CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

Introduction

This chapter compares the predicted environmental consequences for each of the five alternatives. Wolves will be present in Montana regardless of which of the five alternatives is selected, but the number of wolves present will vary by alternative. Different management philosophies and tools will lead to different outcomes, each based on the range of management philosophies – from conservative to aggressive.

The environmental consequences are speculative because no one can accurately predict the status of Montana's wolf population at the time of actual delisting, which may be one to three years away. Moreover, the actual outcomes will result from future management decisions and circumstances that may or may not have been fully anticipated. Therefore, the reader may find it helpful to consider the significance of the impacts described in each alternative, and then to compare alternatives relative to each other rather than to focus exclusively on the prediction. The impacts are estimated using the best available information and historical data, in keeping with accepted scientific and statistical methods. Some assumptions were necessary to estimate impacts. Those assumptions will be identified wherever they occur.

For this EIS, FWP evaluated the environmental consequences by assuming each alternative would be implemented starting in 2003. Impacts are then reported for 2015. Some environmental consequences will be short term and develop rapidly. Others may not emerge for several years. The longer time span accounted for: 1) the time required to complete the delisting process, 2) the biological life span of wolves and their prey, and 3) impacts which develop while the wolf population stabilizes. Cumulative environmental impacts result from incremental consequences added to other past, present, and reasonably foreseeable actions by FWP, including actions by other state agencies and businesses regulated by other state agencies. In this EIS, consideration of cumulative impacts is limited to the State of Montana.

While impacts are predicted, it is also possible for FWP to mitigate or lessen impacts to some degree, based on how and when specific management strategies described for each alternative are implemented. FWP intends to lessen the impacts of a recovered wolf population where possible, while still maintaining a secure and healthy population. This chapter also identifies any irreversible and irretrievable commitments of resources to implement any of the five alternatives. A summary of the consequences of each alternative is presented at the end of this chapter (Table 43).

Methods to Estimate Some of the Environmental Consequences

None of the alternatives in the EIS represent the type of policy choices examined in the analysis conducted prior to the reintroduction of gray wolves to YNP and central Idaho. Rather than a "wolves or no-wolves" analysis, this EIS analyzes the consequences of a spectrum of wolf conservation and management alternatives. This section describes the methods used to estimate certain consequences. Other methods are described under each alternative.

Wolf Numbers and Distribution

Wolf numbers and distribution are expected to increase through time. FWP is uncertain of how rapidly the wolf population will grow. Some newly colonizing wolf populations in highly productive habitat, such as YNP, have grown rapidly. Other long-established populations, such as in northwestern Montana have increased more slowly. Wolf distribution will probably be determined by prey abundance and

Montana geography that presents intermingled valleys and mountainous terrain, and a patchwork of human settlement, variable wild prey densities, and livestock distribution. Future wolf population growth in Montana will probably be determined by social conflicts between wolves and humans. At present, there is no reliable method to determine "social tolerance." How fast the population grows and where wolves will be found will differ across the five alternatives that reflect a spectrum of social tolerance and management approaches. Therefore, the total number of wolves was predicted differently for each alternative. Once the total number was predicted, the number of breeding pairs is also predicted using the mathematical relationships that describe the correlation between the minimum number of wolves in the fall population and the number of breeding pairs for the gray wolf population in the State of Montana, based on historical data (USFWS unpubl. data).

For Alternative 1 (No Action), the gray wolf stays listed and managed according to the original recovery plan and the Yellowstone EIS (USFWS 1994a). The number of wolves in the experimental population area was predicted by assuming the population would grow at 22% per year – the same growth rate assumed for the Yellowstone EIS. The number of wolves in the Northwestern Montana Recovery Area in 2015 was predicted using population performance between 1986 and 2001. The number of wolves in each area was added together to predict the total number of wolves in the Montana population in 2015.

For Alternatives 2 (Updated Council) and 3 (Additional Wolf), wolf numbers were estimated by analyzing historical data for the Montana portion of the tri-state population from 1986-2001 (USFWS unpubl.) Historical finite rates of growth (lambda) were assumed to be representative of future population performance and applied to the predicted Montana wolf population at the time of delisting in 2003. Implementation of liberal management tools was assumed to decrease the population growth rate by 50%. The decreased growth rate was applied to the population from the year liberal tools are implemented until 2015.

Owing to the uncertainty about how fast the wolf population will actually increase, FWP estimated the size of a future wolf population according to a low growth rate and a high growth rate. The low growth rate is derived from actual historical data. The high growth rate was assumed to be double the low growth rate. FWP expects the number to actually be near the low end of the range. The Montana wolf population may stabilize at numbers at or near the adaptive management trigger so that liberal tools may not be available every year between 2003 and 2015. The population could still increase or decrease from year to year.

For Alternative 4 (Minimum Wolf), wolf numbers are capped near the recovery goals. Aggressive management and control is assumed to limit the population at or near the cap.

For Alternative 5 (Contingency), wolf numbers were predicted using the same method as Alternatives 2 and 3. However, FWP could only implement some of the liberal management tools because of certain restrictions imposed by federal regulations. Therefore, the population growth rate was reduced by only 25% (rather than 50%) between the time that liberal management tools are implemented and 2015. The wolf population may stabilize at numbers at or near the adaptive management trigger so that liberal tools may not be available every year between 2003 and 2015. The population could still increase or decrease from year to year.

Prey Populations and Hunter Opportunity

The gray wolf is an effective predator of ungulates. The impact on ungulate population dynamics can usually be gauged in relation to other environmental factors, such as weather, and what other species are present in the system. For example, wolf predation may accelerate declines in ungulate populations already negatively affected by severe winters and even slow the rate of population recovery afterwards –

especially if there is more than one large predator. During a series of mild winters, wolf predation may not significantly influence ungulate populations.

All prey populations vary through time, across a diversity of habitats, and in response to ever changing environmental factors. The cause and effect relationships that make populations go up or down are often not known, yet widely debated. FWP's ungulate management program is designed to provide an opportunity for regulated harvest, while balancing population status, other mortality factors, habitat condition, landowner tolerance, hunter opportunity, previous hunter success, and an array of environmental factors known to influence populations. In general, Montana big game populations are robust and hunters enjoy greater opportunity now than even 20 years ago (see Chapter 2). Statewide harvest trends reflect that. At the regional level, similar trends are apparent, but more variable. At the hunting district level, harvest sometimes varies even more--and so do the factors influencing hunter success.

Changes in ungulate population dynamics or hunter participation may or may not be directly influenced by wolf presence. For example, in one northwestern Montana hunting district having established wolf packs since the mid-1980s, the number of elk hunters declined by 22% and the number of elk hunter days declined by 15% between the late 1980s and the mid-1990s. Declines in white-tailed deer and elk populations were attributed to additive predation pressures by wild carnivores (wolf, black and grizzly bear, coyote, mountain lion) and human hunting during those same years (Kunkel and Pletscher 1999). In a district to the south with similar habitat and snow regimes, the number of elk hunters and elk hunter days also declined, but in the absence of resident wolf packs. But in adjacent districts to the west having resident wolf packs at a lower density, the number of elk hunters and elk hunter days did not decline during that time. FWP does not fully understand why hunter effort changes at the hunting district level, but perceived or real changes in prey abundance due to a variety of factors may influence the decisions of individual hunters. Hunters may also be influenced by changes in hunting regulations for harvesting particular age or sex classes of big game.

This EIS must assess each alternative's potential impact on prey populations and hunter opportunity due to all factors, including the presence of a recovered wolf population. FWP relies on the combination of biological information, results from the telephone harvest survey, changes in the environmental, weather events, and time to interpret ungulate population trends. Ultimately, all sources of data must be taken together to respond to changes in the population status of either wolves or their prey. This EIS considers future changes in ungulate populations due to implementation of each of the five alternatives in relation to historical trends at the statewide level.

Economics

Four specific areas of economic impacts were addressed: 1) wolf depredation on livestock, 2) big game hunting (primarily elk, deer, and moose) and the big game outfitting industry, 3) recreational values, and 4) the fiscal resources of FWP. Historical data were used to calculate some economic impacts. Other economic impacts are less clear due to future uncertainty and to the variation in historical data. Impacts to recreational and social values are also difficult to determine.

Because all the alternatives maintain a recovered wolf population in Montana, the estimated socioeconomic impacts across the five alternatives are similar. In fact, those impacts which can be calculated and estimated with some reliability and that do vary with each alternative, are limited to livestock losses and agency management costs. The lack of differences in impacts across the spectrum of alternatives does not mean that the alternatives have equal impacts. Rather, it is an acknowledgement that in light of all the potential ways that wolves, prey, the environment, human hunting, and recreation

interact, it is difficult to identify the impact associated with incremental differences in wolf numbers statewide.

Livestock Losses. Livestock losses were predicted using historical data for the Montana portion of the tri-state area from 1986-2001 (WS and USFWS unpubl.). As the wolf population in Montana increased during those 15 years, the number of confirmed livestock losses generally increased as well, although losses varied from year to year. FWP expects that general trend to continue as wolf numbers and distribution increase.

To predict confirmed wolf-caused livestock losses, FWP tallied the number of cattle and sheep killed for every wolf in the population each year between 1986 and 2001 and then calculated a depredation rate for each year (number confirmed livestock kills divided by total number of wolves). The annual rates were averaged over all years to account for the variation year to year. Predicted loss in 2015 is the rate multiplied by the predicted number of wolves under each alternative. Because each alternative calls for different management philosophies and specific tools to resolve wolf-livestock conflicts, the loss rate was adjusted to account for implementation of those tools, as described below.

FWP recognizes that wolves have also been the suspected cause of some livestock losses in the past because WS could not confirm a wolf as being responsible. FWP expects this will occur in the future. Therefore, FWP examined the report forms completed by WS personnel upon investigation of a wolf complaint for the calendar years 1999-2001 to discern whether wolves could have possibly been involved. Cattle and sheep losses that were not attributed to some other obvious cause, such as disease, lightening, or accidental death were tallied as "probable" wolf-caused losses. FWP then calculated the rate of probable cattle and sheep losses. The probable loss rate multiplied by the predicted number of wolves under each alternative equals the total probable losses in 2015.

FWP also acknowledges that wolves have killed or injured other domestic animals such as guarding dogs, llamas, or horses. While these losses have been intermittent and are more difficult to predict based on wolf numbers, nonetheless, they do represent economic losses to the owner. To account for these other domestic animal losses, the Defenders of Wildlife compensation records were examined. Historically, payments for other domestic animals were about 8% of the total payments for confirmed and probable cattle and sheep losses. The economic losses for other domestic animals are estimated for each alternative by taking 8% of the predicted economic losses for cattle and sheep.

FWP is also aware that livestock producers may experience losses for which little or no physical evidence is ever found. These are referred to as undocumented losses, and they tend to be associated with remote public land grazing allotments rather than private property. This EIS does not account for undocumented losses because reliable data for Montana were not available.

Under Alternative 1, confirmed and probable livestock losses were estimated using historical data. Management protocols essentially call for a reactive approach to livestock depredation, except for a few specific circumstances.

Under Alternatives 2 (Updated Council) and 3 (Additional Wolf), implementation of liberal management tools is assumed to reduce the historic livestock depredation rate by 50% and in direct proportion to the 50% reduction in the growth rate of the wolf population. Nearly all depredations in Montana to date were on private lands. The management protocols of these alternatives should reduce the number of wolf-livestock conflicts in general, but most specifically on private lands.

Under Alternative 4 (Minimum Wolf), management strategies call for limiting the wolf population at or near Montana's share of the recovery goal. Aggressive management is assumed to reduce the historic livestock depredation rate by 75%.

Under Alternative 5 (Contingency), FWP could only implement some of the liberal management tools because the gray wolf would still be listed. Those tools are assumed to reduce livestock depredation rates by 25% and in direct proportion to the 25% reduction in the growth rate of the wolf population.

Big Game Hunting. There is a link between big game populations, the number of hunters and hunter days, and the overall levels of hunter expenditures in the state. However, the relationship between a recovered wolf population, big game populations, and Montana's economy is not clear-cut. Many things influence hunter participation, including general economic conditions, weather, demographic changes, and changes in hunting regulations. For example, between 1996 and 2000, the number of Montana residents purchasing elk hunting licenses declined by 21%, at a time when big game populations were generally increasing.

Hunter numbers, hunter days, and antlerless opportunity have changed in FWP regions and individual hunting districts where wolves were present and where wolves were not present. So far, the presence of wolves appears to play a relatively minor role among the many factors that affect big game populations, hunting activity, and the economy. It is difficult to isolate potential wolf impacts from the other factors. This is particularly true at the statewide level where differences between hunting districts or regions can be balanced by hunters shifting to other areas with better opportunity.

Therefore, across all alternatives, the economic impacts to big game hunting were estimated based on the actual observed changes year-to-year in deer, elk, and moose hunting activity from 1990-2001 (as measured by the long term average, +/- 1 standard deviation). FWP assumes that changes in the number of hunters, hunter days, and antlerless permits in the future would be no greater than changes already seen in the past. This period includes several major events, including, high hunter harvest years (e.g. 1991), the severe winter of 1996-97, summer forest fires, major programmatic changes in mule deer management, wolf pack activity in new areas, as well as significant increases in hunter opportunity for antlerless elk in some areas. Even though wolves were present in Montana from 1990-2001, changes in permits and hunter participation were driven by a host of factors including wolf predation, changes in recruitment, overwinter survival, hunter opportunity, hunter demographics, previous hunter success, changes in regulations, and hunter access. This combination of factors will persist into the future.

The economic analyses focus on changes in antlerless harvest opportunity for deer and elk and in the number of hunting permits for all moose. These are the primary management tools used by FWP to annually balance hunting pressure with ungulate population levels and to influence population trends relative to management objectives.

Alternative 1. No Action

The environmental consequences of this alternative were originally predicted for the Draft EIS prior to USFWS finalizing the reclassification rule that downlisted wolves in northwestern Montana from endangered to threatened status. In it's final rule notification, USFWS concluded that the new threatened status and the increased agency flexibility will not cause any significant increase in wolf mortality that would impact population levels or prevent population increase (USFWS 2003a). It follows by extension that the wolf population in northwest Montana would also not be expected to increase any faster than historical rates due to increased management flexibility. Therefore, FWP did not reanalyze the environmental consequences of this alternative for the Final EIS. USFWS and FWP agree that no

significant changes in population performance are expected under the new rules that would warrant a new impacts analysis. The environmental consequences of this alternative were predicted as if the current and newly revised federal management policies and regulations were carried forward from 2003 to 2015. For comparison, the environmental consequences of this and the other alternatives are presented in a summary at the end of this chapter (Table 43).

