

Human Habituated Bears

The Next Challenge in Bear Management in Yellowstone National Park

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POSTCARD BY FRANK J. HAYNES, 1900 16



NPS/R. ROBINSON, ca. 1950

AFTER DECADES WITH numerous bear-inflicted human injuries and bear-caused property damage, the implementation of a new Bear Management Program in 1970 appeared to solve most of Yellowstone National Park's (YNP) bear management problems. Under the 1970 program, bear-inflicted human injuries and bear-caused property damage were significantly reduced, and bears were weaned off of human food handouts and garbage (Cole 1976, Meagher and Phillips 1983). Although the program initially contributed to a population decline (Craighead et al. 1974), by the mid-1980s the grizzly bear population was once again growing in number (Schwartz et al. 2006) and expanding in range (Schwartz et al. 2002). However, a new management challenge began to emerge at this time because grizzly bears and black bears that were not conditioned to human foods began habituating to the presence of people (Gunther 1994). These bears were tolerating people at very close distances while feeding on natural foods in meadows next to roads. Bears were learning to live in close proximity to people without causing conflicts or injuring people, but could (and should) park visitors and staff learn to co-exist so closely with bears?

Terminology: Food Conditioning Versus Habituation

Bears and other wildlife can be habituated to humans, conditioned to human foods, or both (Herrero 1985). Human food conditioning is defined as the attraction to human foods or garbage due to prior food rewards giving positive reinforcement (Herrero 1985). Human food conditioned bears are almost universally considered a problem and dangerous to personal property and human safety by most bear management agencies. Most bears conditioned to human foods eventually become aggressive in their efforts to obtain human foods and damage property or injure people in the process. Then they must be destroyed by managers. Human habituation in wildlife is defined as the waning of an animal's flight response following repeated exposure to inconsequential stimuli (Jope 1985, Whittaker and Knight 1998, Herrero et al. 2005). Habituation in bears typically refers to the loss of avoidance or escape responses (Smith et al. 2005). For example, bears feeding on high quality, natural foods near park roads are exposed to thousands of park visitors driving by, viewing, and photographing



Food-conditioning began with early park visitors, 1872–1916.

them, and they are not killed or harmed by the experience. They eventually habituate to the traffic and people associated with roads. Habituation is an adaptive response that reduces energy costs by reducing irrelevant behavior (McCullough 1982). In our example, the irrelevant behavior from the bear would be a flight response from something (people/traffic) that rarely harms or kills them. In areas like YNP, where bears and people come into frequent benign contact (YNP has millions of visitors who are not allowed to hunt or carry loaded guns) and there are few human-caused bear mortalities (mainly management removals of food-conditioned bears and road accidents), bears will readily habituate to people. Human-habituated behavior by bears in YNP is most often observed along road corridors (Gunther et al. 2004), although sometimes habituated bears enter developments to feed on natural foods or forage along popular high-use trails such as the Slough Creek trail. Habituation without food conditioning is not necessarily detrimental to bears or people (Herrero et al. 2005). Habituation of bears to humans in YNP allows them to access and utilize high quality habitat in areas with high levels of human activity without incurring the energetic costs of fleeing every time a park visitor appears (Gunther and Biel 1999). In addition, habituated bears may be less prone to aggression toward people during surprise encounters (Jope 1985).

The Era of Food Conditioned Bears

When bears are in meadows along roads, hundreds of visitors may cause traffic congestion by stopping along (or in) the road to view and photograph the bears; these incidents are referred to as *bear-jams* (Gunther et al. 2004). The first bear-jams along park roads began to occur as early as 1910, when a black bear began panhandling for food handouts from visitors passing by in horse drawn wagons (Schullery 1992). After 1910, the hand-feeding of black bears along park roads quickly became one of the parks most popular attractions. These early roadside bears were both conditioned to human

foods and habituated to human presence. However, having large numbers of park visitors hand-feeding bears led to large numbers of bear-inflicted human injuries and property damages. From 1931 through 1969, there were an average of 48 bear-inflicted human injuries and 138 incidents of bear-caused property damage every year in the park (Gunther 1994). To remedy the situation, YNP implemented a new Bear Management Program in 1970 (Leopold et al. 1969). Under the program, regulations prohibiting the hand-feeding of bears were strictly enforced, all garbage cans and dumpsters in the park were converted to a bear-proof design, and garbage dumps in the park where bears had been feeding for more than 80 years were closed (Cole 1976, Meagher and Phillips 1983). Over the next decade (1971–1979), most panhandling bears along roadsides and those that were conditioned to human foods in park developments were captured and euthanized or sent to zoos (Meagher and Phillips 1983). The bears that survived this period were generally the more wary backcountry bears that were not highly conditioned to human foods. These bears were able to choose and utilize the best quality habitat in remote backcountry areas where they were rarely seen by park visitors. Park visitors accustomed to viewing, photographing, and feeding bears along roads were highly disappointed when panhandling bears no longer lined the roadsides and bears could not be seen within park developments on a regular basis.

