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CALENDAR YEARS 2013 and 2014 ENVIRONMENTAL MONITORING REPORT for FINAL ENVIRONMENTAL ASSESSMENT

GRAY WOLF DAMAGE MANAGEMENT IN IDAHO for PROTECTION OF LIVESTOCK and OTHER DOMESTIC ANIMALS, WILD UNGULATES, and HUMAN SAFETY

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INTRODUCTION

The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services Program in Idaho (Idaho WS) completed a Final Environmental Assessment (EA) for gray wolf (*Canis lupus*) damage management in Idaho for the protection of livestock and other domestic animals, wild ungulates, and human safety (USDA 2011*a*). A Decision and Finding of No Significant Impact (FONSI) was prepared and signed March 29, 2011 (USDA 2011*b*). The EA evaluated the need for Idaho WS activities to reduce livestock/human-wolf conflicts and the relative effectiveness of alternatives to meet that need while accounting for the potential environmental effects of each Alternative. The Decision selected Alternative 2, "Continue the Current Program, Plus Assist the Idaho Department of Fish and Game with Ungulate Protection." This Alternative allows Idaho WS to recommend and use a variety of methods in an adaptive, integrated fashion to reduce wolf-related damage and issues.

On February 24, 2012 and June 20, 2013, annual Environmental Monitoring Reports (USDA 2012, 2013) for Federal Fiscal Years (FYs) 2011 and 2012, respectively, were prepared to analyze Wolf Damage Management (WDM) program activities and environmental impacts. The results of those Environmental Monitoring Reports concluded that a revision of the EA was not necessary and that the FONSI and Decision remains valid because the affected environment and impacts remained essentially unchanged from the analyses in the EA.

PURPOSE OF THIS ENVIRONMENTAL MONITORING REPORT

The purpose of this Environmental Monitoring Report is to: 1) review Idaho WS' WDM program data and activities for Calendar Years 2013 and 2014 to determine if USDA (2011*a*), and the Decision and FONSI (USDA 2011*b*) are still appropriate, and 2) review WS compliance with standard operating procedures (SOPs) designed to minimize or avoid adverse environmental effects (Appendix A).

SCOPE AND NEED FOR ACTION

In 2013 and 2014, the Idaho WS program continued to provide WDM assistance when requested to protect livestock and other domestic animals, wild ungulates and human safety from wolves in Idaho. Throughout this time period, the scope of the analysis and need for action has not changed from that described and analyzed in USDA (2011*a*). During 2013 and 2014, Idaho WS conducted 106 and 109 wolf depredation investigations, respectively. Of those investigations, 80 (75.5%) and 78 (71.6%), respectively, were classified as confirmed wolf predation (Table 1). The number of investigations determined to be "probable and/or possible" wolf predation in 2013 and 2014 were 16 (15.1%) and 24 (22%), respectively. The remaining 10 (9.4%) and 7 (6.4%) investigations in 2013 and 2014, respectively, were classified as caused by predators other than wolves, or unknown cause of death. When compared to previous years, Idaho WS personnel conducted about 55% less investigations in 2013 than in 2012 (n=193) and about 2% more in 2014 than in 2013. As a result of the wolf depredation investigations, Idaho WS confirmed 497 and 165 cattle/sheep/horses/working dogs/pets were confirmed killed or injured, in 2013 and 2014, respectively, by wolves; while 165 and 103 cattle/sheep/horses/working dogs/pets and a goat were classified as "probable or possible" wolf predation (killed, injured or missing) in 2013 and 2014, respectively (Table 2). In the EA, the number of wolf/livestock conflict investigations, confirmed losses and probable losses had been increasing annually over the period of 2003-2009 to a peak of 266 investigations with 160 (71%) confirmed depredations and 59 (26%) depredations classified as "probable" or "possible." Current level of livestock depredations are within the range of values presented in the EA (EA Section 1.3.1).

Table 1. Summary of Idaho WS' wolf damage management activities during 2013 and 2014.

	2013	2014
Total wolf/livestock conflict depredation investigations conducted	106	109
Total investigations that were confirmed wolf predation	80	78
Percentage of total investigations involving confirmed wolf predation	75.5%	71.6%
Number of WDM projects involving protection of ungulates and/or human safety	0	1
Total number of wolves killed by WS	75	56

In 2014, the Idaho Department of Fish and Game (IDFG) requested Idaho WS' assistance with reducing the wolf population in the Lolo Zone where elk recruitment had not met management levels for several years and where excessive wolf predation was identified as the primary cause of the low recruitment. The Lolo Zone was considered in the EA as an area where IDFG data indicated that wolf predation was a concern for the elk population (EA Section 1.3.3). This Section of the EA also discusses the IDFG Predation Management Plan in 2003 for the Lolo and Selway Zones that outlines the conditions under which WDM would be considered. During 2014, Idaho WS implemented a single wolf depredation control project (Table 1), comprised of a total of three aerial shooting (helicopter) flights; one each on February 25, 26 and 27, 2014. These flights removed 15, 5, and 3 wolves, respectively, for a total of 23 wolves. Other lethal control methods (*i.e.* aerial shooting with fixed-wing aircraft, snaring, trapping and ground shooting) were considered but deemed impractical or unsafe to implement for the ungulate protection project because of severe winter conditions, and remoteness and rugged terrain of the area. Jim Hayden (IDFG, pers. comm. January 2015) verified that IDFG will maintain a minimum of 20 to 30 wolves annually in the Lolo Zone as outlined in the Lolo Elk Management Zone Plan (IDFG 2010*a*) which is consistent with the information on wolf management for this area presented in the EA Section 1.3.3.

Table 2. Number, type and disposition of livestock and other domestic animals that resulted in confirmed or probable/possible wolf-related damage from Idaho WS depredation investigations during 2013 and 2014.