Biological Environment

Wolf Management. Wolf management is oriented toward achieving recovery goals and resolving conflicts when and where they occur. Wolves in northwestern Montana would be managed as threatened. Wolves in the rest of the state would be managed as "experimental, non-essential." Thus, slightly differing agency regulations would be implemented in different parts of the state. Management policies do not allow USFWS to proactively adjust wolf numbers or distribution except where there are human safety concerns or conflicts with livestock. Instead, conflicts are usually addressed and resolved after the fact. More conflicts may occur in the future because of higher wolf numbers and wider distribution in Montana. Wolves can be harassed or killed through agency control actions and by private landowners through a special permit in the experimental area. Private citizens can opportunistically harass or intentionally harass by permit wolves in northwest Montana. Private citizens can kill a wolf in the act of biting, wounding, or killing livestock on private property without a permit, but a permit is required to kill persistent problem wolves on public lands. The reader is referred to USFWS (2003a) for additional details.

Wolf Numbers and Distribution. Approximately 854 wolves (or about 70 breeding pairs according to the federal recovery definition) would be present in Montana in 2015. The population will fluctuate because of management actions, changes in prey density and prey distribution, disease, and intraspecific competition. It is possible that Montanans' social tolerance for wolves could lead to USFWS control actions that stabilize the population at a lower level or that the population will grow more slowly than predicted. The number of wolves in the tri-state area would also increase.

Wolf distribution will probably increase as individual wolves disperse from core areas and colonize new habitats with sufficient prey. In the absence of significant conflict, gray wolves could become established in island mountain ranges, such as the Big and Little Snowies or even in eastern Montana. Wolves would be allowed on FWP WMAs. This is consistent with existing FWP policies that these lands were purchased to benefit all wildlife but that they are managed with particular attention to wintering big game. These areas will probably always attract wolves because of the seasonally high densities of prey. In the absence of a state wolf plan, concerns about localized impacts could not be addressed.

Wolf Habitat, Connectivity, and Land Management. Connectivity requirements are met because the wolf population should provide an adequate number of dispersers that emigrate to Idaho, Canada, or Wyoming. Furthermore, wolves coming to Montana from these other areas should have a greater chance to join an existing pack or locate other dispersers to start a new pack. Public land management activities, whether logging, grazing, or travel management are not affected by this alternative. Exceptions could be made for localized area closures around dens, particularly within national parks. Land managers would change practices of their own accord at any time to meet other management objectives.

Monitoring. USFWS's monitoring efforts tabulate breeding pairs that contribute to the recovery goal, locate new packs, document the reproductive status of packs, and document the home range of packs through telemetry. If the gray wolf stays listed once recovery goals are achieved, monitoring effort may decline after documenting the minimum number of breeding pairs and demonstrating that the population still meets the recovery goals. USFWS may also have less knowledge about pack location, home ranges,

or numbers of individuals because more monitoring effort will be required over a greater geographic area. It will also be more difficult to maintain telemetry contact with every pack.

Prey Populations. FWP expects that both species of deer, elk, and moose will constitute the primary prey species for wolves in Montana, but in differing proportions in different parts of the state. Although there may be significant impacts to some populations or herd segments sporadically over time, most big horn sheep and mountain goat populations are not particularly vulnerable to predation by wolves because wolves chase rather than stalk their prey like mountain lions do. The rugged and steep terrain favored by big horn sheep or mountain goats is not conducive to chasing prey over moderate to long distances.

At the regional and statewide scale, prey populations will fluctuate through time due to all causes of mortality (predation, natural mortality, human hunting, habitat conditions, and weather events) similar to the historical patterns described in Chapter 2 (Existing Environment). Across broad geographic areas, wolf predation alone is not expected to influence prey populations in the absence of more significant environmental events. But at a localized level, prey populations may be more influenced by wolf predation, particularly in combination with predation by other large carnivores and/or human hunting. Predation pressure may exaggerate a population decline initiated by unfavorable weather events or even slow population recovery, particularly if human harvest rates of antlerless animals are too high. Localized prey populations may even stabilize at a smaller level. Wolf predation on small ungulate populations, even if infrequent, may be more influential on population trend than for larger ungulate population because predation may remove a greater proportion of animals. In the absence of a state wolf management plan, USFWS would not consider mitigating those impacts to localized big game populations through reductions in pack size. Therefore, FWP may decrease hunter opportunity, particularly for antlerless animals in some hunting districts, since FWP is only able to manage the prey side of the equation. At this time, FWP cannot predict if, when, or how significant those changes might be. It is also possible that hunter opportunity for antlerless animals may increase in the future to meet other management objectives.

Other Wildlife. Some wildlife species would benefit from implementation of this alternative because the gray wolf is an important link in the food chain. In addition, wolf predation tends to remove old, sick, or debilitated animals from the population, although this is not always the case because wolves also kill young and healthy animals. Wolf kills are visited by a wide variety of scavenging species which directly benefit from this food source on a year round basis. The presence of wolves is also thought to enhance ecosystem functioning by changing ungulate habitat use patterns. Other wildlife species may be impacted directly through predation or indirectly through competition for food resources or space. For example, some local mountain lion populations may decline in the general vicinity of wolf pack territories. The magnitude of these positive and negative consequences are difficult to predict, but are expected to occur on a localized level where wolves become established. Nonetheless, FWP would have limited influence to mitigate or enhance impacts to other wildlife because it would not be the lead agency managing the wolf population.

ESA also directs the USFWS wolf program to consult with other USFWS recovery programs to be sure that recovery of one species is not jeopardizing recovery of another. Under this alternative, these internal consultations must continue because the wolf is still listed.

Human Environment

Social Factors. Wolf restoration has been a divisive issue among Montanans. While some Montanans supported recovery, others opposed it. People in northwestern Montana are becoming accustomed to wolves since they have been present going back to the mid 1980s. Elsewhere in Montana, citizens are still adjusting to the presence of a newly introduced population. This alternative would lead to the largest

estimated wolf population of the five considered. For those individuals opposed to the presence of wolves in Montana and/or their management by USFWS, this alternative represents the largest negative impact on social and cultural values. Conversely, individuals supportive of wolf presence in higher numbers and conservative management philosophies would receive the greatest positive social benefit.

Because USFWS administers the program, the diverse interests and needs of all Montanans would not necessarily be taken into consideration or addressed in a proactive fashion due to some of the constraints imposed by federal regulations. Nonetheless, USFWS would take action to alleviate conflicts between wolves and people or livestock where and when they develop.

Public Outreach. Current public outreach efforts may not adequately meet future needs as the wolf population increases and wolves colonize new habitats. The federal wolf program does not have dedicated personnel to fulfill the public's need for information and educational materials. Staff biologists fulfill this need as a part of their other assigned duties. WS may fulfill some of the increasing needs through its technical assistance efforts with livestock producers.

Human Safety. People may encounter wolves more frequently. In the presence of an immediate threat to themselves or another person, people could harass, injure, or kill wolves. USFWS may harass or kill wolves that threaten human safety. Individuals who injure or kill a wolf in the absence of a direct and immediate threat could be subject to federal prosecution. At the present time, people are not able to defend their domestic pet or livestock herding or guarding animals if it is threatened or attacked by a wolf in the experimental area. However, new rules in the Northwest Montana Recovery Area allow a citizen to injure or kill a wolf in the act of attacking dogs and livestock herding and guarding animals. The reader is referred to USFWS (2003a) for additional information.

Private Property. USFWS did not need to restrict uses of private land to recover wolves in the northern Rockies. Restrictions on behalf of a biologically recovered population would also be unnecessary. While wolf use is primarily on public lands, some use of private lands does occur. Use of private lands will undoubtedly increase in the future with increasing wolf numbers.

A larger wolf population under this alternative could result in more conflicts and a greater management burden on private property owners, WS, or USFWS to resolve conflicts. If not under immediate voice command, lion hounds or bird hunting dogs may be injured or killed in wolf encounters. The economic impacts of wolf-livestock conflicts are addressed below.

Economics / Livelihoods

Livestock Depredation. Chapter 2 (Existing Environment) provides a detailed discussion of the recent history of confirmed livestock depredation in Montana. In economic terms, the total lost value per year is equal to the estimated number of lost animals per year times the market value of those animals. From 1986-2001, the average number of cattle and sheep killed per wolf per year was 0.154 and 0.1752, respectively. Actual historical livestock losses to wolves may be underestimated due to the difficulty in identifying the exact cause of death. The extent to which the number of confirmed livestock losses underestimates total livestock losses is unknown. To account for this, probable losses were estimated at 0.093 cattle and 0.015 sheep per wolf per year, and these estimates were added to the confirmed loss estimates. Assuming that all probable losses are actually due to wolves probably overstates actual losses. Nonetheless, that assumption was made on account of the uncertainty about what actual losses might be. Wolves also occasionally kill horses, llamas, or guarding dogs. These losses, while sporadic and difficult to predict, do result in economic loss. Therefore, these economic losses are incorporated as a percentage of the total compensation payments based on historical data.

Approximately 132 cattle and 150 sheep per year would be lost to confirmed wolf depredation. Another 79 cattle and 13 sheep could be lost to probable wolf depredation (Table 31). Losses to other predators are greater than the predicted losses due to wolves, but the combined totals may be of concern. From 1990-2000, an average of 21,500 sheep and lambs per year were killed per year by coyotes in Montana (USDA 2002). In 1995, approximately 1,100 calves were killed by coyotes (USDA 2002). In YNP, the coyote population was reduced by 50% in areas where wolves established territories (Crabtree and Sheldon 1999). Outside YNP, it is not known to what extent wolves will reduce coyote populations under the wolf densities projected by the various alternatives. It is possible that wolves could displace coyotes in some areas grazed by sheep and that coyote predation on sheep may decline. However, it is not clear whether wolves will be tolerated in sheep ranching areas.

The average value of all cattle in Montana was $850 per head, and the average value of all sheep was $94 per head as of January 1, 2001 (Montana Agricultural Statistics Service 2002). Purebred lines may, in fact, have a significantly higher value, while other animals may have a significantly lower value than this average. While value per animal has declined recently, over the last 10 years it has remained relatively stable in real dollar terms. These values are projected to remain stable in real dollar terms (corrected for inflation) out to 2015. These values are similar, but differ slightly from actual payments from the Defender's of Wildlife Compensation Fund because the latter are individually negotiated.

FWP predicts that in 2015, gray wolves in Montana would be responsible for about $210,499 in total livestock depredation losses per year (confirmed, probable, and other) (Table 31). The total costs associated with wolf depredation losses are likely to be smaller during the early years of implementation due to a smaller wolf population. Other expenses of livestock industry include increased management costs due to changes in husbandry practices or materials associated with improving the physical security of animals such as night pens or electric fencing. These costs are difficult to estimate and have not been quantified. Presumably ranchers already incur some management costs to mitigate for predator losses.

The estimated annual livestock depredation losses for this alternative are small compared to either the statewide value of annual sheep and cattle production or to the level of annual livestock losses to predators other than wolves and to natural causes. But wolf losses are not spread evenly among all Montana livestock producers or shared by the industry as a whole. These losses are borne by individual livestock producers and in fact, the losses may be significant in proportion to the size of the operation. Additionally, these losses represent new, added risk to some livestock producers because of where they are located geographically with respect to wolf distribution.

Under this alternative, livestock producers have some assurance that Defenders of Wildlife will continue to pay for confirmed losses since the gray wolf stays listed. However, this program is provided voluntarily and is sustained through private donations. It could be discontinued at any time. If Defenders of Wildlife were to cover the predicted confirmed cattle and sheep losses in 2015, the cost would be about $126,300. Other economic costs, such as probable losses or expenses from enhanced husbandry, would still be borne by the individual livestock producer.

This alternative predicts some of the highest future cattle and sheep losses of any alternative. There may be more wolf-livestock conflicts in the absence of a proactive management program which fine-tunes wolf numbers and distribution. Individual livestock producers and USFWS will incur higher direct and indirect management costs to avoid and resolve wolf-livestock conflicts. This alternative could also foster the expectation that there should be radio collars present in every pack so they can be easily found. Under this alternative, landowners could have a greater risk of losses in the absence of changes on their part as wolves increase in number and distribution.

Big Game Hunting. At the statewide level, wolf management under this alternative is not expected to cause significant changes in hunting activity beyond the increases and decreases observed since 1990. Greater changes at the local hunting district level are more likely, but will probably be caused by a suite of factors that includes the presence of wolves. FWP cannot predict the magnitude of local impacts. Table 32 shows the historical variability in elk, deer, and moose hunting participation from 1990-2001 at the statewide level. Changes between 2003 and 2015 should not exceed what is shown. Note that hunter participation could also increase because of changes in regulations to increase harvest, thereby reducing populations to accomplish other management goals.

Table 31. Estimated livestock losses (confirmed and probable) and the economic value of livestock and domestic animal losses in the year 2015 for Alternative 1 (No Action).

Type of Loss	Number of Animals Lost	Value per Head[a]	Total Value of Loss
Confirmed Cattle	132	$850	$112,200
Confirmed Sheep	150	$94	$14,100
		Confirmed Total Value	$126,300
Probable Cattle	79	$850	$67,150
Probable Sheep	13	$94	$1,222
		Probable Total Value	$68,372
		Total cattle and sheep losses	$194,672
		Estimated Loss of Other Domestic Animals[b]	$15,827
		TOTAL ESTIMATED ANNUAL LOSS	$210,499

[a] Average value of all sheep and lambs and all cattle, 2001 Montana Agricultural Statistics.
[b] Historically, Defenders of Wildlife compensation payments for other domestic animals (guarding dogs, horses, or llamas) was 8.13% of the total payments for cattle and sheep.

Regional Economic Activity. From a statewide perspective, economic theory suggests that nonresident hunter expenditures impact the Montana economy by bringing additional dollar expenditures into the state. Increasing or decreasing levels of resident hunting and hunting-related expenditures will not impact the overall state economy. This is because as residents, these hunters will likely spend the money they did not spend hunting in some other sector of Montana's economy. In other words, changes in hunter opportunity and participation are not anticipated to affect the proportion of income that consumers statewide spend on average for all goods and services combined.

While changes in resident hunter spending patterns within Montana will not substantially impact total statewide economic activity, these changes may impact certain geographic areas and businesses. For example, if big game populations in a popular area were to decline due to wolf predation or some other cause, resident hunters might shift their effort to other areas. This shift could negatively impact the local economy in the area experiencing the loss of hunters and positively impact the areas gaining hunters. While the statewide net impact could be near zero, there could be changes in local communities. Given the current uncertainty about the degree, scale, or areas in which wolf restoration has significantly impacted big game populations and hunter effort to date, it is difficult to estimate the likelihood or extent of these types of regional impacts.

Each year, nonresidents spend significant amounts of time and money hunting big game within the state (Chapter 2). The state's economy could be impacted by a reduction in nonresident hunting if management led to a decline in nonresident hunter opportunity. However, nonresident hunter opportunity is almost entirely driven by policy decisions rather than environmental factors. For example, nonresident elk licenses are capped at 17,000. Due to significant excess demand by nonresidents for elk hunting in Montana, the maximum number of nonresident licenses has been sold since at least 1990. State policy also guides the number of deer licenses, antlerless elk permits and moose permits available to nonresidents. FWP does not anticipate reducing nonresident big game hunting opportunity under this alternative.

