

# REDUCING HUMAN-CAUSED BLACK AND GRIZZLY BEAR MORTALITY ALONG ROADSIDE CORRIDORS IN YELLOWSTONE NATIONAL PARK

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## Abstract

For many years black bears (*Ursus americanus*) and grizzly bears (*Ursus arctos*) that frequented roadside corridors in Yellowstone National Park (YNP) were captured and translocated, removed, or hazed away from habitat adjacent to park roads due to concern for human safety. This practice reduced the overall amount of habitat available to bears in the park and increased human-caused bear mortality. In recent years, YNP has put less emphasis on management of roadside bears and more emphasis on managing people in roadside corridors frequented by bears. The park has successfully used managing of tourists at bear-jams (bear-sitting), no stopping zones, temporary area closures, fencing, vegetation screening, and baiting bears away from roadsides to reduce the need to haze, capture, move, or destroy bears that frequent roadside corridors. Use of these techniques has increased the overall amount of habitat in YNP available for use by bears and reduced the number of human-caused mortalities of black and grizzly bears occurring in the park.

## Introduction

YNP, established March 1, 1872, was dedicated and set apart as a public pleasuring-ground for the benefit and enjoyment of the people and for the preservation, from injury or spoilation, of all timber, mineral deposits, natural curiosities, or wonders and their retention in their natural condition. As part of this legislative mandate, the YNP Annual Bear Management Plan lists as objectives both the preservation of the black and grizzly bear populations within the park, and providing opportunities for visitors to observe and appreciate black and grizzly bears in their natural habitat with a minimum of interference and influence by humans. Maintaining a balance between these conflicting mandates to provide for the needs, desires, and safety of park visitors as well as for the ecological requirements of black and grizzly bears has been a continuous challenge to park managers.

Bears were once commonly observed along roadsides in YNP (Schullery 1992). Bears were attracted to roadside corridors by the availability of human foods in the form of handouts from park visitors and from unsecured garbage in non bear-proof garbage cans. Although having human food conditioned bears readily visible along roadsides was very popular with park visitors, it was also considered to be the primary cause of many property damages and an average of 48 bear-inflicted human injuries per year from 1930 through 1969 (Cole 1974, Meagher and Phillips 1983, Gunther 1994, Gunther and Hoekstra 1998). In 1970, YNP initiated an intensive bear management program with the objectives of restoring the black and grizzly bear populations to subsistence on natural foods and reducing bear-inflicted injuries to humans (Meagher and Phillips 1983). As part of the Bear Management Program implemented in 1970, regulations prohibiting the feeding of bears were strictly enforced and all garbage cans along park roads were converted to a bear-proof design. In addition, bears that frequented roadside corridors seeking human food handouts or garbage were captured and relocated to remote backcountry areas away from human activity. Bears that persistently returned to roadside corridors were removed (sent to zoos or euthanized). By 1979, most bears that had depended on human foods were no longer in the population, the number of roadside bear-caused property damages and bear-inflicted human injuries had been significantly reduced, and it was relatively rare to see bears along park roads (Meagher and Phillips 1983). However, the park also began receiving complaints from park visitors who had come to expect the opportunity to view and interact with bears along park roadways.

By the early 1980s, a new type of bear behavior along park road corridors became evident. Bears that were habituated to human presence, but not conditioned to human foods, began to forage for natural foods along park road corridors during diurnal time periods (Gunther 1994). Having bears feed on natural foods in close proximity to roads attracted large numbers of visitors and created large bear-jams along the roads. Most roads in the park are narrow, winding, and have little or no shoulders with few pull-outs, making parking without partially blocking the road difficult. Management of these human habituated (but non-food conditioned) bears feeding on natural foods within road corridors, often with hundreds of people watching and photographing within distances of 20 to 50 meters, quickly became the park's biggest bear management challenge. Due to the perceived potential safety threat that roadside habituated bears posed to park visitors, the lack of adequate parking, and the concern that people would throw food to or approach these bears too closely, habituated bears were hazed away or captured and moved away from roadsides. Essentially the same management technique that had been used on human food conditioned bears from 1970-79. During the period from 1980 through the early 1990s, non-food conditioned, but human habituated bears that foraged for natural foods along park roads were hazed away from roads with rubber bullets and cracker shells or captured and relocated to remote areas away from human activity. Habituated bears that repeatedly returned to roadside corridors to feed on natural foods were removed from the population. Some of the habituated bears that had been relocated from park road corridors were shot and killed after frequenting areas near people outside of the park where firearms were common. The management strategy of hazing or moving bears from park road corridors resulted in both human-caused bear mortality and a reduction in the total number of acres of habitat available for bears to forage in. The park contains 531 km of paved primary and secondary roads. By excluding bears from using habitat out to approximately 400 m from paved roads, an estimated 83,674 acres of habitat in the park were essentially unavailable for use by bears during diurnal time periods.

