non-chemical, Non-lethal Methods.

Agricultural producer and property owner practices consist primarily of non-lethal preventive methods such as cultural methods[8] and localized habitat modification.

Animal behavior modification refers to tactics that alter the behavior of birds to reduce damages. Some but not all of these devices are:

- Propane exploders
- Pyrotechnics
- Distress calls and sound producing devices
- Visual or tactic repellents
- Lasers

Bird proof exclusions can be effective but are often cost-prohibitive, particularly because of the aerial mobility of birds which require overhead barriers as well as conventional netting. Exclusion adequate to stop bird movements can also restrict movements of livestock, people and other wildlife (Fuller-Perrine and Tobin 1993).

Relocation of damaging birds to other areas.

Nest destruction of the target species before eggs or young are in the nest.

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[7] WS Decision Making is not a written process but a mental problem-solving process common to most, if not all professionals to determine appropriate actions to take.

[8] Generally involves modifications to the level of care or attention given to protected resources.

Localized habitat/environmental modification to attract or repel certain bird species (e.g., selective pruning of trees near residents to disperse bird roosts).

Live traps are various types of traps designed to capture birds alive for relocation or euthanasia. Some examples are: clover traps, decoy traps, pole traps, nest box traps, mist nets, etc.

Lure crops/alternate foods are crops planted or other food resources provided to mitigate the potential loss of higher value crops.

3.2.4.2 Chemical, Non-lethal Methods.

Methyl Anthranilate is a taste repellent for birds. It is normally applied to turf or surface water to repel birds from small areas.

Mesurol is a repellent used for taste aversion and registered for only WS use. The active ingredient is methiocarb which is a carbamate pesticide which acts as a cholinesterase inhibitor.

Avitrol is a chemical frightening agent, however, a small portion of the birds could be killed if they consume too much treated bait (Johnson and Glahn 1994).

Alpha-chloralose, which is a central nervous system depressant, is used as an immobilizing agent to capture waterfowl or other birds.

3.2.4.3 Mechanical, Lethal Methods.

Egg addling/destruction is the practice of destroying the embryo in the egg prior to hatching, physically breaking or oiling eggs, or directly removing eggs from a nest and destroying them.

Shooting is the practice of selectively removing target birds by shooting with an air rifle, shotgun, or rifle.

Snap traps are modified rat traps that are used to remove individual birds.

3.2.4.4 Chemical, Lethal Methods. (See Section 2.1.6 for registration and risk information)

DRC-1339 is an avicide for reducing damage from several species of birds, including blackbirds, starlings, pigeons, crows, ravens, magpies, and gulls. DRC-1339 is highly toxic to sensitive species but only slightly toxic to non-sensitive birds, predatory birds and mammals. This chemical is the primary chemical method used for starling and blackbird damage management under the current and proposed action.

CO or CO_2 is sometimes used to euthanize birds which are captured in live traps and when relocation is not a feasible option. Birds are placed in a chamber, gas is released into the chamber and the birds quickly die after inhaling the gas.

3.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE

Several alternatives were considered but not analyzed in detail. These are:

3.3.1 Compensation for Bird Damage Losses.

The Compensation Alternative would require the establishment of a system to reimburse persons impacted by bird damage. This alternative was eliminated from further analysis because no federal or State

laws/policies or regulations exist to authorize such payments. Under this alternative, WS would not provide any operational bird damage management. Aside from the lack of legal authority, analysis of this alternative in USDA (1997) indicates it has many drawbacks. Some of these are:

- It would require larger expenditures of money and labor to investigate and validate all losses, and administer appropriate compensation.
- Compensation would most likely be below full market value.
- It would be difficult to make timely responses to all requests.
- Many losses could not be verified, for example, it would be impossible to prove conclusively in some situations that birds were responsible for disease outbreaks.
- Compensation would provide less incentive to limit losses through improved husbandry or cultural practices, or other management strategies.
- Not all entities would rely completely on compensation and lethal damage management would most likely continue as permitted by law.
- Compensation would not be practical for reducing threats to public health and safety.

3.3.2 Bounties.

Bounties are payments for killing birds suspected of causing losses. This alternative is not supported by wildlife and agricultural agencies such WS, UDWR, UDAF, and USFWS. In addition, WS does not have the authority to establish a bounty program and does not support this concept because:

- Bounties are generally not effective in reducing damage and it would be difficult to measure overall efficacy.
- Circumstances surrounding the bounty of birds are completely unregulated.
- There is a tendency for fraudulent claims to occur.
- It is difficult or impossible to prevent claims for birds taken from outside damage management areas.

3.3.3 Short Term Eradication and Long Term Population Suppression.

In Utah, eradication of native bird species is not a desired population management goal of WS or State agencies. Although generally difficult to achieve, eradication of a local population of pigeons or starlings may be the goal of individual bird damage management projects. This could, in part, be because pigeons and starlings are not native to North America and are only present because of human introduction. However, eradication as a general strategy for reducing bird damage would not be considered because:

- WS opposes eradication of any native wildlife species.
- UDWR and UDAF oppose eradication of native Utah wildlife species.
- Eradication is not acceptable to most members of the public.
- Regional or Statewide attempts at eradication of any native bird species would be next to impossible under the restrictions on methods and areas where bird damage management could be in Utah.

Suppression would direct efforts toward managed reduction of targeted populations or groups of birds. In areas where damage could be attributed to localized populations, WS could decide to implement local population suppression, if supported by the WS Decision Model (Slate et al. 1992) and after consulting with the UDWR and USFWS. However, with the constraints on bird damage management methods, widespread population suppression would be difficult to maintain.

Problems with the concept of suppression are similar to those described above for eradication. It is not realistic or practical to consider large-scale population suppression as the basis of the WS program in Utah. Typically, WS activities in the State would be conducted on a very small portion of the sites or areas inhabited or frequented by the targeted species as discussed in Section 1.3.1.

3.3.4 Bird Damage Management Should be Conducted Using only Non-lethal Methods.

Under this alternative, only non-lethal management approaches would be used or recommended by WS. Both technical assistance and operational damage management services would be provided, however, only non-lethal methods could be considered. WS technical assistance and operational activities would be funded through WS appropriations. Requests for lethal wildlife damage management services would be referred to the UDWR or USFWS from whom Depredation Permits could be requested to allow property owners or resource managers to implement lethal methods or contract others to do so.

The concept of employing a non-lethal repellent to reduce wildlife depredation arose early in agricultural history and has been pursued vigorously ever since (Rogers 1978). However, a consideration and the measure of success of a non-lethal bird damage management program depends on where target birds relocate because a new site can also be a problem. In addition, most animals adjust and ignore a new sound, a process called habituation (Bomford and O'Brien 1990). Numerous non-lethal techniques have been used to reduce damage caused by many bird species with most having limited success, were labor intensive, impractical, expensive or were not effective in reducing damage (Parkhurst et al. 1987, Dolbeer et al. 1988, Tobin et al. 1988, Bomford 1990, Bomford and O'Brien 1990, Mott and Boyd 1995, Stickley et al. 1995, Andelt and Hopper 1996, Belant et al. 1996, Belant et al. 1998). Some methods, however, had limited success, such as distress calls to repel night herons (*Nycticorax nycticorax*) and starlings and changing management practices when the changes allow the enterprise to remain viable (Spanier 1980, Twedt and Glahn 1982, Bomford and O'Brien 1990). Important points when using frightening strategies include the timing of their application and the choice of devices employed. An aggressive and integrated frightening program is essential (Bomford and O'Brien 1990). Playing animal vocalizations to disperse birds during the night, though, can be annoying to people trying to sleep, and could cause other disturbance to domestic animals and wildlife. And people using sounds based on animal vocalizations must have a certain degree of expertise and motivation to be successful (Bomford and O'Brien 1990).

Many aversive agents have been tested to condition birds to avoid foods, roosts and nest sites. Despite extensive research, the efficacy of these technique remains unproven or inconsistent (Bomford and O'Brien 1990). In addition, most reported bird repellents are not currently registered by the EPA or UDAF for this use and, therefore, cannot legally be used or recommended for this purpose.

Portions of this alternative have been addressed in the other alternatives contained in this EA and through court rulings (U.S. District Court of Utah 1993). Limiting bird damage management to only non-lethal would not allow for a full range of IWDM techniques to resolve damage management problems. WS is authorized and directed by Congress to protect American agricultural and natural resources, and property. The alternatives selected for detailed analysis in this EA include non-lethal bird damage management methods and it is believed that analysis of only non-lethal methods would not allow WS the ability to address every damage situation in the most effective manner and expediency is required for public health and safety risks. The most effective approach to resolving wildlife damage could be 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 reduction of damage based on local problem analyses and the informed judgement of trained personnel. 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 (e.g., animal husbandry), habitat modification (e.g., tree pruning), animal behavior (e.g., scaring techniques), local population reduction, or any combination of these, depending on the characteristics of the specific damage problems.

3.4 MITIGATION AND STANDARD OPERATING PROCEDURES FOR BIRD DAMAGE MANAGEMENT TECHNIQUES

Mitigation measures are features of an action that serve to prevent, reduce, or compensate for impacts that otherwise might result from that action. The current WS program, nationwide and

in Utah, uses many such mitigation measures and are discussed in detail in Chapter 5 of USDA (1997). The following mitigation measures apply to the alternatives in this EA, as indicated in the columns.

Table 3-1. Mitigation Measures.

MITIGATION MEASURES	ALTERNATIVES			
	1	2	3	4
Animal Welfare and Humaneness of Methods used by WS				
WS would continue to improve the selectivity and humaneness of management devices.	X	X	X	
Chemical immobilization/euthanasia procedures that do not cause pain would be used.	X	X		
All live traps would be maintained with food and water.	X	X		
The use of newly-developed, proven, non-lethal methods would be encourages when appropriate.	X	X	X	
Safety Concerns Regarding WS' Bird Damage Management Methods				
All pesticides are registered with the EPA and UDAF.	X	X		
EPA-approved label directions would be followed by WS employees.	X	X		
The WS Decision Model (Slate et al. 1992), designed to identify the most appropriate bird damage management strategies and their impacts, would be used to determine management strategies.	X	X	X	
Most avicides and live traps would be primarily restricted to private lands.	X	X		
WS employees that use pesticides are trained to use each material and are certified to use pesticides under EPA approved certification programs.	X	X		
WS employees, who use pesticides, participate in UDAF approved continuing education to keep abreast of developments and maintain their certifications.	X	X		
Live traps would be placed so that captured animals would not be readily visible from any road or public area.	X	X		
Avicide use, storage, and disposal conforms to label instructions and other applicable laws and regulations, and Executive Orders 12898 and 13045.	X	X		
Material Safety Data Sheets for avicides are provided to all WS personnel involved with specific bird damage management activities.	X	X	X	
Concerns about Impacts of Bird Damage Management Activities on T&E species, Species of Special Concern, and Non-target Species.				
WS consulted with the USFWS regarding the nationwide program and would continue to implement all applicable measures identified by the USFWS to ensure protection of T&E species.	X	X		

MITIGATION MEASURES	ALTERNATIVES			
	1	2	3	4
Live traps in areas occupied by peregrine falcons would be checked at least daily.	X	X		
The presence of non-target species are monitored before using avicides at feedlots and dairies to reduce the risk of mortality to non-target species.	X	X		
If non-target species are present or likely to be present at feedlots or dairies where avicides are being applied, then WS would remain on site to discourage non-target visitation.	X	X		
Research is being conducted to: 1) improve bird damage management methods and strategies, 2) increase selectivity for target species, 3) develop effective non-lethal methods, and, 4) evaluate non-target hazards and environmental impacts.	X	X	X	
WS personnel are trained and experienced to select the most appropriate method for taking targeted animals and excluding non-target species.	X	X		
WS would initiate informal consultation with the USFWS following any incidental take of T&E Species.	X	X		
WS personnel would contact cooperating agencies to determine peregrine falcon nesting and roosting locations in areas where pigeon damage management is proposed.	X	X		
If a peregrine falcon is encountered during aerial hazing operations, activities would cease until the bird(s) is gone.	X	X		
When addressing woodpecker or flicker damage, WS would provide sufficient information to preclude accidental take of Three-toed and Lewis' woodpeckers.	X	X	X	
When practical, WS would work with the UDWR to facilitate removal of depredating greater sandhill cranes by licensed sport hunters during the legal sport hunting seasons.	X	X	X	

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

4.0 INTRODUCTION

Chapter 4 provides information needed for making informed decisions and in selecting the appropriate alternative for meeting the purpose of the proposed action. This chapter analyzes the environmental consequences of each alternative in relation to the issues identified for detailed analysis in Chapter 2 and comparison with the proposed action to determine if the real or potential impacts are greater, lesser, or similar.

4.1 ENVIRONMENTAL CONSEQUENCES

The following resource values in Utah are not expected to be significantly impacted by the alternatives analyzed: soils, geology, minerals, water quality/quantity, flood plains, wetlands, visual resources, air quality, prime and unique farmlands, aquatic resources, timber, wilderness, and range. These resources will not be analyzed further. In addition, no issues have been identified relative to bird damage management that are inconsistent with Executive Order 12898, 13045, or 13186.

4.1.1 Social and Recreational Concerns. It is not anticipated that the proposed action would result in any adverse cumulative impacts to social and recreational resources. Further discussion of WS activities on social and recreational concerns are found in USDA (1997).

4.1.2 Cumulative and Unavoidable Impacts. Cumulative and unavoidable impacts are discussed in relationship to each of the bird species and the environmental impacts are analyzed in this Chapter. This EA recognizes that the total annual removal of individual birds by all causes is the cumulative mortality. It is not anticipated that the proposed action would result in any adverse cumulative impacts to bird populations, including T/E species (Section 4.2).

4.1.3 Wastes (Hazardous and Solid). When bird damage management-treated bait cannot be used or when baits are not totally consumed, the bait is disposed of according to label instructions or directions provided by the UDAF. It is not anticipated that the proposed action would result in any adverse cumulative impacts from solid or hazardous wastes.

4.1.4 Target and Non-target Wildlife Species. Cumulative impacts to potentially affected bird species are addressed in detail in Section 4.2.1.

4.1.5 Irreversible and Irretrievable Commitments of Resources. Other than relatively minor uses of fuels for motor vehicles and electricity for office operations, no irreversible or irretrievable commitments of resources result from the Utah WS program. Based on these estimates, the Utah WS program produces negligible impacts on the supply of fossil fuels and electrical energy.

4.1.6 Impacts on Cultural or Historical Sites or Resources. WS bird damage management actions are not *"Federal undertakings"* and would not adversely affect historic resources. The Utah SHPO concurs with this finding and no additional mitigation is required. Any WS bird damage management conducted on American Indian tribal land which is managed or controlled by the tribe would be coordinated with the respective tribal members.

4.2 ISSUES ANALYZED IN DETAIL

This Section analyzes the environmental consequences of the issues analyzed in detail using the current program as the baseline for comparison with the other alternatives to determine if the real or potential impacts are greater, lesser or the same. Table 4-3 summarizes a comparison of the issues and impacts of each Alternative.