The number of big game, deer, and deer B licenses available to nonresidents from 1990 to 2000 in shown in Table 33. The slight changes are primarily due to a policy decision to use market prices to achieve a given target number of licenses sold in some license categories. Most of the changes through time occur in the outfitter-sponsored category. Depending on year-to-year changes in the interaction between price and hunter response, nonresident prices are set at levels so that the target number of licenses will be sold on average over a five year period. In some years, the target will be exceeded, but sales will fall short in other years if the price is set too high.

Outfitting Industry. Nonresident hunter expenditures and opportunity to hunt big game are not expected to change under this alternative because nonresident licensing opportunities are established by policy and/or pricing. This implies that there will be no impacts to the outfitting industry on a statewide basis because the primary clientele seeking those services are nonresident hunters (Chapter 2). However, individual big game outfitters could be negatively impacted if a specific ungulate herd segment within their allowable hunting area were displaced due to wolf presence or the local herd was disproportionately reduced by wolf predation or a combination of wolf predation and other environmental factors. Hunter success rates are an important marketing tool and some outfitters may experience declines in nonresident bookings. Data to analyze the potential impacts to specific outfitters are currently lacking. The extent or likelihood of such an area-specific impact is unknown.

Table 32. Range of potential change in the number of hunters, hunter days, and opportunity for deer, elk, and moose between 2003 and 2015 based on the historic range of variation (+/- 1 standard deviation from the long term average 1990-2001).

Species	Statewide Number of Hunters	Statewide Hunter Days	Hunter Opportunity
Elk	+/- 4,066	+/- 47,236	+/- 4,274 (number of antlerless permits)
Deer	+/- 16,798	+/- 102,164	+/- 8,333 (antlerless harvest)[a]
Moose	+/- 46	+/- 781	+/- 56 (total number of permits)

[a] Hunter opportunity for deer is reported as total antlerless harvest because hunters can harvest antlerless deer several different ways: the general deer license, a deer B license, and an over the counter permit.

Recreational Values

Hunting Values. Wolves have the potential to affect several kinds of recreation in Montana including hunting and tourism. The economic values that an individual places on these recreational experiences, beyond any amount they actually spend, have been estimated on a per trip or per day basis in a number of studies (Chapter 2).

The estimated net economic value for elk hunting is $109 per day (in 2002 dollars), $74 for deer hunting, and $242 for moose hunting (King and Brooks 2001, Duffield and Neher 1990, and Brooks 1996, respectively). Given the variation in the number of hunter days for elk, deer, and moose hunting observed from 1990-2001, total net economic value of big game hunting would also vary year to year. Total net economic values of hunting would be expected to mirror how hunting participation changes in light of the wolf management program described by this alternative and the other factors influencing hunter behavior.

In recent years, some evidence indicates that net economic values per trip for hunting have increased in real terms (King and Brooks 2001). However, there is not enough evidence to reliably predict this trend out to 2015. Therefore, the net economic values per day (or per trip) presented in Chapter 2 are assumed to be constant in real terms (corrected for inflation) over the foreseeable future.

Table 33. Number of licenses sold to nonresidents (NR) for a variety of deer and elk hunting opportunities, 1990-2000.

Year	NR-Big Game Combo General	NR-Big Game Combo Outfitter	Total NR Big Game Combo	NR- Deer Combo General	NR-Deer Combo Outfitter	NR-Deer Combo Landowner	NR-Deer Combo Total	NR-Deer B Licenses
1990	11424	5576	17000	2000	2000	2000	6000	--
1991	11400	5600	17000	2000	2000	2000	6000	--
1992	11400	5600	17000	2000	2000	2000	6000	--
1993	11400	5600	17000	2000	2000	2000	6000	--
1994	11400	5600	17000	2000	2000	2000	6000	--
1995	11400	5600	17000	2000	2000	2000	6000	--
1996	11500	5500	17000	2300	3114	2000	7414	14002
1997	11500	5500	17000	2300	2395	2000	6695	11737
1998	11500	5500	17000	2300	1994	2000	6294	8780
1999	11500	5500	17000	2300	2143	2000	6443	5320
2000	11500	6229	17729	2300	2304	2000	6604	6243

Source: Montana Department of Fish, Wildlife and Parks License Sale Comparison Records.

Wildlife Viewing and Recreational Trip Values. Wolves are charismatic and garner the public's interest nationwide. Many people value the opportunity to see or hear wolves, or simply to recreate in areas where wolves are present (Duffield 1992, Duffield et al. 2001). The reintroduction of wolves to YNP demonstrated the potential for strong links between visitor experiences, visitor spending, and the presence of wolves in an ecosystem. Since the 1995 reintroduction, a significant amount of recreational and economic activity has developed specifically around viewing and listening to wolves within the park.

YNP's Lamar River Valley provides a unique open setting with excellent viewing opportunities for wolves, grizzlies, and elk. Large numbers of visitors now go to this area in the spring and early summer specifically to see wolves. Over 20,000 visitors have actually seen wolves in the park since reintroduction (R. McIntire pers. comm.). In addition to those park visitors who travel to the Lamar Valley independently, a number of both for-profit and not-for-profit organizations have formed or located near Yellowstone in recent years to provide wolf-watching tours. These operators (including operations out of Bozeman, Gardiner, and Livingston, Montana) charge up to $2,000 per week (J. Williams pers. comm.). Some business owners in Gardiner, Montana target their advertising to "wolf watchers."

It is possible to roughly estimate the economic impact on Montana from wildlife viewing specifically associated with wolves in YNP. Surveys have shown that 3.3% of visitors to YNP would not have made the trip if wolves were not present (Duffield et al. 2001). Of the 1.8 million visitors to YNP per year from outside the tri-state region, approximately 60,000 nonresident visitor trips are due to the presence of wolves.

Although wolf watching can take place throughout the park, it is concentrated in the Lamar Valley. Visitor use in the Lamar Valley is closely tied to the North Entrance (Gardiner, Montana) and the Northeast Entrance (Cooke City, Montana). A conservative assumption is that wolf-watching impacts are instead distributed proportionally to entry through all gates. Given that, about 65% of these wolf-watching visitors (or 39,000 people) enter the park by passing through West Yellowstone, Gardiner, or Cooke City. Expenditures of $293 per nonresident visitor implies a total nonresident expenditure in the Montana economy of $11.3 million per year due to the presence of wolves in YNP (Duffield et al. 2001).

While the experience of YNP and the Lamar Valley suggests that the presence of wolves in an ecosystem can have a strong positive impact on both visitors and a local economy, predicting a similar impact statewide is more difficult. As noted above, the Lamar Valley is a truly unique setting that allows for easy wolf watching in one of the nation's premiere national parks. The extent to which this type of setting and experience might be duplicated elsewhere in Montana is unknown. Despite the presence of wolves for a number of years in northwestern Montana and the Nine Mile Valley, no significant experience similar to that seen in YNP has developed, possibly due to the predominance of forested terrain. A small percentage of visitors to GNP specifically seek wolf-viewing opportunities along the western boundary, home of several wolf packs since the mid-1980s. However, most Glacier visitors gravitate to the spectacular scenery along the Going to the Sun Road.

FWP expects wolf-viewing opportunities to have a positive impact on recreational values in Montana. But at this point, the impact can't be quantified due to an absence of data. For example, we do not know how changes in the number of wolves affect the odds of seeing wolves or how increasing or decreasing viewing opportunities affect expenditures or net benefits. However, it is possible to estimate the number of individuals that may be positively affected. Both residents and visitors enjoy wildlife viewing experiences in Montana every year. The National Fishing and Hunting Survey reported that 341,000 residents age 16 and over (50% of Montana's population) and 511,000 nonresidents participated in wildlife watching in Montana during 2001 (USFWS and U.S. Department of Commerce 2002). Relative to the state population, the number of nonresident wildlife watching participants in Montana (74%) was similar to the estimate for Alaska and greater than that for any other state except Wyoming.

The addition of wolf viewing to the experiential aspect of these trips should positively impact the recreational values of many of these people. The size of the wolf population should be directly related to the positive value accruing to the individuals would seek out wolf viewing or hearing opportunities. As the alternative specifying the largest recovered population, the No Action Alternative would also likely have the greatest potential to positively impact recreational values among the five alternatives examined.

FWP Fiscal Impacts

FWP is primarily funded by user fees and federal excise taxes paid by hunters and anglers. The largest revenue source is the sale of hunting and fishing licenses. Annual license sales generate more than $30 million, $23 million of which is used for day-to-day operations. The balance is earmarked for specific programs like hunter access, conservation easements, and maintenance of property. More than $11 million in federal funds are also allocated to Montana based on formulas that consider the number of paid hunting and fishing license holders and the land and water area of the state.

Nonresidents are assessed higher fees than residents for hunting and angling opportunities. Montana statutes limit the number of licenses available to nonresidents for some hunting licenses. Even though the number of licenses sold is limited, revenues from nonresident license sales account for more than two-thirds of FWP's total license receipts.

How FWP revenue will be affected by each of the alternatives is an important consideration. Trends in license sales for the general elk license and the general deer license are largely influenced by factors such as elk or deer population status, hunter access, changing hunter demographics, or price, and not necessarily the presence or status of a recovered wolf population. However, a recovered wolf population could more directly influence license sales for antlerless elk, deer B licenses, or moose. This is because FWP uses antlerless harvest to fine-tune ungulate population numbers in relation to management objectives. If localized deer or elk populations are negatively affected by wolf predation, hunter opportunity for antlerless animals could decrease. Conversely, if deer or elk populations were not affected by wolf predation and actually exceeded management objectives, opportunity for antlerless harvest would increase. Similarly, a recovered wolf population could more directly influence moose sales because all moose hunting is limited to permit-only opportunities. It is difficult to predict how antlerless opportunity will change in the future under this alternative.

Therefore, fiscal impacts to FWP are estimated based on the observed historic variation in statewide licenses sales due to all causes for antlerless elk permits, Deer B licenses, and moose permits. The FWP Commission establishes final quotas for these licenses and permits. Revenue derived from these sales will change in proportion to the historic variation in past availability and sales from 1990-2001. Table 34 summarizes the lower and upper bounds for the number of licenses/permits that would probably be available in 2015 and the revenue generated by selling them. Several assumptions were made and are footnoted. A major assumption is that prices are constant in real terms. But in fact, nonresident prices have increased significantly in the past decade.

Administration, Funding, and Legal Status

Under this alternative, FWP's role consists of informal consultation, with limited influence over wolf management outcomes. All decisions are made by USFWS and no significant administrative demands are expected for FWP. USFWS decisions would be made primarily at the local level, but the northern Rockies program is also guided by policy established within the national scope of wolf recovery. USFWS would still be required to consult with private individuals or businesses and other federal agencies under Section 7 of ESA.

Because the program remains with USFWS, the adequacy of future budgets is less certain. The Northern Rockies Wolf Recovery Program would be competing against other national interests and priorities to secure adequate funding and staff. Because the program is federal, budgeting is still accomplished through Congressional appropriations. Thus, adequate staffing to meet the needs of Montanans most

Table 34. Expected variation in FWP revenue from the changes expected in statewide license sales of antlerless elk permits, Deer B licenses, and moose permits in 2015, based on 2002 prices.

Species	Average Number Available 1990-2001 (1 standard deviation of the average)	Lower Bound of Availability	Upper Bound of Availability	Expected Variation in Revenue
ELK[a]				
	Antlerless Permits: 33,359 (+/-4,274)	29,085	37,633	
	Residents: 92% of 4,274 @ $19[b]			+/- $74,709
	Nonresidents: 8% of 4,274 @ $3			+/- $1,026
MOOSE[c]				
	Antlerless Permits: 687 (+/-56)	631	743	
	Residents: 97% of 56 @ $75			+/- $4,074
	Nonresidents: 3% of 56 @ $750			+/- $1,260
DEER[d]				
	Antlerless Harvest: 31,729 (+/-8,333)	23,396	40,062	
	Residents: 87% of 8,333 @ $8			+/- $57,997
	Nonresidents: 13% of 8,333 @ $75			+/- $81,247
			TOTAL EXPECTED VARIATION IN REVENUE	+/- $220,313[e]

[a] Antlerless elk permits can only be obtained through the drawing. Nonresidents must have a valid B-10 license obtained through the big game combo drawings. These drawings are capped at 17,000 maximum with waiting lists are kept for any opportunities that may become available after the drawing. FWP assumed that the 17,000 cap would continue to be met. If desired, the successful nonresident may apply for an antlerless elk permit. From 1998-2001, approximately 8% of sales were to nonresidents and 92% of sales to residents.

[b] Because a general elk license is required to receive a special permit, FWP assumed that changes in permit availability would also affect general elk license sales. Expected variation in resident and nonresident permits is based on an assumption of simple apportionment of statewide variation to the residency classes. This procedure slightly understates the resident and nonresident variation estimates.

[c] Moose permits are only obtained through the drawing. The 10% maximum allocation to nonresidents is applied. However, from 1998-2001 about 3% went to nonresidents and 97% to residents. The 10% maximum is not guaranteed to nonresidents during the drawings; nonresidents compete equally with residents.

[d] Hunting opportunities for antlerless deer will be managed through quotas for Deer B antlerless licenses. Both residents and nonresidents may purchase these licenses either through the drawing or over the counter. Over the four-year period 1998-2001, approximately 13% of sales were to nonresidents and 87% to residents. The 10% maximum is lifted if residents have not purchased enough licenses to manage the populations.

[e] The total expected variation in revenue overstates the true statistical variation of this sum.

directly affected by the presence of wolves is not assured. The expected shortfall in personnel and budgets to meet those needs could be problematic for Montana, particularly as needs in Idaho and Wyoming increase, too. WS costs will likely increase due to the higher number of wolves in more areas.

Because the gray wolf would still be protected under ESA, federal rules and regulations apply. Federal authorities, not state authorities, would prosecute violations of federal law or regulations. However, the gray wolf would remain listed as endangered under state law.

In addition to the existing fluctuations in license sales, FWP would incur up to $5,000 in administrative costs associated with informal consultations with USFWS. These expenditures would come out of the existing budget for the endangered species program. No new revenue would be generated through license sales for regulated harvest of wolves.

Physical Environment

No impacts to air, soil, or water resources are predicted under this alternative. Vegetation may be affected to the extent that wolf presence changes ungulate grazing patterns in localized areas (National Research Council 2002). Although wolf hair may capture and later redistribute noxious weed seeds, compared to other methods of seed dispersal, this will not be significant. No archeological sites would be disrupted by this alternative.

Short Term, Long Term, and Cumulative Effects

In the short term, this alternative represents the status quo. Impacts are primarily associated with livestock losses due to wolf depredation. Localized impacts to prey populations, individual outfitters, or individual businesses may also develop in the short term. Wolf numbers and distribution would increase in the absence of more proactive strategies. Hunter opportunity will continue to fluctuate through time for a variety of reasons, which may include wolf predation. The fluctuations may be more significant in localized areas due to locally high densities of wolves. The public and political debate over wolf restoration and subsequent management may become even more conflicted because wolves would still be listed under ESA, even though the northern Rockies population had achieved the biological recovery goal. Wolf recovery issues in the northern Rockies would still maintain their national scope and controversy. Federal resources utilized by the northern Rockies program would not be available for recovery efforts of other rare or more imperiled species. Social tolerance may decline in Montana and illegal killings may increase. The confusion over agency jurisdiction and management responsibility of an expanding population may continue. The cumulative impacts of FWP not preparing a management plan are borne by the Montana citizens more so than FWP. Some citizens' interests and needs may not be met as responsively or proactively as desired.

