

# ECOLOGICAL BENEFITS OF WOLVES



Wolves play a vital role in maintaining the health and sustainability of the landscape in the greater Yellowstone region and our western lands. They are a keystone species, one that has a disproportionate impact on its environment relative to its abundance. Since their return in 1995, wolves have benefitted this ecosystem by regulating prey numbers and movements—allowing streambank habitats to recover, reducing densities of coyotes, and providing food for scavengers.

## ECOLOGICAL BENEFITS OF WOLVES

The most recognized and well-documented ecological benefit of wolves is that they have resumed the important role of maintaining healthy wildlife herds in the northern Rockies by selecting young, old, physically impaired, or diseased animals.<sup>(5)</sup> By reducing prey numbers, dispersing these animals on the landscape, and removing sick animals, wolves also may reduce the transmission and prevalence of wildlife diseases such as chronic wasting disease and brucellosis.<sup>(7)</sup>

In addition to improving the overall fitness of wildlife herds, wolves have also altered the behavior of their prey, leading to a cascade of beneficial effects on the landscape. In the absence of wolves, elk tended to browse heavily in the open flats along rivers and wetlands, since they did not need to evade predators by seeking thicker cover. Without fear of wolves, elk over-browsed the vegetation inhibiting the growth of new trees. Since the reintroduction of wolves in Yellowstone, elk spend more time in the safety of thick cover or on the move.<sup>(6)</sup> As a result, riparian areas and aspen groves that had been suppressed by decades of over-browsing are regenerating, improving habitat for species like beavers and songbirds.<sup>(3)</sup> Beavers, which create wetland habitats with their dams, have improved water quality in streams by trapping sediment, replenishing groundwater, and cooling water.

Species that rely on healthy riparian habitats and benefit from the presence of wolves in Yellowstone National Park include:

- Yellowstone cutthroat trout and other native fish
- Moose
- Waterfowl (ducks, geese, trumpeter swans)
- Songbirds (such as warblers, wrens, and thrushes)
- Small mammals (such as beavers, muskrats, and other rodents)
- Insects, amphibians, and countless other species<sup>(3, 6)</sup>

## WOLVES AND COYOTES

In the absence of wolves, coyotes became a top predator in the ecosystem, but they are not large enough to regulate elk, deer, and moose populations.<sup>(2)</sup> The return of the wolf restored a natural complement of predators to northwest Wyoming and returned the coyote to its role as a mid-level



predator. Wolves will kill coyotes and outcompete them at kill sites. Coyotes also prey heavily on pronghorn fawns. Since wolves returned to the landscape, pronghorn populations have increased in northern Yellowstone as a result of declining coyote populations and densities.<sup>(1)</sup>

## WOLVES AND SCAVENGERS

Scavengers, such as ravens, eagles, and bears, also benefit heavily from the return of wolves. Wolf kills provide scavengers with an important source of protein, particularly in winter. Twelve species of scavengers are known to visit wolf kills in Yellowstone National Park.<sup>(10)</sup> Ravens are especially attuned to wolves and may fly over wolf packs as they pursue prey, allowing them quick access to wolf kills. In turn, wolves may benefit from ravens by following them to carcasses that can feed both species.<sup>(8)</sup>

Prior to the reintroduction of wolves, scavengers were more dependent on animals that died due to harsh winters. Since snow is thawing earlier as a result of a warming climate, there are fewer winter kills available for scavengers. Wolf kills may help buffer the impacts of climate change for scavengers by providing them with a food source in the winter.<sup>(9)</sup>

## CONCLUSIONS

The return of the wolf to Wyoming has had significant ecological benefits in a relatively short period of time. Ecological concerns contributed to the decision to return wolves and should play a role in how states manage this keystone species. Although it is easy to focus on the perceived negative impacts of wolves, it is important to recognize the actual benefits they provide to our ecosystem. By regulating wildlife herds and reducing the prevalence of diseases, revitalizing riparian areas, reducing coyote densities, providing food for scavengers, and indirectly improving conditions for a host of other species, wolves play an essential role in maintaining the ecological health and integrity of the landscape.



