

Yellowstone National Park  
Yellowstone Bear Management Program 2018  
Wyoming, Montana, Idaho

Yellowstone Center for Resources  
National Park Service  
Department of the Interior



# Yellowstone Bear Management Program Annual Report

2018

## Summary

The Greater Yellowstone Ecosystem (GYE) grizzly bear population increased from an estimated 136 bears occupying 5,955 square miles in 1975 when they were listed as a threatened species, to 757 bears occupying approximately 25,038 square miles in 2014. Grizzly bears were delisted from Threatened Status in June of 2017. However, on September 24, 2018, a federal judge restored protections under the Endangered Species Act. The Court indicated the U.S. Fish & Wildlife Service needs to: 1) consider how delisting and decreased protections in the GYE could affect other populations in the lower 48 states through the lack of connectivity, increased isolation, and lack of gene flow; 2) commit to a process of recalibration so that higher estimates of bear numbers generated by a future, more accurate population estimator are brought in line with those generated by the current estimator (Chao2 model) during 2002-2014, which underestimates bear numbers by about 40%-50%; and 3) establish a regulatory mechanism to address the threat continued isolation poses to the Yellowstone area grizzly bear population, which could include efforts to restore connectivity with the North Continental Divide population or use translocation of bears from other populations to enhance genetic diversity.

There were few bear-human conflicts inside of YNP in 2018; however, managing visitors that stopped to view and photograph bears foraging in roadside meadows and thus creating large bear jams was a considerable management challenge. The number of bear jams decreased considerably after mid-August when bears moved away from roads to higher elevations to feed on the abundant whitebark pine seed crop produced in 2018. Counts of whitebark pine cones on transects in the GYE in 2018 were higher than the long-term average. Visitation to YNP exceeded four million visits for the first time in 2015 and has exceeded that number each year thereafter and it is expected to continue to increase into the foreseeable future. Since 2008, annual visitation to Yellowstone has increased by approximately 34%.

As visitation increases, park managers should expect an increasing number of bears to become habituated to people and a higher level of habituation among those bears, thereby causing more bear jams and jams of longer duration. As the level of habituation increases, the distance at which bears allow visitors to approach before fleeing will become shorter, resulting in interactions at closer distances.



A visitor approaches a grizzly bear for a photo at a roadside bear-jam. This is an example of visitors violating park regulations and putting themselves and the bear in danger by approaching wildlife too closely. NPS Photo - D. Schneider

Front cover photo: A grizzly bear near Frying Pan spring. NPS Photo - J. Peaco

## Monitoring Recreational Use of Bear Habitat

YNP encompasses 899,139 hectares in the core of occupied grizzly bear habitat in the GYE. Most (~99%) of the habitat in the park is relatively pristine, undeveloped land; 92% of which is managed as wilderness. Only ~1% of park habitat has been significantly altered through construction of roads and developments. Visitors and bears in YNP are managed in three broad zones: developed areas, road corridors, and backcountry/proposed wilderness. Each zone has different strategies for managing the human-bear interface. Human activities are prioritized in developed areas, road corridors are managed for use by both bears and people, and bears are generally given priority in backcountry areas. Total visitation to YNP was 5,338,438 visits in 2018, including recreational and non-recreational use. Recreational visits in 2018 totaled 4,115,000 which was the third busiest year on record and the 4th straight year that recreational visits has topped the four million mark. Since 2008, annual visitation to YNP has increased by approximately 34%. Most of the park's recreational visitation occurred during the six-month period from May through October, the same period that all sex and age classes of grizzly bears are out of their winter dens and active on the landscape. In 2018, there were 3,954,822 recreational visits (96%) during those peak months, an average of 21,494 recreational visits per day. Park visitors spent 791,238 overnight stays in roadside campgrounds, and 41,759 overnight stays in remote backcountry campsites in Yellowstone. Although total park recreational visitation has increased steadily over time, the average number of overnight stays in backcountry areas, the most critical habitat to bears, has been relatively stable, ranging from 39,280 to 45,615 overnight stays/year since 1972. The number of overnight stays in the backcountry is limited by both the number and capacity of designated backcountry campsites in the park.

## Bear Sightings

There were 1,627 bear sightings reported in YNP in 2018. These reports included 892 observations of grizzly bears, 665 observations of black bears, and 70 reports where the species of bear could not be determined (figure 1). The first observation of spring grizzly bear activity after den emergence was recorded on March 10 at LeHardy Rapids. The first black bear activity of the year was observed on March 31 at Garnet Hill. The first sighting of a female grizzly bear with cubs occurred on April 28 on The Thunderer. The first female black bear with cubs was observed on April 22 north of Calcite Springs. The last grizzly bear activity of the year was observed on December 18 at Floating Island Lake, and the last black bear activity was observed on December 20 at Oxbow Creek.

