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Economic aspects of wolf recolonization in Utah

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5. Economic Aspects of Wolf Recolonization in Utah

An assessment of likely economic effects of wolf recovery should be included in the discussion of the future of wolves in Utah. In this section, we discuss both the potential benefits and the expected costs of wolf recovery to Utah's economy. The potential benefits include both use—such as increases in tourism resulting from the presence of wolves—or non-use values that can be measured by willingness to pay surveys. The expected costs of recovery include direct costs born by agencies involved in wolf management, livestock owners that experience losses from wolf depredation, and those that might result from reduced game take by hunters. In addition, there may be indirect costs, which are more difficult to quantify.

5.1. Potential Benefits of Wolf Recolonization

5.1.1. Tourism

Tourism is one of Utah's top five economic activities, generating $4.25 billion in revenues in 2000, and the majority of visitors come to Utah to engage in outdoor recreation (UT DTD, 2001). Wolf recovery might have a beneficial impact on tourism in Utah as it has in other states where wolves have been reintroduced or have recolonized. An estimated 20,000 people viewed wolves in Yellowstone during the first two and a half years after they were reintroduced (D. Smith et al,. 1999a). Furthermore, the three-year average of entrance receipts from Cooke City, which is the best park access point for viewing wolves, has increased by nearly 25% following reintroduction (Gaillard et. al., 1999). These findings might not be entirely applicable to Utah, as they are confounded by the presence of Yellowstone National Park itself. For example, potential areas for wolf recolonization in Utah may not share the unique characteristics of Yellowstone (e.g., relatively open terrain). However, at least one study suggested there could be an increase in tourism associated with red wolf recovery in North Carolina, where the primary land cover is relatively dense pine forest. Rosen (1997) found that 70% of the people surveyed expressed more interest in visiting northeastern North Carolina because wolves were present. It was also estimated that tourism in the region would increase, resulting in increased revenues of $9.2-$21.1 million (Rosen 1997). These studies suggest that the presence of wolves might also have beneficial impacts on the tourism industry in Utah. Wolf Education Centers, if properly designed and marketed, could also generate substantial revenue. For example, the International Wolf Center in Ely, Minnesota, generates average annual revenues of $3 million (Mech, 1998).

5.1.2. Preservation Value

Another way to quantify the economic benefit of wolf recovery is the "preservation value" of wolves. This is manifested through a person's willingness to contribute toward preservation of wolves and their natural habitats both for current viewing and for future generations (Loomis, 1993). The dichotomous choice contingent valuation method is a survey technique that constructs a hypothetical market to measure willingness to pay (Loomis, 1993). Duffield and Neher (1996) used this method to estimate the public's willingness to pay for wolves in Yellowstone. Visitors to the Park were asked whether they were in favor of, or opposed to, wolf reintroduction in Yellowstone and whether

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they would donate varying dollar amounts for trust fund membership to support or oppose reintroduction (Duffield and Neher, 1996). The responses were analyzed and an average amount was estimated for support or opposition. On average, each person would give $22.87 for a one-time donation to a trust to support wolf recovery. We hesitate to assign these benefits to Utah because those surveyed in the study may have strongly associated wolves with their Yellowstone experience and may not have been assigning a dollar value for wolves themselves. While the presence of wolves in Utah may augment visitor experiences, people who are willing to pay a certain amount for wolves in Yellowstone may or may not be willing to pay the same amount for wolves in Utah.

We were unable to conduct a full economic analysis of wolf recolonization in Utah and are therefore unable to provide more reliable estimates of potential economic benefits. However, there is ample evidence from other areas that such benefits exist. We recommend that a comprehensive economic analysis, which explicitly examines potential benefits, be conducted as part of any planning process. Such an analysis would greatly facilitate a serious discussion of the economic impact of wolf recolonization.

5.2. Expected Costs of Wolf Recolonization

5.2.1. Management Costs

Direct costs will be incurred by the agencies involved in implementing management policy for wolves in Utah. These costs may vary depending on how wolves arrive in Utah. Since Montana, Wyoming, and Idaho have not yet developed state management plans, no data on state management costs are available for the Rocky Mountain region. Therefore, we have attempted to estimate direct management costs for Utah using data from existing and proposed management plans in Minnesota and Wisconsin.

