# ENVIRONMENTAL ASSESSMENT

# AQUATIC RODENT DAMAGE MANAGEMENT IN NEW MEXICO

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In Cooperation With:

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# CHAPTER 1: PURPOSE AND NEED FOR ACTION

## 1.1 INTRODUCTION

While all wildlife including aquatic rodents are a valuable natural resource, some species of wildlife can cause problems with human interests. The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program has personnel with expertise to respond to damage caused by wildlife, including aquatic rodents. Two aquatic rodents are part of New Mexico's wildlife heritage, the beaver (*Castor canadensis*) and muskrat (*Ondatra zibethicus*). Another aquatic rodent, the nutria (*Myocastor coypus*) was introduced into New Mexico in the 1930s and the 1950s.

In New Mexico, beaver, muskrat, and nutria are classified as furbearers. Furbearers are protected by State law and the New Mexico Department of Game and Fish (NMGF) is responsible for management of these species. Under State law, NMGF must respond to complaints from private landowners or lessees when these species are causing damage. WS, under contract, assists NMGF with responding to these complaints. WS also assists public entities and Tribes with ARDM when requested and when they have the appropriate permits necessary for ARDM from the NMGF, as required.

The following document is an Environmental Assessment (EA) that describes and analyzes WS's involvement in aquatic rodent damage management (ARDM) in New Mexico. For the purposes of this document aquatic rodents only include beaver, muskrat, and nutria. While NMGF is clearly responsible for these species' populations and their damage, WS does assist with ARDM. WS also assists Tribes, other federal agencies, and public entities with ARDM. Therefore, WS is providing the following analysis to determine if WS has any significant impacts on the environment. This EA will be used in a decision-making process to determine if WS should continue to provide this service or not. Although WS has federal authority to conduct wildlife damage management, WS also has a policy of abiding by state laws and has agreed to be consistent with any management direction or plans that NMGF establishes on behalf of the State. NMGF is mandated to carry out this work under State law, and, therefore, the human environment with present abundance of aquatic rodents would likely be the same whether or not WS assisted the State or not.

### 1.1.1 Background

Across the United States, wildlife habitat has substantially changed as human populations have expanded and land has been transformed to meet varying human needs. These changes often compete with wildlife and have inherently increased the potential for conflicts between wildlife and people. Some species of wildlife have adapted to and thrive in the presence of humans and the changes that have been made. These species, in particular, are often responsible for the majority of conflicting activities between humans and wildlife. The Programmatic WS Final Environmental Impact Statement (FEIS) summarizes the relationship in American culture of wildlife values and wildlife damage in this way *(hereinafter referred to as* USDA 1997):

> *"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."*

USDA is directed by law to protect American agriculture and other resources from damage associated with wildlife. Wildlife damage management (WDM), or control, is defined as the alleviation of damage or other problems caused by wildlife (Leopold 1933, The Wildlife Society 1990, Berryman 1991). WS uses an Integrated WDM (IWDM) approach (USDA 1997). This includes nonlethal strategies such as the modification of habitat or the offending animal(s) behavior, and lethal control of the offending animal(s) or local population of the offending species.

USDA (1997) contains detailed discussions of potential environmental impacts from methods that are used for WDM in New Mexico. The Council on Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) authorized agencies to eliminate repetitive discussions of issues addressed in programmatic Environmental Impact Statements. Thus, this EA incorporates relevant discussions and analysis from USDA (1997). USDA (1997) may be obtained by contacting the USDA, APHIS, WS Operational Support Staff at 4700 River Road, Unit 87, Riverdale, MD 20737-1234.

USDA-APHIS-WS is authorized by Congress to manage a program to reduce human-wildlife conflicts. WS' mission, developed through a strategic planning process (APHIS 2011), is to *"... provide Federal leadership in managing problems caused by wildlife. WS recognizes that wildlife is an important public resource greatly valued by the American people. By its very nature, however, wildlife is a highly dynamic and mobile resource that can damage agricultural and industrial resources, pose risks to human health and safety, and affect other natural resources. The WS program carries out the Federal responsibility for helping to solve problems that occur when human activity and wildlife are in conflict with one another."* This is accomplished through:

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

**WS' Policy Manual**[1] reflects this mission and provides guidance for engaging in wildlife damage control activities. Before wildlife damage management is conducted, *Agreements for Control* or *WS Work Plans* must be executed by WS and the land owner/administrator/agency representative. WS cooperates with land and wildlife management agencies, when appropriate and as requested, to combine efforts to effectively and efficiently resolve wildlife damage problems in compliance with all applicable federal, state, and local laws and Memorandums of Understanding (MOUs) between WS and other agencies (hereinafter, to include the Joint Power Agreement between WS and NMGF).

[1] **WS Policy Manual** - Provides guidance for WS personnel to conduct wildlife damage management activities through Directives. WS Directives referenced in this EA can be found in the manual but will not be referenced in the Literature Cited Section.

### 1.1.2 The New Mexico WS Program

WS is a cooperatively funded, service-oriented program that responds to wildlife damage complaints from cooperators ranging from private citizens to other agencies. Aquatic rodents, furbearers, are managed by NMGF and individuals or entities requesting assistance in resolving problems with aquatic rodents must go through NMGF. WS is routinely requested by NMGF to assist with aquatic rodent control projects throughout much of New Mexico where beaver and muskrats are causing problems. Under a Joint Powers Agreement between NMGF and WS, WS can provide assistance to NMGF. As outlined in the Agreement, WS responds to requests for assistance from NMGF when NMGF is unable to respond in a timely manner to a beaver or muskrat damage complaint, or for other reasons as NMGF sees fit. WS refers all complaints it receives for aquatic rodents from the public to NMGF because they first must obtain a depredation number (NMGF permits the take of aquatic rodents) for a complaint to be resolved. WS has not received a request for assistance with nutria in New Mexico in the past 10 fiscal years; however the need could arise to assist with a nutria damage management project. It also is a furbearer and managed by NMGF.

WS can provide public entities with ARDM such as counties and the U.S. Fish and Wildlife Service (USFWS). NMGF does not have to respond to complaints from these entities, except NMGF still must be contacted for a depredation number. In addition, Tribes are responsible for wildlife management on their own properties and can request assistance from WS, but do not have to go through the State to resolve aquatic rodent problems.

WS conducts ARDM for NMGF. WS only conducts ARDM on properties where an agreement or work plan is active. New Mexico encompasses about 77.8 million acres divided into 33 counties as shown in Figure 1. Of this, New Mexico only has about 150,000 surface acres of permanent water sources in lakes and ponds which represents about 0.2% of the total area of the State. In addition, about 2,500 to 3,000 miles of rivers and perennial streams exist in New Mexico. Aquatic rodents, only inhabit these waterways and wetlands within their range in New Mexico. WS has active agreements to conduct ARDM on properties totaling 1.25 million acres for beaver (1.6% of New Mexico) and 500 for muskrat as of July 1, 2011. However, WS conducts ARDM only on a small number of these agreements in any given year and only on the wetland portion of the property. When an agreement is signed up, all property is listed on the agreement which includes not only the wetlands, but all surrounding lands. Thus, much of the acreage under agreement is not likely areas where ARDM will be conducted. Of the acreage under agreement, land classes are: 67.9% private land, 14.4% Tribal land, 9.7% U.S. Forest Service (USFS) land, 4.6% U.S. Fish and Wildlife Service (USFWS) refuge land, 2.6% State land, and 0.8% Bureau of Land Management (BLM), County, City, and other federal lands. It should be noted that WS does not conduct ARDM on State Trust lands, but often they are intermingled with private lands and their acreage is included because the lands are part of the agreement. From FY06 (federal Fiscal Year 2006 = (October 1, 2005-September 30, 2006)) to FY10, WS conducted beaver damage management on an average of 58,000 acres annually or 5% of the lands under agreement. In comparison, WS worked on an average of 90 acres for muskrats and none for nutria. Private lands predominated for all aquatic rodent work during this time with WS conducting work on 99.99% on them and 0.01% for all other lands. Thus, even though WS has agreement on public lands, very little was worked from FY06-FY10. This information is kept in a management information system (MIS[2]).

[2] **MIS** - Computer-based Management Information System used by WS for tracking Program activities. WS in New Mexico has had the current MIS system operational since FY94. Throughout the text, MIS will be noted along with the year, e.g., FY06, when the data was entered. MIS reports though will not be referenced in the Literature Cited Section since most reports from the MIS are not kept on file. A database is kept that allows queries to be made to retrieve the information needed.

## 1.2 PURPOSE

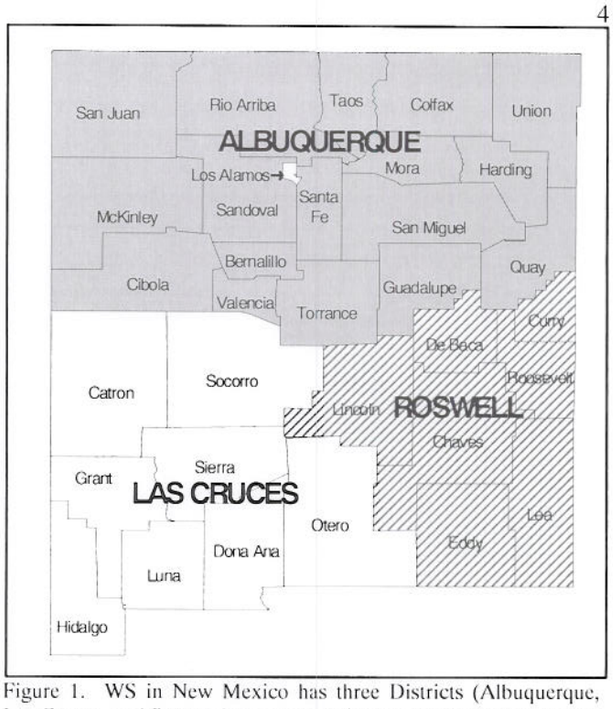


Figure 1. WS in New Mexico has three Districts (Albuquerque, Las Cruces, and Roswell) that have personnel to respond to aquatic rodent damage complaints in New Mexico's 33 Counties.

The purpose of this EA is to analyze the effects of WS activities in New Mexico to manage damage caused by aquatic rodents on the human environment. WS ARDM activities are conducted to protect agriculture such as crops and irrigation systems, property such as homes, aircraft, turf, machinery, electrical equipment, and ornamental trees, natural resources such as fisheries, public recreation areas, and threatened and endangered (T&E) species. These problems are resolved on a case-by-case basis. Ordinarily, according to APHIS procedures implementing the National Environmental Policy Act (NEPA), individual WDM actions, and research and developmental activities may be categorically excluded (7 Code of Federal Regulation (CFR) 372.5(c), 60 Fed. Reg. 6000-6003, 1995). Most all ARDM actions in New Mexico are individual actions because WS receives few requests for assistance for these species, even over several years; WS had an average of 88 work tasks (tasks completed working on a problem; one request may take several work tasks to resolve) for aquatic rodents from FY06 to FY10 (less than 1 for muskrats and none for nutria). However, we prepared this EA on ARDM in New Mexico to facilitate planning and interagency coordination, to streamline program management, and to involve the public and obtain their input through comments and feedback. This EA documents the need for ARDM in New Mexico and assesses potential impacts and effects of various alternatives addressing the resolution of aquatic rodent damage problems.

ARDM for private landowners or lessees in New Mexico is the responsibility of NMGF under State Law and NMGF must respond to damage when private landowners or lessees are affected. WS acts as an agent for NMGF to respond to some of these damage complaints. NMGF would have to conduct ARDM whether or not WS assisted them in responding to damage on private lands. In addition, NMGF prescribes the methods to be used in a permit. Thus, even if WS were not available to conduct ARDM, it is likely that the same action would be conducted and the environmental *status quo* would be the similar, except that WS provides professional problem resolution to resolve problems with aquatic rodents.

NMGF assists municipalities, counties, and other State agencies with ARDM on a limited basis and as time permits. NMGF gives the affected agency a permit with a depredation number and WS can assist them with ARDM, if NMGF does not. Federal agencies must obtain a permit from NMGF and conduct ARDM with their own staff or a contractor, such as WS. Under State law, NMGF is not responsible for responding to damage on public lands (federal, State, etc.) unless the land is under lease by a private party. ARDM on Tribal lands is at the discretion of the Tribe because they are sovereign from the State. With the appropriate *Work Plan* in place, WS can respond to aquatic rodent problems on Tribal lands.

## 1.3 NEED FOR ACTION

The need for action is based on the necessity for a program to protect resources from damage by aquatic rodents. Comprehensive surveys of damage by aquatic rodents in New Mexico have not been conducted. However, WS obtains estimates of the type and value of damage from property and resource owners or land managers who request WS assistance, or WS personnel that respond to such requests make an estimate. Damage data thus obtained are summarized for FY06 through FY10 in Table 1 for beaver. Muskrats had 2 work tasks associated with them in FY09 for a dike with damage estimated at $200. They had no other work tasks from FY06 to FY10. No nutria damage was documented during this time frame. These data represent only a portion of the total damage caused by aquatic rodents, primarily because requesters must go through NMGF and NMGF may resolve the problem themselves. WS only records damage for those projects that WS gives ARDM assistance. In addition, not all people that have aquatic rodent damage request assistance from NMGF, and handle the problem themselves. Of the 3 species of aquatic rodents found in New Mexico, beaver were responsible for more than 99% of work tasks associated and damage value reported to or verified by WS.

Resource owners and government agencies have used a variety of techniques to reduce aquatic rodent damage. However, all lethal and nonlethal methods developed to date have limitations based on costs, logistics, or effectiveness. The cost effectiveness of the New Mexico ARDM program has not been determined (the value of damage saved once ARDM is initiated *vs.* the cost of ARDM). However, such a determination has been made in at least one WS program based on comparing estimates of the amount of damage prevented from occurring with the cost of conducting ARDM. WS in North Carolina (WS 2003) was able to document a 7.1:1 ratio of resource savings per dollar spent for ARDM. This indicates that ARDM as a management tool is highly cost effective for the protection of resources.

**Table 1.** Value of damage caused by beaver in New Mexico as reported to or verified by Wildlife Services in FY06 (October 1, 2005- September 30, 2006) to FY10. The damage reported in this table is only a fraction of the actual damage caused by beaver in New Mexico.

| BEAVER DAMAGE IN NEW MEXICO REPORTED BY WS IN FY00, FY01, AND FY02 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CATEGORY | SUBCATEGORY | FY06 | | FY07 | | FY08 | | FY09 | | FY10 | | Average | |
| | | WTs | Value | WTs | Value | WTs | Value | WTs | Value | WTs | Value | WTs | Value |
| Agriculture | Hayfield/Pasture | 1 | $2,000 | 4 | $500 | 7 | $1,800 | 1 | $8,000 | 1 | $2,500 | 3 | $2,960 |
| | Trees/Ornamentals | 9 | $5,000 | 11 | $2,450 | 27 | $29,450 | 5 | $25,200 | 3 | $1,150 | 11 | $12,650 |
| Natural Resources | Forestry | 1 | $500 | - | - | - | - | - | - | - | - | 0 | $100 |
| | Recr. Area/Watershed | 1 | $5,000 | - | - | 1 | 0 | - | - | 1 | $30,000 | 1 | $7,000 |
| Property | Dikes/Irrigation | 40 | $77,200 | 88 | $68,285 | 70 | $337,800 | 58 | $232,360 | 34 | $66,200 | 58 | $156,369 |
| | Roads/Bridges | 29 | $40,500 | - | - | 3 | $85,000 | 2 | $10,000 | - | - | 7 | $27,100 |
| | Other Property | 12 | $8,500 | 13 | $25,000 | 11 | $2,500 | 4 | $13,800 | - | - | 8 | $9,960 |
| Health/Safety | Nuisance/Disease | 1 | $500 | 1 | $0 | - | - | - | - | - | - | 0 | $100 |
| **TOTAL** | | **94** | **$139,200** | **117** | **$96,235** | **11** | **$473,250** | **70** | **$289,360** | **40** | **$99,850** | **88** | **$219,579** |

WTs= Work Tasks

To understand the need for action, it is important to have knowledge about each species and the types of damage they cause. The need for action is based on beaver, muskrat, and nutria activities that are construed by resource owners as damage to their resources that needs to be reduced or eliminated. Full accounts of the life histories for these species can be found in mammal reference books. Some background information is given below for each species, especially the information pertaining to their range in New Mexico.

### 1.3.1 Beaver

Beavers are part of New Mexico's wildlife heritage. They probably once occupied stream valleys and other suitable habitat in New Mexico at a maximum carrying capacity prior to European settlement (Bailey 1932). Population fluctuations of beavers in the pre-European era were determined by plant succession and its influence upon the amount and quality of habitat. During the 19th century, though, the

major explorations beyond civilization were made solely for the purpose of discovering new beaver trapping areas. About midway through this period the steel trap was invented enabling the trapper to operate with much greater efficiency than had been possible before. Fur trapping was at its peak (Seton 1937). In 1927, it was reported that with commercial beaver trapping, the beaver was eliminated from much of New Mexico (Biota Information System of New Mexico (BISON-M) 2011). They obtained legal protection in 1897 because of their drastic reduction. As a result, NMGF conducted major restocking efforts throughout the State between 1947 and 1958 (Berghofer 1967). By 1967, the statewide beaver population was estimated to be between 5,500 and 6,000 (Findley et al. 1975). Since that point, the beaver once again became established throughout its former range and now inhabits 2,239 miles of riparian habitat in northern and southwestern New Mexico (BISON-M 2011).

The expanding beaver population began to cause increased damage to properties, natural resources, and agriculture largely due to increased human development starting in the early 1950s. As a result, a season was established by NMGF in 1953. Beaver activities can be beneficial or detrimental depending on their activities and location. Habitat modifications from beaver, a result of dam building and tree cutting, can be beneficial to other species of wildlife and the watershed. However, these modifications can also conflict with human land or resource management objectives and can suppress different species of plants and animals including T&E species. Such conflicts, which are viewed as "damage" by resource owners, result in adverse impacts that often outweigh benefits. Most of the damage caused by beavers is a result of dam building, bank burrowing, tree cutting, or flooding. The value of beaver damage is perhaps greater than that of any other single wildlife species in the United States. The economic damage was estimated to have exceeded $4 billion in the southeastern U.S. over a 40-year period (Arner and Dubose 1979). Damage throughout the U.S. has increased since that time and would likely be at least a magnitude greater at present. WS has documented increasing numbers of requests by individuals, especially since 1994, in New Mexico and throughout the country.

Beaver are responsible for a variety of different kinds of damage (Wade and Ramsey 1986, Miller and Yarrow 1994, Willging and Sramek 1989, and Loven 1985). Beaver damage documented by WS in New Mexico annually averaged about $220,000 from FY06 to FY10. Types of damage that result include: (1) flooding of crop fields and livestock pastures, residential areas and other property, and forested tracts of lands killing the lumber; (2) damage to irrigation structures and other waterways; (3) flooding of roads or railways and areas adjacent to them that result in erosion of road and railway beds; and (4) cutting trees for building the dam which have lumber or aesthetic values, and could be important for creek bank stabilization. In flat terrain, a relatively small beaver dam may cause hundreds of acres to be flooded. The majority of complaints in New Mexico, 68%, result from beaver damming man-made irrigation structures such as dikes and levees (Table 1).

Beavers also can create damage from other activities. While feeding beavers can damage and kill trees by gnawing, girdling, and cutting. They also feed on agricultural crops. Beavers sometime burrow into man-made dams and levees or obstruct overflow structures and spillways which can cause such water control structures to fail. Beavers are known to gnaw on or burrow into Styrofoam and wood supports under boat houses and docks requiring expensive repairs. Beavers are also known carriers of the intestinal parasite *Giardia lamblia* and can contaminate surface waters used for human consumption and recreation (Beach and McCulloch 1985).

Beavers are often classified as *ecosystem engineers* because their building activities can change, maintain, or create habitats by modulating the availability of resources of both biotic and abiotic materials for themselves and other species (Rosell et al. 2005). Beaver dams create ponds that contribute to the stabilization of water tables and help reduce rapid run off from rain. Dams also help reduce soil erosion, since much of the silt suspended in running water is deposited in the beaver ponds. These ponds create a habitat beneficial to many plants and animals and contribute to a diversity of plant communities and

provide recreation such as fishing and hunting (Texas Agriculture Extension Service 1998). Their dams also can create valuable wetland habitat for some wildlife in time, especially where a dam holds water during drought periods. Although beavers have been frequently described as a keystone species, some studies have challenged this role, as beavers may decrease the species diversity in lower trophic levels (Rosell et al. 2005). Nevertheless, beavers probably have a key role in ecosystem processes, because their foraging has a considerable impact on the course of succession, species composition, and structure of plant communities (Rosell et al. 2005).