Habituated Bears, a New Management Challenge

By the early to mid-1980s bear numbers and distribution began to increase in the park. As the density of bears increased, they began to fill in the remaining vacant bear habitat in the park, the high quality meadows adjacent to roads and developments. Bears low in the social hierarchy, black bears, young adult female grizzlies, and subadult male and female grizzlies, were the cohorts most commonly observed along roads. These bears likely could not compete with the high density of prime-age adult grizzly bears (higher in the social hierarchy) in remote backcountry locations. With park visitation averaging more than 2.3 million visitors per year in the 1980s, it was not energetically efficient for the bears relegated to utilizing roadside habitat to run every time a car drove by or a visitor stopped to take their picture, so these bears began to habituate to traffic and people. Since the park was strictly enforcing regulations prohibiting the feeding of bears and educating park visitors on how to behave around bears, the bears using roadside habitat were not becoming conditioned to human foods and were not causing conflicts other than the large traffic jams.

Discouraging Habituation

When habituated (but not food conditioned) bears first began appearing along roads in the early 1980s, the park

managed them much the same way they had been managing food conditioned bears since 1970. Park managers worried that the bears would eventually be thrown food by park visitors and that allowing bears to forage in roadside meadows would increase the risk of their being struck by vehicles. To protect both the bears and park visitors, in the 1980s habituated bears were initially captured and relocated to more remote areas of the park. However, relocation was rarely successful because YNP is not big enough to ensure that a bear will not return after being relocated. Bears have strong fidelity to their home ranges and make every effort to return after being relocated (Murie 1944, Miller and Ballard 1982, Blanchard and Knight 1995). No matter where in YNP a bear is relocated, it can easily return in three to four days. Moving bears outside the park could give enough distance to ensure that the bears could not find their way back, but it is not a viable option. Since the goal of moving bears is to keep them alive and out of conflicts with people, moving them outside of the park where there is a much higher risk of conflict and mortality would defeat the purpose. In addition, if YNP requested another agency to accept a bear for relocation, that agency would expect the park to accept one of its “problem” bears in return. Most problem bears from outside the park are highly food conditioned, not the type of bear the park would want to relocate into an area with millions of visitors.

Since relocating habituated bears was not working, park bear managers tried other techniques to reduce the perceived risks from having habituated bears adjacent to roadsides. Roadside meadows frequented by habituated bears were posted with closure signs so that park visitors would not approach bears too closely. However, these temporary closures failed to solve the problems associated with bear-jams and, if law enforcement rangers were not present, many people simply ignored the signs and walked past them to get closer to the bears. Park managers also attempted to teach bears to avoid roadside meadows by hazing the bears with rubber bullets, cracker shells, and other devices. Unfortunately, bears seemed to learn to recognize park vehicles, staff, and the distance at which rubber bullets could be effectively fired. Bears also had a much greater pain threshold and tolerance to hazing than the park had staff time and budget to counteract. Efforts to haze bears away from the foods that were attracting them to roadsides (including ungulate carcasses, elk calves, whitebark pine seeds, clover, biscuit root, pocket gophers, yampa roots, and rose hips) were just not successful. It seemed nearly impossible to get bears to associate high-quality natural foods along roads with pain. It would take more than rubber bullets and cracker shells to change centuries of bear evolution.

Interestingly, these same failures of aversive conditioning had been apparent in the early 1940s. Murie (1944) reported that “experience has shown that the bear learns to recognize the particular person or car that administers the shock or other punishment, and he simply avoids that person or car in the

future, but does not fear other persons or cars.” We re-learned these lessons in the 1980s using more modern hazing techniques, concluding that they had very low success rates and were not cost-effective methods of managing habituation on a long-term basis. Park management also realized that visitors wanted to see, photograph, and appreciate bears. Bears that were habituated to people but not conditioned to human foods just did not fit the bear management paradigm of the previous decades.