In the early 1990s, in an effort to reduce the number of bears being removed in management actions along park roads and to improve habitat effectiveness in road corridors, YNP implemented a variety of new management techniques. These techniques included bear-sitting (people management) at bear-jams, implementing temporary no stopping zones or area closures, planting vegetation screening or constructing fencing along roads, and baiting bears away from roadside corridors. These techniques placed less emphasis on management of roadside bears and more emphasis on management of people in roadside corridors frequented by bears.

## Study Area

YNP encompasses approximately 2,221,722 acres in the states of Wyoming, Montana, and Idaho. The park contains 531 km (330 mi) of paved primary and secondary roads. Park visitation currently exceeds 3 million visitors per year. Over 80% of the visitation occurs during the 4 month period from June through September. During the peak season from July through August, visitation exceeds 24,000 people per day.

The park has populations of both black and grizzly bears. The distribution (Blanchard et al. 1992), home range sizes and movements (Blanchard and Knight 1991), activity patterns (Schleyer 1983, Harting 1985), food habits (Mattson et al. 1991), habitat use (Knight et al. 1984) and population dynamics (Eberhardt et al. 1994) of grizzly bears in the Yellowstone ecosystem have been extensively studied and reported. The

movements, food habits, habitat utilization, activity patterns, and population dynamics of black bears in YNP have been described by Barnes and Bray (1967).

#### Definitions of Terms

The terms bear-jam, habituated bear, and food conditioned bear are used throughout this report. Definitions of these terms are:

**Bear-Jam:** Bear-jams are defined as incidents where bears were close enough to park roads to cause large numbers of tourists to stop their vehicles in the road to view and/or photograph them. When bear-jams become large and traffic congested, patrol rangers, interpretive staff, and resource management staff are dispatched to the area for traffic control and managing tourists to prevent them from approaching or feeding the bears involved.

**Human Habituated Bear:** Bears that have learned to tolerate people, vehicles, and human activity at close distances are commonly referred to as habituated bears (Herrero 1985). Habituation is a decline in a black or grizzly bear's behavioral response to people, vehicles, and/or human developments following repeated inconsequential exposure to these stimuli. Habituation often allows bears access to locally abundant high quality food sources in proximity to areas with a high density of human activity.

**Human Food Conditioned Bear:** Bears that have learned to associate humans, vehicles, or human developments as potential sources of anthropogenic foods due to prior food reward, are commonly referred to as food conditioned bears (Herrero 1985). Human food conditioned bears are often involved in property damages, bear-inflicted human injuries and other types of bear-human conflicts. Food conditioned bears may also be habituated to humans. The primary topic of this paper is management of habituated but non-food conditioned bears.

#### Management Techniques Used at Bear-Jams

**Bear-Sitting:** Bear-sitting is the most common technique we currently employ at bear-jams. When there are safety concerns or significant traffic congestion at bear-jams, patrol rangers, resource managers, interpretive staff, or bear management staff are dispatched to the site for managing vehicles and visitors. This is referred to as bear-sitting. Bear-sitting involves a combination of traffic control, answering visitor questions regarding bears, and ensuring that visitors do not approach, feed, or behave inappropriately around bears. A minimum of 3 people are usually required to manage (bear-sit) a bear-jam effectively. One person at each end of the stopped traffic and one person in the middle of the jam at the location of the bear. Large bear-jams, situations involving females with cubs, or situations where the bear is frequently moving often require more staff.

**Temporary No Stopping Zones:** We occasionally implement no stopping zones on short sections of roads during bear-jams. Signs are posted informing drivers that no stopping is allowed for a stated distance ahead or the no stopping zone is verbally communicated to vehicle drivers by patrol staff managing traffic at the bear-jam. No stopping zones are intended to keep traffic moving, prevent people from stopping in the middle of the road, and to resolve unsafe parking situations or bear related safety concerns. No stopping zones are most often implemented during staff shortages, in areas where bear-jams occur on a daily basis, when traffic becomes unmanageable, or when stopping is unsafe or not feasible.

**Temporary Closures:** In areas where bear-jams will likely continue for several days such as with bears on carcasses or where bear-jams will predictably occur annually due to seasonal high quality food sources such as spawning streams that can attract and hold bears for several weeks, we often implement temporary area closures. Temporary area closures allow people to stop to view bears from the roadside, but keep people from leaving the safety of the roadside and approaching bears too closely. During temporary closures, area closure signs are posted along the area to be closed. Temporary closures may be posted for a period of several days to several weeks.

**Vegetation Screening:** In some circumstances we have planted native vegetation to screen high quality bear habitat from the road corridor in an effort to reduce the frequency of bear-jams in specific areas. For example, in one area of the park there is a cutthroat trout spawning stream running through a small meadow adjacent to the Grand Loop Road. Cutthroat trout are one of the highest sources of net digestible energy available to bears in the Yellowstone ecosystem (Pritchard and Robbins 1990) and will attract and hold bears into a small area. When bears fish this particular stream during daylight hours, they are clearly visible from the road, attracting large numbers of people. Since this segment of road has a narrow shoulder and is bordered by Yellowstone Lake on one side and the riparian stream corridor on the other, there are few pullouts where people can park. This creates an unsafe situation when large numbers of vehicles park in the middle of the road to watch bears catching spawning fish in the creek. To alleviate this problem, we planted native trees to screen the meadow containing the spawning stream from the road. The tree screening makes bears much less visible to traffic on the road, reducing the potential for bear-jams and disturbance of bears catching fish in the creek.