Beaver activities can be beneficial or detrimental depending on the type of activity and location. Opinions and attitudes of individuals, communities, and organizations vary greatly and are primarily influenced and formed by benefits and damage directly experienced by each person or entity (Hill 1982). Habitat modifications from beaver, a result of dam building and tree cutting, can result in positive ecological benefits to other species of wildlife and the watershed (Hill 1976, Reese and Hair 1976). Beaver may increase habitat diversity by flooding and opening forest habitats which result in greater interspersion of successional stages and subsequently increases the floral and faunal diversity of a habitat (Hill 1982, Arner and Hepp 1989). Creation of standing water, edge, and plant diversity, all in close proximity, results in excellent wildlife habitat (Hill 1982). The resulting wetland habitat may be beneficial to some fish, reptiles, amphibians, waterfowl, shorebirds, and furbearers such as muskrats, river otter (*Lutra canadensis*), and mink (*Mustela vison*) (Naimen et al. 1986, Miller and Yarrow 1994). However, these modifications can conflict with human resource management objectives and can suppress different species of plants and animals including T&E species. Additionally, beaver dams are known to alter competitive relationships between fish species, and could help non-native fish species out-compete native species (Collen and Gibson 2001). Dams can create sinks where water evaporates or percolates into the ground decreasing water flows downstream that may be needed for agricultural activities, some fish and wildlife species, and other resources. A more in-depth discussion of the benefits and detriments of the proposed action are addressed in Section 3.2.1.3, ARDM Methods.

### 1.3.2 Muskrat

The muskrat is a native furbearer found throughout most of New Mexico and is abundant in suitable habitat up to 10,000 feet. They inhabit creeks, rivers, lakes, ponds, and drainage ditches with a steady water level feeding primarily on cattails, bullrushes, and aquatic grasses. It has historically been the most heavily exploited furbearer in North America with 6-20 million harvested annually since about 1935 (Boutin and Birkenholz 1987). Boutin and Birkenholz (1987) provide a comprehensive review of muskrat natural history and population dynamics. The muskrat in New Mexico makes use of 2,144 miles of riparian habitat and is found in much of the same parts of New Mexico as the beaver.

Damage by muskrats is usually not a major problem, but can be significant locally in particular situations (Wade and Ramsey 1986). The only muskrat damage documented by WS from FY06 to FY10 in New Mexico was one incident $200 in FY09. They typically do not cause as much damage as beavers, but can damage several resources. For example, muskrats often burrow into levees or dams used to hold water causing washouts which result in the loss of irrigation water or other water supplies, and flooding damage where the water drains, depending on the situation. Muskrats can also damage crops, wetlands, landscaping, and other resources where these are adjacent to muskrat habitat (Wade and Ramsey 1986).

### 1.3.3 Nutria

Nutria, native to Central and South America, became established in the United States when they were released in the 1930s and 1940s from the failure of nutria "fur farming." Some may be found in Lincoln County in the Rio Hondo drainage where they were probable escapees in the late 1930s. In some areas, nutrias were also released to control aquatic weeds (Kinler et al. 1987; Wade and Ramsey 1986). NMGF released nutria in the early 1950s in Hidalgo County. If they still persist, nutria area only in a few local areas in New Mexico. Xeric conditions where they have been found will likely hinder their spread.

Nutrias' preferred habitat is swamps, marshes, rivers, and lakes where they feed on mostly aquatic and semiaquatic vegetation such as cattails and reeds. They also venture from these areas into croplands and can cause considerable damage locally. Nutria feed on agricultural crops such as pasture and corn, tree seedlings, and ornamental shrubs. Perhaps more serious than consumption of crops however, is damage to levees built for water control through their burrowing activities which can result in flooding damage and the need for expensive levee repairs (Wade and Ramsey 1986). Nutria damage management in New Mexico has been non-existent by WS, but may occur to remove this non-native species.

## 1.4 SUMMARY OF PROPOSED ACTION

WS is the agency that carries out the functions referred to in the statutory regulations for USDA to protect American agriculture and other resources from damage associated with wildlife. The Proposed Action is for WS to continue to conduct ARDM in New Mexico as it has in the past. WS activities are conducted in cooperation with other federal, state, and local agencies, Tribes, and private organizations and. The majority of ARDM activities in New Mexico carried out by WS is under the guidance of NMGF for private landowners or lessees as required by State law. Other public agencies and Tribes can request assistance from WS, but ARDM for these entities is not required to be fulfilled by NMGF, and thus are covered by additional cooperative agreements and NMGF permits (depredation number) where necessary.

The objective of ARDM, as conducted in the proposed action, is to minimize loss or the risk of loss to all resource categories from aquatic rodents by responding to all requests with technical assistance (advice or demonstrations) or direct control that NMGF determines needs to be conducted for private landowners or lessees. WS employees give technical assistance to resource owners on a variety of methods that can be used to resolve problems under certain circumstances and where resource owners can handle the problem themselves. WS will also assist resource owners through educational programs on damage identification and prevention. WS will also provide public agencies and Tribes with ARDM when it is requested and where cooperative funding is available.

Direct control support, as requested by NMGF, is mostly given with methods that are difficult for the public to implement, especially those that involve lethal control measures, and where cooperative funding is available; resource owners that are given direct control assistance are also encouraged to use additional management strategies when and where appropriate to help reduce present and future problems.

Under the proposed action, IWDM will be implemented, which is also required of NMGF under State law (NMAC 19.30.2) for private landowners, which encourages the use of practical and legal techniques and methods, used singly or in combination, to meet the needs of requesters for resolving conflicts with aquatic rodents. Recommendations are given for short- and long-term solutions to resolve damage problems with aquatic rodents, where applicable. Most wildlife damage situations require professional expertise, an organized control effort, and the use of multiple control methods to sufficiently resolve them; this will be the task of WS personnel who are trained professionals and equipped to handle most damage situations. The resource, species, location and type of damage, and all available biologically

sound, cost-efficient and legal methods will be analyzed by WS personnel to determine the action taken to correct each conflict with aquatic rodents.

A wide range of legal methods is available to resource owners and WS personnel. These fall into different categories including habitat modification (e.g., beaver pond leveler, dam removal, and exclusion), behavior modification (e.g., electric water barriers), and population management (e.g. traps and shooting). These are discussed in detail later in Section 3.2.1. ARDM will be allowed in the State under the proposed action when and where requested on private and public lands where signed *Agreements for Control* or an appropriate *Annual Work Plan* are in place. All ARDM will comply with federal, state, and local laws and current MOUs between WS and the various management agencies. WS personnel will communicate with other agency personnel as appropriate and necessary.

## 1.5 RELATIONSHIP OF THIS EA TO OTHER ENVIRONMENTAL DOCUMENTS

WS issued a Final EIS on the national APHIS-WS program (USDA 1997). Pertinent information from USDA (1997) has been incorporated by reference into this EA. WS also completed an aquatic rodent EA for New Mexico in 2004 (*hereinafter referred to as* WS 2004). Pertinent portions of that analysis will be incorporated by reference. Monitoring reports for the EA were also completed covering fiscal year activities following the EA to determine if the activities conducted remained within the scope of the EA. The monitoring reports found that ARDM was conducted within the scope of the EA. These will not be referenced.

## 1.6 DECISION TO BE MADE

Based on agency relationships, MOUs, and legislative authorities, WS is the lead agency for this EA, and therefore responsible for the scope, content, and decisions to be made. NMGF, NMDA, USFWS, and the U.S. Army Corps of Engineers (Corps) have had input during the preparation of this EA to facilitate an interdisciplinary approach in compliance with NEPA, and agency mandates, policies, and regulations.

Based on the scope of this EA, the decisions to be made are:

- Should ARDM, as currently implemented, be continued in New Mexico?
- If not, would NMGF provide ARDM to fulfill its legal responsibilities?
- What standard operating procedures (SOPs) should be implemented by WS to reduce potential risks to people, pets, nontarget wildlife, and the environment from implementing ARDM?
- Does the proposal have significant impacts requiring an EIS analysis?

## 1.7 SCOPE OF THIS EA ANALYSIS

### 1.7.1 Actions Analyzed

This EA evaluates ARDM to protect agricultural and natural resources, property, and human health and safety from aquatic rodents in New Mexico. This EA anticipates that requests can come from NMGF (for private landowners and lessees), other public and land management agencies, and Tribes within the range of aquatic rodents.

### 1.7.2 Native American Lands and Tribes

Tribes have requested WS to provide assistance with ARDM in New Mexico for the protection of resources on Tribal lands. The methods employed and potential impacts would be the same as for any private land upon which WS could provide service. WS discusses the methods to be used and addresses

concerns with Tribal representatives at the time the agreement is signed. Therefore, this EA covers such actions as requested and implemented.

### 1.7.3 Federal Lands

WS may provide ARDM on federal lands in New Mexico including USFWS, USFS, BLM, the Corps, and others. The methods employed and potential impacts would be the same on these lands as they would be on private lands upon which WS provides service. If WS were requested to conduct ARDM on federal lands for the protection of private resources, this EA would cover such actions implemented. However, if the request is to protect federal resources, the requesting federal agencies are responsible for their own NEPA documentation.

### 1.7.4 Period for which this EA is Valid

This EA will remain valid until WS and other appropriate agencies determine that new needs for action, changed conditions, or new alternatives having different environmental effects need to be analyzed. At that time, this EA would be supplemented or reissued pursuant to NEPA with the appropriate analyses. Review of the EA will be conducted annually to ensure that the EA is accurate and sufficient and all ARDM activities have been analyzed in the EA.

### 1.7.5 Site Specificity

This EA analyzes potential impacts of ARDM and addresses WS ARDM activities on all lands under *Cooperative Agreement* or *Agreements for Control* within New Mexico. It also addresses the impacts of ARDM on areas where additional agreements with WS may be written in the reasonably foreseeable future within New Mexico. Because the proposed action is to continue the current WS ARDM program, and because the current programs goal and responsibility is to provide service when requested within the constraints of available funding and manpower, it is conceivable that additional ARDM efforts could occur. Thus, this EA anticipates potential expansion and analyzes the impacts of such expanded efforts as part of the current program. This EA emphasizes significant issues as they relate to specific areas whenever possible; however, the issues that pertain to aquatic rodent damage and resulting management are the same, for the most part, wherever they occur in New Mexico, and are treated as such. The standard WS Decision Model (Slate et al. 1992) and WS Directive 2.105 will be the site-specific procedure for determining methods and strategies to use or recommend for individual actions conducted by WS in New Mexico (See USDA 1997, Chapter 2 and Appendix N for a more complete description of the WS Decision Model and examples of its application). Decisions made using the model will be in accordance with any mitigation and SOPs described herein and adopted or established as part of the decision.

### 1.7.6 Interdisciplinary Development of the EA

Comments were solicited from NMGF, NMDA, the New Mexico Department of Environment, BLM, USFS, USFWS, the Corps, and Tribes. Comments are maintained in an administrative file located at the New Mexico WS State Office in Albuquerque.

## 1.8 AUTHORITY AND COMPLIANCE

### 1.8.1 Authority of Federal[4] and State Agencies to Conduct ARDM

**WS Legislative Authority.** USDA is directed by law and mandated by Congress to protect American agriculture and other resources from damage associated with wildlife. Under the Act of March 2, 1931, as amended (7 U.S.C.426-426b), APHIS-WS is authorized to conduct a program of wildlife services with respect to injurious animal species; and, under the Act of December 22, 1987 (7 U.S.C. 426c), APHIS-WS is also authorized to control nuisance mammals and birds and those mammal and bird species that are reservoirs for zoonotic diseases.

**New Mexico Department of Game and Fish.** NMGF has the responsibility to manage all protected and classified wildlife in New Mexico, except Federally listed T&E species, regardless of the land class on which the animals are found (New Mexico Revised Statutes (NMSA) Title 17), including aquatic rodents. NMGF is authorized by State law to contract with WS for controlling damage caused by aquatic rodents. Landowners, lessees or any other person or entity may obtain a permit to take aquatic rodents species causing excessive damage to property in New Mexico (NMSA17-3-31, 17-5-3). NMGF is mandated that it resolve beaver damage for private landowners or lessees (NMSA 19.30.2)

**New Mexico Department of Agriculture.** NMDA manages the pesticide laws in New Mexico. Any WS personnel that use pesticides in their job duties must become certified pesticide applicators through NMDA, or be supervised by a certified pesticide applicator. Zinc phosphide is the only toxicant registered for aquatic rodent control and can be used for muskrat and nutria damage management.

**New Mexico Environment Department.** This Department administers laws and regulations covering water resources in the State of New Mexico.

**U.S. Fish and Wildlife Service.** USFWS has statutory authority to manage federally listed T&E species through the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531-1543, 87 Stat. 884) and migratory birds under the Migratory Bird Treaty Act of 1918 (16 U. S. C. 703-711; 40 Stat. 755), as amended. They are also responsible for managing refuges and conflicts with aquatic rodents if they conflict with the refuge management goals.

**U.S. Army Corps of Engineers.** The Corps regulates and permits activities regarding waters of the United States including protection and utilization under Section 404 of the Clean Water Act.

**U.S. Environmental Protection Agency (EPA).** EPA is responsible for administering and enforcing the Section 404 program of the Clean Water Act with the Corps; Section 404 established a permit program for the review and approval of water quality standards that directly impact wetlands. EPA also is responsible for administering the registration of pesticides under the Federal Fungicide, Insecticide, and Rodenticide Act (FIFRA). Finally, EPA is responsible for publishing Federal Register notices for EISs and reviewing EISs to determine adequacy under NEPA guidelines.

**Natural Resource Conservation Service (NRCS).** NRCS is responsible for certifying wetlands under the Wetland Conservation provisions of the Food Security Act (16 U.S.C. 3821 and 3822). Topographic maps are available through their offices that identify the presence of wetlands.

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[4] Detailed discussions of WS legal responsibilities and key legislation pertinent to wildlife damage management are found in USDA (1997).

**U.S. Food and Drug Administration (FDA).** FDA protects the public health by assuring the safety, effectiveness, and security of human and animal drugs, vaccines and other biological products. With respect to such products used in WDM, FDA regulates the use of immobilization and euthanasia drugs, and immunocontraceptive vaccines.

### 1.8.2 Compliance with Federal Laws

Several Federal laws regulate WS and ARDM. WS complies with these laws, and consults and cooperates with other agencies as appropriate.

**National Environmental Policy Act (NEPA).** All federal actions are subject to NEPA (Public Law 91-190, 42 U.S.C. 4321 et seq.). NEPA sets forth the requirement for all major federal actions to be evaluated in terms of their potential significant impact on the quality of the human and natural environment for the purpose of avoiding or, where possible, minimizing significant adverse impacts. NEPA established the Council on Environmental Quality (CEQ) to oversee the federal government's responsibilities. Federal activities affecting the physical and biological environment are regulated in part by CEQ through regulations in Title 40 CFR, Parts 1500-1508. Each agency, such as APHIS, develops its own guidelines to comply with NEPA requirements. In accordance with CEQ and USDA regulations, APHIS Guidelines Concerning Implementation of NEPA Procedures, as published in the Federal Register (44CFR 50381-50384) provide guidance to APHIS and WS regarding the NEPA process. WS follows the CEQ regulations implementing NEPA (40 CFR 1500 et seq.), USDA (7 CFR 1b), and the APHIS Implementing Guidelines (7 CFR 372) as a part of the decision-making process. These laws, regulations, and guidelines generally outline five broad types of activities that need to be accomplished as part of any project: scoping, analysis, documentation, implementation, and monitoring.

This EA for ARDM, with WS as the lead agency, is the second time that all land classes under *Cooperative Agreements*, *Agreements for Control,* or *Work Plans* will be analyzed in the analysis area in a comprehensive manner. WS coordinates specific projects and programs with other agencies, especially NMGF. 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 activities discussed in this EA would be reviewed, and if necessary, the agency requesting the assistance would be responsible for NEPA compliance.

**Endangered Species Act.** It is WS and Federal policy, under 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 consultations with the USFWS, as required by Section 7 of the ESA, 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 species or threatened species. . .*" (Sec.7(a)(2)). Nationally, WS obtained a Biological Opinion in 1992 from USFWS describing potential effects on T&E species and prescribing reasonable and prudent measures for avoiding jeopardy (USDA 1997, Appendix F). New Mexico WS (2003b) also conducted an informal consultation with USFWS (2003a) for its wildlife damage management program specifically concerning the T&E species in New Mexico. Mitigation measures from that consultation are incorporated into this document.

**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. Migratory birds are not targeted in ARDM, but any migratory birds taken incidentally to ARDM as nontargets are regulated under the Act.

**Clean Water Act (Section 404).** Section 404 (33 U.S.C. 1344) of the Clean Water Act prohibits the discharge of dredged or fill material into waters of the United States without a permit from the Corps unless the specific activity is exempted in 33 CFR 323 or covered by a nationwide permit in 33 CFR 330. The removal of most beaver dams is covered by these regulations (33 CFR 323 and 330).

**Fish and Wildlife Coordination Act.** The Fish and Wildlife Coordination Act encourages federal agencies to conserve and promote conservation of nongame fish and wildlife and their habitats to the maximum extent possible within each agency's statutory responsibilities.

**Food, Drug, and Cosmetic Act.** This Act, as amended, gives the Food and Drug Administration (FDA) the authorization to regulate the study and use of animal drugs. FDA regulates immobilization drugs used by WS under this Act, and immunocontraceptive vaccines should they become available.

**Food Security Act.** The Wetland Conservation provision (Swampbuster) of the 1985 (16 U.S.C. 3801-3862), 1990 (as amended by PL 101-624), and 1996 (as amended by PL 104-127) farm bills require all agricultural producers to protect wetlands on the farms they own. Wetlands converted to farmland prior to December 23, 1985 are not subject to wetland compliance provisions even if wetland conditions return as a result of lack of maintenance or management. If prior converted cropland is not planted to an agricultural commodity (crops, native and improved pastures, rangeland, tree farms, and livestock production) for more than 5 consecutive years and wetland characteristics return, the cropland is considered abandoned and then becomes a wetland subject to regulations under Swampbuster and Section 404 of the Clean Water Act. NRCS is responsible for certifying wetlands according to this Act.

**Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).** FIFRA requires the registration, classification, and regulation of all pesticides used in the United States. All pesticides used or recommended by the WS program are registered with and regulated by the EPA and NMDA. WS uses the chemicals according to labeling procedures and requirements as regulated by the EPA and NMDA. Zinc phosphide is registered for use to take muskrats and nutria under FIFRA, but has not been used by WS.

**National Historical Preservation Act of 1966 as amended (NHPA).** NHPA and its implementing regulations (CFR 36, 800) require federal agencies to: 1) determine whether proposed activities constitute "undertakings" that can result in changes in the character or use of historic properties and, 2) if so, to evaluate the effects of such undertakings on such historic resources and consult with the State Historic Preservation Office regarding the value and management of specific cultural, archaeological and historic resources; and 3) consult with appropriate American Indian tribes to determine whether they have concerns for traditional cultural properties in areas of these federal undertakings. Activities described under the proposed action do not cause major ground disturbance and are not undertakings as defined by the NHPA.

**Native American Graves Protection and Repatriation Act.** The Native American Graves Protection and Repatriation Act requires Federal agencies to notify the Secretary of the Department that manages the Federal lands upon the discovery of Native American cultural items on Federal or tribal lands. Federal projects would discontinue work until a reasonable effort has been made to protect the items and the proper authority has been notified.

**Executive Orders 11988 and 11990 – Floodplain Management and Protection of Wetlands.** These Executive Orders require that agencies avoid, to the extent possible, long and short term adverse impacts associated with the destruction or modification of floodplains and wetlands and minimize impacts to these areas. The purpose of these Executive Orders was to ensure protection and proper management of flood plains and wetlands by Federal agencies. The Executive Orders require Federal agencies to consider the

direct and indirect adverse effects of their activities on flood plains and wetlands. This requirement extends to any Federal action within a floodplain or a wetland except for routine maintenance of existing Federal facilities and structures. The Clinton administration had proposed revising Executive Order 11990 to direct Federal agencies to consider wetland protection and restoration planning in the larger scale watershed/ecosystem context.