2013								
	Confirmed			Probable/Possible				Total
	Killed	Injured	Total	Killed	Injured	Missing	Total	
Adult Cattle	7	2	9	3	0	0	3	12
Calves	32	4	36	11	1	1	13	49
Sheep (All[1])	404	38	442	9	3	135	147	589
Horses (All[2])	1	0	1	0	0	0	0	1
Working Dogs (All[3])	4	5	9	1	0	0	1	10
Pets (Dogs[4])	0	0	0	1	0	0	1	1
Total	448	49	497	25	4	136	165	662
2014								
	Confirmed			Probable/Possible				Total
	Killed	Injured	Total	Killed	Injured	Missing	Total	
Adult Cattle	7	9	16	8	1	0	9	25
Calves	36	5	41	14	0	7	21	62
Sheep (All[1])	100	1	101	8	0	58	66	167
Horses (All[2])	1	1	2	1	0	0	1	3
Working Dogs (All[3])	2	2	4	3	1	1	5	9
Pets (Dogs[4])	1	0	1	0	0	0	0	1
Goat	0	0	0	1	0	0	1	1
Total	147	18	165	35	2	66	103	268

[1]Includes all age classes of sheep.
[2]Includes adult horses and colts.
[3]Includes livestock guarding and herding dogs.
[4]Family pet dogs.

MONITORING INFORMATION

Alternatives Analyzed: The EA developed five alternatives for detailed analysis (EA Section 3.2) including:

- Alternative 1 - Alternative 1 - Continue the Current Wolf Damage Management Program (No Action)
- Alternative 2 - Continue the Current Program, Plus Assist IDFG with Ungulate Protection (Proposed Action/Preferred Alternative)
- Alternative 3 - Continue the Current Program, Plus Assist IDFG with Ungulate Protection and Include Use of Gas Cartridges and Breeding Wolf Sterilization as Potential Additional Control Methods
- Alternative 4 – WS Nonlethal Wolf Damage Management Only
- Alternative 5 – No Wolf Damage Management by WS in Idaho

USDA (2011*a*) also reviewed seven alternatives which were not advanced for detailed analysis (EA Section 3.5). Alternatives not considered in detail included bounties; eradication and suppression; exhausting all nonlethal methods before using lethal methods; exclusive use of lethal methods; exclusive use of technical assistance; WDM by licensed/permitted hunters and trappers; and a modified version of the exhaust all nonlethal methods before using lethal methods alternative ((Natural Resources Defense Council (NRDC)

Proposal)). None of these Alternatives has changed sufficiently to warrant new or additional analysis and no new alternatives have been proposed.

Issues Analyzed: The following five issues were identified in EA Section 2.3 as appropriate for detailed analysis for each of the alternatives (2011*a*):

- Effects on the wolf population in Idaho
- Effectiveness of lethal and nonlethal control efforts in reducing wolf predation on livestock and/or wild ungulates
- Effects on public and pet health and safety
- Animal welfare and humaneness of the methods to be used
- Impacts to stakeholders, including aesthetics of wildlife

The EA considered nine additional issues but did not address them in detail for each alternative (EA Section 2.4). These issues included a discussion of the reasoning behind the statement that lethal wolf damage management is needed to minimize negative attitudes and reduce risk of illegal action; the likelihood that lethal removals will disrupt pack social structure and increase damage instead of decreasing conflicts; the potential cumulative impact of wolf removals on other predator-prey relationships, mesopredators and competition among species; impacts on non-target species; potential for spring WDM to result in orphaned pups; appropriateness of preparing an EA instead of an EIS; the need for an EIS because the proposed action may be highly controversial or its effects highly uncertain; efforts made to target specific individual wolf or wolves involved in depredation; and whether livestock producers should have to accept some level of losses to wolves as a cost of doing business. Risks to non-target species are reviewed below for consistency with the conclusions in the EA. A recent paper on the efficacy of lethal WDM actions is also reviewed below because of potential ramifications relative to the issue that lethal removal of wolves could make depredations worse. Review of the remaining issues and data below on risks to non-target species and efficacy of WDM indicate that the data and conclusions on these issues have not changed sufficiently from material presented in EA to warrant new or additional analysis.

In 2014, the Idaho WS program received comments from the public expressing concerns that the EA may no longer adequately address current environmental conditions and that the Idaho WS program and associated impacts may increase substantially from levels presented in the EA. These issues and an explanation of how the EA accounts for and addresses them are summarized below.

> **Does the EA need to be revised because there are fewer wolves and breeding pairs than there were at the time the EA was prepared?** No, the analysis does not need to be revised because the wolf population continues to remain within the range anticipated in the EA and is above the minimum thresholds established in the EA and U. S. Fish and Wildlife Service (USFWS) and IDFG management plans for the preservation of a sustainable wolf population (EA Sections 1.4.2, 1.4.4, 1.4.5, 4.1.1.1, 4.1.1.3). The potential impacts of WDM on the wolf population was addressed in EA Sections 2.3.1, 4.1.1.1, 4.4.1.1, 4.4.2.1, 4.4.3.1, 4.4.4.1, and 4.4.5.1. The EA acknowledges that the State could establish a hunting season for wolves once wolves were delisted and that the State population management objectives involved managing for a wolf population within a range (500-700 wolves) that was lower than the size of the wolf population at the time the EA was prepared (835 wolves and 49 breeding pairs; EA Sections 1.5, 4.1.1.1, 4.1.1.3, and 4.4.1.1). Wildlife populations are dynamic. Variations in population size are normal and were expected as a result of natural biological processes and ongoing Federal, State and Tribal adaptive management processes intended to achieve multiple management objectives such as maintaining a healthy and viable wolf population, minimizing damage and conflicts associated with wolves, preserving the positive cultural and ecological and economic values of wolves, and providing big game hunting opportunities (EA Section 4.1.1). Consequently, the wolf population impact analysis was not based on take of a set number of animals per year or percentage of the population, but instead, places limits on the actions

Idaho WS can take based on ongoing wolf population monitoring and coordination with the USFWS and/or IDFG, as appropriate, to ensure that cumulative impacts of all actions including the proposed Idaho WS actions do not reduce the population below 15 breeding pairs and 150 wolves. This minimum number of wolves and breeding pairs was established by the Idaho Wolf Conservation and Management Plan ((Idaho Legislative Wolf Oversight Committee (ILWOC) 2002)) and approved by the USFWS. The Idaho plan states that remedial measures will be implemented if the State population falls below 15 breeding pairs. Review of the cumulative impacts of Idaho WS' activities on the regional wolf population is part of the SOPs for Idaho WS EA monitoring and is discussed in section on impacts on the wolf population below.