Mitigation

Because FWP would have very little participation in wolf management, there is little that FWP could do to mitigate the negative impacts of this alternative directly, except to encourage USFWS to adjust the program. Examples would be to request that USFWS increase the Montana-based staff and increase the budget to maintain effective monitoring of the expanding population and to respond to conflicts. FWP could also encourage USFWS to adopt more flexible regulations both for agencies and livestock producers. Livestock producers themselves could decrease their risk of wolf depredation by adapting certain management practices, although the risk can never be fully eliminated. USFWS and WS could devote more effort proactively towards preventing wolf depredation on livestock. Livestock losses would

be partially mitigated by compensation payments made by Defenders of Wildlife. Defenders of Wildlife may also cost-share a portion of the expenses associated with changes in husbandry.

FWP could more directly mitigate for localized impacts to ungulate populations by decreasing hunter opportunity, particularly for antlerless animals. In so doing, FWP would attempt to dampen a population decline or hasten a population increase. FWP could also augment ungulate populations from other sources.

Irretrievable Commitments

Wolves will be present in Montana, and under this alternative, USFWS retains management authority. That commitment is irretrievable until FWP restarts the planning process. In the mean time, USFWS commits resources that could have otherwise been allocated to recovering other imperiled species. FWP would commit some administrative staff time to informal consultations with USFWS that could otherwise be devoted to other activities.

Some wolves will kill livestock. Even though wolves are not expected to have a significant effect on the livestock industry as a whole, some individual livestock producers could sustain substantial losses in a given year. The number of depredations will likely vary widely among years, but over the long term some livestock losses will be an irreversible commitment of resources. Any compensation paid by private groups to livestock operators will be irretrievable by the group paying the compensation.

Alternative 2. Updated Council, *FWP's Preferred Alternative*

For comparison, the environmental consequences of this and the other alternatives are presented in a summary at the end of this chapter (Table 43).

Biological Environment

Wolf Management. FWP would implement an adaptive approach to manage wolves in Montana. The adaptive management trigger that would allow FWP to move from conservative to liberal management tools and vice versa is 15 breeding pairs (federal recovery definition). If the wolf population increases at the low rate, liberal management tools could be implemented starting in 2006. If the population grew at the higher rate, liberal management tools could be implemented in 2004. It is possible that the adaptive management trigger would be reached before 2004 or 2006, depending on how fast the population actually grows. Wolf numbers and pack sizes would be managed proactively to meet the needs of wolves and people. Most importantly, wolf management would be integrated into the larger wildlife program and managed in an ecological context similar to other large carnivores. Conservation and management measures of this alternative would secure the wolf population into the future.

To that end, some packs, such as those occurring in mixed landownership patterns interspersed with livestock, will require more management attention. Other packs, such as those in remote public land areas, would require less attention. Resolution of conflicts would be incremental, depending on where the territory is located and the degree, frequency, and types of conflicts that occur with livestock, people, or prey.

Wolves would be managed as a "species in need of management" which grants full legal protection from indiscriminant human-caused mortality. However, wolves could still be harassed, injured, or killed through agency control actions and by private landowners or livestock owners under certain permitted

conditions. When the number of breeding pairs exceeds 15 and it becomes biologically sustainable to do so, FWP would introduce regulated harvest as a proactive management tool to adjust wolf numbers and distribution in relation to their local environment.

Wolf Numbers and Distribution. Approximately 328-657 wolves (or 27-54 breeding pairs according to the federal recovery definition) would be present in Montana in 2015. This is fewer than Alternative 1 (No Action). FWP expects the population to be near the lower end of the range. It is possible that the number would be less than 328 if the population grows more slowly than predicted. Wolf numbers will fluctuate because of management actions, changes in prey density and distribution, disease, and intraspecific competition. Wolf numbers will not be administratively capped, but will be managed adaptively in keeping with solid principles of wildlife management and the factors affecting social tolerance. This population would be secure and still allow flexibility for FWP, without worrying about whether the population would drop unexpectedly close to the relisting level due to unforeseen events.

Wolf distribution will increase as individual wolves disperse from core areas and colonize new habitats with sufficient prey. Wolves will probably be distributed primarily in western, west central, and south central Montana, although wolves could also expand their distribution into eastern Montana in the absence of significant social conflicts, much as mountain lions did over the last 20 years. For example, wolves could become established in island mountain ranges, such as the Big and Little Snowies or even farther east if there is an adequate prey base and little social conflict. Wolf densities would be lower because prey densities are typically lower. Ultimately, the complex biological and social environment, rather than administrative zones, would guide distribution. Wolves would be encouraged on remote public lands and integrated into mixed land ownerships. Wolves would be allowed on FWP WMAs. This is consistent with existing policies that these lands were purchased to benefit all wildlife, but that they be managed with particular attention to wintering big game.

Wolf Habitat, Connectivity, and Land Management. Connectivity requirements are met because the wolf population should provide an adequate number of dispersers that emigrate to Idaho, Canada, or Wyoming. Furthermore, wolves coming to Montana from these other areas should have a greater chance to join an existing pack or locate other dispersers to start a new pack. FWP would continue to participate in technical discussions with land management agencies and the Montana Department of Transportation about habitat connectivity issues for wide ranging carnivore species. Public land management activities, whether logging, grazing, or travel management are not affected by this alternative, although land management agencies may adopt policies or make changes for other management purposes. Land managers may adopt localized area closures around dens or rendezvous sites, particularly within national parks. FWP would continue to work with land management agencies and private landowners on projects to enhance wildlife habitats.

Monitoring. Through the monitoring program, FWP will ensure that the Montana population is secure and above the recovery goal. It is also an important component of the adaptive management framework so that FWP can evaluate the effects and outcomes of management decisions. This new information will also improve management decisions. The monitoring program will also allow FWP to document wolf activity in new areas as well as the status of existing packs. This in turn, will allow FWP to more closely monitor certain ungulate populations or to coordinate more closely with land managers or private landowners.

During the first five years of implementation, FWP will monitor the Montana wolf population and tabulate the number of breeding pairs according to the federal recovery definition and the more general definition of social groups (four or more traveling in winter). If the more general definition adequately demonstrates reproduction and the security of Montana's gray wolf population and that the number of breeding pairs in Montana satisfies the legal requirement, FWP will adopt the more general definition.

Furthermore, FWP will reduce monitoring intensity for some packs in remote areas that have a small likelihood of causing conflicts. This would allow personnel to focus more monitoring effort on other packs with a higher probability for conflict. The monitoring budget would also be used more effectively or even be decreased to meet wildlife monitoring needs for other species.

Monitoring responsibilities for boundary packs would be shared between FWP and the adjacent jurisdiction. Additional administrative time will be required to share information or coordinate field activities.

Prey Populations. At the regional and statewide scale, prey populations will fluctuate through time due to all causes of mortality (e.g. predation, natural mortality, human hunting, habitat conditions, and weather events) similar to the historical patterns described in Chapter 2 (Existing Environment). At a localized level, prey populations may be more influenced by wolf predation, particularly in combination with predation by other large carnivores. Predation pressures may exaggerate a population decline initiated by unfavorable weather events or even slow population recovery, particularly if human harvest rates of antlerless animals are too high. Localized prey populations may even stabilize at a smaller level. Wolf predation on small ungulate populations, even if infrequent, may be more influential on population trend than for larger ungulate populations because predation may remove a greater proportion of the herd.

Under this alternative, FWP would be able to manage gray wolves and ungulates in an integrated, ecological manner and within the context of other environmental factors. If a local prey population were significantly impacted by wolf predation in conjunction with other environmental factors, FWP would consider reducing wolf pack size. If there were fewer than 15 breeding pairs, relocation would be considered. If there are more than 15 breeding pair, FWP will reduce pack size through liberal management tools, which could include regulated hunting or trapping. Wolf management actions would be paired with other corrective measures to reduce ungulate mortality or enhance recruitment such as decreasing hunter opportunity for antlerless animals.

FWP would not significantly change the principles and philosophies guiding ungulate population management in response to the added management authority for the gray wolf. Ungulate management will continue to be based on the best available scientific information and the established management objectives. FWP actions under this alternative would improve how ungulate and carnivore populations are managed overall because monitoring programs would be improved and FWP would have management authority for both an important predator species and its prey.

Other Wildlife. Some wildlife species would benefit from implementation of this alternative because the gray wolf is an important link in the food chain. In addition, wolf predation tends to remove old, sick, or debilitated animals from the population, although this is not always the case because young and healthy animals are also vulnerable to wolf predation. Wolf kills are visited by a wide variety of scavenging species which directly benefit from this food source on a year round basis. The presence of wolves is also thought to enhance ecosystem functioning by changing ungulate habitat use patterns. Other wildlife species may be impacted directly through predation or indirectly through competition for food resources or space. For example, some local mountain lion populations may decline in the general vicinity of wolf pack territories. The magnitude of these positive and negative consequences are difficult to predict, but are expected to occur on a localized level where wolves become established. By having management authority for the gray wolf, FWP could more thoroughly integrate and account for the needs of the other wildlife species that it is charged to manage and conserve.

Human Environment

Social Factors. Wolf restoration has been a divisive issue among Montanans. While some Montanans are supportive of wolf presence, others are totally opposed. Still others are supportive so long as the needs of those most affected by wolf presence are addressed and as long as the program balances the needs of wolves and people. There are also differing opinions about who should be the lead agency and whether wolves should stay listed in perpetuity. People in northwestern Montana have largely adjusted to wolf presence since wolves have been in the area going back to the mid 1980s. Elsewhere in Montana, citizens are still adjusting to the presence of a newly introduced population. The adaptive approach outlined in this alternative would allow FWP to meet the differing management expectations and needs that exist across the spectrum of social values. It incorporates flexibility for landowners, livestock producers, FWP, and provides for a secure wolf population into the future. Most importantly, Montana citizens would have a stronger voice in wolf conservation and management in their state because the program would be administered from a local perspective, rather than a national perspective.

By FWP assuming management responsibility, citizens that perceive wolves as a "cost" are negatively impacted in the sense that FWP would "have to" manage wolves in order to get the species delisted. On the other hand, citizens that perceive wolves as "neutral" or as a "benefit" could be positively affected by the implementation of a proactive, responsive program at the state level. Either way, the alternative calls on the public to accept the legitimacy of FWP to manage gray wolves and that wolf conservation and management will be integrated within the context of modern scientific wildlife management.

Public Outreach. FWP would be able to increase public outreach activities beyond what is possible under Alternative 1 (No Action) because FWP has dedicated personnel to fulfill public information and educational needs. These personnel are also distributed throughout the state. Public awareness and improved understanding about the conservation and management program should decrease the emotional controversy, improve communications with the public, increase public acceptance of the program, and improve management decisions. The public's safety would be enhanced because FWP could more effectively provide information about the dangers of habituating wolves and safety tips about what to do during encounters.

Human Safety. People may encounter wolves more frequently as the population increases in number and distribution. In the presence of an immediate threat to themselves or another, a person may legally harass, injure, or kill wolves under state law. FWP, WS, or local authorities may harass or kill wolves that threaten public safety. Individuals found to injure or kill a wolf in the absence of a direct and immediate threat or otherwise outside the provisions of Montana law would be prosecuted under state laws. Upon delisting from the federal and state lists, Montanans will be able to defend their domestic dog if it is being attacked or killed by a wolf. Overall, public safety will be enhanced through timely agency response and discouragement of wolf habituation.

Private Property. FWP does not intend to restrict private property uses to manage a recovered wolf population. While wolf use is primarily on public lands, some use of private lands does occur. Use of private lands will undoubtedly increase in the future with increasing wolf numbers. FWP acknowledges that wolves will use public lands in close proximity to private property. Use of private lands will increase in the future with increasing wolf numbers, and conflicts may occur more frequently.

FWP would proactively work with landowners to address their concerns about wolf use or to provide technical assistance. FWP and WS would attempt to remove problem wolves in a timely, efficient manner according to the adaptive management tools outlined in this alternative. Resolution may result in the harassment or killing of wolves by agencies or by the landowner, under certain permitted conditions. In some circumstances, wolves could be injured or killed by private citizens in defense of livestock or

domestic dogs. If not under immediate voice command, lion hounds or bird hunting dogs may be injured or killed in wolf encounters. The economic impacts of wolf-livestock conflicts are addressed below.

Economics / Livelihoods

Livestock Depredation. Approximately 328-657 wolves would be present in Montana in 2015. Liberal management tools would be implemented in 2006 if the population grew at the lower rate. If the population grew at the higher rate, liberal tools would be implemented in 2004. Liberal management tools are specifically intended to decrease livestock depredations and allow livestock owners to harass wolves opportunistically, kill wolves caught attacking, killing, or threatening their stock, or receive a special kill permit to remove a wolf or wolves causing chronic conflicts. Because of this increased flexibility for livestock producers, FWP expects the depredation rate under this alternative to be about one half of historical depredation rates. Additionally, adaptive management of the overall wolf population, combined with removal of problem wolves, should result in lower livestock losses and greater social tolerance (see Haight et al. 2002). The increased emphasis on working with landowners proactively to minimize the risk of depredation is intended to decrease the overall losses.

Approximately 25-51 cattle and 29-58 sheep would be lost to confirmed wolf depredation in 2015. Another 16-31 cattle and 3-5 sheep could be tallied as probable wolf depredation (Table 35). These numbers reflect the assumption that liberal management tools would reduce the potential losses by 50%, compared to the losses per wolf in Alternative 1 (No Action). Liberal tools may actually reduce the potential more or less than 50%. These losses are less than those predicted under Alternative 1 (No Action). FWP and WS would proactively work to minimize the potential for depredation through technical assistance. Losses are likely to be less during the early years of implementation because the wolf population would be smaller.

Whenever the adaptive management trigger of 15 breeding pairs is exceeded, FWP intends to implement a variety of more liberal management tools. These include regulated harvest to help proactively manage total wolf numbers in the population (and the number of wolves per pack by default) and removal of problem animals. These tools are paired with the increased work by FWP, WS, and others to provide technical assistance to private landowners to minimize their risks to the extent possible. These strategies combined reduced depredation by at least 70% and decreased economic losses in a computer simulation model examining a variety of animal damage control strategies for wolves in the Great Lakes (Haight et al. 2002). FWP does not believe that field results in Montana would mimic computer-generated results. However, the results of the study did suggest that the combination of voluntary proactive changes to agricultural practices, in combination with proactive agency management of the number of wolves in the population, and removal of depredating wolves would reduce depredation losses significantly.