The Period of Tolerance of Habituation

In 1990, under an informal adaptive management strategy, the park decided to try managing the people at bear-jams instead of trying to manage the habituated bears. Instead of trapping and hazing, rangers were dispatched to manage traffic and prevent visitors from approaching bears too closely or throwing food to them. The change came slowly at first, a few habituated (but not food conditioned) black bears in a few areas were allowed to feed in meadows next to park roads. Grizzly bears were still considered too dangerous to allow them to forage in meadows adjacent to roads. Over time, management became more tolerant of black bears along roads throughout the park and began to tolerate grizzly bears in roadside meadows as well.

However, just as bears were habituating to people, park staff and visitors were habituating to bears. When people spend a lot of time near bears with very small overt reaction distances (Herrero et al. 2005), they tend to lose their wariness of bears (Murie 1944, Smith et al. 2005) and the need for people management increases. The park also directed more resources toward managing bear-jams. The Ranger Division began to hire summer seasonal employees just to manage traffic and park visitors at bear-jams. The Interpretation Division began hiring Bear Education Rangers whose primary duty is to teach people about bears and how to behave at bear-jams. The Bear



Park rangers managing people at a bear-jam, 2004.



People tend to perceive habituated grizzly bears along roads as a significant threat to human safety and yet think nothing of it when bison are grazing next to roads. This may be somewhat misguided, as bison injure more people almost every year in the park than bears do. From 1980 through 2005, 80 people in the park were injured by bison. During that same time span, 37 people were injured by grizzly and black bears combined.

Management Office began seeking and obtaining non-base funds to help the Ranger and Interpretive Divisions fund their efforts to manage people and traffic at bear-jams.

Park Visitation and Bear Habituation Outpace Available Staff

What started out relatively small, with a few habituated bears causing a few dozen bear-jams that required a small proportion of total park staff time each year, has grown exponentially to hundreds of bears-jams requiring thousands of hours of personnel time annually (Figure 1). In 2004, the year with the most recorded bear-jams, park staff spent 2,980 personnel hours managing visitors at 916 bear-jams, providing traffic control and monitoring visitor behavior to prevent visitors from approaching bears too closely or throwing food to them. The number of habituated bears and roadside bear-jams, as well as the staff time required to manage bear-jams is now far greater than anticipated in 1990 when the park began to tolerate habituation in bears. On some days there are so many bears-jams occurring simultaneously that park staff cannot respond to them all. Park visitors are left unattended interacting with grizzly bears and black bears in roadside meadows. For example, in 2007 there were at least 87 bear-jams with no park staff present. We

suspect the number was significantly higher since the majority of unstaffed bear-jams probably were not reported. Due to this increase in bear-jams, an evaluation of the costs and benefits of tolerating habituation in bears is warranted and will aid the park in determining the future direction for management of habituated bears.

Evaluating Successes and Failures in Managing Habituated Bears

YNP now has 18 years of data that can be used to analyze the successes and failures of the current management program in which bears are tolerated in roadside meadows and emphasis is placed on managing visitors at bear-jams instead of the bears. During that period (1990–2007), park staff managed visitors at 2,161 bear-jams involving grizzly bears and 3,809 involving black bears. An additional 119 bear-jams were so big that rangers could not determine the species of bear—by the time they had cleared traffic to get close enough to see, the bears had disappeared into the forest. In total, the park has recorded 6,089 bear-jams since 1990 without a single bear-inflicted human injury (including both habituated and wary bears). People, traffic, and bison have turned out to be more dangerous than habituated grizzly bears and black bears. From 1990 through 2007, there have been a couple of fender-benders and at least five people injured when they were run over by vehicles at bear-jams. Interestingly, people tend to perceive habituated bears along roads as a significant threat to human safety and yet rarely react at all when bison are grazing next to roads even though bison in the park injure more people almost every year than bears.