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

WS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898 to ensure Environmental Justice. WS personnel use wildlife damage management methods as selectively and environmentally conscientiously as possible. All chemicals used by APHIS-WS are regulated by the EPA through the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), NMDA, by MOUs with Federal land managing agencies, and by ADC Directives. Based on a thorough Risk Assessment, APHIS concluded that when WS program chemicals are used following label directions, they are highly selective to target individuals or populations, and such use has negligible impacts on the environment (USDA 1997, Appendix P). The WS operational program properly disposes of any excess solid or hazardous waste. It is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority and low-income persons or populations.

**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, and 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 WS ARDM program would occur by using only legally available and approved methods where it is highly unlikely that children would be adversely affected. For these reasons, WS concludes that it would not create an environmental health or safety risk to children from implementing this proposed action.

**Invasive Species (Executive Order 13112).** Nonnative plants and animals that inadvertently find their way to the U.S. are of increasing concern as they threaten our natural resources. One study estimates that the total costs of invasive species in the United States amount to more than $100 billion each year (Pimentel et. al. 2000). Invasive species impact nearly half of the T&E species listed under ESA.

### 1.8.3 Compliance with State Laws

Since aquatic rodents are managed by NMGF, several State laws regulate WS and ARDM. WS complies with these laws, and consults and cooperates with State and local agencies as appropriate. These laws are in the New Mexico Statutes Annotated (NMSA) or Administrative Codes (NMAC).

**NMSA 17-3-31. Permit to capture or destroy protected game damaging crops or property; beavers.** NMGF can issue permits to take beaver under this Statute.

**NMSA 17-5-3. Seasons; special permits to take animals doing damage.** NMGF can issue permits under this statute to take fur-bearing animals (beaver, muskrat, and nutria) doing damage to game, private property, poultry or livestock.

**NMSA 17-2-41. Endangered species.** This statute is the equivalent of the ESA. On the basis of investigations concerning wildlife, other available scientific and commercial data and after consultation with wildlife agencies in other states, appropriate federal agencies, local and tribal governments and other interested persons and organizations, the commission shall by regulation develop a list of those species of wildlife indigenous to the state that are determined to be threatened or endangered within the New Mexico.

**NMAC 19.30.2.1-11. Procedures for NMGF to handle depredations caused by wildlife.** These sections of provide information for NMGF and private landowners on how to handle wildlife damage on private and leased lands. In essence, these set the time frames for handling wildlife complaints for NMGF. NMGF and WS provide landowners with short- and long-term solutions for depredation problems.

## 1.9 A PREVIEW OF THE REMAINING CHAPTERS IN THIS EA

This EA is composed of 5 chapters. Chapter 2 discusses and analyzes the issues and affected environment. Chapter 3 contains a description of each alternative, alternatives not considered in detail, and SOPs. Chapter 4 analyzes the environmental impacts associated with each alternative considered in detail. Chapter 5 contains the list of preparers, consulters, of this EA, and literature cited.

# CHAPTER 2: ISSUES

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

Issues are concerns of the public or professional communities about potential environmental problems that might occur from a proposed federal action. Such issues must be considered in the NEPA decision-making process. Issues relating to the management of wildlife damage were raised during the scoping process in preparing USDA (1997) and were considered in the preparation of this EA. These issues are fully evaluated in USDA (1997), which analyzed data specific to the New Mexico WS Program

A major overarching factor in determining which issues to include for analysis of the potential environmental impacts of WS's involvement in ARDM in New Mexico is that if, for whatever reason, the ARDM conducted by WS were discontinued, similar types and levels of ARDM will most likely be continued by NMGF, and local governments or private entities as allowed by state laws. Thus, many of the ARDM activities could take place without federal assistance, and, hence, would not trigger NEPA. From a practical perspective, this means that the Federal WS program has limited ability to affect the environmental outcome of ARDM in New Mexico, except that, based on WS employees' years of professional expertise and experience in dealing with ARDM actions, WS is likely to have lower risks to and effects on nontarget species and the human environment in general, including people, than some other programs or alternatives available to State agencies and private landowners. Therefore, WS has a less likely chance of negatively affecting the human environment affected by ARDM actions than would non-federal or private entities. In other words, WS ARDM activities most likely have less of an adverse effect on the human environment than would ARDM programs that would be likely to occur in the absence of WS ARDM assistance. Thus, WS has a limited ability to affect the environmental *status quo* in New Mexico. Despite this limitation of Federal decision-making in this situation, this EA process is valuable for informing the public and decision-makers of relevant environmental issues and analyzing these under the potential alternatives of ARDM to address the various needs for action described in the EA.

## 2.1 ISSUES CONSIDERED IN DETAIL

Following are issues that have been identified as areas of concern requiring consideration in this EA.

- Effects on Target Aquatic Rodent Species Populations
- Effects on Nontarget Species Populations Including T&E Species
- Effects of Beaver Dam Removal on Wetland Wildlife Habitat
- Effects of ARDM on Public and Pet Safety, and the Environment

Potential environmental impacts of the Proposed Action and Alternatives in relation to these issues are discussed in Chapter 4. All issues have also been addressed in detail in USDA (1997) and WS (2004). As part of this process, and as required by CEQ and APHIS, NEPA implementing regulations, this document and its Decision are being made available to the public through the APHIS-WS website, "Notices of Availability" published in the Santa Fe Statesmen as discussed in the Federal Register, and through direct mailings of the Notice to parties that have specifically requested to be notified. New issues or alternatives raised after publication of public notices will be fully considered to determine whether the EA and its Decision should be revisited and, if appropriate, revised.

### 2.1.1 An Issue that Was Thoroughly Reviewed in WS (2004), but Not in This EA

In addition to the above issues, the issues of selectivity and humaneness would have been considered in this EA, but these were analyzed thoroughly in the previous EA (WS 2004), and analyses in this EA would be about identical. Additionally, the environmental consequences of these issues were found to have the least impacts under the Current Program Alternative, the proposed action in WS (2004) and this EA. However, both selectivity and humaneness are still considered in developing SOPs to reduce effects associated with these issues.

Selectivity of ARDM methods is related to the issue of humaneness in that greater selectivity results in less perceived suffering of nontarget animals. The selectivity of each method is based, in part, on the skill and discretion of the WS Specialist in applying such methods and also on specific measures and modifications designed to reduce or minimize nontarget captures. The humaneness of a given WDM method is based on the human perception of the pain or anxiety caused to the animal by the method. How each method is perceived often differs, depending on the person's familiarity and perception of the issue as discussed in Section 2.2.5. The selectivity and humaneness of each alternative are based on the methods employed and who employs them under the different alternatives.

Schmidt and Brunson (1995) conducted a public attitude survey in which respondents were asked to rate a variety of WDM methods on humaneness (1=not humane, 5= humane) based on their individual perceptions of the methods. Their survey found that the public believes that the nonlethal methods such as animal husbandry, fences, and scare devices were the most humane and traps, snares, and aerial hunting were the least humane. WS EAs (WS 1997a, b, c, 2004) discussed how selective each of the WDM methods used in New Mexico to take target animals were and information on their humaneness.

In comparison, under the No WS Program Alternative, the federal portion of WS would not employ methods viewed by some persons as inhumane and, thus, have no program effect on humaneness. NMGF would probably still provide similar levels of professional direct ARDM assistance, but without federal supervision, and would continue to use the ARDM methods considered inhumane by some individuals at similar levels as that discussed in the EA because they are required to do so by law. State WS personnel, though, would no longer receive training from federal sources, nor would the program benefit from federal research focused on improved humaneness, selectivity, and non-lethal methods. However, private individuals that have experienced resource losses, but are no longer provided professional assistance from WS, could conduct lethal ARDM on their own under NMGF permits. Use of leghold traps, snares, and shooting by private individuals would probably increase. This could result in less experienced persons implementing ARDM methods such as traps without modifications like underpan-tension devices that exclude smaller nontarget animals. Greater take or suffering of nontarget and target wildlife would likely be the result. Therefore, it was concluded that the No Federal Program Alternative would result in the highest potential for negative effects (WS 1997a, b, c, 2004). Additionally, it is hypothetically possible that frustration caused by the inability of resource owners to reduce losses could lead to the illegal use of chemical toxicants. The illegal use of toxicants could also result in increased animal suffering.

ARDM conducted by private individuals would probably be less humane than a WS ARDM Program partly for other reasons as well. WS is accountable to public input and humane interest groups often focus their attention and opposition on ARDM activities employed by WS. ARDM methods used by private individuals may be more clandestine. The people that perceive some ARDM methods as inhumane would be less aware of ARDM activities being conducted by private individuals but mostly because the private individuals would not be required to provide information under any policies or regulations similar to those WS follows. Thus, the perception of inhumane activities could be reduced, although the actual occurrence of ARDM activities may increase.

Therefore, the No Federal Program Alternative would likely result in more negative impacts with regard to humaneness than the current program. The other alternatives analyzed in this EA were also analyzed in the other EAs (WS 1997a, b, c, 2004) and found to be between the Current Program and No Federal Program Alternatives. Thus this will not be discussed further, but is used as a factor to help determine appropriate SOPs to maximize selectivity and humaneness.

## 2.2 ISSUES USED TO DEVELOP STANDARD OPERATING PROCEDURES

### 2.2.1 Effects of ARDM on Target Aquatic Rodent Populations

A common concern among members of the public, wildlife management agencies, and WS is whether ARDM actions adversely affect the viability of target native species populations. SOPs used to ensure that WS does not impact target species individually or cumulatively are discussed. The target species analyzed in this EA are those which may be affected by WS ARDM activities. WS has worked on resolving beaver and muskrat damage in most counties, except those in the southeast, from FY92 to FY10 (Figure 2). WS conducted beaver and muskrat management in 19 and 6 counties in New Mexico during this time. Information on the population dynamics of these species is given so that impacts can be assessed in Chapter 4.

**Beaver.** Of the aquatic rodents, beaver damage management is the major focus of WS efforts in New Mexico in ARDM. The beaver is often characterized by biologists and managers as having the unique ability to modify its environment to create habitat to meet its own needs. The beaver population has steadily increased from very few individuals at the turn of the 20th century to a thriving population at the beginning of the 21st century. To discuss the impacts of WS beaver damage management, combined with various environmental constraints and external factors on beaver population and density, it is essential to understand the basic mechanisms that play a role in the beaver's response to constraints and actions.

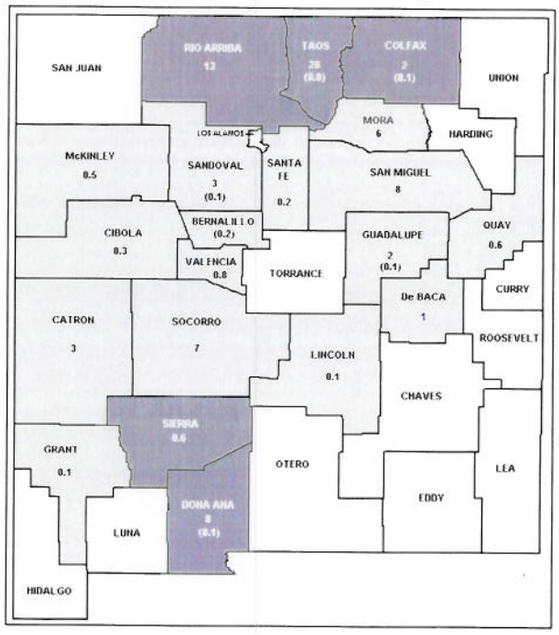


Figure 2. WS conducted ARDM from FY92 to FY10 in shaded counties. Numbers given are the average take of beaver and muskrat (in parentheses) during that time. ARDM was conducted from FY06 to FY10 in dark shaded counties.

Of particular importance is the population dynamics of the beaver. To determine a reasonable estimate of the beaver population, data from scientific studies can be used. Beavers occur mostly in family groups that are comprised of 2 adults with 2-6 offspring from the current or previous breeding season (Novak 1987a). Average family group size has been documented as ranging from 3.0 to 9.2 (Novak 1987a). Beaver abundance has been reported in terms of families per kilometer of stream or per square kilometer surface area for bodies of water. Novak (1987a) summarized reported beaver family abundance as ranging from 0.31 to 1.5 families per kilometer of stream, which converts to 0.5 - 2.4 families per mile of stream. Densities reported in terms of families per square kilometer for bodies of water have been reported to range from 0.15 to 3.9 (Novak 1987a) which is the same as 0.24 to 6.3 per square mile. New Mexico probably has densities for beaver per mile of streams and miles$^2$ of surface water somewhere between the lower to middle part of the range of those summarized by Novak (1987a).

New Mexico has a limited supply of water resources for beaver and ranks 49th among the 50 states in surface acres of water, about 150,000 acres. Beaver make use of 2,237 miles of flowing water ways which

includes rivers, aqueducts, and perennial streams (BISON-M 2011). The beaver population can also make use of intermittent streams, irrigation ditches, and stock ponds. Though much of this area provides beaver habitat, these will not be considered for providing an estimate of the beaver population because some of these could potentially dry out during part of the year. New Mexico, then, has approximately 2,237 miles of perennial (year-round) rivers and streams that beaver use. In addition about 80% of the 230 $mi^2$ in bodies of water greater than 40 surface acres including the larger reservoirs and lakes are within the range of beaver in New Mexico, or 184 $mi^2$.

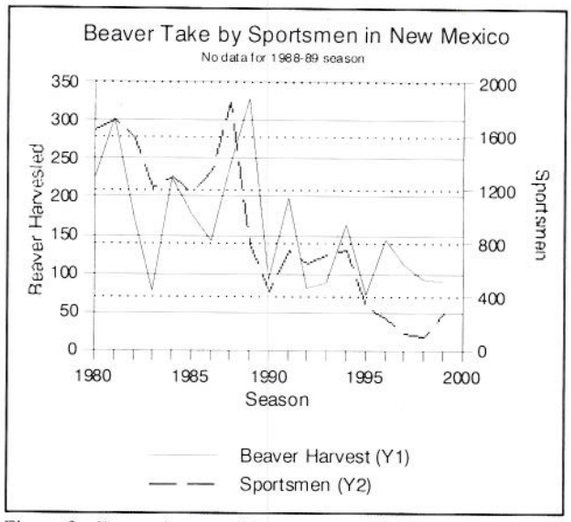


Figure 3. Beaver harvested by sportsmen in New Mexico from the 1980 (1980-81) furbearer season to the 2000 (2000-01) season. Beaver harvest and the number of sportsmen have steadily declined reflecting the decline in the fur market.

With the above information, the beaver population can be estimated. The range, using the lowest parameters (average #/family =3.0, stream density=0.5 families/mile, and surface water density=0.24/$mi^2$) and the highest parameters (average family #=9.2, stream density=2.4 families/mile, and surface water density=6.3/$mi^2$), for New Mexico would be from about 3,500 to 63,000. However, these would be the extremes and neither likely represents the population in New Mexico. NMGF has conservatively estimated the beaver population in New Mexico, using the same data and data from their own field surveys, between 5,300 and 12,000. This would be at the low end of the potential range, but probably fairly realistic, especially when considering the habitat characteristics in New Mexico. Thus, the NMGF estimate can be used to determine impacts of beaver take in ARDM.

In addition to beaver depredation take, hunters and trappers harvest beavers in New Mexico. NMGF collects harvest information from sportsmen to determine the impact on the population. Figure 3 represents the number of sportsmen in New Mexico and their harvest from 1980 to 1999. Both beaver harvest and sportsmen showed a steady decline during this time, likely a result of the decline in fur prices. But the data gives an indication that the beaver population has sustained sport harvest as well as any depredation take for some time. Harvest has remained fairly stable in the 2000s.

**Muskrats.** Muskrats can be found in marshes, ponds, sloughs, lakes, ditches, and slow moving streams and rivers (Boutin and Birkenholz 1987). They are considered abundant, but scattered in suitable habitat throughout New Mexico. Their populations can dramatically change from year to year, depending on extreme weather conditions such as drought and harsh winters, food availability, and disease. However, muskrats are highly prolific and can quickly repopulate an area. They produce 2-4 litters per year with an average of 5-8 young per litter (Wade and Ramsey 1986). With their population parameters, one pair can produce anywhere from 10 to 32 young per year. The breeding density of muskrats is about 2 pair per acre. Densities of muskrats range from low, at 3 per acre in open ponds, to high, at 35 per acre in cattail marshes (Banfield 1974). At the density for open water (3/acre), 10 $mi^2$ could support 19,200 muskrats. For the density in cattail marshes (35/acre), 10 $mi^2$ could support 224,000 muskrats. At the lowest reproduction level (5 young and 2 litters per year) and for 1 pair per acre, the number of young produced would be 64,000 for 10 $mi^2$ of muskrat habitat.

Muskrats make use of 2,143 miles of year-round flowing water ways which includes rivers, aqueducts, and perennial streams (BISON-M 2011). Muskrats can also make use of intermittent streams, irrigation ditches, and stock ponds. Though much of this area provides muskrat habitat, these will not be considered for providing an estimate of the muskrat population because some of these could potentially dry out during part of the year. In addition about 75% of the 230 $mi^2$ in bodies of water greater than 40 surface acres

including the larger reservoirs and lakes are within the range of muskrat in New Mexico, or 173 $mi^2$. If we assume that each acre of wetland habitat in New Mexico has a pair of muskrats, and that one mile of permanent stream covers 12 acres (a width of 100 ft.) and muskrats are found in 25% of the larger bodies of water in their range, then at a minimum New Mexico would have a breeding population of 110,000 muskrats. These could produce over a million offspring annually.

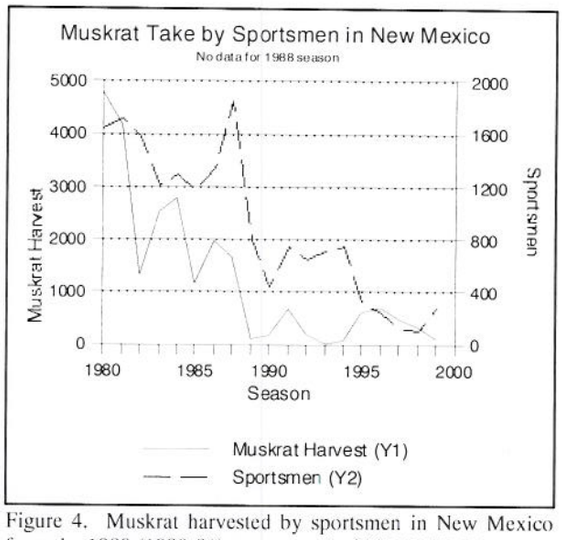


Figure 4. Muskrat harvested by sportsmen in New Mexico from the 1980 (1980-81) season to the 2000 (2000-01) season and the number of sportsmen in the field. Harvest and the number of sportsmen have steadily declined during that time.

For a population to remain stable, the number of young produced would equal the number of muskrats that died annually. Harvest rates of from 3 to 8 per acre have been reported to be sustainable in muskrat populations (Boutin and Birkenholz 1987). Because they are highly prolific, they are considered to be relatively immune to overharvest (Boutin and Birkenholz 1987). Hunters and trappers harvest muskrats in New Mexico. NMGF collects harvest information from sportsmen to determine the impact on the population. Figure 4 represents the number of sportsmen in New Mexico and their harvest from 1980 to 1999. Both muskrat harvest and the number of sportsmen showed a steady decline during this time, likely a result of the decline in fur prices, as with beaver. But the data gives an indication that the muskrat population has sustained sport harvest as well as the depredation take for some time. Harvest has remained fairly minimal in the 2000s. The low rate of harvest by sportsmen is likely imperceptible at the population level when so many young are produced.

**Nutria.** As discussed, the nutria is not part of New Mexico's natural heritage. Thus, any take of nutria would not be detrimental to the human environment. NMGF monitors nutria harvest, but does not have population objectives for them because they are an introduced species.

### 2.2.2 Effects on Nontarget Species Populations Including T&E Species

A common concern among members of the public and wildlife professionals, including WS personnel, is the impact of ARDM control methods and activities on nontarget species, particularly T&E species. WS SOPs include measures intended to minimize the effects of ARDM on nontarget species populations and are presented in Section 3.4.

In contrast to adverse impacts on nontarget animals from direct take by ARDM methods, some nontarget species may actually benefit from ARDM, though this benefit would be unintentional unless it was the focus of the BDM project. A good example would be a reduction of the number of beaver over a large area to benefit fish and invertebrate species requiring rocky riffle habitat that had been reduced from high beaver activity.