Montana Agricultural Statistics Service (2002) reports that, as of January 1, 2001, the average value of all cattle in Montana was $850 per head. Sheep averaged $94 per head. Purebred lines may, in fact, have a significantly higher value, while other animals may have a significantly lower value. The predicted economic loss for confirmed livestock depredation, probable depredation, and loss of other domestic animals is $40,935 - $81,770 (Table 35). This is less than the predicted economic losses for Alternative 1 (No Action). Adaptive management of the overall wolf population, combined with removal of problem wolves, should decrease economic losses (see Haight et al. 2002). Livestock producers may incur other expenses, including increased management costs due to changes in husbandry practices or materials to improve the physical security of animals (e.g. night pens). These costs are difficult to estimate and have not been quantified. Presumably, livestock producers already incur some management costs to mitigate for predator losses.

The estimated annual livestock depredation losses for this alternative are small compared to either the statewide value of annual sheep and cattle production or to the level of annual livestock losses to predators other than wolves and to natural causes. But wolf losses are not spread evenly among all Montana livestock producers or shared by the industry as a whole. These losses are borne by individual livestock producers and the losses may, in fact, be significant in proportion to the size of the operation. And, these losses represent a new, added risk to some individual livestock producers, depending on where they are geographically in relation to wolf pack territories. Under this alternative, livestock producers are assured that FWP will work toward securing a source of compensation funding or livestock insurance.

Big Game Hunting. Same as Alternative 1 (No Action), but localized impacts expected to be less significant.

Regional Economic Activity. Same as Alternative 1 (No Action), but localized changes expected to be less.

Outfitting Industry. Same as Alternative 1 (No Action), but localized impacts expected to be less significant.

Recreational Values

Hunting Values. Same as Alternative 1 (No Action), but localized impacts expected to be less significant.

Wildlife Viewing and Recreational Trip Values. Same as Alternative 1 (No Action).

Table 35. Estimated livestock losses (confirmed and probable) and the economic value of livestock and domestic animal losses in the year 2015 for Alternative 2 (Updated Council). The columns may not sum, due to rounding.

Type of Loss	Number of Animals Lost		Value per Head[a]	Total Value of Loss	
	Low	High		Low	High
Confirmed Cattle	25	51	$850	$21,250	$43,350
Confirmed Sheep	29	58	$94	$2,726	$5,452
			Confirmed Total Value	$23,976	$48,802
Probable Cattle	16	31	$850	$13,600	$26,350
Probable Sheep	3	5	$94	$282	$470
			Probable Total Value	$13,882	$26,820
			Total cattle and sheep losses	$37,858	$75,622
			Estimated Loss of Other Domestic Animals[b]	$3,077	$6,148
			TOTAL ESTIMATED ANNUAL LOSS	$40,935	$81,770

[a] Average value of all sheep and lambs and all cattle, 2001 Montana Agricultural Statistics.
[b] Historically, Defenders of Wildlife compensation payments for other domestic animals (guarding dogs, horses, or llamas) was 8.13% of the total payments for cattle and sheep.

FWP Fiscal Impacts

Fiscal impacts describe the changes in revenue from license sales, the cost of implementing the program, and the potential sources of revenue to fund it. License revenue from antlerless elk permits, deer B licenses, and moose permits could vary by $220,313 annually, the same as for Alternative 1 (No Action). FWP's projected budget to implement this alternative is $872,000 and includes an extra $50,000 specifically for the extra preventative work by FWP, WS, or other cooperators (Table 36). An additional $40,935 – $81,770 is shown for compensation for livestock losses, but FWP monies, matching federal grants for other FWP programs, or state general fund money, would not be used to fund it. The total estimated budget is $912,000-$954,000, not including overhead. FWP would implement this alternative through a combination of state, federal, and private sources. FWP's contribution would be commensurate with its expenditures for other carnivore management programs and would include license revenue, since FWP intends to use regulated wolf harvest as a management tool if it is biologically sustainable. If a regulated wolf harvest were to be implemented, some license revenue would be generated, but the amount can't be predicted at this time. It would depend on how many licenses are sold and the cost of the license. The number of licenses available would be a function of wolf population status, management objectives, and other mortality factors.

Table 36 represents a plausible budget to implement this alternative. The budget reflects the comprehensive nature of designing and implementing a wolf management program. While this budget represents FWP's best projection of the resources required, FWP cannot assess its accuracy until the agency actually assumes management authority and begins implementation. Some components of the wolf program may not be captured fully by this budget. There may also be costs that could not be predicted at this time or were unforeseen.

Administration, Funding, and Legal Status

FWP would be the lead agency for wolf conservation and management in Montana. Decisions are made by FWP, the FWP Commission, or the Montana Legislature. Through an MOU, WS would be an important partner. FWP expects increased consultation with tribal authorities, the states of Idaho and Wyoming, NPS, or others with overlapping interests. This is particularly true for wolf packs that overlap more than one management jurisdiction. FWP will also invest more time in coordination and technical assistance activities with WS, federal land management agencies, private landowners, or other cooperators to proactively reduce the potential for wolf-livestock conflicts. FWP can more thoroughly integrate wildlife management programs by assuming management authority for the gray wolf, even though management decisions may be controversial. USFWS would oversee FWP implementation of the program for five years to ensure that the wolf population would not be in jeopardy of relisting under ESA. Many new wolf management activities fall within existing duties and responsibilities already carried out by FWP or WS. But, some activities would clearly add to existing responsibilities and workloads. Some wildlife biologists, for example, would have new wolf monitoring responsibilities. Some segments of the public will expect the same intense level of monitoring and wolf control currently carried out by the USFWS and WS. FWP field wardens would now investigate potential illegal wolf mortalities. Other changes for wardens and/or biologists may include: working with landowners to address concerns, handling or referring livestock damage calls, responding to wolf sightings and perceived threats to public safety, increased ungulate monitoring effort, addressing hunter concerns and complaints associated with wolves, and responding to reports of injured or road-killed wolves. The FWP Wildlife Laboratory will experience an increased workload associated with processing wolf carcasses, fulfilling wolf health and disease surveillance responsibilities, and filling educational requests. Existing budget and personnel resources cannot absorb this expansion. FWP is also committed to securing adequate supplemental funding and FTE's so that it can meet the public's high expectations without having to divert resources from other equally important programs.

Table 36. Implementation budget for Alternative 2 (Updated Council). Overhead and inflation are not included.

Division / Activity	Estimated Budget
Montana Fish, Wildlife & Parks	
Wildlife Division (Staff 4.30 FTE)	
Biologists (4.0 FTE)	$150,000
Operations	$156,000
Enhanced Ungulate Monitoring	$ 75,000
Wildlife Lab (0.30 FTE)	$ 8,000
Wildlife Lab Operations, Research (contracts, operations, graduate student stipends)	$ 67,000
Total	**$456,000**
Enforcement Division (Staff 2.5 FTE)	
Staff	$ 86,000
Operations	$ 71,000
Total	**$157,000**
Conservation Education Division (Staff 0.75 FTE)	
Information Officer and Headquarters Staff (.75 FTE)	$ 44,000
Operations	$ 10,000
Total	**$ 54,000**
Fiscal, Administration, and Legal (staff 1.0 FTE)	
Fiscal and Administration (0.75)	$ 37,000
Legal (0.25 FTE)	$ 18,000
Total	**$ 55,000**
Proactive, preventative efforts by FWP, Wildlife Services, or other cooperators	**$50,000**
Depredation: Wildlife Services (USDA/APHIS) Cooperative Wolf Damage Management and FWP-directed Predator Control	**$100,000**
FWP ANNUAL TOTAL	**$872,000**
Compensation (money from private source or federal appropriation)	**$ 40,935 – $81,770**
PROGRAM TOTAL (Including Compensation)	**$912,935 – $953,770**

Because FWP needs supplemental sources of funding to implement this alternative, it would be working to secure the funding while the gray wolf is still listed. FWP will pursue all possible funding sources including, but not limited to public/private foundations, special federal or state appropriations, and other private sources.

State laws and FWP administrative rules would now guide management and establish the legal framework. The gray wolf would be removed from the state's endangered species list and reclassified as a "species in need of management." FWP would seek state legislation to make the unlawful taking of a gray wolf a misdemeanor and to include the species under the restitution section of MCA 87-1-111. These changes would allow more effective law enforcement and serve as a greater deterrent to

indiscriminant killing. These changes would be consistent with how black bears and mountain lions are treated in Montana statute.

Physical Environment

Same as Alternative 1 (No Action).

Short Term, Long Term, and Cumulative Effects

During the first five years after delisting, FWP will implement the program but will be overseen by USFWS. Ongoing informal consultation may be required as FWP personnel gain more experience with wolves. The public will also be making that transition as well. Wolf numbers will probably increase and so will wolf distribution. Localized impacts to prey populations, individual outfitters, or individual businesses may also develop in the short term. Hunter opportunity will still continue to fluctuate for a variety of reasons, which may include wolf predation. Livestock losses to wolves will still be documented and increased management costs will still affect individual producers. Over the long term, gray wolves should become more accepted in Montana because the management program is flexible, responsive, and adaptive to people and the wolf population. Conflicted public debate and controversy should decrease because the program is guided by local interests, while still meeting our legal responsibility to maintain a viable population into the future.

Mitigation

One benefit of an adaptive management approach is that it allows FWP to manage the Montana wolf population with a fair degree of flexibility to meet different needs and expectations. To that end, many of the management tools within this alternative are designed to mitigate the potential for negative impacts of a recovered population while, at the same time, maximizing the benefits to the degree possible in a complex environment. The management tools could be applied locally or across a larger area. Wolf numbers and distribution can be adjusted locally to address specific needs, mitigate impacts, or resolve chronic conflicts. Concerns about ungulate populations can also be addressed through the tools identified in this alternative, including enhanced monitoring effort where wolves are established.

Mitigation for the economic losses to individual livestock producers would be enhanced by the increased flexibility and innovative approaches to deter livestock depredations. Providing producers with the flexibility to defend their livestock if a wolf is attacking it, or to receive a special kill permit to resolve a conflict themselves mitigates livestock losses to some degree, but does not eliminate them entirely. Economic losses would still be mitigated to some extent because the State of Montana would create an entity to administrator a compensation program, although it would be funded and independent from FWP. In addition, Defenders of Wildlife or a livestock insurance program could also help address economic costs to individual livestock producers for losses or increased management costs. Adequate funding from outside sources should alleviate most potential FWP fiscal impacts.

Irretrievable Commitments

Under this alternative, FWP would make a commitment to conserve and manage the gray wolf and integrate it within the wildlife program. That commitment would be irretrievable in the sense that FWP does not intend to default on its legal responsibilities to maintain a secure viable population in the future. By assuming the leadership role for wolf management, FWP would be committing staff and financial resources to fulfill the needs of the program. Those resources would be partially unavailable to other program areas to the extent that responsibilities and activities don't overlap.

The adaptive management tools within this alternative will mitigate to a large degree many potentially irretrievable commitments of resources or changes in resource status. However, some wolves will kill livestock. Even though wolves are not expected to have a significant effect on the livestock industry, a few livestock producers could sustain substantial losses in a given year. The number of depredations will likely vary widely among years, but over the long term some livestock losses will be an irreversible commitment of resources. Any compensation paid by private groups to livestock operators will be irretrievable by the group paying the compensation.

Alternative 3. Additional Wolf

For comparison, the environmental consequences of this and all the alternatives are presented in a summary at the end of this chapter (Table 43).

Biological Environment

Wolf Management. Same as Alternative 2 (Updated Council), but FWP's adaptive management approach increases from 15 to 20 the number of breeding pairs (according to the federal recovery definition) that would signal a change from conservative to liberal management tools and vice versa. Because the trigger is raised to 20 breeding pairs under this alternative, it will take longer for the wolf population to reach the trigger compared to Alternative 2 (Updated Council). If the wolf population increases at the low rate, liberal management tools could be implemented starting in 2008. If the population grew at the higher rate, liberal management tools could be implemented in 2006.

Wolf Numbers and Distribution. The statewide population is predicted to be 365-807 wolves (or 30-66 breeding pairs according to the federal recovery definition) in 2015. This is more than Alternative 2 (Updated Council). It is possible that there would be fewer wolves if the population grows more slowly than predicted. This population would be secure and still allow adequate management flexibility for FWP without worrying about whether the population would drop unexpectedly close to the relisting level due to unforeseen events. Wolf distribution would be the same as Alternative 2 (Updated Council).

Wolf Habitat, Connectivity, and Land Management. Most environmental consequences are the same as for Alternative 2 (Updated Council). As a result of increasing the adaptive management trigger to 20 breeding pair, the overall population would be larger and dispersal events should be more frequent. Therefore connectivity among the wolf sub-populations in Canada, Montana, Idaho, and Wyoming should be enhanced above Alternative 2 (Updated Council).

Monitoring. Same as Alternative 2 (Updated Council).

Prey Populations. Same as Alternative 2 (Updated Council). Prey populations are expected to fluctuate through time as described previously. FWP would not change how ungulates are managed in response to the added management authority for the gray wolf. However, under this alternative, more wolves would be present in the population. Therefore, ungulate monitoring efforts would be increased over what was described for Alternative 2.

Other Wildlife. Same as Alternative 2 (Updated Council).

Human Environment

Social Factors. Same as Alternative 2 (Updated Council). But to address the social factors surrounding a state wolf management program, FWP proposes to host an annual workshop and interagency coordination meeting rather than appoint a "standing council." One annual event would be less expensive than multiple meetings throughout the year, so FWP would realize a modest decrease in administrative costs. FWP and other agencies or jurisdictions with overlapping interests could modify management strategies. Communication would be improved between agencies and the public, and more Montanans could be involved in crafting solutions to shortcomings of the program. Some administrative work would be required to organize the meeting as well as to follow up on meeting outcomes and/or implementation.

Public Outreach. Same as Alternative 2 (Updated Council).

Human Safety. Same as Alternative 2 (Updated Council).

Private Property. Same as Alternative 2 (Updated Council).

Economics / Livelihoods

Livestock Depredation. Most of the environmental consequences are the same as Alternative 2 (Updated Council). Owing to the larger wolf population and the 1-2 year delay in implementing liberal management tools, FWP predicts that both confirmed and probable livestock losses will be slightly higher compared to Alternative 2 (Updated Council) but lower than Alternative 1 (No Action). Approximately 28-62 cattle and 32-71 sheep would be lost to confirmed wolf depredation in 2015. Another 17-38 cattle and 3-6 sheep would be lost to probable wolf depredation (Table 37). These numbers reflect the assumption that liberal management tools would reduce the potential losses by 50%, compared to the losses per wolf for Alternative 1 (No Action). Liberal tools may actually reduce the potential by more or less than 50%. FWP and WS would work even more proactively than outlined for Alternative 2 to minimize the potential risk of depredations through technical assistance. Losses are likely to be less than this amount during the early years of implementation because the wolf population would be smaller.

The predicted economic loss for confirmed losses, probable losses and the loss of other domestic animals is $44,917-$99,736 (Table 37). This is less than Alternative 1 (No Action), but more than Alternative 2 (Updated Council). Adaptive management of the overall wolf population, combined with removal of problem wolves, should decrease the number of livestock killed and the resulting economic losses (see Haight et al. 2002). The increased emphasis on working with landowners proactively to minimize the risk of depredation is intended to decrease the overall losses.

