USDA

UNITED STATES DEPARTMENT OF AGRICULTURE

ANIMAL AND PLANT HEALTH INSPECTION SERVICE

WILDLIFE SERVICES

in cooperation with

NEW MEXICO DEPARTMENT OF GAME AND FISH

and

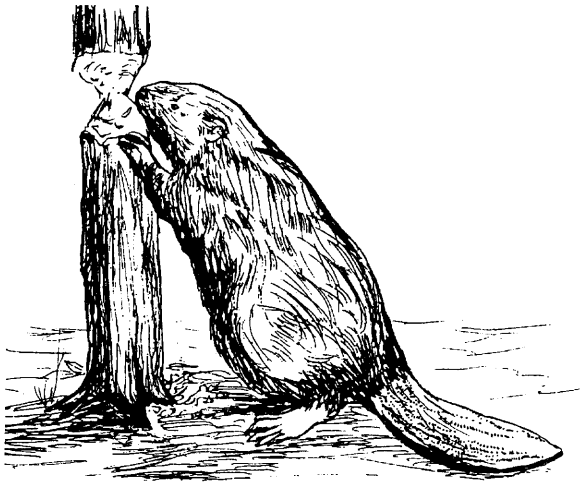
NEW MEXICO DEPARTMENT OF AGRICULTURE

FINDING OF NO SIGNIFICANT IMPACT,

RECORD OF DECISION,

and

ENVIRONMENTAL ASSESSMENT



AQUATIC RODENT DAMAGE MANAGEMENT IN NEW MEXICO

FEBRUARY 2004

United States
Department
of Agriculture

Animal and Plant Health
Inspection Service
Wildlife Services

Finding of No Significant Impact
and
Decision
for
Aquatic Rodent Damage Management
in New Mexico

The U.S. Department of Agriculture, Animal and Plant Health Inspection Service (USDA-APHIS), Wildlife Services (WS) program responds to a variety of requests for assistance from individuals, organizations and agencies experiencing damage caused by wildlife in New Mexico. WS activities are conducted in cooperation with other federal, state, and local agencies, as well as private organizations and individuals.

Ordinarily, according to APHIS procedures implementing the National Environmental Policy Act (NEPA), individual wildlife damage management (WDM) actions maybe categorically excluded (7 CFR 372.5(c), 60 Fed. Reg. 6000-6003, 1995). WS prepared an environmental assessment (EA) to comply with APHIS NEPA implementing regulations and interagency agreements, to facilitate planning, interagency coordination, streamline program management, and involve the public. The predecisional EA, released by WS in October 2003, documented the need for aquatic rodent [beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), and nutria (*Myocastor coypus*)] damage management (ARDM) in New Mexico and assessed potential impacts of various alternatives in relation to issues analyzed for responding to aquatic rodent damage problems.

WS' proposed action was to allow the use of the full range of ARDM methods on all lands authorized in the State for the protection of agriculture, property, natural resources, and public safety. WS cooperates closely with the New Mexico Department of Game and Fish (NMGF). In New Mexico, beaver, muskrat, and nutria are classified as furbearers. Furbearers are protected by State law and 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.

A major overarching factor in determining how to analyze potential environmental impacts of WS' involvement in ARDM is that such management will apparently be conducted by state and local government, or private entities as required by State law that are not subject to compliance with NEPA even if WS were not involved. In fact, WS conducts much of its ARDM as an agent of landowners as directed by NMGF in accordance with a contract. This means that the Federal WS program has limited ability to affect the environmental outcome of ARDM in New Mexico, except that the WS program is likely to have lower risks to nontarget species and less impact on aquatic rodent populations than some alternatives available to NMGF and public and Tribal entities. Therefore, WS has limited ability to affect the environmental *status quo*. Despite this limitation of federal decision-making in this situation, this EA process is valuable for informing the public and decision-makers of the substantive environmental issues and alternatives of ARDM for resource protection.

Public Involvement

A total of 8 draft EAs were sent to agencies with professional expertise covering different aspects (ie. wildlife populations, water) of the EA for their review and comments. Comments received from these agencies were incorporated into the EA. Following interagency review of the draft EA, an EA was prepared and released to the public for a 42-day comment period. The resulting EA was sent directly to 71 interested public and private organizations and individuals. In addition, a "Notice of Availability" of the predecisional EA was published in 11 New Mexico newspapers (the Albuquerque Journal and Tribune, Santa Fe New Mexican, Carlsbad Current Argus, Roswell Daily Record, Hobbs News Sun, Artesia Daily Press, Portales News Tribune, Clovis News Journal, Las Cruces Sun News, and Silver City Press) for 3 consecutive days for daily newspapers and 1 day for weekly newspapers. The legal notices appeared in the newspaper from approximately November 20-22, 2003. The deadline for comments was set at December 19, 2003.

Public Comments

A total of 5 comment letters were received in response to the predecisional EA; all from nonprofit organizations. Most all comments in the letters received were adequately addressed in the predecisional EA, but some will be discussed further where necessary to provide clarity. In addition, some comments were received that had not been addressed in great detail in the EA, and, therefore, the EA was supplemented to provide additional information for clarification in the appropriate area to address these concerns. Comments that were received are discussed below.

Comment 1: A few commentors thought that beaver causing damage should be relocated.

Response 1: Relocation would have to be in accordance with NMGF and their management plan for beaver. WS would work with NMGF on relocation projects if requested, but WS would only conduct relocation programs at NMGF's request and under their authorization.

The beaver population is at historic levels in much of New Mexico and the United States. In some areas they have vastly exceeded that number and are overabundant. As such, most population management methods are no longer used to reintroduce beavers to areas because few areas exist where beavers have not reestablished or have the potential to recolonize. New Mexico does have the potential for some sites for relocation, but such programs would not likely be conducted where a population already existed. Beaver are territorial and relocating beaver could likely result in problems if they were relocated to areas with beaver already present. Territorial beaver fight and losers must set out for new areas. In the process, many beavers would likely die because they may not be able to find suitable, unoccupied habitat or wind up in areas where they would have to be recaptured. One study in Wyoming where beaver were relocated to unoccupied habitat found that relocated beaver losses to mortality and emigration from the relocation site was about 50%; 100% of beavers 2 years old or less died or emigrated away from the release site after being relocated (McKinstry and Anderson 2002). Additional information can be found in the EA as to why relocation is not often done, such as the potential to transmit disease to the relocation site.

Comment 2: A commentor indicated the description of the Proposed Action insufficient and vague, leaving the public with no clear idea of what action WS may take in response to requests for assistance with aquatic rodent conflicts.

Response 2: WS disagrees with the comment that the EA was weak in its discussion of the Proposed Action and believe that the EA had ample discussion of the Proposed Action and methods used in ARDM in Sections 1.4 and 3.2.1 of the EA. The EA is often vague because WS does not know where and when WS will be requested to conduct ARDM and WS cannot predict this except to say that it will be in the range of aquatic rodents in New Mexico. Planning for the management of aquatic rodent damage must be viewed as being conceptually similar to federal or other agency actions whose missions are to stop or prevent adverse consequences from anticipated future events for which the actual sites and

locations where they will occur are unknown but could be anywhere in a defined geographic area. Examples of such agencies and programs include fire and police departments, emergency clean-up organizations, and insurance companies. Similarly, WS Specialists must determine at a site where they have been requested to provide assistance specifically, a management strategy that will be used to resolve the problem; the WS Decision-model (Slate et al. 1992) is used and was discussed thoroughly in USDA (1997) with specific examples for beaver damage scenarios. It is impossible to run through all the scenarios that WS Specialists face because each damage situation is fairly unique, but management strategies for the different situations often recur and the methods were given. In New Mexico for example, where an irrigation ditch (a man-made structure) is dammed and flood waters expand out over cropland, often the beaver are removed lethally because they do not meet with the landowner's structure (getting water from point A to point B) or land-use (crop) objectives, and none of the ARDM methods are likely to get the beaver to move on their own. Additionally, the dam is usually removed and the landowner is often told about exclusionary techniques that will keep beaver from returning unless they venture over land. Section 1.3 of the EA gives information of the types of damage aquatic rodents cause and Section 3.2.1 gives information on the methods that are used to resolve aquatic rodent damage. We believe that these Sections provide enough information to assimilate strategies used in ARDM along with information from USDA (1997) and, thus, we believe the EA speaks for itself.

Comment 3: A commentor thought that no information was given on the frequency of various management actions and how often the various management methods are employed. A simplistic model, the WS Decision-making process (Slate et al. 1992), described in the Proposed Action does not give an idea of what management methods will be used to resolve problems. While the EA reported the number of animals killed, it did not report the number of actions taken in recent years or even the total number of times WS provided assistance. Such information is vital in order to reasonably assess the current program, the Proposed Action.

Response 3: WS disagrees and believes that the Proposed Action was amply discussed in Sections 1.4 and 3.2.1 of the EA. Currently, the Management Information System (MIS), the computer tracking system used by WS to obtain data on ARDM, does not track all information that occurs for each damage request and how each complaint is resolved. The MIS does track the number of requests that are handled strictly by technical assistance and those that are handled through direct damage management which is often coupled with technical assistance that is not recorded. Table 1a of the EA gives the number of requests for beaver for FY00 to FY02 which averaged 28 requests per year. Of those, WS handled, on average, 11 by technical assistance alone and 17 through direct control often combined with technical assistance. It is unknown whether or not each direct control project resulted in the take of beaver. Of the 3 total requests for muskrats (Table 1b) from FY 00 to FY02 (average 1/year), WS handled 2 by technical assistance and 1 through direct control.

WS began the development of a new MIS system called MIS 2000 to take advantage of new technologies, but it has not been implemented. It is expected that the new system will be in place in FY 05. The new system will potentially capture such information as all of the methods used to resolve a complaint and provide a report that quantifies this. However, in lieu of having that information, WS did list current methods available for use or recommendation by WS Specialists. Per WS Policy, the array of ARDM methods are considered in determining an appropriate strategy (the WS Decision-making model (Slate et al. 1992)) to resolve a damage problem (this was discussed thoroughly in USDA (1997) and examples of specific beaver damage situations in urban and rural areas were addressed (USDA 1997 - Appendix N). Additionally, WS dissemination of information on the potential of using different methods is difficult to quantify because it is not restricted to conversations between WS field specialists and resource owners. NWRC and WS operational personnel use journal articles and presentations at meetings, conferences, and workshops to present data on nonlethal alternatives which cannot be quantified as to the extent of their effect.

Finally, the analysis in Chapter 4 provides the information necessary to assess the current program and impacts on the quality of the human environment. WS feels that the analysis in Chapter 4 speaks for itself.

Comment 4: Several comments were received regarding the cost effectiveness of the ARDM program.

Response 4: WS Specialists, that respond to damage complaints, estimate the value of the damage done by beaver and muskrat when they arrive at a site or ask the cooperator what they believe the value to be. A common misconception that the public has when using damage data is that the damage that WS documents is the total damage. Actually, this

is the damage prior to WS intervention. It gives an indication of aquatic rodent damage in New Mexico (an index), but does not actually reflect cost-effectiveness. Without intervention, damage would continue and is be expected to be much greater. Often it would be expected that damage would escalate and surpass the damage that had already been done. Intervention, eliminates or reduces further damage to acceptable levels for the landowner who has already lost the value of damage as identified by WS Specialists. Damage could be the flooding of crops, a house, and other property which, if allowed to continue, could have enormous costs. A good example is the potential flooding of a house; WS receives periodic requests where flooding waters are encroaching a house. Most times, WS can remove the beaver and newly created dam prior to any real damage. If the beaver were allowed to continue to build the dam, the house could be flooded, and damage could rapidly escalate into the thousands should the flood waters reach the house.

A very challenging task for WS has been to determine the effectiveness of WS applied ARDM because one must first predict how much more damage would have occurred if a control strategy had not been implemented. With this number, cost effectiveness can be determined for resources with monetary value, but cannot for nonmonetary values such as the protection of human health. WS in North Carolina, where beaver are a primary focus of the WS program (about 50 to 100 times the effort of the New Mexico ARDM program), has determined the cost-effectiveness of the program by quantifying the damage saved for projects involving monetary values (WS 2003). They have been able to generate data to determine the overall cost savings of conducting beaver damage management by estimating the value of resources remaining in an area that would have likely been damaged should damage have been allowed to continue. WS (2003) determined that the cost:benefit ratio of the program was 1:7.1; for every dollar spent by the WS program the landowner realized a $7.10 return. On another project in the Mississippi WS Program, it was estimated that $198,000 was saved on one timber protection project which cost $ 11,000, a 1:18 cost:benefit ratio. To obtain this estimate requires considerable effort on the part of the WS Specialists to acquire the additional data and a computer database able to accept it. ARDM is only a small portion of the New Mexico WS program (~$10,000??), and collecting data (resources saved) for such would not substantially improve the analysis in the EA and the decision-making process.

Finally, ARDM by WS in New Mexico is almost entirely funded by cooperators. Cooperators would not continue to rely on WS if it was not a cost-effective program.

Comment 5: One commentor thought that the damage losses should reach a threshold, be significant, prior to conducting ARDM.

Response 5: WS believes that this was addressed sufficiently in the EA in Section 3.3.3. Additionally, the New Mexico State law that requires NMGF to resolve complaints does not have a threshold, but requires NMGF to resolve the problem.

Comment 6: One commentor was concerned about the direct and indirect effects WS ARDM has on nontarget species. Another remains concerned that WS ARDM will affect nontarget species...

Response 6: WS addressed the issue of nontarget take throughout the EA. Direct affects would include capturing nontargets incidental to ARDM such as turtles, big fish, and mammals that frequent aquatic sites such as raccoons. Indirect effects could include the removal of beaver or dams from an area which could potentially reduce the wetlands. WS is very concerned about the direct effects of ARDM on nontarget species (Section 2.2.1) and takes steps to avoid nontarget take (Section 3.4.2.2). WS is also very concerned about the indirect effects of ARDM, dam removal, on nontarget species (Section 2.2.3) and takes steps to avoid impacting wetlands (Section 3.4.2.4). WS personnel record nontarget take and this take was analyzed (Section 4.2.2). WS also analyzed impacts on wetlands under the different Alternatives in Section 4.2.4. We believe the EA speaks for itself.