The Minnesota Department of Natural Resources (MN DNR) recently submitted a wolf management plan budget for approval from the state legislature (MN DNR 2001). The estimated annual ongoing costs of the plan are $695,000 (Figure 5). Law enforcement and depredation combined constitute the largest share of the budget at 60%.

Currently, Minnesota has more than 2,500 wolves. It is highly unlikely that Utah will ever have more than several hundred wolves. On the other hand, Wisconsin has estimated costs for managing approximately 200 wolves. The annual state and federal funds expended for wolf management in Wisconsin from 1979 to 1998 averaged $21,481 and $59,959, respectively. The annual management cost per wolf in Wisconsin has averaged approximately $2,300 for the period from 1979 to 1998. This cost has decreased as the number of wolves has increased (the estimated current cost per wolf is $660), although the total management cost has increased. Consistent with this, in Minnesota, with its 2,500 wolves, management costs per wolf are much lower, approximately $265 annually.

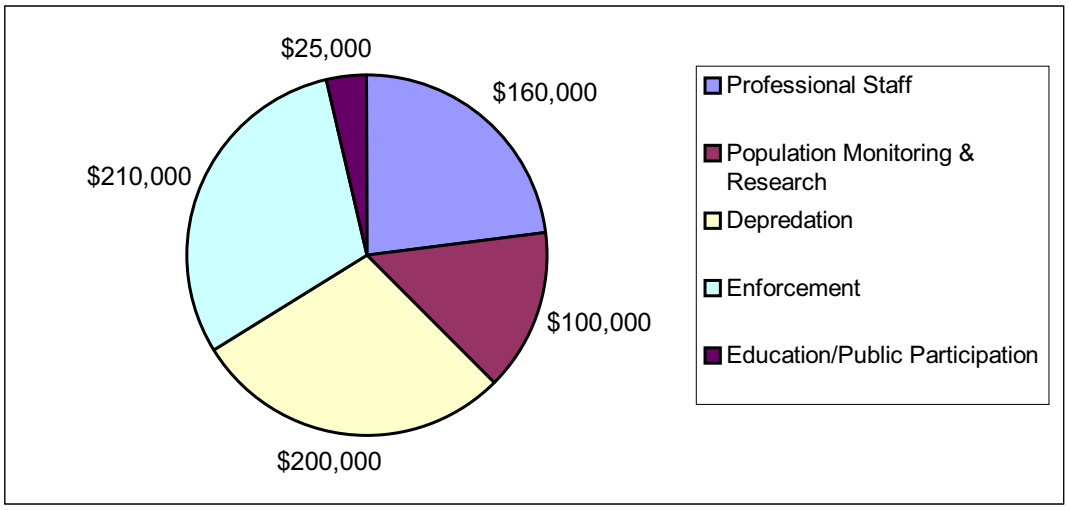

Figure 5. Proposed budget for wolf management in Minnesota (MN DNR, 2001).

Estimated total state and federal costs for wolf management in Wisconsin are $130,000 for fiscal year 1999-2000 and were expected to increase about 10% per year each year thereafter (WWAC, 1999). One third of the $130,000 is allocated toward the salary of a program director. This suggests that the low number of wolves predicted for Utah would not necessarily lead to substantial management costs for either state or federal agencies. If we assume that the current Wisconsin costs ($660 per wolf) are applicable to wolves in Utah, and that the Utah wolf population never exceeds 200 animals (see Section 4.2.), then total management costs should never exceed $130,000 per year. However, we recognize that differences between Utah and Wisconsin (e.g., topography, livestock production practices, and the distribution of wolf habitat) may affect the accuracy of these estimates for Utah. In any case, means for reducing overall costs can be implemented. For example, in Wyoming, the use of volunteers for monitoring wolf populations is currently decreasing the cost of wolf management (Jimenez, 2001).