Whenever the adaptive management trigger of 20 breeding pairs is exceeded, FWP intends to implement a variety of liberal management tools. These include regulated harvest to help proactively manage total wolf numbers in the population (and the number of wolves per pack by default) and removal of problem animals. These tools are paired with the increased work by FWP, WS, and others to provide technical assistance to private landowners to minimize their risks to the extent possible. These strategies combined reduced depredation by at least 70% and decreased economic losses in a computer simulation model examining a variety of animal damage control strategies for wolves in the Great Lakes (Haight et al. 2002). FWP does not believe that field results in Montana would mimic computer-generated results. However, the results of the study did suggest that the combination of voluntary proactive changes to agricultural practices, in combination with proactive management of the number of wolves in the population, and removal of depredating wolves would reduce depredation losses significantly.

The estimated annual livestock depredation losses for this alternative are small compared to either the statewide value of annual cattle and sheep production or to the level of annual livestock losses to

predators other than wolves and to natural causes. But wolf losses are not spread evenly among all Montana livestock producers or shared by the industry as a whole. These losses are borne by individual livestock producers and the losses may in fact, be significant in proportion to the size of the operation. Furthermore, these losses represent a new added risk to some individual livestock producers, depending on where they are geographically with respect to wolf pack territories.

Under this alternative, FWP would not actively promote or facilitate creation of an entity to fund and administer a compensation program should the private programs be discontinued. Defenders of Wildlife, another private organization, or even a livestock insurance program may still compensate livestock producers for their losses. Therefore, economic losses to individual producers would only decrease to the extent that FWP's management program decreased the number of depredation incidents or decreased other expenses incurred by changing husbandry practices.

Big Game Hunting. Same as Alternative 2 (Updated Council).

Regional Economic Activity. Same as Alternative 2 (Updated Council).

Outfitting Industry. Same as Alternative 2 (Updated Council).

Recreational Values.

Hunting Values. Same as Alternative 2 (Updated Council).

Wildlife Viewing and Recreational Trip Values. Same as Alternative 2 (Updated Council)

Table 37. Estimated livestock losses (confirmed and probable) and the economic value of livestock and domestic animal losses in the year 2015 for Alternative 3 (Additional Wolf). The columns may not sum, due to rounding.

Type of Loss	Number of Animals Lost		Value per Head[a]	Total Value of Loss	
	Low	High		Low	High
Confirmed Cattle	28	62	$850	$23,800	$52,700
Confirmed Sheep	32	71	$94	$3,008	$6,674
			Confirmed Total Value	$26,808	$59,374
Probable Cattle	17	38	$850	$14,450	$32,300
Probable Sheep	3	6	$94	$282	$564
			Probable Total Value	$14,732	$32,864
			Total cattle and sheep losses	$41,540	$92,238
			Estimated Loss of Other Domestic Animals[b]	$3,377	7,498
			TOTAL ESTIMATED ANNUAL LOSS	$44,917	$99,736

[a] Average value of all sheep and lambs and all cattle, 2001 Montana Agricultural Statistics.
[b] Historically, Defenders of Wildlife compensation payments for other domestic animals (guarding dogs, horses, or llamas) was 8.13% of the total payments for cattle and sheep.

FWP Fiscal Impacts

Fiscal impacts under this alternative are similar to Alternative 2 (Updated Council). FWP anticipates some changes in revenue associated with antlerless elk permits, deer B licenses, and moose permits, but it will be similar to historic fluctuations. Some license revenue could be expected if FWP were to implement regulated harvest for wolves sometime in the future. However, the projected budget is amended to reflect 2 changes (Table 38). The amount for enhanced ungulate monitoring increased from $75,000 to $100,000 per year and no compensation program is shown. The budget also includes as a separate line item the $50,000 to fund extra preventative work by FWP, WS, and others. FWP's predicted budget to implement this alternative is $897,000.

Administration, Funding, and Legal Status

Same as Alternative 2 (Updated Council).

Physical Environment

Same as Alternative 1 (No Action).

Short Term, Long Term, and Cumulative Effects

The environmental consequences of this alternative will be similar to Alternative 2 (Updated Council). Over the longer term, the consequences increase because of higher livestock losses that overall management strategies and approaches to minimize risk may or may not mitigate completely. The absence of a compensation program actively promoted by FWP means that the resultant economic costs of whatever livestock are lost would be borne by the livestock producer.

Mitigation

Mitigation for this alternative is similar to Alternative 2 (Updated Council). Mitigation for the increased economic losses to individual livestock producers would be enhanced by the increased flexibility and innovative approaches to deter livestock depredations.

Irretrievable Commitments

Same as Alternative 2 (Updated Council). In the absence of a compensation program, the economic losses are irretrievable.

Table 38. Implementation budget for Alternative 3 (Additional Wolf). Asterisk denotes a change from the budget for Alternative 2 (Updated Council). Overhead and inflation are not included.

Division / Activity	Estimated Budget
Montana Fish, Wildlife & Parks	
Wildlife Division (Staff 4.30 FTE)	
Biologists (4.0 FTE)	$150,000
Operations	$156,000
Enhanced Ungulate Monitoring*	$100,000*
Wildlife Lab (0.30 FTE)	$ 8,000
Wildlife Lab Operations, Research (contracts, operations, graduate student stipends)	$ 67,000
Total	**$481,000**
Enforcement Division (Staff 2.5 FTE)	
Staff	$ 86,000
Operations	$ 71,000
Total	**$157,000**
Conservation Education Division (Staff 0.75 FTE)	
Information Officer and Headquarters Staff (.75 FTE)	$ 44,000
Operations	$ 10,000
Total	**$ 54,000**
Fiscal, Administration, and Legal (staff 1.0 FTE)	
Fiscal and Administration (0.75)	$ 37,000
Legal (0.25 FTE)	$ 18,000
Total	**$ 55,000**
Proactive, preventative efforts by FWP, Wildlife Services, or other cooperators	**$50,000**
Depredation: Wildlife Services (USDA/APHIS) Cooperative Wolf Damage Management and FWP-directed Predator Control	**$100,000**
FWP ANNUAL TOTAL	**$897,000**

Alternative 4. Minimum Wolf

For comparison, the environmental consequences of this and the other alternatives are presented in a summary at the end of this chapter (Table 43).

Biological Environment

Wolf Management. FWP would implement an aggressive program that manages the gray wolf at the minimum legal requirements. Although many of the management tools would be the same as for Alternatives 2 (Updated Council) and 3 (Additional Wolf), they would not be implemented adaptively. Aggressive WS control actions, coupled with landowner removals would keep the population at the minimum level to avoid relisting. Private landowners would have more responsibility for control work on

their property. Wolves would be harassed more routinely and killed more often than for the other alternatives. Regulated harvest would not be implemented consistently over time because aggressive wolf control by landowners and by WS is expected to keep wolf numbers low. Wolf packs near national parks would be managed more conservatively than other packs in the state, as an added measure of security that some natural dispersal could occur. FWP would apply the more strict federal definition of a breeding pair (federal recovery definition) because the program goal is to maintain the minimum number to prevent relisting. FWP would have less flexibility to adjust management in that every wolf or pack would be an important contribution to the total population because the population would be close to the minimum required.

Gray wolves would be managed as a "species in need of management" which grants full legal protection from indiscriminant killing. However, significant wolf mortality may be necessary through the provision for special kill permits issued to landowners and through WS control actions to maintain wolf numbers near the cap. FWP would issue special kill permits at the level necessary to achieve enough mortality to maintain the population at the capped, minimum level. The species would not be integrated into the wildlife program in the context of modern scientific wildlife management, but would instead be treated separate and distinct.

Wolf Numbers and Distribution. Approximately 154 wolves would be present in Montana in 2015, which could be about 13 breeding pairs according to the federal recovery definition. It is the fewest of any alternative. If the number of wolves were greater at the time of actual delisting, FWP would accelerate control actions by WS or by private landowners and utilize a licensed hunting/trapping program to decrease the population until it was at the minimum. Total wolf numbers could fluctuate because of management actions, changes in prey densities, or intraspecific competition. The future population should be secure, but so close to the margin that it could drop below relisting criteria in the face of unexpected environmental events. If that should occur, FWP would have limited management flexibility and most management/control activities would be non-lethal.

Wolf distribution would be limited to western Montana by control actions. Wolves would be strongly discouraged in central and eastern Montana, on private lands, and on FWP WMAs. In western Montana, wolf distribution may ultimately be limited to federal public lands and national parks.

Wolf Habitat, Connectivity, and Land Management. Connectivity requirements would be met marginally and would have to be maintained by periodically relocating wolves. This tool is expensive, and it has had mixed success in the past. Connectivity of the tri-state population with Canada would occur because of more conservative management in northwest Montana. Public land management activities, whether logging, grazing, or travel management are not affected by this alternative, although managers may adopt policies or make changes for other purposes. Some land managers may adopt localized area closures around den or rendezvous sites, especially within national parks. FWP would not invest much effort in coordinating with land managers or private landowners on wildlife habitat projects that would benefit wolves.

Monitoring. FWP will monitor the population to ensure that it is secure and above the recovery goal. Telemetry would be required to a greater extent under this alternative, and it will increase monitoring costs compared to the other alternatives. Monitoring efforts themselves must be very precise and reliable because it will be important to document every pack and its reproductive status to determine whether it could be tallied as a breeding pair. Wolves would be captured and handled more frequently to maintain telemetry contact with each pack. Significant effort must be committed to achieve the intensity required to document that Montana is meeting the minimum requirements.

Prey Populations. At the regional and statewide scale, prey populations will fluctuate through time due to all causes of mortality and environmental factors similar to the historical patterns described in Chapter 2. At the localized level, wolf predation may still influence prey populations, particularly in combination with environmental factors. Because so few wolves would be on the landscape, fewer localized impacts are expected. Overall, aggressive wolf management philosophies would benefit prey populations across a broader area because wolf predation on prey would be less under this alternative in that fewer wolves would exist on the landscape. Because there would be fewer wolf packs, ungulate monitoring would not be increased.

Other Wildlife. Species such as scavengers that benefit from wolf presence in an ecosystem would not benefit as much from this alternative compared to the others. Those species that may compete with wolves for food or space would be less impacted by this alternative.

Human Environment

Social Factors. Wolf restoration has been a divisive issue among Montanans. Those citizens opposed to wolf presence would benefit the most by this alternative. Citizens who are supportive or neutral may be impacted by the minimal wolf management philosophy. By not taking an adaptive approach, FWP would not meet the differing conservation and management expectations and interests that exist across the spectrum of social values. While Montana citizens would have a stronger voice in wolf management in their state because the program would be administered from a local perspective, FWP would not be able to address all the local interests. In addition, because FWP management flexibility could be constrained by the low wolf numbers, some management decisions may not be entirely satisfactory in light of the need to maintain enough breeding pairs to prevent relisting.

Public Outreach. A significant component of public outreach would consist of working with private landowners to achieve management objectives and to notify them when wolves are in the area. This role would partially be filled by biologists or wardens and partially by information officers distributed around the state. The public outreach to inform landowners and the public about wolf pack activities or whereabouts may increase the public's sense of safety. Significant public outreach may also be required to explain the program and its purposes.

Human Safety. Under this alternative, people would encounter wolves less frequently. There should be fewer encounters between wolves and lion hounds or bird hunting dogs. Other impacts would be the same as Alternative 2 (Updated Council).

Private Property. FWP does not intend to restrict private property uses to manage a recovered wolf population. While wolf use is primarily on public lands, some use of private lands does occur. Use of private lands will increase in the future with increasing wolf numbers, and conflicts may occur more frequently. Any conflicts on private property would be resolved with aggressive management tools, not incrementally through adaptive management as described under Alternative 2 (Updated Council). In the case of livestock, this would be accomplished either by WS or by the landowner through special kill permits. Management tools would be implemented specifically to discourage wolf use of private property. The economic impacts of wolf-livestock conflicts are addressed below.

Economics / Livelihoods

Livestock Depredation. This alternative predicts that there will be about 154 wolves in Montana in 2015. FWP expects that the historic per wolf depredation rate would be reduced by 75% from the estimate used for Alternative 1 (No Action). Approximately six cattle and seven sheep would be lost annually to

confirmed wolf depredation. Four cattle and one sheep could be tallied as probable depredation (Table 39). Losses may be greater in the early years of implementation if more wolves are in the population.

Montana Agricultural Statistics Service (2002) reports that, as of January 1, 2001, the average value of all cattle in Montana was $850 per head. Sheep averaged $94 per head. Purebred lines may, in fact, have a significantly higher value, while other animals may be a lower than average value. The predicted economic loss is $5,758 for confirmed depredation, $3,494 for probable depredation, and $752 for other domestic animals (Table 39). Livestock producers may incur other expenses, including increased management costs due to changes in husbandry practices or materials to improve the physical security of animals. These costs are difficult to estimate and have not been quantified. Presumably, livestock producers already incur some management costs to mitigate for predator losses.

The estimated annual livestock depredation losses for this alternative are small compared to either the statewide value of annual cattle and sheep production or to the level of annual livestock losses to predators other than wolves and to natural causes. But wolf losses are not spread evenly among all Montana livestock producers or shared by the industry as a whole. These losses are borne by individual livestock producers and the losses may in fact, be significant in proportion to the size of the operation. Furthermore, these losses represent a new added risk to some individual livestock producers, depending on where they are geographically located with respect to wolf pack territories.

This alternative does not include a compensation program because landowners and livestock producers are able to aggressively manage situations on their private properties through special kill permits provided by FWP. On public lands, livestock producers could kill a wolf it is attacking, killing, or threatening their livestock. Aggressive management tools should limit livestock depredation to the lowest levels of any alternative. In another sense, this alternative places the highest management burden on private property owners and livestock producers to carry out a significant amount of control work–which is a different type of cost to them.

Big Game Hunting. Same as Alternative 2 (Updated Council).

Regional Economic Activity. Same as Alternative 2 (Updated Council).

Outfitting Industry. Same as Alternative 2 (Updated Council).

Recreational Values.

Hunting Values. Same as Alternative 2 (Updated Council)

Wildlife Viewing and Recreational Trip Values. FWP expects wolf-viewing opportunities to have a positive impact on recreational values in Montana. But at this point, the impact can't be quantified due to a lack of data. For example, it's unknown how changes in the number of wolves affects the odds of seeing wolves or how increasing or decreasing viewing opportunities affect expenditures or net benefits. The addition of wolf viewing should positively impact the recreational values of many citizens and visitors to Montana. The size of the wolf population should be directly related to the positive value accruing to the individuals who value and would seek out wolf viewing or hearing opportunities. As the alternative specifying the lowest recovered population, it would also likely have the least potential to positively impact recreational values of the five alternatives examined.

