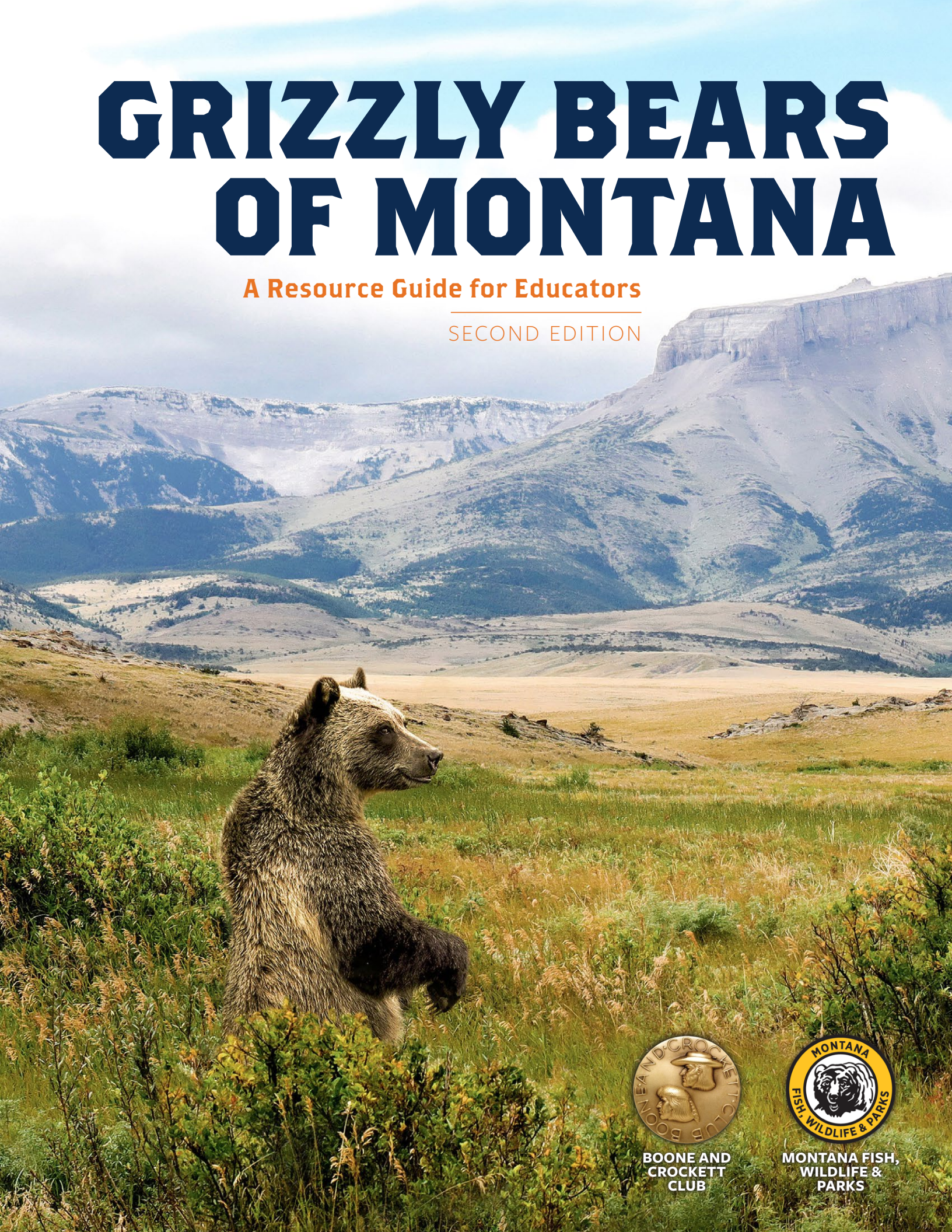
GRIZZLY BEARS OF MONTANA

A Resource Guide for Educators

SECOND EDITION



BOONE AND CROCKETT CLUB

MONTANA FISH, WILDLIFE & PARKS

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Grizzly sow and cub wandering through sage brush in the Greater Yellowstone Ecosystem.
NPS/Jim Peaco

Rob Green

FOREWORD

Bears and humans represent two dominant mammal species on the North American landscape. Both are very intelligent beings that often desire to use the same lands and expect the other to yield when conflict arises. It is no real surprise then that, since the beginning of time, bears and man have faced off in an ancient battle for food, space, and life itself. There is no doubt that modern man has acquired the capacity to eradicate bears if we wish, and we nearly accomplished it. Fortunately, some unique features of our own intelligence intervened. The human capacity to conceptualize the future, learn from the past, and understand complex relationships of the natural world has enabled us to make a choice to share this world with other life.

During the past 100 years, the science and practice of nature conservation progressed from focusing on saving favored species through restoration and protection to more complex efforts of safeguarding the ecological integrity of large ecosystems. In addition to a new ecological approach, there has been an increased focus on the social and cultural dimensions of natural resource conservation. Although there is a tendency for great despair when thinking about conserving nature in the face of ever-growing human populations and pending changing climate, I remain optimistic. I am inspired by ongoing efforts to educate one another about the value of keystone species within large ecosystems. Perhaps the most important conservation task before us is teaching modern humans how to value nature, live sustainably on the land, and foster social goodwill that ensures a future for people and wildlife in healthy ecosystems. The Boone and Crockett Club has held fast to its long conservation history and created this new teaching guide that will contribute greatly to that task.

Over the past decades, grizzly and black bear research in western Montana has been incredibly important for revealing the needs of grizzly bears and raising hard questions about how humans can live alongside them. I am convinced that by applying new knowledge acquired through long-term research and nurturing the human will to live with bears will guarantee their future. Unfortunately, good science alone cannot cultivate the human will to live with bears. We need effective information translators who can share the latest science with society and educate humans about the needs of wild bears while explaining best practices for living with them. As a wildlife research scientist, I am certain that our historic failure to transfer good science to societies and cultures has been a great weakness of modern conservation. I have come to believe only a well-educated society will give social license to wildlife managers who must make difficult resource decisions affecting bears, bear habitat, and people. In addition, a lack of understanding about bear science was not inspiring or enabling our society to make critical personal changes in behaviors to live together with wild bears. To increase public understanding of bears and acquire proper social license to better manage them, we need good educational resources that translate the best science into a format that is digestible for public consumption. I am convinced that "Grizzly Bears in Montana: A Resource Guide for Educators" will help meet that important conservation need.

Keith Aune
Montana Fish, Wildlife & Parks (retired)
Bozeman, Montana

CHAPTER ONE

CONSERVATION HISTORY OF THE GRIZZLY BEAR

Montana is bear country, with the grizzly bear being the official state animal. Grizzly bears in Montana are an iconic native species with high value to people and cultures across the state and around the world, and they play important roles in Montana ecosystems and economies. Today, Montana has the largest remaining grizzly bear population in the lower 48 states.

ABUNDANT GRIZZLY BEAR POPULATION

Historically, the grizzly bear occurred throughout much of western North America, including the western half of the United States, northern and central Mexico, western Canada, and most of Alaska. An estimated 50,000 grizzly bears were distributed throughout all or portions of 18 states: Montana, Idaho, Wyoming, North Dakota, South Dakota, Alaska, Washington, Oregon, Colorado, California, Utah, New Mexico, Arizona, Minnesota, Nebraska, Kansas, Oklahoma, and Texas. In Canada they were historically found in the provinces of British Columbia, Alberta, Yukon, Northwest Territories, Nunavut, and portions of Saskatchewan and Manitoba. In Mexico, they were found in the states of Baja California, Sonora, Chihuahua, Coahuila, Sinaloa, Durango, Zacatecas, and Nuevo León. Before European settlers came west, western tribal nations had been sharing the landscape with grizzly bears since time immemorial. Pictographs in central Montana dating back 3,000 years illustrate the importance of bears to prehistoric humans. Some pictographs portray a combination bear-shaman body. Others show bears with spears or arrows piercing the body[1].

The relationship with grizzly bears varied between tribal nations. While some tribal nations hunted bears for meat, hides, and claws, and to display bravery and skill, others considered them to be the Chief of the Animals, were present in many of their creation stories, and were not hunted for food. For many tribal nations, the grizzly bear was and still is a species of great cultural and spiritual importance. The power and significance of grizzly bears is present in many stories and oral history, and in spiritual and cultural activities of the tribal people. At the center

Bear Petroglyph Near Moab, Utah
SHUTTERSTOCK

of these cultures is an attitude of deep respect toward grizzly bears and an ethic of reciprocity. As Johnny Arlee, Confederated Salish Kootenai Tribal elder on the Flathead Indian Reservation, said in 2018, the grizzly bear and other animals "took care of us for many, many years, now it's our turn to treat them in a good way, to help them survive."

Although western tribal people knew much about grizzlies, members of the Lewis and Clark expedition were familiar only with the American black bear (*Ursus americanus*) of the eastern forests. Just a small number of Europeans had seen grizzlies and descriptions were elusive. On April 29, 1805, Meriwether Lewis had his first encounter with a grizzly and didn't see much to fear. "... the Indians may well fear this anamal equiped as they generally are with their bows and arrows or indifferent fuzees, but in the hands of skillful riflemen they are by no means as formidable or dangerous as they have been represented."

The expedition co-leader soon changed his mind, and by the time the expedition reached the Great Falls of the Missouri, the "white bears" had chased several of the men up trees or into the river, earning the respect of the entire expedition. Lewis wrote: "The white bears have become so troublesome to us that I do not think it prudent to send one man alone on an errand of any kind... they come close arround our camp every night but have never yet ventured to attack us and our dog gives us timely notice of their visits, he keeps constantly padroling all night. I have made the

Bear Dance, Preparing for a Bear Hunt
George Caitlin, Smithsonian Art Museum

men sleep with their arms by them as usual for fear of accedents." Lewis and Clark's detailed accounts led to the bear's formal, scientific classification, *Ursus arctos horribilus*.

DECLINE OF GRIZZLY BEAR POPULATION

Grizzly bear populations declined in the late 1800s with the arrival of European settlers. Livestock depredation control, habitat deterioration, commercial trapping, unregulated hunting, and protection of human life were the leading causes of decline in the overall grizzly bear population. Logging, agriculture, and recreational development also contributed to the increase in human-caused mortality of grizzly bears[2]. Additionally, government-funded bounty programs were implemented. Bears were shot, trapped and poisoned from fear, for sport, for food, and to protect life and property. By the early 1900s, grizzlies had either been extirpated (i.e., become locally extinct) from most of the West or were on their way out. The grizzly bear disappeared from Texas by 1890, California (where the bear is on the state flag) by 1922, Utah by 1923, Oregon and

Top: Grizzly bear bounty hunters.
MT Historical Society

Above: Market hunters' cabin near Helena, Montana, in 1895, with heads, hides, skins, and skulls gathered for market.
MT Historical Society

New Mexico by 1931, and Arizona by 1935. In Montana, by the 1930s the grizzly bear population dipped below an estimated 300 bears, most of which lived in or close to Glacier and Yellowstone national parks[3]. Following these region-wide population declines, their distribution was reduced to less than 2 percent of historical range in the lower 48 states.

Predator control and loss of habitat from European settlers caused range restriction to only the most remote, forested mountain ranges in the Lower 48, i.e., areas where they did not compete for space with cattle, crops, etc. These areas included national parks, where bears were protected and were an attraction for park visitors. Over time, with greater protection, bears have begun to reoccupy some areas from which they were excluded. An interesting example is the prairie "niche," although the large ungulate herds that likely supported historic populations are now missing.

By the time the grizzly bear was listed as threatened under the Endangered Species Act in 1975, the estimated population in the lower-48 states was 700 to 800 individuals. They could be found mostly in five areas made up of mountainous regions, national parks, and wilderness areas. These five areas included:

1. Northern Continental Divide in northwest Montana
2. Greater Yellowstone in northwest Wyoming, eastern Idaho, and southwest Montana
3. Cabinet and Purcell mountains in northwest Montana and northeast Idaho
4. Selkirk Mountains in northwest Idaho and northeast Washington
5. North Cascades range in northcentral Washington4

Read more about the recovery areas in Chapter 3.

RECOVERY OF GRIZZLY BEAR POPULATION

Grizzly bears increasingly vanished across the West in the 20th Century, and while many states started to protect both species of bears in the 1920s and 30s, populations had diminished in many places, and protection came too late. However, Montana stood out as a conservation leader because of policies, management, and our large areas of remote and/or protected lands. Montana Fish, Wildlife & Parks (FWP), formerly the Montana Fish and Game Department, implemented management measures and promoted public awareness to try and slow the decline of grizzly bear populations. Montana abolished baiting (1948) and the

HISTORIC TIMELINE FOR MONTANA GRIZZLIES

Pre-1800s — 1930

PRE-1800s — Around 50,000 to 100,000 grizzly bears roam widely across the West, sharing territory with Tribal peoples.

1804-1806 — The Lewis & Clark Expedition encounters the first grizzly bears along the Missouri River at the present-day North Dakota-Montana border. By the time the expedition is over, approximately 43 bears have been killed (most bears were encountered along the Missouri and Yellowstone Rivers).