## Bear Observation Flights

We flew two rounds of fixed-wing observation flights over eight Bear Observation Areas in 2018. The first round of flights were conducted from June 12 through July 4 and the second round from July 10 through August 10. The duration of observation flight time was 17.9 hours for round 1 and 17.3 hours for round 2. Total observation flight time was 35.2 hours. Average duration of observation flights was 2.2 hours per Bear Observation Area. Excluding dependent young (cubs, yearlings, two-year-olds), 60 grizzly bear sightings were recorded during the observation flights. These observations included 46 adult and subadult bears without dependent young, 7 females with cubs, 4 females with yearlings, and 3 females with two-year-olds. None of the observed bears had radio collars. Our observation rate was approximately 1.7 grizzly bears per flight hour for all bears excluding dependent offspring and 0.40 bears per hour for females with dependent young. A total of 11 cubs, 6 yearlings, and 3 dependent two-year-olds were observed.

Excluding dependent young, 11 black bear sightings were recorded during the observation flights. These observations included 10 adult and subadult bears without dependent offspring and 1 female with cubs. No females with yearlings were observed, and none of the observed bears were radio collared. Our observation rate was approximately 0.3 black bears per flight hour for all bears excluding dependent offspring and 0.03 bears per hour for females with dependent young. A total of 2 cubs were observed.

## Management of Roadside Bear Viewing

Roadside bear viewing is one of the primary activities of visitors to YNP and contributes millions of dollars to the



Bear management technician Travis Wyman conducting grizzly bear population counts from a fixed-wing aircraft. NPS Photo - T. Wyman

# 2018 Reported Bear Observations

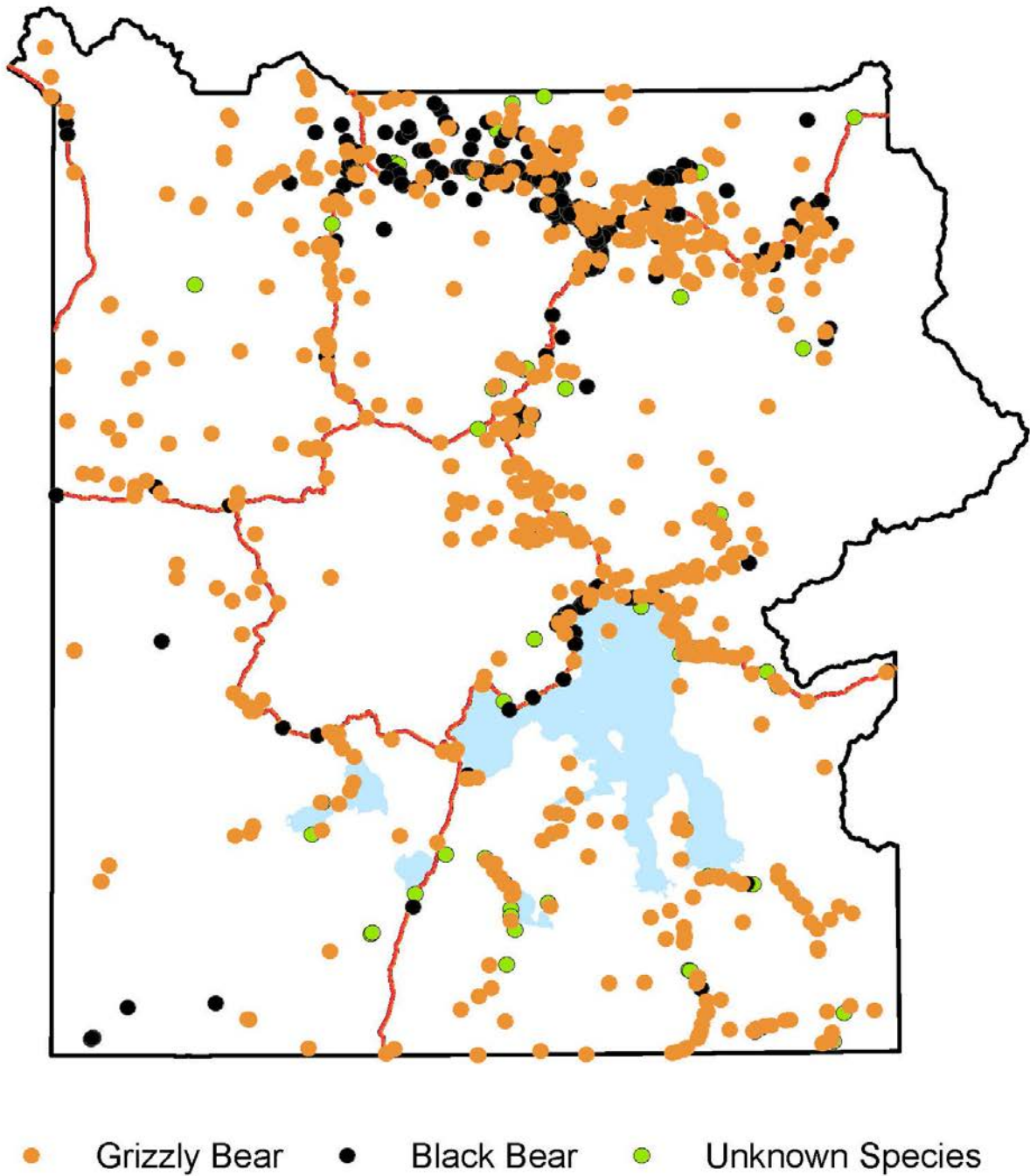


Figure 1. Reported observations of grizzly bears, black bears, and their sign (tracks, scats, feeding sights) in Yellowstone National Park, 2018.