> **Comment 6 a:** ...including river otter (*Lutra* [*Lontra*] *canadensis*)... Otters are being reintroduced and recovered in northern New Mexico and the EA did not address this.
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> **Response 6a:** The Southwest river otter (*L. c. sonora* [*sonorae/sonorensis*]) subspecies once inhabited New Mexico, but the record is meager. The last otter taken in New Mexico was by a beaver trapper in the Gila River drainage near Cliff, New Mexico in 1953, but it has long been thought that river otters have been extirpated

(Findley et al. 1975, Regan Smetak, NMGF, pers. comm. 2004). Unverified sightings have occurred since then, but mainly from northen New Mexico where it is believed that if they did occur, they were likely from releases made in Colorado or, possibly, Arizona. Debate has ensued whether or not the southwestern subspecies was a unique subspecies or not because its unique characteristics were based on only 3 specimens. Typical characteristics of the Southwest river otter were that they were larger, had a unique head shape, and had a paler pelage; modern forensic biology may undoubtably be able to resolve this debate. Based on the lack of evidence for creating a new subspecies, the U.S. Fish and Wildlife Service (USFWS) did not consider or list the Southwest subspecies as a T&E species nor is it listed by NMGF on their T&E list. River otter have been seen, but unverified, in northern New Mexico and if they are present, are thought to be from reintroduction efforts in Colorado, or possibly Arizona, that started in the 1970s. This has stirred up more debate; should New Mexico reintroduce any river otter or hope for a population of the Southwest subspecies (there are none in captivity nor any known populations) to show up. The Colorado otter population was started from otters that came from several states, but are not the Southwest subspecies. If Southwest otters still exist in New Mexico, different otter subspecies would further imperil any hopes of establishing the Southwest subspecies, should it be determined to be separate, from loss of genetic integrity.

With that said, otter are taken as nontargets in beaver damage management because of their similarity in size and habitat selection as the beaver. None have been taken by WS in New Mexico from FY 94 to FY 03. WS Specialists in New Mexico are knowledgeable about otter sign and, if found, they would relay that information to NMGF. The incidence of otter taken as nontargets is greatly reduced by experienced trappers and this has been the case in many states where otters are present and WS has an active ARDM program. In an attempt to reduce otter take, many trigger designs have been made for quick-kill traps and had claims of great success by their manufacturer. Recent research by NWRC and WS has found that a variety of "otter-safe" triggers and other trigger configurations for conibears were not effective at reducing the incidence of non-target take (D. Nolte, NWRC, pers. comm. 2003 *unpubl. data*). The research did find, that the single biggest factor for avoiding nontarget take was trapper experience. WS hires most personnel with professional experience which, therefore, is likely to reduce nontarget otter take. In addition, supervisors work with WS personnel to show proper sets as needed. Therefore, we conclude that, while the take of nontarget otters in ARDM is a potential, WS Specialists will continue to strive to keep this to a minimum. It has not been a problem in New Mexico as discussed in 4.2.2.1 and will likely continue to be lower than under the other alternatives should otters make a comeback as a result of experienced and professional WS Specialists implementing ARDM in New Mexico.

Comment 6b: ...and southwestern willow flycatcher (*Empidonax traillii extimus*). Beavers create habitat for willow flycatchers. Should not remove beaver dams. Need required mitigation measures to ensure that WS does not impact flycatcher such as no ARDM from April 15 - July 15 so that nests and nestlings are not disturbed during that time.

Response 6b: The southwestern willow flycatcher, a Federal endangered species, occurs in riparian habitats with dense vegetation such as willows, tamarisk, or Russian olives. It is found in western New Mexico from spring through summer. This species is highly insectivorous, taking insects on the wing or gleaning them from vegetation. The flycatcher is found throughout most of western New Mexico with the majority found in the Gila Valley of Grant County (Williams and Leal 1998). Several reasons have been cited for their decline including habitat degradation, water changes, fire, invasive plant encroachment, nest parasitism by cowbirds, predation (especially nestling/egg by great-tailed grackles (*Quiscalus mexicanus*) and possibly corvids), and negative impacts associated with recreational and research activities.

WS has consulted locally with USFWS and determined that ARDM as conducted in New Mexico will not adversely affect the flycatcher or its habitat. The WS ARDM method that has the potential for affecting the flycatcher is the removal of established beaver dams that have been established for many years. However, this activity would most likely require a section 404 permit from the Army Corps of Engineers. WS in New Mexico, does not remove established beaver dams that have become wetlands and almost always conducts beaver damage management for very recent beaver activity. Recent beaver activity does have the potential to impact this species by flooding established habitat and cutting down the flycatchers' nesting trees and, thus, beaver

damage management could benefit the species. The only other ARDM activity that could potentially have an effect on the flycatcher is just the presence of WS personnel near nesting sites. However, WS field personnel usually do not remain in any area for long times (usually less than 1 hour) and move on shortly after conducting ARDM activities. Flycatchers are typically not shy birds and brief interactions are not likely to cause them to be disturbed or abandon nest sites. However, since the WS program has the potential to affect the flycatcher in many states, WS has initiated consultation at the national level to ensure that WS activities do not impact the flycatcher. However, WS in New Mexico does not have programs that involve the methods considered to have a significant adverse effect on the flycatcher which USFWS in New Mexico has concurred (2003).

Comment 7: One commentor noted that beavers are found throughout New Mexico and not only in northern and southwestern New Mexico (pg. 5).

Response 7: The description of the beaver range in New Mexico was where beaver are most abundant. Beavers are found throughout New Mexico in suitable habitat. This was edited to reduce the confusion.

Comment 8: A commentor stated that WS's professed allegiance to integrated wildlife damage management (IWDM) is good. Hopefully not like WS's control of predators which has not been good because too often traps, shooting, and denning have occurred in ways that are unsafe or illegal or at least not the best solution to the problems, and often they weren't any solution. Hopefully this will be different in ARDM. It is not adequate for the EA to merely state that lethal control will be used if nonlethal control would not adequately address the problem without any discussion of how it is predicted that nontlethal control methods would not work.

Response 8: WS uses IWDM consistently to resolve problems. IWDM considers all available approved methods of prevention and management to reduce damage caused by wildlife and was discussed thoroughly in the EA in Sections 1.1.1, 1.4, and 3.2.1.1. WS disagrees with the comments on unsafe, illegal, and unwise use of predator control IWDM methods and refers the commentor to WS predator damage management EAs for New Mexico and USDA (1997) because the comment was outside the scope of the EA. WS Specialists are knowledgeable about ARDM methods and use them accordingly. In areas where nonlethal methods are appropriate, WS personnel suggest such to the landowners. However, WS Specialists are professionals and realize when and where these methods will work and run through them in the WS decision making process (USDA 1997). WS applies IWDM (WS Directive 2.105) to reduce wildlife damage. WS personnel use the WS Decision Model (Slate et al. 1992) at each site to determine the most appropriate methods and strategies to resolve wildlife damage as discussed in Section 3.2.1.1 of the predecisional EA and WS Directive 2.105. Nonlethal methods are given preference where practical when formulating a damage reduction strategy (WS Directive 2.101). When nonlethal methods alone are not practical, WS uses or recommends a combination of lethal and nonlethal methods to address damage problems. WS personnel use their expertise to determine the appropriate response to wildlife damage at each site. In situations where experience has shown that nonlethal methods are not effective, WS personnel may use lethal methods as their primary tool. In addition, available nonlethal methods are often recommended to those sustaining damage if these methods are not already being used. The use of both lethal and nonlethal methods can greatly enhance the efficacy of a damage reduction strategy. Ultimately, the goal is to preserve wildlife while resolving conflicts between humans and wildlife. As far as using IWDM, we believe that the EA speaks for itself.

Comment 9 Many nonlethal methods that have been researched including those from NWRC were not included in the methods sections and much of the information was outdated. Abrasives are only briefly mentioned in the EA and it appears that WS has not kept up with more recent advances in technology.

Response 9: Since it was thought that WS was not keeping up on new technology, the methods section in the EA was expanded in Section 3.2.1.3. WS is very aware of current nonlethal technology regarding abrasives, electrical barriers and pond-levelers, but realize that they only work in certain situations; recent research indicated the effectiveness of such devices are at best 50% and with the expense may not be effective for several situations, especially where private landowners do not have the money to install such devices or where they are not committed to maintaining them. With the additional information included in the EA, we believe the EA speaks for itself.

Comment 9: The current drought combined with removal of beaver will have significant cumulative effects.

Response 9: The drought is a real concern and will impact the beaver population in New Mexico should it continue. If areas do dry up as a result of the drought, over time, it will reduce the beaver population. However, this will significantly reduce the need for ARDM because beavers will only inhabit the larger water courses such as rivers and large reservoirs where water would still be found and these are areas where ARDM is seldom conducted. Therefore, the cumulative effect of such an event and ARDM would be minimal because the drought would dictate the outcome. However, events such as droughts are outside of the scope of this EA because WS cannot reasonably predict their duration and severity.

Comment 10: Drowning and so-called "quick-kill" traps are inhumane and clearly condemned by the AVMA 2000 Euthansia Report. Conibears result in an inhumane death. Drowning is not euthanasia (Ludders et al. 1999). The only acceptable methods of euthanasia are live-capture with subsequent euthanasia by lethal injection, CO2 inhalation, or gunshot. An animal's suffering is an objective fact. The EA did not discuss the issue of humaneness relative to nontarget injury from ARDM methods.

Response 10: Drown sets are commonly used for beaver and muskrat with leghold traps and snares. The AVMA 2000 panel on euthanasia (Beavers et al. 2001) listed drowning as an inhumane method of euthanasia, but offered no supporting evidence for such. The AVMA panel report (Beavers et al. 2001) was intended for use by members of the veterinarian profession and recommendations were intended to serve as guidelines for veterinarians who must use their professional judgement in applying them to the various settings where animals are to be euthanized. Because this was brought up as an issue and was only discussed briefly in the EA, Section 2.2.2 in the EA was expanded to include a more thorough discussion of the issue.

Quick-kill traps have been a standard name associated with the Conibear type traps for years. However, because this was brought up as an issue, WS expanded the humaneness section in 2.2.2 to discuss this issue further. However, WS still believes that most beaver, especially smaller ones, and muskrats die quickly as a result of injury/drowning in conibears. Gilbert (1976) stated that most animals were clinically dead in 1 ½ minutes (EEG), but their hearts kept beating past 10 minutes (ECG) as a result of their physiology. However, the Conibears used by him had half of the force that he used for a beaver to survive. His animals were sedated and not in water and therefore, provide less evidence that they survive great lengths of time underwater because of the stress and inability to breath. Conibear traps are very efficient at capturing beaver and muskrat. The trap is designed such to kill them soon after capture. Smaller size beaver and muskrats probably die very quickly after the trap is closed, especially when set appropriately. Those that do survive may hold their breath until they die, which for a relatively short period of time could be painful. However, this issue was expanded in the EA.

WS believes that the issue of humaness was analyzed thoroughly enough in 4.2.3 for the decision-maker to select an alternative. Some ARDM techniques, as discussed above, are considered to be inhumane. Yet, they still are the best methods for resolving problems in ARDM and, in the case of drowning, cause the quickest death for an animal that is slated for removal. If the only acceptable humane methods of euthanasia are following live capture, many complaints would not be resolved because live traps are often the least successful method available to WS Specialist that need to resolve complaints. Thus, this creates a tradeoff between a quick death and a drawn out death with potential for injury ending in euthanasia. ARDM techniques considered inhumane by some people would be used most professionally with the least amount of animal pain and suffering under the Proposed Alternative whereas these could increase under the other Alternatives as analyzed in Section 4.2.3.

The commentor stated that animal suffering is an objective fact. Unfortunately, animal suffering is only a subjective fact, not objective, that has been attempted to be measured objectively. Human stress indicators can be objectively measured in animals such as epinephrine, but humans do not have the ability to perceive an animal's pain and suffering because that would be anthropomorphic (ascribing human characteristics to nonhuman things). Human's perceive what that person would feel in that situation, which in itself is different for every individual (ie. a person may play football with injuries such as a broken thumb and only notice the injury on occasion whereas the next person may stay home from work and take pain medication for the same injury). Therefore, while we believe that animals suffer similarly to humans in some situation, it is only subjective and not an objective fact.

As discussed in comment 6 above, it is noted that nontargets can be taken in ARDM. Quick-kill traps were noted that they do not always kill an animal, especially nontarget animals larger than the intended target and that the EA did not discuss their pain and suffering. The issues of nontarget take and humaneness were discussed in the EA. Nontargets are taken with ARDM methods and the number of animals taken as nontargets would likely be most under the other Alternatives analyzed in the EA because the use of ARDM methods would likely increase by the general public including those inexperienced in their use. Therefore, we believe that the overall animal pain and suffering would be least under the Proposed Action. Even so, WS expects to take some nontargets that survive in quick-kill traps. The most common animal that survives quick-kill traps are turtles because their carapace protects them. It is unknown the amount of pain and suffering that they incur. However, they are released if it is deemed that they will be able to survive. Otherwise they are euthanized at the trap site. The relative low incidence of nontarget take by WS indicates that animal suffering is very limited under the Preferred Alternative than under the other alternatives.

Comment 11: Commentor concerned about the use of zinc phosphide in ARDM and its potential for impacting nontargets.

Response 11: WS is aware that chemical pesticide use can be quite concerning to the public, especially the public that is unfamiliar with that chemical, the labeling, and how it is used. The use of zinc phosphide in muskrat and nutria damage management is fairly safe with a low potential to affect a few nontargets species. USDA (1997 - Appendix P) completed a formal risk assessment and concluded that the use of zinc phosphide presented few risks, especially in ARDM. Further information on zinc phosphide was added to the EA in Section 3.2.1.3 to address this concern.

Comment 12: Commentor does not support local population suppression.

Response 12: This was addressed, generally, in Section 3.3.4 WS does not generally conduct population suppression except at the very local level. Aquatic rodents are removed from areas where they are unwanted because they are causing damage and do not meet with the landowners land/structure-use objectives (ie. beavers in an irrigation ditch). This typically amounts to a few individuals or colonies in a given area such as in a small drainage. This does not qualify as population suppression because an aquatic rodent population covers a much broader area. Therefore, WS believes that this has not been an issue in New Mexico, especially considering the low numbers of beaver removed annually.