4.2.1 Cumulative Effects of WS Bird Damage Management on Target Species Populations.

Analysis of this issue is limited primarily to those species most often removed during WS bird damage management. Magnitude is described in USDA (1997) as " . . . *a measure of the number of animals killed in relation to their abundance*." Magnitude may be determined either quantitatively or qualitatively. Quantitative determinations are based on population estimates, allowable harvest levels, and actual harvest data. Qualitative determinations are based on population trends and harvest data when available. Generally, WS conducts damage management on species whose population densities are high (e.g., overabundant) and/or invasive species and usually only after they have caused damage. The analysis for magnitude of impact on these species' populations generally follows the process described in USDA (1997, Chapter 4).

Each issue will be evaluated under each alternative and the direct, indirect and cumulative impacts will be estimated where applicable. NEPA describes the elements that determine whether or not an impact is "significant." Significance is dependent upon the context and intensity of the impact. The following factors were considered when evaluating the significance of the impacts on target bird populations in this EA that relate to context and intensity.

- magnitude of the impact (size, number, or relative amount of impact) (intensity)
- duration and frequency of the impact (temporary, seasonal impact, year round or ongoing) (intensity);
- likelihood of the impact (intensity);
- geographic extent (limited to the immediate project area(s), Utah counties, the State of Utah or beyond) (context); and
- the legal status of a species that may be removed, or conformance with regulations and policies that protect the resource in question (context).

The target species were selected because they are targeted by Utah WS and could be removed or deterred to protect people and resources from injury or damage.

4.2.1.1 Alternative 1 - Continue the Current Federal Bird Damage Management Program (No Action/Proposed Action).

The majority of targeted bird species are migratory and range from northern to southern latitudes during the year, therefore, this analysis focuses on regional, subregional and Utah population data using Breeding Bird Survey (BBS) population trend data. The BBS is a national survey that annually gathers data during the nesting season, primarily in June, regarding breeding birds. The survey consists of about 3700 routes across the U.S. and Canada. The northwest and southwest regions, as defined by Dolbeer and Stehn (1983), are used because the boundaries of these geographical units are based on ecological differences making regions more meaningful in terms of migratory bird problems.

Non-lethal Damage Management Activities.

Preference is given to non-lethal damage management when practical and effective (WS Directive 2.101). Utah WS dispersed about 143,144 birds of at least six species (starling, mallard, swallows, golden eagle, feral geese, California gulls) during FY 97, 98, 99, 00 and 01 using non-chemical harassment methods such as propane exploders and pyrotechnics. One advantage of dispersing birds would be that relatively no cumulative impacts occur. However, there would be the possibility that the birds could return to the damage site and inflict additional damages or move to another site and continue to cause damage. Normally, large scale relocation activities are limited to wild and feral/domestic waterfowl in and around urban areas. Live capture and relocation is not normally practical for smaller birds such as starlings, blackbirds, pigeons, etc. because of: 1) the number of birds WS confronts annually, 2) potential public safety and health issues (i.e., capturing birds at an airport where they were involved with aircraft hazards and relocating those birds to another area where they could return to an airport and continue to be a safety hazard to aircraft, and relocating birds being removed because of potential disease transmission to people could potentially threaten public health at the new site), 3) competition for food resources and other limiting

factors with other birds and wildlife, 4) the difficulty in finding acceptable release sites, and 5) costs of relocation would increase because of the great distance it requires to relocate birds if trying to prevent them from returning to the original site.

Lethal Damage Management Activities.

Lethal damage management is implemented when a bird damage management problem cannot effectively be resolved through non-lethal damage management and where *Agreements for Control* or other comparable documents provide for operational damage management. Table 4-1 provides information on the number of birds Utah WS killed by method during in FY 99, 00 and 01.

USFWS Depredation Permits (DPs).

Depredation Permits (DP's) are necessary under the Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act (BGEPA) for activities which *"take"* protected species. DPs are not necessary for non-lethal harassment of species protected only under MBTA, but are required for species protected under the BGEPA. Additionally, any *"take"* of a bald eagle (which is protected under MBTA, BGEPA and the ESA) would require multiple permits under all three acts.

Table 4-1. Target Birds Killed by WS during FY 99, 00 and 01.

FY	Species	Damage Management Methods			
		Trap	Shooting	DRC-1339[1]	Euthanasia
2001	Feral Ducks	52			
	N. Flicker		1		
	Canada Geese				1
	Feral Geese				2
	California Gulls				2
	Pigeon	4	8		
	Ravens		7	34	
	Starlings			22,250	
2000	Feral Ducks				2
	Canada geese				1[2]
	Feral geese				3
	California gulls				2[2]
	Magpie				1
	Pigeon		80	1,274	
	Ravens		23		
	Starlings			12,939	
1999	Ducks	1			105
	Canada Geese				1[2]
	Mallards				5[2]
	Ravens	1	22	150	
	Starlings			23,066	
	Pigeon		7	3,981	

[1] Theoretical, based on bait application.
[2] Birds were euthanized after capture because of injury unrelated the WS activities.

The USFWS has authority for managing migratory birds and issuance of DPs (50 CFR 21.41) to persons who clearly show evidence of migratory birds causing or about to cause damage. WS has the responsibility for responding to and attempting to reduce damage caused by migratory birds as specified in an MOU with the USFWS and an MOU with the UDWR, and when funding allows. In cases where intermittent damage is occurring and it is not feasible or practical for WS to provide operational assistance, WS could recommend to the USFWS the issuance of a DP to the resource owner (WS Directive 2.301). Table 4-2 provides information on the number of requests for assistance WS received in FY 97, 98, 99, 00 and 01 for

bird damage management and the number of DPs WS recommended and forwarded to the USFWS.

The issue of DP's for WS activities has evolved over the past 5 years. Litigation against the USFWS resulted in a 1997 Department of Justice (DOJ) opinion that permits were not necessary under MBTA and BGEPA for federal agencies. Litigation against WS in Virginia resulted in a 1999 stipulation that WS would request, and USFWS would issue, MBTA permits, the previous DOJ opinion notwithstanding. USFWS notified WS on November 7, 2001 that a 1982 Solicitors opinion which held that prohibitions in the BGEPA did not apply to federal employees had been rescinded.

Currently, WS is required to obtain MBTA and BGEPA permits for activities which may *"take"* species protected under the respective acts. Guidelines for issuance of permits have been developed and implemented by the USFWS. WS believes the analysis contained in this EA will address the consequences of both the selected action and the issuance of the permit to WS. However, the determination regarding issuance of permits is the sole responsibility of the USFWS, and their NEPA implementing regulations will apply to their actions.

It should be noted that starlings, house sparrows and pigeons are non-indigenous, invasive species, and because of their negative impacts and competition with native birds, are considered by many wildlife biologists and ornithologists to be an undesirable component of North American wild and native ecosystems. These three species are not protected by MBTA or state law. Any reduction in starling, house sparrow or pigeon populations in North America, even to the extent of complete eradication, could be considered beneficial to native bird species. Additionally, blackbird, raven, crow and magpie 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 these birds 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.* All of the above information indicate that populations of starlings and blackbirds, and ravens, crows and magpies are healthy and viable.

Table 4-2. Requests for Assistance and DPs. Recommended by WS in FY 97, 98, 99, 00 and 01.

Species	Requests	Permits Recommended
Coots, American	1	0
Jays, Scrub	1	0
Mourning dove	1	0
Robin, Am.	6	1
Ducks, Feral	2	0*
Ducks, Dabbling	2	0
Ducks, Mallard	31	3
Gulls, Calif.	13	3
Gulls, Ring-billed	2	0
Magpie,	46	2*
Horned Lark	2	0
Geese, Canada	63	1
Swallows	28	4
Flickers, N.	38	14
Woodpeckers, Other	16	0
Cranes, Sandhill	6	0
Hawks, other	2	0
Eagles, Golden	177	0
Eagles, Bald	15	0
Raven, Common	23	3
Hawks, Coopers	1	0
Kestrels, American	4	0
Owls, Other	2	1
Sparrow, English	6	0*
Heron, Blk Crowned	2	2
Heron, Great Blue	7	7

*Permits not recommended because of

4.2.1.1.1 WS, at Times, Conducts Lethal Bird Damage Management on the Species Below.

Many bird population trends are best monitored by using data from the BBS. The BBS is a large-scale inventory of North American birds coordinated by the U.S. Geological Survey, Patuxent Wildlife Research Center (Sauer et al 2002). The BBS is a combined set of over 3,500 roadside survey routes primarily covering the continental United States and southern Canada. The BBS was started in 1966, and routes are surveyed in June by experienced birders. The stated primary objective of the BBS has been to generate an estimate of population change for songbirds. Populations of birds tend to fluctuate, especially locally, as a result of variable annual local habitat and climatic conditions. Trends can be determined using different population equations, and statistically tested to determine if a trend is significant. The significance of a trend's "change" is reflected in the calculated P-value (probability) for that species.

To use the BBS, though, a few assumptions would need to be accepted. The first assumption is that all birds within a quarter mile of the observer are seen at all stops on a BBS route; this assumption is faulty because observers often cannot see a quarter mile in radius at all stops due to obstructions such as hills, trees, and brush and because some birds can be very elusive creatures. Therefore, the birds seen per route would provide a conservative estimate of the population. In Utah, the detectability of birds would likely be fairly high, though, at most stops because much of an area at a stop could be seen.

The second assumption to be made would be that the chosen survey routes are totally random and are fully representative of Utah habitats. However, when BBS routes are established, survey rules allow the observers to make stops for surveys based on better quality habitat or convenient parking areas, even though the survey sites are supposed to be spaced a half-mile apart. Therefore, if survey areas had stops with excellent food availability, such as a landfill site or waterfowl nesting habitat where birds may congregate, the count survey could be biased. This would tend to overestimate the population. However, if these sites were not on a route at all, the population could be underestimated.

Finally, it would have to be assumed that birds are equally distributed throughout the survey area (i.e., Utah, Western Region or USFWS Region 6) and routes were randomly selected. However, routes are randomly picked throughout the State/areas, but are placed on the nearest available road. The starting point is picked for accessibility by vehicle. Some birds tend to congregate along roadsides and others avoid roadside areas. However, most BBS routes are selected because they are "off the beaten path" so the observer can hear birds without interruption from vehicular noise.

WS recognizes the statistical variability of the data and believes that the BBS represents the best available commercial and scientific data available to evaluate potential impacts to bird populations and population trends. Trend data reported for all species below reflect apparent trends in reported data. WS has not independently evaluated statistical significance in trend data. Because bird damage management is directed at individual birds or local populations of overabundant species, the statistical significance of population trends over a large area are only marginally related to local populations where bird damage management occurs.

Starling and Blackbird Biology and Population Impacts.

Starlings were introduced into North America in 1890-91 when about 80 pair were released into New York City's Central Park (Bump and Robbins 1966). In just 100 years, starlings have colonized the U.S. and expanded into Canada and Mexico, and have become one of the most common birds in North America (Feare 1984).

Precise counts of blackbirds and starling do not exist, but one estimate placed the U.S. summer population of blackbirds at more than one billion (USDA 1997) and the winter population at 500 million birds (Royall 1977). Meanley and Royall (1976) estimated 538 million blackbirds and starlings in winter roosts across the country during the winter of 1974-75. Of this total about 26% or 139 million were in the west (Meanly and Royall 1976).

The nationwide starling population has been estimated at 140 million (Johnson and Glahn 1994) and Meanly and Royall (1976) report that the 1974-75 winter starling population in the western States was estimated at 27.8 million birds. The estimated natural mortality of starlings is about 50%. Based on the 1974-75 wintering population estimate, about 14 million starlings die annually in the western States and about 70 million starlings die annually to natural mortality nationally (Meanly and Royall 1976).

An extensive population survey by Dolbeer and Stehn (1983) showed that in the northwestern U.S., the number of breeding starlings tripled between 1968 and 1981. BBS data (Sauer et al. 2002) indicate starling breeding populations have increased in Utah from 1966-200, are relatively stable in the Western BBS Region and slightly increasing in USFWS Region 6. The impact from Utah WS starling damage management is of the low magnitude.

Red-winged blackbird population trends from 1966 to 2001 show that the population is relatively stable to slightly decreasing in Utah and stable to increasing in the Western BBS Region and USFWS Region 6 (Sauer et al. 2002). Yellow-headed blackbird populations trends in Utah and the Western BBS Region appear to be stable and increasing in USFWS Region 6 (Sauer et al. 2002). Population trends for Brewer's blackbird from 1966 to 2001 in Utah show a population decrease trend, stable to slightly increasing in the Western BBS Region, and remain stable in the USFWS Region 6 analysis area (Sauer et al. 2002). During this same time period, brown-headed cowbird population trends are stable to slightly decreasing in Utah, stable in the Western BBS Region and increasing the USFWS Region 6 (Sauer et al. 2002). Common grackle populations appear to be sharply increasing in Utah, stable in the Western BBS Region and slightly decreasing in the USFWS Region 6 (Sauer et al. 2002). Since Utah WS has not targeted or baited for any red-winged blackbirds, yellow-headed blackbirds, Brewer's blackbirds, brown-headed cowbirds or common grackles there would be no cumulative effects from WS bird damage management activities. However, it is possible that some of these species could be present and unidentifiable in flocks of starlings where Utah WS conducts bird damage management at feedlots and dairies. Because of this possibility, Utah WS has determined that bird damage management would likely have minimal cumulative effects to populations of these blackbirds based on apparent breeding bird population trends as described by Sauer et al. (2002), and their reproductive potential. Therefore, removal of damaging blackbirds would have a low magnitude of impact.

Data from Packham (1965) suggests that an average of 57 starlings were killed per pound of DRC-1339 treated bait used at feedlots. Based on the amount of bait distributed by Utah WS, this would have resulted in a starling and blackbird take of 3,990 (FY97), 7,026 (FY98), 23,066 (FY99), 12,939 (FY00) and 11,611 (FY01). These numbers represent a worse case analysis since degraded or unconsumed bait may result in fewer birds being killed. Those estimates would account for only 0.014%, 0.025%, 0.083%, 0.046% and 0.042%, respectively, of the estimated wintering population in the western States as reported by Meanly and Royall (1976), and 0.003%, 0.005%, 0.016%, 0.009% and 0.008%, respectively of the estimated national population.

Cumulative impacts would be mortality caused by Utah WS bird damage management and other known causes of mortality (USDA 1997). Given that the FY99, FY00 and FY01 estimated mortality caused by Utah WS accounts for less than 0.016%, 0.009% and 0.008% of the estimated starling and blackbird population in the western States and that the anticipated kill should not exceed 0.1% of the starling and blackbird population in any future year under the current program, bird damage management as proposed would have a very low magnitude of impact on those species' populations.

In addition, starlings, being non-indigenous, invasive species, and because of their negative impacts and competition with native birds, are considered by many wildlife biologists and ornithologists to be an undesirable component of North American wild and native ecosystems. Any reduction in starling populations in North America, even to the extent of complete eradication, could be considered a beneficial impact to native bird species. Additionally, blackbird 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 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. All of the above information indicate that populations of starlings and blackbirds are health and viable.

Feral, Domestic Pigeon Biology and Population Impacts.