**For more information visit [www.westernwolves.org](http://www.westernwolves.org)**

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# WOLVES AND ECONOMICS



Travel and tourism make up a significant portion of Wyoming's economy. More than 7 million overnight visitors traveled to Wyoming in 2008, and visitors to Wyoming spent \$2.7 billion, or \$7.4 million each day in 2007.<sup>(1)</sup> Wildlife watching is one of the top reasons people choose to visit Wyoming.<sup>(2)</sup> In fact, nearly 59% percent of visitors to Wyoming in 2008 participated in wildlife watching.<sup>(3)</sup> Fifty percent of tourists said they visited a state or national park – prime wildlife watching locales – in Wyoming.<sup>(3)</sup>

Visitors to Wyoming spend an average of 3.2 days in the state, with an average party size of 3.8 people, spending an average of \$1,207 on their trip, or approximately \$108 per person, per day.<sup>(3)</sup> Often, these tourism dollars are spread across multiple communities.

## WHY DO TOURISTS CHOOSE YELLOWSTONE?

Yellowstone National Park is world-renowned for its scenery, wildlife, and geothermal features. Although viewing scenery was the primary activity for visitors to Yellowstone, wildlife watching was the second-most popular activity.<sup>(2)</sup> Eighty-five percent of visitors to Yellowstone participated in wildlife watching, bird watching or wildlife photography across the four seasons.<sup>(2)</sup>

For many visitors to Yellowstone watching wolves is a significant attraction. When asked which wildlife species they would like to see, 44 percent of visitors to Yellowstone National Park in 2005 wanted to see wolves. The only species that they wanted to see more was the grizzly bear.<sup>(2)</sup> Depending on the season, 50 percent or more of Yellowstone visitors were specifically interested in the possibility of seeing wolves in the park.<sup>(2)</sup> In winter, when wolves are most visible in the park, 59 percent of visitors came to Yellowstone specifically to see or hear wolves.<sup>(2)</sup>

Visitors to Yellowstone National Park spend close to one-third of the total cost of their trip in the counties around the park.<sup>(2)</sup> An average of 3.5 percent of park visitors indicated that they would not have come to Yellowstone if they had not had an opportunity to hear or see wolves.<sup>(2)</sup> Based on the average spending of visitors in the 17 counties around Yellowstone, across the four seasons, about \$22.5 million are directly attributable to the presence of wolves in the park.<sup>(2)</sup> Based on the amount of money spent in the entire three-state area around Yellowstone National Park, visitors who specifically want to see or hear wolves generate approximately \$35.5 million.<sup>(2)</sup>



## ECOLOGICAL TOURISM

Many businesses depend on wolves and other wildlife species to help their bottom line. For example, one Jackson-based ecotourism company offers single and multi-day wildlife viewing trips in Grand Teton National Park, Yellowstone National Park and Jackson Hole. The company also offers trips catered specifically toward seeing wolves and bears. From the winter of 2006 through the end of winter 2009, approximately 650 people participated in multi-day, overnight wolf and bear watching trips. The cost of these trips ranges from \$650 to \$2,000, resulting in estimated revenues of \$422,500 to \$1,300,000.



## CONCLUSION

Although the perceived economic costs of having wolves in Wyoming are often well-publicized, the economic benefits that wolves provide by drawing visitors and their valuable tourist dollars to the state far outweigh the costs.