Wolf population monitoring and management in Idaho is a cooperative effort between the State of Idaho, Nez Perce Tribe, Idaho WS, and the USFWS. Wolf population monitoring is undertaken by State and Tribal biologists collecting important demographic information (reproduction; mortality, including wolf mortality resulting from Idaho WS' WDM activities; pack size;, breeding pair status;, etc.) through intensive field surveys, capture and radio-collaring, and observing and documenting individual wolves and wolf pack. Supplemental sources of data collection (i.e., wolf observations from hunters and data collected from harvested wolves) also provide valuable information facilitating wolf monitoring across the State. These sources provide confirmation of new packs via evidence of reproduction from harvested juveniles; distribution of previously unknown packs of wolves; and pack sizes. This information has been particularly useful for remote locations not being monitored through tradition methods due to difficulties with site access (IDFG and Nez Perce Tribe 2014). This is the same system of monitoring that was in place and referenced in the EA.

Does the EA adequately consider cumulative impacts of the program on the regional wolf population? Yes, The EA discusses the status of the regional wolf population and USFWS management objectives for the population in the EA Sections 1.5.4, 4.1.1.1, 4.1.1.2, and Idaho WS includes review of the NRM population in monitoring of the impacts of the wolf population. The USFWS continues to monitor the NRM Regional wolf population to ensure the ongoing health and sustainability of the population (http://www.fws.gov/mountain-prairie/species/mammals/wolf/).

Will the funding from the Idaho Wolf Depredation Control Board substantially increase Idaho WS WDM activities and wolf removals in the State? No, WDM actions and impacts on the wolf population are at similar or lower levels than presented in the EA. The number of wolves lethally taken in 2014 when funding from the board was available from August to December was actually less than the number of wolves taken by Idaho WS in 2013 prior to the allocation of funds from the Idaho Wolf Depredation Control Board. The action by the board provided funding to replace federal funds that were no longer available because wolves in Idaho are not federally listed under the Endangered Species Act (ESA), funds from IDFG and funds from the Idaho State Animal Damage Control Board collectively supported the majority of WDM in Idaho in 2013 and the first 7 months of 2014. Wolf Damage Management conducted in Idaho as needed, based case by case evaluations of the damage/conflict by the lead and applicable cooperating agencies. In the case of WDM for protection of ungulates, this need is identified by the IDFG. The group of agencies and organizations listed above has been able to find the funding needed to provide needed WDM, but the funding mechanism was insecure and unduly complicated. It is erroneous to believe that wolves would be lethally removed just because there is funding for lethal removal of wolves but no documented instances of damage. However, the funding from the Idaho Wolf Depredation Control Board may enable Idaho WS to hire additional staff to help in responding to wolf damage reports. This will reduce Idaho WS' response time to damage complaints and may actually decrease the need for and magnitude of lethal WDM. Faster response times would better enable Idaho WS to help the landowner/manager to identify nonlethal preventive management actions for use that are often most effective when implemented before problem wolf behavior becomes well established. Even when lethal removal is needed, Idaho WS experience indicates that rapid response to confirmed livestock

depredation may enable resolution of the problem with removal of fewer individuals than if the problem behavior becomes established in a pack.

Does the EA adequately consider the impacts and issues associated with wolf management for the protection of ungulates? Yes, WDM for the protection of ungulates was discussed at length. Although studies continue in this area, there have been no new findings which substantively alter the conclusions of the analysis. Impacts of this type of WDM were considered in detail in the analysis of Alternative 2 which includes Idaho WS involvement in wolf removal to enhance big game populations at the request of the IDFG. The EA also addressed questions regarding the need for wolf management to protect big game in: (1) The need for Action Section 1.3.3; (2) in the discussion of issues relevant to the analysis, including Section 2.3.2 Effectiveness of the proposed action, and Section 2.4.3 – impact of wolf removals on predator prey relationships, mesopredators and species competition; (3) the list of issues declared outside the scope of the analysis (2.5.4 – Appropriateness of trying to limit the impacts of wolf predation on ungulates and 2.5.6 – Appropriate population level for wolves in Idaho) and; (4) responses to comments in Appendix C of the EA. Wolf Damage management for the protection of ungulates is also addressed in responses to Comments 4a, 4b, 5, and 12 in the FONSI.

Does the EA address impacts of removals for damage management on pack structure and subsequent tendency for a pack to prey on livestock? The issue of impacts of removals on pack structure is addressed in Section 2.4.2 and Appendix C of the EA and in response to Comment 23 in the FONSI. A study by Wielgus and Peebles (2014) indicated that lethal removals may make depredation on livestock worse and hypothesized that the reason for the increase may relate to impacts on wolf populations and population structure. However, the study was fundamentally flawed in several respects and the results, and not reliable. The study is discussed in detail in the section below on Effects on the Wolf Population in Idaho. No other data or information has been identified that warrants revision of the material in the EA.

Is the relationship between hunting mortality and removals for damage management discussed in the EA? The analysis of hunting as a replacement for damage management or as a way to reduce the need for damage management is addressed in EA at Section 1.5.3. There is no new information available that substantively changes the material presented in the analysis and that would warrant revision of the analysis at this time.

Does the EA consider a nonlethal before lethal alternative? The EA reviewed two versions of a nonlethal before lethal alternative: 1) an alternative in which all nonlethal methods must be exhausted before any lethal methods are used, and 2) the NRDC proposal in which required cooperators to provide proof of sustained and ongoing use of nonlethal methods prior to receiving assistance from Idaho WS, giving priority to nonlethal before lethal methods, and use of lethal methods only when nonlethal methods failed to adequately resolve the conflict. The EA did not advance those alternatives for the reasons analyzed in the EA Sections 3.5.3 and 3.5.7. Reasons for continuing not to further analyze these alternatives remain as presented in the EA and no additional analysis is warranted at this time.

1) Effects on Wolf Populations in Idaho

In addition to the final delisting that went into effect on May 5, 2011, the USFWS had also removed wolves in the Northern Rocky Mountain (NRM) Distinct Population Segment (DPS)[1] from the Federal list of T/E) species in April 2009 (74 FR 15123-15188), a decision vacated by the U.S. Federal District Court in August

[1] The Northern Rocky Mountain Distinct Population Segment includes wolves in Idaho, Montana, Wyoming, Northern Utah and Eastern Washington and Oregon.

2010. While delisted, wolves were managed in accordance with IDFG's 2008 Wolf Management Plan (IDFG 2008). The 2008 plan was a step-down document from ILWOC (2002) plan approved by the USFWS and provided additional details on 1) public harvest; 2) wolf depredation management for livestock, pets and other domestic animals, and ungulates; and, 3) protection of human safety. However, with the relisting of wolves on August 5, 2010 by the U.S. Federal District Court in Missoula, Montana, the Idaho Fish and Game Commission cancelled IDFG (2008) stating that the plan was moot, because it could not be fully implemented while wolves were listed (IDFG 2010*b*).