Pigeons, also known as rock doves, are an introduced non-native species to North America and are not protected by law. Any lethal Utah WS bird damage management would likely be restricted to sites where pigeons are causing damage, or are considered a health threat or nuisance, and reduction or removal of a local population could be attempted. This action would be considered a beneficial impact since it would reduce disease threats and property damage/defacing.

No DRC-1339 treatments were used for pigeons in FY 01. During FY 99 and 00, based on bait application, theoretically WS may have killed 3,981 and 1,274 pigeons, respectively (Table 4-1) through the use of DRC-1339. However, the majority of bait during pigeon applications degrades and is not consumed[9]. Few birds are recovered during DRC-1339 treatments. In FY 97, 98, 99, and 00, WS recovered 64, 26, 0, and 167 pigeons, respectively, from all damage management actions.

Utah BBS population trend data (Sauer et al. 2002) indicate that pigeon populations are increasing Utah, stable in the Western BBS Region and increasing in USFWS Region 6. The impact of Utah WS bird damage management is not having an adverse effect on pigeon populations in Utah, in USFWS Region 6, or the BBS Western Region therefore, the magnitude of impact from WS or any other sources is low.

Canada Goose Biology and Population Impacts.

Canada geese are the most common and recognized geese in North America. Their body length varies between 16 to 25 inches with a wingspan of 50 to 60 inches (Robbins et al. 1983). Canada geese are readily recognized by their black heads and necks, brownish body and wings, and whitish hind part (Johnsgard 1975). There are at least ten subspecies of Canada geese, however, the *"Greater"* subspecies is the more common in Utah.

Summering and wintering Canada geese in Utah are in the Pacific Flyway and belong to the Rocky Mountain Population (RMP). The Pacific Flyway management goal for the RMP *"is to maintain the RMP of western Canada geese at a level and distribution that optimizes recreational opportunity and reduces depredation and nuisance problems"* (Subcommittee on Rocky Mountain Canada Geese 2000 as cited in USDI 2002). The Pacific Flyway established separate population objectives for the two populations of western Canada geese. The RMP plan set a breeding population objective of 115,000 birds and specifies maintenance of current distributions as a primary objective.

The RMP management plan lists provision of optimum hunting opportunities and viewing, educational, and scientific pursuits as a primary objective. The Plan recognizes the importance of resident Canada geese for wildlife viewing on federal refuges, State wildlife areas, and urban locations. The RMP geese have become most important component of goose harvest in interior Flyway states with 150,000 birds harvested annually.

As RMP geese have increased, so have depredation concerns. Evaluation of depredation and nuisance issues and implementation of appropriate management actions are a primary objective of the Plan. In 1998, the Pacific Flyway Council issued a Depredation Policy statement to address problems associated with the increasing size of the migrant and resident Canada goose population. One of the principles generated was to use public hunting as the preferred method for reducing agricultural depredation. In addition, it is recommended that agencies implement programs to assist landowners on agricultural and non-agricultural

[9] Uneaten bait is retrieved and disposed of according to label directions.

lands. WS is authorized to assist landowners with goose complaints but funding has been minimal or nonexistent. Furthermore, the Flyway recommends kill permits be a part of the management scheme and should be evaluated based on local needs (USDI 2002).

The BBS population trend data from 1966 to 2001 shows that breeding populations of Canada geese have increased sharply and are now stable in Utah, sharply increased in the Western BBS Region and in USFWS Region 6 (Sauer et al. 2002).

During FY 97-00, WS did not use lethal bird damage management to reduce damage by Canada geese and only captured and euthanized two birds that were injured from unknown reasons. In addition, during FY 97-01, WS provided technical assistance on 24 incidents of damage by Canada geese, and after on-site damage assessments, WS only recommended one DP be issued by the USFWS. Because Canada goose populations appear to be increasing, removal of damaging geese by WS would resulted in a low magnitude of impact and have low impacts to hunting opportunities.

Wild Mallard Biology and Population Impacts.

The mallard is the world's most familiar duck (Gooders and Boyer 1986) and is the most adaptable, occupying a wide range of habitats. Clutch sizes vary from 10-12 eggs and incubation takes about 28 days. One of the mallard's foraging characteristics is its ability to utilize agricultural grain crops as well as natural aquatic foods (Johnsgard 1975).

The decline of mallard populations is not fully understood, however, most waterfowl biologists agree that recurring drought conditions in nesting areas in Canada are an important factor. Duck production depends upon water conditions and when water is abundant, production is good and poor production is expected when water is scarce. Other factors that may influence mallard population trends are predation, limited nesting habitat, liberal hunting regulations, and harvesting females. The BBS population trend data from 1966 to 2001 shows that breeding populations of mallards are stable in Utah, and have increased in the Western BBSC Region and USFWS Region 6 (Sauer et al. 2002).

Non-lethal methods were used in FY 97-01 to move or disperse 93 mallards. In FY 97-01, WS received 31 requests for bird damage management technical assistance from the public and natural resource agencies to help reduce duck damage. After on-site damage assessments were conducted, WS recommended that three DP be issued by the USFWS because of disease threats to zoo animals and human health and safety concerns. If WS perceived any need to conduct lethal damage management of mallards or any other wild waterfowl, WS would first consult with USFWS and UDWR. Because of this consultation, and that mallard breeding populations appear to be increasing in the Western BBS Region and USFWS Region 6, WS activities have resulted in a low magnitude of impact and have low impacts to hunting opportunities.

Common Raven Biology and Population Impacts.

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

In some parts of its range, the raven population is rapidly expanding along with a dramatic increase in raven damage, and programs have been implemented to reduce population size. In many areas of the West, the raven is seen as an indicator of human disturbance, being closely associated with garbage dumps, sewage ponds, highways, agricultural fields, urbanization, and other typical signs of human-altered landscapes (Boarman and Berry1993). Supplemental feeding sources such as garbage, crops, road-kills, etc., have

afforded the raven an advantage over other not-so-opportunistic feeders and has allowed the raven population to increase precipitously in some areas.

Raven populations throughout North America and Utah have been increasing at a steady rate (Sauer et al. 2002). The current raven population is considered to be higher than it has ever been in western United States and currently rebounding in much of its eastern range in the Appalachians (Boarman and Heinrich 1999).

BBS data survey-wide has shown a 2.8% increase per year from 1966 until 2001 with a relative abundance of almost 4 ravens per BBS route in 1966 to about 9 ravens per BBS route in 2001 (Sauer et al. 2002). West-wide BBS data has shown a similar trend with a 3.3% increase per year from 1967 until 2001 with a relative abundance of about 3 ravens per BBS route in 1966 to over 10 ravens per BBS route in 2001 (Sauer et al. 2002). Utah BBS data has also shown an increasing trend starting with about 9.2 ravens per BBS route in 1966 to about 16 ravens per BBS route in 2001 (Sauer et al. 2002).

The current relative abundance for the Western BBS Region is about 10.5 ravens/BBS route, the USFWS Region 6 has about 8 ravens/BBS route and Utah has about 13.5 ravens/BBS survey route. With a relative abundance of about 13.5 ravens/route in Utah over the last 36 years (Sauer et al. 2002), a total raven population could be estimated at about 110,290 for Utah (13.5 ravens/route/10 mi^2 * 82,000 mi^2 land area in Utah = 110,700). The West-wide BBS data currently has a relative abundance of about 10.5 birds/survey route which gives a population estimate of 86,100 for Utah.

Knight and Call (1981) summarized a number of studies on raven territories and home ranges in the western U.S. Nesting territories ranged in size from 3.62 mi^2 to 15.7 mi^2 in Wyoming and Oregon and home ranges varied from 2.53 mi^2 to 3-6 mi^2 in Utah and Oregon. If current breeding raven densities in Utah were conservatively estimated at about five birds/BBS survey route (10 mi^2) (breeding population and floaters), a minimum estimated population of about 41,000 ravens inhabit the State. If raven populations are increasing at an annual rate of just 3.3%, then about 1,350 ravens could presumably be removed from the population annually without reducing the current population level. WS removed 632 (e.g., averaging 126 annually) ravens to reduce damage in Utah during the 1997-2001 period. The figures cited above suggests that if necessary, WS could remove as many as 1,350 ravens annually without having any affects on the overall breeding population in the State. Between FY 97 and 01, WS responded to 23 requests for raven bird damage management technical assistance (Table 4-2). After on-site investigations and assessments of damage, WS recommended three DPs be issued by the USFWS. Trend information, cited above, suggests that WS could remove up to 1,350 damaging ravens without adversely affecting the overall raven population in Utah. WS activities result in a low magnitude of impact on raven populations.

Black-billed Magpie Biology and Population Impacts.

Like ravens and crows, black-billed magpies are omnivorous and very opportunistic in their feeding habits (Hall 1994). Magpies have been reported creating nuisances when concentrated in large numbers or nesting near patios, outdoor eateries, and other structures of private residents and commercial buildings and businesses.

Gazda and Connelly (1993) documented a nesting density of 35 active magpie nests/mi^2 on the Sterling Wildlife Management Area in southeastern Idaho. Magpie populations are apparently healthy and the losses they cause are great enough that the USFWS has established a standing depredation order (50 CFR 21.43). Under this *"order"* 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*.

Magpie BBS data for Utah indicates an increase in the breeding population from 1966 to 2001 (Sauer et al. 2002). However, BBS data from the BBS Western Region and USFWS Region 6 indicate that breeding

populations of magpies are relatively stable to slightly decreasing.

WS killed 36 magpies during the FY 97-98 fiscal years but only one for the FY99-01 analysis period (Table 4-1). Between FY 97-01, WS received 46 requests for technical assistance with magpie damage management (Table 4-2) and recommended that the USFWS issue two DP for resources outside of the Depredation Order. Therefore, WS bird damage management had a low magnitude of impact.

California Gull Biology and Population Impacts.

The California gull is a medium-sized greenish-footed gull, with a gray mantle and black wingtip. The bill is yellow with a red or red and black spot on both sides of the lower mandible (Larrison et al. 1967). It is similar in coloration and size to the ring-billed gull but lacks the black band around the bill (Robbins et al. 1983). California gulls migrate from the Pacific coast and arrive in Utah in late March to late April. They normally migrate back to the Pacific coast during August, with most of the population gone by October; stragglers may stay as late as December. Scattered flocks and nesting colonies can be found near the Great Salt Lake and near irrigated agricultural areas. Some adults winter in Utah and feed on earthworms, grasshoppers, and aquatic invertebrates and small invertebrates in fields. The California Gull is the State bird of Utah and is prominent in the history of pioneer Utah. It is common to see California gulls and ring-billed gulls together in the same flock.

WS reported euthanizing four California gulls during FY 99-01 in response to the birds being injured after the birds apparently stuck high-tension wires. Lethal damage management was not used on California gulls during the FY 97-01 analysis period. Non-lethal methods were used during this same time period to move or disperse 10,000 nesting California gulls from a colony immediately north of the Salt Lake City International Airport where they posed a significant risk to aviation safety.

During FY 97-01, WS responded to eight requests for technical assistance for California gull bird damage management. After WS conducted on-site investigations and assessments, one permit was recommended to the USFWS for DPs. BBS California gull population trend data indicate that they are increasing in Utah, relatively stable in the Western BBS Region and increasing in USFWS Region 6 (Sauer et al. 2002). Removal of damaging or injured California gulls under the current Utah WS program has a low magnitude of impact.

Great Blue Heron Biology and Population Impacts.

One of the tallest birds in Utah, the great blue heron stands about 38 inches tall and has a wing span of about 70 inches (Robbins et al. 1983). Great blue herons are the most widely distributed herons in the U.S. and are commonly seen in Utah during the spring, summer, and autumn. Herons feed on fish and other aquatic vertebrates and are commonly viewed standing or wading on the shores of ponds, creeks, and rivers. The head of the heron is largely white with dark underparts and the body is primarily bluish in color.

BBS population trend data for Utah, the BBS Western Region and USFWS Region 6 indicate that great blue heron populations have been relatively stable from 1966 to 2001 (Sauer et al. 2002) and out of a total of 101 BBS regions, great blue heron population trends have increased.

During FY 97-01, WS shot two great blue herons (Table 4-1) and provided technical assistance with 17 incidents of great blue heron damage and recommended that four DPs be issued by the USFWS (Table 4-2). Because great blue heron populations appear to be stable in Utah, in USFWS Region 6 and thec Western BBS Region and increased in 81 BBS regions (80%), removal of damaging herons by WS under the current program results in a low magnitude of impact.

Northern Flicker Biology and Population Impacts.

Flickers have a strong, sharply pointed bill for chiseling and digging into trees or branches for insects, and

to excavate nesting cavities. Flickers have black spots on a tanish-white breast and belly and are about 11 inches in length. Males have a black or red "mustache" extending from the gape of the beak to below the eyes. In summer, flickers are distributed from Alaska to the southern regions of the U.S. (Short 1982) and migrate to Mexico and the southern U.S. during winter. The habitats of the flicker are diverse, from shrub deserts and tree-bordered streams of the Great Plains to everglade hammocks, city parks, montane fir forests, and farm pastures.

Flickers' diet consist of ants, termites, beetles, crickets, aphids, caterpillars, including their eggs, pupae, and larvae, and other insects obtained from trees and the ground (Short 1982). Vegetation such as berries and other fruits make up a large part of the diet in the autumn and winter. The nesting season in Utah begins in April. Males claim territories and attract females by "drumming," vocalizing, wing flicking, and other displays. Nests are constructed in cavities of dead trees, buildings, fence posts, telephone poles, etc.

During FY 97-01, Utah WS removed one flicker by shooting and did not disperse any flickers using non-lethal techniques, but received 38 requests for assistance. After on-site investigations and damage assessments, however, Utah WS recommended that 14 DPs be issued by the USFWS.

The BBS trend data (Sauer et al. 2002) indicate that breeding flicker populations are relatively stable in Utah, in the BBS Western Region and in USFWS Region 6. Because northern flicker populations appear to be relatively stable, WS removal of a few damaging flickers under the current program results in only a low magnitude of impact.

Feral, Domestic and Exotic Birds Biology and Population Impacts.

WS is requested to provide bird damage management for losses or nuisances created by feral, free-ranging, domestic, non-indigenous, and exotic birds (WS Directive 2.320). The terms "feral" and "free-ranging" relate to domestic animals which have permanently escaped confinement or have been released into the wild, rural areas, city parks, etc. Feral and free-ranging birds are not necessarily dependent upon people for food or care. A domestic duck, commonly found on farms and inter-urban lakes and ponds, is a product of the domestication of the mallard, a larger bird than generally found in truly wild populations. Examples of other domestic or domestic hybrid birds include, muscovy ducks, peacocks, golden pheasants, monk parakeets, etc. "Domestic" refers to animals which are generally animals such as chickens, turkeys, guinea fowl, racing pigeons, domestic ducks and geese, ostriches, emus, etc. and have escaped temporarily from their confinements or owners and are still totally dependent on people for food and care. "Exotic" and "non-indigenous" refers to animals not native to Utah which have been illegally or accidentally introduced or released in the wild.

Birds classified or termed feral, free-ranging, domestic, and exotic are not considered wildlife and are not afforded lawful protection or managed by the USFWS or UDWR. Therefore, no populations or population trend data exist.