The number of bears being killed by vehicles has also remained low under the current management strategy. An average of 0.4 grizzly bears and 1.1 black bears were killed by vehicles each year from 1990 through 2007, compared to

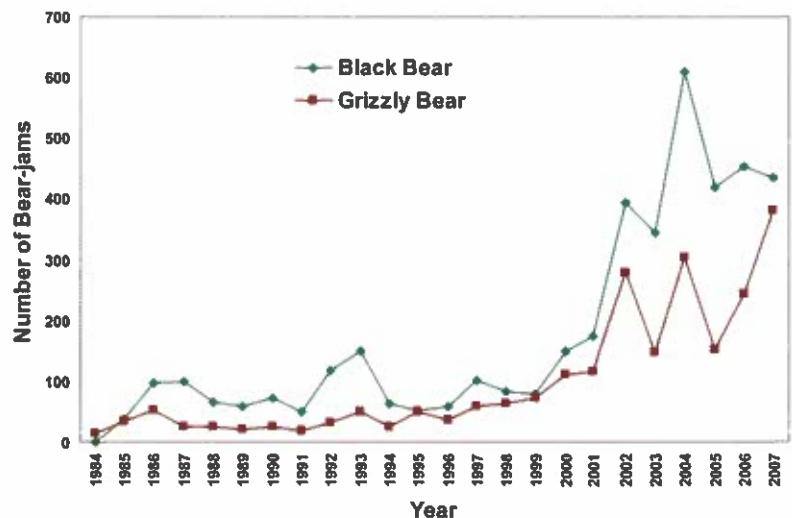


Figure 1. The number of bear-jams each year has been increasing.

Table 1. Comparison of the number of bear–human conflicts, bear-inflicted human injuries, bears removed in management actions, and vehicle strike mortality of bears occurring during two periods with different management policies regarding habituation of grizzly and black bears to people in Yellowstone National Park.

Time Period	Habituation Related Management Goal	Bear–Human Conflicts ^a		Bear-Inflicted Human Injuries		Management Removal of Bears		Vehicle Strike Mortality of Bears	
		Grizzly	Black	Grizzly	Black	Grizzly	Black	Grizzly	Black
1980–1989	Prevent Habituation	9.1/yr	6.0/yr	1.2/yr	0.2/yr	1.1/yr	0.2/yr	0.2/yr	0.9/yr
1990–2007	Tolerate Habituation	5.1/yr	4.1/yr	1.1/yr	0.2/yr	0.3/yr	0.3/yr	0.4/yr	1.1/yr

^aIncidents where bears damaged property or obtained anthropogenic foods.

an average of 0.2 grizzly bears and 0.9 black bears from 1980 through 1989 when habituation in bears was not tolerated (Table 1). Other than a few black bears in the Tower Subdistrict and grizzly bear #264 between Mammoth and Norris, most of the bears that have been struck by vehicles since 1990 have not been roadside habituated bears. The majority of road-killed bears have been wary, seldom seen bears that dart across roads in areas where bear-jams are not common.

The concern that tolerating habituated bears along roadways would lead to an increase in bear–human conflicts and human-caused bear mortalities has not materialized (Table 1). The average number of bear–human conflicts has actually decreased from 9.1 grizzly and 6.0 black bear per year from 1980 to 1989, to 5.1 grizzly and 4.1 black from 1990 to 2007. The number of bear-inflicted human injuries and management removals of problem bears has not changed significantly. The numbers of bear–human conflicts, bear-inflicted human injuries, and management removals of bears have all remained low despite an increase in park visitation and a significant increase in the number of bear-jams occurring in the park (Table 1).

The park has demonstrated that given adequate staff, it can manage habituated bears along roadsides in a manner that is relatively safe for both park visitors and bears. Under the current management philosophy, thousands of people have been able to view, photograph, and appreciate bears while visiting the park. The opportunity to view bears appears to provide a positive visitor experience. However, the increasing numbers of visitors and bear-jams in the park has strained the ability of park staff to manage bear jams and increased concerns about the safety of park visitors that view habituated bears in roadside meadows (Herrero et al. 2005).

Positive and Negative Aspects of Bear Habituation to People

In determining the extent to which bear habituation is tolerated, managers must weigh several factors. There are several benefits of habituation for bears (Herrero et al. 2005). Habituation allows bears to access high-quality food resources that occur adjacent to roads. Roadside habitat is avoided and

underutilized by wary bears (Mattson et al. 1986), so tolerance of habituation may allow the park to support a higher density of bears. Habituation may also increase public appreciation of bears and build support for bear conservation and habitat protection.

Habituation in bears benefits people (Herrero et al. 2005). It provides for public enjoyment by offering opportunities for bear viewing, photography, and filming. Habituated bears also provide excellent opportunities for education of visitors about bears, their ecology, and conservation. Public viewing of habituated bears provides economic benefits to gateway communities, park concessions operations, and the wildlife tour industry. Habituated bears are generally less likely to act aggressively or attack people during surprise encounters (Jope 1985).