By order of the Department of Defense and Full-Year Appropriations Act, 2011 (Public Law 112-10, Section 1713) signed by President Obama on April 15, 2011, the USFWS published a notice in the Federal Register on May 5, 2011 (76 FR 25590-25593), enacting the final rule published on April 2, 2009 (74 FR 15123-15188) identifying the NRM population of gray wolf as a distinct population segment and removing wolves from Idaho and Montana, as well as portions of eastern Oregon and Washington, and north-central Utah, from the list of T/E wildlife. The rule specifies that Idaho must manage for at least 15 breeding pairs and at least 150 wolves in mid-winter to ensure that the population never falls below the minimum Federal recovery goal of 10 breeding pairs and 100 wolves in Idaho. After publication of the notice, primary responsibility for the management of wolves in Idaho shifted from USFWS to the IDFG and the Nez Perce Tribe. State management efforts are conducted in accordance with the Idaho Wolf Conservation and Management Plan (ILWOC 2002) previously adopted by the Idaho Legislature and accepted by the USFWS. On May 19, 2011, the Idaho Fish and Game Commission directed the IDFG to manage wolves as big game animals consistent with the goals and objectives of the Idaho Wolf Conservation and Management Plan (ILWOC 2002).

After the IDFG and the Nez Perce Tribe resumed management of wolves in 2011, cumulative impacts on the wolf population, including removals for damage management and hunting and trapping seasons, resulted in minimum wolf population estimates of 768, 683, and 659 wolves for the years 2011, 2012, and 2013, respectively (IDFG and Nez Perce Tribe 2014). The 2014 preliminary range for the minimum year-end population estimate is 550-750[2] wolves (IDFG 2015) (Table 3). The 2013 level is about 3.5% less than the estimated minimum population in 2012 and the preliminary 2014 level is about -16.5% to +13.8% of the 2013 level. The minimum number of breeding pairs of wolves in Idaho in 2013 and 2014 was 20 and 22[3] pairs, respectively. Both the estimated minimum population and minimum breeding pairs for 2013 and 2014 exceed the minimum 150 individuals and 15 breeding pairs listed in the Idaho Wolf Conservation and Management Plan (ILWOC 2002) and 74 FR 15123-15188, resulting in meeting the annual minimum 5-year delisting monitoring criteria. The estimated minimum year-end population also meets the minimum number of wolves set in the EA (150 wolves and 15 breeding pairs) is within the likely population range of (500-700 wolves; EA Section 4.1.1.3) presented in the EA.

During 2013 and 2014, Idaho WS personnel killed a total of 75 and 56 wolves, respectively, in response to confirmed wolf depredations on livestock/working dogs/pets and to protect wild ungulates. No wolves were removed either year for purposes of addressing human safety. From the depredation control actions in 2013 and 2014, 75 and 33 wolves, respectively, were removed by Idaho WS for livestock protection, and 0 (zero) and 23 wolves, respectively, were removed to promote elk survival and recruitment. The total wolf mortality attributed to Idaho WS in 2013 and 2014 accounts for about 15.9% and 15.9%, respectively of the total known wolf mortalities from all causes; and about 11.4% and 7.5% to 10.2%, respectively, of the year-end

[2] The preliminary range of the minimum year-end population estimates are tentative and were provided by the IDFG through a briefing paper to the Idaho Fish and Wildlife Commission on January 5, 2015 (IDFG 2015). The estimates will not be finalized until the end of March, 2015; however, the minimum year-end population is not expected to be less than 550 wolves.

[3] The estimated number of breeding pairs for 2014 is tentative and was provided by the IDFG through a briefing paper to the Idaho Fish and Game Commission on January 5, 2015 (IDFG 2015) and direct consultation with Idaho WS. The final estimate will not be available until the end of March, 2015. However, at least 22 breeding pairs had been documented by IDFG at the time this report was prepared (J. Gould, IDFG, pers. comm. January 2015).

estimated minimum population (Table 3). This is similar to the range of mortality for damage management presented in the EA of 5-12.6% of the total population for the period of 2005-2009. The proportion of total wolf mortality attributable to Idaho WS has declined from the 29 - 64% presented in the EA for 2005-2008 when there wasn't a hunting season in Idaho and is similar to the 11.7% for 2009 which was the only year of data available for a year with a hunting season

Based on the above information, Idaho WS' WDM activities and associated cumulative mortality (Table 3) are consistent with levels analyzed in the EA and are having a low magnitude of impact on the overall statewide wolf population. Given current activities and anticipated future needs, the effects of Idaho WS' WDM activities are expected to remain within parameters analyzed in USDA (2011*a*), resulting in a low magnitude of impact.

In 2013 and 2014, the IDFG held regulated public hunting and trapping seasons for wolves. Statewide, sport hunters and trappers harvested 356 wolves in 2013 (IDFG and Nez Perce Tribe 2014) (Table 3) and 329 wolves during 2012 (IDFG and Nez Perce Tribe 2013), an 8.2% increase from 2011; and 253 wolves (J. Rachael, IDFG, pers. comm. January 2015) during 2014, a 40.7% decrease from 2013 (Table 3).

Table 3. Idaho WS Cumulative Impact to the Wolf Population During 2013 and 2014.

	2013	**2014**
Minimum estimated population as of December 31, of each year	659[1]	550-750[2]
Percent change from the previous year's minimum estimated population	-3.5%[3]	-16.5% to +13.8%
Number of wolves killed by Idaho WS	75[4]	56[5]
The percentage of the number of wolves killed by Idaho WS compared to the minimum estimated population of each calendar year	11.4%	7.5% to 10.2%
Wolves, other than those taken by Idaho WS, lethally controlled (killed by IDFG to benefit prey species, or IDFG-authorized agents in response to livestock protection or were killed by livestock producers/landowners in defense of property)	19[1]	11[6]
Wolves legally harvested by hunters and trappers	356[1]	253[6]
Other known human-caused wolf mortalities for each CY[7]	16[1]	17[6]
Total estimated number of wolves dying from causes other than human-caused mortality (*i.e.*, natural and unknown)	7[1]	17[6]
Total number of known wolf mortalities from all causes during each CY	473	353[6]

[1] IDFG and Nez Perce Tribe (2014).