economies of gateway communities annually. In 2018, 240 roadside traffic jams caused by visitors stopping to view habituated bears along roadsides were reported in YNP. Thousands of visitors viewed bears at these bear jams. Park staff responded to 180 (75%) of the grizzly bear jams and spent 1,066 personnel hours managing grizzly bears,

the traffic associated with the bear-jams, and the visitors that stopped to view and photograph the grizzly bears. On average, park staff spent 5.9 hours managing each grizzly bear jam. In addition, there were 481 reports of traffic jams caused by black bears. Park staff responded to 411 (85%) of the black bear jams and spent 1,287 personnel hours managing

them. On average, park staff spent 3.1 hours managing each black bear jam.

After the second week of August, there was a noticeable decrease in the number of both grizzly and black bear jams (figure 2) as bears moved away from roadside meadows and higher in elevation to feed on whitebark pine seeds. Counts of whitebark pine cones on transects in 2018 were greater than the long-term average. The number of late summer and fall roadside bear jams are lower during years with good whitebark pine cone production because bears are foraging for pine seeds in red squirrel middens in forested areas where they are not readily visible. Bears are also less visible to visitors when feeding on whitebark pine because there are fewer park roads at the higher elevations where whitebark pine trees grow.

### Bear Cub Production

Based on observations, an estimated minimum of 7 unique adult female grizzly bears produced cubs inside the park in 2018. These 7 females produced at least 11 cubs. Average litter size was 1.6 cubs per litter. There were 4 one-cub, 2 two-cub, and 1 three-cub litters observed. Biologists did not observe litters larger than three cubs. On average, adult female grizzly bears in the GYE produce a litter of cubs approximately once every three years. Combining the minimum counts of

females with cubs from the most recent three-year period (2016-2018) provides a minimum estimate of 30 adult female grizzly bears with home ranges wholly or partially within the park.

An estimated minimum of 18 unique adult female black bears produced cubs inside YNP in 2018. These 18 females produced at least 36 cubs. Average litter size observed was 2.0 cubs per litter. There were 1 one-cub, 16 two-cub, and 1 three-cub litters observed. No litters larger than three cubs were observed.

### Bear Mortalities

There was one known grizzly bear death in YNP in 2018 due to natural causes. On November 26, the skeletal remains of a 15-18 year-old grizzly bear was discovered in Lamar Valley. Wolves and scavengers had nearly consumed the carcass, so the exact cause of death could not be determined. The Junction Butte wolf pack consisting of 11 wolves had fed on the carcass and may have killed the bear.

Trends in causes of grizzly bear deaths inside YNP have changed over time. From the late 1950s through the 1970s most grizzly mortality in the park was due to human causes (figure 3), primarily management removals of bears involved in bear-human conflicts. In recent decades (1980-2018), most