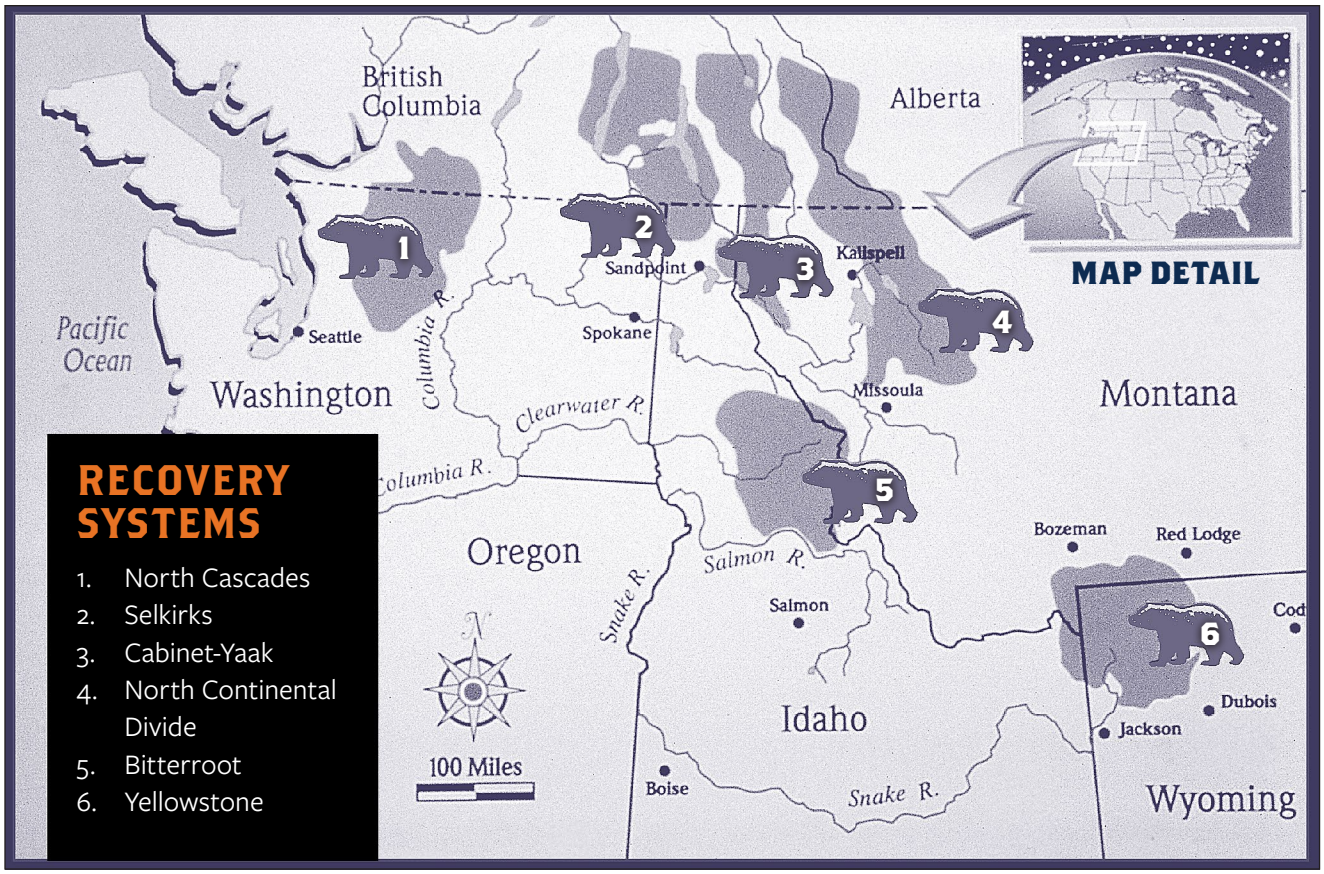
1807 — Montana's first European settlement is established in Stevensville.

1800s-1840s — Fur traders and trappers frequently encounter grizzly bears. Bears are killed for self-preservation, sport, status, meat, and money ($5 per hide). The trading post at the Three Forks of the Missouri is abandoned because of persistent conflict with Blackfeet Indians and grizzly bears.

MID-1800S — European Americans settle in the West and set up ranches. Grizzlies prey on livestock and are killed. Improved firearms, traps, and poisons speed the destruction of bear populations.

1862 — The Homestead Act causes rapid conversion of native vegetation to agricultural lands. From the early homestead era through the early 1930s, bears, wolves, and other large predators are considered a threat to settlers' livelihoods, so are extirpated from much of their original range across Montana. Grizzly bears survive in only the most remote, mountainous regions in the state.

1872 — National Organic Act establishes Yellowstone National Park for the benefit and enjoyment of the people. Sport and subsistence hunting is allowed in the park.



1883 Congress passes the Sundry Civil Bill, which allows the Secretary of the Interior to enlist military troops to aid in policing Yellowstone National Park and protecting the wildlife. (Troops finally arrive in Yellowstone in 1886.)

1886 The killing of grizzly bears in Yellowstone National Park is prohibited.

1894 Congress passes the Lacey Act to protect Yellowstone National Park's natural resources, and a commissioner (judge) is appointed to preside over legal cases within the park.

1900 A second Lacey Act is established for two principal purposes. First, to strengthen and supplement state wildlife conservation laws, and second, to promote the interests of agriculture and horticulture by prohibiting the importation of certain types of wildlife determined to be injurious to those interests.

1910 Glacier National Park is established for its aesthetics and conservation values, with strong support of the Boone and Crockett Club. The park protects excellent bear habitat.

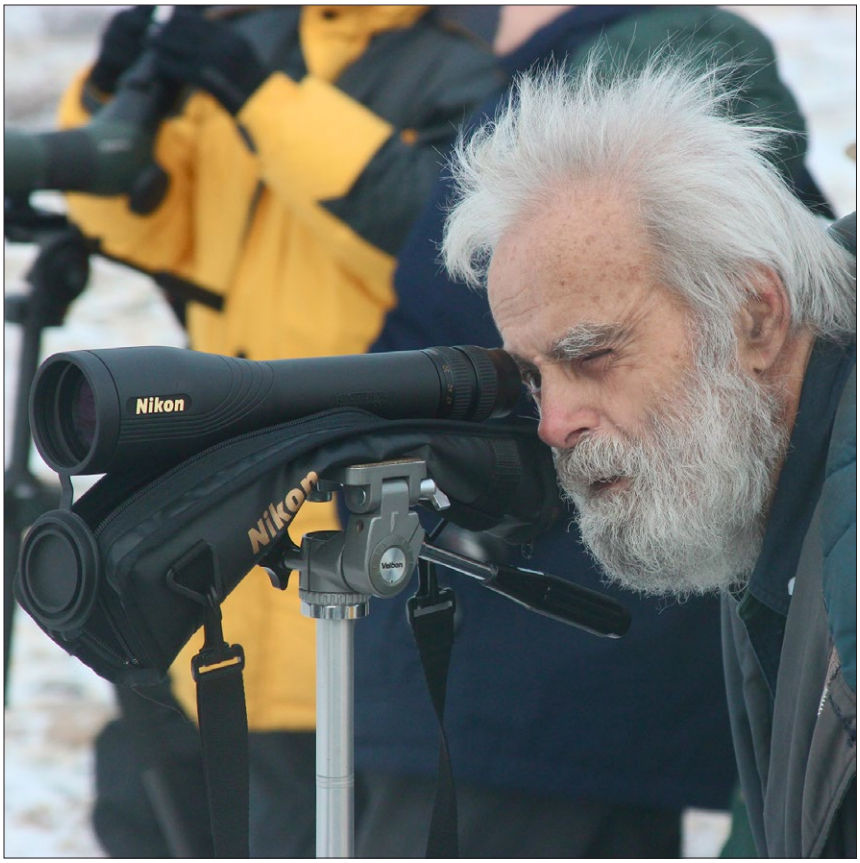
1915 The first bear-caused human death in Yellowstone National Park is recorded.

1916 The National Park Service (NPS) is created.

1921 Hunting bears with dogs is prohibited in Montana and a statute enacted against enticing or baiting game animals.

1923 Montana Game Commission reclassifies the grizzly bear from predator to game animal. This places restrictions on grizzly hunting and gives the state authority to manage bears through harvest limits and hunting seasons.

1930 Predator control and the use of poisons in the western states is extensive; many bears are killed by the poison strychnine.



Chuck Jonkel
Courtesy of Jamie Jonkel

use of hounds to hunt grizzly bears (1921), listed grizzly bears as a managed game species (1923), and prohibited the killing of cubs or females with cubs (1947). In 1991, the grizzly bear hunt was closed. In the 1980s, Montana also began hiring bear conflict specialists to handle human-bear conflicts by responding to conflicts, as well as providing and promoting tools to reduce conflict proactively.

Grizzly bears benefitted greatly from the protection provided by securing habitat with the closing of Forest Service roads in certain areas and the implementation of Food Storage Orders on National Forest lands. The critical role of Food Storage Orders was that they require bear attractants be stored to make it inaccessible to bears. The gradual adoption of bear-resistant containers and electric fencing helped reduce conflict and protect bears.

HISTORIC TIMELINE FOR MONTANA GRIZZLIES
1940 – 1978

1940 — Bob Marshall Primitive Area is established a year after Bob Marshall dies. This is the first piece of the eventual Bob Marshall Wilderness Complex.

1946 — Grizzly bear hunting is prohibited by law in Idaho.

1947 — Killing bear cubs or female bears with cubs is prohibited in Montana.

1953 — Population surveys indicate an increase in grizzly numbers. However, more accurate population trend monitoring and density estimates are needed before any conclusions can be drawn.

1959 — Scientists John and Frank Craighead initiate a study of the Yellowstone grizzlies to discover more about the bears' habitat and habits.

1964 — Congress passes the Wilderness Act. The Bob Marshall Primitive Area is designated a Wilderness Area of 949,356 acres.

1967 — The first fatal maulings occur in Glacier National Park. Two people are killed. The book *Night of the Grizzly* shocks the nation.

National Park Service (Glacier National Park) develops the first bear management plan.

The first specific grizzly hunting license is sold; Montana Dept. of Fish and Game charges a trophy license fee for any bear killed.

1967-1976 — Scientists find that the population of grizzlies in Yellowstone National Park has greatly diminished due to closure of park dumps and human- bear conflicts.

1969 — National Environmental Policy Act (NEPA) is implemented and sets the stage for assessment of human impacts on wildlife habitat.

1971 — Montana Environmental Policy Act (MEPA) is passed.

Some of the first scientific studies of grizzly bears were conducted in Montana, including a 1941 survey by Robert "Bob" Cooney, Montana's first wildlife biologist, and Ray Gibler in the Bob Marshall Wilderness Complex.

"There hadn't been much of anything done about the grizzly, but we did I'm sure help out in bringing them up from practically nothing to pretty reasonable numbers," Cooney said in the PBS documentary "Back from the Brink." "We found they needed quite a bit of care."

FWP continued grizzly bear surveys through the 1940s and 1950s. Major research was conducted in the 1970s with the Border Grizzly Bear Study led by Chuck Jonkel and a study in the Mission Mountains by Chris Servheen. These were followed by the East Front Grizzly Bear Study led by Keith Aune and the South Fork of the Flathead River

Rick Mace, FWP Bear Manager

1972

The 239,296-acre Lincoln-Scapegoat Wilderness Area is added to the Bob Marshall Wilderness Area. This action enlarges the habitat protection for bears in the Northern Continental Divide Ecosystem.

1973

Endangered Species Act passes.

The Interagency Grizzly Bear Study Team is founded to gather information on the grizzly bear and aid in its management in the Yellowstone Ecosystem.

1974

A moratorium is placed on grizzly hunting in the Yellowstone Ecosystem.

Grizzly hunting season in the Cabinet-Yaak Ecosystem is closed.

The Border Grizzly Project Research Studies conducted by the University of Montana are initiated in northwestern Montana to collect the first baseline grizzly bear ecology information in the area.

1975

The grizzly bear is listed as threatened in the lower 48 states by the U.S. Fish & Wildlife Service (USFWS) under terms of the Endangered Species Act.

An annual quota of 25 humancaused grizzly bear mortalities, including hunting, is implemented in Northwestern Montana.

The Mission Mountain Primitive Area is established as a 73,877-acre wilderness area to provide more habitat security for the grizzly bear.

1976

The Greater Yellowstone Ecosystem Management Guidelines are developed. This is the first cooperative effort to recover, protect, and manage the grizzly.

Rocky Mountain Front (RMF) Grizzly Bear Research Studies are initiated and conducted by the MDF&G over a 10-year period. Important ecological information is gathered on one of the last prairie and foothill regions in the world still occupied by grizzlies.

The National Forest Management Act (NFMA) is passed, requiring all National Forests to develop programmatic plans that outline management criteria and prescriptions to maintain indigenous wildlife species.

1978

A 60,000-acre addition is made to the Bob Marshall Wilderness Area.

The 286,700-acre Great Bear Wilderness Area is established, providing a land corridor between Glacier National Park and the Bob Marshall Wilderness for grizzly bears and other wildlife. The Bob Marshall Wilderness Complex (BMWC) is now composed of three contiguous wilderness areas of nearly 1.5 million acres, including 100 miles of the Continental Divide. Larger than the state of Delaware, the 2,398-square-mile complex provides habitat protection and security for bears.

Study under Rick Mace. John and Frank Craighead conducted landmark studies of grizzly bears in Yellowstone National Park from 1959 to 1972. Since the 1980s, the U.S. Fish & Wildlife Service (USFWS), has conducted studies in the Cabinet-Purcells led by Wayne Kasworm.

In 1973, the Interagency Grizzly Bear Study Team (*IGBST*) *was formed by the Department of Interior (DOI*) as a direct result of controversy surrounding the closure of open pit garbage dumps within Yellowstone National Park during 1968-1972. IGBST members/ representatives are scientists that come from the U.S. Geological Survey (USGS), National Park Service (NPS), USFWS, U.S. Forest Service (USFS), the Eastern Shoshone and Northern Arapaho Tribal Fish and Game Department, and the states of Idaho, Montana, and Wyoming, with USGS serving as its coordinating agency[5]. Since its formation, the published work of the IGBST has made the GYE grizzly bear population one of the most studied in the world.

Montana remains at the forefront of grizzly bear research today.

In 1975, the USFWS listed the grizzly bear in the lower 48 states as a threatened species under the federal Endangered Species Act. Recovery efforts have been underway since, following a federal recovery plan. Currently, all grizzly bears in the lower 48 states remain federally protected as threatened[6].