In Utah, WS uses a combination of methods to distinguish feral ducks (unprotected) from wild ducks (protected under MBTA). Feral ducks are distinguished by feather coloration not typical of wild ducks (i.e., all white, a combination of white and other colors in a random pattern (i.e., mottled) or very dark plumage on hens), weight (ducks in excess of 3¾ lbs (1.7 kg) during most of the year or 4½ lbs (2.0 kg) from November through January are considered feral) and/or flight ability (i.e., many domestic ducks cannot fly or fly very poorly). Flight ability alone is not used as a determining condition during the summer molt. Most feral ducks exhibit two or more of these characteristics. Feral ducks, when captured, are euthanized while wild ducks are released to the wild in accordance with permit guidance from the USFWS.

Where practical, WS will use non-lethal methods for feral, domestic and exotic birds, including adoption of captured birds to the public when appropriate. Any lethal bird damage management by WS would be restricted to individual sites. In those cases where birds are causing damage or are a nuisance, complete removal of the local population could be desired. This would be considered a beneficial impact on the

human environment since it would be requested by the affected property owner, administrator, or resource management agency.

During FY 97-01, WS captured and euthanized 247 feral, domestic, and exotic birds and adopted out an additional 86 birds. However, because of the status of these birds, lethal removal would not be considered an adverse affect to native species.

4.2.1.1.2. WS Did Not Conduct Lethal Bird Damage Management on the Species Below, but did Provide Technical Assistance or Non-lethal Operational Bird Damage Management.

Even though WS did not provide any lethal bird damage management to reduce damage to the species below, occasions could arise whereby lethal bird damage management would be required to reduce damages to acceptable levels or reduce health and safety risks or threats.

American White Pelican Biology and Population Impacts.

American white pelicans are white in color with black wing tips, wing spans of up to 110 inches (Robbins et al. 1983) and weights of 9 to 10 lbs. (Abbate 1993). Summer distributions extend from northern California to British Columbia and eastwardly to Ontario (Abbate 1993). Pelicans arrive in Utah from winter migration during March. The majority of pelicans nest in large, calm bodies of water in northern Utah. Sexual maturity occurs at about four years of age. Pelicans migrate from Utah during November to winter on the coastal waters of Mexico and Texas.

The pelican's diet consists primarily of *"rough fish"* however, reports of pelicans consuming exclusively trout have been documented (Abbate 1993). Adults consume about 2 lbs of fish per day, while chicks require about 3 to 4 lbs per day. The general population trend for pelicans in North America has been upward since the era of inadequate colony protection during the early 1970's (Abbate 1993). Data from the BBS in Utah shows a downward population trend, the Western BBS region reflects a stable pelican population trend and the USFWS Region 6 reflects an upward trend in populations from 1966 to 2001 (Sauer et al. 2002). White pelicans are considered one of Utah "Partners in Flight Priority Species."

During FY 97-01, WS did not kill any pelicans, but responded to one incident of pelican damage to aquaculture but did not recommend that a DP be issued by the USFWS. However, pelicans pose a short-term threat to aviation safety during their spring and fall migrations along the Wasatch Front. Pelican damage management may include removal of rough fish to preclude them from roosting or feeding near airports. In addition, during these times, limited harassment may be used or recommended to remove them from airports. Because WS did not remove any pelicans, the impact from Utah WS results in a low magnitude of impact.

Black-crowned Night Heron Biology and Population Impact.

Black-crowned night-herons are characterized by heavy bodies, short thick necks, and short legs. The diet of the night-heron consists of fish, crustaceans, aquatic insects, frogs, and small mammals (King and Pyle 1966) and is normally a nocturnal hunter (Bent 1963). The neck and belly are white and have light gray wings. The back and crown of the head are black (Robbins et al. 1983).

BBS population trend data indicate that black-crowned night herons in Utah are in a downward trend, however, in the BBS Western region and USFWS Region 6 black-crowned night herons have increased at more 6% annually from 1966 to 2001 (Sauer et al. 2002).

During FY 97-01, WS did not kill any black-crowned night herons. Two incidents of black-crowned night heron damage reported to WS and upon investigation WS recommended permits be issues by the USFWS for these two incidents. Black-crowned night heron populations appear to be increasing, therefore the removal of several damaging herons by WS would result in a low magnitude of impact.

Common Merganser Biology and Population Impact.

Common mergansers are large, common waterfowl. Males have green crested heads, however, the crest seldom appears and their heads appear black; females have distinct white throats and sharp contrast between their head and throat which distinguish it from the female red-breasted merganser.

BBS population trend data indicate that common merganser populations in the Western BBS Region are stable, and in USFWS Region 6, common merganser populations are slightly increasing from 1966 to 2001 (Sauer et al. 2002). During FY 97-01, WS did not kill any common mergansers and no incidents of common merganser damage were reported to WS. Therefore, WS activities had a low magnitude of impact on common merganser populations.

Ring-billed Gull Biology and Population Impacts.

Ring-billed gulls appear similar to California and herring gulls but are smaller, have yellow feet, and a yellow bill with a black band near the tip. Ring-billed gulls are the most common gulls in Utah and populations are concentrated near lakes, reservoirs, and other large bodies of water. Like most gulls, ring-billed gulls are omnivorous, feeding on animal and plant matter. Common feeding sites are open refuse dumps, livestock feedlots, fish hatcheries, open fields and food processing plants. Spring arrival of migrants in Utah begins in about March and autumn migration is normally completed in October, however, some ring-billed gulls may remain longer or not migrate at all.

BBS population trend data indicate that ring-billed gulls in the BBS Western Region and stable to slightly increasing and are increasing at about 7.6% in the USFWS Region 6 from 1966-2001 (Sauer et al. 2002) and that 94% of the BBS regions throughout the United States and Canada show this same increase in populations.

WS did not remove any ring-billed gulls during FY 97, 98, 99, 00 and 01. Between FY 97 and 00, WS did respond to two requests for assistance to reduce ring-billed gull damage. After on-site investigations and assessments, WS did not recommended that the USFWS issue any DPs. Because ring-billed gull population trend data indicate that populations are stable to increasing, the annual removal of several damaging gulls by WS under the current program results in a low magnitude of impact.

House Sparrow Biology and Population Impacts.

House sparrows or English sparrows were introduced to North America from England in 1850 and have spread throughout the continent (Fitzwater 1994). The species is not protected by federal or State laws. Like starlings and pigeons, because of their negative impacts and competition with native bird species, house sparrows are considered by many wildlife biologists, ornithologists, and naturalists to be an undesirable component of North American native ecosystems. House sparrows are found in nearly every habitat except dense forest, alpine, and desert environments. It prefers human-altered habitats, and is abundant on farms and in cities and suburbs (Robbins et al. 1983).

BBS population trends from 1966-2001 show that house sparrows are increasing in Utah, however are decreasing in USFWS Region 6 and the BBS Western Region. Between FY 97-01 WS responded to six house sparrow complaints, but did not kill any house sparrows (Table 4-2) and because they are not afforded protection by the MBTA, DP's are not required before they can be killed by the public.

Any bird damage management involving lethal damage management by WS would probably be restricted to individual sites. Any reduction in house sparrow populations, even to the extent of complete eradication, could be considered a beneficial impact on populations of native bird species since house sparrows are considered an invasive species.

Swallow Biology and Population Impact.

Barn Swallow - Barn swallows are common near farms, bridges and other buildings, where they build mud nests on building rafters, bridges, or other vertical structures. BSS data indicate that barn swallow population trends in Utah are increasing, slightly decreasing in the Western BBS region and relatively stable in the USFWS Region 6 (Sauer et al. 2002).

Cliff Swallows - Cliff swallows are also common in Utah. These swallows soar more than other swallows and can be distinguished by its orange rump, square tail, broad martin-like wings and buffy forehead. Cliff swallows are also colony nesters and build nests under eaves or bridges. BSS data indicate that cliff swallow population trends in Utah are sharply increasing, relatively stable in the Western BBS region and increasing in the USFWS Region 6 (Sauer et al. 2002).

During FY 97-01, WS did not kill any swallows, but responded to 28 incident of swallow damage and recommend four DP be issued by the USFWS for swallow damage problems. Since swallow population trends appear to be increasing in Utah and stable in the Western BBS and stable to increasing in the USFWS Region 6, WS activities had a low magnitude of impact

American Robin Biology and Population Impacts

The American robin is a very familiar bird and is one of the most common, widely distributed birds in North America. In Utah, robins are commonly seen from March to December and normally migrate south to California, Arizona, New Mexico, and Mexico during winter. It is recognized by its dark gray back and brick-red breast. The head and back of adult males are blackish, while females are dark gray. Juvenile robins are distinctive from adults in that they have speckled, rusty colored breasts (Peterson 1990). The diet of robins consist of insects, earthworms, and a variety of berries and fruits. Nests are constructed of grass and mud in orchard trees or shrubs, or on buildings (Robbins et al. 1983). Robins are mostly solitary, however, during winter, robins will form flocks and often roost communally with other bird species (Smithsonian Institution 2001). Only the female incubates the eggs, which is about 12-14 days. The young are fed mainly by the female and will usually fledge in 14-16 days. Often adult robins will incubate a second clutch and males usually tend to the first clutch after they leave the nest. Clutches consist of 2-4 young per nest and broods average 2-3 per year (Smithsonian Institution 2001).

In Utah, robins primarily cause damage to fruits, such as cherries, grapes, and stone fruits; occasionally cause safety concerns with aviation; nuisance problems from nest building activities; and fecal accumulation on homes, businesses, and other buildings. In addition, the Federal Aviation Administration reported that robins were involved in 70 civilian aircraft strikes from 1991 to 1997 (Cleary et al. 1998).

BBS population trend data collected from 1966 to 2001 indicate that American robin populations in the United States and Canada are stable and increasing (Sauer et al. 2002). One hundred (75%) out of 133 BBS regions report robin populations have increased from 1966 to 2000 (Sauer et al. 2001). BBS data from Utah indicate robin population trends from 1966 to 2001 are stable, and slightly increasing in the Western BBS Region and USFWS Region 6 (Sauer et al. 2002).

During FY99 and FY01, WS did not kill any robins, but did respond to 6 reported occurrences of robin damage. In responding to the requests for assistance and after verifying damage, WS recommended that one DP be issued by the USFWS. Since robin population trends appear to be stable in Utah and increasing in the Western BBS and USFWS Region 6, WS activities had a low magnitude of impact

American Crow Biology and Population Impacts.

American crows are distributed north to south from the Yukon Territory, Canada, to Baja, California and Gulf of Mexico, and are found from the west coast to the east coast (Johnston 1961). American crows can be found throughout the year in Utah. From their spring nesting colonies, or autumn and winter roosts, they

forage for insects, grain, and carrion. Johnston (1961) reports that crows reach their peak abundance in agricultural areas where there are wooded areas, and have increased in numbers where agricultural practices have increased.

According to the BBS population trend results, crow populations in Utah have decreased, however crow population trends in USFWS Region 6 and the Western BBS Region have been shown to be stable to increasing from 1966 to 2001 (Sauer et al. 2002). 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*.

During FY 97-01, WS did not use lethal bird damage management to reduce damage caused by crows, nor were non-lethal methods used to move or disperse crows. Between FY 97-01, WS did not provided assistance involving incidents of crow damage (Table 4-2). If damage occurs, WS could remove some crows from the population, however, the magnitude of WS' response would of a low magnitude of impact.

Turkey Vulture Biology and Population Impacts.

This species breeds from Canada to southern South America, adapting equally well to deserts, eastern deciduous forests, and tropical lowlands (Wilbur 1983). Adult turkey vultures are black in color with a bright-red, naked head (Robbins et al. 1983), while immature vultures have black heads. Turkey vultures migrate to Utah during early April, nest, and return to their winter range in September. In western North America, turkey vultures nest predominately in caves, however hollow trees, thickets, and old buildings are also selected (Jackson 1983, Ritter 1983). Usually two eggs are laid during nesting but as many as four eggs have been documented (Jackson 1983).

Turkey vultures are carrion feeders, eating fresh meat or carrion in advanced stages of decay, and will readily feed on mammal and bird carcasses of various sizes. In search of food, vultures soar in circle-type patterns. When food is located by a single bird, it is not long before other vultures are aware of the find and join the feeding.

Local vulture populations have been known to increase and decline (Wilbur 1983) which suggests that food availability could be a limiting factor. A major range expansion into the northeastern U.S. began after 1920, possible caused by a decline in bison carrion in the west and an increase of white-tailed deer populations and other road-killed animals.

The BBS population trend data from 1966 to 2001 indicates the turkey vulture breeding population has increased in Utah and also populations are also increasing in USFWS Region 6 and the BBS Western Region (Sauer et al. 2002).

There is a small similarity in the habits of turkey vultures and the experimental population of California condors introduced into northern Arizona and southern Utah. Turkey vulture damage management involves moving roosting birds from areas where they pose a threat to human safety. Because condors do not roost with vultures in these situations, there is no possibility that vulture damage management would affect condors.

During FY 97-01, WS did not use lethal bird damage management to reduce damage by turkey vultures. Additionally, WS did not recommend that the USFWS issue any DPs to reduce turkey vulture damage, therefore there was a low magnitude of impact from WS.

American Coot Biology and Population Impacts.

American coots or “mud hens,” are common, duck-sized, blackish-gray birds with a white bill and are distributed over most of the lower 48 States and in Canada (Larrison et al. 1967). Coots migrate to Utah in March or April. Autumn flocks form in August and September and migrate to wintering areas. Like several species of waterfowl, coots are omnivorous, with aquatic and terrestrial plants and invertebrates making up most of their diet.

Coots are managed by the USFWS and UDWR for the purpose of hunting and recreation. The daily bag limit is 20 coots with a maximum possession limit of 40 after the first day of season. According to Sauer et al. (2001), coot population trends in Utah and in USFWS Region 6 have sharply increased from 1966 to 2001 and been relatively stable to slightly decreasing in the BBS Western Region.

WS data between FY 97-00 indicate that no coots were killed from WS activities. During the same time period, WS responded to one incident of coot damage and did not recommend to the USFWS that a DP be issued (Table 4-2). Because the coot is a game bird in Utah and because there is a hunting season, any birds taken by WS during a damage management action would have minimal impacts to the population. If extensive lethal bird damage management toward coots would be conducted, WS would consult with the USFWS and UDWR regarding potential impacts to the population and hunting opportunities.

Greater Sandhill Crane Biology and Population Impacts.

The greater sandhill crane is the largest of six subspecies of sandhill cranes and is common to Utah during spring, summer, and autumn. During the winter, it migrates to northern areas of Mexico and parts of Texas and New Mexico.

Greater sandhill crane adults stand about 37 inches high and have a wing span of about 80 inches (Robbins et al. 1983). Adult bird coloration is gray with a red crown. Juvenile bird coloration is brownish and they lack the red crown. Adult males are larger than females and weigh about 12 and 9 pounds, respectively. Greater sandhill’s breeding habitats in the western U.S. consist of open mountain parks in coniferous forests, willow-dotted streams in sagebrush areas, shallow marshes in sagebrush or arid grasslands, beaver ponds, and other associated wetland habitats (Johnsgard 1983).