**For more information visit [www.westernwolves.org](http://www.westernwolves.org)**

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# WOLVES AND LIVESTOCK



## WOLVES AND LIVESTOCK

Wolf predation causes relatively few livestock losses compared to other sources. However, as small as this percentage might be, any losses to individual livestock producers can have profound effects on that individual's livelihood. To mitigate these impacts, government and private funds are available to compensate producers for their losses. Despite the challenges of raising livestock in areas with predators, many producers remain successful and some are discovering that certain husbandry techniques used to protect livestock from wolves can actually lead to reduced predation by other animals, higher stock weights and survival, and increased profits. Current research suggests that livestock production may indirectly benefit wolves since the habitat and open space provided by ranch lands is crucial for big-game animals, which are the primary prey of wolves. Successful wolf conservation may ultimately depend on wolves and livestock producers learning to coexist.<sup>(5)</sup>

## ACTUAL LIVESTOCK LOSSES

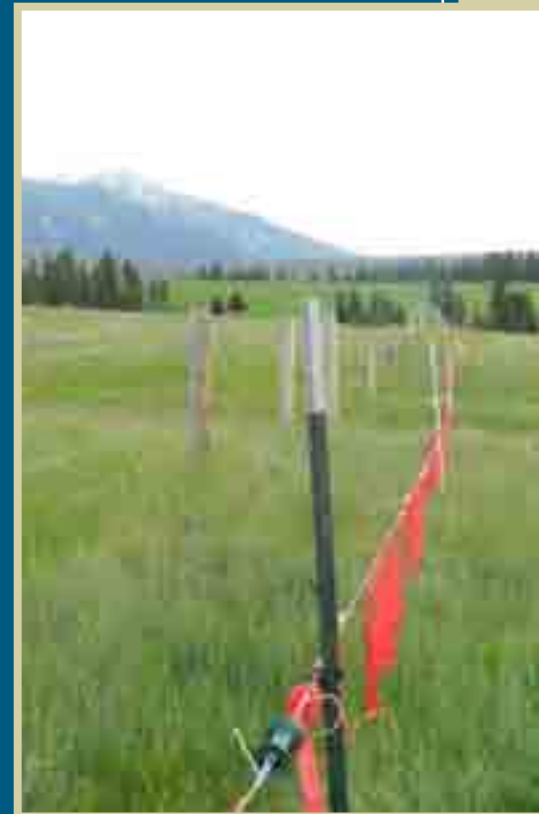
In 2007, there were an estimated 1,311,799 cattle and 412,804 sheep in Wyoming.<sup>(9)</sup> Wolves depredated 67 livestock (41 cattle and 26 sheep) in Wyoming in 2008.<sup>(2)</sup> The National Agricultural Statistics Service completes a census detailing the causes of livestock deaths in the lower 48 states. According to this report, non-predator losses, including weather, respiratory illness, digestive problems and calving complications, cause over 90 percent of cattle losses in Wyoming.

Based on the report:

- Livestock were five times more likely to be stolen than preyed on by wolves
- Only 5% of all cattle losses in the U.S. were attributed to predators
- In Wyoming less than 1% of sheep losses were attributable to wolves
- In Wyoming less than 3% of cattle losses were attributable to wolves
- Domestic dogs killed almost five times as many cattle as did wolves

## METHODS TO PREVENT DEPREDAATION

Individuals, non-profit organizations, and state and federal agencies are engaged in a variety of efforts to minimize conflicts between people and wildlife in the West. Ongoing research and the development of new tools and techniques also may assist livestock producers with protecting their stock. These include proactive techniques such as the use of sheep guard dogs, fladry, and range riders, as well as animal husbandry techniques such as fencing and pasture rotation.<sup>(2, 7)</sup> The use of fladry involves stringing flagging that acts as a visual deterrent. Fladry is being used successfully to deter wolves from entering pastures and, in some cases, has been electrified to increase its effectiveness.<sup>(6)</sup> Researchers also are working to develop primary repellents to minimize wolf predation. Primary repellents include the use of chemicals that deter wolves from preying on carcasses, or the use of sound devices such as RAG boxes. When RAG boxes detect the presence of radio-collared wolves in the vicinity of livestock, they are programmed to emit loud disruptive sounds like sirens.<sup>(8)</sup> None of these tools are 100 percent effective and the use of certain tools may be too labor intensive for a particular producer. However, there are a variety of tools available that producers who are interested in proactively working to protect their livestock can use.