Control of problem wolves is another management cost that will be experienced in Utah, although it is included in the estimates above. In Minnesota, 161 out of an estimated population of 2,500 (6%) were killed in response to damage complaints (for example, livestock or pet depredations) in 1998 (Paul, 1999). In contrast, in the three states of the Northern Rockies Recovery Area, an average of 4.4%-9.6% of the wolf population has been controlled (e.g., capture, relocation, or killing of problem wolves) annually since 1987 (E. Bangs, USFWS, personal communication; USFWS et al., 2001). The average percent controlled varies depending upon how exactly the calculation is performed, as wolves killed are often the same ones moved (E. Bangs, USFWS, personal communication). Using these numbers, we would estimate that, on average, between 9 and 19 wolves would be controlled annually in Utah, assuming a wolf population of 200 animals.

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5.2.2. Direct Livestock Depredation Costs

Perhaps the most contentious potential economic impact of wolf recolonization is the potential loss of livestock to depredation. In areas where wolves have been reintroduced, the data have shown that wolves choose to prey primarily on deer and elk populations (USFWS et al., 2001). However, wolves will kill livestock. The two aspects that need to be considered are the direct losses resulting from the depredations and the cost of any compensation program that might be implemented. We have attempted to estimate these costs using data from other states that have both wolves and livestock in combination with relevant data on the Utah livestock industry.

In 1999, 1.4% of cattle losses (200 head) and 3.8% of calf losses (1,000 calves) in Utah were from predators (UASS, 2000), as shown in Figures 6 and 7. These predators included coyotes, black bears and mountain lions. Using 1999 values ($660 per head of cattle and $290 per calf), total cattle and calf losses due to depredation in Utah were $417,000. It is difficult to determine how these predation losses may change if wolves return to Utah.

Much concern has been expressed regarding possible increases in cattle losses in Utah due to wolf depredation. However, there are very few recorded instances of wolf depredation on healthy adult cattle (Paul, 1999; Niemeyer, 2001). In fact, no wolf depredations on adult cattle have been confirmed in the 25 years that wolves have been recolonizing Wisconsin (WWAC, 1999; Jurewicz et al., 2000), and Minnesota's 2,500 wolves kill fewer than an average of 10 adult cattle and yearlings per year (Paul 1999). In Alberta, which has more than 5,000 wolves, an average of 21 adult and yearling cattle were killed by wolves annually between 1974 and 1980 (Gunson, 1983). In the three

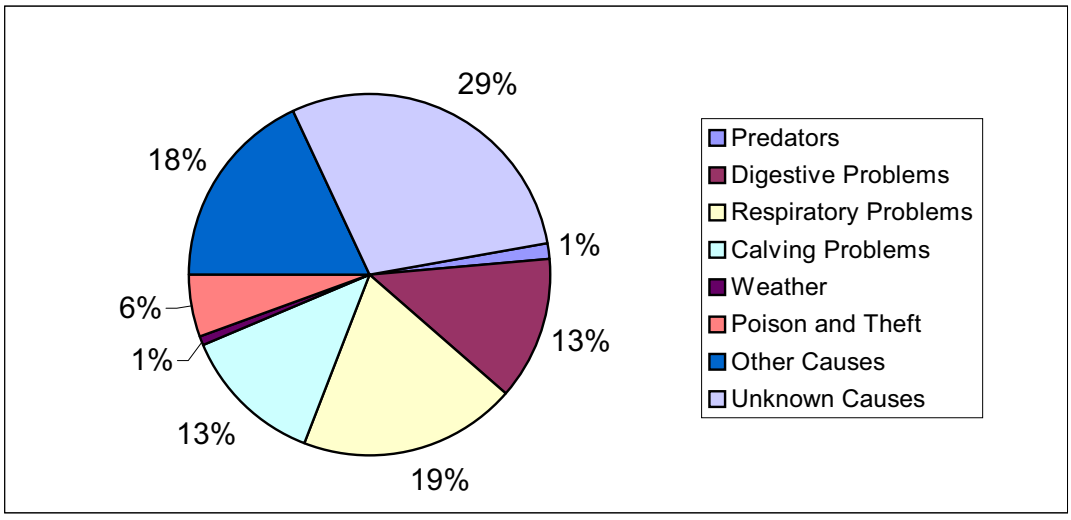

Figure 6. Causes of death for adult cattle lost in Utah during 1999. Predators were responsible for 1% of total losses (UASS, 2000).