The Interagency Grizzly Bear Committee (IGBC) was formed in 1983 to help ensure recovery of viable grizzly bear populations and their habitat in the lower 48 states through interagency coordination of policy, planning, management, and research. The IGBC consists of representatives from the USFS, the NPS, the USFWS, the Bureau of Land Management (BLM), the USGS, various tribal wildlife management agencies, and representatives of the state wildlife agencies of Idaho, Montana, Washington, and Wyoming. Learn more at the IGBC website, found in the reference section[7].

The 1993 Grizzly Bear Recovery Plan identified six ecosystems, with recovery zones at the core of each, to further recovery efforts. Each recovery zone represents an area large enough, and of sufficient habitat quality, to support a recovered grizzly bear population. The Recovery Plan recognized that grizzly bears will move and reside permanently in areas outside the recovery zones, and that movement between recovery areas would be necessary for isolated populations to increase and sustain themselves at recovery levels.

HISTORIC TIMELINE FOR MONTANA GRIZZLIES 1980 — 1991

1980

The Rattlesnake Wilderness Area is established, adding 29,609 protected acres to the Northern Continental Divide Ecosystem (NCDE).

1981

Confederated Salish & Kootenai Tribes write Flathead Indian Reservation Grizzly Bear Management Plan. Tribes establish the 91,778-acre Mission Mountain tribal wilderness.

The first truly comprehensive amendments are made to the Lacey Act. The new amendments pertain to provisions prohibiting certain dealings in specimens taken, transported, or sold in violation of underlying state, federal, or foreign laws.

1982

Federal Grizzly Bear Recovery Plan is approved for the lower 48 states and identifies actions necessary for the maintenance, survival, and recovery of grizzly bears.

Grizzly bear hunting is closed on Flathead Indian Reservation.

1983

Female grizzly bear hunting subquotas are established for the NCDE.

MTFWP and US FWS initiate Cabinet-Yaak Grizzly Study.

The Interagency Grizzly Bear Committee (IGBC) is established to effectively coordinate management of both state and federal (USFS, USFWS, BLM, NPS) activities for the lower 48 states within the recovery areas of MT, WY, ID, WA, plus British Columbia and Alberta.

1984

MTFWP initiates a programmatic environmental impact statement on all aspects of grizzly management for northwest Montana.

MID-1980S

Management and public education efforts increase, as well as awareness of and concern for grizzlies.

Forest plans are completed for many national forests, outlining programmatic direction for resource management, including grizzly bears. The national forests contain approximately 20 million acres of grizzly bear habitat, about 75 percent of the recovery areas.

The recovery ecosystems (zones) identified:

1. Greater Yellowstone (GYE) in northwestern Wyoming, eastern Idaho, and southwestern Montana
2. Northern Continental Divide (NCDE) of north-central Montana
3. North Cascades (NC) area of north-central Washington
4. Selkirks (SE) area of northern Idaho, northeast Washington, and southeast Bristish Columbia
5. Cabinet-Yaak (CYE) area of northwestern Montana and northern Idaho
6. Bitterroot (BE) in the Bitterroot Mountains of central Idaho and western Montana

Four recovery zones are either partially or completely in Montana: the NCDE, GYE, CYE, and BE[8].

The Grizzly Bear Recovery Plan also established recovery criteria (goals) for each of the recovery zones. The original 1993 Recovery Plan has evolved over time. The Recovery Plan, and subsequent revisions based on improved monitoring methods, identify three demographic recovery criteria for each ecosystem: (1) establish a minimum populations size; (2) ensure reproductive females (i.e., females with young) are well distributed across the recovery zone; and (3) outline sustainable mortality limits that would allow the population to achieve and sustain recovery. In addition, habitat-based recovery criteria have been developed for the GYE and NCDE but have not yet been developed for the remaining ecosystems. Habitat-based recovery criteria define thresholds based on habitat features that were compatible with a stable to increasing grizzly bear population in the past, including (1) secure core or habitat (area with no motorized access), (2) livestock allotments, and (3) developed sites[9]. To learn more about the specific criteria for each ecosystem/zone, access the most current USFWS Grizzly Bear Recovery Program Annual Report.

As of 2022, there are at least 2,000 individuals in the lower 48 states: 1,068 in the NCDE, 1,063 in the GYE, 55-60 in the CYE, and a minimum of 53 in the U.S. portion of the SE, although some bears use habitat across the international border. In addition, grizzly bears have been verified in areas outside of designated recovery zones, and in Montana, grizzly bears may be found anywhere west of Billings.

1986

For two consecutive years, research studies indicate an increase in the number of grizzly bears in the GYE; 25 females and 48 cubs are counted—the highest number recorded in modern history.

IGBC adopts the interagency grizzly bear management guidelines for all ecosystems.

MTFWP hires its first grizzly bear specialist focused on prevention of and reponse to human-grizzly bear conflict. By 2022, the agency would employ 11 full-time employees devoted to this work.

1987

The Blackfeet Tribe begins a study to describe grizzly bear habitat use, habits and population dynamics.

MDFW&P initiates a grizzly bear study for the South Fork of the Flathead River. The study is to determine population and habitat use and the effects of multiple-use forest management on grizzly bears.

1988

Yellowstone fires burn more than 1.4 million acres in and around the nation's oldest national park. The fires have a minimal impact on the grizzly bear population.

A Grizzly Bear Management Program is implemented by the MDFW&P for the NCDE east of the Continental Divide. The first of its kind, the RMF Grizzly Bear Management Program uses ecological information and is tailored around the concerns of local residents.

1989

The oldest known wild grizzly bear (34 years old) sheds its radio collar in the Cabinet Mountains and is presumed healthy.

1990

A program to augment the small Cabinet Mountain grizzly bear population with females from other populations is begun. Four young females are moved from the Flathead Valley of British Columbia during 1990-1994.

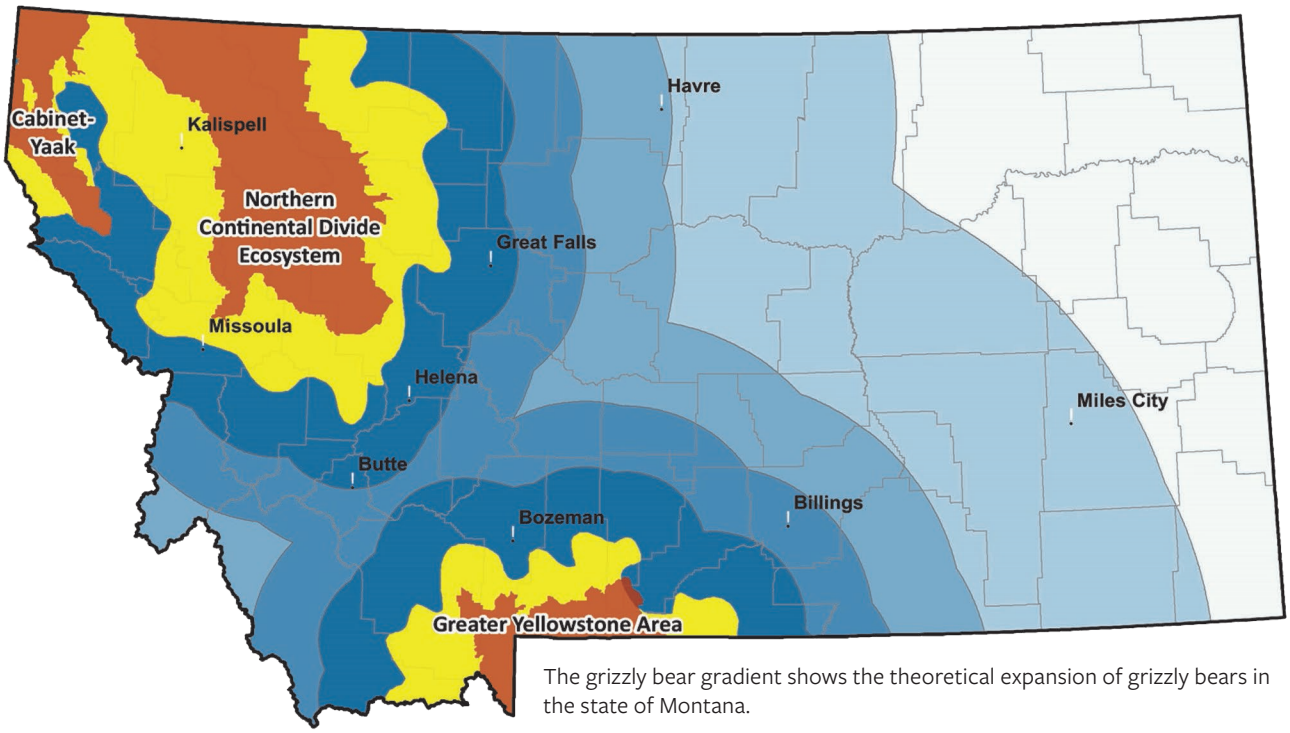
1991

MTFWP estimates that there are between 492 and 687 grizzly bears in the entire NCDE, including Glacier National Park.

MTFWP conducts a five-year update of the Programmatic Environmental Impact Statement.

A federal judge halts all grizzly bear hunting in Montana based on a lawsuit challenging authority of the state and federal governments to hunt a federally threatened species.

GRIZZLY BEAR EXPANSION MAP



The grizzly bear gradient shows the theoretical expansion of grizzly bears in the state of Montana.

EXPANSION OF GRIZZLY BEARS

GRIZZLY EXISTING RANGE

GRIZZLY RECOVERY EFFORTS

Black Bears are common in Montana. Even though they are generally more common in the western half of the state, people can encounter black bears anywhere in Montana.

The possible extent of grizzly bear distribution in Montana is depicted in blue. The darker the colors, the more likely grizzly bears are there.

HISTORIC TIMELINE FOR MONTANA GRIZZLIES 1993 – 2021

1993

MDFW&P develops a Grizzly Bear Management Plan for the western side of the NCDE.

A revised Grizzly Bear Recovery Plan is completed.

South Fork Study describes reduced bear use in areas of forest roads and human use, and begins to affect forest management.

1994

IGBC initiates conservation strategies based on the collection and documentation of existing management practices along with new information for the Yellowstone and NCDE populations. The Endangered Species Act requires strategies to be in place in order to delist a recovered grizzly bear population.

1994-1999

New and better scientific information is collected in the Yellowstone ecosystem showing grizzly populations growing at 4 to 7 percent each year. Bears are expanding their range 20 to 40 miles outside the recovery zone.

1998

Glacier National Park initiates an interagency project using a genetic-DNA sampling method that analyzes grizzly bear hair collected by "hair snares" at monitored sites. Preliminary results are promising for providing more accurate grizzly population estimates.

2000

The USFWS published a plan to reintroduce grizzly bears into the Bitterroot Ecosystem, but reverses the plan a year later due to objections from the states.

2004

A team of state, federal, and tribal agencies is formed to monitor population trend of the NCDE population and conduct research.

Using hair-snare DNA sampling, a USGS study uniquely identifies 563 individual grizzly bears living in the NCDE and estimates a population total size of 765 bears using mark-recapture methods.

2005

The Cabinet Mountain augmentation program is reinitiated. Five young females are moved from the NCDE during 2005-2009.

2007

The USFWS recognizes the GYE population as a distinct population segment and, having determined that it has met recovery goals, removes it from threatened status under the ESA giving management authority to the states. State and federal agencies publish a Conservation Strategy detailing post-delisting population and habitat management.

While there are no known grizzly bears reproducing in the NC or BE, individuals have been verified in each area.

GRIZZLY BEAR GENERAL DISTRIBUTION

After decades of hard work by all Montanans, grizzly bear populations have reached and surpassed federal recovery goals in the GYE and NCDE. The number of grizzly bears in and around these two ecosystems has continued to slowly increase. Grizzly bear populations are expanding into areas where they have not been for decades, including connectivity areas between recovery zones. These areas include a greater percentage of working private lands and places where the human population is also expanding, creating a greater potential for conflicts between bears and people.

Montana remains at the forefront of grizzly bear research today. Although grizzly bears in the lower 48 states remain under the jurisdiction of the USFWS, much of the day-to-day management in Montana is done by FWP, tribes and parks, which is detailed more in: U.S. Fish and Wildlife Service. 2021. Biological report for the grizzly bear (*Ursus arctos horribilis*) in the Lower-48 States. Version 1.1, January 31, 2021. Missoula, Montana. 370 pp.

ENDNOTES

1 U.S. Fish and Wildlife Service. 2021. Biological report for the grizzly bear (*Ursus arctos horribilis*) in the Lower-48 States. Version 1.1, January 31, 2021. Missoula, Montana. 370 pp.
2 U.S. Fish and Wildlife Service. 2021. Biological report for the grizzly bear (*Ursus arctos horribilis*) in the Lower-48 States. Version 1.1, January 31, 2021. Missoula, Montana. 370 pp.
3 https://fwp.mt.gov/conservation/wildlife-management/bear/management
4 U.S. Fish and Wildlife Service. 2021. Biological report for the grizzly bear (*Ursus arctos horribilis*) in the Lower-48 States. Version 1.1, January 31, 2021. Missoula, Montana. 370 pp.
5 https://www.usgs.gov/science/interagency-grizzly-bear-study-team
6 https://fwp.mt.gov/conservation/wildlife-management/bear/management
7 https://igbconline.org
8 https://fwp.mt.gov/conservation/wildlife-management/bear/management
9 U.S. Fish and Wildlife Service. 2021. Grizzly Bear Recovery Program-2021 Annual Report

2010 A federal court overturns the 2007 USFWS delisting rule, restoring threatened status to the GYE population.

The Cabinet Mountain augmentation program expands to include young males. Eight young males and 4 young females are moved from the NCDE during 2010-2019.

2012 A study by the trend monitoring team indicates the NCDE population is growing about 3% per year and is above 1,000 bears.

A DNA hair-snairing study indicates the popultion in the CYE is 48-50 bears, about half of the recovery goal.