## COMPENSATION FOR LOSSES DUE TO WOLVES

Defenders of Wildlife, a non-profit conservation organization, supported wolf reintroduction realizing that there could be conflicts with livestock producers in areas where wolves live. To compensate for these losses, the organization has paid 100 percent of the market value of confirmed livestock losses attributable to wolves and 50 percent of the value of probable losses attributable to wolves while wolves have been listed as an endangered species. To date, Defenders has administered over 800 payments to livestock producers, totaling more than \$1,100,000. In Wyoming alone, it has compensated ranchers for over \$350,000 in livestock losses.<sup>(1)</sup>

The state of Wyoming created its own wolf compensation program in preparation for eventual wolf delisting. However, the Wyoming program only compensates producers within the small portion of the state where wolves are protected as "trophy game" animals. Ranchers outside of the trophy game area, where wolves are classified as "predators," receive no compensation by the state for losses and are expected to deal with this hardship alone. This is one reason conservation groups advocate trophy game status statewide for wolves in Wyoming, so that livestock producers across the state are compensated equally for conflicts with wolves. Within the trophy game area, the state of Wyoming compensates ranchers for seven times the actual number of cattle confirmed lost to wolves, or a 7:1 ratio.<sup>(4)</sup>

## LETHAL CONTROL OF WOLVES

Where wolf depredations of livestock are chronic, the U.S. Fish and Wildlife Service typically has responded by lethally removing wolves. The Service allows lethal removal if it has issued a permit or if wolves are in the act of killing, wounding, or biting livestock on private lands. Lethal removal can be costly and time consuming, and it is always a reactive solution to livestock depredation. By proactively managing livestock and using non-lethal tools, producers can minimize their losses and perhaps reduce other potential costs of wolf-livestock interactions, such as livestock harassment and weight loss.

## CONCLUSIONS

While wolves garner a great deal of attention, they are only one of many concerns for ranchers in Wyoming and have less of an impact than often is perceived. Livestock is more likely to be lost because of inclement weather, disease, and domestic dogs. Individual producers could experience localized losses that may impact their income; however, compensation programs can help to offset these costs. Livestock producers provide habitat for wolves and other wildlife. The future of wolf management and ranching in wolf country depends on finding solutions that allow livestock and wolves to coexist.



**For more information visit [www.westernwolves.org](http://www.westernwolves.org)**

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# WOLVES AND UNGULATES



Many sportsmen in Wyoming worry about the impact wolves might have on elk and other big game species. In early 2009, 302 wolves lived in Wyoming including Yellowstone National Park. Although wolves prey on elk, most elk herds in Wyoming are above the population objectives set by the Wyoming Game and Fish Department (WGFD). Elk may be harder to find since they move around more to evade wolves, but hunter success rates in Wyoming remain higher than in most states in the West.

## WYOMING'S BIG GAME POPULATIONS

The WGFD conducts annual surveys to monitor Wyoming's elk herds, including those that experience wolf predation. In 2009, the WGFD counted elk in 25 of the 35 state elk herds and estimated that the population numbered 93,383 elk, or 12.3 percent above their objective of 83,140 animals.<sup>(11)</sup> Despite these numbers, game managers keep a careful eye on elk distribution and calf recruitment, factors that could be affected by local wolf predation. Wolves may have a localized impact on cow to calf ratios, but overall, herd numbers and hunter success remain high.

Hunters have tremendous opportunities to harvest elk in Wyoming, particularly if they focus their efforts in areas with overabundant elk populations. Although it is widely assumed that wolves significantly decrease hunting success, an estimated 37.1 percent of hunters in Wyoming were successful in harvesting an elk in 2008.<sup>(11)</sup> This success rate is one of the highest in the Intermountain West and shows that many hunters continue to hunt successfully in wolf country.

Mule deer populations in northwest Wyoming have declined significantly in the past 10 years but only make up 3 percent of the wolf's diet.<sup>(3)</sup> Research near Pinedale has documented a 27 percent decline in mule deer populations as a result of natural gas development.<sup>(6)</sup> Loss of winter habitat due to natural resource and residential development continues to be the primary threat to deer populations.