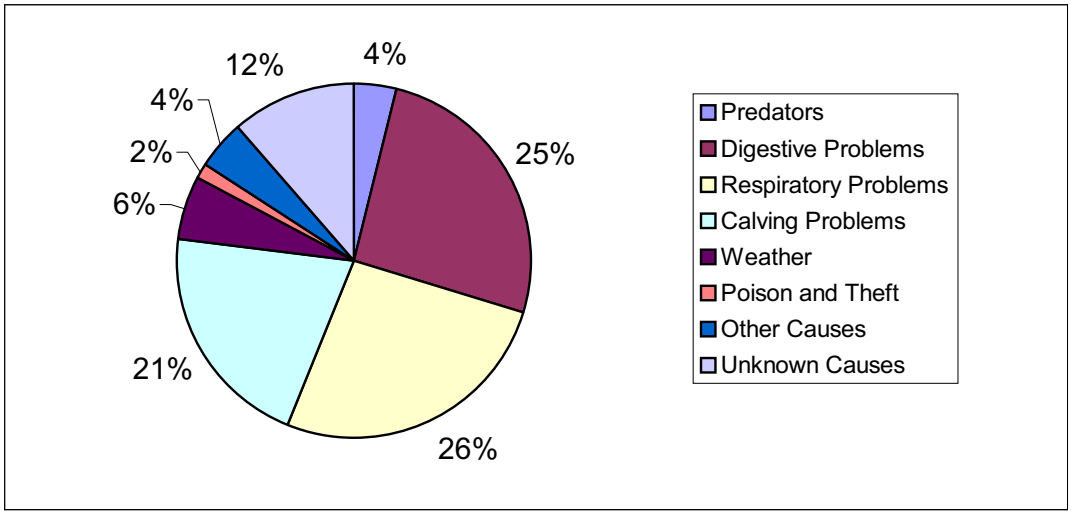

Figure 7. Causes of death for calves lost in Utah during 1999. Predators were responsible for 4% of total losses (UASS, 2000).

states of the Northern Rockies Recovery Area, according to Defenders of Wildlife (2001a), fewer than two depredations on adult cattle have been compensated each year since 1987. However, according to the USFWS, there have been a total of only two confirmed depredations on healthy adult cattle during that time (J. Fontaine, USFWS, personal communication) Given these data, we would expect very few depredations (averaging < 2 annually) on adult cattle in Utah. At 1999 prices ($660 per animal), this corresponds to an additional annual loss due to wolf predation of $1,320 (see Table 2).

On the other hand, we do expect to see an increase in calf losses, as wolves preying on livestock are known to selectively attack calves (Gunson, 1983; Fritts et al., 1992). In the year 2000, for example, the 433 wolves in Montana, Wyoming, and Idaho killed a confirmed total of 32 cattle (all calves and yearlings; USFWS et al., 2001; J. Fontaine, USFWS, personal communication), whereas in 2001, with a population of 572 wolves, there were 35 confirmed depredations on cattle (E. Bangs, USFWS, personal communication). We used these numbers to estimate likely losses of calves to wolf depredation in Utah, assuming a wolf population of 200. Of the 572 wolves in the Northern Rockies Recovery Area in 2001, only approximately 340 had regular

Table 2. Estimated Direct Livestock Depredation Costs in Utah with a Wolf Population of 200 (1999 Dollar Value and Livestock Prices)

Type of Livestock	Number of Losses	Estimated Cost
Adult Cattle	2	$1,320
Calves	116	$33,720
Sheep and Lambs	200	$39,000
Estimated Total Direct Losses	**288**	**$74,040**