Comment 13: A commentor questioned what was the basis for saying that illegal activities would increase if WS did not conduct ARDM. Another commentor questioned why the illustration of the man in Oklahoma who suffered a heart attack was included in Section 3.2.2 because it is more likely that WS Specialists traveling to damage management sites are more likely to be in traffic accidents.

Response 13: This is a potential issue brought out in the EA because WS believes that this would be more likely to occur if professional assistance in ARDM was not given. USDA (1997) discusses examples of the potential for misuse of wildlife damage management methods as a result of no program. USDA cited a document that discussed case histories of the illegal use or misuse of pesticides to remedy wildlife problems (White et al. 1989). This is not uncommon. Just a quick look on the internet and you can find several cases/convictions for frustrated property owners illegally using wildlife damage management methods such as pesticides and traps to resolve a damage problem. For example, in Georgia on a 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 2003). The Texas Department of Agriculture has a website and brochure devoted solely to preventing pesticide misuse in controlling agricultural pests (Texas Department of Agriculture 2004). Similarly, the Britain Department for Environment, Food and Rural Affairs has a "Campaign Against Illegally Poisoning of Animals" (Dacko 2004). WS Specialists have heard of many anecdotal reports of people using different methods that would be unsafe for the environment such as pouring the herbicide paraquat into a stream to get rid of beavers. The commentors may believe that these types of activities do not take place, but they do. WS Specialists typically do not assist persons that already have an ongoing wildlife damage management program, especially where they are controlling the same species with a pesticide (WS Directive 2.401). WS Specialists frequently have been requested for assistance because people using wildlife damage management techniques improperly are having trouble resolving problems; most people were unaware of WS and when they find out that WS has a wildlife damage management

program, they often abandon their efforts and let WS resolve or assist them with their problem. WS believes that if WS Specialists respond to their wildlife damage complaints either with technical assistance or direct control, and makes a professional effort to reduce losses, that at least those persons would not be as likely to use improper/illegal techniques.

Comment 14: How often does WS check traps?

Response 14: WS Specialists check their traps according to State law or Special Authorization such as a State statute, and WS Policy (WS Directive 2.450). Trap check requirements for WS are currently set at twice per week for traps and once per week for snares. WS continually endeavors to balance the need to provide practical and effective solutions to wildlife damage problems while still striving to minimize animal suffering. WS could adopt more frequent trap check intervals; however; this would result in substantial increases in program costs.

Comment 15: WS is not needed, NMGF can do ARDM themselves.

Response 15: NMGF contracts with WS because WS has personnel that can often respond quickly to aquatic rodent damage situations where NMGF cannot. In some situations especially involving beaver, a rapid response can make a substantial difference in the amount of damage that is done. NMGF does not have to contract with WS, but they have found it to be cost-effective. If WS did not assist them, they would have to conduct the ARDM anyway, under state law or contract it out.

Comment 16: The commentor stated that, as given in Section 3.4.2.3, it was reassuring that WS personnel abide by relevant laws and regulations when conducting ARDM, but that obeying laws and regulations is not a mitigation measure, but a minimum standard expected of public employees and all citizens. It should be removed.

Response 16: In essence, the commentor is partially right. However, abiding by laws and regulations is mitigation because relevant laws and regulations were put into place by the public to mitigate problems. Therefore, it is vital that the public know that these relevant laws and regulations are being followed, even though it mostly goes without saying. WS standard operating procedures set forth by WS Directives emphasize adherence to laws and regulations and thus it is, in essence, mitigation to lessen impacts on the environment. Not all people that read the EA and not all federal agencies abide by State laws, and thus it is important to state. Therefore, the mitigation was not removed from the EA.

Major Issues

Cooperating agencies and the public helped identify a variety of issues deemed relevant to the scope of this EA. These issues were consolidated into the following 5 primary issues that were considered in detail in the predecisional EA:

- Effects on Target Aquatic Rodent Species Populations
- Effects on Nontarget Species Populations, Including T&E Species
- Humaneness of Control Techniques
- Effects of Beaver Dam Removal on Wetland Wildlife Habitat
- Effects of ARDM Methods on Public Safety

Affected Environment

The areas of the proposed action is to continue conducting ARDM along streams, rivers, lakes and other areas where aquatic rodents are causing damage to agriculture, property, natural resources or public health and safety to private, public, and Tribal properties in new Mexico. ARDM will only be conducted where the appropriate Agreement for Control or Work Plan is in place allowing ARDM methods to be used and at

the request of NMGF, Tribe, or other Federal Agency that manages land. The current program's goal and responsibility is to provide service when requested within the constraints of available funding and manpower.

Alternatives Analyzed in Detail

Three potential alternatives were developed to address the issues identified above. Seven additional alternatives were considered, but not analyzed in detail. A detailed discussion of the anticipated effects of the alternatives on the objectives and issues is described in Chapter 4 of the EA. The following summary provides a brief description of each alternative and its anticipated impacts. Table 3 in the predecisional EA summarizes the environmental consequences (issues) of each of the alternatives in a table format.

Alternative 1. Continue the Current Federal ARDM Program (Proposed Action/No Action). Consideration of the No Action alternative is required under 40 CFR 1502.14(d), and provides a baseline or the environmental *status quo* for comparing the potential effects of all the other alternatives. In this EA, the "No Action" alternative is consistent with CEQ's definition. In the case of the ARDM EA for New Mexico, the No Action Alternative was the equivalent of the Proposed Action Alternative and the Current Program. Alternative 1 benefits individual resource owners/managers, while resulting in only low levels of impact on target and nontarget wildlife populations, minimal potential to adversely impact ecosystems, very low risks to or conflicts with the public, and low risk to T&E species. Current lethal methods available for use are fairly selective for target species and appear to present a balanced approach to the issue of humaneness when all facets of the issue are considered. The "No Action" alternative is a procedural NEPA requirement (40 CFR 1502.14(d)), and is a viable and reasonable alternative that could be selected. It will serve as a baseline for comparison with the other alternatives.

Under the current program, WS responds to requests for ARDM to protect human health and safety, agricultural crops and resources, property, natural resources, threatened and endangered species, and forestry in New Mexico mostly at the request of NMGF, the agency with responsibility of managing aquatic rodents. To meet the goal, WS has the objective of responding to all requests from NMGF, other public agencies and Tribes for assistance with, at a minimum, technical assistance or self-help advice, or, where appropriate and where cooperative or congressional funding is available, direct damage management assistance with professional WS Specialists conducting damage management actions. An IWDM approach would be implemented which allows the use of any legal technique or method, used singly or in combination, to meet the needs of requestors for resolving conflicts with beavers or muskrats. Agricultural producers and others requesting assistance would be provided with information regarding the use of effective nonlethal and lethal techniques. In many situations, the implementation of nonlethal methods such as exclusion-type barriers and pond-levelers would be the responsibility of the requestor to implement which means that, in those situations, WS's only function would be to implement methods difficult for the requestor to implement, if determined to be necessary. ARDM by WS would be allowed in the State, when requested, on private property sites, public facilities or other locations where a need has been documented, upon completion of an *Agreement for Control*. All management actions would comply with appropriate Federal, state, and local laws.

Alternative 2. No Federal WS ARDM. This alternative would consist of no federal involvement in ARDM in New Mexico - neither direct operational ARDM nor technical assistance to provide information on nonlethal or lethal ARDM techniques would be available from WS. The majority of the formerly federal ARDM assistance would be borne by NMGF. Private individuals could increase their efforts if NMGF were unable to respond adequately which means more ARDM would be conducted by persons with less experience and training, and with little oversight or supervision. Risks to the public, nontarget and T&E species, and wetlands would probably be greater than under Alternative 1, and effectiveness and selectivity would

probably be lower. In addition, frustrated resource owners that have endured recurring losses may resort to the use of illegal or inappropriate techniques that could result in unknown consequences.

Alternative 3. Technical Assistance Only. Under this alternative, WS would not provide any direct control assistance to persons experiencing aquatic rodent damage problems, but would instead provide advice, recommendations, and limited technical supplies and equipment. Lethal ARDM would likely be conducted by persons with little or no experience and training, and with little oversight or supervision. Risks to or conflicts with the public, wetlands, nontarget, and T&E species would probably be more than Alternative 1, but slightly less than or about the same as Alternative 2. The effectiveness of WS and selectivity of ARDM methods would probably be lower than Alternative 1. Finally as discussed above, frustrated resource owners that have endured recurring losses may resort to the use of illegal or inappropriate techniques that could result in unknown consequences.

Alternatives considered but not analyzed in detail were:

1. **Compensation for Aquatic Rodent Damage Losses.** Compensation would require the establishment of a system to reimburse resource owners for damages. This alternative was eliminated from further analysis because no federal or state laws currently exist to authorize such action for aquatic rodents. This Alternative was eliminated from further analysis because it had many problems associated with it as discussed in the EA.

2. **Bounties**. Payment of funds for killing aquatic rodents (bounties) suspected of causing economic losses has not been supported by New Mexico State agencies such as NMGF as well as most wildlife professionals for many years (Latham 1960). WS concurs with these agencies and wildlife professionals because of several inherent drawbacks and inadequacies in the payment of bounties This alternative was eliminated from further analysis.

3. **Wildlife Damage Should Be an Accepted Loss -- a Threshold of Loss Should Be Reached Before Providing ARDM Services.** Under such an alternative, WS would not provide any direct control or technical assistance until a certain economic threshold of damage had been reached. Although some loss of resources to wildlife can be expected and tolerated, WS has the legal direction to respond to requests for WDM, and it is Program policy to aid each requester to minimize losses.

4. **Eradication and Long Term Population Suppression.** An eradication alternative would direct all WS Program efforts toward total long term elimination of aquatic rodents in entire cooperating counties or larger defined areas in New Mexico. In New Mexico, the eradication of beaver and muskrat is not a desired goal of state agencies, although these species may be taken by the general public in areas where they are causing damage. This alternative was eliminated from further analysis because WS and NMGF oppose eradication of any native wildlife species, and because it is generally impossible to achieve. Long term population suppression is not a desired goal of state agencies or of WS for the analysis area as a whole but could be implemented for localized areas prone to aquatic rodent damage under the current program alternative (ie. urban neighborhoods). The impacts of localized population suppression are analyzed in the EA.

5. **Reproduction Control.** A review of research evaluating chemically induced and surgically induced reproductive inhibition as a method for controlling nuisance beaver populations is contained in Novak (1998). 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. At present, no chemical reproductive inhibitors are legal for use for beaver or muskrat. For these reasons, this method will not be considered further by WS. Should current research at NWRC with immunocontraceptives develop to the point of field use, it may be considered for certain situations in ARDM.

6. **Biological Control**. The introduction of a species or disease to control another species has occurred throughout the world, but has rarely been successful. In fact, many of the introduced species become pests themselves. This alternative was eliminated from further analysis because this method has many problems associated with it.

7. **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. 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 the FEIS (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.

Comments regarding the Alternative Selection

The following comments were received regarding the selection of an alternative in the Record of Decision suggesting the commentor's preferred alternative:

1. Support emphasizing relocation programs (2 commentors).
2. Support No WS ARDM program (Alternative 2), nonlethal only.
3. Support Nonlethal before Lethal Alternative.
4. Support eradication of nutria with lethal trapping and shooting.

Finding of No Significant Impact

The analysis in the EA indicates that there will not be a significant impact, individually or cumulatively, on the quality of the human environment as a result of the Proposed Action. I agree with this conclusion and therefore find that an Environmental Impact Statement need not be prepared. This determination is based on the following factors:

1. ARDM, as conducted by WS in New Mexico, is not regional or national in scope. It is a statewide program and the scope was discussed thoroughly in the EA. ARDM in New Mexico is for the most part conducted at the request of NMGF to fulfill their legal responsibilities Under the proposed Action, WS would continue to assist entities with aquatic rodent damage as necessary. Even if WS

were not involved, under state law most ARDM would be conducted by state and local government, or private entities that are not subject to compliance with NEPA.

2. The proposed action would pose minimal risk to public health and safety. No injuries to any member of the public are known to have resulted from WS ARDM activities. In addition, a risk assessment has analyzed the use of ARDM methods by WS (USDA 1997) and these were found to pose only minimal risks to the public, pets and nontarget wildlife species. This issue was addressed in the EA and the Proposed Action was found to have the least impacts.

3. There are no unique characteristics such as park lands, prime farm lands, wetlands, wild and scenic areas, or ecologically critical areas that would be significantly affected. Almost all ARDM projects conducted by WS occur in agricultural and developed areas. All involve wetlands because this is where aquatic rodents live. However, as discussed in detail in the EA, wetlands are not impacted under the Proposed Action. Hand removal of dams by WS restores the wetland characteristics of an area that has been covered by the beaver pond which does not become a wetland for years.

4. The effects on the quality of the human environment are not highly controversial. Although there is some opposition to aquatic rodent control, this action is not highly controversial in terms of size, nature, or effect. Beaver and muskrat populations will not be significantly affected by ARDM under the Proposed Action, and is likely to be similar under the other Alternatives because NMGF is required by law to respond to problems except on Tribal and federal lands.

5. Based on the analysis documented in the EA, the effects of the proposed ARDM program on the human environment would not be significant. The effects of the activities under the Proposed Action are not highly uncertain and do not involve unique or unknown risks. These activities would occur as NMGF would have to respond to damage complaints. If NMGF were unable to respond quickly under the other Alternatives, a potential exists that could involve unique and unknown risks by non-professionals implementing ARDM and frustrated property owners that have been ineffective with ARDM methods resorting to the illegal use of chemicals.

6. The proposed action would not establish a precedent for any future action with significant effects. All issues under the proposed action were discussed thoroughly, and these would not add cumulatively to any known future actions that would result in significant effects.

7. No significant cumulative effects on the quality of the human environment were identified through the EA. The number of beaver and muskrat taken by WS, added to the total known other take of such species, is within the levels sustainable by their populations and authorized by the responsible State Agency, NMGF, that represent their interests.

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

9. An evaluation of the proposed action and its effects on T&E species determined that no significant adverse effects would occur to such species. This is supported by the 1992 Biological Opinion (USDA 1997) and a subsequent New Mexico WS Biological Assessment with Concurrence from USFWS in 2003. No other T&E species have been listed in New Mexico since then.