Pronghorn populations have increased during the past decade as wolves have reduced the number of coyotes, which prey on pronghorn fawns. A recent study documented a fourfold increase in the survival rate of pronghorn fawns because of the reduction in coyote numbers by wolves.<sup>(2)</sup>

Moose populations in northwest Wyoming have dropped sharply in recent years, though wolves do not appear to be responsible. Recent research indicates that wolf predation had a minimal effect on population declines in the north Jackson moose herd.<sup>(1)</sup> Instead, the researchers found that moose numbers are more likely to be limited by habitat quality and availability.

## WHAT DO WOLVES EAT?

In 2008, the U.S. Fish and Wildlife Service documented that Wyoming's wolves preyed primarily on:

- Elk (80 %)
- Bison (4%)
- Deer (3%)
- Moose (<1%)
- Other predators, scavengers, and small animals (12%)<sup>(3)</sup>



## CHANGES IN ELK BEHAVIOR

When wolves returned to Yellowstone, scientists expected that abundant elk populations would serve as the wolves' primary prey. <sup>(4, 8)</sup> Yet, wolf predation is only one of many factors that contribute to overall big game survival. Habitat conditions, disease, other predators, hunter success, and pregnancy rates all play a role in maintaining healthy big game populations. <sup>(10)</sup>

Because they lacked a top predator for decades, elk populations exploded in the northern Rockies and in Wyoming. Furthermore, elk often grazed in highly visible areas, such as open meadows and along streams, known as riparian areas, sometimes damaging these areas by over-browsing. <sup>(9)</sup> The tendency for elk to forage in the open may have made it easier for hunters to find elk.

With the return of the wolf, researchers have documented changes in elk behavior, such as elk spending less time grazing in open meadows and riparian areas. <sup>(9)</sup> Instead, elk often seek cover at higher altitudes and in timbered areas. As a result, hunters have had to adapt and seek out elk in new areas.

By altering elk browsing patterns, wolves have enabled riparian vegetation to regenerate for the first time in decades, creating habitat for beavers, songbirds, fish, amphibians, and a host of small mammals. <sup>(5)</sup> Additionally, wolves have improved the herd health of prey species by selecting young, old, diseased, or physically-impaired animals. <sup>(4,12)</sup>

## WOLVES AND FEEDGROUNDS

In northwest Wyoming, elk feedgrounds cause additional controversy. Elk congregate in artificially high numbers at these visible locations during the winter, thereby attracting wolves. Wolves have visited every state feedground in Wyoming, yet have had little impact on elk populations at feedgrounds. During the winter of 2007-2008, wolves killed elk at 5 of the 22 state feedgrounds. Feedground personnel documented only 15 individual elk killed by wolves in 2007. <sup>(12)</sup> The state of Wyoming, however, reported a winter mortality rate of 1.5 percent on these feedgrounds in 2007, which amounts to over 270 elk and suggests that disease and other factors are the biggest contributors to elk mortality at feedgrounds. Furthermore, according to state reports, approximately 10 percent of the calves that would be born each year are lost because of brucellosis, a disease that is exacerbated by the density of elk on feedgrounds. By reducing prey numbers, dispersing these animals on the landscape, and removing sick animals, wolves may reduce the transmission and prevalence of wildlife diseases such as chronic wasting disease and brucellosis. <sup>(7)</sup>

## THE FUTURE OF HUNTING IN WYOMING

The biggest threat to big game populations in the northern Rockies and Wyoming is loss of habitat due to residential and natural resource development. Whereas predation may play a less significant role than habitat in shaping big game populations, it nonetheless is crucial to maintaining healthy landscapes. Despite their concern about wolves, Wyoming hunters continue to have some of the greatest hunting opportunities of any western state, with abundant and diverse big game and high hunter success.

**For more information visit [www.westernwolves.org](http://www.westernwolves.org)**

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