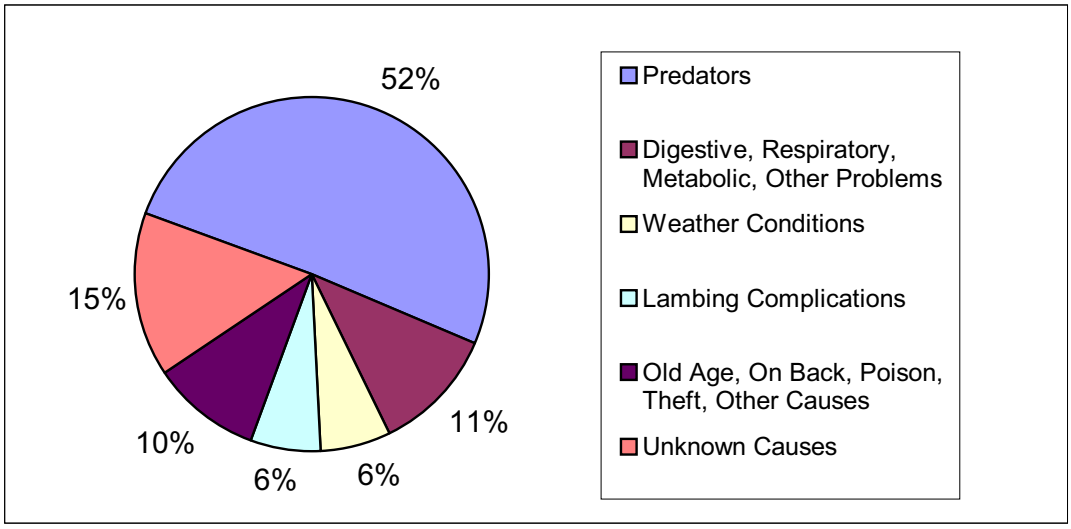

Figure 8. Causes of death for sheep and lambs in Utah during 1999 (UASS, 2000). Predators were responsible for 52% of total losses.

contact with livestock (E. Bangs, USFWS, personal communication). Therefore, we used this lower number to calculate a per wolf depredation rate (0.102/wolf). Because actual depredations are generally higher than confirmed depredations, we adjusted this number using the results of a recent study that found a ratio of actual:confirmed depredations of 5.7:1 (USFWS et al., 2001). Although this may still be an underestimate of the true number of depredations, it suggests that actual losses of calves to wolves in Utah should be less than 116 per year**.** At 1999 prices ($290 per calf), this corresponds to a maximum additional annual loss of approximately $34,000 (see Table 2).

Predators were responsible for 52% of the sheep and lamb losses in 1999 in Utah (see Figure 8), or approximately 34,000 animals (UASS, 2000). Using a 1999 value of $99 per head, total sheep and lamb losses due to depredation in Utah were approximately $3.4 million. In the year 2001, 132 sheep and lambs were confirmed killed by wolves in Montana, Wyoming, and Idaho (Ed Bangs, USFWS, personal communication). Since wolf recovery began in the northern Rockies, this number has fluctuated between 0 and 132 annually. Once again, this is certainly an underestimate of actual losses to wolves. Connolly (1992) estimated that, nationwide, 19% of reported depredations on adult sheep and 21% of depredations on lambs are confirmed by United States Department of Agriculture Wildlife Services.

Using these numbers, we estimated that a wolf population of 200 would kill approximately 385 sheep and lambs annually. We arrived at this figure by assuming that only 20% of reported losses of sheep and lambs in the northern Rockies were confirmed as killed by wolves. We further assumed that a wolf population of 200 wolves would kill at about the same rate as the 340 wolves in the northern Rockies that regularly contact

livestock. At 1999 prices ($99 per animal), this corresponds to an additional loss of approximately $39,000 statewide due to wolf predation (see Table 2). Wolves may not prey selectively on lambs relative to adult sheep (Gunson, 1983), so we have not considered them separately in our loss estimates. We recognize that differences exist between Utah and these other states (e.g., size of operations, differences in management, and/or environmental circumstances), so these estimates are approximate. Nevertheless, it is clear that, even with a relatively large wolf population (200), impacts on the Utah livestock industry as a whole are likely to be relatively minor. In fact, it is possible that overall losses to predation would actually decrease following wolf recolonization, as a result of the effects of wolves on other predators. For example, a substantial reduction in coyote numbers, as has occurred in Yellowstone, might reduce total predation on sheep (see Section 4.4.3). We recognize that impacts on individual producers may be significant, however.