10. The proposed action would be in compliance with all Federal, State, and local laws imposed for the protection of the environment. The proposed activity does not violate the Migratory Bird Treaty Act, the Endangered Species Act, or any other law. As allowed by State law, ARDM is such that the majority of ARDM will apparently be conducted by NMGF, or Tribe anyway that are not subject to compliance with NEPA if WS were not involved.

11. There are no irreversible or irretrievable resource commitments identified by this assessment, except for a minor consumption of fossil fuels for routine operations.

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Decision

I have carefully reviewed the EA and the input resulting from the public involvement process. I believe the issues and objectives identified in the EA would be best addressed through implementation of Alternative 1 (the Proposed or No Action Alternative to continue the current program). Alternative 1 is therefore selected because (1) it offers the greatest chance at maximizing effectiveness and benefits to affected resource owners and managers within current program funding constraints; (2) it will maximize selectivity of methods available; (3) it offers a balanced approach to the issue of humaneness when all facets of the issue are considered; (4) it will continue to minimize risk to or conflicts with the public; and (5) it will minimize risks to nontarget and T&E species. WS in New Mexico will continue to use an IWDM approach in compliance with all the applicable mitigation measures listed in Chapter 3 of the EA.

For additional information regarding this decision, please contact Alex Lara, State Director, USDA-APHIS-WS, 8441 Washington NE, Albuquerque, NM 87113 - (505) 346-2640.

Michael V. Worthen, Regional Director
APHIS-WS Western Region

2-5-04
Date

ENVIRONMENTAL ASSESSMENT

AQUATIC RODENT DAMAGE MANAGEMENT IN NEW MEXICO

Prepared By:

UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
WILDLIFE SERVICES

In Cooperation With:

New Mexico Department of Game and Fish
New Mexico Department of Agriculture

February 2004

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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[1] (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 aquatic rodent damage management (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 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. Final Environmental Impact Statement (FEIS) summarizes the relationship in American culture of wildlife values and wildlife damage in this way (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."*

---

1 Wildlife Services was previously known as the Animal Damage Control program. The name change became effective in 1997.

USDA is directed by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authority for WS is the Animal Damage Control Act of 1931 (7 U.S.C. 426-426c; 46 Stat. 1468), as amended in the Fiscal Year 2001 Agriculture Appropriations Bill, which is given in Section 1.8.1.

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 (sometimes referred to as "Integrated Pest Management") and is described in Volume 4, Chapter 1, pages 1-7 of the WS FEIS (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.

The FEIS contains detailed discussions of potential environmental impacts from methods that are used for WDM in New Mexico (USDA 1997). The Council on Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) authorize agencies to eliminate repetitive discussions of issues addressed in programmatic Environmental Impact Statements (EIS) by tiering to the broader documents (CFR (Code of Federal Regulations) 1500.4(I); 1502.20). Thus, this EA incorporates relevant discussions and analysis from the FEIS. The FEIS may be obtained by contacting the USDA, APHIS, WS Operational Support Staff at 4700 River Road, Unit 87, Riverdale, MD 20737-1234.

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

- training of wildlife damage management 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 wildlife damage management programs;
- informing and educating the public on how to reduce wildlife damage; and
- providing technical advice and a source for limited-use management materials and equipment such as cage traps.

WS' Policy Manual[2] 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).

1.1.2 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

[2] **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.

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 (it 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 Willdlife Service. 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 does conduct 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 833,153 acres as of March 1, 2003. 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. This information is kept in a management information system (MIS[3]).

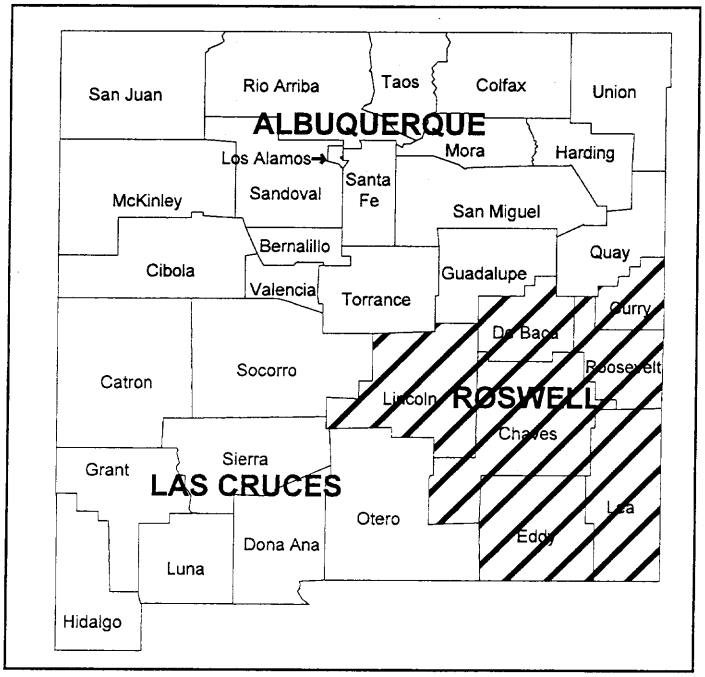

Figure 1. WS in New Mexico has three Districts (Albuquerque, Las Cruces, and Roswell) that have personnel to respond to aquatic rodent damage complaints in New Mexico's 33 Counties.

1.2 PURPOSE

This EA analyzes ARDM for the protection of agriculture, property, natural resources, and human health and safety. These problems are resolved on a case-by-case basis. Normally, according to the APHIS procedures for implementing NEPA, individual ARDM actions are categorically excluded (7 CFR 372.5(c), 60 Fed. Reg.

3 **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 FY 94. Throughout the text, MIS will be noted along with the year, ie. 1996, 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.

6,000-6,003, 1995). We have decided to prepare this EA to facilitate planning, interagency coordination, streamline program management, and clearly communicate with the public the analysis of cumulative impacts.

ARDM is conducted on private, federal, tribal, county, and municipal lands in New Mexico. The total land under agreement for ARDM, 833,153 acres, by land class as of February 2003 was 61.7% private, 34.4% U.S. Fish and Wildlife Service (USFWS), 3.6% State, and 0.3% on U.S. Forest Service (USFS), Tribal, County, 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.

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.

NMGF assists municipalities, counties, and other State agencies with ARDM on a limited basis and as time permits. They are given a permit, a depredation number, from NMGF 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 FY00 through FY02 in Table 1a for beaver and Table 1b for muskrats. 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 are responsible for about 97% of requests for assistance WS receives and 94% of the damage 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.

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. 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.

Table 1a. Value of damage caused by aquatic mammals in New Mexico as reported to or verified by Wildlife Services in FY00 (October 1, 1999- September 30, 2000), FY01, and FY02. 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	FY00		FY01		FY02	
		Req.	Value	Req.	Value	Req.	Value
Agriculture	Hayfield/Pasture	-	-	2	$100	3	$900
	Trees	2	$3,400	1	$1,500	-	-
Natural Resources	Forestry	4	$2,200	3	$6,900	5	$12,000
Property	Landscaping/Turf	1	$1,000	-	-	-	-
	Dikes/Irrigation System	17	$13,425	17	$39,753	20	$71,400
	Residential Building	-	-	1	$20,000	-	-
	Roads/Bridges	1	$500	4	$1,250	1	$5,000
	Other Property	2	$1,800	2	$2,100	-	-
TOTAL		27	$22,325	30	$71,603	29	$89,300

Requests = Requests for assistance

Table 1b. Value of damage caused by muskrats in New Mexico as reported to or verified by Wildlife Services in FY00, FY01, and FY02.

MUSKRAT DAMAGE IN NEW MEXICO REPORTED BY WS IN FY00-FY02							
CATEGORY	SUBCATEGORY	FY00		FY01		FY02	
		Requests	Value	Requests	Value	Requests	Value
Agriculture	Aquaculture	-	-	-	-	1	$500
Property	Dikes/Irrigation System	1	$500	-	-	-	-
	Golf Course	1	$10,000	-	-	-	-
TOTAL		2	$10,500	0	$0	1	$500

Requests = Requests for assistance

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, J. S. Ligon reported that with commercial beaver trapping, the beaver was eliminated from much of New Mexico (NMGF 2002). 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 throughout the State and now inhabit 2,239 miles of riparian habitat, especially in northern and southwestern New Mexico.

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 threatened and endangered (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 $61,000 from FY00 to FY02. 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 results 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, 62% of the complaints received, result from beaver damming man-made irrigation structures such as dikes and levees.

Beavers also can create damage from other activities. While feeding beavers can damage and kill trees by gnawing, girdling and cutting. They can 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).

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). Muskrat damage documented by WS in New Mexico was $10,500 in FY00, $0 in FY01, and $500 in FY02. 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 ranching." Some may be found in Lincoln County in the Rio Hondo drainage where they were probable escapees in the late 1930s. In some areas, nutria 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 cause damage by feeding 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 are available to resource owners and WS personnel. These fall into different categories including habitat modification (ie. beaver pond leveler, dam removal, and exclusion), behavior modification (ie. electric water barriers), and population management (ie. 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 Programmatic EIS. WS has issued an FEIS (USDA 1997) and Record of Decision on the USDA-APHIS-WS nationwide program. The FEIS (USDA 1997) did discuss ARDM at the nationwide level and concluded that the nationwide WS program did not impact aquatic rodent populations. This EA is tiered to the FEIS and the pertinent portions of the FEIS that discuss WS and ARDM are incorporated by reference in this EA.

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?
- If not, would NMGF provide ARDM to fulfill its legal responsibilities?
- What mitigation measures should be implemented by WS to reduce identified risks?
- Would 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 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 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 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 standard operating procedures (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, USFWS, and the Corps. 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. The primary statutory authority for USDA is the Act of March 2, 1931 (7 U.S.C. 426-426c; 46 Stat. 1468), as amended in the Fiscal Year 2001 Agriculture Appropriations Bill, which provides that:

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

In 1988, Congress passed the Rural Development, Agriculture, and Related Agencies Appropriations Act which strengthened the Act of March 2, 1931 at that time (the amended Act of March 2, 1931 in 2001 superseded this Act). This Act states, in part:

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

New Mexico Department of Fish and Game. 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. WS registers any pesticides it uses with NMDA. 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. Administers laws and regulations covering water resources in the State of New Mexico.

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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. 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.

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 first 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 species discussed in this EA would be reviewed, and if necessary, the agency requesting the assistance would be responsible for NEPA compliance.

Endangered Species Act (ESA). It is WS 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)). 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 has also conducted an informal consultation with USFWS 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 are covered by these regulations (33 CFR 323 and 330). However, a recent court decision, the Tulloch Rule Decision, determined that minimal quantities of material released during excavation activities, such as may occur during beaver dam removal, may be considered "incidental fallback" which would not be governed by Section 404 and is allowed (Wayland and Shaeffer 1997).

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 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. The Natural Resources Conservation Service (NRCS) is responsible for certifying wetland determinations 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. Currently, all use of pesticides has been banned in New Mexico except in emergency situations as deemed necessary by CDPHE. Zinc phosphide is registered for use to take muskrats under FIFRA.

National Historical Preservation Act of 1966 as amended (NHPA). The 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 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.

Executive Order 13112 of February 3, 1999, Invasive Species. 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.

NMSA 17-2-27/31. Permits to relocate wildlife. These two sections provide NMGF the authority to authorize the trapping and relocation of wildlife including beaver and muskrat.

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 will 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 mitigation and SOPs. Chapter 4 analyzes the environmental impacts associated with each alternative considered in detail. Chapter 5 contains the list of preparers of this EA, persons consulted, and the literature cited in the EA.

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 mitigation measures and 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 mitigation measures. 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 the programmatic WS FEIS (USDA 1997) and were considered in the preparation of this EA. These issues are fully evaluated within the FEIS, which analyzed data specific to the New Mexico WS Program

2.1 ISSUES CONSIDERED

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
- Humaneness of Control Techniques
- Effects of Beaver Dam Removal on Wetland Wildlife Habitat
- Effects of ARDM Methods on Public Safety

Potential environmental impacts of the Proposed Action and Alternatives in relation to these issues are discussed in Chapter 4. All issues except the final two have also been addressed in detail in the FEIS (USDA 1997). 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 "Notices of Availability" published in local media 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.

2.2 ISSUES USED TO DEVELOP MITIGATION

2.2.1 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 mitigate or reduce the effects of ARDM on nontarget species populations and are presented in Chapter 3.

Special efforts are made to avoid jeopardizing T&E species through biological evaluations of potential effects and the establishment of special restrictions or mitigation measures. A description of mitigation measures established to avoid jeopardizing T&E species are presented in Chapter 3. The results of the biological evaluation are given in Chapter 4.

2.2.2 Humaneness of 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 (CDFG) 1991), such as shooting.

Defining pain as a component of humaneness in WS methods appears to be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain, and identifying the causes that elicit pain responses in humans would "*. . . probably be causes for pain in other animals . . .*" (AVMA 1987). However, pain experienced by individual animals probably ranges from little or no pain to significant pain (CDFG 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*" (CDFG 1991). Research suggests that some methods, such as restraint in leg-hold 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 AVMA states "*... euthanasia is the act of inducing humane death in an animal*" and "*... the technique should minimize any stress and anxiety experienced by the animal prior to unconsciousness.*" (Beaver et al. 2001).

Some people would prefer that only AVMA accepted methods of euthanasia be used when killing all animals, including wild and feral animals. The AVMA 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 decision-making process involves tradeoffs between the above aspects of pain and humaneness. An objective analysis of this issue must consider not only the welfare of wild animals, but also the welfare of humans 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 and humaneness of management techniques through research and development. Research is continuing to bring new findings and products into practical use. Until new findings and improved products are proven practical and reliable, a certain amount of animal suffering could occur when some wildlife damage management methods are used. In certain situations non-lethal damage management methods are not practical or effective. New Mexico WS personnel are experienced and professional in their use of management methods to increase humaneness as much as possible under the constraints of current technology, workforce and funding. Mitigation measures and SOPs used to maximize humaneness are listed in Chapter 3.