FWP Fiscal Impacts

Fiscal impacts describe the changes in revenue from license sales, the cost of implementing the program, and the potential sources of revenue to fund it. License revenue from antlerless elk permits, deer B licenses, and moose permits would vary by $220,313 annually, the same as for the other alternatives. FWP's projected budget to implement this alternative is $952,000. FWP would implement this alternative through special federal appropriations, which would be the sole funding source.

Table 40 represents a budget to implement this alternative. It illustrates increased costs to FWP for an intensive wolf monitoring program, the higher administrative costs for increased coordination with adjacent states and USFWS, and increased costs to administer the special kill permit system, and landowner contact. Ungulate monitoring would not be enhanced because so few wolves would be present. WS funding would decrease because private landowners would carry more responsibility. There would be no compensation program. While this budget is FWP's best projection of the resources required, FWP cannot assess its accuracy until the agency actually assumes management authority and implements this alternative. Some components may not be captured fully by this budget. There may also be costs that could not be predicted at this time or were unforeseen.

Table 39. Estimated livestock losses (confirmed and probable) and the economic value of livestock and domestic animal losses in the year 2015 for Alternative 4 (Minimum Wolf). The number of animals is rounded to the nearest whole number.

Type of Loss	Number of Animals Lost	Value per Head[a]	Total Value of Loss
Confirmed Cattle	6	$850	$5,100
Confirmed Sheep	7	$94	$658
		Confirmed Total Value	$5,758
Probable Cattle	4	$850	$3,400
Probable Sheep	1	$94	$94
		Probable Total Value	$3,494
		Total cattle and sheep losses	$9,252
		Estimated Loss of Other Domestic Animals[b]	$752
		TOTAL ESTIMATED ANNUAL LOSS	$10,004

[a] Average value of all sheep and lambs and all cattle, 2001 Montana Agricultural Statistics.
[b] Historically, Defenders of Wildlife compensation payments for other domestic animals (guarding dogs, horses, or llamas) was 8.13% of the total payments for cattle and sheep.

Administration, Funding, and Legal Status

Under this alternative, FWP would be the lead agency, and WS would still be an important cooperator. A great deal of coordination would be required between FWP and WS, Idaho, Wyoming, tribal authorities, NPS, and USFWS. Private landowners would be administering a significant aspect of the program in that their actions will help manage wolf numbers and distribution. This would require greater effort on their part. Individual landowners would make more decisions on how management is implemented in local situations. To that end, landowners' discretionary decisions would significantly influence outcomes. For

FWP and WS, many new wolf management activities fall within existing duties and responsibilities already carried out. However, some activities would clearly add to existing responsibilities and workloads. Existing resources would not be adequate.

State laws and FWP administrative rules would guide management and establish the legal framework. The gray wolf would be removed from the state's endangered species list and reclassified as a "species in need of management." Management regulations would be drafted to reflect the aggressive management philosophies described. Even though the gray wolf would be legally protected from an "open season", wolves would be treated differently from how other large carnivores are managed in that the inherent value is not recognized.

Physical Environment

Same as Alternative 1 (No Action).

Short Term, Long Term, and Cumulative Effects

FWP will implement the program, in conjunction with WS, but will be closely supervised by USFWS. Overall, agency flexibility to respond to anticipated and unanticipated situations would be constrained to a large degree because every wolf and pack is a valuable contribution to the Montana population. FWP and WS would also be closely scrutinized by Idaho and Wyoming authorities to ensure that a drop in Montana wolf numbers would not jeopardize the tri-state population.

Wolf numbers will probably increase and so will wolf distribution in the first few years, until control activities bring numbers back down to the delisting level. Localized impacts to prey populations, individual outfitters, or individual businesses may also develop in the short term but are expected to diminish with time. Hunter opportunity will continue to fluctuate. Livestock losses to wolves will still be documented and affect individual producers, but those impacts will be minimal. Landowners and livestock producers would be more closely scrutinized because their participation is a significant part of the program. Licensed hunters and trappers would not be able to regularly participate in wolf conservation and management in Montana.

In the long run, it may not actually be possible to effectively cap wolf numbers and limit wolf distribution. A significant amount of mortality may be required and that level may not be completely achievable or socially acceptable. On the other hand, Montana's portion of the tri-state population could drop below the minimum level, thereby risking the possibility that the species would be listed again and once again managed by USFWS in Montana. In the absence of a proactive program that responds to people and wolves, management efforts may not be efficiently focused or effective. Because the program would be funded strictly by federal money, it may be held to a higher standard and more stringent accountability during USFWS oversight of FWP's federal aid program. All of FWP's matching federal funds could be jeopardized if those standards were not met.

In a cumulative sense, wolf conservation and management in Montana will become increasing controversial because, given the lack of an adaptive approach, not all interests and needs would met in a balanced, responsive way. By managing wolves as close to a legally-defined predator as possible, FWP would ignore a segment of the public that is either supportive or neutral towards wolf presence in Montana and the idea that the gray wolf could be integrated in a modern wildlife program and managed similar to black bears or mountain lions.

Table 40. Implementation budget for Alternative 4 (Minimum Wolf). Asterisk denotes a change from the budget for Alternative 2 (Updated Council). Overhead and inflation are not included.

Division / Activity	Estimated Budget
Montana Fish, Wildlife & Parks	
Wildlife Division (Staff 5.30 FTE)	
Biologists (5.0 FTE)*	$187,000*
Operations*	$225,000*
Enhanced Ungulate Monitoring*	-0-*
Wildlife Lab (0.30 FTE)	$ 8,000
Wildlife Lab Operations, Research (contracts, operations, graduate student stipends)	$ 67,000
Total	**$487,000**
Enforcement Division (Staff 3.5 FTE)	
Staff (3.5 FTE)*	$ 121,000*
Operations*	$ 91,000*
Total	**$212,000**
Conservation Education Division (Staff 1.25 FTE)*	
Information Officer and Headquarters Staff (1.25 FTE)	$ 60,000*
Operations*	$ 25,000*
Total	**$ 85,000**
Fiscal, Administration, and Legal (staff 1.5 FTE)*	
Fiscal and Administration (1.25)*	$ 75,000*
Legal (0.25 FTE)	$ 18,000
Total	**$ 93,000**
Depredation: Wildlife Services (USDA/APHIS) Cooperative Wolf Damage Management and FWP-directed Predator Control*	**$75,000***
FWP ANNUAL TOTAL	**$952,000**

Mitigation

One of the most significant impacts of this alternative is the risk that the wolf population in Montana would decline to the extent that the tri-state population is in jeopardy and would require renewed protection under ESA. Relisting the northern Rockies population prior to that happening could mitigate the risk so that wolves would be fully protected by federal law, which is more restrictive than the proposed state management program and Montana law. USFWS may consult with FWP to adjust the program before relisting becomes necessary. Reintroducing wolves from Canada or other adjacent states could augment the Montana population. FWP could also mitigate that impact by modifying specific aspects of how this alternative is implemented. FWP could manage more conservatively or issue fewer permits to private landowners. These same measures would also mitigate for the constraints this alternative places on FWP.

Irretrievable Commitments

In the future, wolves will be present in Montana. FWP would make the commitment to maintain the population. That commitment would be irretrievable in the sense that FWP does not intend to default on its legal responsibilities to maintain a viable, but small population. By assuming the lead role for wolf management, FWP would be committing staff and financial resources to fulfill the needs of the program. Those resources would be partially unavailable to other program areas to the extent that responsibilities don't overlap. Some wolves will still kill livestock. Even though wolves are not expected to have a measurable effect on the livestock industry, a few producers could sustain substantial losses in a given year. The number of depredations will be small, but irretrievable nonetheless.

Alternative 5. Contingency

The environmental consequences of this alternative were originally predicted for the Draft EIS prior to USFWS finalizing the reclassification rule that downlisted wolves in northwestern Montana from endangered to threatened status. In it's final rule notification, USFWS concluded that the new threatened status and the increased agency flexibility will not cause any significant increase in wolf mortality that would impact population levels or prevent population increases (USFWS 2003a). It follows by extension that the wolf population in northwest Montana would also not be expected to increase any faster than historical rates due to increased management flexibility. Therefore, FWP did not reanalyze the environmental consequences of this alternative for the Final EIS. USFWS and FWP agree that no significant changes in population performance are expected under the new rules that would warrant a new impacts analysis. The environmental consequences of this alternative were predicted as if the current and newly revised federal management policies and regulations were carried forward from 2003 to 2015. For comparison, the environmental consequences of this and the other alternatives are presented in a summary at the end of this chapter (Table 43).

Biological Environment

Wolf Management. The consequences would be similar to Alternative 2 (Updated Council). FWP would implement an adaptive program with a 15-breeding pair trigger to move from conservative to liberal tools and vice versa. FWP would have the flexibility to implement most provisions outlined in Alternative 2, but all FWP management options and decisions would be guided by federal regulations until the gray wolf was fully delisted in the northern Rockies. If the wolf population increases at the low rate of growth, liberal management tools would be available in 2006. If the population grew at the higher rate, liberal tools would be available starting in 2004.

The proactive provisions of this alternative would be emphasized to a much greater degree than under Alternative 1 (No Action, USFWS authority). FWP would have more personnel resources from which to draw because personnel are distributed more widely than USFWS personnel. Furthermore, because federal rules are more restrictive about the conditions under which wolves could be harassed or killed, proactive strategies become increasingly more important. Emphasizing proactive strategies earlier on may dampen or avoid future conflicts. Wolves could still be harassed or killed in certain circumstances. Special kill permits will be available to landowners, but the permits would be provisioned according to federal rules. Nonetheless, fewer wolves would probably be harassed or killed under this alternative than for Alternative 2 (Updated Council) because certain provisions of state law allowing defense of property

would not be allowed. Defense of property would be guided by federal laws. Also, regulated harvest through hunting and trapping would also be precluded by federal rules.
Numbers and Distribution. Between 421 and 1,167 (or 35-95 breeding pairs according to the federal definition) could be present in Montana in 2015 under this alternative. FWP expects the population to be closer to the low end of the range, which is fewer than for Alternative 1 (No Action), but more than Alternatives 2, 3 and 4. This result could be expected since not all liberal management tools would be available to FWP until delisting is fully complete. It is possible that there would be fewer wolves if the population grows more slowly than predicted. The population could be higher if the management tools that FWP could implement didn't slow population growth to the extent assumed for this EIS. This population would be secure and still provide the maximum management flexibility allowed under federal regulations. FWP would not expect the population to drop unexpectedly close to the relisting level, but it will fluctuate through time.

Wolf distribution would be the same as for Alternative 2 (Updated Council).

Wolf Habitat, Connectivity, and Land Management. Same as Alternative 2 (Updated Council).

Monitoring. Same as Alternative 2(Updated Council).

Prey Populations. Same as Alternative 2 (Updated Council). However, in circumstances where reliable data indicate that wolves are disproportionately affecting a local prey population, FWP would not be able to adjust the wolf-prey balance using regulated wolf harvest. Instead, FWP could only use wolf relocation techniques and adjust human hunter opportunity for ungulates to address the situation.

Other Wildlife. Same as Alternative 2 (Updated Council).

Human Environment

Social Factors. In most respects, the consequences of this alternative would be similar to Alternative 2 (Updated Council). One important difference is that the gray wolf would still be listed under ESA. FWP can still implement an adaptive program and respond to the needs of people and wolves in most ways desired. However, FWP could not implement all the management tools that are included in Alternative 2 (Updated Council).

This alternative could be a reasonable interim step in the event that wolf delisting is delayed for an extended period of time. It provides a mechanism for FWP to carry out day to day wolf management. Because it is adaptive, it would allow FWP to meet the differing management expectations and needs that exist across the spectrum of social values. For some citizens, FWP may fulfill these needs and expectations more effectively. Other citizens may not agree, believing that federal authorities alone should manage species listed under ESA. Still others may believe the federal government should manage wolves in perpetuity. This alternative would call on the public to accept the legitimacy of FWP to manage gray wolves while the species is still officially listed under ESA.

Public Outreach. Same as Alternative 2 (Updated Council). Some additional effort would be required initially to inform the public about the rules and regulations, as FWP would be assuming management authority of a listed species from USFWS.

Human Safety. Same as Alternative 1 (No Action). FWP would implement the federal regulations pertaining to defense of human life. Under federal regulations, wolves could be harassed or killed in defense of human life in the presence of an immediate and direct threat. Federal regulations would also

permit harassment or lethal control of a wolf if it is a demonstrable, but not immediate threat to human life or safety. There is a 24-hour reporting requirement.
Private Property. Same as Alternative 2 (Updated Council).

Economics / Livelihoods

Livestock Depredation. This alternative predicts that there will be about 421-1,167 wolves in Montana in 2015. FWP expects that a greater emphasis on proactive strategies would reduce the historic depredation rate by 25%, although this is a smaller percentage than Alternative 2 (Updated council) because not all liberal tools would be available. Approximately 49-135 cattle and 55-153 sheep would be lost to confirmed depredation (Table 41). About 29-81 cattle and 5-13 sheep could be lost to probable depredation. The predicted economic loss for confirmed depredation is $46,820 - $129,132. Economic loss due to probable depredation is $25,120 – $70,072. Economic losses for other domestic animals could be $5,849 - $16,195 (Table 41).

Livestock producers may incur other costs, including increased management costs due to changes in husbandry practices or materials to improve the physical security of animals. These costs are difficult to estimate and have not been quantified. Presumably livestock producers already incur some management costs to mitigate for predator loss.

The estimated annual livestock depredation losses for this alternative are small compared to either the statewide value of annual cattle and sheep production or to the level of annual livestock losses to predators other than wolves and to natural causes. But wolf losses are not spread evenly among all Montana livestock producers or shared by the industry as a whole. These losses are borne by individual livestock producers and the losses may in fact, be significant in proportion to the size of the operation. Furthermore, these losses represent a new added risk to some individual livestock producers, depending on where they are geographically in relation to wolf pack territories. Under this alternative, livestock producers have some assurance that Defenders of Wildlife would still provide compensation because the gray wolf would still be listed. However, because the Defenders of Wildlife program is voluntary and funded by private donation, it could be discontinued at any time. FWP would not seek out or develop a substitute, so these losses could go uncompensated if Defenders of Wildlife no longer paid compensation.

Big Game Hunting. Same as Alternative 2 (Updated Council).

Regional Economic Activity. Same as Alternative 2 (Updated Council).

Outfitting Industry. Same as Alternative 2 (Updated Council).

Recreational Values.

Hunting Values. Same as Alternative 1 (No Action), but localized impacts expected to be less.

Wildlife Viewing and Recreational Trip Values. Same as Alternative 2 (Updated Council).

FWP Fiscal Impacts

Fiscal impacts describe the changes in revenue from license sales, the cost of implementing the program, and the potential sources of revenue to fund it. License revenue from antlerless elk permits, deer B

licenses, and moose permits could be expected to vary by $220,313 annually, the same as for all alternatives. FWP's projected budget to implement this alternative is $924,739 – $1,062,399. An additional amount is shown for compensation, but that would be provided independently. FWP would implement this alternative through a combination of federal, private, and state funding. Ninety percent of the total budget would be covered by federal sources. No new FWP revenue would be derived from a regulated wolf harvest.