5.2.3. Indirect Livestock Depredation Costs

In addition to the direct costs arising from wolf depredation on livestock, there are a number of potential indirect costs. They may include costs associated with the time required for locating and obtaining verification of kills, losses of investments in selected breeding lines, loss of future offspring, increased time and labor to recover predator-dispersed flocks or herds, underutilization of some potential foraging sites and excessive degradation of others, stress-related changes in animal body condition, and decreases in pregnancy percentages and weaning weights (Wagner, 1988; Stricklin and Mench, 1989; W. Urie, Utah Farm Bureau Federation, personal communication). These indirect costs are difficult to quantify, and few data are available that address these issues. Therefore, we recommend that a study be conducted to measure the magnitude of indirect costs arising from wolf depredations.

In addition, concern has been expressed regarding a possible increase in the cost of predator control in wolf-recolonized areas. Some temporary restrictions on trapping or other predator management techniques are likely to occur in some areas and might lead to increased control costs. For example, restrictions on M-44s (spring-loaded sodium-cyanide delivery devices) and neck snares in wolf-occupied areas might require more expensive aerial gunning for coyote control (Bodenchuk, 2001), although studies have shown that coyote populations are depressed in areas recolonized by wolves (see Section 4.4.3.). Finally, there may be costs associated with implementing techniques to minimize depredation. Such costs might include increased fencing, additional guard animals, or additional range riders, for example. However, some of these costs are being subsidized in the Northern Rockies Recovery Area by conservation groups involved in wolf recovery.

5.2.4. Wolf Depredation Compensation Programs

One approach to reducing the financial impacts of predator depredations on livestock has been the establishment of compensation programs that pay ranchers for depredated livestock (Wagner et al., 1997). Currently, Defenders of Wildlife, through the Bailey Wildlife Foundation Wolf Compensation Trust, pays compensation for confirmed and probable losses of sheep, cattle, and pets that result from wolf depredation. The goal of

this Trust is "to shift economic responsibility for wolf recovery from the individual rancher and toward the millions of people who want to see wolf populations restored" (Defenders of Wildlife 2001a). Accordingly, the Compensation Trust, using donations from private citizens across the country, pays fair market value for depredations confirmed by USDA Wildlife Services personnel, and 50% of fair market value for probable depredations.

Payments made to ranchers in 2000 for both probable and confirmed livestock losses in Wyoming, Idaho, Montana, Arizona, and New Mexico totaled $50,446.25. This included payments for 36 cattle and calves, 105 sheep, and 13 other losses (mostly dogs). Since the program's inception in 1987, payments have totaled $156,608 for 185 cattle and calves, 401 sheep, and 24 other animals (Defenders of Wildlife, 2001a, 2001b). In Minnesota, the Department of Agriculture has established a state-funded compensation program that pays "fair market value" to producers for confirmed wolf depredations, although payments are capped at $750 per animal (raised from $400 in 1998). Compensation payments under this program ranged from $31,000 to $67,437 per year from 1993-1998 (MN DNR, 2001). In 1998, under the new $750 limit, 99 farms, out of a total of approximately 8,000 in wolf range, received compensation payments totaling $67,437 for losses of cows, sheep, turkeys, and other animals (Paul, 1999).

Utah will also require some form of compensation program to help reduce animosity and promote cooperation among livestock producers, managers, and wolf advocates. Defenders of Wildlife has indicated that they may compensate any wolf depredation that occurs in Utah, at least while wolves retain endangered or threatened status. Although this assistance will be helpful in the short term, a long-term solution that does not depend on donations may be required. A state-funded compensation program, modeled after those established in Minnesota and Wisconsin (Jurewicz et al., 2000, MN DNR, 2001), is probably the most appropriate way to address this requirement. Based on the depredation rates and loss estimates derived above for a population of 200 wolves, direct compensation payments should not exceed $46,320 annually, not including administrative costs.

These estimates do not include indirect costs. To adjust for this, we suggest that any state compensation program include supplemental payments, the magnitude of which should be determined after a thorough and ongoing analysis of potential indirect costs. In the short term, we suggest that the state of Utah establish a supplementary compensation program to complement the Defenders of Wildlife program. Although there is no precedent for such supplementary compensation, either for wolf predation elsewhere in the country or for other predators such as lions and bears in Utah, we believe that it is important for several reasons. First, it sends a credible message to ranchers that indirect costs are legitimate. Second, it recognizes that opportunities for the utilization of current forms of predator control may be limited because of the special legal status of wolves. And finally, it may be an effective method of reducing (not eliminating) animosity toward wolves, and thereby minimizing illegal killing.