Some people are concerned about the humaneness of drowning beaver and muskrats while restrained by leg-hold traps. Considerable debate and disagreement among animal activists, veterinarians, wildlife professionals, fur trappers and nuisance wildlife specialists is apparent. Debate centers around an uncertainty as to whether drowning animals are rendered unconscious by high levels of carbon dioxide (CO_2) and thus insensitive to distress and pain (Ludders et al. 1999). The AVMA identifies drowning as an unacceptable method of euthanasia (Beaver et al. 2001), but provides no literature citations to support this position. Ludders et al. (1999) concluded drowning is not euthanasia based on the animals not dying from CO_2 narcosis, because CO_2 narcosis does not occur until 95 millimeters of mercury in arterial blood is exceeded. Ludders et al. (1999) showed death during drowning is from hypoxia and anoxia, and thus animals experience hypoxemia. Ludders et al. (1999) also concluded that animals that drown are distressed because of stress related hormones, epinephrine and norepinephrine; therefore, drowning is not euthanasia.

CO_2 causes death in animals by hypoxemia and some animals (i.e. cats, rabbits, and swine) are distressed before death (Beaver et al. 2001). Even though these animals are distressed, the AVMA states this death is an acceptable form of euthanasia (Beaver et al. 2001). Thus, the AVMA does not preclude distress or pain in euthanasia. In fact, the AVMA supports inducing hypoxemia related distress when necessary to reduce total distress, because reducing total distress is a more humane death.

Death by drowning in the classical sense is caused by inhalation of fluid into the lungs and is referred to as wet drowning (Gilbert and Gofton 1982, Noonan 1998). Gilbert and Gofton (1982) reported that all submerged beaver do not die from wet drowning, but die of CO_2 induced narcosis. According to Gilbert and Gofton (1982) and Noonan (1998), the AVMA accepts CO_2 as a suitable form of euthanasia. Gilbert and Gofton (1982) also reported that after beaver were trapped and entered the water struggling occurred for 2-5 minutes followed by a period of reflexive responses. Andrews et al. (1993) reports that with some techniques that induce hypoxia, some animals have reflex motor activity followed by unconsciousness that is not perceived by the animal. Gilbert and Gofton (1982) stated it is unknown how much conscious control actually existed at this stage and anoxia may have removed much of the sensory perception by 5-7 minutes post submersion. However, Gilbert and Gofton (1982) have been criticized because levels of CO_2 in the blood were not reported (Ludders et al. 1999) and there was insufficient evidence that the beaver in their study were under a state of CO_2 narcosis when they died (V. Nettles, Southeastern Cooperative Wildlife Disease Study, letter to W. MacCallum, Massachusetts Division of Fisheries and Wildlife, June 15, 1998). Adding to the controversy, Clausen and Ersland (1970) did measure CO_2 in the blood for submersed restrained beaver, yet none of the beaver in the study died. Therefore, Clausen and Ersland (1970) could not determine if beavers die of CO_2 narcosis. However, Clausen and Ersland (1970) were able to demonstrate that CO_2 increased in arterial blood while beaver were submersed and that CO_2 was retained in tissues. While Clausen and Ersland (1970) did measure the amounts of CO_2 in the blood of submersed beaver they did not attempt to measure the analgesic effect of CO_2 buildup to the beaver (V. Nettles, Southeastern Cooperative Wildlife Disease Study, letter to W. MacCallum, Massachusetts Division of Fisheries and Wildlife, June 15, 1998).

When beaver are captured using leg-hold traps or snares with intent to drown, beaver are exhibiting a flight response. Gracely and Sternberg (1999) reported that there is stress-induced analgesia resulting in reduced pain sensitivity during fight and flight responses. Environmental stressors that animals experience during flight or fight activate the same stress-induced analgesia (Gracely and Sternberg 1999).

Use of drowning trap sets has been a traditional wildlife management technique in trapping aquatic mammals such as beaver, nutria, and muskrats. Trapper education manuals and other wildlife damage management

manuals written by wildlife biologists recommend drowning sets for leghold traps set for beaver (Howard et al.1980, Randolph 1988, Bromley et al. 1994, Dolbeer et al. 1994, Miller and Yarrow 1994). In some situations drowning trap sets are the most appropriate and efficient method available to capture beaver and muskrats. For example, a drowning set attachment should be used with leg-hold traps when capturing beaver to prevent the animal from injury while restrained or from escaping (Miller and Yarrow 1994). Animals that drown die relatively quickly (e.g., within minutes) versus the possible stress of being restrained and harassed by people, dogs and other wildlife before being euthanized. Drowning sets make the captured animal and trap less visible and prevent injury (i.e., bites and scratches) to people who may otherwise approach a restrained animal. Furthermore, some people are offended seeing dead animals and drowning often takes the dead animal out of public view. Some sites may be unsuitable for body-gripping traps or snares because of unstable banks, deep water or substrate conditions. However, these sites would be suitable for leghold traps. In some situations where muskrats occur in high densities, multiple catch colony traps may be the most efficient method to reduce populations and alleviate damage. Therefore, drowning is a humane way of killing muskrats (Gilbert and Gofton 1982) in colony traps.

Given the short time period of a drowning event, possible analgesic effect of CO_2 buildup to beaver, the minimum, if any, pain or distress on drowning animals, the AVMA's acceptance of hypoxemia as euthanasia and a minimum of pain and distress during euthanasia, acceptance of catching and drowning aquatic rodents approved by International Humane Trapping Standards, the conclusion has been drawn that drowning is acceptable. Some people will disagree and remain unswayed.

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 damages 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. 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 are 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 do not use binary explosives to remove beaver dams either. WS Specialists in other WS State programs can be certified to use explosives, but this is an efficient method and less environmentally disturbing practice to dislodge a beaver dam. 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 per the Corps and EPA's regulatory definition (40 CFR 232.2). 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 (*Lutra canadensis*), waterfowl, and trout (*Onchorhynchus spp.*) when it becomes an established wetland. 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. 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 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 Methods on Public Safety. A formal risk assessment of WS methods, including almost all of those used for ARDM in New Mexico, concluded low risks to humans (USDA 1997, Appendix P). However, to further reduce the effects of ARDM methods on the public, mitigation measures are incorporated into the use of specific ARDM methods that could have potential impacts on public safety.

2.3 ISSUES NOT CONSIDERED IN DETAIL WITH RATIONALE

2.3.1 WS's Impact on Biodiversity. No WS wildlife management program in New Mexico is conducted to eradicate a native wildlife population. WS operates in accordance with international, federal, and state laws and regulations enacted to ensure species viability. Any reduction of a local population or group would be temporary because immigration from adjacent areas or reproduction would soon replace the animals removed. The impacts of the current WS Program on biodiversity are not significant nationwide or in New Mexico (USDA 1997). WS operates on a relatively small percentage of the land area in New Mexico and WS take is a small proportion of the total population of the species analyzed in Chapter 4. On the other hand, WS could be involved in the eradication of invasive or introduced species where that would be desirable.

2.3.2 Wildlife Damage Management Should Be Fee Based and Not a Taxpayer Expense. WS is aware of concerns that WDM should not be provided at the expense of the taxpayer or that it should be fee based. WS was established by Congress as the agency responsible for providing WDM to the people of the United States. Funding for WS ARDM comes from a variety of sources in addition to federal appropriations. Such nonfederal sources include local government funds (county or city), producer associations, and individual private citizens which are all applied toward program operations. Federal, state, and local officials have decided that WDM needs to be conducted and have allocated funds for these activities. Additionally, WDM is an appropriate sphere of activity for government programs, since wildlife management is a government responsibility. A commonly voiced argument for publicly funded WDM is that the public should bear the responsibility for damage to private property caused by "publicly-owned" wildlife.

2.3.3 American Indian and Cultural Resource Concerns. The National Historic Preservation Act of 1966, as amended, requires federal agencies to evaluate the effects of any federal undertaking on cultural resources and to consult with appropriate American Indian Tribes to determine whether they have concerns for cultural properties in areas of these federal undertakings. The Native American Graves and Repatriation Act of 1990 provides protection of American Indian burials and establishes procedures for notifying Tribes of any new discoveries. Senate Bill 61, signed in 1992, sets similar requirements for burial protection and Tribal notification with respect to American Indian burials discovered on state and private lands.

WDM has little potential to cause adverse effects to sensitive historical and cultural resources. ARDM activities, specifically, will have no adverse effects on historical and cultural resources. However, dams that flood historical or cultural areas or structures would benefit from ARDM.

In consideration of Native American cultural and archeological interests, the WS Program requested a list of the Tribes in New Mexico from the Bureau of Indian Affairs (BIA). Each Tribe will be solicited for comments regarding the EA and ARDM activities in New Mexico. ARDM actions on Tribal property currently occur as requested by Tribal officials, assuring that Tribes can decide what actions occur considering any overriding cultural resource concerns.

2.3.4 Appropriateness of the Geographic Scope of the EA, Statewide. Federal agencies have the discretion to determine the geographic scope of their NEPA analyses (*Kleppe v. Sierra Club,* 427 U.S. 390,

414 (1976)) and WS has determined that preparation of this EA to address ARDM activities in New Mexico is appropriate. In terms of considering cumulative impacts, one EA covering New Mexico is likely to provide a better analysis of impacts than multiple EA's covering smaller zones within the analysis area. For example, NMGF monitors the furbearer populations at the statewide level and in smaller units, but WS information compares the best at the statewide level. In addition, a more detailed and more site-specific level of analysis would not substantially improve the decision-making process, and pursuing a more site-specific and more detailed analysis might even be considered inconsistent with NEPA's emphasis on reducing unnecessary paperwork (Eccleston 1995). If, in fact, a determination is made, though, as a result of this EA that the proposed action would have a significant environmental impact, then an EIS would be prepared.

2.3.5 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. The failure of any particular special interest group to agree with every act of a Federal agency does not create a controversy, and NEPA does not require the courts to resolve disagreements among various scientists as to the methodology used by an agency to carry out its mission (Marsh v. Oregon Natural Resource Council, 490 U.S. 360, 378 (1989)). Although opposition exists to ARDM, this action is not highly controversial in terms of size, nature, or effect." If in fact a determination is made through this EA that the proposed action would have a significant environmental impact, then an EIS would be prepared.

2.3.6 Impacts of Removal on the Public's Aesthetic Enjoyment of Aquatic Rodents. Wildlife is generally regarded as providing economic, recreational, and aesthetic benefits (Decker and Goff 1987), and the mere knowledge that wildlife exists is a positive benefit to many people. Some members of the public have expressed concerns that ARDM could result in the loss of aesthetic benefits to the public, resource owners, or local residents. Aesthetics is the philosophy dealing with the nature of beauty, or the appreciation of beauty. Therefore, aesthetics is truly subjective in nature, dependent on what an observer regards as beautiful.

WS ARDM activities in New Mexico occur on a relatively limited portion of the total area of the State, and the percentage of the beaver and muskrat populations removed through WS ARDM activities is typically low (see Chapter 4), nutria have not been taken by WS for over 10 fiscal years . In localized areas where WS does remove some portion of the aquatic rodent population, immigration from adjacent areas typically contributes to repopulation of the area. In addition, beaver and muskrat populations are relatively abundant in New Mexico in their appropriate habitat, but are not commonly observed because of their secretive and largely nocturnal behavior. Therefore, the likelihood of getting to see beaver or muskrats in some localized areas could be temporarily reduced as a result of WS ARDM activities. In addition, NMGF would respond to requests for assistance if WS did not, and impacts would likely be about the same. Therefore, this issue will not be analyzed further in this EA.

2.3.7 Potential Effects of Human Activity Associated with ARDM Activities on Wildlife during the Breeding Season. Some members of the public have expressed concerns that the mere presence of WS personnel in the field during the spring months has the potential to cause harmful disturbance to wildlife, and could potentially cause some animals to be separated from their mothers or might cause the abandonment of nest sites. Professional wildlife biologists with NMGF believe there is no basis for this speculation, especially considering the short duration of WS personnel in any particular area (B. Dunn, NMGF, pers. comm., 2003).

2.3.8 Concerns That the Killing of Wildlife Represents "Irreparable Harm." Some members of the public have suggested that the killing of any wildlife represents irreparable harm. Although an individual or multiple aquatic rodents in a specific area may be killed through WS ARDM activities, this does not in any way irreparably harm the continued existence of these species. New Mexico's historic and current populations of beavers and muskrats, which annually sustain harvests of hundreds of animals, are obvious testimony to the fact that the killing of wildlife does not cause irreparable harm. Populations of some of these species are in fact much higher today than they were several decades ago (e.g., beaver), in spite of liberal hunting seasons and the killing of hundreds or thousands of these animals annually. The legislated mission of the NMGF is to preserve, protect, and perpetuate all the wildlife of the State. NMGF would never allow any activity that would cause irreparable harm to the wildlife resource of the State, and NMGF strongly disagrees that the killing of wildlife represents irreparable harm (B. Dunn, NMGF, pers. comm., 2003).

2.3.9 Concerns That WS Employees Might Unknowingly Trespass onto Private Lands or Across State Boundary Lines While Conducting ARDM. WS is well aware that it is sometimes difficult to determine land ownership in some areas, and WS field employees make diligent efforts to ensure that they do not enter properties where they do not have permission. Landowners who request assistance from WS typically provide WS representatives with very specific information not only about the property boundaries of their own land, but about the boundaries of neighboring lands as well.

CHAPTER 3: ALTERNATIVES INCLUDING THE PROPOSED ACTION

The FEIS developed 13 possible alternatives (USDA 1997). Of the 13 courses of action, only the following three were relevant for ARDM in New Mexico. The range of alternatives were 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. In addition, private parties are told to contact NMGF prior to receiving assistance from WS and, therefore, are not ultimately responsible for approving and advising them on ARDM activities. Therefore, for private landowners and lessees, only two Alternaitves 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 Federal 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 WS 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 Federal 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 judgement 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 the FEIS (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. WS may be requested for assistance, but only provide advice on how to resolve the problem and implementation is the responsibility of the requestor. 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, quick-kill 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 to damage problems; these strategies are based on the level of risk, the abilities of the requestor, need, and practical application. Technical assistance may require substantial effort by WS personnel in the decision making process, but the actual management is primarily the responsibility of the requestor.

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. Two strategies are used by WS, preventive and corrective management.

Preventive Damage Management. 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. However, lethal preventive management is not frequently used in ARDM because State law requires land owners to show damage or prove the immediate threat of damage.