**Fencing:** We have also used fencing to create a visual and physical barrier to discourage people from entering high quality bear habitat adjacent to park roads and developments. In the Lake Lodge area of the park, there is a cutthroat trout spawning stream flowing through a forested area adjacent to the Lake Lodge entrance road and cabin rental area. In past years, park visitors often walked down from the road and rental cabins to the stream. This led to potentially dangerous surprise encounters with bears that were fishing or day-bedded along the spawning stream. We built a buck and rail fence between the entrance road/rental cabin area and the spawning stream to discourage human entry into the area. Closure signs are placed on the fence during the cutthroat trout spawning season when bears fish the stream, to prevent park visitors from walking down to the stream and having surprise encounters with bears. When the spawning season is over and bears leave the area, the closure signs are removed and people are given access to the stream.

The fence was constructed of a rustic looking, buck and rail design, appropriate for a national park setting. Periodic gaps left in the fence facilitate movements of bison (*Bison bison*), moose (*Alces alces*), and elk (*Cervus elaphus*) through the area. The visual and physical barrier of the fence in combination with the closure signs appears to be more effective at preventing human entry into the area than the use of closure signs alone. The public sometimes ignores closure signs.

**Baiting:** Bears can usually be attracted to meat baits during seasons when vegetal foods are their primary food source. In situations where we don't have sufficient staff to adequately manage park visitors at bear-jams, we have occasionally used strategically placed road-killed ungulate carcasses to lure bears away from roadside corridors. We have successfully used this technique when bears were feeding on biscuit root, yampa, truffles, and clover along roadside corridors. A typical road-killed ungulate carcass can attract and hold a bear for periods of several days to a week or more, depending on the size of the carcass and the amount of competition from other scavengers.

**Roadside Carcass Management:** Ungulate carcasses are an important high quality food source for bears in YNP (Mattson 1997). Ungulate carcasses will often attract and hold bears for periods of several days to a week or more. Due to the high quality of ungulate carcasses as bear food, even bears that are very wary of humans will often tolerate people at close distances in exchange for access to feed on carcasses. Carcasses within 100 m of roads are likely to cause large bear-jams and potentially pose a hazard to bears that could be hit by vehicles while approaching carcasses to scavenge. To reduce these risks in YNP, carcasses within 100 m of roads are dragged away from roads or are loaded into trucks and hauled to areas away from visitor activity.

## Road-Killed Bears

Over the last 10 years (1989-98) 8 black bears and 2 grizzly bears were hit and killed by vehicles on roads in YNP. None of these incidents involved carcasses as attractants. The road-killed bears were not concentrated in any specific locations on park roads. Bears were hit and killed by vehicles more frequently on park roads with faster speed limits than on other park roads.

## Discussion

The public education and sanitation programs implemented as a component our 1970 Bear Management Plan have been highly effective at reducing the number of bear-human conflicts and human-caused bear mortalities in YNP (Gunther 1994). Continuation of these programs is essential to further reducing and preventing bear-human conflicts and human-caused bear mortalities within the park. Management of human habituated but non-food conditioned bears that feed on natural foods within road corridors, often with hundreds of people watching and photographing within distances of 20 to 50 meters, is currently the most challenging bear management issue in the park. Habituated bears have learned to live in close proximity to people while being involved in relatively few conflicts with humans. If park visitors can be managed so that they behave appropriately around habituated bears in a manner that does not put themselves or these bears at risk, it can be beneficial to both bears and people. Bears will benefit by the reduction in the number of bears being removed in management actions along roads and by gaining access to previously unavailable high quality habitat adjacent to park road corridors. Park visitors will benefit by being able to watch and photograph bears involved in natural behavior in their natural habitat. The management techniques we described in this report hold promise as tools to reduce the potential for conflicts between people and habituated bears using roadside habitat. New innovative strategies for managing park visitors and roadside habituated bears should continue to be developed to reduce the potential for bear-human conflicts with, and human-caused mortality of, habituated bears that frequent road corridors in YNP.

As the grizzly bear population increases and recovery goals are met, the problem of habituated bears foraging for natural foods along roadsides is likely to increase and expand to other areas outside of YNP throughout the Yellowstone ecosystem. New innovative strategies for managing people and habituated bears along roadside corridors would also benefit bears outside of the park on National Forest lands and help ensure the continued survival of black and grizzly bear populations throughout the Yellowstone ecosystem.

## Acknowledgements

We wish to thank all park employees for their contributions to implementing a highly successful bear management program in YNP. The management techniques described in this report were designed, implemented, and perfected by many different park employees. Special acknowledgement is given to the Ranger and Interpretive Divisions for their extensive commitment of time, effort, and patience in bear-sitting at bear-jams throughout the park during the busy summer season.

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