[2] The preliminary minimum year-end population estimates are tentative and were provided by the IDFG through a briefing paper to the Idaho Fish and Wildlife Commission on January 5, 2015 (IDFG 2015). The actual number will not be finalized until the end of March, 2015, but the minimum year-end population is not expected to be less than 550 wolves.

[3] The minimum estimated population as of December 31, 2012 is 683 wolves (IDFG and Nez Perce Tribe 2013).

[4] All wolves killed were for the protection of livestock.

[5] Thirty-three wolves were killed responding to livestock depredation and 23 were killed to enhance elk recruitment in IDFG's Lolo Zone.

[6] Preliminary number of wolves (J. Rachel, IDFG, pers. comm. January 2015). The data will not be finalized until the end of March, 2015.

[7] For 2013, includes: 1) illegal take (n=8); 2) vehicle (n=4); 3) non-target (n=2); 4) wounding loss/illegal take (n=1); and 5) capture related (n=1) (Idaho and Nez Perce Tribe 2014). For 2014, includes: 1) illegal take (n= 11); 2) vehicle (n=1); and other (n=5) (J. Rachael, IDFG, pers. comm. January 2015).

The most recent USFWS report (USFWS 2014*a*) on the NRM Regional wolf population indicates that the estimated minimum number of wolves in the population (≥1,691 wolves in ≥320 confirmed packs with at least 78 breeding pairs) is above the minimum recovery goal of at least 300 wolves and 30 breeding pairs in Montana, Idaho and Wyoming and the above management goal of maintaining at least 15 breeding pairs and 150 wolves in each State. The wolf population had expanded from the core recovery states of Idaho, Wyoming and Montana into Washington (≥38 wolves in ≥10 packs including ≥3 breeding pairs) and Oregon (≥61 wolves in ≥8 packs including ≥4 breeding pairs). Documented Dispersal of radio-collared wolves and effective dispersal of wolves between recovery areas determined through genetic research further substantiates that the metapopulation structure of the NRM Distinct Population Segment (DPS) has been

maintained solely by natural dispersal. The USFWS continued to monitor the NRM DPS population during 2014; however, the annual review report for 2014 will not be available until March or April 2015.

Based on the information above on the Idaho wolf population and the NRM population, impacts on the wolf population and wolf population monitoring remain as presented and anticipated in the EA. No revised analysis of the EA to address this issue is warranted at this time.

2) Effectiveness of Lethal and Nonlethal Control Efforts in Reducing Wolf Predation on Livestock and/or Wild Ungulates

Some critics of WDM and regulated wolf harvest have suggested that lethal WDM is unnecessary because they believe nonlethal methods can effectively prevent wolf depredations on livestock, and that lethal removal of wolves may actually exacerbate conflicts between wolves and livestock. Conversely, proponents of WDM and wolf harvest believe both of these activities can be effective in helping to reduce wolf-livestock conflicts and the impact of wolves on select big game herds.

Wielgus and Peebles (2014) reviewed the effects of wolf mortality on reducing livestock depredations from 1987 to 2012 in Idaho, Montana and Wyoming and concluded that the number of livestock depredated the year after the methods were used, that the odds of livestock depredations increased with increased wolf control up and until wolf mortality exceeded the mean intrinsic growth rate of wolves at 25%. But the authors also acknowledge that lethal control of individual depredating wolves may sometimes be necessary to stop depredations in the near-term. Some of the conclusions from Wielgus and Peebles (2014) were confounded by the fact that the overall wolf population was increasing throughout the time period used in their analysis. Several fundamental flaws in the analysis have also been identified in the analysis ((J. Young, USDA-APHIS-WS, National Wildlife Research Center (NWRC), pers. comm., December 2014)). For example, the spatial scale of the analysis (State level) makes it impossible to consider that removing wolves may stop problems in the project area, but would not affect losses in other locations. The temporal scale of the analysis (2 years) was generally longer than the average period of efficacy documented by other authors for lethal removals ($\leq$ 1yr; Rossler et al. 2012). Several flaws in the data analysis were also identified by WS, NWRC researchers such as the publication only uses control-based removals and does not address how hunting removals or even nonlethal methods impact their analysis. For example 329 wolves were killed during public harvest verses 73 wolves killed for livestock depredation and ungulate protection (control actions) in Idaho during 2012. Since hunting and trapping have become legal, they are responsible for more wolves removed annually than control actions (J. Young, USDA-APHIS-WS, NWRC, pers. comm., December 2014). Additionally, the focus of results and discussion have shown a bias by focusing solely on the conclusion that illustrates killing that <25% of the population may increase subsequent year's depredations. However, one could just as easily focus on the other side where removing >25% of the wolves does reduce livestock depredation in the subsequent year (J. Young, USDA-APHIS-WS, NWRC, pers. comm., December 2014).

Idaho WS, at the direction of the IDFG, and consistent with the alternative selected in the EA, applied an integrated WDM approach where the integration and application of all approved methods of prevention and management, both nonlethal and lethal, were considered for resolving wolf predation problems. The evaluation, selection and eventual application of methods consider the: 1) overall effectiveness of the method and its ability to resolve the problem; 2) specific type and magnitude of damage; 3) geographic extent; 4) duration, frequency and likelihood of recurring damage; 5) non-target species vulnerability; 6) environmental condition and impacts; 7) social and legal factors; and 8) relative costs.

Nonlethal WDM methods continued to be recommended by Idaho WS during 2013 and 2014, including the use of livestock protection dogs, fencing, livestock corralling at night, use of herders, increase human presence (*i.e.,* range riders), use of radio-activated guards and fladry, including turbo fladry (Lance et al. 2010). Although nonlethal methods are normally implemented by livestock owners themselves, Idaho WS

routinely distributes information and provides technical assistance on the proper use of nonlethal methods. Despite nonlethal methods being recommended by Idaho WS and those employed by livestock producers around the State, the number of confirmed investigations by Idaho WS where livestock/working dogs/pets killed or injured by wolves presented above in the Section on the Scope and Need for Action indicate that these methods are not sufficient to resolve wolf depredations in the State and that use of an integrated program including the use of lethal methods, is still warranted.