2013 Outlier observations of grizzly bears begin to be consistently recorded every year at least 50-100 miles away from occupied Recovery Zones.

2017 The USFWS, again, removes the GYE distinct population segement from threatened status under the ESA giving management authority to the states. State and federal agencies publish a revised GYE Conservation Strategy detailing post-delisting population and habitat management.

The USFWS releases a draft plan for reintroducing grizzly bears into the North Cascades Ecosystem, Washington.

2019 A federal court overturns the 2017 USFWS delisting rule, restoring threatened status to the GYE population.

Having determined that the popualtion has met recovery goals, state and federal agencies publish a NCDE Conservation Strategy detailing post-delisiting population and habitat management, in anticipation of delisting.

2020 The 18-member governor's Grizzly Bear Advisory Council completes their set of recommendations for management of grizzly bear populations in Montana.

The first statewide survey is conducted to understand Montanans' views about grizzly bears and grizzly bear management.

2021 IGBST updates methods and estimates a population size of 1,063 bears within the Demographic Monitoring Area of the GYE. Geographic range is estimated at >27,000 square miles, triple the size of the Recovery Zone.

NCDE estimated population at 1,114 bears. Geographic range is estimated at >26,000 square miles, triple the size of the Recovery Zone.

CYE population increasing by about 2% per year and now numbers >55 bears. One translocated female is known to have produced 27 progeny in 3 generations, and another female and a male are known to have produced a total of 4 offspring.

CHAPTER TWO

MEET THE BEARS

Bears are members of the Order Carnivora, a taxonomic group including mostly meat-eating animals such as cats, dogs, hyenas, weasels, and seals. Scientists believe the first bear ancestor appeared approximately 20 million years ago as a dog-sized animal. *Ursus elemensis* displayed the molars that have allowed bears to evolve as omnivores, eating everything from grass to elk calves. Beginning about 5 million years ago, a number of bear species arose and disappeared. There are eight species of bears in the world today, all in the Family Ursidae. Three live in North America: the American black bear (*Ursus americanus*), grizzly bear (*Ursus arctos*), and polar bear (*Ursus maritimus*). Black bears and grizzlies are both found in Montana.

BLACK BEARS

Black bears evolved in the forested ecotypes of North America about 2 million years ago and remain forest specialists. Historically, they were found in forested habitats across North America. Today they can be found in forested parts of Montana, and they are the most common and widely distributed bear on our continent. They have short, curved claws that allow them to climb trees, even as adults. When threatened, black bears generally run a short distance into cover or climb a nearby tree. This tendency is why people generally feel less threatened by black bears than by grizzly bears, despite the fact both can be dangerous.

The name "black bear" can be misleading. In Montana, most black bears are black, but other colors commonly occur including brown, cinnamon, and occasionally, blond.[1] "In American black bears, the [genetic] variant causing the cinnamon morph arose 9,360 years ago in the western lineage where it provides an adaptive advantage and has spread northwards and eastwards by migration." There are even white (Kermode bear), and blue (Glacier bear) color variations found in Canada.

Black bear cub climbing a tree.
Adobe Photo Stock/Tony Campbell

Black bear cubs at Montana WILD's Wildlife Center.
MT WILD's Wildlife Center – Jesse Varnardo

An estimated 13,000 black bears call Montana home. Estimated black bear densities (both sexes) are between approximately 9 and 19 bears/100 km2 in Montana. The highest density area for black bears in the state was in the area of Glacier National Park and the Blackfeet Indian Reservation (25 bears/100 km).[2]

Adult black bears average 5 to 6 feet in length, with males weighing 170 to 480 pounds and females ranging from 130 to 300 pounds. Generally, the average body size of bears in each population is determined by the abundance of food and the quality of the habitat. The record live weight of a Montana black bear is 660 pounds. Black bears weigh about half a pound at birth. Black bear weight also varies significantly throughout the year with individuals gaining as much as 1.5 times their body weight each fall and losing nearly 30 percent while denning.

In Montana, black bear litters average 2.08 cubs, and females produce cubs, on average, about every 2.2 years. Black bears begin breeding at age 4. The last black bear population estimate in Montana was reported in 2011, and at that time there were an estimated 13,307 black bears in the state. The density of black bears is greatest in the wetter coniferous forests of northwest Montana, and less dense in drier southwest Montana.

Bears are one of many species where there is an observable physical or physiological difference among genders, called "sexual

Black bear weights from various states.

State	Weight* (pounds)	B&C Record Skull Size (inches)	Year
MT	660	21- 9/16"	2020
PA	875	23 - 9/16"	2011
GA	673	21 - 14/16"	2002
SC	609	21 - 3/16"	1994
AK	Not recorded	22 - 15/16"	1996
FL	760	21 13/16"	1985

*Due to feasibility of transporting game out of the field whole and the availability of a certified scale nearby, weight can be arbitrary. The above weights do not reflect the actual B&C official state record for skull size. Remember weight also fluctuates drastically throughout the seasons while skull size remains consistent, slowly growing throughout the entirety of the bears life. This chart is meant to show the variety of size (weight and skull measurements) across the entirety of black bear range.

dimorphism." In bears this means that in adulthood male bears are larger than their female counterparts. As bears reach adulthood at 4-6 years, size of a young, or subadult, male bear can be comparable to an older, adult female. Therefore, it is difficult to identify the sex of a bear by size alone.

GRIZZLY BEARS

Ursus arctos, or the brown bear, has the widest range of any living bear species, including parts of Europe, Asia, and North America. In North America, *it* goes by several different common names, including grizzly, silver tip, Kodiak bear, and Alaskan brown bear. The term "grizzly" refers to the way in which silver-tipped guard hairs make some brown bears appear "grizzled." Every brown bear in North America belongs to one of two subspecies: *U. a. horribilis*, or *U. a. middendorffi*. "Horribilis" is by far the most common, found from Wyoming to Alaska. *U. a. middendorffi* is an isolated population that exists only on Kodiak, Afognak, and Shuyak islands and along the Alaskan Peninsula as well as eastward and south-eastward along the Alaskan coast. Kodiak's genetically isolated bears have slightly varied skull proportions, claw shape, and dentition that sets them apart from grizzly bears found elsewhere in Alaska. For those reasons, Kodiak's "brown bears" are considered a separate subspecies.

For the purpose of this guide, when referring to "grizzly bears" we mean *Ursus arctos horribilis*. Interior grizzly bears, like those in Montana, are typically smaller than those found along the coast where spawning salmon provide a high-calorie, predictable food source. Size of bears within Montana however also varies due to the foods bears are exposed to as well as genetics and the season of the year (see Chapter 4).

Alaska bear with salmon.
Adobe Photo Stock/Stuckreed

Brown bears evolved about 800,000 years ago in Asia, spread westward into Europe, and reached North America via the Bering land bridge about 100,000 years ago. During this Pleistocene expansion, brown bears branched out from forest into tundra and grassland habitats left open by retreating ice; some biologists hypothesize that the lack of trees for cover or escape could explain the bear's more aggressive behavior. With no place to climb or hide, it had to be aggressive defending itself, its young, and its food sources. Contrast such an evolutionary strategy with black bears that

Sow with cubs.
Wesley Ashton/Adobe Photo Stock

spend more of their time in densely forested areas. The longer front claws seen on mature grizzly bears were also specialized for digging foods often more common in these open habitats, such as roots and rodents. While young grizzlies are capable of climbing trees, the long claws hamper the climbing ability of older grizzly bears compared to black bears.[3]

Grizzlies in Montana tend to be up to twice as large as black bears of the same age and sex. Although they only weigh about 1 pound at birth, adult, male grizzlies can tip the scales anywhere from 300 to 800 pounds; adult females range from 200 to 600 pounds. The record weight for a live Montana grizzly is 1,018 pounds (1939 Upper Boulder River). In the wild, a grizzly can live 25 to 30-plus years.

Measuring Bear Conservation

At this point you may be asking yourself; how can you measure these values of bears? Height, weight, size, and head shape all plays a role in how we "see" how big a bear is. Since the 1920s the Boone and Crockett Club has been recording the "size" (skull length and skull width) of hunter taken and "picked up" (found) black, grizzly, Alaskan brown and polar bear skulls. These two measurements are precise, repeatable, and totally unbiased to one's imagination.

To be officially measured, all bear skulls must have gone through a 60-day drying period in which the skull itself is free of any meat or muscular material and has been stored at a habitable

GRIZZLY OR BLACK Color, Shape, and Size Can Sometimes Be Misleading

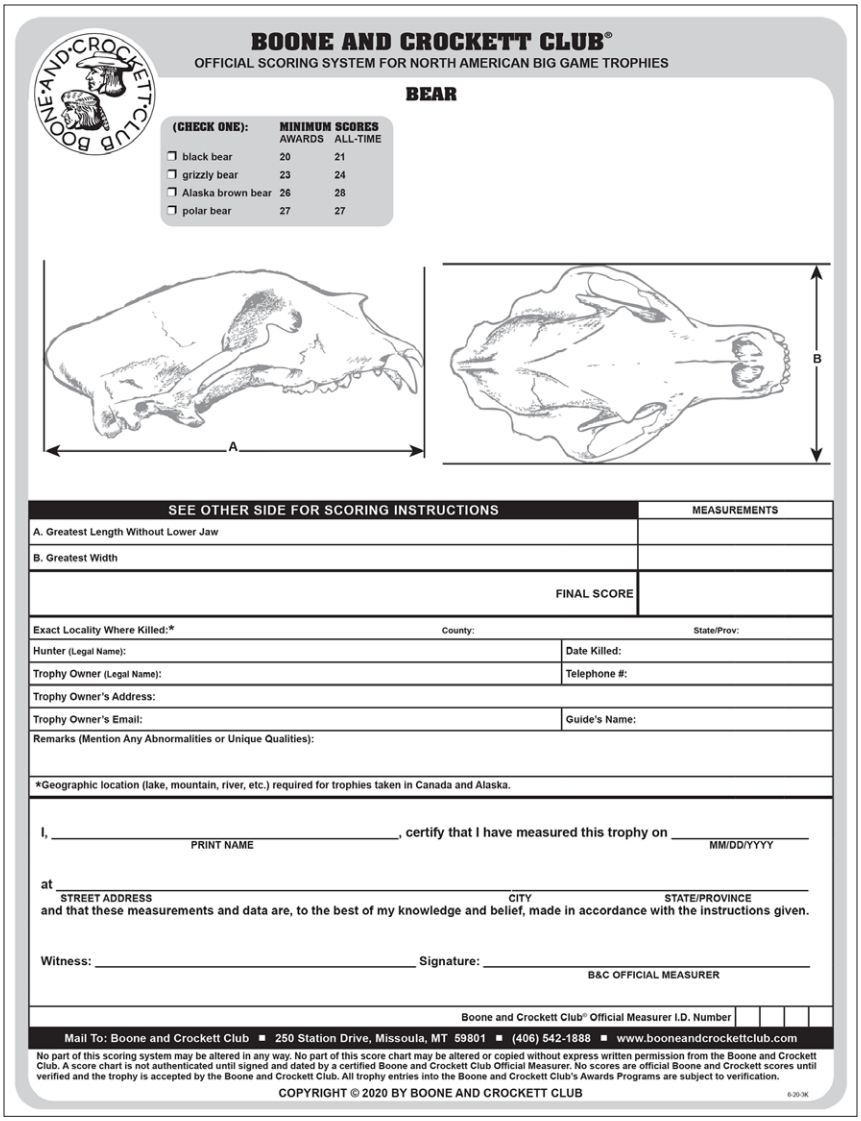
There are four main physical differences between black and grizzly bears: body shape, face, claws, and tooth length. The first three characteristics can be observed from a distance. The fourth requires close investigation.

- Adult grizzlies generally have a hump between their front shoulders. Black bears do not. When walking on all fours, the highest point of a black bear's body is its rump; on a grizzly, the highest point is the hump between the front shoulders. Black bears may appear to have a hump if their head is near the ground, such as when feeding.
- Adult grizzlies generally have a dished face profile. Adult black bears have a straighter face profile, sometimes called a Roman nose.
- The claws on the front foot of an adult grizzly are 2 to 4 inches long and make excellent digging tools. They are rarely less than 1 3/4 inches long. The claws on black bears are seldom longer than 1 1/2 inches. The shorter claws make for better climbing, but they are not as efficient as a grizzly's for digging. The toes on the grizzly bear are closer together and the toes on a black bear are more separated. The combination of the spacing between toes and length of claws make the tracks of the bears appear differently (see graphic below).
- The last major difference between the two bear species lies in the mouth, though it's a spot few people want to inspect. A black bear's last upper molar measures less than 1 1/8 inches long, whereas the same tooth in a grizzly's mouth is longer than 1 1/8 inches.

See fwp.mt.gov for a bear identification test.

temperature throughout the entire 60-day period. Commonly, dermestid beetles are used to clean skulls, and since these beetles require a habitable temperature to survive (above 60° F/ 15° C), a bear skull can be placed into beetles without violating the drying period requirements. However, beetle-cleaned skulls are often submerged to be degreased once the beetle cleaning process is complete, and this submersion does reset the drying time.

The Boone and Crockett Club maintains the records of native North American big game as a vital conservation record in assessing the success of wildlife management programs. The idea behind keeping record of "trophy" animals was not to recognize personal hunter achievements but rather to serve as a barometer for the effectiveness of conservation practices and wildlife management procedures within various populations. For example, if multiple large male specimens are routinely harvested out of the same area year after year, we have



BOONE AND CROCKETT CLUB®

OFFICIAL SCORING SYSTEM FOR NORTH AMERICAN BIG GAME TROPHIES

BEAR

(CHECK ONE):	MINIMUM SCORES AWARDS	ALL-TIME
❒ black bear	20	21
❒ grizzly bear	23	24
❒ Alaska brown bear	26	28
❒ polar bear	27	27

SEE OTHER SIDE FOR SCORING INSTRUCTIONS	MEASUREMENTS
A. Greatest Length Without Lower Jaw	
B. Greatest Width	
FINAL SCORE	

Exact Locality Where Killed:* County: State/Prov:

Hunter (Legal Name): Date Killed:

Trophy Owner (Legal Name): Telephone #:

Trophy Owner's Address:

Trophy Owner's Email: Guide's Name:

Remarks (Mention Any Abnormalities or Unique Qualities):

*Geographic location (lake, mountain, river, etc.) required for trophies taken in Canada and Alaska.