**2.2.2.1 Federally Listed T&E Species.** Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects on them and the establishment of special restrictions or mitigation measures to reduce the potential. A current list of threatened and endangered (T&E), and candidate species was obtained from USFWS for New Mexico in July 2011 which includes 5 mammals, 4 birds, 2 reptiles, 1 amphibian, 14 fish, 7 invertebrates, and 13 plants (Table 2). Table 2 excludes those species listed in New Mexico, but not found including the grizzly bear (*Ursus arctos horribilis*) and Sonoyta mud turtle *(Kinosternon sonoriense longifemorale*). Of the species and subspecies currently listed in New Mexico under provisions of the ESA, 21 animal and 7 plant species are endangered, 10 animal and 6 plant species are threatened, and 1 animal species is proposed to be endangered.

Additionally, 17 species (3 mammals, 3 birds, 1 reptile, 1 amphibian, 4 fish, 4 invertebrates, and 1 plant) are listed as candidates. One subspecies has a nonessential, experimental population (NEP), the Mexican wolf. Combining information for species and subspecies from all lists resulted in a list of 8 mammals, 8 birds, 3 reptiles, 2 amphibians, 18 fishes, 11 invertebrates, and 14 plants. WS ARDM will have no effect on most listed species, and little potential to adversely affect a few T&E species. In all, ARDM has the potential to have a slight adverse impact on 6 federally listed species (Table 2). The Tables denote where a problem could occur. Some species could be impacted by methods used in ARDM, but are found outside the area where ARDM is conducted (e.g., jaguar – ARDM has not been conducted in Hidalgo County).

WS conducted a national Section 7 consultation with USFWS in 1992 on the potential for WDM, in general and including most ARDM methods currently used, to impact the species listed nationwide. WS received a Programmatic BO in 1992 (USDA 1997, Appendix F) from USFWS on the species that WS had the likelihood to adversely affect. However, USFWS concluded that WS would have no adverse effects on listed species (USDA 1997, Appendix F) following the Reasonable and Prudent Measures and Alternatives and Terms and Conditions of the BO. The New Mexico WS Program completed a statewide consultation in 2003 (WS 2003b, USFWS 2003a). The consultation concluded with a similar conclusion as Table 2. The 2003 consultation included all T&E species in Table 2, but candidate species changed somewhat and a few candidates were elevated to T&E species, but these latter species were considered in the 2003 consultation. WS will continue to abide by SOPs to minimize potential problems that could occur to T&E species while conducting ARDM.

Beaver can affect several T&E fish species. Beaver ponds can be beneficial or detrimental to the T&E fish species depending on the extent of beaver activity, the historic and present stream characteristics, and available spawning grounds (gravel bottoms). Beaver ponds can provide fish with deep water refugia during times of low flow and droughts. However, if the streams already have naturally occurring deep pools, beaver ponds can reduce necessary spawning habitat from sedimentation and loss of water flow through percolation (in desert areas, downstream waters can be lost to percolation into the sandy soils, especially where no historic wetland existed). Additionally, beaver dams are known to alter competitive relationships between fish species, and could help non-native fish species out-compete native species (Collen and Gibson 2001). Beaver dam building activity in some areas of the State may be a long-term management goal of NMGF or other management entity, but WS works closely with these entities to determine where beaver activity is wanted. It is anticipated that WS will only remove dams by hand from developed areas such as irrigation canals and urban areas where flooding is causing problems and T&E species are unlikely to occur. Therefore, it is expected that even if WS were to remove dams, no effect on the T&E fish species would occur from such activity.

Of the federally listed mammalian species, the gray wolf could potentially be affected by the use of leg-hold and quick-kill traps, and snares. The New Mexico meadow jumping mouse could be affected from the total removal of beaver from an area. The amphibians could be impacted by the spread of chytrid fungus (*Batrachochytrium dendrobatidis*) and the northern Mexican garter snake by the loss of amphibians, much of their prey base, from the spread of chytrid fungus. The Rio Grande silvery minnow could be impacted by the removal of beaver dams, primarily from the use of heavy equipment. WS will implement SOPs to minimize potential to take these species and are given in Section 3.4.

Table 2. New Mexico Federally listed T&E and candidate species.

| SPECIES | Scientific Name | Status | Locale | Habitat | Diet* | ARDM |
|---|---|---|---|---|---|---|
| **MAMMALS** | | | | | | |
| Lesser & Mexican Long-nosed Bats | *Leptonycteris curasoae yerbabuenae & nivalis* | Es | Hidalgo | R | N | 0 |
| Black-footed Ferret* | *Mustela nigripes* | E | Colfax | GR | S | 0 |
| Mexican Gray Wolf | *Canis lupus baileyi* | X | SW | FR | L | -, 0 |
| Jaguar | *Panthera onca* | E | Hidalgo | FR | LS | 0 |
| Canada Lynx | *Lynx canadensis* | C | N | F | S | 0 |
| Gunnison's Prairie Dog (montane pop.) | *Cynomys gunnisoni* | C | NC | GR | G | 0 |
| New Mexico Meadow Jumping Mouse | *Zapus hudsonius luteus* | C | NC/C/SC | W | G | -, 0, + |
| **BIRDS** | | | | | | |
| Piping Plover | *Charadrius melodus* | T | C/NC | W | AI | 0 |
| Least Tern (interior pop.) | *Sterna antillarum* | E | Scattered Statewide | W | AI | 0 |
| Northern Aplomado Falcon | *Falco femoralis septentrionalis* | E | S | G | S | 0 |
| Lesser Prairie-Chicken | *Tympanuchus pallidicinctus* | C | E | GR | GI | 0 |
| Yellow-billed Cuckoo (western pop.) | *Coccyzus americanus* | C | W | F | I | 0 |
| Mexican Spotted Owl | *Strix occidentalis lucida* | TH | W | F | S | 0 |
| Southwestern Willow Flycatcher | *Empidonax traillii extimus* | EH | W | F | I | -, 0, + |
| Sprague's Pipit | *Anthus spragueii* | C | Scattered Statewide | G | GI | 0 |
| **REPTILES** | | | | | | |
| Dunes Sagebrush Lizard | *Sceloporus arenicolus* | PE | SE | GR | I | 0 |
| New Mexican Ridge-nosed Rattlesnake | *Crotalus willardi obscurus* | TH | Hidalgo | F | Si | 0 |
| Northern Mexican Gartersnake* | *Thamnophis eques megalops* | C | Grant/Hidalgo | FW | AIs | -, 0 |
| **AMPHIBIANS** | | | | | | |
| Jemez Mountains Salamander | *Plethodon neomexicanus* | C | LAlam./RArriba/Sandoval | F | AI | -, 0 |
| Chiricahua Leopard Frog | *Rana chiricahuensis* | TH | SW | RW | AI | -, 0 |
| **FISHES** | | | | | | |
| Gila & Rio Grande Cutthroat Trout | *Oncorhynchus gilae & clarki virginalis* | E & C | W & NC/SC | Sg & LSg | AI | 0, + |
| Colorado Pikeminnow | *Ptychocheilus lucius* | EH | San Juan | Lg | A | 0 |
| Gila & Chihuahua Chubs | *Gila intermedia & nigrescens* | EH & T | Grant | Sgm & Sg | AI | 0 |
| Headwater & Roundtail Chubs | *Gila nigra & robusta* | Cs | Catron/Grant&C/G/SJuan | Sg & LSg | A | 0 |
| Spikedace | *Meda fulgida* | TH | Catron/Grant/Hidalgo | Sg | A | 0 |
| Woundfin | *Plagopterus argetissimus* | EH | SW | Sg | A | 0 |
| Loach Minnow | *Tiaroga cobitis* | TH | Catron/Grant/Hidalgo | Sg | Ai | 0 |
| Rio Grande Silvery Minnow | *Hybognathus amarus* | EH | C | Sgm | A | -, 0, + |
| Beautiful Shiner | *Cyprinella formosa* | TH | Grant/Luna* | Sg | AI | 0 |
| Pecos Bluntnose Shiner | *Notropis simus pecosensis* | TH | Chavez/De Baca/Eddy | Sg | AI | 0, + |
| Arkansas River Shiner | *Notropis girardi* | TH | Quay/San Miguel | Sg | A | 0, + |
| Zuni Bluehead Sucker | *Catostomus discobolus yarrowi* | C | Cibola/McKinley | Sg | A | 0 |
| Razorback Sucker | *Xyrauchen texanus* | EH | San Juan | Lg | A | 0 |
| Pecos Gambusia | *Gamgusia nobilis* | E | Chavez/Eddy | Sgm | AI | 0 |
| Gila Topminnow | *Poeciliopsis occidentalis* | E | Grant/Hidalgo | Sg | A | 0 |
| **INVERTEBRATES** | | | | | | |
| Socorro Isopod | *Thermosphaeroma thermophilus* | E | Socorro | Sg | - | 0 |
| Noel's Amphipod | *Gammarus desperatus* | EH | Chavez | SW | - | 0 |
| Texas Hornshell (mussel) | *Popenaias popei* | C | Eddy | LS | - | 0 |
| Socorro & Chupadera Springsnails | *Pyrgulopsis neomexicana & chupadarae* | EH & C | Socorro | S | - | 0 |
| Roswell & New Mexico Springsnails | *Pyrgulopsis roswellensis & thermalis* | E & C | Chavez & Grant | S | - | 0 |
| Gila Springsnail | *Pyrgulopsis gilae* | C | Catron/Grant | S | - | 0 |
| Pecos Assiminea Snail | *Assiminea pecos* | EH | Chavez | S | - | 0 |
| Alamosa & Koster's Springsnails | *Tryonia alamosae & Juturnia kosteri* | E & EH | Socorro & Chavez | S | - | 0 |
| **PLANTS** | | | | | | |
| Sacramento Prickly Poppy | *Argemone pleiacantha pinnatisecta* | E | Otero | R | - | 0 |
| Mancos Milk-vetch | *Astragalus humillimus* | E | San Juan | R | - | 0 |
| Sacramento Mountains & Wright's Marsh Thistles | *Cirsium vinaceum & wrightii* | T & C | Otero & C/SE | SW & W | - | 0 |
| Lee & Sneed Pincushion Cactus | *Coryphantha sneedii v. leei & sneedii* | T & E | Eddy & Dona Ana/Eddy | GR | - | 0 |
| Kuenzler Hedgehog Cactus | *Echinocereus fendleri v. kuenzleri* | E | SE | FG | - | 0 |
| Zuni Fleabane | *Erigeron rhizomatus* | T | Catron/Cibola/McKinley | F | - | 0 |
| Gypsum Wild-buckwheat | *Eriogonum gypsophilum* | T H | Eddy | G | - | 0 |
| Todsen's Pennyroyal | *Hedeoma todsenii* | E H | Otero/Sierra | G | - | 0 |
| Pecos Sunflower | *Helianthus paradoxus* | T | WC C | GW | - | 0 |
| Holy Ghost Ipomopsis | *Ipomopsis sancti-spiritus* | E | San Miguel | R | - | 0 |
| Knowlton's Cactus | *Pediocactus knowltonii* | E | San Juan | F | - | 0 |
| Mesa Verde Cactus | *Sclerocactus mesae-verdae* | T | San Juan | R | - | 0 |

* - *believed extirpated* ****Diet** - *Capitals = large proportion of diet - Lower case = small proportion of diet.*

**STATUS**
**E** - Endangered
**T** - Threatened
**P** - Proposed
**C** - Candidate
**H** - Critical Habitat estab.
**X** - Exp. nonessential pop.

**HABITAT**
**F** - Forests/riparian borders
**G** - Grassland/meadow
**R** - Range/sage/desert
**W** - Wetland/marsh/sandbar
**L** - Lakes, Rivers
**S** - Springs/creeks/ponds
**g** - gravel/flowing water
**m** - mud bottoms/pools

**DIET**
**A** - Aquatic- fish/invertebrates/plants
**G** - Grains/grass/seeds
**I** - Invertebrates/insects
**N** - Nectar/sap
**S** - Small vertebrates (i.e. rodents, birds)
**L** - Large Vertebrates

**ADM - Impacts**
**(-)** - Negative
**0** - none
**(+)** - Positive

On the other hand, some T&E species could unintentionally benefit from BDM. The Southwestern Willow Flycatcher could benefit from beaver control where their nest trees were being cut down or flooded. In the range of the jumping mouse, WS could benefit the mouse where newly created beaver dams flooded their hibernation habitat (the jumping mouse hibernates more than other species, about 9 months). In areas where beaver activity is high and rocky riffle habitat of streams had been reduced significantly, the removal of some beaver would benefit several fish species. However, WS would consult with USFWS if it was known that there was a potential to impact a T&E species, even if the species would benefit from the activity. For the most part, WS would have to target beaver specifically in an area to enhance the T&E species populations and the beaver activity would have to be identified as a limiting factor to the T&E species.

**2.2.2.2 State Listed T&E Species.** NMGF lists animals (NMGF 2008, BISON-M 2011) that are considered T&E or sensitive species in New Mexico. This list contains most federally listed species. It also lists additional species considered T&E in New Mexico, but not their entire range as these are not listed federally. The State T&E list has, in addition to the federal list, 12 mammals, 28 birds, 12 reptiles, 5 amphibians, 9 fish, and 16 invertebrates. As the same for federally listed species, ARDM will have no effect on listed species that inhabit upland areas or inhabit areas outside the area where ARDM is conducted (e.g. Hidalgo County). Of the 88 additional species, 9 species could be adversely affected by ARDM, but impacts would be minor at most, especially following SOPs to avoid them.

Table 3. New Mexico State listed T&E species that could be impacted by ARDM.

| SPECIES | Scientific Name | Status | Locale | Habitat | Diet* | ARDM |
|---|---|---|---|---|---|---|
| **BIRDS** | | | | | | |
| Brown Pelican | *Pelecanus occidentalis* | SE | Statewide | L | A | -, 0 |
| Neotropic Cormorant | *Phalacrocorax brasilianus* | ST | S | L | A | -, 0 |
| Bald Eagle | *Haliaeetus leucocephalus alascanus* | ST | Statewide | LSW | AC | -, 0 |
| **REPTILES & AMPHIBIANS** | | | | | | |
| Western Ribbon Snake | *Thamnophis proximus diabolicus* | ST | Chaves/Eddy/Harding/Union | LSW | AI | -, 0 |
| Boreal Toad | *Anaxyrus boreas* | SE | Los Alamos/Rio Arriba/Sandoval | LSW | AI | -, 0 |
| **FISHES** | | | | | | |
| Peppered Chub | *Macrhybopsis tetranema* | ST | Quay | Sg | AI | 0, + |
| Southern Redbelly Dace | *Phoxinus erythrogaster* | SE | Colfax/Mora | Sg | Ai | 0, + |
| Suckermouth Minnow | *Phenacobius mirabilis* | ST | NE | Sg | AI | 0, + |
| Mexican Tetra | *Astyanax mexicanus* | ST | Chaves/Eddy/Guadalupe | Sg | AI | 0, + |
| Bigscale Logperch (native pop.) | *Percina macrolepida* | ST | Chaves/DeBaca/Eddy/Guadalupe | SLgm | AI | 0, + |
| **INVERTEBRATES** | | | | | | |
| Wrinkled Marshsnail | *Stagnicola caperata* | SE | Sandoval | LSgmW | - | -, 0 |
| Lake Fingernailclam | *Musculium lacustre* | ST | Colfax/San Miguel | LSgm | - | -, 0 |
| Long Fingernailclam | *Musculium transversum* | ST | Union/San Miguel | LSgm | - | -, 0 |
| Star Gyro Snail | *Gyraulus crista* | ST | Colfax | GSmW | - | -, 0 |

Table 3 lists the State listed species which could be affected by ARDM. Three species of waterbirds, the Brown Pelican, Neotropic Cormorant, and Bald Eagle could be taken in leghold traps and snares set in shallow waters, and the cormorant, specifically, could be killed in quick-kill traps in underwater sets. The boreal toad, which commonly inhabits beaver ponds, the marshsnail, and 2 species of fingernail clams could be impacted by the removal of beaver dams that had created a wetland. However, WS does not remove beaver dams that have created new wetlands as discussed in Section 2.2.3. The toad also could be impacted by the spread of chytrid fungus and the northern western ribbon snake by the loss of amphibians, much of their prey base, from the spread of chytrid fungus. WS has SOPs (Section 3.4) to avoid the take of these species. On the other hand, 5 species of fish requiring rocky riffle habitat could benefit from beaver damage management in areas where beaver activity was reducing this needed habitat. If WS were to conduct ARDM in areas inhabited by these species, NMGF would be aware of the activity as they issue the permits to take beaver and, thus, could require the use of specific methods to avoid their take. In addition to the above, the narrowhead garter snake (*Thamnophis rufipunctatus rufipunctatus*), western river cooter (*Pseudemys gorzugi*), and paper pondshell (*Utterbackia imbecillis*) were discussed as being impacted by beaver dam removal; for the most part, WS has not conducted ARDM in the range of these species from FY92 to FY10 with methods that could potentially impact them. WS conducted beaver control with shooting in Grant and Catron County in the range of the garter snake but this would

have no effect on them because WS only removed a few beavers to resolve problems and not whole populations. WS also conducted beaver damage management in San Miguel County in the range of the pondshell but it is found only in Concho Lake and ARDM will not impact the lake and have no effect on wetlands in that County, and thus, WS will have no impact on them. An immature pondshell was found in Harding County which represented range expansion, but WS did not conduct any ARDM in Harding County from FY92 to FY10, and, thus, did not impact any potential population there.

### 2.2.3 Effects of Beaver Dam Removal on Wetland Wildlife Habitat

Some people are concerned about the effects of the alternatives on the wetland ecosystem and that the removal of beaver or breaching beaver dams from an area will result in the loss of wetland habitat and the plant and animal species included in those wetlands.

Beavers build dams primarily in smaller riverine wetlands (intermittent and perennial streams and creeks) with dams consisting of mud, stick and other vegetative materials. Their dams obstruct the normal flow of water and typically change the preexisting wetlands' hydrology from flowing or circulating waters to slower, deeper, more expansive waters that accumulate bottom sediment; the depth of the bottom sediment depends on the length of time an area is covered by water and the amount of suspended sediment in the water.

WS beaver damage management activities are primarily conducted to alleviate damage to agricultural crops, timber resources, and public property such as roads, irrigations structures, bridges and water management facilities. Activities are also conducted to enhance or reclaim wildlife and stream fishery habitats because beaver activity in some areas can reduce required habitat such as rocky riffle habitat needed by certain species of fish for spawning. WS operations routinely incorporate population reduction with dam breaching or installation of temporary water levelers or exclusion devices. In New Mexico, dams are breached only by hand. No heavy equipment such as backhoes or bulldozers is used by WS in these damage reduction and wildlife enhancement activities, but can be by private individuals. These activities take place on small watershed streams, tributary drainages, and ditches and can best be described as small projects conducted to restore water flow through previously existing channels. Only that portion of the dam blocking the stream or ditch channel is altered or breached. WS personnel in New Mexico do not use binary explosives to remove beaver dams either. WS Specialists in other WS State programs can be certified to use explosives, an efficient method to remove beaver dams and less environmentally disturbing than the use of heavy equipment. In this method, the blast is such that it only dislodges the beaver dam, but does not affect the stream channel or bottom. After a blast, any remaining fill material still obstruction the channel is normally washed downstream by water current. The only noticeable side effects from this activity are diluted mud, water, and small amounts of debris from the dam scattered around the blasting site. Considerably less than 10 cubic yards of material is moved in each of these project activities.

Beaver dams in time can establish new, but different wetlands. The Corps and the U. S. Environmental Protection Agency's (EPA) regulatory definition of a wetland (40 CFR 232.2) is:

> *Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.*

Therefore, per this definition, a site needs to meet three qualifications to be considered a wetland. First, it must contain soils saturated by surface or ground water during a specific period of the growing season. Hydric soils are those soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part. In general, hydric soils form much easier where wetlands preexisted. Secondly, the site must exhibit evidence of wetland hydrology. An area has wetland

hydrology if it is inundated or saturated to the surface for at least 5% of the growing season in most years. Finally, the site must be dominated by hydrophytic vegetation which are those species tolerant of and specially adapted to live in saturated soil conditions. Hydrophytic vegetation includes those plants that grow in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. These three factors must be present for an area to be classified as a wetland. Another good characteristic of an established wetland from a beaver dam, is if vegetation is growing on the beaver dam itself; this usually gives a good indication of the age of the dam. If a beaver dam is not breached and water is allowed to stand, hydric soils and hydrophytic vegetation eventually form. This process, though, can take years depending on preexisting conditions.