5.2.5. Potential Effects on Hunting

There is concern in the Utah hunting community that wolves will destroy big-game populations (e.g., Peay, 2001b), and reduce the economic benefits associated with hunting. However, as reviewed above (see Section 4.4.1.), there is little evidence suggesting that managed wolf populations would significantly affect Utah's ungulate populations. For example, the 2000 Gardiner, Montana, late elk-hunt harvest of the northern Yellowstone herd was slightly above average, and hunter success was 63% (compared with the 25-year average of 65%), despite the presence of a rapidly increasing wolf population in the area (MT DFWP 2001).

A more realistic concern for hunters, however, may be increased dispersal of ungulate populations in areas occupied by wolves, and a corresponding increase in hunting effort required to fill a permit, resulting in hunter frustration, and possibly decreased revenues for outfitters whose designated permit area is disrupted by wolves. It is possible that this might result in localized economic impacts, especially if hunters abandon these areas. It is difficult to estimate the magnitude of these potential economic impacts. We are aware of only a single study that addresses these issues. Prior to wolf reintroduction, it was estimated that the loss of expenditures in the Greater Yellowstone Ecosystem (GYE) due to reduced hunting opportunities would be $207,000-$414,000, and the lost net social benefits would be $187,000-$465,000 (Duffield and Neher, 1996). A recent study, however, has found that no actual economic losses have occurred since wolf reintroduction in the GYE (Brown et al., 2000). In summary, the limited evidence suggests that wolf recolonization does not have to affect either hunting success itself, or the economic benefits associated with hunting.

5.3. Alternative Funding Sources

Although wolf management and compensation programs may represent new costs for the state of Utah, there may be ways to offset these costs. Possible revenue sources that have been utilized in other states to fund nontraditional wildlife management programs include dedicated taxes, themed license plate and stamp sales, state lotteries, and state tax check-offs. Arizona, for example, has a $10 million annual dedication from the state lottery to fund nongame wildlife management. Collaboration with nongovernmental organizations and other private entities should be sought wherever possible, as such organizations bring a constituency and a willingness to pay for wolf recovery. For example, the Turner Endangered Species Fund, founded by Ted Turner, has been instrumental in facilitating wolf recovery in the northern Rockies by providing facilities, personnel, and research funds. Similar programs, if implemented in Utah, could significantly reduce costs to state agencies after de-listing. It is also possible to secure federal assistance pursuant to section 6(c) of the Endangered Species Act. Finally, once a viable population is established and wolves are de-listed, a limited trophy hunt on wolves might be possible with permit fees dedicated to offset management costs.

5.4. Conclusion

Although there is much to be learned from the experiences of other states, each situation is unique, and Utah will be no exception. For that reason, we feel there is a compelling argument to be made for a comprehensive analysis of the probable economic benefits and

costs of wolf recovery in Utah. Such an analysis may reveal that tangible economic benefits are likely to result, perhaps as a result of increased tourism, but through other avenues as well. Other nontangible benefits, such as willingness to pay benefits, should not be overlooked, but rather used as a starting point from which real economic benefits might flow, given a thoughtful and creative planning process. On the other hand, the potential costs of wolf recovery are much easier to quantify, as they largely arise from issues such as livestock depredation that may be more directly analogous to what has happened in other areas. Even so, an in-depth analysis that focuses specifically on Utah may reveal significant differences in probable costs as compared with other states. In any case, the analysis would provide a common set of agreed-upon data that all stakeholders could use.

One conclusion of our brief analysis is that livestock depredations and impacts on ungulate populations may not be as problematic on a regional scale as is often assumed, although local impacts could be more significant. This is not meant to trivialize the important concerns that many people in Utah have about wolves, but to suggest that the actual number of livestock depredations attributed to wolves in Utah may be relatively low. Additionally, deer and elk populations in Utah may not be significantly affected by wolves. That these issues remain contentious merely underscores the need for a comprehensive economic analysis that addresses the concerns of all stakeholders interested in wolf management.