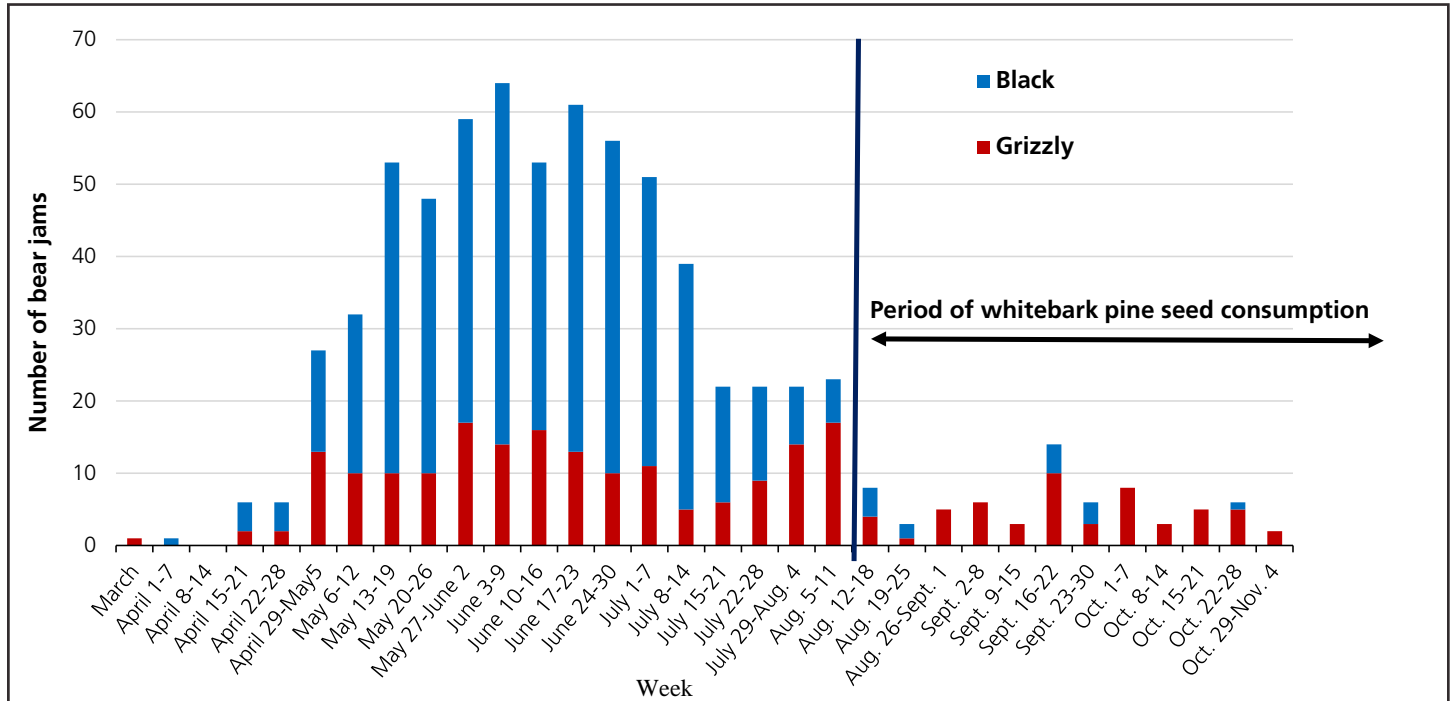


Figure 2. Number of grizzly and black bear caused traffic jams by week in Yellowstone National Park, 2018. Note the reduction in the number of bear jams after the second week in August, when bears forage for whitebark pine seeds, which are found in forested areas where bears are not highly visible from roads. In 2018, the number of whitebark pine cones counted on transect trees in the GYE was higher than the long-term average.

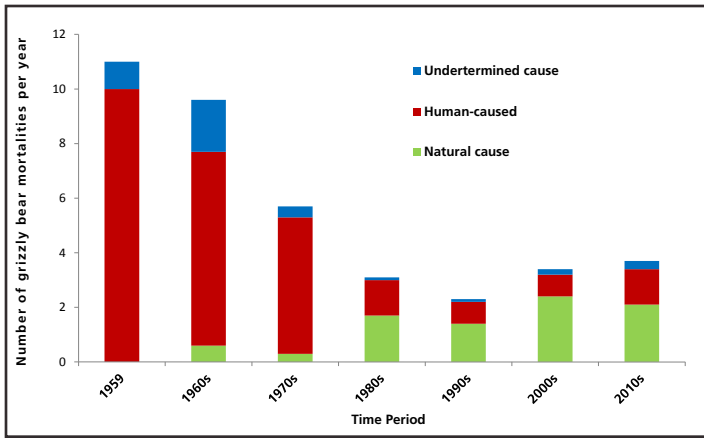


Figure 3. Number of known and probable grizzly bear mortalities by time period in Yellowstone National Park, 1959-2018.

grizzly mortality in the park is from natural causes, primarily old age, and predation by other bears or wolves.

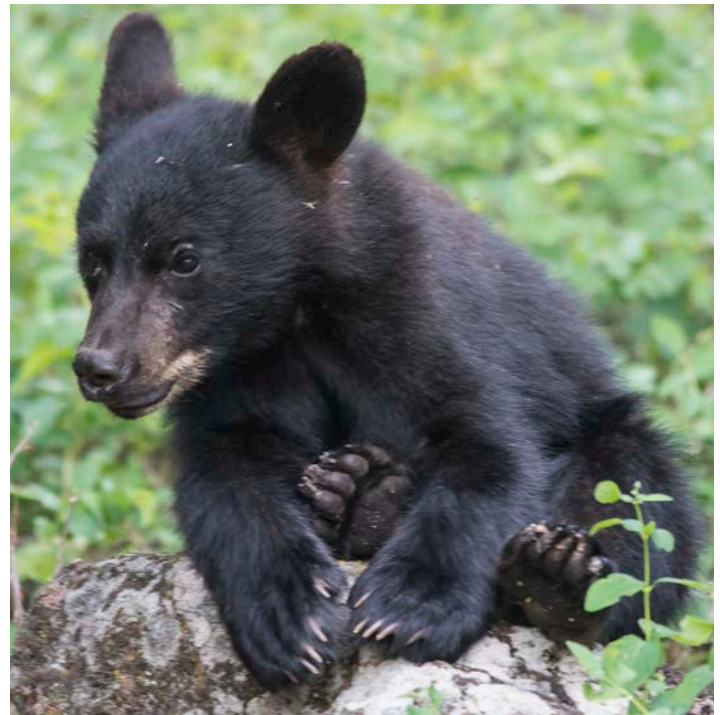
Four black bear mortalities were also documented in 2018. On July 24, a vehicle struck and killed an 8-10 year-old, reddish brown, 255-pound male black bear at milepost 27.6 on U.S. Route 191. On August 3, a reddish brown subadult black bear that had been hit and killed by a vehicle was found behind the guardrail at milepost 27.5 on U.S. Route 191; the bear appeared to have died several weeks earlier. On September 19, a vehicle struck and killed a 108-pound, chocolate brown, subadult female black bear at milepost 25 on U.S. Route 191. On December 20, biologists found the scavenged remains of a 4-8 year-old black bear in the backcountry in the Oxbow Creek drainage; due to consumption of the carcass the cause of death could not be determined.