The preexisting habitat and the altered habitat have different ecological values to the fish and wildlife native to the area. Some species will abound by the addition of a beaver dam, while others will diminish. For example, several species of fish in New Mexico such as shiners listed as T&E species require fast moving waters over gravel or cobble beds which beaver dams can eliminate, thus reducing the habitat's value for these species. Beaver dams can potentially be beneficial to some species of wildlife such as river otter, waterfowl, and trout (*Onchorhynchus spp.*) when it becomes an established wetland, but can also be detrimental to some species such as trout and various species of bivalves where beaver activity is excessive. Simply said, new beaver dams disrupt the current value of habitat in an area. First, habitat is lost for certain species of wildlife and plants that are covered by the area that is flooded, but the flooded area could be used by other wildlife. However, newly created beaver dams typically have habitat loss associated with them until they become, at least, somewhat established. Since a potential exists for beaver damage management to impact wildlife habitat, this is being considered as an issue.

The intent of most dam breaching is not to drain old established wetlands. With few exceptions, requests from public agencies and private individuals and entities that request assistance from WS through NMGF involve dam removal to return an area back to its preexisting condition within a few years after the dam was created; the removal of dams from most irrigation canals takes place within a few weeks of their construction because farmers need the water for their crops. If an area did not have preexisting hydric soils, it usually takes many years for them to develop and a wetland to become established; this often takes more than 5 years as recognized by the Swampbuster provisions. Most beaver dam removal by WS is allowed under exemptions stated in 33 CFR parts 323 and 330 of Section 404 of the Clean Water Act under Nationwide permit exemptions or parts 3821 and 3822 of the Food Security Act. However, the removal of some beaver dams can trigger certain portions of Section 404 that require landowners to obtain permits from the Corps. WS personnel determine the proper course of action upon inspecting a beaver dam impoundment.

### 2.2.4 Effects of ARDM on Public and Pet Safety, and the Environment

A formal risk assessment of WS ARDM methods, including almost all of those used in ARDM in New Mexico, found low risks to humans (USDA 1997, Appendix P). However, to further reduce the effects of ARDM on the public, SOPs are incorporated into the use of specific ARDM methods that could have potential impacts on public and pet safety, and the environment.

WS uses a variety of methods in ARDM, but includes SOPs to reduce potential safety impacts to the public and the environment. WS relies on its Specialists to use their professional judgment to determine the most effective methods to use in a given aquatic rodent damage situation, while having minimal, if any, impact to people, pets, and the environment. WS Specialists are professionally trained to use ARDM techniques, especially with those techniques that have the potential to impact themselves, the public, and the environment. Several ARDM methods have the potential to be hazardous including firearms, leg-hold traps, and zinc phosphide. Section 3.4 lists measures that WS implements to reduce potential problems.

Some individuals have expressed concerns that they believe that chemical ARDM methods and firearms could adversely affect people and pets from direct exposure or indirectly from muskrats that have died

from chemical use. Under the proposed alternatives in this EA, WS could potentially use zinc phosphide, a rodenticide used to remove damaging muskrats and nutria. Rodenticides are regulated under FIFRA and New Mexico pesticide laws by EPA and NMDA, and applied by WS under their management and in accordance with labeling and WS Directives. WS applicators are certified by the State and must complete a written examination and undergo recurrent training. Other chemical methods that could be used are tranquilizers such as ketamine and euthanizing drugs such as Fatal Plus®. These drugs are regulated by FDA under the Food, Drug, and Cosmetic Act and WS policy. WS has not used zinc phosphide or drugs for beaver or muskrats in New Mexico and anticipates no or minimal use of these products. A formal risk assessment of WS methods concluded low risks to humans, pets, and the environment (USDA 1997, Appendix P) including ARDM methods used by WS such as toxicants, immobilization drugs, firearms, and traps.

Some people may be concerned that WS's use of firearms could cause injuries to people. WS personnel use firearms to remove aquatic rodents causing damage. WS policy has requirements for training, safe use, storage and transportation of firearms as prescribed by WS Directive 2.615 and the WS Firearms Safety Training Manual. The required firearms training is conducted biennially by certified instructors. Hands-on firearms proficiency is evaluated in the field and candidates must pass a written exam. Therefore, firearms are handled in a safe manner with consideration given to the proper firearm to be utilized, the target density, backstop, and unique field conditions. Therefore, we believe that firearm use will not result in adverse incidents and the Risk Assessment in USDA (1997) concluded the same.

On the other hand, public health and safety may be jeopardized by not having a full array of ARDM methods for responding to complaints involving threats to human health and safety such as a disease outbreak such as *Giardia* at a public recreation area. WS often uses several ARDM methods to capture target animals, depending on the specifics of these types of situation. Firearms, traps, chemical immobilization, or toxicants may be used to take a target aquatic rodent that represents a public health threat. ARDM methods that may pose a slight public safety risk may be used safely and effectively to eliminate or monitor for a recognized public safety risk.

One peripheral factor pertinent to assessing the risk of adverse effects of WS ARDM activities is the potential for adverse effects from not having professional assistance from programs like WS available to private entities that express needs for such services. WS operates to assist individuals with damage from aquatic rodents where a need exists. In the absence of a WS ARDM Program, or where restrictions prohibit the delivery of an effective program, it is most likely that BDM would be conducted by NMGF, their designated agents, or private individuals. Private ARDM activities are less likely to be as selective for target species, and less likely to be accountable. Additionally, private activities may include the use of unwise or illegal methods to control birds. For example, Great-tailed Grackles were illegally poisoned in Texas with dicrotophos (Mitchell et al. 1984) and a corporation in Kentucky was fined for illegally using carbofuran to destroy unwanted predators including raptors at a private hunting club (Porter 2004). Similarly, on a Georgia quail plantation, predatory birds were being killed by eggs that had been injected with carbofuran (the Federal Wildlife Officer 2000); in Oklahoma, Federal agents charged 31 individuals with illegally trapping and killing hawks and owls to protect fighting chickens (USFWS 2003b). The Texas Department of Agriculture (2011) has a website and brochure devoted solely to preventing pesticide misuse in controlling agricultural pests. Similarly, Britain's Chemicals Regulation Directorate (2009) has a "Campaign against Illegally Poisoning of Wildlife." Therefore, WS believes that it is in the best interest of the public, pets, and the environment that a professional BDM program be available because private resource owners could elect to conduct their own control rather than use government services and simply out of frustration resort to inadvisable techniques (Treves and Naughton–Treves 2005).

### 2.2.5 Humaneness of ARDM Methods Used by WS

The issue of humaneness and animal welfare as it relates to killing or capturing wildlife is an important and 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 . . .*" (American Veterinary Medical Association (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 . . .*" (California Department of Fish and Game 1991), such as shooting.

Defining pain as a component of humaneness and animal welfare in ARDM methods used by WS 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 . . .*" (American Veterinary Medical Association 1987). However, pain experienced by individual animals probably ranges from little or no pain to significant pain (California Department of Fish and Game 1991).

Pain and suffering, as it relates to 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 nor veterinary curricula explicitly address suffering or its relief*" (California Department of Fish and Game 1991). Research suggests that some methods, such as restraint in leghold traps or changes in the blood chemistry of trapped animals, indicate "*stress*" (USDA 1997). However, such research has not yet progressed to the development of objective, quantitative measurements of pain or stress for use in evaluating humaneness.

The American Veterinary Medical Association (2007) states "*Euthanasia techniques should result in rapid loss of consciousness followed by cardiac or respiratory arrest and the ultimate loss of brain function. In addition, the technique should minimize distress and anxiety experienced by the animal prior to loss of consciousness.*" Some people would prefer American Veterinary Medical Association accepted methods of euthanasia to be used when killing all animals, including wild and feral animals. This states that "*For wild and feral animals, many of the recommended means of euthanasia for captive animals are not feasible. In field circumstances, wildlife biologists generally do not use the term euthanasia, but use terms such as killing, collecting or harvesting, recognizing that a distress-free death may not be possible.*" (Beaver et al. 2001). The American Veterinary Medical Association (2007) reiterated that the absence of pain and distress cannot always be achieved, especially in field situations.

Some individuals and groups are opposed to some management actions of WS. WS personnel are experienced and professional in their use of management methods. This experience and professionalism allows WS personnel to use equipment and techniques that are as humane as possible within the constraints of current technology. Professional ARDM activities are often more humane than nature itself (i.e. death from starvation) because these activities can produce quicker deaths that cause less suffering. Research suggests that with some methods, such as restraint in leghold traps, changes in the blood chemistry of trapped animals indicate "stress." Blood measurements indicated similar changes in foxes that had been chased by dogs for about five minutes as those restrained in traps (USDA 1997). However, such research has not yet progressed to the development of objective, quantitative measurements of pain or stress for use in evaluating humaneness. People concerned with animal welfare often express that they would like to see animal suffering minimized as much as possible and that unnecessary suffering be eliminated. The interpretation of what is unnecessary suffering is the point to debate (Schmidt 1989).

Thus, the decision-making process involves tradeoffs between the above aspects of pain and humaneness and resolving wildlife damage issues. Objective SOPs to minimize impacts from this issue must consider

not only the welfare of wild animals, but also the welfare of humans suffering ongoing damage if damage management methods were not used. Therefore, humaneness, in part, appears to be a person's perception of harm or pain inflicted on an animal. 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 within the constraints imposed by current technology and funding.

WS has improved the selectivity of management devices through research and development of pan-tension devices, break-away snares, and chemical immobilization/euthanasia procedures that minimize pain. Research continues to improve selectivity, practicality, and humaneness of management devices (USDA 1997). Until such time as new findings and products are found to be practical, a certain amount of animal suffering will occur if ARDM objectives are to be met in those situations where nonlethal ARDM methods are ineffective or impractical. Furthermore, if it were possible to quantify suffering, it is possible that the actual net amount of animal suffering would be less under the proposed action (or any other alternative involving the use of lethal methods) than under the No Federal WS PDM Alternative since inexperienced individuals would be implementing ARDM the most under this alternative. SOPs used to maximize humaneness are listed in Section 3.4.

## 2.3 ISSUES NOT CONSIDERED IN DETAIL WITH RATIONALE

In addition to the above issues, several other issues have been raised that warrant discussion, but not consideration in the analysis. Several of these issues have been discussed in other WS environmental documents (USDA 1997, WS 1997a, b, c, 2004, 2006, 2009) and found that they would not have an effect on the decision, as rationalized. These issues would have the same discussion in this EA. No new information has arisen that would change the analysis already provided in the other EAs or suggest a need for their inclusion here in the issues considered in the comparison of alternatives. A synopsis of issues that have been considered in prior EAs that will not be included here are:

- WS's Impact on Biodiversity
- Wildlife Damage Management Should Be Fee Based and Not a Taxpayer Expense
- Appropriateness of the Geographic Scope of the EA, Statewide
- Concerns That the Proposed Action May Be "Highly Controversial" and Its Effects May Be "Highly Uncertain," Both of Which Would Require That an EIS Be Prepared
- Impacts of Removal on the Public's Aesthetic Enjoyment of Aquatic Rodents
- Potential Effects of Human Activity Associated with ARDM Activities on Wildlife during the Breeding Season
- Concerns That the Killing of Wildlife Represents "Irreparable Harm"
- Concerns That WS Employees Might Unknowingly Trespass onto Private Lands or Across State Boundary Lines While Conducting ARDM
- American Indian and Cultural Resource Concerns

The reader is referred to the other EAs for their discussion. A new issue has arisen regarding the use of lead ammunition that has been discussed in WS (2006, 2009), but was not discussed in WS (2004). This issue will not be included in the analyses in Chapter 4 with the following rationale.

### 2.3.1 Effects from the Use of Lead in Ammunition

WS addressed this issue in WS (2006, 2009) which concluded that the WS WDM program in New Mexico would have minimal potential to impact wildlife, particularly bird species susceptible to lead poisoning from shooting, especially in comparison to sports harvest. An analysis here would be the same as that already given in those documents as WS use of firearms has remained relatively the same as that analyzed. Additionally, the WS ARDM program would have very little opportunity to impact wildlife, primarily predatory and scavenging birds, because few aquatic rodents are taken annually with firearms.

From FY06 to FY10, WS took an annual average of 4.0 beaver and 0.2 muskrats with firearms. Intuitively, the take of such few aquatic rodents with firearms would suggest that WS would not have an impact on any bird population, especially considering that WS analyzed the use of thousands of shotgun shells and bullets along with the cumulative impact of hundreds of thousands of shells and bullets fired by hunters. It should be noted that, where feasible, the carcasses of aquatic rodents shot are retrieved and disposed per WS Policy. This would further reduce the minimal potential risk of lead poisoning to birds. Thus, we believe that the WS ARDM program will have minimal to no potential to impact wildlife from lead poisoning and will not discussed further.

### 2.3.2 Impacts on the Natural Environment Not Considered

USDA (1997) evaluated many WS BDM activities for their impacts on several other natural environmental factors not discussed above. USDA (1997) concluded that WS would have negligible impacts on air quality from the use of WDM methods. In addition, the proposed action does not include construction or discharge of pollutants into waterways and, therefore, would not impact water quality or require compliance with related regulations or Executive Orders. The proposed action would cause only very minimal or no ground disturbance and, therefore, would impact soils and vegetation insignificantly. WS uses very little fossil fuels and contributes negligible greenhouse gases that could impact global warming.

### 2.3.3 Irreversible and Irretrievable Commitments of Resources

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

# CHAPTER 3: ALTERNATIVES INCLUDING THE PROPOSED ACTION

USDA (1997) had 13 possible alternatives to conduct WDM throughout the country. Of the 13 courses of action, only the following three were deemed relevant for ARDM in New Mexico. The range of alternatives is limited because State laws require NMGF to resolve aquatic rodent damage for private landowners and lessees whether or not WS assists with the ARDM activities. WS requires private parties to contact NMGF prior to receiving assistance from WS and, therefore, WS is not ultimately responsible for approving and advising them on ARDM activities. NMGF permits aquatic rodent activities and specifies the method(s) of take on their permit. Therefore, for private landowners and lessees, only two alternatives are applicable. WS either assists NMGF with ARDM or it does not because they have to resolve damage problems regardless of WS' actions. For public agencies such as the State Highway or County Road Departments, USFWS, and Tribes an additional alternative is considered.

## 3.1 ALTERNATIVES ANALYZED IN DETAIL

### 3.1.1 Alternative 1 - Continue the Current WS ARDM Program

This is the "No Action" and "Proposed Action" alternative as defined by CEQ for ongoing Programs. This alternative would allow the current program to continue under this EA in New Mexico. Under this alternative, WS would respond to requests from NMGF to assist private landowners and lessees with ARDM. In addition, WS would assist public entities with ARDM at their request.

### 3.1.2 Alternative 2 - No Federal ARDM

This alternative consists of no federal ARDM. NMGF would rely on their own staff, other agents, or the landowners to resolve damage problems with aquatic rodents. ARDM on public lands would be left up to the efforts of the agency in coordination with NMGF. Tribes would be responsible for resolving aquatic rodent problems on their lands.

### 3.1.3 Alternative 3 - Technical Assistance Only

Under this alternative, WS would not conduct any direct operational ARDM activities in New Mexico. This alternative would have no bearing on private landowners or lessees because WS requires them to contact NMGF who prescribes ARDM activities under a permit. NMGF would be responsible for conducting ARDM and providing technical assistance for them. If assistance was requested of WS from public entities or Tribes, WS could assist the effected public or Tribal resource owners with technical assistance information only. However, the requesting public agency would also be referred to NMGF to obtain a permit to conduct ARDM.

## 3.2 DESCRIPTION OF THE ALTERNATIVES

### 3.2.1 Alternative 1 - Continue the Current WS ARDM Program

A succinct description of the proposed action was presented in Chapter 1. The discussion that follows contains further information intended to foster understanding of WS's rationale for constructing the proposed action.

**3.2.1.1 IWDM.** For more than 70 years, WS has considered, developed, and used numerous methods of managing wildlife damage problems (USDA 1997, P. 2-15). The efforts have involved research and development of new methods and the implementation of effective strategies to resolve wildlife damage. The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. IWDM is the implementation and application of safe and practical methods for the prevention and control of damage caused by wildlife based on an analysis of the local problem and the informed judgment of trained personnel. The WS Program applies IWDM (WS Directive 2.105), to reduce damage through the WS Decision Model (Slate et. al. 1992) described in USDA (1997).

The philosophy behind IWDM is to implement effective management techniques in a cost effective manner while minimizing the potentially harmful effects on humans, target and nontarget species, and the environment. IWDM draws from the largest possible array of options to create a combination of techniques appropriate for the specific circumstances. IWDM may incorporate cultural practices (i.e. animal husbandry), habitat modification, animal behavior (i.e. scaring), local population reduction, or any combination of these, depending on the characteristics of the specific damage problems. In selecting management techniques for specific damage situations consideration is given to the:

- Species responsible;
- Magnitude and geographic extent of damage;
- Duration and frequency of the damage;
- Prevention of future damage (lethal and nonlethal techniques); and
- Environmental concerns such as T&E species in the same area.

The cost of IWDM may be secondary because of overriding environmental, legal, human health and safety, animal welfare, or other concerns.

**3.2.1.2 IWDM Strategies That WS Employs.** WS employs different strategies to resolve wildlife damage problems. In certain situations, WS may provide cooperators with the information necessary to resolve the problem themselves (technical assistance). In others, WS may directly resolve the problem (direct assistance). However, the most common strategy to resolve wildlife damage is to use a combination of these approaches as outlined in IWDM.

**Technical Assistance Recommendations.** When assistance is requested, WS may elect to only provide advice on how to resolve the problem, leaving the requestor responsible for implementation. WS personnel provide information, demonstrations, and advice on many of the available IWDM techniques. Technical assistance includes demonstrations on the proper use of management devices (pond-levelers, cage traps, etc.) and information and advice on habitat management and animal behavior modification devices. Technical assistance is generally provided following an on-site visit or verbal consultation with the requestor. Generally, several management strategies are described to the requestor for short and long-term solutions and are based on the level of risk, the abilities of the requestor, need, and practical application. Technical assistance may require substantial effort by WS personnel in the decision making process, but actual management is primarily the requestor's responsibility.

**Direct Control Assistance.** Some ARDM activities are directly conducted or supervised by WS personnel. Direct control assistance is implemented when the problem cannot effectively be resolved through technical assistance alone or when *Cooperative Agreements* provide for WS direct control

assistance. The initial investigation defines the nature and history of the problem, extent of damage, and the species responsible for the damage. Professional skills of WS personnel are often required to effectively resolve problems, while some problems may require the direct supervision of a wildlife professional. WS considers the biology and behavior of the damaging species and other factors using the WS Decision Model (Slate et al. 1992). The recommended damage management program to resolve a problem may include any combination of preventive and corrective actions that could be implemented by the requestor, WS, or other agency, as appropriate.

***Preventive Damage Management*** is applying ARDM strategies before damage occurs, and is based on historical damage problems. As requested and appropriate, WS personnel provide information, conduct demonstrations, or take action to prevent these historical problems from recurring. For example, in areas where substantial damage by flooding has occurred historically and beaver have been removed, WS may provide information about effective exclusion, pond levelers, or other nonlethal techniques, or be requested to conduct operational ARDM after new activity is noticed prior to new damage.

***Corrective Damage Management*** is applying ARDM to stop or reduce current losses. As requested and appropriate, WS personnel provide information and conduct demonstrations or, with the appropriate signed agreement, take action to prevent additional losses from recurring. For example, in areas where roads have been flooded, WS may provide information about exclusion methods or pond levelers, and conduct operational ARDM to stop the losses. Corrective damage management is usually the most common ARDM strategy.

**3.2.1.3 ARDM Methods.** This section summarizes the best technology for resolving aquatic rodent damage that has evolved from continued development and refinement by research and the experience of professional wildlife biologists. Species-specific methods are discussed for beaver in Miller and Yarrow (1994), for muskrats in Miller (1994), and nutria in LeBlanc (1994). Several ARDM methods are available for use. Resource owner practices consist primarily of nonlethal preventive methods such as exclusion and habitat modifications. Resource owners are encouraged to use these methods, based on the level of risk, need, and professional judgment of their effectiveness and practicality (Slate et al. 1992). WS employs several lethal control methods to selectively remove aquatic rodents causing damage where nonlethal techniques would not adequately address the damage situation.

Most ARDM methods have strengths and weaknesses in each specific damage situation, and can range from being very effective at reducing damage to being virtually of no value. WS personnel using the WS Decision Model (Slate et al. 1992) can determine, for each ARDM situation, the method or combination of methods that is most appropriate and effective. The following is basic list of ARDM methods given consideration by WS, a discussion of their use, and specific species targeted by their use. Methods fall into 3 basic categories: resource management, physical exclusion, and wildlife management.