I, _____, certify that I have measured this trophy on _____
PRINT NAME MM/DD/YYYY

at _____
STREET ADDRESS CITY STATE/PROVINCE

and that these measurements and data are, to the best of my knowledge and belief, made in accordance with the instructions given.

Witness: _____ Signature: _____
B&C OFFICIAL MEASURER

Boone and Crockett Club® Official Measurer I.D. Number

Mail To: Boone and Crockett Club ■ 250 Station Drive, Missoula, MT 59801 ■ (406) 542-1888 ■ www.booneandcrockettclub.com

6-20-3K

An example of a Boone and Crockett Club official score chart for measuring bear skulls.

good reason to believe that animal population is doing well and the laws and regulations regarding the hunting of those animals remains sound. However, if what was once a quality producing area no longer yields animals meeting the previously recorded minimum scores, wildlife managers and policy makers can revisit those population subsets and propose new management strategies or quotas.

The Club's involvement with measuring trophy animals dates back to 1895. In response to public interest generated by the Club's National Collection of Heads and Horns in the 1920s, and increased interest in the recovery and conservation of big game species, the Club established an official measurement and scoring system for trophy big game. The National Collection and the measurement system were initially conceived to record species of North American big game thought to be vanishing. As our conservation efforts began to pay dividends and populations recovered so did the number of mature specimens. Wildlife managers and others in the scientific community soon recognized that the system was an effective means of tracking the success of new conservation policies and programs.

Thanks to the leadership and ideas of Theodore Roosevelt, and the ongoing efforts of the Boone and Crockett Club to conserve big game through the creation of laws, bag limits, policy work, and overall awareness of wildlife conservation, our North American big game populations continue to thrive. Although there is currently no grizzly bear hunting season in Montana at the time of this publication, the

ABOVE: Comparison of a grizzly and black bear skull.
Corie Bowditch

RIGHT: Grizzly bear tracks in the snow.
Luke Coccoli

hunting of grizzly bears was once legal in our state. The current Boone and Crockett record for this category in Montana is a hunter taken skull measuring 25 9/16 inches dating back to 1890. The Boone and Crockett Club state record black bear for Montana measured 21 9/16" comparatively and was taken in 2021.

ENDNOTES

1 Puckett et.al.2022.Genetic architecture and evolution of color variation in American black bears
2 2011. Mace, R. D. and T. Chilton-Radandt. Black bear harvest research and management in Montana: Final Report. Montana Department of Fish, Wildlife & Parks, Wildlife Division, Helena, Montana, USA.
3 1972. International Association of Bear Research and Management. Vol. 2, A Selection of Papers from the Second International Conference on Bear Research and Management, Calgary, Alberta, Canada, pp.221-231

CHAPTER 3

WHERE THE GRIZZLIES ROAM: HABITAT AND RANGE

Animals are supported by their habitats—the forests, meadows, prairies, mountains, and streams where they live. Because grizzlies require large, diverse areas to fulfill their life requirements, grizzly bear habitat is also home to elk, bald eagles, bighorn sheep, trout, squirrels, leopard frogs, and hundreds of other species. Wildlife abundance and diversity serves as an indicator of a quality environment for people. Some people live in Montana and the neighboring states because they enjoy a certain quality of life that is enhanced by habitat rich with wildlife. In a study of human attitudes regarding grizzly bears and their management, 85 percent of Montanans agreed or strongly agreed that grizzly bears are part of what makes Montana special.[1]

Grizzly bears are habitat generalists, meaning they can thrive in a range of habitats. They have the largest world-wide distribution of any bear species and occupy habitats ranging from desert to temperate forest to tundra. They evolved in semi-open habitats but often select for forested areas.

Ideal habitat for grizzly bears includes diverse, high-calorie natural foods and large blocks of intact land. Although grizzly bears in the lower 48 use open habitats, like meadows, alpine, and prairie, they still select for areas with full or partial forest, to provide protection from the elements (thermal cover) and protection from disturbance by humans or other animals (security cover). The moister conditions in the mountainous and forested areas of Montana offer greater food diversity, thus the mountains and foothills likely always represented a stronghold for grizzly

A grizzly bear walks along the edge of Blacktail Ponds.
NPS/Jacob W. Frank

HOME, HOME ON THE RANGE

A bear's home range encompasses the places it visits for food, water, resting cover, mating, and denning. Home ranges are somewhat changeable and can be broken into seasonal, age-specific, annual and lifetime ranges. Seasonal home ranges vary according to the time of year and available food sources. Age-specific home ranges categorize the bear's home area during a specific life stage. Annual home range is the measure of an area used by a bear for a single year. Lifetime home ranges encompass the home range used over the bear's lifespan and is often much larger than an annual home range. Bears do not actively defend their home ranges and, unlike territorial mammals such as wolves, the home ranges of neighboring individual bears usually overlap, often extensively.

The size and shape of a bear's home range varies depending on food availability, population density, age, and/or breeding status. Males likely use larger areas to gain access to multiple females for mating and their greater caloric requirements due to their larger body size. Young grizzlies can have even larger home range sizes when they are undergoing natal dispersal.

The home ranges of female bears change from year to year depending on if they are alone or if they have cubs or yearlings at their side. Grizzly cubs normally remain with their mother for two years, mastering the skills needed to survive and fend for themselves. Female bears have a smaller home range in the years when they have cubs. This may be due to the fact that youngsters simply don't have the ability to cover the larger home range females have when alone. Family groups likely use these smaller home range more intensely, conserving travel time and energy to devote to cub rearing. Smaller home range use during years with cubs may allow females to stay in very familiar ground and avoid other bears, especially potentially infanticidal males.

AVERAGE ANNUAL HOME RANGE OF MALE AND FEMALE ADULT GRIZZLIES

Ecosystem	Females	Males	Citation
Northern Continental Divide	138 mi²	527 mi²	MFWP, unpublished data*
Greater Yellowstone	50 mi²	183 mi²	Bjornlie *et al.* 2014b, supplement 3** [1]
Cabinet-Yaak	127 mi²	835 mi²	Kasworm 2020, *in litt.** [2]
Selkirk	115 mi²	241 mi²	Kasworm 2020, *in litt.** [3]

* Using 100% minimum convex polygons
** Using 95% minimum convex polygons

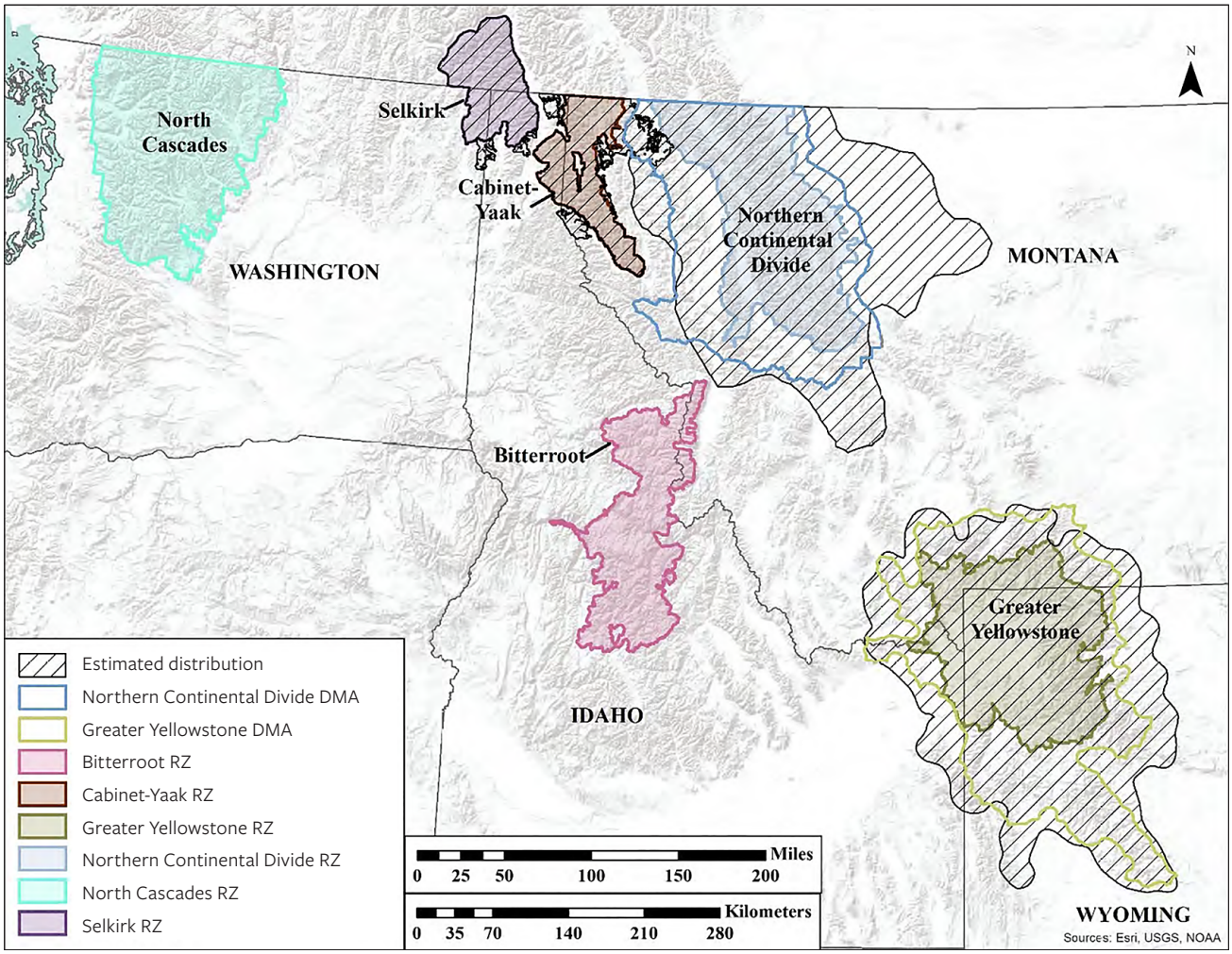
Chart: U.S. Fish and Wildlife Service. 2021. Biological report for the grizzly bear (*Ursus arctos horribilis*) in the Lower-48 States. Version 1.1, January 31, 2021. Missoula, Montana. 370 pp.

1 2014b. Bjornlie, D., F.T. van Manen, M. R. Ebinger, M. A. Haroldson, D. J. Thompson, and C. M. Costello.Whitebark pine, population dernsity, and home-range size of grizzly bears in the Greater Yellowstone Ecosystem. PLOS ONE 9: 1-8

2 Kasworm.2020.USFWS.Cabinet-Yakk Ecosystem Grizzly Bear Annual Report

3 Kasworm.2020.USFWS.Cabinet-Yakk Ecosystem Grizzly Bear Annual Report

RECOVERY ZONES



Detailed map of the Grizzly Bear Recovery Zones.
US Fish and Wildlife Services

bears. Forested areas can include everything from coniferous montane zones to cottonwood river bottoms.

As opportunistic omnivores, grizzly bears are very adaptable and focus on different food sources depending on what is available where they live. Their diet varies year to year, season to season, and even among individuals in a population. Common foods include elk calves and deer fawns, insects, grasses, berries, and herbaceous plants. Bears' digestive system is similar to humans; This means they can't get as many nutrients from plants as herbivores can, so their annual diet needs to include more than just plants. Animal matter (which includes everything from insects to bison) comprises from 30 to 45 percent of the diets of grizzlies in the Greater Yellowstone Ecosystem. However, in the Cabinet-Yaak Ecosystem animal matter makes up less than 15 percent of their yearly diet, with the larger percentage made up of berries and vegetation.[2] There are over 260 species of plants, animals, and fungi used as food by grizzlies in the Greater Yellowstone Ecosystem.[3]

Studies of grizzlies in the Northern Continental Divide Ecosystem show that most of their habitat use occurs in timber, mesic sites (moderately moist areas such as seeps, creek bottoms, and avalanche chutes), aspen stands, burns, and talus slopes

These habitats are distributed across a variety of elevations, and a bear might use one type of habitat in the spring and a different type in the fall. This variety of habitats may be used for foraging, cover, escape, denning, or other life history traits.

Recovery zones (RZ), demographic monitoring areas (DMA), where applicable, and current distributions for the six ecosystems are identified in the Recovery Plan. DMAs surround

A mature grizzly searching for forage on Boone and Crockett Club's Theodore Roosevelt Memorial Ranch near Dupuyer, Montana.

Estimated Grizzly Bear Populations by Ecosystem
(Demographic Monitoring Areas)

Current population estimates of grizzly bears in the six ecosystems in the lower-48 States (NCDE = Northern Continental Divide Ecosystem; GYE = Greater Yellowstone Ecosystem; CYE = Cabinet-Yaak Ecosystem; SE = Selkirk Ecosystem; and BE = Bitterroot Ecosystem).