Foraging behaviors of sandhill cranes vary by season and area and they adjust their diets to local resources. However, corn and other small grains are the most important food items during spring migration and an important aspect of crane survival in winter and spring (Johnsgard 1983). Other food items consist of invertebrates (worms, grasshoppers, grubs, etc.) and various vegetation. Sandhill cranes forage primarily on land and do much digging with their bills when necessary to extract food items from the soil (Johnsgard 1983).

BBS population trends for Utah, the USFWS Region 6 and the BBS Western Region show that greater sandhill crane populations have increasing from 1966 to 2001 (Sauer et al. 2002).

During FY 97-01, WS did not kill any greater sandhill cranes (Table 4-1) but did receive six requests for sandhill crane damage management assistance; no DPs were recommended to the USFWS. Because sandhill crane populations appear healthy, and are sport hunted in Utah and other States, removal of greater sandhill cranes causing damage by WS would result in a low magnitude of impact and have low impacts to hunting opportunities.

Double-crested Cormorant Biology and Population Impacts.

The double-crested cormorant is one of six species of cormorants breeding in North America and has the widest range (Hatch 1995). The double-crested cormorant inhabiting Utah belongs to the West Coast population. Adult cormorants stand 27 inches tall with wing spans of 50 inches (Robbins et al. 1983) and males weight about 5.3 pounds and females about 5 pounds (Abbate 1993). Plumage of adults is black with a greenish gloss and juveniles are dark brown with a pale neck and underparts (Palmer 1962).

Hatch (1995) reports that West Coast populations in Canada and the U.S. are increasing, but the status of the Mexican populations is unclear. The Utah population trend indicates that cormorants are decreasing, however the BBS Western Region population trend shows that double-crested cormorants have increased from 1966 to 2001 (Sauer et al. 2002),and the USFWS Region 6 breeding cormorant population has sharply increased.

Utah WS has not used lethal means to reduce cormorant damage to aquaculture, nor have non-lethal methods been used to move or disperse cormorants from areas experiencing damage, or where they have presented a public health or safety problem. WS has not responded to any requests in FY 97-01 for bird damage management assistance in dealing with cormorant damage. Because cormorant populations appear to be increasing in the Western BBS region and in the USFWS Region 6, removal of damaging cormorants would result in a low magnitude of impact.

Great Horned Owl Biology and Population Impacts.

The great-horned owl is common in Utah and throughout the western U.S. The great-horned owl's color pattern is similar to long-eared owls, however, great-horned owl "ear tufts" are larger and farther apart; their bellies are finely barred horizontally. Great-horned owls occupy the abandoned nests of large birds, nests in tree cavities, stumps, in caves or on rocky ledges. They lay from one to three egg but typically two eggs are laid.

BBS population trends for Utah indicate that great-horned owl population trends have sharply increased and are relatively stable in the USFWS Region 6 (Sauer et al. 2002). During FY 97-01, WS did not kill any great-horned owls (Table 4-1) but did receive two requests for great-horned owl damage management assistance; the issuance of one DPs was recommended to the USFWS. Because great-horned owl populations appear healthy and sharply increasing in Utah, removal of several great-horned owls causing damage by WS would result in a low magnitude of impact.

Golden Eagle Biology and Population Impacts.

The golden eagle is the largest of two species of eagles in North America and its distribution extends north to the arctic regions and south to Mexico (Brown and Amadon 1989). Its distribution in other old world countries extends into North Africa, Arabia, the Himalayas, and Europe. It is probably the most numerous eagle of its size in the world, by reason of the extent of its range and the huge areas of mountain country it frequents. Robbins et al. (1983) reports that mature eagles are 32 inches in length with a wing span of 78 inches. They are a dark brown color with a lighter brown, golden neck, and legs are feathered to the feet. Home ranges of golden eagles in California vary from 19 to 59 mi^2, with an average of 35 mi^2 (Brown and Amadon 1989). Most of the prey is taken on the ground after being spotted from the air, and scavenging is also utilized. Golden eagles spend much of their time soaring and gliding above hills, cliffs, and ridges searching for prey. The excessive amount of soaring and the extent they cover sometimes interferes with low-level aviation operations near airports.

Golden eagles are provided federal protection through the Bald and Golden Eagle Protection Act (16 USC 668) which prohibits, except under certain specified conditions, the taking, possession, and commerce of such birds, and assesses penalties for violating the Act. BBS population trend data for golden eagles in Utah and the USFWS Region 6 indicate that populations of golden eagle are increasing (Sauer et al. 2002).

The USFWS is in the process of drafting a Director's Order outlining a procedure for resolving depredating golden eagle situations. The Director's Order will establish a procedure for handling and disposition of damaging eagles. Utah WS has never used lethal methods to resolve bird damage management complaints regarding golden eagles. Utah WS has responded to 177 requests for assistance during FY 97-01 for golden eagle damage management. These requests resulted in WS recommending that the USFWS not issue any DPs. WS did capture one adult male golden eagle and relocate to an area away from the damage site and harassed another 55 eagles from damage sites. Because golden eagle populations appear to be increasing,

removal of damaging golden eagles would result in a low magnitude of impact. WS will coordinate any eagle damage management with the USFWS.

Bald Eagle Biology and Population Impacts.

Bald eagles are unnoticeably smaller in body size and weight to golden eagles, but have a slightly wider wing span. Mature bald eagles have a distinct white head and tail and legs are unfeathered. They have a much heavier bill than golden eagles. Immature bald eagles are easily mistaken for golden eagles since the two species' coloration is similar. Bald eagles are normally found in Utah near large bodies of water, rivers and creeks, and marshes. Food habits of bald eagles are varied and they partake in scavenging more often than hunt for live prey. It is not uncommon to find bald eagles feeding on livestock carcasses or carcasses of deer and other large animals killed near highways.

The bald eagle is provided federal protection through the Bald and Golden Eagle Protection Act (16 USC 668) which prohibits, except under certain specified conditions, the taking, possession, and commerce of such birds, and assesses penalties for violating the Act. Additionally, the bald eagle is provided further protection since it is a threatened species in the conterminous (lower 48) States (50 CFR 17.11). The bald eagle is also proposed for delisting from protection of the ESA and Western BBS data indicate that populations are increasing (Sauer et al. 2002).

WS responded to 15 requests during FY 97-01, however, did not recommend the issues of any DPs. When WS responds to such requests for assistance, consultation with the USFWS is initiated and they are informed of the incident. Utah WS has never used lethal methods to resolve damage/hazard complaints of bald eagles. Rather, WS works with the landowner or resource owner to find alternative methods to resolve the issue. If operational assistance is necessary, WS obtains the necessary approval from the USFWS and non-lethal methods are employed. However, the 1992 USFWS BO stipulates that WS is allowed incidental take of two bald eagles nationwide per year, with the exception of the Southwestern population. The BO references that the USFWS has determined that this level of impact is not likely to result in jeopardy to the species, thus, having no cumulative impacts to bald eagles.

4.2.1.2 Alternative 2 -Non-lethal Damage Management Required Before Lethal.

Under this alternative, WS removal of target species may sometimes be less than that of the *Proposed Action* because lethal bird damage management would be restricted to situations where non-lethal damage management has been tried without success. However, for many damage situations, this alternative would be similar to the current program because many agricultural producers and property owners have tried non-lethal methods without success or found them to be impractical for their situation. For the same reasons described in Section 4.2.1.1, it is unlikely that statewide or regionwide, target species' populations would be adversely affected by implementation of this alternative. Impacts and hypothetical risks of illegal toxicant use would probably be slightly greater than the *No Action/Proposed Action.*

4.2.1.3 Alternative 3 - Technical Assistance Only.

Under this alternative, WS would have no impact on target species populations directly. Private efforts to reduce or prevent damage and perceived disease transmission risks or other human health and safety risks could increase, resulting in increased potential impacts on those bird populations and humans. For the same reasons shown in Section 4.2.1.1, it is unlikely that starling, blackbird or other target populations would be adversely affected by implementation of this alternative. Impacts and hypothetical risks of illegal toxicant use would be greater under this alternative than Alternative 1. DRC-1339 is currently only available for use by WS employees. It is hypothetically possible that frustration caused by the inability to reduce losses would lead to illegal use of toxicants which could increase impacts to an unknown degree.

4.2.1.4 Alternative 4 - No WS Bird Damage Management.

Under this alternative, WS would not have any impact on target species' populations in the State. Private efforts to reduce or prevent depredations would increase which could result in varying degrees of impacts to target species' populations. Impacts to target species under this alternative could be the same, less, or more than those of the Proposed Action depending on the level of effort expended. For the same reasons shown in the population impacts analysis in Section 4.2.1.1, it is unlikely that starlings, blackbird or most other target species populations would be adversely affected by implementation of this alternative. Alpha chlorolse and DRC-1339 are currently only available for use by WS employees. It is hypothetically possible that frustration caused by the inability to reduce losses would lead to illegal use of toxicants which could increase impacts to an unknown degree.

4.2.2 Effects of WS Bird Damage Management on Non-target Species Populations, Including T&E Species.

4.2.2.1 Alternative 1 - Continue the Current Federal Bird Damage Management Program (No Action/Proposed Action).

According to Utah WS Annual Reports, only two non-target birds are known to have been killed during bird damage management from 1997 to 2001. Those two incidents involved the accidental killing of Canada geese in FY99 and 01 through the use of alpha chlorolose. There have not been any confirmed cases of non-target bird deaths from WS use of DRC-1339 in Utah. If DRC-1339 prebaiting observations or prior history suggest a likelihood of non-target bird presence, then any treated bait applied to a site must be constantly monitored to ensure that non-target birds do not arrive and consume bait. Alternatively, some type of structure or feeding station could be used that would only allow access by the target species but not by non-target birds.

While every precaution would be taken to safeguard against killing non-target birds, at times changes in local flight patterns and other unanticipated events could result in the incidental death of unintended species. These occurrences are rare and should not affect the overall populations of any species under the current program.

Interspecific nest competition has been well documented with some non-indigenous species. 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 Kestrel (*Falco sparverius*) (Nickell 1967, Von Jarchow 1943, Wilmers 1987), red-bellied woodpeckers (*Centurus carolinus*), Gila woodpeckers (*Centurus 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 evicting bats from nest holes. Reduction of nest site competition could be a beneficial impact for some native species. Although such reductions are not likely to be significant, the benefits would probably outweigh any adverse effects 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 5 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.

A Section 7 Programmatic Consultation between the USFWS and WS (USDA 1990), determined that certain damage management methods could have a "may affect" determination to American peregrine falcon, bald eagle, and whooping crane. As a result of these determinations, the USFWS prepared a BO regarding the extent of effects (USFWS 1992). The BO concluded that damage management methods previously mentioned in this EA, which are used in bird damage management will not jeopardize the

continued existence or adversely modify critical habitats of those species. However, the BO did conclude that DRC-1339 may adversely affect the whooping crane. Mitigation measures to avoid negative impacts to T/E species as well as the inherent safety features of DRC-1339 that preclude hazards to mammals and plants are described in USDA (1997, Appendix F) and in Section 3.4 of this EA. Those measures would assure there would be no jeopardy to T&E species, or adverse impacts on mammalian, or non-T/E bird scavengers from the Proposed Action.

Utah WS conducted a Section 7 consultation with the USFWS to preclude adverse affects to T/E species found in Utah. We have also reviewed the list of State sensitive species and Utah Partners in Flight Priority Species and determined that the methods used by WS for bird damage management will not adversely affect the populations of those species. As part of the consultation, WS conducted a BA which proposed mitigation measures to avoid adverse affects to peregrine falcons.

WS also has reviewed the current list of candidate species, State Sensitive species and Partners in Flight Priority Species and determined that the proposed action would not negatively affect these species. SOP's listed in Chapter 3 preclude negative effects and the low nontarget risk associated with WS methods precludes other impacts. In addition, WS bird damage management may benefit some of the species of special concern (e.g. raven damage management targeting sage grouse or sharptail grouse nesting habitat).

4.2.2.2 Alternative 2 -Non-lethal Damage Management Required Before Lethal.

Under this alternative, WS take of non-target birds would be similar or slightly less than the *No Action/Proposed Action* because reasonable efforts would be made to implement non-lethal damage management. Mitigation measures to avoid T/E species impacts are described in Section 3.4. Those measures would help insure that adverse impacts would not likely occur to T/E species from WS bird damage management if Alternative 2 would be implemented. However, if WS was restricted to implementing non-lethal damage management prior to lethal damage management, efforts by agricultural producers, property owners or others to reduce or prevent damage could increase. This could result in less experienced persons implementing bird damage management, which could lead to greater take of non-target species. Hazards to peregrine falcons, bald eagles and other T/E species could be greater under this alternative. 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.

4.2.2.3 Alternative 3 - Technical Assistance Only.

Alternative 3 would not allow any WS direct operational bird damage management in Utah. There would be no impact on non-target or T/E species by WS bird damage management from this alternative. Technical assistance or self-help information would be provided when requested to agricultural producers, property owners, or others. Although technical assistance could lead to more selective use of bird damage management methods by private entities than that which would occur under Alternative 4, private efforts to reduce or prevent damage could result in less experienced persons implementing bird damage management methods and lead to a greater take of non-target wildlife. Hazards to raptors, peregrine falcons, bald eagles, and other T/E species could be greater under this alternative. It is possible that, similar to Alternative 4, 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 and threats to raptors, including peregrine falcons and bald eagles, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

4.2.2.4 Alternative 4 - No WS Bird Damage Management.

Alternative 4 would not allow any WS bird damage management in Utah. There would be no impact on non-target or T/E species by WS bird damage management from this alternative. However, private efforts

to reduce or prevent damage could increase, resulting in less experienced persons implementing damage management methods and could lead to greater take of non-target wildlife than the *No Action/Proposed Action*. Hazards to raptors, peregrine falcons, bald eagles, and other T&E species could, therefore, be greater under this alternative. As in Alternative 3, possible frustrations caused by the inability to reduce losses could lead to illegal use of toxicants which could impact local non-target species populations, including T&E species.

4.2.3 Risks Posed by WS Bird Damage Management Methods to the Public and Domestic Pets.

The effects on safety from WS bird damage management include potential benefits by fostering a safer environment from reduced disease transmission and bird/aircraft strikes, and potential negative effects that might result from the exposure of the public to bird damage management methods. WS uses chemical methods that are deemed appropriate to reduce a variety of damage problems, and WS personnel are aware of the potential risks to non-target species and humans (See Appendix C for a detailed description of bird damage management methods and chemicals). The use of pesticides by WS is regulated by the EPA through the FIFRA, by State law, the UDAF, and by WS Directives. Along with effectiveness, cost and social acceptability, risk is an important criterion for the selection of damage management strategies. Determination of risks to non-target animals, the public, and WS personnel would be an important prerequisite for successful application of the IWDM approach. Based on a thorough Risk Assessment (USDA 1997, Appendix P), APHIS concluded that, when chemicals are used according to label directions, they are selective for target individuals or populations, and such use has negligible impacts on the environment.