### Bear-Human Conflicts

There were a total of 8 bear-human conflicts reported in YNP in 2018 (table 1, figure 4). Three involved grizzly bears, three involved black bears, and in two incidents the species of bear could not be determined. Grizzly bear conflicts included two incidents where bears obtained garbage or recycling and one incident where a bear injured a person after a surprise encounter on a hiking trail.

The annual number of grizzly bear-human conflicts occurring in YNP can vary widely from year to year and depends upon many factors including the availability of natural bear foods, grizzly bear population numbers, park visitation, and park staffing levels. The annual number of grizzly bear-human conflicts in the park has decreased significantly after efforts to prevent bears from obtaining human foods were implemented in the late 1960s and early 1970s (figure 5).

Black bear conflicts included two incidents where bears obtained human foods and one incident where they damaged



A black bear cub in northern Yellowstone. Bear cubs are born in the den during winter. Black bear cubs generally spend 1 1/2 years with their mothers before weaning and separation. Grizzly cubs are generally weaned and separate from their mothers at 2 1/2 years of age. NPS Photo - D. Schneider

property without obtaining a food reward. In addition, there were two incidents of property damage by an unknown species of bear, without the bear obtaining food.

### Bear Management Actions

Although grizzly bears caused few conflicts in the park in 2018, biologists dedicated considerable management effort toward preventing conflicts. Because of grizzly bear activity in visitor use areas, biologists posted bear warning signs at 15 locations and temporary trail and/or area closures at 21 locations. In addition, they removed 87 large mammal wildlife carcasses likely to attract grizzly bears from visitor use areas. In an effort to prevent the need to capture and relocate or remove bears, biologists hazed grizzly bears out of human use areas 36 times, including from park developments 5 times and primary roads 31 times. Biologists did not capture, relocate, or remove any grizzly bears involved in conflicts.

Due to black bear activity in visitor use areas, biologists posted bear warning signs at two locations and temporary trail and/or area closures at eight locations. In an effort to prevent the need to capture and relocate or remove bears, biologists hazed black bears out of human use areas 33 times, including park developments 10 times, primary roads 22 times, and high use trails one time. Biologists did not capture, relocate, or remove any black bears involved in conflicts.

Table 1. Number of bear-human conflicts in YNP, 2018.

Conflict Type	Grizzly Bear	Black Bear	Unidentified Bear	Total
Property Damage without Food Reward	0	1	2	3
Property Damage with Human Foods	2	2	0	4
Human Injury	1	0	0	1
Human Fatality	0	0	0	0
<b>Total conflicts</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>8</b>

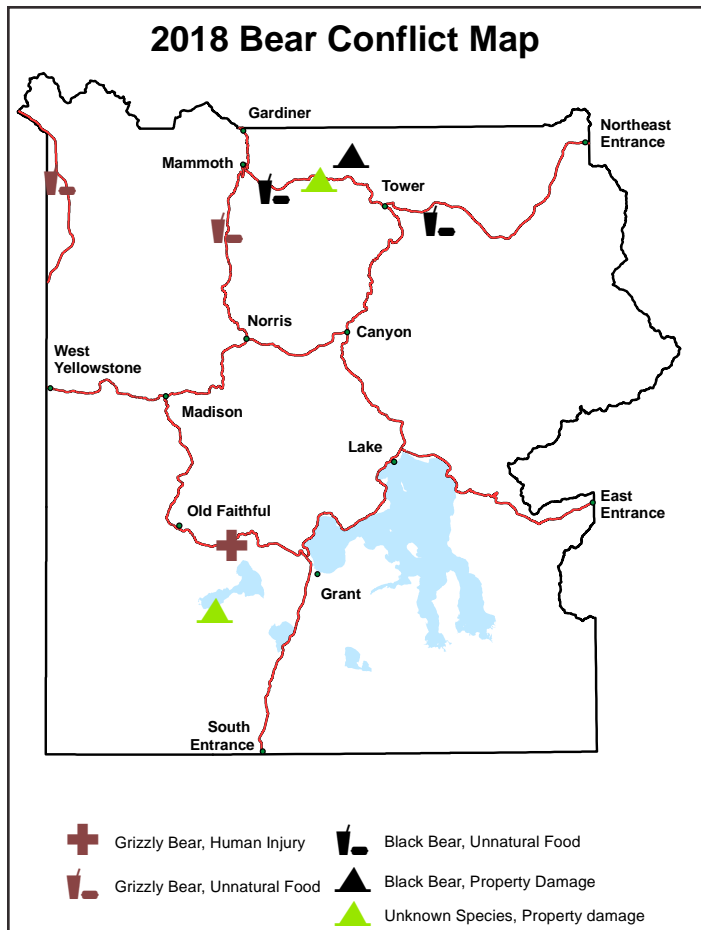


Figure 4. Locations of bear-human conflicts reported in Yellowstone National Park, 2018.

### Bear-Human Interactions in Backcountry Areas

Most bear-inflicted human injuries occur in backcountry areas of the park. To determine the relative risk of bear attack, we record information on encounters between backcountry recreationalists and bears and the outcomes of those encounters.