Ecosystem	State(s)	Estimated number of bears	Citation
GYE	MT, ID, WY	1,063	IGBST 2022
NCDE	MT	1,068	*Costello 2020, in litt.*
CYE	MT	55-60	*Kasworm et al. 2020a, p.40*
SE	WA, ID (plus British Columbia)	At least 53 (in US portion), BC estimate in progress	*Kasworm et al. 2020b, p.19*
BE	MT, ID	No known population	—
North Cascades	WA	No known population	—

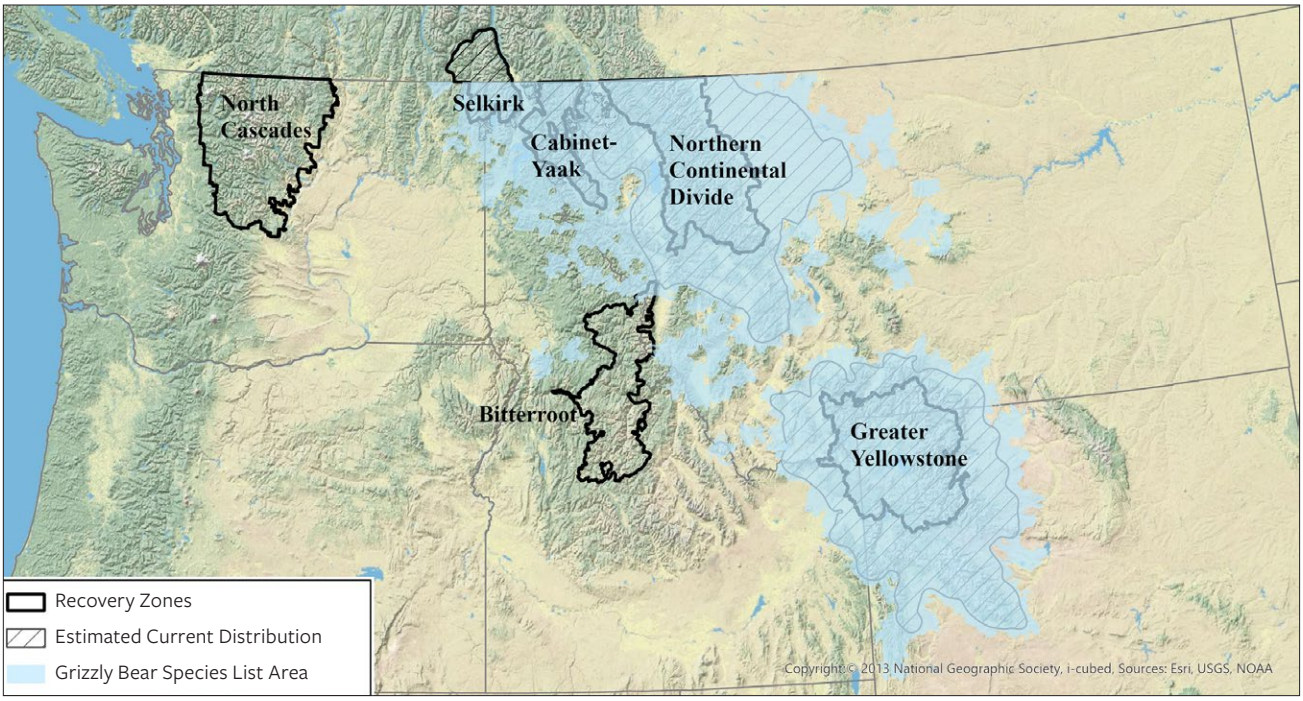
Chart and citations above (except 2022 IGBST estimated population) and following ecosystem maps from: U.S. Fish and Wildlife Service. 2021. Biological report for the grizzly bear (*Ursus arctos horribilis*) in the Lower-48 States. Version 1.1, January 31, 2021. Missoula, Montana. 370 pp.

and include the recovery zones in the GYE and NCDE. Current distributions represent "occupied range," which do not include low-density peripheral locations and represent a minimum known area of occupancy, not an extent of occurrence.[4]

HOME IS WHERE THE ECOSYSTEM IS

As mentioned in Chapter One, in 1975, the U.S. Fish and Wildlife Service listed the grizzly bear as a threatened species in the Lower 48 States under the Endangered Species Act, placing the species under federal protection. The 1993 U.S. Fish and Wildlife Service Recovery Plan identified six ecosystems outside of Alaska. Grizzlies live within and outside the boundaries of these ecosystems. At the time of this guide's publication, we are seeing grizzlies in areas they haven't been observed in decades, every year. Generally, grizzlies could

SPECIES LIST AREA FOR GRIZZLY BEARS



be found anywhere west of Billings, in the state of Montana.

These ecosystems each contain a recovery zone. These six ecosystems are in Idaho, Montana, Washington, and Wyoming, and grizzly bear populations currently exist in the Northern Continental Divide Ecosystem, the Yellowstone Ecosystem, the Selkirk Ecosystem, and the Cabinet-Yaak Ecosystem.

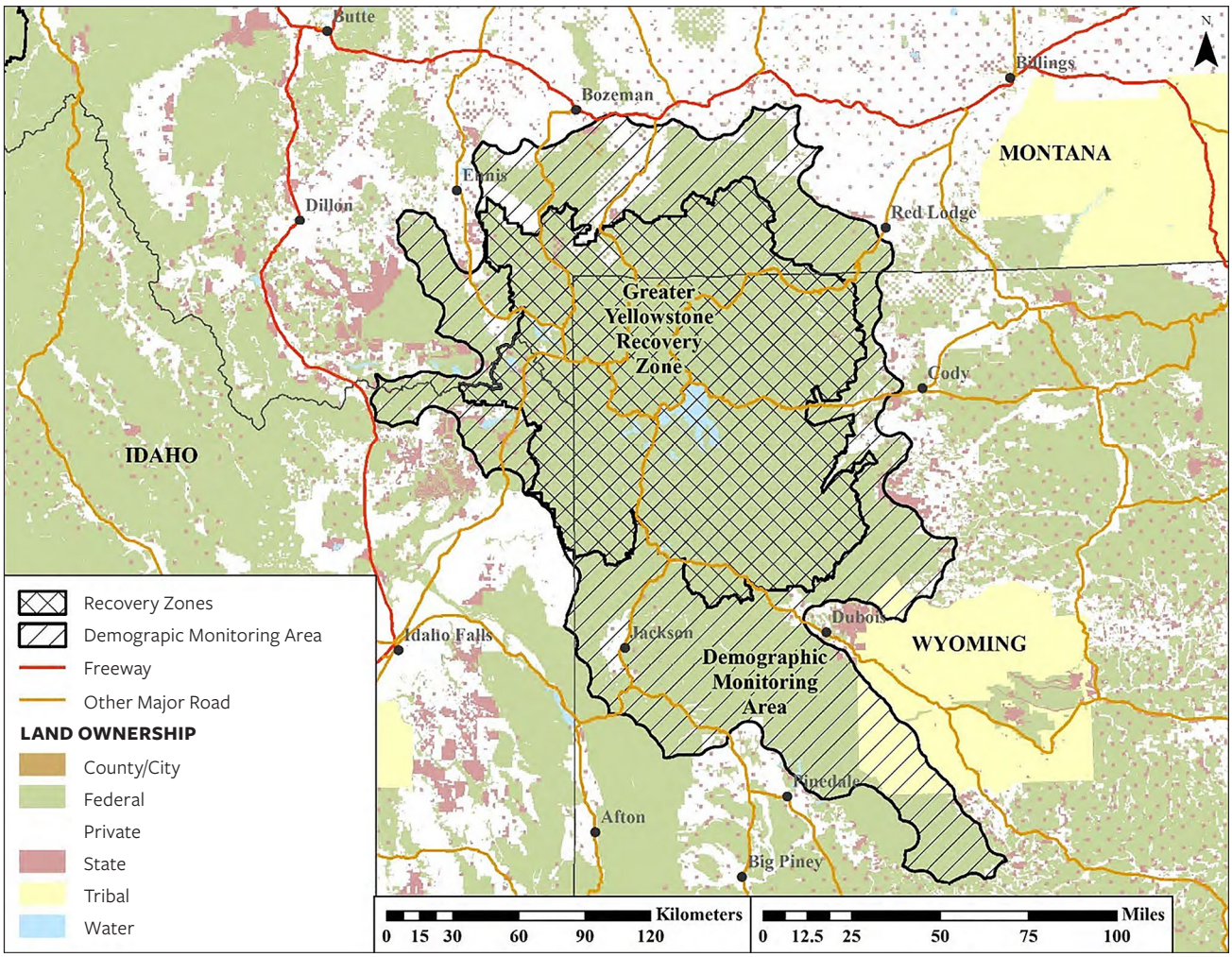
There is no grizzly bear population in the Bitterroot Ecosystem or the North Cascades Ecosystem. While grizzly bear sightings have been documented in these two ecosystems, as of 2022 there is no evidence that grizzly bears have begun breeding or established home ranges there.

Since the Montana Grizzly Bear Teacher Resource guide focuses primarily on grizzly bears in Montana, the following provides information for the four ecosystems that fall within Montana (GYE, NCDE, CYE, and BE).

Species List Areas (or "may be present" map) help federal agencies determine where effects to listed species should be considered for consultation from actions they carry out, fünd, or permit to meet requirements under Section7(a) of the Endangered Species Act (ESA). As grizzly bears expand their range, the SLA is intended to be spatially inclusive of all areas that meet the "may be present" methodology for grizzly bears. The "may be present" methodology is derived from current distributions and verified location data outside of current distributions; not all areas that are designated as "may be present" meet the criteria to be included in current distributions. Local evaluation is needed by federal Level 1 ESA Streamlining Teams to determine potential effects of agency actions where grizzly bears "may be present." Identifying locations where grizzly bears "may be present" will facilitate project planning activities that promote grizzly bear conservation and recovery. The grizzly bear SLA is updated with any new verified sightings every 90 days. Although we receive sighting infomation throughout the year, there can be a lag between receipt of the information, verification of grizzly bear, and updating the map. To provide the most up-to-date information for Section 7 consultation pending those updates, we will notify the relevant federal agency personnel when any new HUCs are added.

We will continue to supply an updated verified map to all partners through PAC.Last updated July 26, 2022 with data from 2012 to July 26, 2022.

GREATER YELLOWSTONE ECOSYSTEM MAP

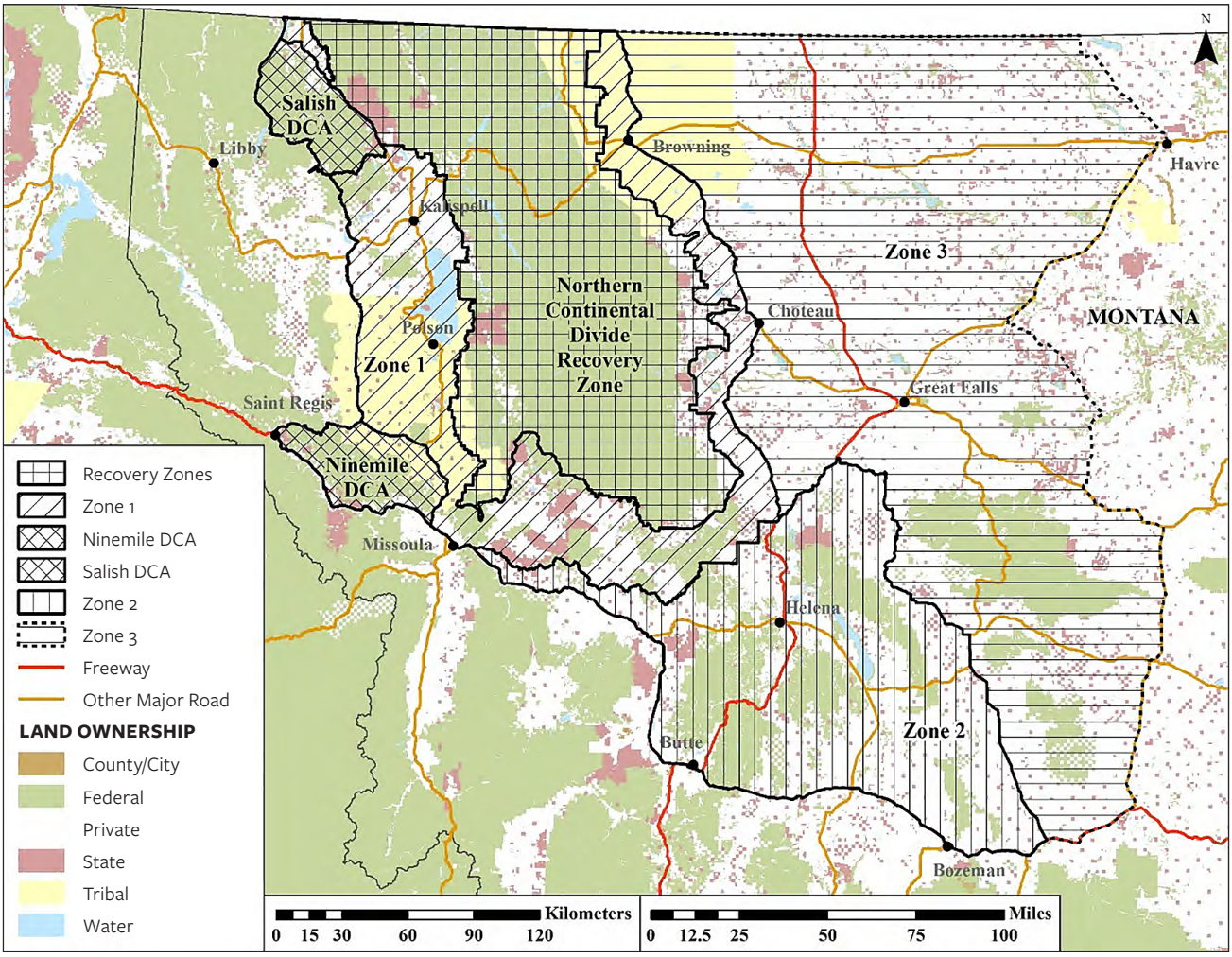


Map of the Greater Yellowstone Ecosystem (GYE). Land ownership and boundaries are shown for the recovery zone and the Demographic Monitoring Area (DMA). The DMA surrounds and includes the recovery zone.