As noted in the EA Section on SOPs, WS, NWRC continues to conduct research to improve the selectivity and humaneness of management methods. Current efforts include a project to assess new breeds of livestock guarding dogs for their effectiveness in reducing wolf predation (USDA 2014). Idaho WS also reviews available literature and scientific meetings for information developed by entities outside Idaho WS including improvements in shock collars for wolf management (Hawley et al. 2013, Rossler et al. 2012) and research on fladry (Lance et al. 2010). These methods are improvements to existing methods considered in the EA and, as such, have similar impacts to those analyzed in the EA. Consistent with provisions of the EA, Idaho WS incorporates new information on use of nonlethal methods as appropriate including recommendations for the use of electrified fladry discussed by Lance et al. (2010). No new revision of the EA is warranted to address these methods.

3) Effects on Public and Pet Health and Safety

Wolf Damage Management actions may be conducted to reduce risks to people and pets from wolves. Procedures for addressing risks to human health and safety from wolves are outlined in USFWS (1994), 71 FR 43410, 73 FR 10514, 74 FR 15123-15188, and ILWOC (2002). During 2013 and 2014, Idaho WS did not conduct any wolf control projects where IDFG officials requested assistance with wolves threatening the public's safety. Idaho WS confirmed one instance of a pet dog being killed by wolves in 2014 and had one instance of probable/possible wolf predation on a pet dog in 2013 (Table 2). Although not common, instances of wolf predation on pets continues to be a need for action as presented in the EA.

Potential risks to the public and domestic pets from WDM methods, such as the mechanical methods used for wolf capture and/or removal (*i.e.*, traps, snares, aerial shooting), or certain nonlethal methods (*e.g.*, livestock protection dogs and propane cannons), must also be considered. The greatest risks associated with Idaho WS WDM methods are incurred by the employees who implement those methods. Idaho WS is unaware of any adverse impacts to public health or safety associated with implementation of any WS WDM methods in Idaho during 2013 and 2014. There were no instances of unintentional mortality or injury of pet dogs during WDM in 2013 and 2014. However, as noted in Table 4, one livestock guarding dog was captured and released and one livestock guarding dog was killed in 2014 by Idaho WS while conducting WDM activities. Livestock guarding dogs live full-time with the animals they guard; consequently risks to livestock guarding dogs are substantively different than those to companion animals and pets. Impacts, and risks to non-target species including dogs remain as presented in the EA (See also discussion of impacts on non-target species below).

4) Humaneness and Animal Welfare of the Methods to be Used

Idaho WS personnel are trained professionals who strive to use the most humane methods available to them, recognizing the constraints of current technology, workforce, funding, and social concerns. In determining the most appropriate damage management strategy, preference is given to practical and effective nonlethal methods (WS Directive 2.101). However, nonlethal methods may not always be applied as a first response to each damage problem. The most appropriate response could be an integration of nonlethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy.

Program activities and their potential impacts on humaneness have not changed from those analyzed in USDA (2011*a*) and Idaho WS continues to support and promote improvements in the selectivity and humaneness of many lethal and nonlethal WDM techniques and devices tested or developed through research efforts of the USDA-APHIS-WS, NWRC. Review of the SOPs presented in the EA and summarized in Appendix A of this document identified no new strategies or revisions which should be added at this time.

Table 4. Number of un-intentional non-target animals captured and released or killed by Idaho WS personnel during WDM activities in 2013 and 2014 compared to the Hunter and Fur Harvest from July 1, 2012 to June 30, 2013, and July 1, 2013 to June 30, 2014, respectively (hunter and fur harvest data is only available from IDFG through the State Fiscal Year time period which is July 1, to June 30, of each year).

2013				
Species	Captured		Hunter/Fur Harvest	WS' Impact on the Population
	Released	Killed		
Badger	0	1	245[1]	Low
Black Bear	0	3	2,393[2]	Low
Bobcat	1	0	1,189[1]	Low[3]
Mule Deer	0	1	31,348[4]	Low
TOTAL	1	5		
2014				
Species	Captured		Hunter/Fur Harvest	WS' Impact on the Population
	Released	Killed		
Black Bear	7	1	2,180[2]	Low
Bobcat	2	0	1,419[2]	Low[3]
Livestock Guarding Dog	1	1	NA[5]	NA[5]
Mountain Lion	0	1	564[2]	Low
Mule Deer	2	1	25,913[2]	Low
Turkey Vulture	0	1	NA[5]	Low
TOTAL	12	5		

[1] IDFG (2014).

[2] J. Rachael, IDFG, pers. comm. January 2015.

[3] There were no negative impacts to bobcat populations from Idaho WS' WDM activities because the only bobcats affected were captured in foothold traps, released unharmed, and presumed survived.

[4] IDFG (2013).

[5] Not applicable.

5) Impacts to Stakeholders, Including Aesthetics of Wildlife

The goal of WDM is to provide relief from wolf damage or threats to human health or safety while minimizing the potential for negative impacts on the environment, including aesthetic and social values. Idaho WS only conducted WDM in consultation with the IDFG and then only after a request has been received from citizens, organizations, and others who are experiencing problems (*i.e.,* where a need exists).

Idaho WS' integrated WDM approach (*e.g.,* Alternative 2), as described in USDA (2011*a*), is still believed to be the best approach for resolving livestock/human-wolf conflicts while conserving Idaho's wolf population. Such an approach has benefited both livestock producers and wolves. Livestock producers benefit because there is a compensation program managed by the Governor's Office of Species Conservation that provides payments for partial economic losses caused by wolves; and the subsequent removal of depredating wolves reduces or eliminates the threat of additional losses at affected ranches or other properties. Wolf populations

overall benefit because Idaho WS' WDM actions target wolves at only those sites where livestock depredations or threats of human health or safety have been verified, or in specific areas identified by IDFG where wolves are having a negative impact on ungulate survival and recruitment. Processes used by IDFG for identifying areas for WDM to protect ungulates are specifically designed to preserve positive values of wolves and a health wolf population while also balancing the aesthetic and recreational values of individuals who value viewing and hunting ungulates (*e.g.*, elk).

Utilization of nonlethal methods for WDM may serve as a buffer between wolves, livestock producers, and the public in some situations. The presence of a readily available effective WDM program also reduces the risks that frustrated individuals will attempt to solve wolf problems on their own. Frustrated individuals may intentionally or unintentionally use illegal methods or methods that are not as selective or humane for target individuals or target species. Program activities and methods and their potential impacts on aesthetics have not changed from those analyzed in USDA (2011*a*).