### Activity of Bears in Occupied Backcountry Campsites

Bears occasionally enter designated backcountry campsites while the campsites are occupied by recreational users. In 2018, people reported 11 incidents where grizzly bears entered

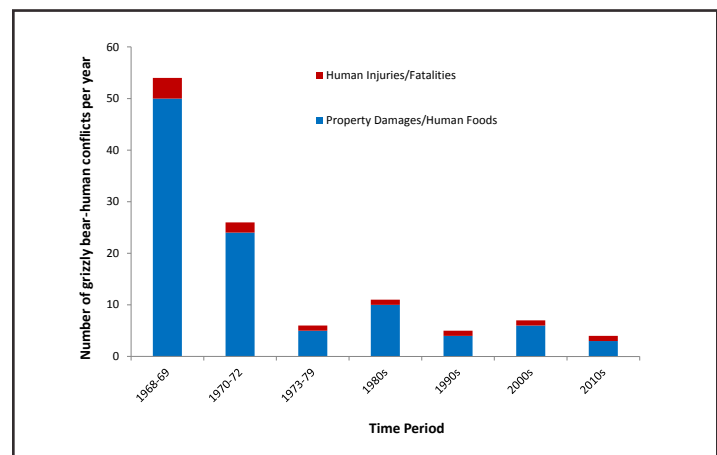


Figure 5. Number of human-grizzly bear conflicts by time period in Yellowstone National Park, 1968-2018.

occupied backcountry campsites. People reported the bears' primary activity for nine of these incidents, including walking through the campsite (5), foraging on native foods in the core camp (2), investigating the tent without causing damage or obtaining food (1), and investigating the food storage locker without causing damage or obtaining food (1).

People reported four incidents where black bears entered occupied backcountry campsites, including walking through the camp (2), investigating a tent without obtaining food (1), and investigating the food hanging pole without obtaining food (1).

### Bears Reactions to the Presence of People in Backcountry Campsites

In 10 of 11 incidents where grizzly bears entered occupied backcountry campsites, the occupants believed the bear was aware of their presence. In these incidents, grizzlies had no overt response in five the encounters, a flight response in one, and approached people in one. Grizzly bears charged the campers without making contact in three of the incidents.

Black bears were aware of people's presence in three of four incidents where they entered occupied backcountry campsites. Black bears reacted by running away (1), walking away (1), and initially approaching a person before leaving (1).



Grizzly bears scavenged an ungulate carcass taken from a pack of wolves. Approximately 45% of large ungulates killed by wolves in summer are usurped by bears. NPS Photo - D. Stahler

### ***Bears Reactions to Encounters with People on Backcountry Trails***

People reported 24 encounters with grizzly bears on backcountry trails. Reactions of bears included a flight response (8), no obvious change in behavior (7), charging without making contact (4), standing and staring (2), and curiously approaching (2). In one incident, a grizzly bear charged and made contact with a 10-year old boy, inflicting minor injuries.

Nineteen encounters with black bears on backcountry trails were reported. People reported the bear's reaction in 17 of these encounters. Four bears reacted with a flight response, seven had no change in behavior, four were curious, and two charged without making contact.

### ***Bear Reactions to Encounters with People in Off-Trail Backcountry Areas***

People reported 13 encounters with grizzly bears while traveling off-trail in backcountry areas. Grizzly bears reacted by fleeing (7), charging without making contact (4), no obvious change in behavior (1), and by curiously approaching (1).

People reported 12 encounters between black bears and off-trail backcountry travelers. Black bears reacted with a

flight response (5), no obvious change in behavior (4), curious behavior (1), and by charging without making contact (2).

### **Visitor Compliance with Bear Spray & Group Size Bear Safety Recommendations**

To reduce the risk of bear attack in the park, safety information distributed to visitors recommends that backcountry recreationists traveling on foot maintain group sizes of at least three people and carry bear spray. To evaluate visitor compliance with these safety recommendations, we conduct annual observations to determine the proportion of recreationists that follow these recommendations. We also record how many hikers carry other deterrents such as bear bells or firearms.

### ***Day Hikers***

YNP contains more than 1,000 miles of backcountry hiking trails accessible from 92 trailheads. We observed 1,940 day hikers traveling in 657 groups on 30 different trails. Average party size was 3.0 people per group. However, the most common group size was two people per party. Fifty-six percent (365) of day hiking parties had less than the recommended party size of three people and 11% (74) hiked by themselves. Of the 1,940 individual day hikers, 409 (21%)



carried bear spray, 37 (2%) had bear bells, and 7 (less than 1%) carried firearms. Of the 657 groups of day hikers, 301 (46%) had at least one member that carried bear spray, 33 groups (5%) had at least one person wearing bear bells, and 5 groups (1%) had at least one person carrying a firearm.

### **Overnight Backpackers**

YNP has 301 designated backcountry campsites. We observed 300 backpackers in 72 groups on 20 different trails. Average party size was four people per party. The most common group size was two people per party. Forty-seven percent (34) of the backpacking groups had less than the recommended party size of three people and 11% (8) hiked alone. Of the 300 backpackers, 141 (47%) carried bear spray, 5 (2%) had bear bells, and 3 (1%) carried firearms (table 46). Of the 72 groups of backpackers, 58 (81%) had at least one person in the party that carried bear spray, 4 groups (6%) had at least one person wearing bear bells, and 3 groups (4%) had at least one person carrying a firearm.