Corrective Damage Management. 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. 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 judgement of their effectiveness and practicality (Slate et al. 1992). WS employs several lethal control methods selectively to remove aquatic rodents causing damage where nonlethal techniques would not adequately address the damage situation. A formal risk assessment of all mechanical devices and toxicant (zinc phosphide) used by the WS ARDM program in New Mexico is in USDA (1997 Appendix P). WS conducts direct control operations with any of the following methods on private property only if a signed *Agreements For Control On Private Property* is on file, or where *Agreements For Control On Nonprivate Property* or *Work Plans* on federal, state, county or other local government lands are in place that cover the intended target species and methods to be used.

Most ARDM methods have strengths and weaknesses in each specific damage situation, and can range from being very effective at reducing damage to being of virtually 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. Following is a basic list of methods given consideration by WS for ARDM, a discussion of their use, and the 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 residents of an area to eliminate the feeding of wildlife that occurs in parks, recreational sites, or residential areas to reduce damage by certain species of wildlife, such as nutria that can become tame and very aggressive towards people. 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 who are not directly affected by problems caused by wildlife enjoy wild animals and engage in activities that encourage their presence. It is difficult to consistently enforce no-feeding regulations and to effectively educate all people concerning the potential liabilities of feeding wildlife.

Habitat management such as the removal of vegetation near water and damage prone areas reduces cover and eliminates food sources which might discourage the presence of aquatic rodents. Regulated farm ponds such as those used for irrigation can be drawn down after they have provided their annual use to reduce aquatic rodents from inhabiting them. Additionally, the continual destruction of beaver dams and removal of dam construction materials on a daily basis sometimes causes beavers to move elsewhere, although this strategy can be far more expensive than removing the beavers in conjunction with dam removal.

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 affects on the environment. Their dams can create valuable wetland habitat for wildlife in time (usually several years), especially where a dam holds water during drought periods. On the other hand, their dams can create sinks where water evaporates and percolates into the ground which decreases water flows which may be needed for agricultural activities, some fish and wildlife species, and other resources downstream during the time that it is becoming a wetland. Beaver dam removal 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. The impoundments that WS removes 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, preexisting function).

Unwanted beaver dams can be breached by hand with a rake, power tools (e.g., a winch) or machinery (e.g., backhoe), or with binary explosives (discussed below). Beaver dam breaching by hand, with power tools, machinery or with binary explosives does not affect the substrate or the natural course of the stream and returns the area back to its preexisting condition with similar flows and circulations. Because beaver dams involve waters of the United States, removal is regulated under Section 404 of the Clean Water Act. WS has consulted with the U.S. Army Corps of Engineers on beaver dam removal by hand as conducted by WS in New Mexico; WS does not remove wetlands, and, thus the Corps agreed that WS activities are allowed under the Clean Water

Act.

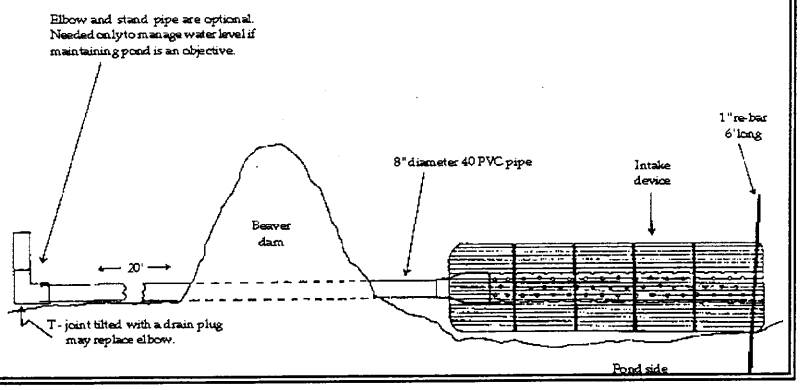
Beaver dam breaching can have varying effects, both positive and negative on T&E species, depending on the species present. The breaching of recently built beaver dams from irrigation ditches and other artificial waterways such as culverts where roads, bridges, buildings or houses are constructed will not likely have an adverse effect on T&E species. However, the breaching of beaver dams that have been created along natural drainages such as creeks and streams could have varying affects on T&E species depending on the species that could potentially be affected and the amount of time that the dam has been in place. The longer the beaver dam has been in place, the higher the potential for its removal to have an impact. Recently built dams are more likely to have negative effects on wildlife until it is an established wetland and are usually easily removed. Beaver dams that have been in place for several years are not as likely to be removed by hand (sedimentation and vegetation would make it much more solid), but would take heavy equipment or explosives to remove; WS would defer the cooperator to the Corps for a permit to remove the dam.

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 1) (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).

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. Nat. Res. 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),

Figure 1. Pond Leveler



$496 - $560 for a single modified Clemson leveler, $1050 - $2,300 for a single beaver stop, or more than $1,000 for a Beaver Deceiver (C. Sloan, WS-MS, pers. comm. 2002). 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.2000). Nolte et al. (2000), checking the status of Clemson pond-levelers that had been in the field anywhere from a few months to a few years, found that about 45% remained effective. For those situations where the leveler did work, it required many man hours in effort to maintain the pond-leveler working and required additional costs associated with their use. They also found that their effectiveness was somewhat related to the land-use objectives of the landowner (e.g., wanted a pond for waterfowl habitat). Nolte et al. (2000) also found that the use of pond-levelers were most effective (95%) where beaver numbers were controlled in an area and kept at a low population level.

Water-level control devices are most effective on wetlands lacking in-stream flow (C. Sloan, WS-MS, pers. comm. 2002) and may be ineffective in beaver ponds located in broad, low-lying areas (Organ et al. 1996). Pond-levelers are also very effective at culverts where the entrance to the culvert is deepened to reduce the potential for beavers wanting to build a dam at the site (D. Nolte, NWRC, pers. comm. 2003). 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 and around aquaculture facilities can prevent access to otter. 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, recent tests with electrical barriers in Arizona were ineffective for long periods in reducing beaver damage (Nolte et al. 2003). Fencing, especially if it is installed with an underground skirt, can prevent access to aquatic mammals 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, fruit trees, etc) 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 and where other trees are available for beaver to take. 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 several 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. A formal risk assessment of all wildlife damage management methods used by the WS ARDM program in New Mexico is in the FEIS, Appendix P (USDA 1997).

Relocation, the translocation of an animal, may be appropriate in some situations (i.e., a suitable relocation site is available, if the problem species' population is at very low levels at the relocation site, and the additional dollars needed for relocation can be obtained.) However, species that often cause damage problems are often 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, and in some cases could require payment of damage compensation claims. Additionally, NMGF would have to authorize relocations before they could be done per NMSA 17-3-27 and 31. NMGF would likely allow relocations only where aquatic rodents are not already present, but were historically, and the landowners were agreeable to having them.

Cage traps, snares, and leghold traps can be used to capture aquatic rodents alive for relocation. This method was used to reestablish beaver throughout much of New Mexico after their populations had been depleted. This method is now rarely used to solve problems caused by beaver or muskrat in New Mexico because these species are abundant. In addition, moving damage-causing individuals to other locations can typically result in damage at the new locations, or the translocated individuals may move from the relocation site to areas where they are unwanted. AVMA, the National Association of State Public Health Veterinarians, and the Council of State and Territorial Epidemiologists all oppose the relocation of mammals because it poses a risk of disease transmission to naturally occurring mammals in the new area, particularly for small mammals such as raccoons or skunks (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 is not necessarily precluded in all cases, it would in many cases be logistically impractical and biologically unwise.

The beaver and muskrat populations are at historic levels in much of the United States. In many areas they have vastly exceeded that number and are overabundant. As such, most population management methods are no longer used to reintroduce beavers or muskrats to areas because few areas exist where beavers and muskrats have not already been reestablished. NMGF has relocated many beaver in the State and relocation projects conducted by WS for NMGF would only be done at their request or where a permit was granted by NMGF to a cooperator. WS does not receive many of these requests. NMGF policy requires approval from all adjacent private landowners that might

be affected, prior to relocation of beaver. In addition, relocation would not likely be conducted where a population already existed. Beaver are territorial and relocating beaver could likely result in problems if they were relocated to areas with beaver already present. Territorial beaver fight and losers must set out for new areas. In the process, many beavers would likely die because they may not be able to find suitable, unoccupied habitat or wind up in areas where they would have to be recaptured. One study in Wyoming where beaver were relocated to unoccupied habitat found that relocated beaver losses to mortality and emigration from the relocation site was about 50%; 100% of beavers 2 years old or less died or emigrated away from the release site after being relocated (McKinstry and Anderson 2002).

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 are ineffective or are short-lived in reducing or eliminating damage caused by wildlife, therefore, are not used very often 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 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).

Body-gripping (e.g., Conibear®) traps are designed to cause a fairly quick death of the animal that activates the trap. The number 330 body-gripping trap is generally used for beaver and the 110/120 for muskrats. Body-gripping 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 body-gripping traps, such as those used for muskrats, can be set either in or out of the water. Placement of these traps is in travel ways or at their 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-gripping traps do present a risk to nontarget animals; however, the take of nontargets is much less for professional users than novices because they have expertise in selective placement of the traps and the trigger which can reduce nontarget hazards significantly (D. Nolte, NWRC, pers. comm. 2003).

Leg-hold traps can be effectively used to capture a variety of rodents. 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 non-target 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 non-target 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 euthanized by shooting.

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 effected by inclement weather. Target animals are caught around the neck, body, or leg and later euthanized by shooting.

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 with drugs or shooting. They also could be relocated, if this were desired by NMGF.

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 non-target animals. Disadvantages of these traps are expense (approximately $275 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), are less cost and time-efficient than snares, leg-holds and body-gripping traps, and may cause serious and debilitating injury to otters (Blundell et al. 1999). Beaver captured in Hancock traps would be euthanized by shooting or with drugs, or relocated according to NMGF desires.

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.

Toxicants have been used to target aquatic rodents. The only toxicant currently registered in New Mexico for use in ARDM is zinc phosphide for muskrat and nutria control. No toxicants are registered for use on beavers. The use of zinc phosphide on various types of fruit or vegetable baits (apples, carrots, sweet potatoes) on floating rafts to kill muskrats and nutrias has proven to be quite effective at suppressing a local population. Zinc Phosphide (EPA. Registration No. 56228-22) is a metallic pesticide. It has a strong, pungent, garlic-like odor that actually is attractive to rodents such as rats, but unattractive to other animals. Prebaiting with the same bait carrier as the mixed bait is used prior to bait application to make the treatment more effective. When zinc phosphide comes into contact with dilute acids in the stomach, phosphine gas is released and this gas probably causes death. Animals that ingest lethal amounts of bait usually succumb overnight with terminal symptoms of convulsions, paralysis, coma, and death from asphyxia. If death is prolonged for several days, intoxication occurs with severe damage the liver. Animals that are alive after 3 days are said to completely recover. All chemicals used by WS are registered under FIFRA and administered by EPA and NMDA. 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 the New Mexico State pesticide control laws and regulations.. No chemicals are used on federal or private lands without authorization from the land management agency or property owner/manager. A quantitative risk assessment evaluating potential impacts of WS's use of chemical methods when used according to the label concluded that no adverse effects are expected from the above (USDA 1997, Appendix P).

Zinc phosphide baits deteriorate slowly into phosphine gas; therefore, dry bait must be considered toxic indefinitely and used accordingly. Under field conditions, zinc phosphide that has been dusted onto wet baits such as cubed vegetables and fruits break-down in a few days. Once in the soil, zinc phosphide breaks down rapidly to phosphine, which is either released into the atmosphere or converted into phosphates and zinc complexes. Translocation of phosphine has been demonstrated, but it is rapidly converted to harmless phosphates. WS has not used zinc phosphide to reduce damages from muskrats or nutria in New Mexico in the past 5 FYs (FY98 - FY02). Use of zinc phosphide following label instructions is not likely to adversely affect T&E species.

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 3 years thereafter (WS Directive 2.615).

In New Mexico, WS personnel receive National Rifle Association certified training. 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.

Private persons may take beaver and muskrat for recreation with shooting with the appropriate license during the designated season as established by NMGF. Beaver and muskrat can be taken year-round on lands owned or leased by private individuals when causing damage.

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 does hold. It is WS' conclusion that the use of immobilizing and euthanizing drugs will have no effect on T&E species because they are highly target specific.

3.2.2 Alternative 2 - No Federal WS 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. Tribes and public agencies would have to conduct ARDM themselves or with a contractor. If landowners tried to handle the problems themselves, it is probable that many ARDM methods would be used unsafely and improperly resulting in potential harm to the environment and themselves, and result in the increased take of nontarget species. As an illustration, in 1997 a man was killed in Oklahoma when he and another man set fire to a beaver lodge (which is not an efficient method to control beavers) and quickly were overcome with a dense cloud of smoke; the man suffered a heart attack while trying to escape (D. Dudley, WS, OK, pers. comm. 2003). Additionally, it is hypothetically possible that 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, would increase significantly without assistance.

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.

3.3.1 Compensation for Aquatic Rodent Damage Losses. Compensation would require the establishment of a system to reimburse resource owners for damages. This alternative was eliminated from further analysis because no federal or state laws currently exist to authorize such action. Under such an alternative, WS would not provide any direct control or technical assistance. Aside from lack of legal authority, analysis of this alternative in the FEIS indicates that the concept has many drawbacks (USDA 1997) such as:

- It would require larger expenditures of money and manpower to investigate and validate all losses, and to determine and administer appropriate compensation. Based on data for damage prevented from other WS programs, compensation could be expected to cost 5-6 times as much as the current program (J. Heisterberg, WS, NC pers. comm. 2003).

- It would be difficult, if not impossible, to assess and confirm losses in a timely manner for all requests, and, therefore, many losses could not be verified and would go uncompensated.

- Compensation would give little incentive to resource owners to limit damage with ARDM strategies such as improved barriers.

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

- Compensation would likely be below the full market value of the resource damaged.

3.3.2 Bounties. Payment of funds for killing aquatic rodents (bounties) suspected of causing economic losses has not been supported by New Mexico State agencies such as NMGF and NMDA as well as most wildlife professionals for many years (Latham 1960). WS concurs with these agencies and wildlife professionals because of several inherent drawbacks and inadequacies in the payment of bounties, including:

- Bounties are generally ineffective at controlling damage, especially over a wide area such as New Mexico.