Impacts on Other Resources

USDA (2011*a*) concluded that there would be no negative impacts to park land, farm land, wild or scenic areas, ecologically unique areas, historical sites, and other unique physical features from the selected Alternative. Consistent with the conclusions in the EA, there were no instances where Idaho WS' WDM activities have adversely affected any of these resources. Revisions to address impacts on park land, farm land, wild or scenic areas, ecologically unique areas, historical sites, and other unique physical features are not needed.

A common concern among members of the public and wildlife professionals, including Idaho WS, is the cumulative effect of WDM methods on non-target species, including T/E and species of special concern. During 2013 and 2014, no T/E species or species of special concern were captured or killed by Idaho WS during WDM activities. Unfortunately, 5 un-intentional non-target animals were killed each in 2013 and 2014; and 1 and 12, respectively, were captured and released unharmed (Table 4). The IDFG manages hunting and trapping in the State to ensure healthy and sustainable populations of game species and furbearers. When comparing the un-intentional non-target animals killed by Idaho WS during WDM activities with the numbers killed by recreational hunters and private fur trappers, Idaho WS' cumulative impact on those species populations is low (Table 4). The time frames for IDFG reporting of hunter and trapper harvest and Idaho WS program reporting do not quite match, but no matter how Idaho WS take is allocated among years, Idaho WS' take remains an extremely low (<0.5%) proportion of hunter and trapper harvest.

One turkey vulture was unintentionally killed in 2014. The Partners in Flight Database estimates there are approximately 13,000 turkey vultures in Idaho (Partners in Flight Science Committee 2013). U.S. Geological Survey Breeding Bird Survey (BBS) data indicate a stable to increasing population trend for turkey vultures in the State and increasing trend for turkey vultures nationwide and in the western BBS region over the period of 2002-2012 (Sauer et al. 2014). The unintentional mortality of one turkey vulture will not adversely impact the State, regional or national turkey vulture population.

There has been no take of T/E species by Idaho WS during WDM actions. Idaho WS consults with USFWS on its program's potential effects on T/E species from WDM activities including completion of a new Section 7 consultation and resulting Biological and Conference Opinion from the USFWS on all Idaho WS activities and methods used, including WDM (USFWS 2014*b*). The Section 7 consultation was completed in 2014. No action occurs without either 1) a determination that the program would have no effect on T/E species, 2) a concurrence from USFWS that the program would not be likely to adversely affect T/E species, or, 3) a USFWS formal Biological and Conference Opinion with reasonable and prudent measures, if necessary, to ensure that Idaho WS would not jeopardize the continued existence of T/E species in Idaho. The proposed WDM actions would have no effect on listed plants or aquatic species. Only one new

terrestrial species has been added to the Federal list of T/E species since the EA was completed – the Yellow-billed Cuckoo. The 2014 Biological Opinion concluded that Idaho WS actions may affect but are unlikely to adversely affect yellow-billed cuckoo with potential impacts limited to rare and short term disturbance. The USFWS concluded that the impacts of this type of disturbance would be insignificant. Sage-grouse have also been proposed as a threatened species and were considered in the Biological Opinion. As with the Cuckoo, the USFWS concluded that Idaho WS actions, with provisions for minimizing disturbance to sage-grouse leks, may affect but were unlikely to adversely affect sage-grouse.

Coordination with Federal and State Agencies

Idaho WS' officials prepared annual Work Plans that include WDM for the Boise, Caribou-Targhee, Challis/Salmon, Clearwater, Nez Perce, Payette and Sawtooth National Forests; the Southcentral and the Lower and Upper Snake River BLM District Offices; and the Eastern, Southcentral and Payette Lakes Area offices of the Idaho Department of Lands (IDL). Each Work Plan and WDM activities that occurred on public lands from the previous year were discussed with officials from each land agency. No major concerns were raised or issues expressed related to Idaho WS' WDM by any of the public land management officials.

Compliance and Monitoring

Idaho WS' WDM activities have been conducted in a manner consistent with all applicable environmental regulations, including the ESA and the National Environmental Policy Act. Idaho WS representatives will continue to meet at least annually with cooperating local officials from the BLM, US Forest Service, USFWS, IDFG, IDL, Idaho State Animal Damage Control Board, Idaho Wolf Depredation Control Board and the Nez Perce Tribe, as applicable, regarding conduct of WDM activities. Substantial changes in the scope of work, changes in relevant guidance documents or environmental regulations may trigger the need for further analysis; however, no substantive changes to the proposed program, or SOPs or program impacts have been identified at this time. Review of Idaho WS compliance with SOPs presented in Appendix A indicates the Idaho WS program continues to comply with SOPs established in the EA.

SUMMARY STATEMENT

The current Idaho WS WDM program addresses the issues and needs while balancing the environmental concerns of management agencies, landowners, advocacy groups, and the public. USDA (2011*a*, *b*) indicate that there will not be a significant impact, individually or cumulatively, on the quality of the human environment and that Idaho WS' WDM activities are insignificant and that these actions do not constitute a major Federal action. Review of Idaho WS WDM actions conducted during 2013 and 2014 indicate that the effects of implementing the program have been consistent with the analysis in USDA (2011*a*). The issues and affected environment have not changed from that described and anticipated in the EA and impacts on the environment remain as analyzed in USDA (2011*a*).

The minimum number of breeding pairs of wolves in Idaho in 2013 and 2014 is estimated at 20 and 22[4], respectively. Both the estimated minimum population and minimum breeding pairs for 2013 and 2014 meets the minimum 150 individuals and 15 breeding pairs listed in the Idaho Wolf Conservation and Management Plan (ILWOC 2002) and 74 FR 15123-15188, resulting in exceeding the minimum annual 5-year delisting monitoring criteria. The estimated minimum year-end wolf population for 2013 and 2014 also exceeds the minimum number of wolves analyzed in the EA.

[4] The estimated number of breeding pairs for 2014 is tentative and was provided by the IDFG through a briefing paper to the Idaho Fish and Game Commission on January 5, 2015 (IDFG 2015) and direct consultation with IDFG. The final estimate will not be available until the end of March, 2015. However, at least 22 pairs were documented by IDFG (J. Gould, IDFG, pers. comm. January 2015) at the time this report was prepared.

the minimum 150 individuals and 15 breeding pairs listed in the Idaho Wolf Conservation and Management Plan (ILWOC 2002) and 74 FR 15123-15188, and exceeds the minimum annual 5-year delisting monitoring criteria. The estimated minimum year-end wolf population for 2013 and 2014 also exceeds the minimum number of wolves analyzed in the EA as the threshold below which WDM measures must be halted or modified and the EA re-evaluated.