### **Yellowstone Cutthroat Trout Monitoring**

Yellowstone cutthroat trout (YCT) are a calorie rich food for bears with home ranges near Yellowstone Lake. Non-native lake trout, whirling disease caused by an exotic parasite, and drought have substantially reduced the cutthroat trout population in Yellowstone Lake. For these reasons, we monitor cutthroat trout spawning activity in five streams located along the north shore and four streams located in the West Thumb of Yellowstone Lake.

### **North Shore Streams**

The ice went off Yellowstone Lake on May 20. In North Shore streams, biologists counted 52 spawning cutthroat trout, including 45 in Bridge Creek, 6 in Hatchery Creek, and 1 in Lodge Creek. Biologists did not observe spawning cutthroat trout in Incinerator Creek or Wells Creek. Biologists observed grizzly bear tracks along Hatchery Creek and tracks from an unknown species of bear along Bridge Creek. Biologists did not observe evidence of bear fishing activity (i.e., observations of bears fishing, fish parts, bear scats containing fish parts) along any of the monitored North Shore streams.

### **West Thumb Streams**

On West Thumb streams, biologists counted 72 spawning YCT, including 58 in Little Thumb Creek, 13 in Sandy Creek, and 1 in Sewer Creek. Biologists did not observe spawning cutthroat trout in stream #1167. Biologists observed grizzly bear tracks along Little Thumb Creek, Sandy Creek, and Sewer Creek. They observed black bear tracks along Little Thumb Creek, Sandy Creek, and stream #1167. Biologists found bear scats consisting of vegetation on Little Thumb Creek, but no bear scats containing fish. A trail camera set up on Little Thumb Creek captured video of an adult black bear fishing in the creek, but the bear was not successful. Evidence (fish parts with associated bear tracks) found on Sewer Creek indicated a grizzly bear was likely fishing there.



A grizzly bear catches a Yellowstone Cutthroat Trout in a tributary stream to Yellowstone Lake. The number of spawning trout and associated bear fishing activity have declined in recent decades due to impacts from non-native Lake Trout, whirling disease, and drought. An increase in observations of bear predation on trout in a few streams in recent years suggests the fish population may be rebounding in some tributaries. (NPS Photo - D. Schneider)

## Whitebark Pine Cone Production Monitoring

Whitebark pine seeds are a rich source of fat for bears when they are putting on weight for hibernation. Bears whose home ranges include whitebark pine forest stands preferentially consume whitebark pine seeds during autumn in years when cone production exceeds approximately 13-23 cones per tree. We monitor whitebark pine cone production on 10 transects located throughout the park. Cone production on these transects averaged 40 cones per tree in 2018. Many bear scats containing whitebark pine seeds were observed while conducting field work in late summer and fall.

## Northern Range Black Bear Study

In 2018, biologists completed a two-year DNA-based study of black bear density in northern Yellowstone. The study was a collaborative effort between the Bear Management Office, Montana State University, and the Interagency Grizzly Bear Study Team. Biologists collected 3,874 samples of bear hair from 26 scent-baited snares and 217 bear rub trees. Laboratory extraction of individual genotypes identified 144 black bears (70 males and 74 females) and 35 grizzly bears (21 males and 14 females). Further analysis will be conducted from these results to estimate the abundance and density of black and grizzly bears in Yellowstone.

As part of the study, biologists captured and fit radio-collars on 14 black bears: 4 adult males, 6 adult females, 2 subadult males, and 2 subadult females. Average minimum convex polygon home range estimates for bears with more than 1,000 telemetry fixes were 1,331 square kilometers for adult males, 266 for subadult males, 161 for adult females, and 123 for subadult females. Resource selection modeling of spring habitat use based on telemetry fixes indicates black bears are selecting habitats with high vegetation biomass. Black bears in northern Yellowstone did not appear to make directed movements specifically to known elk calving areas to prey on newborn calves, but rather consumed calves opportunistically encountered throughout their home ranges.

## Bear-proof Food Storage Locker Installation

As part of the park's strategy for preventing bears from obtaining human foods, the park purchased 162 bear-proof food storage lockers with donations raised by Yellowstone Forever in 2018. The Youth Conservation Corps, Ground Work USA, Montana Conservation Corps, and bear management staff installed these lockers in roadside campgrounds and backcountry campsites. With the installation of 158 food storage lockers in roadside campgrounds in 2018, 825 (43%) of the park's 1,907 front-country campsites now have bear-proof food storage lockers.



Bear management technician Elise Loggers conducting whitebark pine cone production surveys in the Gallatin Mountains. Photos: Top, USFS Photo; Bottom, NPS Photo - T. Wyman

Seven of the parks 11 campgrounds have a food storage locker in every campsite. It is the park’s goal to provide visitors with bear-proof food storage lockers in every roadside campsite in the park. Biologists also installed 4 food storage lockers in backcountry campsites to replace broken food poles. All 301 designated backcountry campsites in YNP currently have a food storage device (food hanging pole or bear-proof food storage locker).