**Resource Management**

**Modification of human behavior** is often used by WS personnel to resolve potential conflicts between humans and wildlife by altering the perception of an action. For example, WS may talk with area residents to eliminate feeding wildlife occurring in parks, recreational sites, or residential areas. This both reduces wildlife damage and the likelihood that certain species will become tame. Some aquatic rodents, after being accustomed to being fed by people in parks, have been known to approach people without feed for them very aggressively and bite them (e.g., nutria (*Myocastor coypus*)). Many wildlife species adapt well to human settlements and activities, but their proximity to humans may result in

damage to structures or threats to public health and safety. Eliminating wildlife feeding and handling can reduce potential problems, but many people, not directly affected by wildlife problems, enjoy wild animals and engage in activities that encourage their presence. It is difficult to consistently enforce no-feeding regulations and effectively educate all people concerning the potential liabilities of feeding wildlife.

**Habitat management**, such as the removal of vegetation near water or damage-prone areas, aids in reducing cover, eliminating food sources, and possibly discouraging the presence of aquatic rodents. In addition to this, most habitat management is aimed at reducing the presence of beavers and muskrats.

**Beaver dam removal** is done when beaver create a dam where the resource owner does not want the area to be flooded. Beaver damming activities can have varying effects on the environment. Their dams can create valuable wetland habitat for wildlife, especially where a dam holds water during drought periods. Conversely, dams can create sinks where water evaporates or percolates into the ground decreasing water flows needed for agricultural activities, some fish and wildlife species, and other resources. Breaching of beaver dams is generally conducted to maintain existing stream channels and drainage patterns, and reduce flood waters that have affected established silviculture, agriculture (i.e., ranching and farming activities), roads, bridges, and residential and commercial property, or drainage structures such as culverts. Beaver dams are made from natural debris such as logs, sticks, and mud that beaver take from the immediate area. It is this portion that is dislodged during a beaver dam breaching operation. Breached impoundments are usually from recent beaver activity and the area has not been flooded or inundated with water long enough for the area to take on the qualities of a true wetland (i.e., hydric soils, hydrophytic vegetation, and pre-existing function).

Unwanted beaver dams in New Mexico can be breached using a rake, power tools (e.g., a winch), heavy equipment (e.g., backhoe), or binary explosives. WS has removed beaver dams by hand in New Mexico, but has not used heavy equipment or binary explosives. Breaching the upper portion of a dam or beaver dam removal (heavy equipment and binary explosives must be used appropriately) does not affect the substrate or the natural course of the stream, but returns the area back to its preexisting condition with similar flows and circulations. Where beaver dams involve "waters of the United States," most removal is regulated under Section 404 as defined by CWA. Since hand removal of a dam does not result in deposition of fill, a section 404 permit is not required. The use of binary explosives and back hoes, though, may trigger Section 404 and require the landowner to get a permit. However, several activities are covered under nationwide permits under Section 404. If WS gives advice on beaver dam removal, WS will try to ensure that the cooperator is made aware of Section 404 permits and that they should consult with the Corps. When a dam is removed, natural debris is released into the water. The Corps must determine whether or not this debris has the *effect of fill* on waters of the United States, and therefore, whether or not a permit is required. These agencies determined that if an activity has the *effect of fill* on wetlands below the activity, then CWA would apply. However, in most beaver dam removal operations, the material that is displaced, if considered to be discharge, is exempt from permit requirements under 33 CFR 323 or 330, but the Corps must be notified in most cases of such activities.

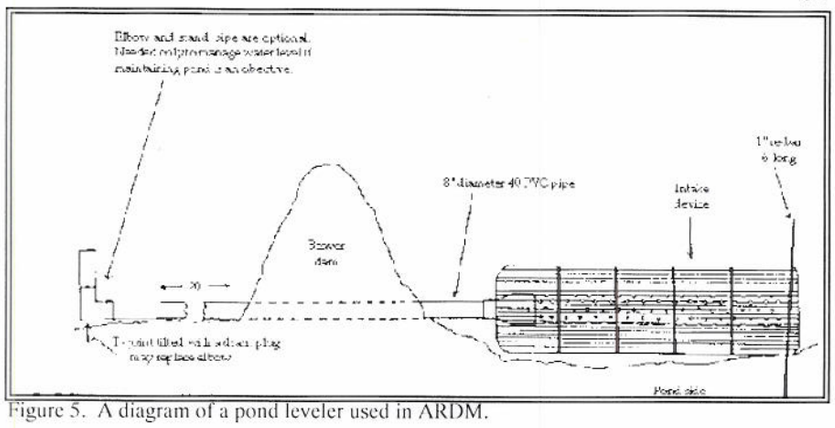

Figure 5. A diagram of a pond leveler used in ARDM.

**Water-level control devices** (pond levelers) have been used for many years with varying degrees of success. Several devices such as the Three-log Drain (Roblee 1983), the T-culvert Guard (Roblee 1987), wire mesh culvert (Figure 5) (Roblee 1983), and the Clemson beaver pond leveler (Miller and Yarrow 1994) may be used to regulate water levels in beaver ponds. Additionally, the Beaver Deceiver is a water-level control system that attempts to quiet, calm, and deepen the water in front of culverts (i.e., to reduce the attractiveness to beaver) and exclude beaver from a wide area around the upstream opening of the culvert (Lisle 1996). However, the effectiveness of this method has not been evaluated in field trials.

Various types of beaver pond levelers have been described (Arner 1964, Laramie and Knowles 1985, Lisle 1996, Roblee 1984) and installation of beaver pond levelers can be effective in reducing flooding in certain situations, if properly maintained (Minn. Dept. Natural Resources 1994, Miller and Yarrow 1994). Water-level control devices generally are of two designs. One design is a perforated pipe passing through the beaver dam and the second is a fence erected 15 - 90 feet in front of the culvert to prevent the beaver from blocking the culvert with debris (Lisle 1996.). The second design may include a perforated pipe extending from the fence to the culvert to allow water to continue to flow if the fence becomes clogged with debris.

The cost of water-level control devices is variable, depending on number of devices per dam, type of device, materials used, and labor. Dams may need multiple devices to accommodate the volume of water in the flowage. Materials and installation for water-level control devices can be relatively modest for a three-log drain (Arner 1964), $496 - $560 for a single modified Clemson leveler (Nolte et al. 2000), $1050 - $2,300 for a single beaver stop, or more than $1,000 for a Beaver Deceiver. The use of pond levelers or water-level control devices may require frequent maintenance, depending on the type of water-level control device used. Because stream flow, leaf fall, floods, and beaver activity may bring debris to the water-level control device, frequent maintenance is often required (Nolte et al.2003).

Water-level control devices are most effective on wetlands lacking in-stream flow and may be ineffective in beaver ponds located in broad, low-lying areas (Organ et al. 1996). Water-level control devices may not be appropriate in streams or ditches with continuous flow because the volume of water is too great for the device and debris is continuously carried to the site. Similarly, water-level control devices may be ineffective during periods of unusually high rainfall or increased water flow (Wood et al. 1994).

## Physical Exclusion

**General exclusion** pertains to methods that prevent access to resources through fencing or other barriers. Fencing of small critical areas such as around culverts and drain pipes can sometimes prevent beavers from plugging them. Construction of concrete spillways may reduce or prevent damage to dams by burrowing aquatic rodent species. Riprap can also be used on dams or levees at times, especially to deter muskrat burrowing. Electrical water barriers have proven effective in limited situations for beaver; an electrical field through the water in a ditch or other narrow channel, or hot-wire suspended just above the water level in areas protected from public access, have been effective at keeping beaver out. The effectiveness of an electrical barrier is extended when used in conjunction with an odor or taste cue that is emitted because beaver will avoid the area even if the electrical field is discontinued (Kolz and Johnson 1997). However, WS-NWRC found that an electrical barrier proved ineffective at preventing beaver damage in Arizona. Fencing, especially if it is installed with an underground skirt, can prevent access to aquatic rodents to areas such as yards, hay meadows, aquaculture facilities, and poultry barns. Lastly, hardware cloth or other metal barriers can sometimes be practical to prevent girdling and gnawing of valuable trees.

**Abrasives** are materials that discourage, reduce or prevent gnawing behavior of rodents. Abrasives produce an unpalatable surface which irritates the teeth and mouth of rodents when they attempt to gnaw or chew on the surface. Flexible materials, such as sandpaper, grinder pads and fine-mesh stainless steel screening can be placed on or over objects (e.g., electrical wiring, plastic piping, or fruit trees) that are susceptible to rodent gnawing. Fine sand can be added and mixed with paint, glue or other suitable liquid adherents to formulate a paste or heavy mixture that can be brushed-on or applied to a surface to discourage rodent gnawing. This method has had limited success when applied or painted to tree trunks to discourage beaver from cutting down trees. Recent preliminary tests of applying a textural repellent (e.g., sand mixed in paint) by WS' National Wildlife Research Center (Nolte et al. 2003) suggest that this method may be more applicable for large diameter trees. However, additional research is needed to fully evaluate the efficacy and practicality of abrasives.

## Wildlife Management

Reducing wildlife damage through wildlife management is achieved through the use of a myriad of techniques. The objective of this approach is to alter the behavior of or repel the target species, remove specific individuals from the population, reduce local population densities, or suppress/extirpate exotic species populations to eliminate or reduce the potential for loss or damage to property and natural resources.

**Relocation**, the translocation of an animal, 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 (e.g., muskrat) are relatively abundant and relocation is not necessary for the maintenance of viable populations. Relocation may also result in future depredations if the relocated animal encounters protected resources again, possibly triggering payment of damage compensation claims in some cases. However, beaver have been restored through translocation and WS has assisted NMGF with authorized relocations to areas where they are wanted, primarily to restore habitat for other species such as the southwestern willow flycatcher.

The American Veterinary Medical Association, The National Association of State Public Health Veterinarians, and the Council of State and Territorial Epidemiologist all oppose the relocation of mammals because of the risk of disease transmission, particularly for small mammals such as raccoons (*Procyon lotor*) or striped skunks (*Mephitis mephitis*) (Center for Disease Control 1990). Relocation of wildlife is also discouraged by WS policy (WS Directive 2.501) because of stress to the relocated animal, poor survival rates, and difficulties in adapting to new locations or habitats. Although relocation may be conducted periodically, it is not necessarily precluded because in many cases it is logistically impractical and biologically unwise.

**Chemical repellents** are nonlethal chemical formulations used to discourage or disrupt particular behaviors of wildlife. There are three main types of chemical repellents: olfactory, taste, and tactile. Olfactory repellents must be inhaled to be effective. These are normally liquids, gases or granules, and require application to areas or surfaces in need of protection. Taste repellents are compounds (i.e., liquids, dusts, granules) aversive to the target animal that are normally applied to trees, shrubs and other materials that are likely to be ingested or gnawed by the target species. Tactile repellents are normally thick, liquid-based substances which are applied to areas or surfaces to discourage travel of wildlife by irritating them or making the area undesirable for travel. Most repellents attempted for beavers have been ineffective or are short-lived in reducing or eliminating damage caused by wildlife. Therefore, repellants are infrequently used by WS. In addition, no proven repellents are currently available for ARDM.

**Capture or take methods** involve several methods available to capture or take offending animals. The appropriateness and efficacy of any technique will depend on a variety of factors. Many capture methods are nonlethal and the animal could be relocated or euthanized following capture. Most all aquatic rodents are euthanized by WS. Lethal damage management involves methods specifically designed to remove aquatic rodents in certain situations to a level that stabilizes, reduces or eliminates damage. Level of removal necessary to achieve a reduction of aquatic rodent damage varies according to the resource protected, habitat, population, effectiveness of other damage management strategies and other ecological factors. Despite the numerous damage management methods developed, trapping remains the most effective method of removing beaver and reducing damage (Hill 1976, Hill et al. 1977, Wigley 1981, Weaver et al. 1985). Intensive trapping can eliminate or greatly reduce beaver populations in limited areas (Hill 1976, Forbus and Allen 1981).

***Leg-hold traps*** can be effectively used to capture a variety of mammals. Leg-hold traps are either placed beside or in travel ways being actively used by target species. Placement of traps is contingent upon habits of the respective target species, habitat conditions and presence of nontarget animals. Effective trap and lure placement, adjustment, and use by trained WS personnel contributes to the leg-hold trap's selectivity. An additional advantage is that leg-hold traps can allow for on-site release of nontarget animals. Use of leg-hold traps requires more skill than some methods, but leg-hold traps are indispensable in resolving many damage problems. Aquatic rodents live-captured in leg-hold traps are often humanely euthanized.

***Snares*** are capture devices comprised of a cable formed in a loop with a locking device. Snares are often placed in travel ways and equipped with a swivel to minimize cable twisting and breakage. Leg-hold traps can be difficult to keep operational during periods of inclement weather. However, snares are easier and less affected by inclement weather. Target animals are caught around the neck, body, or leg and then humanely euthanized.

***Cage traps*** come in a variety of styles for WDM to target different species. The most commonly known cage traps used in the current program are box traps. Box traps are usually rectangular, made from wood or heavy gauge wire mesh (very heavy gauge for beavers). These traps are used to capture animals alive and can often be used where many lethal or more dangerous tools would be too hazardous. Box traps are well suited for use in residential areas for all the aquatic rodents.

Cage traps do have a few drawbacks. Some individual target animals avoid cage traps. Some nontarget animals become "trap happy" and purposely get captured to eat the bait, making the trap unavailable to catch target animals. These behaviors can make a cage trap less effective. Cage traps must be checked frequently to ensure that captured animals are not subjected to extreme environmental conditions. For example, an animal may die quickly if the cage trap is placed in direct summertime sunlight. Another potential problem with the use of cage traps is that some animals will fight to escape and become injured. Aquatic rodents caught in cage traps are often euthanized. They also could be relocated, if ecologically desirable.

***Hancock traps*** (suitcase/basket type cage traps) are designed to live-capture primarily beaver. This type of trap is constructed of a metal frame covered in chain-link fence that is hinged with springs. Trap appearance is similar to a large suitcase when closed. When set, the trap is opened to allow an animal to enter, and when tripped the sides close around the animal. One advantage of using the Hancock trap is the ease of release of beaver or nontarget animals. Disadvantages of these traps are expense (approximately $350 per trap), cumbersome and bulky size, and difficulty to set (Miller and Yarrow 1994). Hancock traps can also be dangerous for humans to set (i.e., hardhats are recommended when setting suitcase traps), and are less time-efficient than snares, leg-holds and body-grip traps, and may cause serious and debilitating injury to otters (Blundell et al. 1999). Beaver captured in Hancock traps would be euthanized unless they were slated for relocation.

***Colony traps*** are multi-catch traps used to either live-capture or drown muskrats. There are various types of colony traps. One common type of colony trap consists of a cylindrical tube of wire mesh with a one-way door on each end (Novak 1998b). Colony traps are set at entrances to muskrat burrows or placed in muskrat travel lanes. Colony traps are effective and relatively inexpensive and easy to construct (Miller 1994). The stovepipe trap, a common type of colony trap, is usually made with sheet metal and may capture two to four muskrats on the first night (Miller 1994). Muskrats live-captured in colony traps would be euthanized by shooting or with drugs.

***Body-grip (e.g., Conibear®) traps*** are designed to cause quick death of the animal that activates the trap. The number 330 body-grip trap is generally used for beaver and the 110 or 120 for muskrats. Body-grip traps for beaver capture are used exclusively in aquatic habitats, with placement depths varying from a few inches to several feet below the water surface. Smaller Conibear traps, such as those used for muskrats, can be set either in or out of the water. Placement is in travel ways or at lodge or burrow entrances. Animals are captured as they travel through the trap and activate the triggering mechanism. Safety hazards and risks to humans are usually related to setting, placing, checking or removing the traps. Body-grip traps present a minor risk to nontarget animals because of the selectivity of placement in aquatic habitats and below the water surface.

***Shooting*** is the most selective method for removing target species and may involve use of spotlights and shotguns, rifles, or pistols. Shooting is an effective method to remove small numbers of aquatic rodents in damage situations, especially where trapping is not feasible. Removal of specific animals in the problem area can sometimes provide immediate relief from a problem. Shooting is sometimes used as

one of the first lethal damage management options because it offers the potential of resolving a problem more quickly and selectively than some other methods, but it does not always work. Shooting may sometimes be one of the only ARDM options available if other factors preclude setting of damage management equipment. WS personnel receive firearms safety training to use firearms that are necessary for performing damage management duties.

Firearms use is very sensitive and a public concern because of safety issues related to the public and misuse of firearms. 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 within 3 months of their appointment and a refresher course every 2 years thereafter (WS Directive 2.615 and APHIS Safety & Health Manual 4790, Chapter 10, Section 10.9.5). Many WS employees carry firearms as a condition of employment and are required to certify that they meet the criteria as stated in the *Lautenberg Amendment*. The *Lautenberg Amendment* prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

***Zinc phosphide*** is a toxicant registered in New Mexico for use in muskrat and nutria damage management. No toxicants are registered for use on beaver. Use of zinc phosphide on various types of fruit, vegetable, or cereal baits (e.g., apples, carrots, sweet potatoes, oats, barley) has proven to be effective at suppressing local populations. All chemicals used by WS are registered under FIFRA and administered by EPA and NMDA. Zinc phosphide is federally registered by APHIS/WS. Specific bait applications are designed to minimize nontarget hazards (Evans 1970). Zinc phosphide presents minimal secondary hazard to predators and scavengers. Zinc phosphide is an emetic; therefore, meat-eating animals such as mink, dogs, cats, and raptors regurgitate animals that are killed with zinc phosphide with little or no effect. No T&E species occurring in New Mexico would be adversely affected by use of this formulated product. WS personnel that use chemical methods are certified as pesticide applicators by NMDA and are required to adhere to all certification requirements set forth in FIFRA and New Mexico pesticide application laws and regulations. A quantitative risk assessment evaluated potential impacts of WS use of chemical methods and found that when pesticides are used according to their labeling, no adverse effects are expected from them including zinc phosphide (USDA 1997).

**Chemical immobilizing and euthanizing drugs** are important tools for managing wildlife. Under certain circumstances, WS personnel are involved in the capture of animals where the safety of the animal, personnel, or the public are compromised and chemical immobilization provides a good solution to reduce these risks. For example, chemical immobilization has often been used to take animals in residential areas where public safety is at risk. WS employees that use immobilizing and euthanizing drugs are certified for their use and follow the guidelines established in the WS Field Operational Manual for the Use of Immobilization and Euthanasia Drugs. Telazol® (tiletamine), and Ketamine/Xylazine are immobilizing agents often used by WS to capture and remove predators and other animals. These are typically used in urban, recreational, and residential areas where the safe removal of a problem animal is most easily accomplished with a drug delivery system (e.g., darts from rifle, pistol, or blow gun, or syringe pole). Immobilization is usually followed by relocation when appropriate or euthanasia. Euthanasia is usually performed with drugs such as Beuthanasia-D® or Fatal-Plus® which contain forms of sodium phenobarbital. Euthanized animals are disposed of by incineration or deep burial to avoid secondary hazards. Drugs are monitored closely and stored in locked boxes or cabinets according to WS policies, and Department of Justice, Drug Enforcement Administration guidelines. Most drugs fall under restricted-use categories and must be used under the appropriate license from the U.S. Department of Justice, Drug Enforcement Administration which WS has.

### 3.2.2 Alternative 2 - No Federal ARDM

This alternative would consist of no WS involvement in ARDM in New Mexico. Neither direct operational management nor technical assistance would be provided from WS. Information on future developments in nonlethal and lethal management techniques that culminate from WS's research branch would not be available to producers or resource owners. It would be left up to NMGF and the public resource owners to conduct ARDM under this option. NMGF is required to resolve aquatic rodent problems for private landowners or lessees, and would do it with their staff or with contractors, or allow the landowners to handle the problem themselves. If landowners handle the problems themselves, it is probable that many ARDM methods would be used unsafely and improperly such as the illegal use of pesticides and traps simply out of frustration by resource owners over the inability to reduce damage losses to a tolerable level. As an illustration, in 1997 a man was killed in Oklahoma when he and another man set fire to a beaver lodge and quickly were overcome with a dense cloud of smoke; the man suffered a heart attack while trying to escape (WS 2004). In addition, it is likely that inexperienced people using many of the ARDM methods could harm the environment, themselves, and result in the increased take of nontarget species. Tribes and public agencies would have to conduct ARDM themselves or with a contractor.