4.2.3.1 Alternative 1 -Continue the Current Federal Bird Damage Management Program (No Action and Proposed Action).

Under this alternative, bird damage management conducted by WS in Utah is guided by WS, APHIS, and USDA Directives, Cooperative Agreements and MOUs with other agencies, the USFWS BO, and federal, State, and local law and regulations. WS is not aware of any record of harm or injury that has occurred to the public or pets as a result of WS bird damage management in Utah. The bird damage management methods used by Utah WS are discussed in Appendix C of this EA and used as prudently as possible.

4.2.3.2 Alternative 2 -Non-lethal Damage Management Required Before Lethal.

Impacts under this alternative would be similar to those described in Alternative 1 once the non-lethal before lethal requirement has been met.

4.2.3.3 Alternative 3 - Technical Assistance Only.

Under this alternative, less selective use of methods by individuals less experienced in their application could occur. Frustration caused by the inability to reduce losses could lead to illegal use of toxicants which could lead to unknown impacts to humans and pets. Hazards to humans and pets could be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used.

4.2.3.4 Alternative 4 - No WS Bird Damage Management.

Alternative 4 would not allow any WS bird damage management in Utah. There would be no impact to humans or pets by WS bird damage management. However, private efforts to reduce or prevent damage could increase, resulting in less experienced persons implementing damage management methods and leading to a greater risk than the No Action/Proposed Action alternative. Hazards to humans and pets could, therefore, be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used. It is hypothetically possible that frustration caused by the inability to reduce losses could lead to illegal use of toxicants.

4.2.4 Efficacy and Selectivity of WS Bird Damage Management Methods.

Under the current program, all methods are used as effectively and selectively as practically possible, in conformance with the WS Decision Model (Slate et al. 1992) and WS Directives. The efficacy and selectivity of each method is based, in part, on the application of the method, the skill of the personnel using the method and the guidance provided by WS Directives and policies for WS personnel.

The efficacy and selectivity of each alternative are based on the types of methods employed under that alternative. WS personnel are trained in the use of each method, and are certified by the UDAF as restricted-use pesticide applicators for each pesticide that is used. Some methods may be more or less effective, or applicable depending on weather conditions, time of year, biological considerations, economic considerations, legal and administrative restrictions, or other factors. Because these various factors, may at times, preclude use of certain methods, it is important to maintain the widest possible selection of damage management methods to most effectively and selectively resolve bird damage problems (see Appendix C for a more detailed discussion of methods).

4.2.4.1 Alternative 1 -Continue the Current Federal Bird Damage Management Program (No Action/Proposed Action).

Methyl anthranilate is a non-lethal bird repellent derived from a human food additive. The chemical is effective in reducing bird food consumption and area-use, and is selective in that it primarily repels birds.

Alpha-chloralose is delivered as a bait to targeted birds, and is selective and effective in immobilizing targeted individuals. Removal of uneaten bait and immobilized birds reduces secondary non-target hazards. Some unintentional mortality may occur due to differences in target bird weight, aggressiveness in feeding, or post baiting behavior.

Lasers are selective and an effective non-lethal method to disperse some bird species (i.e., Canada geese) under the correct lighting conditions and present virtually no health hazards to the birds (APHIS 2001).

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Live traps are erected in locations where a targeted population is causing damage or where other techniques cannot be safely used. Live traps, as applied and used by WS, are highly selective for target species. If a non-target is accidentally captured, it would be released unharmed.

Nest box traps are effective and selective in capturing secondary cavity nesting birds (DeHaven and Guarino 1969, Knittle and Guarino 1976).

Snap traps are used to remove individual birds, primarily northern flickers and magpies, that are causing damage. Selectiveness can be increased by placing the traps near where the damage is occurring and by baiting the trap with food items which are highly attractive to the targeted species and less attractive to non-target birds.

Nest destruction is selective for targeted species/individuals because nests would be identified by species-specific characteristics and nesting material. Heusmann and Bellville (1978) reported this method effective, but time-consuming.

Egg addling/destruction is highly selective because the eggs of specific birds are targeted for destruction, no impacts to other species would occur. This method is considered highly selective, but time consuming.

DRC-1339 - Over 30 years of studies have demonstrated the safety and efficacy of this compound. Non-target hazards are low due to the low degree of sensitivity that most birds and mammals have

for this chemical, thus the selectivity to specific pest bird species. In addition, there are vitally no secondary hazards associated with the use of DRC-1339 (USDA 1997, Appendix P). Prebaiting is conducted to monitor for the presence of non-target and target species consumption to increase efficacy.

Avitrol - Prebaiting is usually conducted to increase baiting efficacy and selectivity. Any granivorous bird associated with the target birds could be affected by Avitrol if it consumed treated bait. However, Avitrol only affects a very small number of birds in a baited area. Laboratory studies with predator and scavenger species have shown minimal potential for secondary poisoning, and during field use, only magpies and crows appear to have been secondarily affected by Avitrol (Schafer et al. 1974).

Shooting is selective for target species (USDA 1997). It would also be effective as a dispersal technique or to reinforce dispersal techniques.

There are several other bird damage management methods used by WS under the current program. Appendix C provides a description of each.

4.2.4.2 Alternative 2 -Non-lethal Damage Management Required Before Lethal.

Under this alternative, the efficacy of the WS program would be reduced, but selectivity would be similar to the current program. For many damage situations, this alternative would be similar to the current program because requesters have generally tried one or more non-lethal methods without success or have considered and found them to be impractical for their situations. This alternative does not preclude requesters the option of implementing their own lethal damage management measures, which could decrease the selectivity of bird damage management.

4.2.4.3 Alternative 3 - Technical Assistance Only.

Under this alternative, WS would not have an operational bird damage management program to assist requesters to reduce bird damage. Efficacy of the WS program would not be a consideration. Assistance would be limited to providing technical assistance and instructional demonstrations on legally available methods and self-help advice. Selectivity of WS bird damage management would also not be a consideration because entities experiencing damage would be implementing the damage management, which could decrease the selectivity of bird damage management.

4.2.4.4 Alternative 4 - No WS Bird Damage Management.

Under this alternative, WS bird damage management would not be a consideration because the Utah WS program would not conduct nor provide technical assistance to entities experiencing bird damage. Private efforts to reduce or prevent damage would probably increase which could result in less efficacy and selectivity in using bird damage management methods. It is reasonable to assume that frustration caused by the inability to reduce losses through legal means in a timely manner could lead to the use of illegal techniques which could result in unwanted impacts to bird populations and the environment.

4.3 SUMMARY OF WS' IMPACTS

Table 4-3 presents a relative comparison of the anticipated impacts of each of the four alternatives as they relate to each of the four major issues identified in Chapter 2.

Table 4-3. Relative Comparison of Anticipated Impacts From Alternatives.

Issues/Impacts	*Alt. 1* *Current Program*	*Alt. 2* *Non-lethal*	*Alt. 3* *Tech. Assist*	*Alt. 4* *No Program*
Target Species Impacts	Low	Low	Low	NA
Impacts to Non-target Species	Low risk	Low risks	Probably greater risks than Alt. 1 and 2	Probably greater risks than Alt. 1, 2 and 3
Safety Concerns	Low	Low	Low	NA
Selectivity and Efficacy of Methods	Best	Similar selectivity as Alt. 1 but lower effectiveness	Lower than Alt.1 and 2	Lower than Alt. 1, 2 and3

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APPENDIX A
LITERATURE CITED IN THE EA

APHIS (Animal and Plant Health Inspection Service). 2001. Tech Note: Use of lasers in avian dispersal. USDA, APHIS, WS. 2 pp.

AVMA (American Veterinary Medical Association). 1987. Journal of the American Veterinary Medical Association. Panel Report on the Colloquim on Recognition and Alleviation of Animal Pain an Distress. 191:1186-1189.

Abbate, M. 1993. Cormorants, darters, and pelicans of the world. Smithsonian Institution Press, Washington. 445 pp.

Andelt, W. F., and S. N. Hopper. 1996. Effectiveness of alarm-distress calls for frightening herons from a fish rearing facility. Progress. Fish-Cultur. 58: 258-262.

Arhart, D. K. 1972. Some factors that influence the response of starlings to aversive visual stimuli. M.S. Thesis. Oregon State Univ., Corvallis.

Avery, M. L., and D. G. Decker. 1994. Responses of captive fish crows to eggs treated with chemical repellents. J. Wildl. Manage. 58:261-266.

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

Balser, D. S., D. H. Dill, and H. K. Nelson. 1968. Effect of predator reduction on waterfowl nesting success. J. Wildl. Manage. 32:669-682.

Barnes, T. G. 1991. Eastern bluebirds, nesting structure design and placement. College of Agric. Ext. Publ. FOR-52. Univ. of Kentucky, Lexington, KY. 4 pp.

Batterson, W. M., and W. B. Morse. 1948. Oregon sage grouse. Oregon Fauna Series Number 1, Oregon State Game Commission, Portland, USA.

Belant, J. L., T. W. Seamans, L. A. Tyson, and S. K. Ickes. 1996. Repellency of methyl anthranilate to pre-exposed and naive Canada geese. J. Wildl. Manage. 60: 923-928.

Belant, J. L., P. P. Wornecki. R. A. Dolbeer, and T. W. Seamans. 1998. Ineffectiveness of five commercial deterrents for nesting starlings. Wildl. Soc. Bull. 26: 264-268.

Bent, A. C. 1963. Life histories of North American marsh birds. Dover Publ., Inc, New York, N.Y. 392 pp.

Bergerud, A. T. 1988. Increasing the numbers of grouse. Pages 686-731 *in* A. T. Bergerud and M. W. Gratson, editors. Adaptive strategies and population ecology of northern grouse. University of Minnesota Press, Minneapolis, USA.

Besser, J. F. 1985. A grower's guide to reducing bird damage to U.S. agricultural crops. Bird Damage Research Rep. No. 340. U. S. Fish and Wildl. Serv. Denver Wildl. Res. Center. 84 pp.

Besser, J. F., W. C. Royal, and J. W. DeGrazio. 1967. Baiting starlings with DRC-1339 at a cattle feedlot. J. Wildl. Manage. 3:48-51.

Besser, J. F., J. W. DeGrazio, and J. L. Guarino. 1968. Costs of wintering starlings and red-winged blackbirds at feedlots. J. Wildl. Manage. 32:179-180.

Bishop, R. C. 1987. Economic values defined. Pages 24 -33 *in* D. J. Decker and G. R. Goff, eds. Valuing wildlife: economic and social perspectives. Westview Press, Boulder, CO. 424 p.

Blackwell, B. F., G. E. Bernhardt, and R. A. Dolbeer. 2002. Lasers as nonlethal avian repellents. J. Wildl. Manage. 66:250-258.

Blanton, E. M., B. U. Constantin, and G. L. Williams. 1992. Efficacy and methodology of urban pigeon control with DRC-1339. Proc. East. Wildl. Damage Cont. Conf. 5:58-62.

Boarman, W. I., and K. H. Berry. 1993. Common ravens in the southwest United States, 1968-1992. National Biological Service, Desert Tortoise Research Project, 6221 Box Springs Blvd., Riverside, CA 92507.

Boarman, W. I. and B. Heinrich. 1999. Common Raven. *in* Birds of North America, No. 476, Cornell Lab. Ornithology and the Acad. Nat. Sci. A. Poole and F. Gill, eds. 31 pp.

Bomford, M. 1990. Ineffectiveness of a sonic device for deterring starlings. Wildl. Soc. Bull. 18:151-156.

Bomford, M., and P. H. O'Brien. 1990. Sonic deterrents in animal damage control: a review of device tests and effectiveness. Wildl. Soc. Bull. 18: 411-422.

Brown, L., and D. Amadon. 1989. Eagles, hawks, and falcons of the world. The Wellfleet press. Secaucus, New Jersey. 945 pp.

Bump, G., and C. S. Robbins. 1966. The newcomers. *In* Birds in our lives. A. Stefferrud ed. U.S. Government printing office, Washington, D. C. 561 pp.

CDC (Centers for Disease Control and Prevention). 1997. Histoplasmosis protecting workers at risk. DHHS (NIOSH) Publ. No. 97-146. U.S. department of health and human services. 22 pp. plus appendix.

CDFG (California Department of Fish and Game). 1999. California department of fish and game. Revised environmental document - bear hunting. Sections 265, 365, 366, 367, 367.5. Title 14 Calif. Code of Regs. Calif. Dept. of Fish and Game, State of California, April 25, 1991. 13 pp.

Center for Wildlife Law. 1996. Saving biodiversity. Status report on state law, policies, and programs. Defenders of Wildlife, 1117 NE Standford. Albuquerque, NM. 118 pp.

Cleary, E. C, S. E. Wright, and R. A. Dolbeer. 1996. Wildlife strikes to civilian aircraft in the United States 1993-1995. Federal Aviation Administration, Office of Airport Safety and Standards, Airport Safety/Operations Division, Washington, DC. Ser. Rep. No. 2. 33 pp.

Connelly, J. W., and C. E. Braun. 1997. Long-term changes in sage grouse *Centrocercus urophasianus* populations in western North America. Wildlife Biology 3:229-234.

Conover, M. R. 1982. Evaluation of behavioral techniques to reduce wildlife damage. Proc. Wildl.-Livestock Relation. Sym. 10:332-344.

Cote, I. M., and W. J. Sutherland. 1996. The effectiveness of removing predators to protect bird populations. Conservation Biology 11(2):395-405.

Council on Environmental Quality. 1981. Forty most asked questions concerning CEQ's NEPA regulations. 40 CFR 1500-1508 and Fed. Reg. 55:18026-18038.

Cowardin, L. M., D. S. Gilmer, and C. W. Shaiffer. 1985. Mallard recruitment in the agricultural environment of North Dakota. Wildlife Monographs 92.

Cunningham, D. J., E. W. Schafer, and L .K. McConnell. 1981. DRC-1339 and DRC-2698 residues in starlings: preliminary evaluation of their effects on secondary hazard potential. Proc. Bird Cont. Sem. 8:31-37.

Curtis, K. S., W. C. Pitt, and M. R. Conover. 1996. Overview of techniques for reducing bird predation at aquaculture facilities. Jack Berryman Institute and International Assoc. of Fish and Wildl. Agencies. Utah State University, Logan, Utah. 19 pp.

Day, G. I., S. D. Schemnitz, and R. D. Taber. 1980. Capturing and marking wild animals. pp. 61-88 *in* Wildlife management techniques manual. S. D. Schemnitz ed. The Wildl. Soc., Inc. Bethesda, MD. 686 pp.

Decino, T. J., D. J. Cunningham, and E. W. Schafer. 1966. Toxicity of DRC-1339 to starlings. J. Wildl. Manage. 30:249-253.

Decker, D. J., and G. R. Goff. 1987. Valuing Wildlife: Economic and Social Perspectives. Westview Press. Boulder, Colorado, p. 424.

DeHaven, R. W., and J. L. Guarino. 1969. A nest box trap for starlings. Bird Banding 40:49-50.

Dolbeer, R. A., and R. A. Stehn. 1983. Population status of blackbirds and starlings in North America, 1966-81. Proc. East. Wildl. Damage Cont. Conf. 1:51-61.