There are also negative aspects of bear habituation (Herrero et al. 2005). When habituated bears are foraging near roads and developments they often create significant traffic congestion that can lead to human as well as bear injuries and mortalities. Although habituated bears may be less prone to react aggressively during surprise encounters (Jope 1985), habituation may increase the cumulative likelihood of human–bear encounters and therefore of bear-inflicted human injury (Herrero et al. 2005). Managing park visitors that stop



A crowd of wildlife watchers lines the roadside.



GRIZZLY BEAR #264 was probably Yellowstone's most famous habituated (but not food conditioned) roadside bear. She first came to the attention of bear managers as a four-year-old in 1995, when she began foraging in roadside meadows during the day, causing large traffic jams. For the next eight years she was a common sight in the roadside meadows between Golden Gate and Gibbon Meadows, where she attracted large numbers of visitors and caused huge bear-jams. Grizzly bear #264 was a popular attraction during the spring when she scavenged winter-killed ungulate carcasses and in the late spring and early summer when she hunted newborn elk calves. She was a highly successful predator, but she also spent considerable time in roadside meadows digging biscuit root and yampa root, and in open forests adjacent to roads foraging sweet cicely. She was especially popular with photographers during years when she had cubs. She was known to have had three litters of at least two cubs each; in 1997, 1999, and 2000. She was easy to photograph and film and was featured in the Animal Planet episode "Seasons of the Grizzly."

Grizzly bear #264 was very tolerant of people, even when visitors misbehaved. In 1997 a visitor walked out into the meadow where she was grazing with her two cubs and petted one of the cubs. The cub bawled and #264 bluff charged the man but did not injure him. Grizzly #264 exemplified both the positives and negatives of habituation. In 2003, she darted out of the forest in front of a truck. The driver



Clockwise from top: #264 with her yearlings near Sheepeater Cliff, June 2002; Gardiner, Montana, residents show their attachment; #264 along the roadside.

braked and swerved to avoid her but she was struck by the right front tire. The collision broke her spine and paralyzed the lower portion of her body. Bear Management Office staff took her to a veterinary clinic but she had to be euthanized. Bear #264 was probably the park's most filmed and photographed bear. She was able to carve out a home range along a busy road corridor where she lived for 12 years and had six cubs in three litters, providing entertainment and education for thousands of park visitors.

to view habituated bears is staff intensive and expensive. In addition, habituation of bears increases the chances that park visitors might approach, feed, or otherwise behave inappropriately around bears, especially when park rangers are not present. Inappropriate visitor behavior could lead to human injury or death or to the injury or death of the bear.

Where Do We Go from Here?

In 1970, the decision to prevent bears from obtaining human foods and garbage in the park was obvious and management techniques to prevent bears from becoming conditioned to human foods were relatively straightforward. Since habituation without food conditioning is harder to define as good or bad, and the management options for habituated bears are not yet perfected and will be subject to staff limitations, the decision on how to manage habituation is much less obvious. With adequate staff and budgets, roadside viewing of habituated bears can be a safe and enjoyable learning activity with minimal and probably acceptable risks for park visitors (Herrero et al. 2005). Allowing visitors to view habituated bears along roads also builds a constituency of people that may be more likely to support conservation of bears and their habitat (Herrero et al. 2005). However, if staff and budgets to manage visitors viewing roadside bears do not keep pace with visitation, then park visitors and, ultimately, the bears themselves may be at greater risk of injury or death. Under such a scenario, park management may have to choose other options such as removal or intensive aversive conditioning to attempt to prevent habituation of bears to people.

Conclusions

The dilemma for park managers is to balance the needs of bears with the desires of park visitors while providing for visitor safety and remaining within fiscal constraints. The next challenge for park managers is to find innovative,

cost-effective ways to manage the large numbers of visitors that want to view and experience habituated bears, or to develop cost-effective methods to prevent habituation. In the meantime, highly intelligent and very adaptable grizzly and black bears are habituating and learning to live and coexist in close proximity to people so that they can survive in a landscape that is ever more increasingly dominated by humans.