Greater Yellowstone Ecosystem

As of 2020, grizzly bears occupy more than 27,000 square miles of mountainous terrain in and around Yellowstone National Park. This area includes Yellowstone National Park; Grand Teton National Park; John D. Rockefeller Memorial Parkway; significant portions of the Shoshone, Bridger-Teton, Targhee, Beaverhead-Deerlodge, and Custer Gallatin national forests; Bureau of Land Management lands; and more than 4,600 square miles of private lands in Montana, Wyoming, and Idaho. Grizzly bears have nearly tripled the extent of their occupied range in the GYE since the early 1980s. The current (2021) estimate of the population within the demographic monitoring area (DMA) is 1,063 grizzly bears and grizzlies are permanently occupying areas outside the DMA.[5] The GYE population is currently not connected to other grizzly bear populations. Genetic information collected from bears is how their ecosystem of origin is determined.

NORTHERN CONTINENTAL DIVIDE ECOSYSTEM

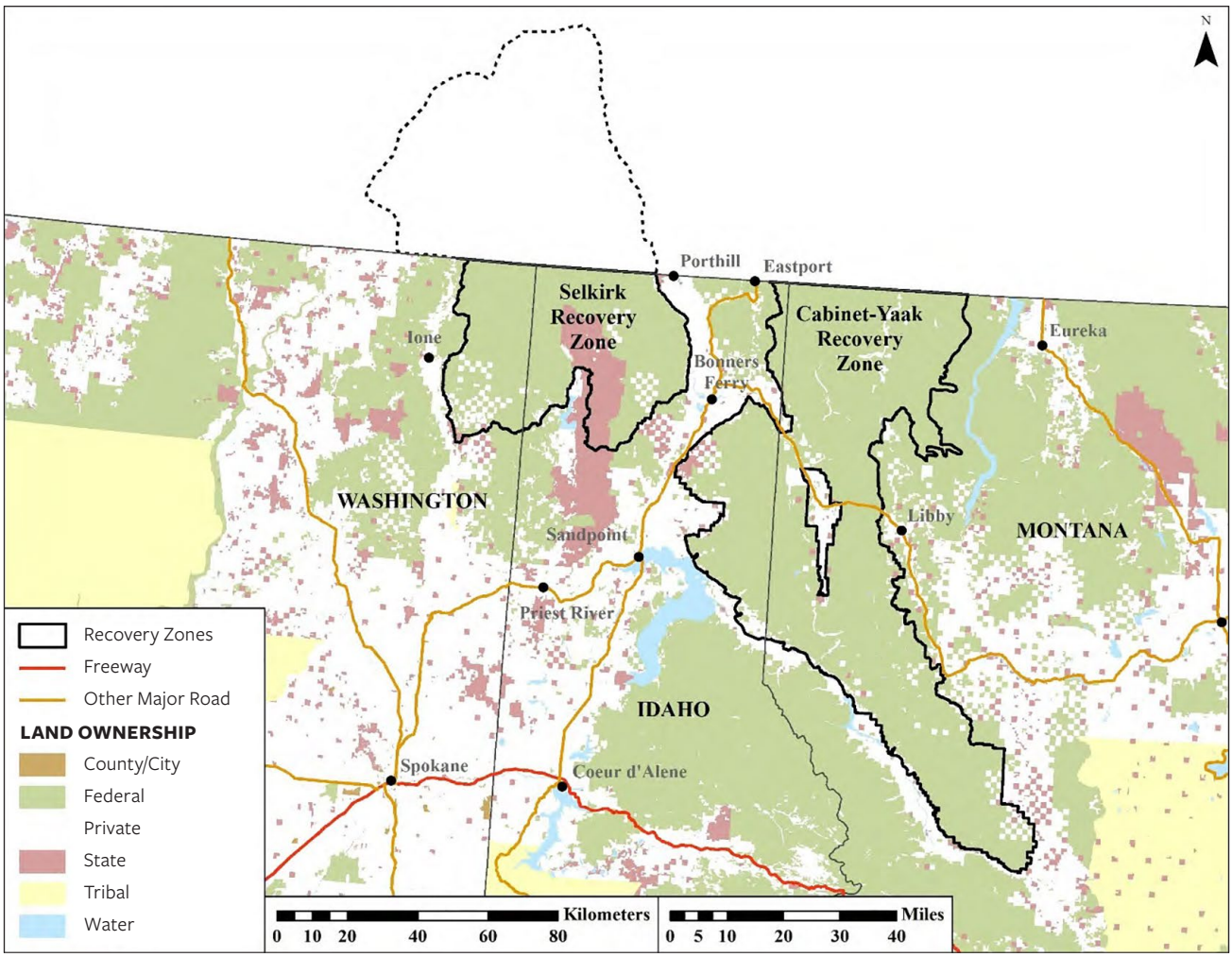


Northern Continental Divide Ecosystem

The NCDE is in Northwest Montana and is a large ecological system including Glacier National Park, parts of the Flathead and Blackfeet Indian reservations, parts of four national forests (Flathead, Kootenai, Helena-Lewis and Clark, and Lolo), BLM lands, and a significant area of state and private lands. The NCDE also includes four wilderness areas (Bob Marshall, Mission Mountains, Great Bear, and Scapegoat). The interchange of bears across the international border has been well documented. The 2021 population estimate is 1,114 bears.[6] Since 1975, range of the NCDE grizzly bear population has tripled from 8,900 square miles to 26,000 square miles. With the population doing so well, grizzly bears are now expanding into areas far away from the mountains.

Map of the Northern Continental Divide Ecosystem (NCDE). Land ownership and boundaries are shown for the NCDE grizzly bear recovery zone, management Zones 1, 2, and 3, and demographic connectivity areas (DCAs). The demographic monitoring area (DMA) is comprised of the recovery zone and Zone 1. The eastern and southern extent of Zone 3 will be determined in future Service decisions.

CABINET-YAAK ECOSYSTEM



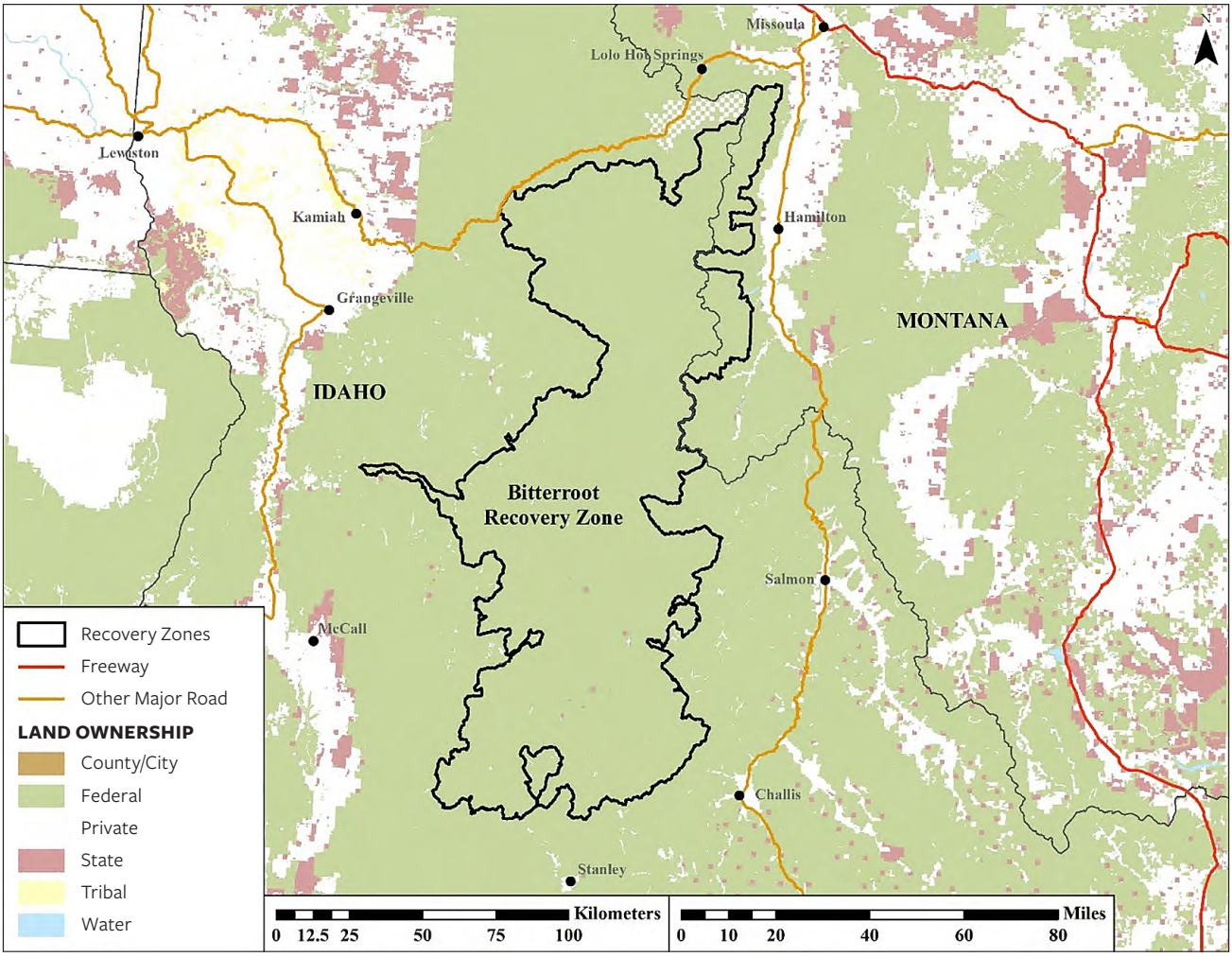
Map of the Cabinet-Yaak (CYE) and Selkirk (SE) Ecosystems. Land ownership and recovery zone boundaries are shown for the CYE and SE. Based on the 1993 Recovery Plan, the SE recovery zone extends into Canada, therefore, some of the demographic information (i.e., female survival and population trend) we have is based on the entire recovery zone (includes bears in Canada).

Cabinet-Yaak Ecosystem

The Cabinet-Yaak Ecosystem in northwestern Montana and northeastern Idaho has more than 2,600 square miles of forested and mountainous habitat occupied by grizzly bears. Based on known fates of GPS-collared individuals and reproduction, it is estimated that the population of grizzly bears in the CYE is currently increasing annually at 1.01 percent and the population is now thought to be around 60 individuals.[7] The interchange of bears across the international border into both British Columbia and Alberta, Canada, has been well documented. Recovery of grizzlies in the CYE will be determined by the distribution of females with cubs and the amount of human-caused mortality over time.[8]

Travel corridors for grizzly bears between the Cabinet and Purcell mountains are currently under investigation, but little movement of individual grizzly bears between the Purcell Mountains and the Cabinet Mountains has been documented. However, black bears are known to move between the areas, and it is reasonable to assume that a viable travel corridor connects the Cabinets and the Purcell mountains. Grizzlies in this area occurs at such low densities that detection of specific movements is challenging.

BITTERROOT ECOSYSTEM



Map of the Bitterroot Ecosystem (BE). Land ownership and the recovery zone boundary is shown for the BE.

Bitterroot Ecosystem

The Bitterroot Ecosystem is in central Idaho and western Montana. It was unknown if grizzly bears still existed there in 1975 when grizzly bears were listed, but later surveys found no presence of resident bears.[9] There have been multiple confirmed observations in the area immediately surrounding this recovery zone since 2007, mostly involving young dispersing males or individuals moving around after being translocated. This ecosystem is currently considered unoccupied, as defined as having two or more reproductive females, or one female reproducing during two separate years.[10]

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CHAPTER 4

SEASONS OF THE BEAR

People often wonder where they can go to see a grizzly bear. Since they're in the wild the answer is, "it depends." Wild bears move around freely within their home range. And the truth is, seeing a bear in the wild is a rare occurrence for most people. But we do know something about the bears' habits and where they might be in any given season.

SPRING

No one knows for sure what causes a bear to emerge from its winter den, even when the den is covered with several feet of snow. Some inner biological alarm clock goes off and urges a bear to get up. Warming temperatures, increasing day length, snow melting around a den entrance, and the smells of spring may all play a role. A grizzly may spend several days awake in and around the den site, sunning itself and resting in daybeds. Eventually, bears move from their high elevation dens to lower, warmer habitats.

It also once was believed that bears obtained nutrients from sucking their paws during hibernation. This idea most likely arose from observations of bears licking the bottom of their paws during the last half of the denning period when their old, callused footpads slough off (Rogers 1977). The sucking and licking actions apparently help toughen the new footpads so bears can walk on them without pain or difficulty when they emerge from the den and begin searching for food (Beecham et al. 1983).[1]

In general, adult males emerge first followed by sub-adult males, then females without cubs. Females with cubs normally come out last. Emergence can be as early as March, in which case the animals could face a bleak, hungry spring, or bears may sleep well into May.

Surprisingly, a grizzly is not immediately hungry, even after six months in a hole in the ground. Its body functions and appetite take a few days to revive. Once fully awake, bears search out winter-killed animal carcasses, especially elk and deer. That flesh, no matter how frozen or rotten, is ravenously devoured, as it represents a crucial shot of protein

Sow with two cubs in higher elevation.
FWP Tim Manley

TOP: Bear den.
Danielle Oyler

ABOVE: Bear cub eating cow parsnip.
Lisa Hupp/USFWS

that can help sustain a bear until it finds the green vegetation that makes up most of its diet.

Because grizzlies usually den at 6,000 feet elevation and above, they typically emerge and move to areas where food is most available. Grizzlies may behave as "seasonal altitudinal migrants" where they move from their higher elevation dens to lower elevations to eat ungulate carcasses and early emerging spring plants. Low-lying areas, where streams flow and seeps surface as well as the upper elevation hillsides most exposed to sunlight tend to have the first green shoots of spring. Plants such as angelica, cow parsnip, and snakegrass grow in these spots and hungry bears eagerly seek them out. Bears will often rest in

Snowcapped mountains in northwest Montana are excellent grizzly bear spring habitat.

timber and shrubs along streams during the day, then become active at night to graze in meadows. Others feed during the day in open grasslands and avalanche chutes. In the Mission Mountains, biologists found that bears in the backcountry were active by day but nocturnal in areas closer to people. In Yellowstone National Park, research has shown that in the spring grizzlies are most active at dawn and dusk, and they bed down during the afternoon and in the middle of the night.[2]

SUMMER

Peak plant production occurs in late spring and early summer, and it is a veritable bear smorgasbord. In the weeks leading up to summer many mammal species, from ground squirrels and mice to elk and moose, are giving birth. An omnivore like the grizzly can easily shift from eating roots and grasses to devouring a newborn elk calf. Some grizzlies may learn to feed on elk calves in the first couple weeks of June, but elk calves and deer fawns can run fast enough to escape a hungry bear within just a few weeks of birth.