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

- It is difficult or impossible to assure that the animals claimed for bounty were taken from the damage management area.

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

3.3.3 Wildlife Damage Should Be an Accepted Loss -- A Threshold of Loss Should Be Reached Before Providing ARDM Services. WS is aware of concerns that Federal WDM should not be allowed until economic losses for resource owners become unacceptable. Under such an alternative, WS would not provide any direct control or technical assistance until a certain economic threshold of damage had been reached. Although some loss of resources to wildlife can be expected and tolerated, WS has the legal direction to respond to requests for WDM, and it is Program policy to aid each requester to minimize losses. This alternative was eliminated from further analysis because it was determined that a threshold of damage does not have to be reached to conduct WDM. In a ruling for Southern Utah Wilderness Alliance, et al. vs. Hugh Thompson, Forest Supervisor for the Dixie NF, et al., the United States District Court of Utah upheld the determination that a WDM program may be established based on threatened damage. In part, the court found that a forest supervisor need only show that damage (from predators) is threatened to establish a need for WDM (Civil No. 92-C-0052A January 20, 1993). Thus, there is precedent for conducting ARDM when damage has not yet occurred but is only threatened.

3.3.4 Eradication and Long Term Population Suppression. An eradication alternative would direct all WS Program efforts toward total long term elimination of aquatic rodents in entire cooperating counties or larger defined areas in New Mexico. In New Mexico, the eradication of beaver and muskrat is not a desired goal of state agencies, although these species may be taken by the general public in areas where they are causing damage. Eradication of nutria may be a desired goal because they are not a native species, but NMGF would be responsible for making this determination because they are a furbearer under State law. Eradication as a general objective for ARDM will not be considered by WS in detail because:

- WS opposes eradication of any native wildlife species;

- NMGF opposes eradication of any native New Mexico wildlife species;

- The eradication of a native species or local population would be extremely difficult, if not impossible to accomplish, and cost-prohibitive in most situations; and

- Eradication is not acceptable to most members of the public.

Suppression would direct WS Program efforts toward managed reduction of certain problem populations or groups. When a large number of requests for WDM are generated from a localized area, WS would consider suppression of the local population or groups of the offending species, if appropriate. However, it is not realistic, practical, or allowable under present WS policy to consider large-scale population suppression as the basis of the WS Program. Typically, WS activities in New Mexico are conducted on a small portion of the area inhabited by aquatic rodents.

3.3.5 Reproduction Control. Contraceptive measures for mammals can be grouped into four categories: surgical sterilization, oral contraception, hormone implantation, and immunocontraception (the use of

contraceptive vaccines). These techniques 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 induced and surgically induced reproductive inhibition as a method for controlling nuisance beaver populations is contained in Novak (1998a). 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. At present, no chemical reproductive inhibitors are legal for use for beaver, muskrat, or nutria..

Potential environmental concerns with chemical sterilization would still need to be addressed, including safety of genetically engineered vaccines to humans and other wildlife. At this time, chemical sterilization is controversial among wildlife biologists and many others. In any event, no contraceptive agents or methods are currently registered and are thus not legal for use or practical for use on aquatic rodents. Should any become registered in the future, WS could consider them among the methods to be used. Any additional NEPA analyses deemed necessary at that time would be conducted.

These methods will not analyzed in detail in this EA because: (1) surgical sterilization would require that each animal be captured and sterilized by licensed veterinarian, and would therefore be extremely labor intensive and expensive; and (2) no Federally or State approved chemosterilants are available for operational use in ARDM.

3.3.6 Biological Control. The introduction of a species or disease to control another species has occurred throughout the world. Unfortunately many of the introduced species become pests themselves. For example, in Hawaii, the Indian mongoose (*Herpestes auropunctatus*) was brought in to control rats (*Rattus spp.*), but wound up causing declines in many native Hawaiian bird species. The only biological control that has been tried for managing aquatic rodents is the introduction of alligators (Wade and Ramsey 1986). Although alligators can and do sometimes prey on aquatic rodents, they would be unreliable in reducing numbers to the point that damage no longer occurred. In addition, alligators themselves can become problems, and could present hazards to people and pets. Because alligators are not native to New Mexico, this method will not be considered further by WS.

3.3.7 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. 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, WS Policy (WS Directive 2.101) requires WS Specialists to consider and prefer nonlethal over lethal ARDM methods while assessing a damage situation and applying the WS Decision-making Process (Slate et al. 1992). Additionally, WS personnel experienced in ARDM know when and where nonlethal control techniques would be effective or ineffective, and, thus, this alternative could result in the use of methods that are known to be ineffective in particular situations just to meet the requirements. This would also take additional time to resolve a problem and potentially exacerbating the damage sustained by a resource owner before a problem was resolved. This Alternative has been discussed in detail in USDA (1997) and other WS EAs such as the Aquatic Rodent Damage Management in Oklahoma EA (WS 1998); this alternative has always been found to have slightly higher negative environmental impacts than implementing IWDM, the proposed action. Therefore, this alternative was dropped from analysis in this EA.

3.4 MITIGATION IN SOPs FOR WILDLIFE DAMAGE MANAGEMENT TECHNIQUES

3.4.1 Mitigation in WS SOPs. Mitigation measures are any features of an action that serve to prevent, reduce, or compensate for impacts that otherwise might result from that action. The current WS Program, nationwide and in New Mexico, uses many such mitigation measures which are discussed in detail in Chapter 5 of the FEIS (USDA 1997). Some key mitigating measures pertinent to the proposed action and alternatives that are incorporated into WS's SOPs include the following.

- The WS Decision Model, which is designed to identify effective WDM strategies and their impacts, is consistently used.
- Nontarget animals captured in leghold traps or snares are released if it can be done safely, unless it is determined by WS Specialists that they will not survive.
- Conspicuous, bilingual warning signs alerting people to the presence of traps and snares are placed at major access points to areas where they are set in the field.
- Reasonable and prudent alternatives and measures are established through consultation with USFWS and implemented to avoid adverse impacts to T&E species.

Some additional mitigating factors specific to the current WS ARDM program include the following.

- Management actions are directed toward localized populations or groups of target aquatic rodent species or individual offending members of those species. Generalized population suppression across New Mexico will not be conducted, except for possibly the nutria because of its status as an introduced species.
- Although hazards to the public from ARDM devices and activities are low according to a formal risk assessment (USDA 1997, Appendix P), hazards to the public and their pets are even further reduced by the fact that ARDM activities are primarily conducted on private or other properties in New Mexico where public access is highly restricted or denied.

3.4.2 Additional Mitigation Specific to the Issues. The following is a summary of additional mitigation measures that are specific to the issues listed in Chapter 2 of this document.

3.4.2.1 Effect on Target Aquatic Rodent Species Populations.

- ARDM activities to resolve damage problems are directed at taking action against individual problem animals, or local populations or groups, and not by attempting to eradicate populations in the entire area or region.
- WS take is monitored to maintain the magnitude within levels desired or authorized by NMGF representing the State's interests in terms of managing or controlling affected species (See Chapter 4).

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 method(s) for taking problem animals with little impact to nontarget animals.

- The nationwide WS program engaged in formal consultation with the USFWS pursuant to Section 7 the Endangered Species Act and received a Biological Opinion in 1992 (see USDA 1997, Appendix F and P). That opinion is incorporated herein by reference. However, it did not cover the potential effects of beaver dam removal on listed species. To address these other concerns, WS consulted with USFWS about the potential impacts of ARDM activities on T&E species in New Mexico with the USFWS.

- 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 is the bald eagle. 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 either 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.

  - If a bald eagle is incidentally taken from the Southwest population, use of the control method will be halted immediately, and WS will reinitiate consultation.

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

- Potential impacts on other T&E species not covered in the 1992 Biological Opinion (USDA 1997) in New Mexico have been assessed and no adverse impacts are likely to occur from WS actions. Potential impacts from ARDM for the Southwestern willow flycatcher (*Empidonax trailii extimus*), Chiricahua leopard frog (*Rana chiricahuensis*), boreal toad (*Bufo boreas boreas*), and Rio Grande silvery minnow (*Hybognathus amarus*) were addressed. USFWS has concurred that WS ARDM activities are not likely to adversely affect these T&E species in New Mexico if the following mitigation measures are followed.

  - WS will remove beaver dams only by hand.

  - WS will not remove dams that have become wetlands.

  - WS will conduct all proposed beaver control actions in a manner that will minimize disturbance of nesting willow flycatchers.

- WS will remove all mud, snails, algae, and other debris from traps, snares, waders, and gloves if they conduct work in the range of boreal toad or Chiricahua leopard frog to reduce the chance of spreading chytridiomycete fungus or other disease. These will then be scrubbed with a 10% bleach solution and then rinsed clean with sterilized (boiled previously) water.

3.4.2.3 Humaneness of Control Techniques

- WS personnel attempt to kill captured target animals that are slated for lethal removal as quickly and humanely as possible. In most field situations, a shot to the brain with a small caliber firearm is performed which causes rapid unconsciousness followed by cessation of heart function and respiration. This is in concert with the AVMA's definition of euthanasia.

- Research on selectivity and humaneness of management practices would be monitored and adopted as appropriate.

- The WS Decision Model (Slate et al. 1992) is used to identify effective biologically and ecologically sound aquatic rodent damage management strategies and their impacts.

- WS personnel are trained and experienced to select the most appropriate method for taking targeted animals with minimal impacts on nontarget species. WS specialists also use trap lures and set traps in locations that are conducive to capturing the target animal, but minimize potential impact to nontarget species.

- WS specialists recommend the use of various nonlethal methods such as exclusion and pond levelers where these are applicable.

- The use of traps and snares conform to current laws and regulations administered by NMGF and WS policy (ADC Directive 2.450).

- WS use of ARDM capture devices is consistent with internationally recognized humane trap standards.

3.4.2.4 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. In neither case are wetlands affected.

- 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.

3.4.2.5 Effects of ARDM Methods on Public Safety

- 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 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 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.

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.

4.1 ENVIRONMENTAL CONSEQUENCES

This section analyzes the environmental consequences of each alternative in comparison with the proposed action to determine if the real or potential impacts are greater, lesser or the same.

4.1.1 Cumulative and Unavoidable Impacts. Cumulative and unavoidable impacts will be discussed in relationship to each of the potentially affected species analyzed in this chapter.

4.1.2 Nonsignificant Impacts. The following resource values within New Mexico are not expected to be significantly impacted by any of the alternatives analyzed: soils, geology, minerals, floodplains, visual resources, air quality, or prime and unique farmlands. These resources will not be analyzed further.

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

4.2 ISSUES ANALYZED IN DETAIL

4.2.1 Effects on Target Aquatic Rodent Populations. NEPA requires federal agencies to determine whether their actions have a "significant impact on the quality of the human environment." A declining population of a resident wildlife species does not necessarily equate to a "significant impact" as defined by NEPA if the decline is collectively condoned or desired by the people that live in the affected human population. It is reasonable and proper to rely on the representative form of government within a state as the established mechanism for determining the "collective" desires or endorsements of the people of a state. WS abides by this philosophy and defers to the collective desires of the people of the State of New Mexico by complying with State laws and regulations that govern the take or removal of resident wildlife. Although the analysis herein indicates aquatic rodent populations are not being impacted to the point of causing a decline, if at some point in the future they are, then such a decline would not constitute a "significant" impact as defined by NEPA so long as the actions that cause the decline are in accordance with State law, and concomitantly, with the collective desires of the people of the State.

4.2.1.1 Alternative 1 - Continue the Current Federal 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. NMGF provided statistics on population trends and take, but was unable to provide any definitive estimates of population sizes for purposes of the following analyses on impacts to the population. Therefore, WS used the best available information to produce reasonable estimates.

Beaver Population Impact Analysis. 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. Beaver damage has increased and damage requests have increased accordingly in New Mexico. NMGF strives to keep beaver damage to a minimum and retain a viable population in New Mexico. In 1967, the beaver population was estimated to be between 5,500 and 6,000 by NMGF and an annual harvest of 1,000 was recommended (Findley et al. 1975). The population has increased since then, and thus, the population has been considered viable with sport harvest. NMGF has tracked sport harvest in New Mexico and it is compared with the number of licensed furbearer hunters for 1980 to 1999 seasons in Figure 2. Both beaver harvest and furbearer hunters have shown a steady decline likely as a result of a decline in fur prices. But the data gives an indication that the beaver population can sustain the sport harvest as well as the depredation take.

Of the aquatic rodents, beaver damage management is the major focus of WS efforts in New Mexico, 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. 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 adult parents with 2-6 offspring from the current or previous breeding season (Novak 1998a). Average family group size has been documented as ranging from 3.0 to 9.2 (Novak 1998a). Beaver abundance has been reported in terms of families per kilometer of stream or per square kilometer surface area for bodies of water. Novak (1998a) 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 1998a) 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 at least at the middle of the range of those summarized by Novak (1998a).

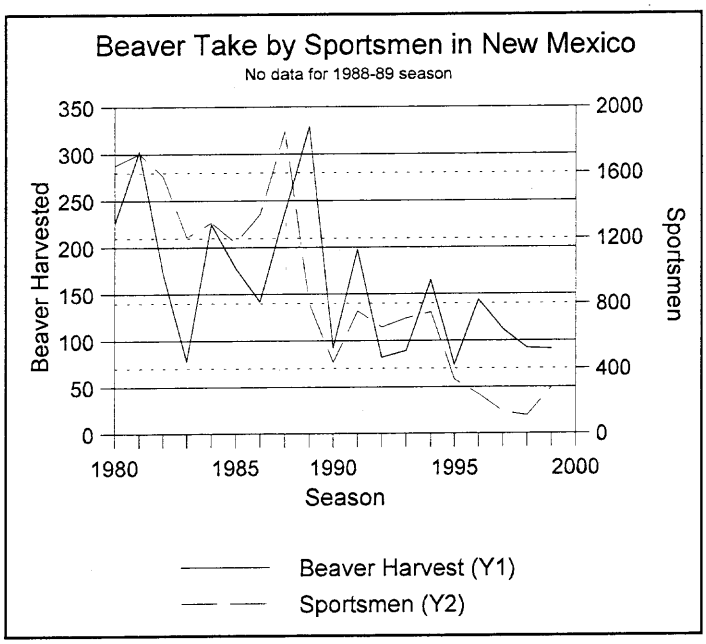


Figure 2. Beaver harvested by sportsmen in New Mexico from the 1980 (1980-81) furbearer season to the 2000 (2000-01) season. Beaver harvest and the number of sportsmen have steadily declined reflecting the decline in the fur market.