### 3.2.3 Alternative 3 - Technical Assistance Only

This alternative would not allow WS to conduct operational ARDM in New Mexico. WS would only provide technical assistance to public agencies and Tribes and make recommendations when requested. However, NMGF would still respond to all damage complaints for private landowners and lessees with their staff or contractors, or permit the resource owners to conduct ARDM activities including the use of traps, snares, shooting, and any nonlethal methods they deem effective. Methods and control devices could be applied by persons with little or no training and experience. If resource owners become frustrated they are likely to resort to unconventional methods that could cause harm to the environment or result in greater take of nontarget animals as suggested under Alternative 2.

## 3.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE

Several alternatives were considered but not analyzed in detail. These were not considered because of problems associated with their implementation. Several of these were discussed in WS (2004) with the rationale for not including in them among the alternatives and will not be discussed here:

- Compensation for Aquatic Rodent Damage Losses
- Bounties
- Wildlife Damage Should Be an Accepted Loss -- a Threshold of Loss Should Be Reached Before Providing ARDM Services
- Eradication and Long Term Population Suppression of Native Wildlife
- Biological Control

The reader is referred to WS (2004) for their discussion. An alternative that was considered, but not analyzed in WS (2004) will be discussed further here since new information has become available since WS (2004). Additionally, an alternative that frequently arises is also given. This issue will not be included in the analyses in Chapter 4 with the following rationale.

### 3.3.1 Reproduction Control

This alternative would allow only contraception as the method to control aquatic mammals. Contraceptive measures for mammals can be grouped into four categories: surgical sterilization, oral contraception, hormone implantation, and immunocontraception (the use of contraceptive vaccines). Surgical sterilization would require that each animal be captured and sterilized by licensed veterinarian, and would be extremely labor intensive and expensive, thus will not be considered further. The techniques involving drugs would require that each individual animal receive either single, multiple, or possibly daily treatment to successfully prevent conception. The use of oral contraception, hormone implantation, or immunocontraception would be subject to approval by Federal and State regulatory agencies. A review of research evaluating chemically and surgically induced reproductive inhibition as a method for controlling nuisance beaver populations is contained in Novak (1987a). Although these methods were found to be effective in reducing beaver reproduction by up to 50%, the methods were not found to be practical or were too expensive for large-scale application. Additionally, no chemical reproductive inhibitors are currently legal for use for beaver, muskrat, or nutria.

Sterilization is controversial among wildlife biologists and many others. In any event, no contraceptive agents or methods are currently registered for aquatic rodents and are, thus, not legal for use or practical. Should any become registered in the future, WS could consider them among the methods to be used, but not be limited to the use of them. Any additional NEPA analyses deemed necessary at that time would be conducted. However, if NMGF specified such on their permit, we believe that this document will suffice for NEPA unless new potential environmental concerns are recognized with the use of the proposed product requiring a new analysis. Of the methods, immunocontraceptives tend to be the safest, most cost-effective, and least labor intensive approach to reproduction control and are available for white-tailed deer (*Odocoileus hemionus*) and other species; the target species list would need to be broadened to include aquatic rodents. If these become available for ARDM, WS would not solely rely on controlling reproduction to resolve damage problems, but use immunocontraceptives as option just as other ARDM methods and as authorized under an NMGF permit.

### 3.3.2 Nonlethal required before Lethal Control

This alternative would not allow the use of lethal methods by WS as described under the proposed action until nonlethal methods had been attempted to relieve damage caused by aquatic rodents and found to be ineffective or inadequate. NMGF, Resource owners or managers would still have the option of implementing nonlethal and lethal control measures and WS would continue to recommend them where appropriate, but no preventive lethal control by WS would be allowed. However, personnel experienced in ARDM generally know when and where nonlethal control techniques would work; this alternative could result in the use of methods that are known to be ineffective in particular situations. This has normally been an alternative considered by WS, such as in USDA (1997) and other WS EAs such as the Aquatic Rodent Damage Management in Oklahoma EA (1998). This alternative has always been found to have slightly higher negative environmental impacts than the proposed action. In addition, it is WS policy that non-lethal ARDM be considered first. Therefore, this alternative was dropped from analysis in this EA.

## 3.4 WS SOPs INCORPORATED INTO ARDM TECHNIQUES TO MINIMIZE EFFECTS

An SOP is a direction detailing all steps and activities of a process, and specifically for WDM methods, one that serves to prevent, reduce, or compensate for potential adverse effects from the use of a WDM method that otherwise might result from its use. The current program, nationwide and in New Mexico,

uses many such SOPs. Many WS SOPs are discussed in USDA (1997, Chapt. 5). The key SOPs are incorporated into all alternatives as applicable, except the no federal program alternative (Alternative 2). Most SOPs are instituted to abate specific issues while some are more general and relate to the overall program. SOPs include those recommended or required by regulatory agencies such as EPA and these are listed where appropriate. Additionally, specific measures to protect resources such as T&E species that are managed by WS's cooperating agencies (USFWS and NMGF) are included in the lists below.

### 3.4.1 General SOPs Used by WS in ARDM

- WS ARDM activities in New Mexico are consistent with USDA (1997) SOPs.

- WS complies with all applicable laws and regulations that pertain to conducting ARDM on private and public lands.

- WS coordinates with agency officials for work on public lands to identify and resolve any issues of concern with ARDM.

- WS coordinates with tribal officials for work on tribal lands to identify and resolve any issues of concern with ARDM.

- The use of ARDM methods such as traps and rodenticides conform to applicable rules and regulations administered by the State.

- WS personnel adhere to all label requirements for toxicants. EPA approved labels provide information on preventing exposure to people, pets, and T&E species along with environmental considerations that must be followed. WS personnel abide by these. These restrictions invariably preclude or reduce exposure to nontarget species, the public, pets, and the environment.

- The WS Decision Model (Slate et al. 1992) thought process as discussed in Section 1.7.5 which is designed to identify effective WDM and their impacts, is consistently used.

- WS personnel using 4-wheel ATVs will use roads and existing trails as possible to conduct field work.

- WS personnel will not collect animals and plants while afield other than those targeted or taken incidentally.

### 3.4.2 WS SOPs Specific to the Issues

The following is a summary of the SOPs used by WS that are specific to the issues listed in Chapter 2 of this document.

#### 3.4.2.1 Effects on Target Aquatic Rodent Species Populations.

- ARDM is directed toward localized populations or individual offending animals, depending on the species and magnitude of the problem, and not an attempt to eradicate any native wildlife population in a large area or region. In the case of invasive species such as the nutria, the goal may be to eradicate them (this is rarely feasible for established populations).

- WS Specialists use specific trap types, lures, and placements that are most conducive for capturing the target animal.

- WS ARDM kill is monitored. Both "Total Harvest" and estimated population numbers of key species are used to assess cumulative effects of harvest. WS ARDM is designed to maintain the level of harvest below that which would impact the viability of populations of native species (see Chapter 4) as determined by WS in consult with USFWS and NMGF, as appropriate. WS provides data on total take of target animal numbers to other agencies (i.e., NMGF) as appropriate.

- WS currently has agreements for ARDM on less than 2% of the land area in New Mexico. This could be increased several-fold, but target aquatic rodent take would be monitored to ensure that harvest remains below a level that would impact viability of a species which is determined by NMGF. However, it should be noted that WS will not impact aquatic rodents species' populations on more than 99% of the lands in New Mexico annually.

- WS will relocate beavers, as appropriate and requested by NMGF. Nonnative species (i.e., nutria) will not be relocated, but can be transferred to various facilities under the direction/permit of NMGF.

**3.4.2.2 Effects on Nontarget Species Populations, Including T&E Species.**

- WS personnel are highly experienced and trained to select the most appropriate ARDM method(s) for taking problem aquatic rodents with little impact on nontarget species.

- WS personnel work with research programs such as the WS-National Wildlife Research Center to continually improve and refine the selectivity of management devices, thereby reducing nontarget take.

- Nontarget animals captured in traps or with any other ARDM method are released at the capture site unless it is determined by WS Specialists that the animal is not capable of self-maintenance.

- When working in an area that has T&E or sensitive species or has the potential for T&E species to be exposed to ARDM methods, WS personnel will know how to apply ARDM methods to minimize the take of the T&E species. However, ARDM in New Mexico has little potential to impact T&E species.

- Snares will not be used in areas where T&E species could likely be taken. In areas with a T&E species smaller than the target animal, snare stops will be used to preclude their capture.

- Quick-kill traps (e.g., Conibears) will be used where T&E species would not be or minimally exposed. Trap placement (e.g., under water) nullifies exposure to most T&E species.

- ARDM could have an indirect effect on nontarget reptiles and amphibians that live in wetlands inhabited by beavers. Declines in amphibian populations have been linked to the spread of chytridiomycete (chytrid) fungus. Thus, the amphibians could die off in an area if the chytrid fungus were spread which could happen from working in one watershed and then moving to another with infected material on equipment. Several species of snakes and other animals depend on amphibians

as their prey base, especially semiaquatic predatory reptiles like garter snakes, and, if the chytrid fungus were spread, these species could have a loss in their prey base which could have an impact on them. Therefore, WS will remove all mud, snails, algae, and other debris from traps, snares, waders, and gloves, scrub them with a 10% bleach solution or 5% solution of QUAT128 (or equivalent quaternary ammonium compounds), and rinse with clean sterilized water to reduce the chance of spreading chytrid fungus or other disease.

- ***Measures to Reduce the Potential Take of Specific T&E or Candidate Species.*** WS takes several precautions to protect T&E, and sensitive species that were listed in Tables 2 and 3. Potential impacts on federally listed T&E species were covered in the 1992 USFWS Biological Opinion (USDA 1997), through separate consultations with the USFWS for wolves (USFWS 1998), jaguar (*Panthera onca*) (USFWS 1998a and b), and all listed species in New Mexico (WS 2003b, USFWS 2003a) and no adverse impacts are likely to occur from WS actions adhering to the following SOPs. Additionally, the following considers State listed species that could be affected by ARDM.

  - **Mexican Wolf.** This Federal and State listed species could be taken in shallow water beaver sets as a nontarget. However, WS personnel will abide by the USFWS BO (1998) for the potential "naturally occurring" wolves (they are believed extirpated) and Conference Opinion for the NEP to avoid incidental take. In the event that WS personnel sight a wolf or find evidence that indicates their likely presence in an area, such as scat and tracks, or WS is made aware of verified sightings, WS will initiate conservation measures as is conducted within the NEP zone. Within the immediate area where wolves or verified sign have been found and documented, WS personnel will not use neck snares, and padded-jaw leghold traps and leg-snares will be checked on a daily schedule. In addition, the USFWS Wolf Recovery Team will be notified of the presence of a wolf.

  - **New Mexico Meadow Jumping Mouse.** The jumping mouse, which recently was added to the Federal candidate list of T&E species, nests in dry soils, but uses moist, streamside, dense riparian areas along perennial streams composed of willow and alders (*Alnus spp.*) or wetland vegetation with persistent emergent herbaceous layer of sedges and reeds. The jumping mouse hibernates about 9 months out of the year which is longer than most other mammals. Identified threats to this subspecies include excessive grazing pressure, water use and management, highway reconstruction, development, recreation, and beaver removal. The highly fragmented nature of its distribution is also a major contributor to the vulnerability of this species and increases the likelihood of very small, isolated populations being extirpated. The insufficient number of secure populations throughout its range, and the destruction, modification, or curtailment of its habitat, continue to pose the most immediate threats to this species.

    ARDM focused on the complete removal of beaver from an area has been identified as a threat to this species. New Mexico WS has not removed beaver to that extent in the range of the jumping mouse and does not anticipate such where the jumping mouse is found. Thus, WS believes that beaver damage management in occupied meadow jumping mouse habitat will have ***no effect***.

  - **Bald Eagle.** WS determined that the only T&E species that could potentially be negatively impacted by WDM, as discussed in the formal consultation of 1992 (USDA 1997), in New Mexico was the Bald Eagle. The Bald Eagle has since been delisted federally, but remains on the State threatened list. Reasonable and prudent alternatives and mitigation measures and their

terms and conditions from the 1992 Biological Opinion (USDA 1997, Appendix F) for Bald Eagles as related to the proposed action and alternatives described in this EA are as follows:

- WS personnel will contact the local NMGF office or the appropriate USFWS regional or field office to determine nest and roost locations for bald eagles;

- The appropriate USFWS office shall be notified within five days of the finding of any dead or injured bald eagle. Cause of death, injury, or illness, if known, would be provided to those offices; and

- When bald eagles are in the immediate vicinity of a proposed WDM program, WS personnel will conduct daily checks for carcasses or trapped individuals.

- **Brown Pelican and Neotropic Cormorant.** These species tend to inhabit large bodies of water with the pelican only sporadically seen in the State. These species could be taken with leghold traps and snares, and the cormorant in quick-kill traps. If these species are seen in the area, WS will set traps and snares in areas where these species are not likely to go such as a wooded area. Additionally, leghold traps and snares will be checked frequently so they can be released, if caught.

- **Southwestern Willow Flycatcher.** This species of flycatcher, addressed in WS (2003b) and USFWS (2003a), is associated with riparian areas throughout the western two thirds of the State. They are migratory, arriving in May and leaving by late September to wintering grounds in Central America. A concern has been activity being carried out near active nests, especially the use of explosives or heavy equipment to remove dams. WS in New Mexico does not use these methods. WS will conduct all proposed beaver control actions in a manner that will minimize disturbance of nesting willow flycatchers. Thus, WS believes that ARDM will have no effect on this species.

- **Northern Mexican Gartersnake, Western Ribbon Snake, Jemez Mountains Salamander, Chiricahua Leopard Frog, and Boreal Toad.** The Chiricahua leopard frog (federally listed) and boreal toad (a federal candidate at that time, currently state listed) were addressed in WS (2003b) and USFWS (2003a). The other 3 species are State listed or recently listed federally. ARDM will have no effect on these species directly. However, ARDM could have an indirect effect. Declines in amphibian populations have been linked to the spread of chytridiomycete (chytrid) fungus. Thus, the amphibians could die off in an area if the chytrid fungus were spread which could happen from working in one watershed and then moving to another with infected material on equipment. The two snake species are fairly aquatic and rely on amphibians for much of their prey and could be impacted by their loss. Therefore, if WS conducts ARDM in the range of these species, WS will remove all mud, snails, algae, and other debris from traps, snares, waders, and gloves, scrub them with a 10% bleach solution or 5% solution of QUAT128 (or equivalent quaternary ammonium compounds), and rinse with clean sterilized water to reduce the chance of spreading chytrid fungus or other disease. Additionally, WS will not remove dams that have become wetlands as all of these species could be found in beaver pond wetlands.

- **Rio Grande Silvery Minnow.** This fish species, addressed in WS (2003b) and USFWS (2003a), is found in central New Mexico and associated mainly with large streams with shifting silty or sandy bottoms. They sometime can be found in areas with mud bottoms and the juveniles

in shallower areas including irrigation ditches. The juveniles were the primary concern for potential impact from the removal of dams with heavy equipment and explosives. Thus, WS will only remove beaver dams by hand in the range of minnow to avoid potential adverse effects.

- **Wrinkled Marshsnail, Lake and Long Fingernailclams, Star Gyro Snail.** These State listed species will inhabit a wide variety of wetland habitats but are often associated with lakes and ponds with mud substrate, and sometimes streams including irrigation structures. It has been determined that the removal of dams that have become wetlands could have an adverse effect on these species. However, WS does not remove beaver dams that have become wetlands and only removes new dams by hand. Thus. Following these guidelines, WS will have no effect on these species.

**3.4.2.3 Effects of Beaver Dam Removal on Wetlands.**

- WS ARDM activities do not affect "wetlands" as defined in Swampbuster or CWA. Most ARDM activities involve removal of beaver dams from recent beaver activity which has flooded areas for a short time or man-made structures including culverts under roads and irrigation structures. Wetlands are not affected in either case.

- WS would not recommend dam removal requiring a section 404 permit without notifying the project
- proponent that they will likely need a Section 404 permit from the Corps.

- Beaver dams are removed in New Mexico only on rare occasions. If they are removed, they are only removed by hand (binary explosives and heavy equipment are not used). The top of dams are often breeched, though, to aid in capturing beaver.

- Beaver dam removal is conducted to restore drainage of irrigation structures or the stream channel for an area. It is also conducted for areas that have established silvicultural, agricultural, or ranching activities and where such an area has not become an established wetland. These activities will have no impact on wetland wildlife habitat because wildlife habitat often takes several years to develop.

- ARDM does not remove habitat for fish species, but removal of dams does return the water course to its original state. This can benefit fish by protecting streamside vegetation, removing siltation of stream bottoms, and reducing vulnerability to predators and invasive species.

**3.5.2.4 Impacts on Public and Pet Safety, and the Environment.**

- A formal risk assessment (USDA 1997, Appendix P) concluded that hazards to the public from ARDM devices and activities are low.

- All pesticides are registered with EPA and NMDA. WS employees will comply with each pesticide's directions and labeling and any additional EPA and NMDA rules and regulations. Only zinc phosphide is available for ARDM.

- WS Specialists that use restricted-use pesticides are trained and certified by program personnel or other experts in the safe and effective use of these materials under EPA and NMDA approved programs. WS employees who use chemicals participate in continuing education programs to keep abreast of developments and to maintain their certifications.

- WS Specialists who use firearms are trained and certified by experts in their safe and effective use and receive this training within 3 months of their first appointment and a refresher course every 2 years, thereafter. WS policy has requirements for training, safe use, storage and transportation of firearms as prescribed by WS Directive 2.615 and the WS Firearms Safety Training Manual. Additionally, WS personnel who use firearms must meet the criteria of the Lautenburg Amendment which prohibits firearm possession by anyone convicted of a misdemeanor crime of domestic violence.

- WS ARDM methods are implemented by trained professionals. WS policies regarding use of specific methods minimize exposure of these methods to the public. Warning signs are placed where traps or snares are used to further reduce public safety concerns.

- ARDM on public lands is coordinated with the public land management agency to identify areas of concern. Projects which might expose the public to safety risks are modified accordingly.

- ARDM on private lands is conducted with signed *Agreements for Control* which notify the landowner/manager of any possible risks.

- WS Specialists will be supervised in the use of ARDM methods, including firearms, watercraft, and traps to ensure that they are used properly and according to policy.

- WS Specialists using restricted-use vertebrate pesticides will be certified according to EPA and New Mexico State laws.

- Conspicuous, bilingual warning signs, alerting people to the presence of traps, rodenticides, and other ARDM methods, are placed at major access points when they are set in the field.

#### 3.5.2.5 Humaneness of Methods Used by WS

- Chemical immobilization and euthanasia procedures that do not cause pain or undue stress are used by certified WS personnel when practical and where safe.

- WS personnel attempt to kill captured target animals that are slated for lethal removal as quickly and humanely as possible. In most field situations for aquatic rodents, A properly placed gunshot can cause immediate insensibility and humane death. a shot to the brain is performed which causes rapid unconsciousness followed by cessation of heart function or respiration and ultimately the loss of brain function which is in concert with the American Veterinary Medical Association's (2007) definition of euthanasia. In some situations, accepted chemical immobilization and euthanasia methods are used.

- Cage, leghold traps, snares, and quick-kill traps are set and inspected according to WS policy.

- The WS-National Wildlife Research Center continues to conduct research with the goal of improving the humaneness of WDM devices.

# CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

Chapter 4 provides the information needed for making informed decisions in selecting the appropriate alternative for meeting the purpose of the proposed action. This chapter analyzes the environmental consequences of each alternative discussed in Chapter 3 in relation to the issues identified for detailed analysis in Chapter 2. The environmental consequences of each alternative are compared with the proposed action to determine if the real or potential impacts would be greater, lesser, or the same. Therefore, the proposed action or current program alternative serves as the baseline for the analysis and the comparison of expected impacts among the alternatives. The background and baseline information presented in the analysis of the current program alternative, therefore, may also apply to the analysis of each of the alternatives.

## 4.1 ISSUES ANALYZED IN DETAIL

NEPA requires federal agencies to determine whether their actions have a "*significant impact on the quality of the human environment.*" The environmental consequences of the 4 alternatives are discussed below with emphasis on the issues presented in Chapter 2. The comparison of alternatives will be used to make a selection of the most appropriate alternative for WS BDM activities. The alternatives selected for detailed assessment from Chapter 3 provide the best range of alternatives that could potentially meet the purpose and the need of ARDM in New Mexico as identified in Chapter 1.