Based on this Environmental Monitoring Report, the need for action and issues identified in USDA (2011*a*) are best addressed by continuing the current program and applying the associated mitigation measures discussed in Chapter 3 of USDA (2011*a*). The current program: (1) successfully addresses WDM using a combination of the most effective methods and does not have a significant adverse effect on the environment, property, and/or non-target species, including T/E species; (2) offers the greatest chance at maximizing effectiveness and benefits to resource owners and managers while minimizing cumulative impacts on the quality of the human environment; (3) presents the greatest chance of maximizing net benefits while minimizing adverse impacts to public health and safety; and (4) offers a balanced approach to the issues of humaneness and aesthetics when all facets of those issues are considered. However, the foremost considerations are that: (1) WDM will only be conducted by Idaho WS at the request of landowners/managers, (2) management actions are consistent with applicable laws, regulations, policies and orders and coordinated with the IDFG, and (3) no significant adverse impacts to the environment were identified in the analysis. Idaho WS will continue to provide effective and practical technical assistance and direct management techniques that reduce damage.

Idaho WS will continue to conduct WDM according to program procedures, protection measures and mitigation factors including SOPs discussed in USDA (2011*a*), and in coordination with the IDFG and the goals indicated in ILWOC 2002. Revision of USDA (2011*a*) is not deemed necessary and the March 29, 2011 Decision and FONSI (USDA 2011*b*) remain appropriate.

For additional information concerning this determination, contact: State Director, USDA-APHIS-WS, 9134 W. Blackeagle Drive, Boise, Idaho 83709, or telephone Area Code (208) 373-1630.

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1/22/15
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Appendix A

Gray Wolf Damage Management in Idaho for Protection of Livestock and other Domestic Animals, Wild Ungulates, and Human Safety Revised Environmental Assessment

***Quality Assurance Checklist*[5]**

Effects on Wolf Population

- ✓ Wolf Damage Management (WDM) actions were directed toward offending wolves and packs or localized populations.
- ✓ The total number of wolves killed did not exceed the quantitative levels analyzed in USDA (2011*a*), or levels identified in ILWOC (2002) and 74 FR 15123-15188. Idaho WS' WDM activities and actions are having no significant overall impact on Idaho's wolf population.

Effects on Non-target Species Populations

- ✓ Non-target animals captured in foothold traps and snares were released at the capture site unless the Idaho Wildlife Services (Idaho WS) employee determined that animal would not survive.
- ✓ Impact of WDM activities on non-target animals is negligible and there has been no significant impact on these species' populations.
- ✓ Traps and snares were set at least 30 feet from exposed carcasses to avoid or minimize risk of capturing scavenging bird species.
- ✓ Idaho WS personnel are experienced and trained to select the most appropriate method for taking targeted wolves and excluding non-target animals.
- ✓ Breakaway snare locks, as appropriate, were implemented to facilitate the self-release of deer, elk or livestock that might be inadvertently captured.
- ✓ Pan tension devices are used on foothold traps and foot/leg snare devices to minimize the likelihood of capturing non-target species unless such use would preclude capture of the intended target animal.

Protecting Human Safety

- ✓ Conspicuous, bilingual warning signs alerting people to the presence of foothold traps and snares were placed at major access points when such devices were set in the field.
- ✓ No injuries or illnesses to members of the public occurred as a result of Idaho WS WDM activities.

Use of Pesticides

- ✓ No pesticides were used by Idaho WS in WDM activities.

Historic Preservation

- ✓ Idaho WS determined this program's actions are not the kind of actions with potential to affect historic resources.
- ✓ Idaho WS consulted with the State Historic Preservation Office and has determined that the program is not likely to affect historic properties or archeological sites.

[5] Checklist of Standard Operating Procedures to minimize or avoid adverse environmental effects.

Native American Cultural Issues

- ✓ No activities were conducted on Native American Tribal lands and actions would only be conducted on Tribal lands at the request of the Tribe.

Humaneness

- ✓ Euthanasia procedures (*e.g.*, gunshot to the brain) that minimize pain were used to kill wolves slated for lethal removal.
- ✓ Pan tension devices are used on foothold traps and foot/leg snare devices to minimize the likelihood of capturing non-target species that are lighter in weight than the target species, unless such use would preclude capture of the intended target animal.
- ✓ Research by APHIS WS National Wildlife Research Center continued to improve the selectivity and humaneness of management devices and on nonlethal methods.

Endangered, Threatened and Sensitive Species

- ✓ No non-target take of any listed threatened or endangered species occurred.
- ✓ "Reasonable and Prudent Alternatives" (RPAs) or "Reasonable and Prudent Measures with Terms and Conditions" (RPMs) from USFWS (1996, 2002), 2014 Biological and Conference Opinion (USFWS 2014*b*), or other Biological Opinions from the U. S. Fish and Wildlife Service were applicable to this action; and to the best of the knowledge of the project or program's manager, all of the RPAs and/or RPMs were met during the reporting period.
- ✓ Neck snares were not used for wolves in areas occupied by grizzly bears or in Grizzly Bear Recovery Zones during the time period of March 16 to November 30 of each year.
- ✓ For Federal lands, sensitive species were addressed during the annual Work Planning process.

Land Management Issues/Conflicts

- ✓ Idaho WS developed Work Plans in coordination with the Bureau of Land Management (BLM), U.S. Forest Service (USFS) and Idaho Department of Lands (IDL) officials before conducting WDM activities on lands managed by these agencies.
- ✓ Work conducted on BLM, USFS or IDL managed lands was in accordance with the developed Work Plans referenced above.
- ✓ Vehicle access was limited to existing roads or trails unless otherwise authorized by the land management agency.
- ✓ No conflicts with public land recreationists or other users occurred during the reporting period.
- ✓ Actions in Wilderness Study Areas were conducted in accordance with BLM's Interim Management Policy for Lands Under Wilderness Review (H-8550-1, III. G. 5).

Additional Measures to Minimize Impacts

- ✓ The APHIS WS Decision Model was used to identify the most appropriate WDM strategies and their impacts.
- ✓ Preference is given to nonlethal damage management when practical and effective.

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