Dolbeer, R. A., P. P. Woronecki, A. R. Stickley, and S. B. White. 1978. Agricultural impact of a winter population of blackbirds and starlings. Wilson Bull. 90:31-44.

Dolbeer, R. A., P. P. Woronecki, and R. L. Bruggers. 1986. Reflecting tapes repel blackbirds from millet, sunflowers, and sweet corn. Wildl. Soc. Bull. 14:418-425.

Dolbeer, R. A., M. A. Link, and P. P. Wornecki. 1988. Napthalene shows no repellency for starlings. Wildl. Soc. Bull. 16: 62-64.

Eccleston, C. 1995. Determining when an analysis contains sufficient detail to provide adequate NEPA coverage. Federal Facilities Environmental J., Summer pp. 37-50.

Feare, C. 1984. The starling. Oxford University Press, Oxford, N.Y. 315 pp.

Feare, C., A. J. Isaacson, P. A. Sheppard, and J. M. Hogan. 1981. Attempts to reduce starling damage at dairy farms. Protection Ecol. 3:173-181.

Fitzwater, W. D. 1994. House Sparrows. pp. E101-108 *in* Prevention and control of wildlife damage. S. Hygnstrom, R. Timm, and G. Larson eds. Coop. Ext. Serv. Univ. of Nebr.-Lincoln.

Forbes, J. E. 1995. Starlings are expensive nuisance on dairy farms. Ag. Impact. 17:4.

Fuller-Perrine, L. D., and M. E. Tobin. 1993. A method for applying and removing bird exclusion netting in commercial vineyards. Wildl. Soc. Bull. 21:47-51.

Garrettson, P. R., and F. C. Rowher. 2001. Effects of mammalian predator removal on production of upland-nesting ducks in North Dakota. J. Wildl. Manage. 65:398-405.

Gazda, R., and J. Connellly. 1993. Ducks and predators: more ducks with fewer trees? Idaho Wildl. 13:8-10.

Giri, S. N., D. H. Gribble, and S. A. Peoples. 1976. Distribution and binding of radioactivity in the starling after intravenous administration of [^{14}C]3-chloro-*p*-toluidine. Exper. Molecular Pathol. 24:392-404.

Glahn, J. F. 1982. Use of starlicide to reduce starling damage at livestock feeding operations. Proc. Great Plains Wildl. Damage Cont. Work. 5:273-277.

Glahn, J. F., and D. L. Otis. 1981. Approach for assessing feed loss damage by starlings at livestock feedlots. ASTM Spec. Tech. Publ. No.752.

Glahn, J. F, and B. F. Blackwell. 2000. Safety guidelines for using the Desman laser and Dissuader laser to disperse double-crested cormorants and other birds. United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services' National Wildlife Research Center, Fort Collins, Colorado, USA.

Glahn, J. F., and E. A. Wilson. 1992. Effectiveness of DRC-1339 baiting for reducing blackbird damage to sprouting rice. Proc. East. Wildl. Damage Cont. Conf. 5:117-123.

Glahn, J. F., S. K. Timbrook, and D. J. Twedt. 1987. Temporal use patterns of wintering starlings at a southeastern livestock farm: implications for damage control. Proc. East. Wildl. Damage Cont. Conf. 3:194-203.

Glahn, J. F., G. Ellis, P. Fiornelli, and B. Dorr. 2001. Evaluation of moderate- and low-power lasers for dispersing double-crested cormorants from their night roosts. Proceedings of the Eastern Wildlife Damage Management Conference 9:34-45.

Gregg, M. A. 1991. Use and selection of nesting habitat by sage grouse in Oregon. Thesis, Oregon State University, Corvallis, USA.

Gooders, J., and T. Boyer. 1986. Ducks of North America and the northern hemisphere. Facts on File Publications, New York, N.Y. 176 pp.

Goodwin, D. 1986. Crows of the world. Raven. British Museum of Natural History. Cornell University Press, Ithaca, N.Y. pp. 138-145.

Gough, P. M., and J. W. Beyer. 1982. Bird-vectored diseases. Proc. Great Plains Wildl. Damage Cont. Work. 5:260-272.

Grabill, B. A. 1977. Reducing starling use of wood duck boxes. Wildl. Soc. Bull. 5:67-70.

Greenwood, R. J. 1986. Influence of striped skunk removal on upland duck nest success in North Dakota. Wildlife Society Bulletin 14:6-11.

Hall, T.C. 1994. Magpies. pp. E79-85 *in* Prevention and control of wildlife damage. S. Hygnstrom, R. Timm, and G. Larson eds. Coop. Ext. Serv., Univ. of Nebr.-Lincoln.

Hatch, J. J. 1995. Changing populations of double-crested cormorants. Colonial Waterbirds 18:8-24.

Heusmann, H. W., and R. Bellville. 1978. Effects of nest removal on starling populations. Wilson Bull. 90:287-290.

Heusmann, H. W., W. W. Blandin, and R. E. Turner. 1977. Starling-deterrent nesting cylinders in wood duck management. Wildl. Soc. Bull. 5:14-18.

Hygnstrom, S. E., and S. R. Craven. 1994. Hawks and owls. pp. E53-62 *in* Prevention and control of wildlife damage. S. Hygnstrom, R. Timm, and G. Larson eds. Coop. Ext. Serv. Univ. of Nebr.-Lincoln

Ingold, D. J. 1994. Influence of nest site competition between European starlings and woodpeckers. Wilson Bull. 106:227-241.

Jackson, J. A. 1983. Nesting phenology, nest site selection, and reproductive success of black and turkey vultures. pp. 245-270 *in* Vulture biology and management. S. R. Wilbur and J. A. Jackson, eds. University of California Press, Berkeley. 550pp.

Johnsgard, P. A. 1975. Waterfowl of North America. Indiana University Press, Bloomington. 575 pp.

Johnsgard, P. A. 1983. Cranes of the world. Indiana University Press, Bloomington. 257 pp.

Johnson, D. H., A. B. Sargeant, and R. J. Greenwood. 1988. Importance of individual species of predators on nesting success of ducks in the Canadian Prairie Pothole region. Can. J. Zool. 67:291-297.

Johnson, R. J., and J. F. Glahn. 1994. European starlings. pp. E109-E120 *in* Prevention and Control of Wildlife Damage. S. Hygnstrom, R. Timm, and G. Larson eds. Coop. Ext. Ser. Univ. of Nebr.-Lincoln.

Johnston, D. W. 1961. The biosystematics of American crows. University of Washington Press, Seattle. 119pp.

Keister, G. P., and M. J. Willis. 1986. Habitat selection and success of sage grouse hens while nesting and brooding. Progress report. Pitman Robinson Project W-87-R-2. Oregon Department of Fish and Wildlife, Portland, USA.

Kerpez, T. A., and N. S. Smith. 1990. Competition between European starlings and native woodpeckers for nest cavities in saguaros. Auk. 107:367-375.

King, J. E., and R. L. Pyle. 1966. Some birds like fish. pp. 230-239 *in* Birds of our lives. A. Stefferud, ed. U.S. Government printing office, Washington, D. C.

Knittle, C. E., and J. L. Guarino. 1976. Reducing a local population of starlings with nest-box traps. Proc. Bird Cont. Sem. 7:65-66.

Knight, R. L., and M. W. Call. 1981. The common raven. USDI, Bureau of Land Management. Tech. Note. No. 344. 62 pp.

Larrison, E. J., J. L. Tucker, and M. T. Jollie. 1967. Guide to Idaho birds. J. of the Idaho Academy of Sci. Vol. V. 220 pp.

Lustick, D. 1973. The effect of intense light on bird behavior and physiology. Proc. Bird Control Seminar 6:171-186.

Mason, J. R., R. E. Stebbings, and G. P. Winn. 1972. Noctules and starlings competing for roosting holes. J. Zool. 166:467.

Maycock, C., and G. Graves. 2001. Aversive conditioning of black-billed magpies through the use of mesurol on the Sterling wildlife management area, March, 2001. Unpublished report. Wildlife Services, Boise, Idaho, USA.

McCracken, H. F. 1972. Starling control in Sonoma county. Proc. Vertebr. Pest Conf. 5:124-126.

McGilvrey, F. B., and F. M. Uhler. 1971. A starling deterrent wood duck nest box. J. Wildl. Manage. 35:793-797.

Meanley, B., and W. C. Royall. 1976. Nationwide estimates of blackbirds and starlings. Proc. Bird Cont. Sem. 7:39-40.

Messmer, T. A., M. W. Brunson, D. Reiter, and D. G. Hewitt. 1999. United States public attitudes regarding predators and their management to enhance avian recruitment. Wildlife Society Bulletin 27:75-85.

Miller, J. W. 1975. Much ado about starlings. Nat. Hist. 84:38-45.

Mills, D. H. 1967. Predation on fish by other animals. pp. 377-397 *in* Biological Basis of Freshwater Fish Production. S. Gerking, ed. John Wiley & Sons, New York, N. Y.

MIS (Management Information System). 1997. Statewide Overview Reports, Utah. WS State Office, P. O. Box 26976, Slat Lake City, UT.

MIS (Management Information System). 1998. Statewide Overview Reports, Utah. WS State Office, P. O. Box 26976, Slat Lake City, UT.

MIS (Management Information System). 1999. Statewide Overview Reports, Utah. WS State Office, P. O. Box 26976, Slat Lake City, UT.

MIS (Management Information System). 2000. Statewide Overview Reports, Utah. WS State Office, P. O. Box 26976, Slat Lake City, UT.

MIS (Management Information System). 2001. Statewide Overview Reports, Utah. WS State Office, P. O. Box 26976, Slat Lake City, UT.

Mott, D. F. 1985. Dispersing blackbird-starling roosts with helium-filled balloons. Proc. East. Wildl. Damage Cont. Conf. 2:156-162.

Mott, D. F. and F. L Boyd. 1995. A review of techniques for preventing cormorant depredations at aquaculture facilities in the southeastern United States. Col. Waterbirds 18: 176-180.

Nelson, A .L. 1934. Some early summer food preferences of the American raven in southeastern Oregon. Condor 36:10-15.

Nickell, W. P. 1967. Starlings and sparrow hawks occupy same nest box. Jack-Pine Warbler 45:55.

Occupational Safety and Health Administration. 1991. Guidelines for laser safety and assessment. Publication 8-1.7. United States Department of Labor, Occupational Health and Safety Administration, Washington, DC, USA.

Orians, G. H. 1985. Blackbirds of the Americas. University of Washingtron Press, Seattle. 163 pp.

Packham, C. J. 1965. Starling control with DRC-1339 at cattle feedlots in Idaho winter of 1964-1965. Unpublished report. WS State Office, 9134 W. Blackeagle Dr., Boise, ID 22 pp.

Palmer, R. S. 1962. Handbook of North American birds. Yale University Press, New Haven, CT 567 pp.

Parkhurst, J. A., R. P Brooks, and D. E. Arnold. 1987. A survey of wildlife depredation and control techniques at fish-rearing facilities. Wildl. Soc. Bull. 15: 386-394.

Peterson, R. T. 1990. A field guide to western birds. Houghton Mifflin Company, Boston, and New York, New York, USA.

Ritter, L. V. 1983. Growth, development, and behavior of nesting turkey vultures in central California. pp. 287-308 *in* Vulture Biology and Management. S. R. Wilbur and J. A. Jackson eds. University of California Press, Berkeley. 550 pp.

Robbins, C. S., B. Bruun, and H. S. Zim. 1983. A guide to field identification birds of North America. Golden books publ. Co., Inc., Racine, Wisconsin. 360 pp.

Roberts, H. B. 1992. Birds of east central Idaho. Northwest printing, Inc. Boise, ID 117 pp.

Rogers, J. G., Jr. 1978. Repellents to protect crops from vertebrate pests: some considerations for their use and development. Flavor Chemistry of Animal Foods: ACS Sym. Series 67: 150-165.

Rohwer, F. C., P. R. Garrettson, and B. J. Mense. 1997. Can predator trapping improve waterfowl recruitment in the Prairie Pothole region? Proceedings of the Eastern Wildlife Damage Management Conference. 7:12-22.

Rossbach, R. 1975. Further experiences with the electroacoustic method of driving starlings from their sleeping areas. Emberiza 2:176-179.

Royall, W. C. 1977. Blackbird-starling roost survey. Bird Damage Res. Rep. 52. Denver Wildlife Research Center. 54pp.

Royall, W. C., T. J. DeCino, and J. F. Besser. 1967. Reduction of a starling population at a turkey farm. Poultry Sci. 46:1494-1495.

Salmon, T. P., and F. S. Conte. 1981. Control of bird damage at aquaculture facilities. Wildl. Manage. Leaflet no. 475. U.S. Fish and Wildlife Service. Washington, D.C. 11pp.

Sauer, J. R., J. E. Hines, and J. Fallon. 2001. The North American breeding bird survey, results and analysis 1966-2000. Version 2001.2, United States Geological Survey (USGS), Patuxent Wildlife Research Center, Laurel, Maryland, USA.

Sauer, J. R., J. E. Hines, and J. Fallon. 2002. The North American breeding bird survey, results and analysis 1966 - 2001. Version 2002.1, USGS Patuxent Wildlife Research Center, Laurel, MD. (Info. retreived from http://www.mbr-pwrc.usgs.gov/bbs/bbs.html)

Schafer, E. W. 1991. "Bird control chemicals-nature, mode of action and toxicity." pp. 599-610 *in* CRC Handbook of Pest Management in Agriculture Vol. II. CRC Press, Cleveland, OH.

Schafer, E. W. Jr., R. B. Brunton, and N. F. Lockyer. 1974. Hazards to animals feeding on blackbirds killed with 4-aminopyrine baits. J. Wildl. Manage. 38:424-426.

Schmidt, R. H. 1989. Vertebrate pest control and animal welfare. pp. 63-68 *in* ASTM STP 1055. Vertebrate Pest Control and Management Materials. Vol. 6. K. A. Fagerstone and R. D. Curnow, eds. American Society for Materials and Testing. Philadelphia.

Schmidt, R. H., and R. J. Johnson. 1984. Bird dispersal recordings: an overview. ASTM STP 817. 4:43-65.

Schroeder, M. A., and R. K. Baydack. 2001. Predation and the management of prairie grouse. Wildlife Society Bulletin 29:24-32.

Shake, W. F. 1967. Starling wood duck interrelationships. M.S. Thesis. Western Illinois Univ., Macomb.

Shirota, Y. M., M. Sanada, and S. Masake. 1983. Eyespotted balloons are a device to scare gray starlings. Appl. Ent. Zool. 18:545-549.

Short, L. L. 1982. Woodpeckers of the world. American Museum of Natural History. New York, N.Y. 676 pp.

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

Smith, R. L. 1977. Elements of ecology and field biology. Harper and Row publishers, New York, N.Y. 497pp.

Smithsonian Institution. 2001. Birds of North America. DK Publishing, Incorporated, New York, New York, USA.

Southern, W. E. 1967. Colony selection, longevity, and ring-billed gull populations: preliminary discussion. Bird-Banding 38:52-60.