Table 42 presents a budget for this alternative. FWP anticipates slightly increased administrative costs because of increased coordination with USFWS (not shown) and enhanced ungulate monitoring compared to Alternative 2 (Updated Council). In addition, FWP would dedicate an extra $50,000 to increase technical assistance to landowners for proactive work. Because wolves would still be listed, FWP assumes that WS will continue to be funded directly by Congressional appropriation or through USFWS. While it is FWP's best projection of the resources required, FWP cannot assess its accuracy until the agency actually assumes management authority and begins implementation

Table 41. Estimated livestock losses (confirmed and probable) and the economic value of livestock and domestic animal losses in the year 2015 for Alternative 5 (Contingency). The columns may not sum, due to rounding.

Type of Loss	Number of Animals Lost		Value per Head[a]	Total Value of Loss	
	Low	High		Low	High
Confirmed Cattle	49	135	$850	$41,650	$114,750
Confirmed Sheep	55	153	$94	$5,170	$14,382
			Confirmed Total Value	$46,820	$129,132
Probable Cattle	29	81	$850	$24,650	$68,850
Probable Sheep	5	13	$94	$470	$1,222
			Probable Total Value	$25,120	$70,072
			Total cattle and sheep losses	$71,940	$199,204
			Estimated Loss of Other Domestic Animals[b]	$5,849	$16,195
			TOTAL ESTIMATED ANNUAL LOSS	$77,789	$215,399

[a] Average value of all sheep and lambs and all cattle, 2001 Montana Agricultural Statistics.
[b] Historically, Defenders of Wildlife compensation payments for other domestic animals (guarding dogs, horses, or llamas) was 8.13% of the total payments for cattle and sheep.

Administration, Funding, and Legal Status

Under this alternative, administrative impacts are similar to Alternative 2 (Updated Council). An important exception is that even though FWP would be the lead agency for day to day management functions and is the primary decision maker, USFWS would oversee the state's implementation. Some elements of the program would be implemented using federal regulations, while others would be implemented using state regulations. That poses some challenges both for FWP, WS, and the public to fully understand all the details. USFWS would still fulfill Section 7 consultations, not FWP.

Many new wolf management activities fall within existing duties and responsibilities already carried out by FWP or WS. But, some activities would clearly add to existing responsibilities and work loads (see Alternative 2). FWP would still dedicate some staff time to coordinate with USFWS, Idaho, and Wyoming to delist the gray wolf in the northern Rockies. In addition, there remains some risk to FWP that federal funds may be difficult to maintain over the long term. FWP may have to decide whether to continue state involvement sometime in the future if state and private sources cannot make up the difference.

Table 42. Implementation budget for Alternative 5 (Contingency). Asterisk denotes a change from the budget for Alternative 2 (Updated Council). Overhead and inflation are not included.

Division / Activity	Estimated Budget
Montana Fish, Wildlife & Parks	
Wildlife Division (Staff 4.30 FTE)	
Biologists (4.0 FTE)	$150,000
Operations	$156,000
Enhanced Ungulate Monitoring*	$100,000*
Wildlife Lab (0.30 FTE)	$ 8,000
Wildlife Lab Operations, Research (contracts, operations, graduate student stipends)	$ 67,000
Total	**$481,000**
Enforcement Division (Staff 2.5 FTE)	
Staff	$ 86,000
Operations	$ 71,000
Total	**$157,000**
Conservation Education Division (Staff 0.75 FTE)	
Information Officer and Headquarters Staff (.75 FTE)	$ 44,000
Operations	$ 10,000
Total	**$ 54,000**
Fiscal, Administration, and Legal (staff 1.0 FTE)	
Fiscal and Administration (0.75)	$ 37,000
Legal (0.25 FTE)	$ 18,000
Total	**$ 55,000**
Proactive, preventative efforts by FWP, Wildlife Services, or other cooperators	**$50,000**
FWP ANNUAL TOTAL	**$797,000**
Depredation: Wildlife Services (USDA/APHIS) Cooperative Wolf Damage Management and FWP-directed Predator Control; source is separate federal appropriation*	**$50,000***
Compensation (money from private source or federal appropriation)	**$ 77,739 – $215,399**
PROGRAM TOTAL (Including Compensation)	**$924,739 – 1,062,399**

Physical Environment

Same as Alternative 1 (No Action).

Short Term, Long Term, and Cumulative Effects

In the short term, this alternative could serve as a bridge between federal and state authority. Despite USFWS oversight, FWP would be implementing the program and state personnel would gain knowledge and experience prior to assuming full responsibility. There could be some confusion in the public's understanding of the roles and responsibilities of the state and federal agencies because the state would be assuming management of a listed species. While there are some limitations to what FWP could do, FWP would still have latitude to implement much of the program, especially the proactive elements. In so doing, the program is more responsive both in the short and long term. Wolf numbers will probably increase and so will wolf distribution. Localized impacts to prey populations, individual outfitters, or individual businesses may also develop in the short term. Hunter opportunity will still continue to fluctuate for a variety of reasons, which may include wolf predation. Livestock losses will still affect individual producers.

In a cumulative sense, FWP would be stepping into a controversial arena. For some citizens, wolf acceptance would be improved because management would be through a state agency, adaptive principles would make for a more flexible program than currently exists, and the program would balance the needs of people and wolves. For other citizens, wolf acceptance may even decrease because the state would manage a listed species that had achieved the biological recovery requirements but was still listed under ESA. Public debate surrounding wolf conservation will probably remain conflicted because the national scope will be maintained because the species would still be listed.

Mitigation

Mitigation measures for this alternative are similar to Alternative 2 (Updated Council). An increased public outreach effort can mitigate public confusion over agency roles and responsibilities, the management framework, and uncertainty about the laws and regulations.

Irretrievable Commitments

Wolves will be present in Montana. Under this alternative, FWP would make a commitment to conserve and manage the species and integrate it within the wildlife program. In the short term, that integration may not be complete since federal regulations guide some elements of the program. However, in the long term once the wolf is delisted, FWP's commitment would be irretrievable in the sense that FWP does not intend to default on its legal responsibilities to maintain a secure viable population in the future. FWP would be committing staff and financial resources to fulfill the needs of the program. Those resources would be partially unavailable to other program areas to the extent that responsibilities and activities don't overlap. FWP would be taking the risk that federal funding would be secure, adequate, and would not diminish prior to full delisting. FWP would also make the commitment to conserve and manage the gray wolf, no matter the outcome of the delisting process – whether delays are short term or long term.

The adaptive management tools within this alternative will mitigate many potentially irretrievable commitments of resources or changes in resource status. However, some wolves will kill livestock and those losses are irretrievable.

Table 43. Summary of environmental consequences for each alternative.

Issue	1. No Action	2. Updated Council	3. Additional Wolf	4. Minimum Wolf	5. Contingency
Wolf Management	Recovery emphasis; increase population size and distribution; address conflicts	Adaptive; responsive; balanced; FWP has flexibility; gray wolf integrated into wildlife program; resolve conflicts	Same as Alternative 2; more management flexibility because more wolves	Not adaptive; aggressive; liberal; more control done by landowners; FWP has limited flexibility	Same as Alternative 2 but not all tools available while gray wolf still listed (no regulated harvest)
Number of Wolves in 2015	854 wolves or 70 breeding pairs	LOW: 328 wolves or 27 breeding pairs; liberal tools start in 2006 HIGH: 657 wolves or 54 breeding pairs; liberal tools start in 2004	LOW: 365 or 30 breeding pairs; liberal tools start in 2008 HIGH: 807 or 66 breeding pairs; liberal tools start in 2006	CAP: 154 or 13 breeding pairs; aggressive management upon delisting until population reduced to cap	LOW: 421 or 35 breeding pairs; liberal tools start in 2006; no regulated harvest HIGH: 1,167 or 95 breeding pairs; liberal tools start in 2004; no regulated harvest
Wolf Distribution in 2015	Statewide is possible, but will ultimately be determined by prey abundance and conflicts with people in practical terms; expected to be western, west-central, and southwestern Montana	Statewide is possible, but will probably be primarily western, west central and southwestern Montana; no administrative zone, but encouraged on remote public lands and integrated in mixed landowner-ships; localized distribution will be determined by prey abundance and conflicts with people	Same as Alternative 2	Public lands in western Montana; administrative zone defined by FWP regional boundaries; no wolves east of FWP Region's 4 and 5 boundaries; management to restrict wolf use of private lands; localized distribution will be determined by prey abundance and conflicts	Same as Alternative 2
Wolf Habitat, Connectivity, Land Management	Connectivity assured through legal protection and adequate prey and wolf numbers	Connectivity assured through legal protection and adequate prey and wolf numbers	Connectivity slightly increased over Alternative 2	Connectivity not assured without periodic wolf trap/relocation efforts	Same as Alternative 2
Monitoring	Moderate, declining intensity; done by USFWS	Moderate cost and intensity; done by FWP	Same as Alternative 2	High cost and intensity; done by FWP; strong reliance on telemetry	Same as Alternative 2

Table 43. Continued.

Issue	1. No Action	2. Updated Council	3. Additional Wolf	4. Minimum Wolf	5. Contingency
Prey Populations	Management not fully integrated with wolves; numbers fluctuate through time because of predation (all species), natural mortality, human hunting, habitat conditions, weather events; fluctuation similar to historical patterns; local ungulate populations may decrease in presence of wolves; local populations may take longer to recover from environmental events in the presence of wolves	Management integrated with wolves and managed ecologically; local populations may decrease in presence of wolves or take longer to recover from environmental events; local impacts expected to be less than Alternative 1; impacts across broad geographic areas not expected; numbers will fluctuate through time due to predation (all causes), natural mortality, human hunting, habitat conditions, weather events; fluctuation similar to historical patterns	Same as Alternative 2	Same as Alternative 2, but no impacts to localized ungulate populations expected	Same as Alternative 2; no regulated wolf harvest to help balance wolf-prey relationships; wolf management tools primarily relocation
Other Wildlife	Some species may be impacted; other species benefit	Same as Alternative 1; FWP better able to address needs of other wildlife species	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
Social	Variable	Variable	Variable	Variable	Variable
Public Outreach	Less effort than Alternatives 2, 3 and 5	Increased from Alternative 1; statewide effort (general ecology, safety, landowner contacts, etc.); many types	Same as Alternative 2	Emphasizes landowner contacts	Same as Alternative 2
Human Safety	Defense of human life under ESA acceptable; report within 24 hours; USFWS management to remove threats to public safety	Defense of human life acceptable under Montana law; FWP management to remove threats to public safety	Same as Alternative 2	Same as Alternative 2	Same as Alternative 1; FWP implements federal regulations
Private Property	No restrictions by USFWS	No restrictions by State of Montana	Same as Alternative 2	Wolf use discouraged; same as Alternative 2	Same as Alternative 2
Livestock Depredation	Confirmed Cattle: 132 Confirmed Sheep: 150 Probable Cattle: 79 Probable Sheep: 13	Confirmed Cattle: 25-51 Confirmed Sheep: 29-58 Probable Cattle: 16-31 Probable Sheep: 3-5	Confirmed Cattle: 28-62 Confirmed Sheep: 32-71 Probable Cattle: 17-38 Probable Sheep: 3-6	Confirmed Cattle: 6 Confirmed Sheep: 7 Probable Cattle: 4 Probable Sheep: 1	Confirmed Cattle: 49-135 Confirmed Sheep: 55-153 Probable Cattle: 29-81 Probable Sheep: 5-13

Table 43. Continued.

Issue	1. No Action	2. Updated Council	3. Additional Wolf	4. Minimum Wolf	5. Contingency
Compensation	Privately funded, voluntary; Defenders of Wildlife possible Confirmed: $126,300 Probable: $68,372 Other Domestic: $15,827	State of Montana with FWP in leadership role establishes an independent entity; no state or matching dollars are used; mitigation through management possible Confirmed: $23,976-$48,802 Probable: $13,882-$26,820 Other Domestic: $3,077-$6,148	No effort by FWP to establish program; private and voluntary OK; no state or matching federal dollars; mitigation possible Confirmed: $26,808-$59,374 Probable: $14,732-$32,864 Other Domestic: $3,377-$7,498	None Confirmed: $5,758 Probable: $3,494 Other Domestic: $752	Same as Alternative 2 Confirmed: $48,820-$129,132 Probable: $25,120-$70,072 Other Domestic: $5,849-$16,195
Big Game Hunting	No impact for non-residents; resident opportunity variable through time; changes not expected to be greater than observed historically; impacts localized; decreases or increases possible due to wolf presence or other management objectives; no mitigation	No impact to non-residents; resident opportunity variable through time; changes not expected to be greater than observed historically; impacts localized, but less severe than Alternative 1 because ungulate management is integrated with wolf management; increases possible due to wolf presence or other management objectives; mitigation possible	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
Regional Economy	No regional or statewide impact; localized possible	Same as Alternative 1; localized changes expected to be less than Alternative 1	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
Outfitting Industry	No impact statewide or regionally; impacts to certain outfitters possible where wolves affect local prey populations; no mitigation	Same as Alternative 1; localized impacts expected to be less than Alternative1	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
Recreational Values (Hunting and Wildlife Viewing)	Variable	Variable	Variable	Variable	Variable

Table 43. Continued.

Issue	1. No Action	2. Updated Council	3. Additional Wolf	4. Minimum Wolf	5. Contingency
FWP Fiscal	Minor impact due to historic changes in license revenue FWP: up to $5,000 for coordination; costs absorbed in existing budget USFWS $1,111,000 -- total for Montana, Idaho, and Wyoming combined WS: all federal appropriation	Minor impact due to historic changes in license revenue; funding shared by federal, state, and private sources; some revenue generated if implement regulated wolf harvest FWP: $913,000-$954,000; combination of FWP, federal, and private; extra $50,000 for preventative work, $100,000 for WS, and compensation included; overhead and inflation not included	Same as Alternative 2 FWP: $897,000; combination of FWP, federal, private; extra $50,000 for preventative work included; $100,000 for WS included; compensation not included	Same as Alternative 1; funding by federal sources; inconsistent revenue from wolf license sales FWP: $952,000 all federal; no extra $$ for preventative work; $75,000 for WS included; no compensation included	Minor impact due to historic changes in license revenue; 90% funding federal; state share out of existing budget; no new revenue generated by wolf license sales FWP: $924,739 – $1,062,399; cost share 90% federal: 10% state until wolf delisted and authority transferred completely; upon delisting, combination of FWP, federal, and private; extra $50,000 for preventative work included; $50,000 for WS shown in budget, but is separate federal appropriation; compensation included
Administration, Funding, and Legal Status	Still listed as "threatened" and "experimental / non-essential"; USFWS and partners; federal laws	Delisted; state laws; "species in need of management"; FWP and WS;	Same as Alternative 2	Delisted; state laws; "species in need of management" but managed aggressively as if it was a "predator"; FWP and WS	Still listed; "threatened" and "experimental / non-essential"; state laws for most things but federal regulations for activities resulting in wolf harassment, injury or death; FWP and WS with USFWS oversight
Physical Environment	No Impact	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1