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NATURE NOTES

Possible Grizzly Cub Adoption in Yellowstone National Park

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WE SUSPECT that two females with cubs-of-the-year (COY) that have been observed frequently in the Dunraven Pass-Antelope Creek areas of Yellowstone National Park (YNP) were involved in a COY adoption during early August 2007. One of the females was radio-marked (#125) and has an extensive research history. First radio-collared as a three-year-old in Antelope Creek on August 6, 1986, she was subsequently captured and re-collared five times (1990, 1993, 1995, 2000, and 2006) in the Antelope Creek drainage, and she has been radio-located during 18 of the 21 years since her initial capture. Her life range, computed using VHF (Very High Frequency) telemetry locations ($n=272$) and employing a fixed kernel estimator (95%), is centered on the Antelope Creek-Mount Washburn area (Fig. 1). We know of four previous litters that she has produced (in 1990, 1994, 1997, and 2002). During 2007 she was observed with three COY during aerial telemetry and observation flights seven times between June 3 and August 3 (Fig. 1, where observation and telemetry locations coincide). She was last seen with three COY during a telemetry flight on

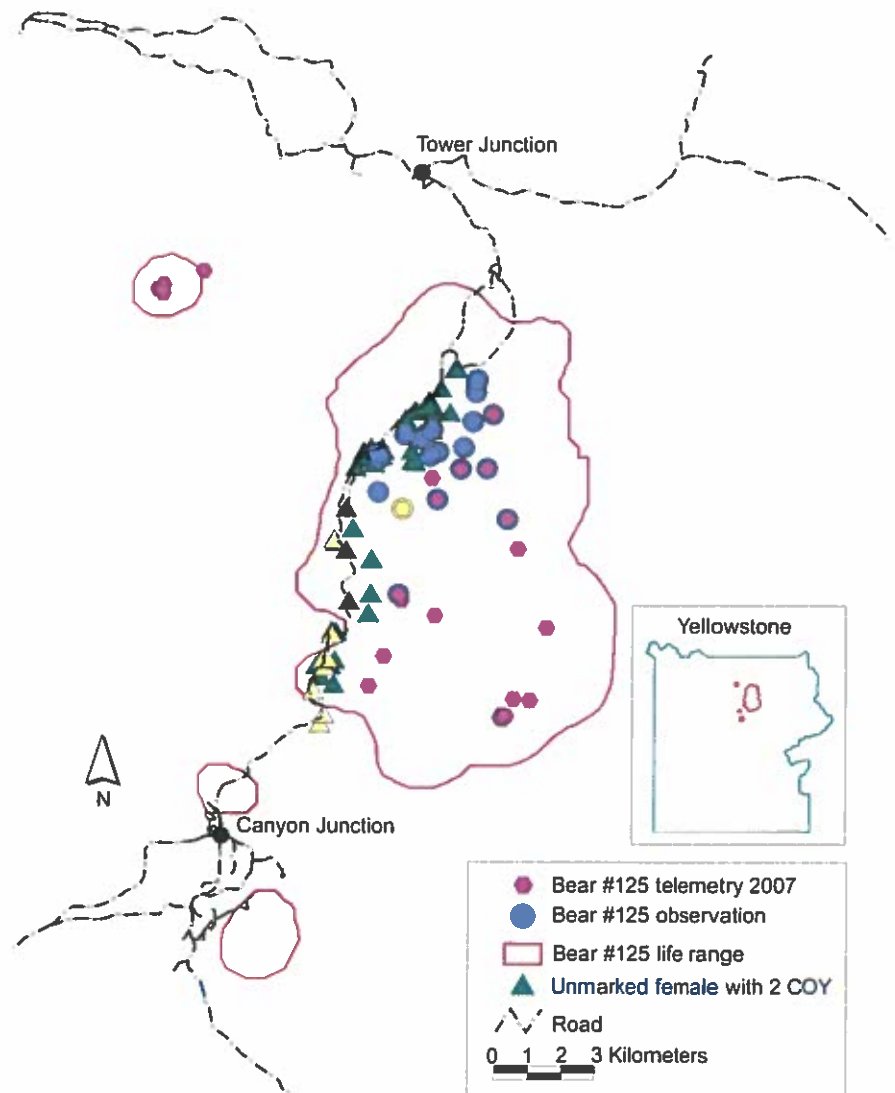


Figure 1. Distribution of observed locations of the female bears apparently involved in an adoption of cubs during August 2007. Yellow shapes depict observations after the number of young accompanying each female changed. Also shown (red polygon) is the 95% fixed kernel life range (272 locations over 18 years) for female #125.