The professional opinion of wildlife biologists at NMGF (B. Dunn, NMGF, pers. comm., 2003) and WS suggests that the present beaver population in New Mexico is at least close to the middle of the range for streams and lakes reported by Novak (1998a). However, for the purposes of analysis, the low density with the median family group size will be used to determine impacts. The number of beavers per family to be used for a population estimate will be the midpoint given by Novak (1998a) or 6.1 beavers per family which is considered to be a fairly accurate estimate for beavers per family in New Mexico. Using the low and middle estimates for beaver density for lakes and streams, again considered conservative to realistic, the beaver population would range 0.5 families/mile of stream and 0.24 families/mi^2 surface area to 1.5 families/mile of stream and 3.3 families/mi^2 surface area of impoundments.

New Mexico has a limited supply of water resources and ranks 49th among the 50 states in surface acres of water, about 150,000 acres. A database (BISON- Biota Information System of new Mexico) maintained by NMGF indicated that from GIS surveys beaver make use of 2,239 miles of flowing water ways which includes rivers, aquaducts, and perennial streams (NMGF 2002). 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, does have approximately 2,239 miles of perennial (yearround) 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. With these assumptions, the beaver population can be estimated. The following formula for the mean of each variable was used:

The Estimated Beaver Population =

*(beavers/family * # beaver families/mile of stream * miles of streams in NM)*
*+ (beavers/family * # beaver families/mi^2 of impoundments * surface mi^2 in NM)*

or

*low estimate = (6.1*0.5*2,239) + (6.1*0.24*184) = 7,098*
*high estimate = (6.1 * 1.5 * 2,239) + (6.1 * 3.3 * 184) = 24,191*

Using the low population (6.1 beavers/family; 0.5 families/mi stream and .24 families/mi^2 surface water) from Novak (1998a) to be conservative with the above formula to determine a low population boundary for beaver in New Mexico would result in a population of about 7,000. The population which wildlife biologists feel is realistic is at least somewhere between the range of estimates, but closer to the 24,000. This range will be used for the population analysis and be considered the low and high range of beaver in New Mexico (Table 2). Included in Table 2 is WS' take and the Statewide harvest which includes sportsman harvest, and private and WS' depredation take.

Table 2 summarizes the analysis of WS and cumulative impacts on the beaver population. WS killed 47 beavers in FY00, 84 in FY01, and 81 in FY02. The number taken in FY01 was the highest number ever taken in one year by the New Mexico WS Program. Private harvest and depredation take of beaver as reported by the NMGF was 310 during the 1999-2000 season and 453 in the 2001-02 season. NMGF reported that 336, 174, and 255 permits were issued for depredation complaints in Calendar Year 1999, 2000, and 2001. B. Dunn (NMGF, 2003 pers. comm.) reported that because take data is not obtained from all permittees, the number of permits multiplied by 3 provides a fairly

accurate estimate of the beaver take under their depredation permits. The sum of the 3 takes give total take in New Mexico.

Table 2. Analysis of cumulative beaver take in New Mexico for depredation take by the WS Program and private permittees, and sportsman harvest for FY00, FY 01, and FY02.

BEAVER POPULATION	Low	High	Low	High	Low	High
Fiscal Year	FY00		FY01		FY02	
Est. Population	7,000	24,000	7,000	24,000	7,000	24,000
WS Kill	47	47	84	84	81	81
% Pop. WS Take	0.7%	0.2%	1.2%	0.4%	1.2%	0.3%
NMGF Depredation Kill	37	37	70	70	21	21
Sportsmen Take	273[1]	273[1]	342[2]	342[2]	432[1]	432[1]
TOTAL TAKE	357	357	496	496	534	534
Sustainable Harvest (SH)	2100	7200	2100	7200	2100	7200
% POP. TOTAL TAKE	5.1%	1.5%	7.1%	2.1%	7.6%	2.2%
% SH TOTAL TAKE	17%	5.0%	23.6%	6.9%	25.4%	7.4%
IMPACT	Low	Low	Low	Low	Low	Low

[1]New Mexico Department of Game and Fish harvest levels are based on survey data. Because only 32% of the surveys are returned on average, they estimate that their recorded harvest levels could be underestimating harvest by as much as 300%. In order to obtain a more accurate analysis, their reported harvest figures have been multiplied by a factor of 3.
[2]Harvest figures for FY01 were not available from NMDGF. For analysis, an average of the previous 10 years harvest was used.

USDA (1997) determined that beaver populations can withstand harvest rates of up to 30% without declining. This is referred to as "sustainable harvest" in this analysis. The highest total estimated take of beavers occurred during FY02, and was 534 animals. This is 7.6% of the minimum population estimate of 7,000 beavers. This level of take represents a low impact to the estimated beaver population. A sustainable harvest for the low population estimate would be about 2,100. Thus, cumulative take for the low population estimate is about 25% of the sustainable harvest, well beneath the level that would begin to cause a decline in the population. The combined sportsmen harvest and depredation take could increase by 400% before the level of significance is reached. The highest take by WS was in FY01. Total harvest during that year represented 7.1% of the conservatively estimated beaver population, and 23.6% of the sustainable harvest. This is well below a level of significance. WS take and the cumulative impact on the beaver population is considered to be of extremely low magnitude (B. Dunn, NMGF, pers. comm., 2003). Therefore, WS concludes that beaver have not been impacted by the WS program.

Muskrat Population Information and Impact Analysis. 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 to 4 litters per year that average 5-8 young per litter (Wade and Ramsey 1986) The maximum breeding density of muskrats is 2 pair per acre. With these population parameters, one pair can produce anywhere from 10 to 32 young per year. For a population to remain stable, the number of young produced would equal the number of

muskrats that died annually. 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.

Densities of muskrats range from low, at 3 per acre in open ponds, to dense, 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. 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).

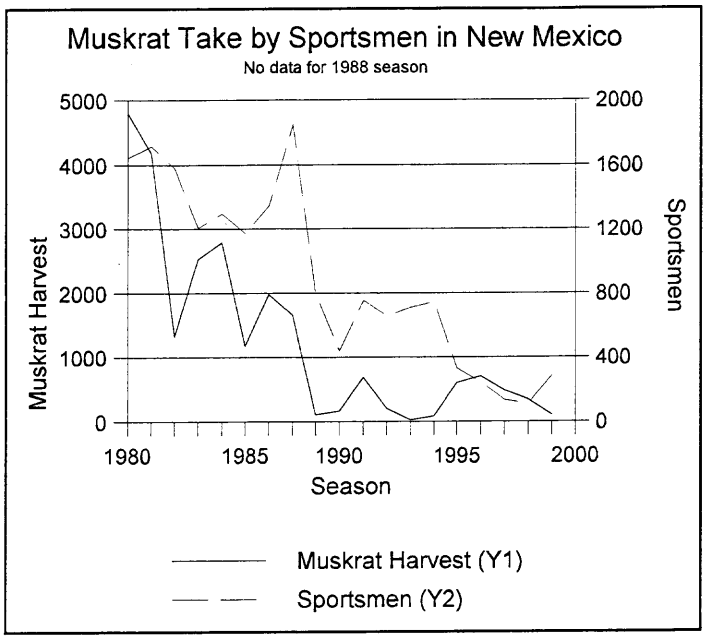


Figure 3. Muskrat harvested by sportsmen in New Mexico from the 1980 (1980-81) season to the 2000 (2000-01) season and the number of sportsmen in the field. Harvest and the number of sportsmen has steadily declined during that time.

NMGF does not estimate muskrat populations in New Mexico, but considers the population to be stable. The majority of harvest has almost always been from sportsmen. However, muskrat harvest has fallen considerably in recent years to a decline in the number of sportsmen and fur market (Figure 3). Depredation take is typically 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 only took 5 muskrats in FY02 and none in FY00 or FY01. WS did take 1 nontarget in FY00 incidental to beaver damage management. Sportsmen harvested 107 and 865 in the 1999-2000 and 2001-02 seasons. No harvest statistics were available for the 2000-2001 fur season. Sportsmen have accounted for at least 99% of the harvest of this species. The highest harvest by sportsmen in New Mexico from 1980 to 2000 was during the 1980-81 season when 4,804 muskrats were harvested (Figure 3). Coincidentally, the number of fur trappers and fur prices were much higher than they are today. 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 (NMGF 2002). 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 (B. Dunn, NMGF, pers. comm., 2003). WS 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 (ie. 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 still 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 up 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 reported that 80 were taken by one individual in 1995, but no others have been reported taken. Thus, the cumulative impact of the last few years has likely be 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.

4.2.1.2 Alternative 2 - No Federal WS 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, 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.

4.2.1.3 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.

4.2.2 Effects on Nontarget Species Populations Including T&E Species

4.2.2.1 Alternative 1 - Continue the Current Federal 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 no nontargets in FY 98, FY99, and FY01, a muskrat in FY 00, and a carp (*Cyprinus carpio*) in FY02. WS has freed 4 nontarget turtles and a bullfrog *(Rana catesbeiana)* which was superficially caught by the hind leg from FY98 to FY02; 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, raccoons and diving birds, though none were taken in the last 5 FYs. The take of non-target take 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 00 to FY02, 62% of all beaver requests were for protection of dikes or irrigation structures and an additional 15% were for protection of man-made resources (houses, landscaping, and roads). These cases involve artificial habitats not conducive to T&E species. Mitigation or minimizing measures that serve to avoid adverse impacts on T&E species in New Mexico were described in Chapter 3 (section 3.4.2.2) for the 4 species that could potentially be impacted by ARDM, the southwestern willow flycatcher, Chiricahua leopard frog, boreal toad, and Rio Grande silvery minnow. Those measures should assure that the proposed action would not adversely impact T&E species. WS did address T&E impacts in a 2003 Biological Assessment with concurrence from USFWS.

4.2.2.2 Alternative 2 - No Federal WS 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 mitigation measures. 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.

4.2.2.3 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. NMGF would still 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.

4.2.3 Humaneness of Control Techniques

4.2.3.1 Alternative 1 - Continue the Current Federal WS ARDM Program. Under this alternative, methods viewed by some persons as inhumane would be employed. Despite SOPs designed to maximize humaneness as described in sections 3.4.2.4 and 2.2.3, the perceived stress

and trauma associated with being held in leghold traps or snares until the WS specialist arrives at the trap or snare site to dispatch the animal, or, as in the case of an unharmed nontarget, to release it, is unacceptable to some persons. In addition, some methods are used in "drown sets" where the animal drowns shortly after being caught which is also considered inhumane by some persons. Other ARDM methods used to take target animals including body-gripping traps (i.e., Conibears®), cage traps with shooting and shooting alone result in a relatively humane death because the animals die instantly or within seconds to a few minutes. From FY00 to FY02; 85% of the beaver were taken with quick-kill traps, 13% with shooting, and 2% with leghold traps; the target muskrats were taken 100% in cage traps. Thus, the issue of humaneness was minimal because relatively few target aquatic rodents (4) were taken with methods that are considered inhumane.

4.2.3.2 Alternative 2 - No Federal WS ARDM. Under this alternative, leghold and quick-kill traps, cage traps, snares, and shooting would not be used by WS. NMGF would still provide assistance to private landowners and lessees at the same rate as WS and NMGF efforts combined and, thereofre, would likely have the same effect. Use of such methods by some private individuals, other agencies and Tribes would probably increase. This could result in less experienced persons implementing use of traps and snares without modifications such as pan tension devices which exclude smaller nontarget animals from leghold traps. Greater take and suffering of nontarget wildlife could result. It is hypothetically possible that frustration caused by the inability to reduce losses could lead to illegal use of chemical toxicants which might result in increased animal suffering.

4.2.3.3 Alternative 3 - Technical Assistance Only. Impacts regarding the issue of humaneness under this alternative would likely be similar to those under Alternative 2, except that technical assistance would lead to better training for the general public on the appropriate procedures for using different methods.

4.2.4 Effects of Beaver Dam Removal on Wetland Wildlife Habitat

4.2.4.1 Alternative 1 - Continue the Current Federal 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 impoundments because they have flooded areas such as roads, crops, merchantable timber, pastures, and other types of property or resources that were not previously flooded. The majority (69%) of complaints addressed by WS combining data from FY 00 through FY02 involved damage to irrigation ditches, dikes, roads, and bridges where "wetlands" would not be involved. Another 8% of projects involved damage to man-made structures, (houses, utilities, and landscaping), again not affecting wetland wildlife habitat. About 10% of WS projects involve agricultural crops, pasture or range that recently became flooded. Finally, the remaining 13% involved flooded timber. 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 does make landowners aware 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 and invariably are not considered "true" wetlands. 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.

4.2.4.2 Alternative 2 - No Federal WS 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 4.2.4.1. 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.

4.2.4.3 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.

4.2.5 Effects of ARDM Methods on Public Safety

4.2.5.1 Alternative 1 - Continue the Current Federal WS ARDM Program. Some ARDM methods could pose risks where they are not used by professionals. Methods used in ARDM that could present risks are the use of explosives, firearms, and Conibear® 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 NMDA or 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 FY00 to FY02, beaver take with quick-kill traps averaged 85% of the total take of beaver. This shows that this method is relied upon, but in the same time period, WS did not have any reportable incidents with the method.

Under this alternative, the risk of adverse impacts to the public from ARDM methods would continue to be low as discussed. Risk to members of the public from use of explosives to remove beaver dams, firearms, and body-gripping traps to take aquatic rodents would remain low due to adherence to WS policies, required safety precautions, and training.

4.2.5.2 Alternative 2 - No Federal WS ARDM. There would be no potential for adverse impacts to humans from federal use of ARDM methods. 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.

4.2.5.3 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 many individuals might receive technical assistance from WS and act in accordance with the safety advice given.

4.3 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 3). Alternative 2, followed closely by Alternative 3 would probably have the highest impacts to the environment.

Table 3. 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
Humaneness	Low	Low to Moderate	Low to Moderate
Wetland Habitat	Low	Low to Moderate	Low to Moderate
Public Safety	Low	Moderate	Low to Moderate

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