### 4.1.1 Effects on Target Aquatic Rodent Populations

To adequately determine the magnitude of impacts in relation to aquatic rodents and their populations, WS data and known cumulative or "other" take (sportsmen harvest and permitted depredation take) will be analyzed. The authority for management of aquatic rodents is NMGF. NMGF regulates hunting and depredation take for furbearers in New Mexico. An aspect, perhaps overriding, that is germane to the determination of "significance" under NEPA is the effect of a federal action on the *status quo* of the environment. States have the authority to manage most "resident" wildlife populations as they see fit and their management is not subject to NEPA compliance. Therefore, the *status quo* for the environment with respect to state-managed wildlife species is the management direction established by the States. Federal actions that are in accordance with state management have no effect on the *status quo*. Wildlife populations are typically dynamic and can fluctuate without harvest or control by humans. Therefore, the *status quo* for wildlife populations is fluctuation, both within and among years, which complicates determining the significance of human impact on such populations.

**4.1.1.1 Alternative 1 - Continue the Current WS ARDM Program.** To adequately determine the impacts that this alternative would have on aquatic rodents, their populations need to be analyzed. The authority for management of resident wildlife species has traditionally been a responsibility left to the states. NMGF is the state agency with management responsibility over animals classified by state law as protected furbearers and provided information on population sizes, trends, and ranges for the EA. As the managing agency, NMGF is responsible for the setting objectives for the aquatic rodent populations.

A "viable" wildlife population can exist at many levels between one that is at carrying capacity (the maximum number of a species that a particular habitat can support) and one that is at only a fraction of carrying capacity. Because rates of increase are mostly density dependent (i.e., the population grows at a faster rate as the population is reduced in relation to carrying capacity), aquatic rodents have the ability to recover from declines that might result from mistakes in management. History has born this out by the fact that efforts in the early half of the 20th century to eradicate some of the larger mammalian predator species (i.e., coyotes, black bears, and mountain lions) failed to do so. However, the larger predator numbers were most likely reduced substantially (Evans 1983). Density dependent rates of increase are a

built-in mechanism of most wildlife populations that serve to reduce effects of population reductions whether by harvest, localized control, or non-man-induced mortality. This provides additional assurance that a viable population of a target species would be maintained in New Mexico, even if a sustainable harvest rate is exceeded in the short term in areas where the objective is to maintain the population.

The methods used by WS in ARDM under the current program are the same as those that have been used in recent years and were described in Section 3.2.1.3. The methods used in each damage situation depend on the species causing damage and other factors including location (public *versus* private lands), weather, and time of year as discussed in section 3.2.1. The primary methods include physical exclusion, shooting, cage traps, padded-jaw leghold traps, quick-kill traps, and snares. Many ARDM methods, especially those that can be safely implemented by the user with minimal training or instruction, may only be recommended by WS personnel and incorporated by the resource owner such as pond levelers. However, NMGF conducts much of the technical assistance with people during the permitting process and provides advice on many ARDM activities. Often, WS's only response is to carry out the recommendations of the NMGF permit. It should be noted that landowners given assistance with damage problems are much more likely to have a favorable view of wildlife (International Association of Fish and Wildlife Agencies 2004, Treves and Naughton-Treves 2005).

WS uses lethal and nonlethal methods as needed for appropriate biologically sound, effective ARDM. Analysis of this issue is limited mostly to beaver and muskrat, the only species taken in ARDM in New Mexico. The analysis for magnitude of impact generally follows the process described in USDA (1997, Chapt. 4). 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. NMGF has a population estimate for beaver, but relies on trends and harvest data for the muskrat population.

**Beaver Population Impact Analysis.** NMGF strives to keep beaver damage to a minimum and retain a viable population in New Mexico. NMGF (2006) used conservative population dynamic parameters from Novak (1987a) and their own surveys to derive a population estimate, primarily to account for New Mexico's more arid landscape than many other areas and the noncontiguous habitat-types. NMGF (2006) completed a furbearer population assessment and harvest management matrix which estimated the beaver population between 5,300 and 12,000. Novak (1987a) and USDA (1997) reported a sustainable harvest of 30% for beaver. NMGF has a harvest management objective of 12%, or 630 to 1,400 for their estimated low and high populations. WS tracks take of beaver in ARDM and NMGF tracks sport harvest and depredation take which is used to provide a cumulative take analysis.

Table 4 summarizes the analysis of WS and cumulative impacts on the beaver population in New Mexico. WS killed an average of 31 beavers from FY06 to FY10, 0.6% of the population, with a maximum of 42 in FY06. NMGF reported an average of 155 taken by sportsmen during the same time for a cumulative impact of 186 taken annually from FY06 to FY10 or 3.5% of the population and 29% of NMGF's conservative sustainable harvest. The maximum cumulative take occurred in FY06 with 308 beaver taken, 5.8% of the population or half NMGF's minimum sustainable harvest. This level of take represents a low impact to the estimated beaver population. WS's take and the cumulative impact on the beaver population are considered to be of low magnitude and a not significant impact on the population. NMGF biologists have concurred with this conclusion (Rick Winslow, Furbearer Biologist, NMGF, pers. comm. 2011). Therefore, WS concludes that beaver have not been impacted by the WS program nor cumulatively considering sportsmen harvest. If beaver harvest in New Mexico remains at the current levels, fluctuating periodically, then WS could increase depredation take over ten-fold before reaching the minimal harvest objective set by NMGF.

Table 4. Analysis of cumulative beaver killed in New Mexico from depredation take by the WS Program and sportsman harvest for FY06 to FY10.

| Fiscal Year | FY06 | FY07 | FY08 | FY09 | FY10 | Average |
|---|---|---|---|---|---|---|
| Min. Estimated Population | 5,300 | 5,300 | 5,300 | 5,300 | 5,300 | 5,300 |
| Wildlife Services Take | 42 | 40 | 37 | 14 | 20 | 31 |
| % Population WS Take | 0.8% | 0.8% | 0.7% | 0.3% | 0.4% | 0.6% |
| Sportsman Harvest | 266 | 154 | 213 | 83 | 61 | 155 |
| Cumulative Take | 308 | 194 | 250 | 97 | 81 | 186 |
| Cumulative Take % Pop. | 5.8% | 3.7% | 4.7% | 1.8% | 1.5% | 3.5% |
| Impact | Minimal | Minimal | Minimal | Minimal | Minimal | Minimal |

**Muskrat Population Information and Impact Analysis.**

NMGF does not estimate muskrat populations in New Mexico, but considers the population to be stable. Using conservative population parameters, the population could be estimated at 110,000 in New Mexico (Section 2.2.1). The majority of harvest has almost always been from sportsmen. NMGF (2006) has harvest management objectives of 30% for muskrats, or 33,000 of a conservatively estimated population. Muskrat harvest has fallen considerably over the last few decades with declines in the number of sportsmen and the fur market prices (Figure 4). Depredation take is fairly minimal because muskrats do not cause substantial damage problems in New Mexico. Occasionally they may damage crops or weaken levees from burrowing activities. WS took 1 muskrat in FY09 and none in FY06 to FY08 or FY10. WS took 5 nontarget incidentally to beaver damage management. Sportsmen harvested an average of 123 from FY06 to FY10. Thus, the cumulative impact for FY06 to FY10 was 124, 0.1% of the population or 0.4% of the estimated harvest potential. The maximum cumulative take from FY06 to FY10 was 291. This level of harvest is well within the level of take muskrat populations could withstand. Clearly, the mortality as a result of fur harvest or damage control would have a virtually imperceptible impact, especially considering that muskrats inhabit 2,144 miles of wetland habitat in New Mexico (BISON-M 2011). Much higher harvest rates have occurred in the past and the population was not significantly impacted. NMGF concurs with the conclusion that WS will not significantly impact the muskrat population (Rick Winslow, Furbearer Biologist, NMGF, pers. comm. 2011). WS and sportsmen will likely continue at the same take in the foreseeable future and will likely take relatively few muskrats in a given year. However, if WS increased its take dramatically to several thousand under the proposed action as a result of special projects (e.g., remove all the muskrats from a 20 acre stock reservoir where the dam was being weakened from muskrat burrows), the overall muskrat population in New Mexico would not be impacted because the population throughout New Mexico is likely much higher than in the examples discussed above.

**Nutria Information and Impact Analysis**

WS has not targeted nutria in at least the past 10 fiscal years. Nutria, though, are distributed in a few isolated areas of New Mexico. Kinler et al. (1987) summarized density estimates from different reports and these ranged from 0.6 to 138 per hectare (0.3 to 56 per acre). This means that any square mile of habitat could support anywhere from 200 to 36,000 nutria. NMGF does not have a harvest management quota for nutria being an invasive species. NMGF does not estimate the nutria population in New Mexico, but just a few sites could have numbers in the thousands. NMGF reported that an average of 18 were taken from the 2005-06 to 2009-10 seasons. Thus, the cumulative impact of the last few years has been very minimal and therefore, insignificant. In addition, take of nutria by WS is considered to be of no significant impact on the human environment since nutria are not an indigenous component of ecosystems in New Mexico.

**4.1.1.2 Alternative 2 - No Federal ARDM.** Under this alternative, WS would have no impact on target aquatic rodent species populations in New Mexico. However, NMGF would still provide the same level of direct control assistance for private landowners and lessees which is currently the combined ARDM efforts of NMGF and WS. In addition non-federal public agencies would likely be given some support to resolve problems with aquatic rodents from NMGF as they are today. However, federal agencies requesting ARDM for federal resources would no longer be given any direct support, with the exception of some technical assistance from NMGF. Tribes would be responsible for all aspects of ARDM. It should be noted that ARDM conducted by private individuals and contractors would likely increase under this alternative that could use ARDM methods with little or no training, which would create some potentially unknown consequences. However, impacts on target species under this alternative would likely be similar as the proposed action. For the same reasons shown in the population impacts analysis in section 4.2.1.1 it is highly unlikely that aquatic rodent populations would be impacted significantly by implementation of this alternative. Under this alternative, the hypothetical use of illegal methods for ARDM could be higher depending on NMGF response time because frustrations from the inability of resources owners to reduce losses may increase over the level under the proposed action. However, this is still anticipated to be very minimal because NMGF must respond to damages for private landowners. The use of illegal chemicals and other methods under this alternative as described in Section 2.2.4 could lead to real but unknown impacts on target aquatic rodent populations.

**4.1.1.3 Alternative 3 - Technical Assistance Only.** Under this alternative, WS would have no impact on target aquatic rodent populations directly. NMGF would still provide the same level of direct control assistance with ARDM for private land owners and lessees. Non-federal public agencies would still be given support at a lesser effort from NMGF. Federal agencies and Tribes would have to conduct ARDM themselves. WS could provide public agencies and Tribes with technical assistance. Private landowners and lessees would be directed to discuss ARDM with NMGF. However, for the same reasons shown in the population impacts analysis in section 4.2.1.1, it is highly unlikely that aquatic rodent populations would be impacted significantly by implementation of this alternative. Again, the hypothetical use of illegal methods could increase under this alternative, but would be expected to be somewhat less than alternative 2 and fairly minimal.

### 4.1.2 Effects on Nontarget Species Populations Including T&E Species

**4.1.2.1 Alternative 1 - Continue the Current WS ARDM Program.** Nontarget species taken in New Mexico are recorded as target-unintentional (i.e., they were listed on the agreement as target species but were taken unintentionally during efforts to take other target species) or nontarget (i.e., they were not listed as target species on the agreement and were taken unintentionally during efforts to take target species). WS personnel try to minimize the take of nontargets by placing traps in areas conducive to trapping only the target animal, using the appropriate traps, and using lures likely to attract the target animals and not nontargets. However, nontargets are occasionally taken in ARDM. WS killed an average of 1 muskrat and 1 raccoon (*Procyon lotor*) from FY06 to FY10, a fairly minimal number of nontargets. This would have no bearing on either species' population. Other nontarget species taken in the past by WS have included turtles (most are freed), bullfrogs *(Rana catesbeiana)* , and carp (*Cyprinus carpio*); hard-shelled turtles are often able to be freed because the carapace withstands the effects of the kill trap. No other known effects to nontargets occurred as a result of ARDM activities, though other nontargets could include river otter and diving birds, though none were taken in the last 5 FYs. The take of nontargets by WS is minimal and, intuitively, this level of take would have no impact on these species' populations.

**T&E Species.** ARDM in New Mexico under the Current Program Alternative would have minimal, if any, potential impacts on either T&E species or their habitat. From FY 06 to FY10, 66% of the requests from the public for beaver damage were for protection of dikes or irrigation structures, 17% were for

road, bridges, and other property, and 16% were for trees and crops. These cases involve artificial habitats not conducive to T&E species. SOPs that serve to avoid adverse impacts on T&E species in New Mexico were described in Section 3.4.2.2 for the species that could potentially be impacted by ARDM. Those measures should assure that the proposed action would not adversely impact Federal or State listed T&E species. WS (2003b) addressed T&E impacts in a Biological Assessment with concurrence from USFWS (2003a). Another element that further reduces the likelihood of WS taking an endangered species is that NMGF determines the methods to be used where T&E species are present during the permitting process. Thus, we believe that ARDM has minimal potential to impact T&E species in New Mexico.

**4.1.2.2 Alternative 2 - No Federal ARDM.** Alternative 2 would not allow any WS ARDM in New Mexico. There would be no impact on nontarget or T&E species by WS activities from this alternative. However, private, public agency, and Tribal efforts to reduce or prevent depredations could increase which could result in less experienced persons implementing ARDM methods and could lead to greater take of nontarget wildlife than the proposed action. NMGF would still provide direct control assistance with aquatic rodent damage problems for private landowners and lessees, and to some county and State agencies. Federal agencies and Tribes would be responsible for conducting their own ARDM, or contract it out. Private individuals may trap aquatic rodents year round with the appropriate permits and would not be restricted to WS's self-imposed SOPs to minimize potential hazards to nontarget species including T&E species. Hazards to nontargets could therefore be greater under this alternative. It is hypothetically possible that frustration caused by the inability to reduce losses could lead to illegal use of chemical toxicants or other methods which could impact local nontarget species populations including T&E species.

**4.1.2.3 Alternative 3 - Technical Assistance Only.** Alternative 3 would not allow any WS direct operational ARDM in New Mexico. There would be no impact on nontarget or T&E species by WS activities from this alternative. Technical assistance or self-help information would be provided at the request of resource owners and others, but most private persons requesting assistance would be told to contact NMGF for assistance. NMGF would provide private landowners or lessees with direct control assistance with aquatic rodent damage and would continue to take nontargets similar to the current take. Some public agencies would also be provided direct control support from NMGF, but federal agencies and Tribes would not. Although technical support might lead to more selective use of control methods by private parties, public agencies, and Tribes than that which could occur under Alternative 2, private efforts to reduce or prevent damage could result in less experienced persons implementing control methods, including the hypothetical illegal use of toxicants, leading to greater take of nontarget wildlife and T&E species, similar to Alternative 2.

### 4.1.3 Effects of Beaver Dam Removal on Wetland Wildlife Habitat

**4.1.3.1 Alternative 1 - Continue the Current WS ARDM Program.** Under this alternative, beaver impounded areas could be removed by hand for the purpose of returning streams, channels, dikes, culverts, and irrigation canals to their original function. WS removes most beaver dams because they are blocking an irrigation structure or have flooded areas such as roads, crops, merchantable timber, pastures, and other types of property or resources that were not previously flooded. The majority (66%) of complaints addressed by WS combining data from FY 06 through FY10 involved damage to irrigation ditches, dikes, roads, and bridges where "wetlands" would not be involved. Another 17% of projects involved damage to man-made structures, (houses, utilities, and landscaping), again not affecting wetland wildlife habitat. About 16% of WS projects involve agricultural crops, pasture, or timber that recently became flooded. The dams that are removed were almost invariably created as a result of recent beaver activity because WS personnel receive most requests soon after affected resource owners discover damage or become aware of the WS program. Dams that can be removed by hand are, otherwise it is left

up to the landowner to conduct this activity. WS informs landowners that they may require a permit to remove a dam from the Corps, though most can be under Nationwide Permits granted under Section 404 of the Clean Water Act. The majority of impoundments that WS personnel see during ARDM activities have been in existence but a few weeks or months. These dams are not considered true wetland habitats and, therefore, do not possess the same wildlife habitat values that established wetlands have. The terrestrial habitat and wetland existing prior to the establishment of the beaver dam are restored following the removal of a newly established dam. In addition, the majority of beaver dams removed by WS have less than a surface acre or two of water held in them. Thus, significant impacts on established wetland wildlife habitat are avoided. Therefore, it is concluded that WS has minimal impact, if any, on wetland wildlife habitat.

**4.1.3.2 Alternative 2 - No Federal ARDM.** Under this alternative, needs for beaver dam removal would be met by NMGF for private landowners and lessees at similar to the effects noted in 4.2.3.1. However, local and federal government entities and Tribes may contract with private individuals or companies that could drain beaver impounded areas that WS would advise against draining, which could have adverse impacts on wetland habitats in limited circumstances. This would not likely be very frequent.

**4.1.3.3 Alternative 3 - Technical Assistance Only.** The impacts under this alternative would be similar to Alternative 2. However, private individuals, agencies and Tribes receiving guidance from WS might act in accordance with the advice given and, therefore, have somewhat less impact as under Alternative 2.

### 4.1.4 Effects of ARDM on Public and Pet Safety, and the Environment

**4.1.4.1 Alternative 1 - Continue the Current WS ARDM Program.** Some ARDM methods could pose risks where they are not used by professionals. Methods used in ARDM that could present risks to the public and pets are the use of firearms, leghold traps, snares, quick-kill traps, and live traps. However, no accidents resulting in harm to any persons have occurred under the current program.

WS uses firearms to shoot aquatic rodents and euthanize animals caught in traps. WS personnel are trained and given refresher courses to maintain awareness of firearm safety and handling as prescribed by WS policy. Therefore, no adverse impacts to public safety are expected from the use of firearms by WS in New Mexico.

WS uses body-gripping traps (e.g. Conibear® traps, leghold traps, and snares) to take target aquatic rodents under permits from NMGF. Traps are strategically placed to minimize nontarget take and minimize exposure to the public. Signs are used to post properties where traps are set to alert the public of their presence. In addition, body-gripping traps are restricted to water sets by WS policy, which further reduces threats to public safety and nontarget take. From FY06 to FY10, beaver take with quick-kill traps averaged 88% of the take of beaver, firearms 10%, and leghold traps and snares 2%. This shows that the primary method that is relied upon is quick-kill traps, but in the same time period, WS did not have any reportable incidents with the method, nor with the others. Thus, we believe that WS will have minimal to no impact on the public or pets under the proposed action.

**4.1.4.2 Alternative 2 - No Federal ARDM.** There would be no potential for adverse impacts to humans from federal use of ARDM methods under this alternative. NMGF would provide the same level of support for private landowners, lessees and local agencies as WS and NMGF combined and, therefore, risks would likely be the same. However, some agencies and Tribes may rely on contractors to conduct ARDM who may not be as experienced at using ARDM methods as NMGF or WS, and therefore, increase risks to human safety. Body-gripping traps can cause injuries to persons who try to use them without proper training. In addition, the potential exists for illegal activities to occur such as the misuse

of poisons, especially from frustrated resource owners that cannot manage damage situations. Public safety risks under this alternative would, therefore, likely increase, but minimally.

**4.1.4.3 Alternative 3 - Technical Assistance Only.** The effects of implementing this alternative on public safety would be similar to, but somewhat less than, Alternative 2. Although there would be no potential for adverse impacts to humans from federal use of ARDM methods, risks would likely increase because of increased use of ARDM methods by untrained and less experienced persons. However, the increased risks under this alternative would be somewhat less than under Alternative 2 since some individuals might receive technical assistance from WS and act in accordance with the safety advice given.

## 4.2 ALTERNATIVE IMPACTS

Each of the 3 analyzed Alternatives would have varying impacts in the 5 issue areas, but for the most part, would be fairly similar. Alternative 1 would probably have the overall lowest impacts on the environment (Table 5). Alternative 2, followed closely by Alternative 3 would probably have the highest impacts to the environment.

Table 5. Alternative Impacts on Issues Compared.

| Issues | Alternative 1 | Alternative 2 | Alternative 3 |
|---|---|---|---|
| Target Species | Low | Low | Low |
| Nontarget Spp. Pops. | Low | Low | Low |
| - T&E Species | Low | Low to Moderate | Low to Moderate |
| Wetland Habitat | Low | Low to Moderate | Low to Moderate |
| Public and Pet Safety, and the Environment | Low | Low to Moderate | Low to Moderate |

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