### Vehicle Strike Mortality of Wildlife

A total of 76 large mammals were struck and killed by vehicles on park roads in 2018 (figure 6). Bison (25) and mule deer (20) were the species most often killed in collisions with vehicles. Other species hit and killed by vehicles on park roads include elk (13), pronghorn (7), black bear (3), moose (2), mountain lion (2), whitetail deer (1), wolf (1), coyote (1), and raccoon (1).

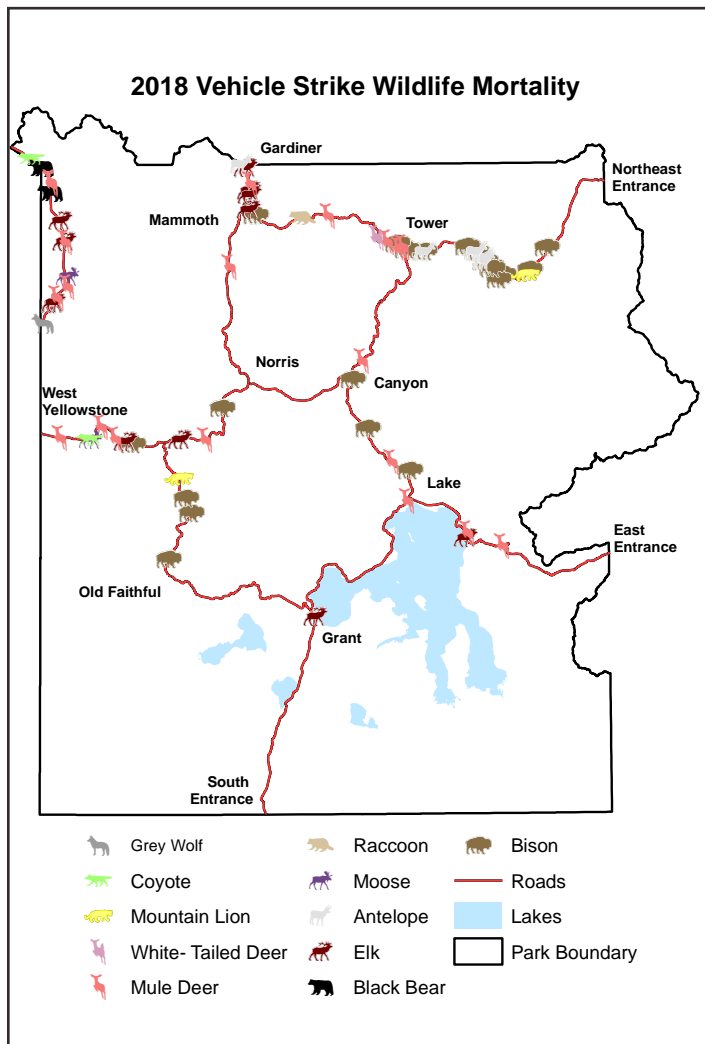


Figure 6. Locations of vehicle strike wildlife mortality in Yellowstone National Park, 2018.

### Publications

Gunther, K.A., A.M. Bramblett, and R.J. Weselmann. 2018. Grizzly bear consumption of midges in Yellowstone National Park. *Ursus* 29(1):51-57.

Gunther, K.A., K.R. Wilmot, S.L. Cain, T. Wyman, E.G. Reinertson, and A.M. Bramblett. 2018. Managing human-habituated bears to enhance survival, habitat effectiveness, and public viewing. *Human-Wildlife Interactions* 12(3):373-386.

### Acknowledgement of Volunteer Work

Twenty-three dedicated volunteers provided 4,889 hours of field assistance to Bear Management Office staff working on research, monitoring, and management activities in 2018. The success of the Bear Management Program would not have been possible without these dedicated individuals.

#### 2018 Bear Project Volunteers

Name	Hours
Katie Picora	800
Nikki Tatton	800
Hitomi Okada	720
Neal Hurst	720
Sam Schmidt	616
Lea Hayward	320
Sonia Bornemann	192
Noe Sitbon-Taylor	128
Anna Reid	120
Annie Merrill	96
Matt Crane	72
Ben Sission	56
Joseph Bozzo	50
Jim McHugh	48
Victoria Ibarra	32
Connor Meyer	27
Daniel Miller	26
Andy Stratton	26
Lisa Bowersock	8
Vickie Regula	8
Paula Clements	8
Sean Miller	8
Gabe Garcia	8
<b>Total</b>	<b>4,889</b>

Back cover photo: Bear cubs are proficient at climbing trees and will often climb to escape from adult male bears, wolves, and coyotes which sometimes kill cubs. NPS Photo - D. Schneider

To learn more about bear management in Yellowstone National Park, please visit: [go.nps.gov/yellbears](https://www.nps.gov/yellbears)



Suggested citation: Gunther, K., Wyman, T., Reinertson, E., Bowersock, N., Dunne, B., Hadley, J., Loggers, E., Mills, J., and Schneider, D. 2019. Yellowstone National Park Bear Management Program Annual Report 2018. National Park Service, Yellowstone Center for Resources, Wildlife & Aquatic Resources Branch, Yellowstone National Park, WY, USA, YCR-2019-03.