Spanier, E. 1980. The use of distress calls to repel night herons (*Nycticorax nycticorax*) from fish ponds. J. Appl. Ecol. 17: 287-294.

Stickley, A. R., and R. J. Weeks. 1985. Histoplasmosis and its impact on blackbird/starling roost management. Proc. East. Wildl. Damage Cont. Conf. 2:163-171.

Stickley, A. R., Jr., D. F. Mott, and J. O. King. 1995. Short-term effects of an inflatable effigy on cormorants at catfish farms. Wildl. Soc. Bull. 23: 73-77.

Terres, J. K. 1980. The Audubon Society Encyclopedia of North American Birds. Wings Bros., New York, N.Y. 629pp.

The Wildlife Society. 1992. Conservation policies of the wildlife society: a stand on issues important to wildlife conservation. The Wildlife Society, Bethesda, Md. 24 pp.

Tobin, M. E, P. P. Woronecki, R. A. Dolbeer, and R. L. Bruggers. 1988. Reflecting tape fails to protect ripening blueberries from bird damage. Wildl. Soc. Bull. 16:300-303.

Twedt, D. J., and J. F. Glahn. 1982. Reducing starling depredations at livestock feeding operations through changes in management practices. Proc. Vertebr. Pest Conf. 10:159-163.

UASS (Utah Agricultural Statistics Service). 2001. Utah Agricultural Statistics and Utah Department of Agriculture and Food Annual Report. Utah Agricultural Statistics and Utah Department of Agriculture and Food, Salt Lake City, Utah.

UASS (Utah Agricultural Statistics Service). 2002. Utah Agricultural Statistics and Utah Department of Agriculture and Food Annual Report. Utah Agricultural Statistics and Utah Department of Agriculture and Food, Salt Lake City, Utah.

UASS (Utah Agricultural Statistics Service). 2003. Utah Agricultural Statistics and Utah Department of Agriculture and Food Annual Report. Utah Agricultural Statistics and Utah Department of Agriculture and Food, Salt Lake City, Utah.

U. S. District Court of Utah. 1993. Civil No. 92-C-0052A. January.

USDA (U.S. Department of Agriculture). 1990. Section 7 programmatic consultation for animal damage control. Unpublished document. 65 pp.

USDA (U.S. Department of Agriculture). 1995. Tech note DRC-1339 (starlicide). USDA, APHIS, ADC Operational Support Staff, 4700 River Road, Unit 87, Riverdale, MD 20737.

USDA (U.S. Department of Agriculture). 1997, revised. Animal damage control program, final environmental impact statement. USDA, APHIS, ADC Operational Support Staff, 4700 River Road, Unit 87, Riverdale, MD 20737.

USDA (U.S. Department of Agriculture). 1999. Animal and plant health inspection service, animal damage control strategic plan. 1989. USDA, APHIS, ADC Operational Support Staff, 4700 River Road, Unit 87, Riverdale, MD 20737.

USDI (U.S. Department of Interior). 2002. Resident Canada goose management: Draft Environmental Impact Statement. USDI, USFWS, Main Interior Building, 1849 C Street, Washington, DC 20240.

USFWS (United States Fish and Wildlife Service). 1992a. Biological opinion [July 28, 1992]. U.S. Fish and Wildlife Service. Washington, D.C. Unpublished document. 69 pp.

Von Jarchow, B. L. 1943. Starlings frustrate sparrow hawks in nesting attempt. Passenger Pigeon 5:51.

Weber, W. J. 1979. Health hazards from pigeons, starlings, and English sparrows. Thompson Publ., Fresno, Calif. 138 pp.

Weitzel, N. H. 1988. Nest site competition between the European starling and native breeding birds in northwestern Nevada. Condor. 90:515-517.

West, R. R., and J. F. Besser. 1976. Selection of toxic poultry pellets from cattle rations by starlings. Proc. Bird Cont. Sem. 7:242-244.

West, R. R., J. F. Besser, and J. W. DeGrazio. 1967. Starling control in livestock feeding areas. Proc. Vert. Pest Conf. 3:89-93.

Wilbur, S. R. 1983. The status of vultures in the western hemisphere. pp. 113-126 *in* Vulture Biology and Management. S. R. Wilbur and J. A. Jackson, eds. University of California Press, Berkeley. 550 pp.

Willis, M. J., G. P. Keister, D. A. Immell, D. M. Jones, R. M. Powell, and K. R. Durbin. 1993. Sage grouse in Oregon. Wildlife Research Report Number 15. Oregon Department of Fish and Wildlife, Portland, USA.

Wilmers, T. J. 1987. Competition between starlings and kestrels for nest boxes: a review. Raptor Res. Rep. 6. pp. 156-159.

Wornecki, P. P., R. A. Dolbeer, and T. W. Seamans. 1990. Use of alpha-chloralose to remove waterfowl from nuisance and damage situations. Proc. Vertbr. Pest Conf. 14:343-349.

Wright, E. N. 1973. Experiments to control starling damage at intensive animal husbandry units. Bull. OEPP. 9:85-89.

Wywialowski, A. P. 1994. Agricultural producers' perceptions of wildlife-caused losses. Wildl. Soc. Bull. 22:370-382.

APPENDIX B
AUTHORITY AND COMPLIANCE

WS Legislative Authority

The primary, statutory authority for WS is the Act of March 2, 1931, as amended (46 Stat. 1486; USC 426-426c), which provides that:

> *"The Secretary of Agriculture is authorized and directed to conduct such investigations, experiments, and tests as he may deem necessary in order to determine, demonstrate, and promulgate the best methods of eradication, suppression, or bringing under control on national forests and other areas of the public domain as well as on State, Territory or privately owned lands of mountain lions, wolves, coyotes, bobcats, prairie dogs, gophers, ground squirrels, jackrabbits, brown tree snakes and other animals injurious to agriculture, horticulture, forestry, animal husbandry, wild game animals, furbearing animals, and birds, and for the protection of stock and other domestic animals through the suppression of rabies and tularemia in predatory or other wild animals; and to conduct campaigns for the destruction or control of such animals. Provided that in carrying out the provisions of this Section, the Secretary of Agriculture may cooperate with States, individuals, and public and private agencies, organizations, and institutions."*

Since 1931, with the changes in societal values, WS policies and its programs place greater emphasis on the part of the Act discussing *"bringing (damage) under control,"* rather than *"eradication"* and *"suppression"* of wildlife populations. In 1988, Congress strengthened the legislative mandate of WS with the Rural Development, Agriculture, and Related Agencies Appropriations Act (Public Law 100-202). This Act States, in part:

> *"That hereafter, 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."*

In 2001, Congress passed the Fiscal Year 2001 Agricultural Appropriations Bill, which further amends and strengthens the Act of March 2, 1931 and provides that:

> *"The Secretary of Agriculture may conduct a program of wildlife services with respect to injurious animal species and take any action the Secretary considers necessary in conducting the program. The Secretary shall administer the program in a manner consistent with all of the wildlife services authorities in effect on the day before the date of the enactment of the Agriculture, Rural Development, Food and Drug Administration, And Related Agencies Appropriations Act, 2001."*

Utah Division of Wildlife Resources (UDWR)

The UDWR is responsible for managing all protected and classified wildlife in Utah despite the land class the animals inhabit (UCA §23-13-2). UDWR is also authorized to cooperate with WS and the UDAF for controlling predatory animals (UCA, Title 4 Chapter 23). The UDWR purview is jointly shared with the US Fish and Wildlife Service for migratory birds and Threatened and Endangered Species.

Utah Department of Agriculture and Food (UDAF)

The UDAF is authorized to enter into Cooperative Agreements with WS and local entities (UCA §4-23-5). The UDAF currently has an MOU, Cooperative Agreement, and Annual Work Plan with WS. These documents establish a cooperative relationship between WS and UDAF, outlines responsibilities, and sets forth annual objectives and goals of each agency for resolving wildlife damage management conflicts in Utah.

U.S. Forest Service and Bureau of Land Management (BLM)

The Forest Service and BLM have the responsibility to manage the resources of Federal lands for multiple uses, while recognizing the State's authority to manage wildlife. Both the Forest Service and BLM recognize the importance of reducing wildlife damage on lands and resources under their jurisdiction, as integrated with their management responsibilities. For these reasons, both agencies have entered into MOUs with WS to facilitate a cooperative relationship.

National Forest Land and Resource Management Plans (LRMPs). The National Forest Management Act requires that each National Forest prepare a Land and Resource Management Plan (LRMP) for guiding long range management and direction. LRMP documents and the decision made from this EA would Be consistent.

BLM Resource Management Plans (RMP) and Management Framework Plans (MFPs). The BLM currently uses RMPs to guide management on lands they administer. RMPs generally replace older land use plans known as MFPs. Any decision made because of this analysis would be according to the direction in the RMPs/MFPs for the BLM Districts in Utah.

COMPLIANCE WITH FEDERAL LAWS and EXECUTIVE ORDERS. Several Federal laws and Executive Orders regulate WS wildlife damage management. WS complies with these laws, and consults and cooperates with other agencies as appropriate.

National Environmental Policy Act (NEPA). This EA, with WS as the lead agency fulfills the NEPA requirements for conducting bird damage management in Utah. Environmental documents pursuant to NEPA (this EA) must be completed before other plans, consistent with the NEPA supported decision, can be developed. Federal agencies that request WS assistance to protect resources from the species discussed in this EA would review this document, and if necessary, the agency requesting the assistance would be responsible for NEPA compliance.

WS also coordinates specific projects and programs with other agencies. The purpose of these contacts is to coordinate any wildlife damage management that may affect resources managed by these agencies or affect other areas of mutual concern. Federal agency requests for WS' assistance to protect resources outside the species discussed in this EA would be reviewed, and if necessary, the agency requesting the assistance would be responsible for NEPA compliance.

Endangered Species Act (ESA). It is WS (WS Directive 2.310) and Federal policy, under the ESA, 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 Section 7 consultations with the USFWS to utilize the expertise of the USFWS to ensure that *"any action authorized, funded or carried out by such an agency . . . is not likely to jeopardize the continued existence of any endangered or threatened species. . ."* (Sec.7(a)(2))

Migratory Bird Treaty Act of 1918 (16 U.S.C. 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. The law prohibits any "*take*" of these species by private entities, except as permitted by the USFWS; therefore the USFWS issues permits to private entities for reducing bird damage. WS provides on-site assessments for persons experiencing migratory bird damage to obtain information on which to base damage management recommendations. Damage management recommendations could be in the form of technical assistance or operational assistance. In severe cases of bird damage, WS provides recommendations to the USFWS for the issuance of DPs to private entities. Starlings, pigeons, house sparrows and domestic waterfowl are not classified as protected migratory birds and therefore have no protection under this Act. USFWS DPs are also not required for yellow-headed, red-winged, rusty, and Brewer's blackbirds, cowbirds, all grackles, crows, and magpies found committing or about to commit depredation 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 (50 CFR 21.43).

Federal Insecticide, Fungicide, and Rodenticide Act

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requires the registration, classification and regulation of all pesticides used in the United States. The Environmental Protection Agency (EPA) is responsible for implementing and enforcing FIFRA. All pesticides used or recommended by the WS program in Utah are registered with, and regulated by, the EPA and the UDAF. Utah WS uses all chemicals according to label directions as required by the EPA and UDAF.

National Historical Preservation Act (NHPA) of 1966 as amended The NHPA requires: 1) federal agencies to evaluate the effects of any federal undertaking on cultural resources, 2) consult with the SHPO 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.

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

Environmental Justice (EJ) is a movement promoting 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. EJ has been defined as the pursuit of equal justice and equal protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status (The EJ movement is also known as Environmental Equity -- which is the equal treatment of all individuals, groups or communities regardless of race, ethnicity, or economic status, from environmental hazards).

EJ is a priority both within APHIS and WS. Executive Order 12898 requires Federal agencies to make EJ 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. To meet this, WS developed a strategy that: 1) identifies major programs and areas of emphasis to meet the intent of the Executive Order, 2) minimize any adverse effects on the human health and environment of minority and low-income persons or populations, and 3) carries out the APHIS mission. To that end, APHIS operates according to the following principles: 1) promote outreach and partnerships with all stakeholders, 2) identify the impacts of APHIS activities on minority and low-income populations, 3) streamline government, 4) improve the day-to-day operations, and 5) foster non-discrimination in APHIS programs. In addition, APHIS plans to implement Executive Order 12898 principally through its compliance with the provisions of NEPA.

All WS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898 to insure EJ. WS personnel use wildlife damage management methods as selectively and environmentally conscientiously as possible. 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.

Protection of Children from Environmental Health and Safety Risks (Executive Order 13045).

Children may suffer disproportionately from environmental health and safety risks for many reasons, including their development physical and mental status. Because WS makes it a high priority to identify and assess environmental health and safety risks that may disproportionally affect children, WS has considered the impacts that this proposal might have on children. The proposed bird damage management would occur by using only legally available and approved damage management methods where it is highly unlikely that children would be adversely affected. For these reasons, WS concludes that it would not create an adverse environmental health or safety risk to children from implementing this proposed action. In contrast, the proposed action may reduce adverse environmental health or safety risks by reducing risks (i.e., disease, bird/aircraft strikes, etc.) to which children may potentially be exposed.

Executive Order 13186 and MOU between USFWS and WS

Executive Order 13186 directs federal agencies to protect migratory birds and strengthen migratory bird conservation by identifying and implementing strategies that promote conservation and minimize the take of migratory birds through enhanced collaboration between WS and the USFWS, in coordination with state, tribal, and

local governments. A National-level MOU between the USFWS and WS has been drafted to facilitate the implementation of Executive Order 13186.

APPENDIX C

Methods Proposed for Use by Species

Species	Pyrotechnics	Aerial Harassment	Propane canons	Flags or other exclusion	Live trap	Nest destruction	Egg Addling	Trap / relocate	DRC 1339	Avitrol	Methyl Anthralate	Alpha Clorolosse	Shooting	Laser Harassment	Mesurol
Starling	X				X	X			X		X		X		
Black birds	X	X	X		X	X			X	X	X		X		
Canada geese	X		X	X	X	X	X	X			X	X		X	
Pigeon				X	X	X	X		X				X	X	
Mallard	X		X	X	X	X	X	X			X	X		X	
Common raven	X	X	X	X		X	X		X				X	X	X
California gull	X		X	X		X	X						X	X	
Great blue heron	X		X	X	X	X	X						X	X	
Feral ducks				X	X	X	X				X	X	X		
White pelican	X		X	X	X										
Black Crowned night heron	X		X	X		X	X						X	X	
Ring-billed gull	X		X	X		X	X							X	
House sparrow				X	X	X	X			X			X		
Northern flicker				X		X							X		
Crow	X	X	X	X		X	X		X				X		X
Magpie	X			X		X	X		X				X		X
Coot	X		X	X	X	X	X	X			X	X	X		
Turkey vulture	X		X	X	X	X	X	X					X		
Sandhill crane	X		X	X											
Double-crested cormorant	X	X	X	X									X		
Golden eagle	X		X					X							
Swallow				X		X									

* Bald eagle work is only conducted under permit from the USFWS assuming delisting proceeds as proposed by the USFWS.