Early summer is mating season for grizzly bears. During this time, males spend almost all their time expending energy searching and competing for mates. This can play a big role in weight reduction of males, while females spend most of their time foraging for food in order to gain weight for the purpose of successful hibernation and ultimately reproductive viability.

Average age of first reproduction, litter size, and inter-birth interval for the six ecosystems

Ecosystem	Age of First Reproduction	Litter Size	Inter-Birth Interval	Citation
Northern Continental Divide	5.8	2.1	3	Mace and Waller 1997a, p. 108; Costello *et al.* 2016b, pp. 56–57
Greater Yellowstone	5.8	2.78	2.78	Schwartz *et al.* 2006b, pp. 19–20; IGBST 2012, p. 34
Cabinet-Yaak	6.3	2.84	2.84	Kasworm *et al.* 2021a, pp. 34–40
Selkirk	6.3	3.42	3.42	Kasworm *et al.* 2021b, p. 26
Bitterroot	NA	NA	NA	NA
North Cascade	NA	NA	NA	NA

Chart: U.S. Fish and Wildlife Service. 2021. Biological report for the grizzly bear (*Ursus arctos horribilis*) in the Lower-48 States. Version 1.1, January 31, 2021. Missoula, Montana. 370 pp.

Huckleberrty shrubs and fruit, *Vaccinium globulare*. Preferred fruit fed on by grizzly and black bears, late summer and fall.
NPS Photo

This is one of the few times of the year adult bears will tolerate being close to one another. (Bears will also tolerate ursine company when there is an abundance of food, like a salmon run or ripe berry patch.) During mating season, males may compete for breeding females. Occasionally, a dominant male may control a female and be the only one to mate with her. Other times, females mate with two or three males. That can lead to a female giving birth to two or three cubs, each with a different father. Females generally breed every three years, typically starting when they are 5 to 7 years old.

About midsummer, alpine plants lose much of their nutritional value, and grizzlies begin to switch to other foods. Buffaloberries, serviceberries, and huckleberries all grow within distribution of the Continental Divide, and in some spots, chokecherries are extremely abundant and highly sought after. Bears will crowd into berry patches if the fruit is plentiful, but a pecking order seems to be observed. If a berry crop or other major food source fails one year, smaller bears, often sub-adults, are forced into marginal feeding areas or may come into conflict with humans while searching out food.

Bears inhabiting the Northern Continental Divide and the Cabinet-Yaak Ecosystems have extremely wide variety of food sources: huckleberries, chokecherries, currants, buffaloberries, and limber pine nuts, just to name a few. During July and August, some grizzlies use upper elevation habitats, feeding on succulent plant foods or grazing on sedges in high meadows and cirques (deep steep-walled basins). They travel along subalpine ridges and dig for roots and tubers, creating small, tilled areas for future plant growth. Near several of the highest mountain peaks on both sides of the Continental Divide, army cutworm moths congregate in the hundreds of thousands from late June through August. The moths feed on alpine flowers at night, crawling under large talus rocks during the heat of the day to regulate their body temperature. Bears will search for these areas, then spend days devouring this highly nutritious food.

Although this can provide for exceptional "bear watching," disturbing bears on a known food source is not a recommended practice. To help curb any potential conflict, the Confederated Salish and Kootenai tribes have established an 11,495-acre grizzly conservation zone around one of

Riparian habitat along the Rocky Mountain Front.
Mike Madel/FWP

these moth sites in the Mission Mountains on the Flathead Indian Reservation. Hikers are not allowed in this area from July 15 to October 1.[3]

In the summer many bears feed and travel at night, though activity still peaks at dusk and dawn. Summer brings humans and heat, and bears do their best to avoid the two by sleeping during the day. Exceptions occur during berry season, the latter half of summer, when bears are often active during the day.

FALL

Availability of seasonal foods reaches its climax in late summer and early fall. A bear will rack up many miles searching out much needed nutrition, as its body demands a buildup of fat in anticipation of the coming winter. The grizzly's metabolism starts to speed up, and the bear enters a food-eating binge known as hyperphagia.

Bears in hyperphagia eat up to 20,000 calories a day, putting on several pounds each day. Fat deposits are the bear's ticket to a healthy, happy winter sleep. Without a sufficient buildup of fat, a bear in hibernation may deplete its muscle tissue and emerge from the den seriously weakened in the spring when food is scarce. Bears in that condition may starve to death. Others don't even make it to spring, dying during hibernation. Fall feeding not only affects the physical condition of bears preparing for hibernation but also the ability of pregnant females to give birth to healthy cubs.

What do bears eat during the fall in this heightened state of caloric intake? Berries high in sugar and whitebark pine nuts are important in autumn. After berries disappear in late fall, bears may add more meat to their diet.

DELAYED IMPLANTATION

Evidence indicates that the male mating interaction with the female stimulates release of the egg; this is called induced ovulation. Although the eggs are fertilized at this time, they do not become implanted in the female's uterus. By mid-summer the fertilized egg has developed into a multi-celled blastocyst, but further growth is arrested and the embryo floats freely in the uterus until denning time, later in the fall. This delayed implantation allows the female's body to assess whether she has sufficient fat reserves to carry, give birth to, and suckle cubs through her long winter nap. If a bear is not able to gain enough fat, the blastocyst won't attach to the uterine wall, ensuring that a female in poor condition will not be further stressed by reproduction.

Grizzly sow with cubs.
NPS/Jim Peaco

Hunting season, which takes place during the fall, brings opportunities and dangers to grizzly bears. Successful hunters usually field dress their quarry, leaving the offal or internal organs, which bears will eat. Wounded game that escapes hunters can also become a great source of protein to ready bears for hibernation. Ungulates that have exhausted themselves or been injured during rut may end up being easy prey for a hungry grizzly bear. Bears can be drawn to any and all attractants left behind by hunters, their camp, or their harvest.

WINTER

Bears do not have a rigid schedule for going into hibernation. Generally, pregnant females are the first to enter the winter den and adult male grizzlies are last. Denning can occur anytime from October through December, depending on weather and availability of food. In years when food is scarce, bears will den earlier. Occasionally, some individual bears emerge earlier and for short spells and later return to their den until food sources again become more abundant.

Winter dens are usually found between 6,000 and 8,000 feet. Dens can be excavated by digging, or "found" as naturally protected locations such as small caves, rock overhangs, and among the roots of an upturned tree. They generally return to the same area, and several bears may concentrate in an area that offers favorable den conditions.

Some grizzlies line the den chamber floor with vegetation, allowing just enough room to turn around. This minimizes heat loss through the long, cold, high-elevation winter. Snow depth and isolation, not vegetative cover, seem to be the desired factors for den location. Some den sites are in timber, others are in open areas.

Unlike ground squirrels and marmots, bears have their own form of hibernation.[4] The body temperature of some rodent hibernators might fall from 97°F to 40°F. Breathing will drop to one breath every six minutes, and the pulse will go from 100 beats a minute to four. Despite this deep slumber, they must wake every few days. They raise their body temperature and respiration, move around, urinate, and sometimes eat, drink, and defecate.

By contrast, a grizzly enters a deep sleep for three to five months. The bear's typical resting heart rate of 40 to 50 beats per minute drops to 8 to 12, though once a day it rises back to 40 beats per minute.[4] Body temperature drops from the upper 90s to the lower 90s. If a bear's body temperature dips below 89°F it will wake up. There is also a drop of up to 50 percent in oxygen consumption as blood is shunted from limbs to heart and brain. While a bear in this state can be aroused, chances are it will sleep solidly for months if there is no outside stimulus.

THE CUBS OF WINTER

Near the end of January, pregnant females give birth in the den. Average litter size is two, and the cubs are born tiny and helpless. A grizzly's average weight at birth is 1 pound. Black bears average half a pound. The blind, dependent cubs nurse on rich milk that is 20 to 40 percent fat (human milk contains 4 percent fat), while their mother sleepily stimulates urination and defecation by licking the cubs' anal areas. At emergence, a female with cubs may have lost 30 to 40 percent of her body weight, while females without cubs may have lost only 15 to 20 percent. Cubs weigh about 8 pounds when they emerge from the den at about 4 months old, and weigh 20 to 30 pounds by summer, depending on available diet. While the mother grizzly wakes from her deep sleep from time to time—to give birth, eat the placenta, and clean up her newborns— researchers are not sure that she ever fully comes out of hibernation until the spring. However, the cubs never hibernate. Instead, they spend their first winter drinking mother's milk and growing.

ENDNOTES

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4 https://www.nps.gov/yell/learn/nature/denning.htm

THE LIFE OF

A Montana Fish Wildlife & Parks bear management specialist has kept track of the same female grizzly for 21 years—and counting. Here he shares highlights from his journal of Grizzly Bear 500.

JANUARY 1979

In a snow-covered den high on a slope of the Rocky Mountain Front in Montana, a grizzly bear is born. The 1-pound cub nestles in her mother's fur. Nourished on rich milk she grows rapidly, and when she emerges from the den in late May with her mother, she weighs about 10 pounds.

MAY 1983

At 4 1/2 years old, the youngster is captured for the first time on a ranch several miles from where she was born. She weighs 235 pounds and is nearly blonde, with darker brown legs. She is outfitted with a radio collar labeled "Grizzly Bear 500," though she will eventually be named "Bonnie," for the rancher on whose land she liked to roam.

Grizzly Bear 500 at a livestock carcass redistribution site in 1994.
Mike Madel/MFWP

GRIZZLY 500

JUNE 1983

Grizzly Bear 500 is seen traveling with a male grizzly. She is in estrus, meaning she is receptive to mating. Grizzly Bear 500 spends most of this year on plains and river bottoms west of Choteau, Montana. Her range is only 23 square miles.

1984

At 5 years old, she has her first cubs: one female, two males. The family spends spring, summer, and fall on the prairie and along streams. Her range is now 35 square miles. In late October, the family enters a newly dug den for the winter.

1985

Spring and summer are very dry. Grizzly Bear 500 and her 1-year-old cubs get into trouble for the first time, raiding and damaging beehives near houses. The family is captured and moved 58 miles west to the other side of the Rocky Mountains. One male yearling dies from injury sustained in the capture. She and the two remaining cubs are back two weeks later and do more damage to the beehives. On June 29, 1985, the bears are captured again and moved farther west, to the Mission Mountains 70 air miles away. Grizzly Bear 500 and her offspring are back by late summer. The beehives have been removed. A dry summer and little food cause her to roam and increase her range. She weighs 300 pounds and her fur has turned dark brown, though her head and hump are still blond. There is no trouble with people this fall.

1986

Grizzly Bear 500 emerges from the den in April with her offspring, who are now 2 years old. Soon after emerging, she leaves the youngsters. Although she is not seen with a male, she probably mates this spring.

The newly independent cubs stay together, raiding, and damaging beehives. In May, the young female is captured under the porch of a ranch house and moved permanently to the Detroit City Zoo. The young male raids more beehives then disappears.

Using a signal transmitted from her radio collar, biologists keep track of Bonnie through the year until she dens. Her range is now 77 square miles. In October, while in the den, the radio collar quits.

1987–1989

Although her radio collar is not working, Grizzly Bear 500 probably remains in her home range along the Rocky Mountain Front. In the fall of 1988, a large female with her coloring is seen with a yearling. The beehives are now protected with an electric fence.

THE LIFE OF GRIZZLY 500

OCTOBER 1989

Grizzly Bear 500 is captured for the fourth time in 10 years. She has two cubs, and the family has been preying on sheep next to a ranch home. Grizzly Bear 500 is a fat 450 pounds. She is almost all brown, with only a golden head. The cubs are a healthy 120 pounds each. With a new radio collar, she and the cubs are moved 131 miles, to the Montana-British Columbia border. She goes north into Canada and disappears in mid-October, probably into a den.

1990

In May, Grizzly Bear 500 appears with her yearlings back in Montana. She has a very strong homing instinct and has traveled over some of the roughest mountains in the United States to get back to her home range. In the summer, the female cub is illegally killed and the second cub disappears.

1991

At 12 years old, Grizzly Bear 500 gives birth to two cubs, her fourth litter. It's a dry summer. The bear family damages two bee yards, one with no electric fence and the other with an electric fence that isn't working. The owners fix the fence; Grizzly Bear 500 ventures far to the east, away from the safety of the mountains, but stays out of trouble.

Grizzly bear damage to domestic beehives.
Mike Madel/MFWP

1992

Quiet, rainy year. The family does not have to roam far for food.

1993 AND 1994

Grizzly Bear 500 separates from her cubs. The cubs play and travel together. No problems with people. A hidden camera takes her picture in the summer of 1994. Now 15 years old, she's chocolate brown, heavy, and healthy. In the fall of 1994, Grizzly Bear 500 loses her radio collar.

SEPTEMBER 1998 TO 2022

Grizzly Bear 500 is captured for the fifth time, trapped on this occasion well outside the recovery line. She is 19 years old

Painting of grizzly bear 500. Scenes from her life.
Robert Spannring Illustrations © 2001

and has two small female cubs of the year. The year has been poor for chokecherries, and she has been damaging domestic beehives. She is relocated a short distance up along the eastern mountain front and is monitored for the next two years. This litter of cubs stays with her for two years.

In 2000, Grizzly Bear 500 is observed breeding with a large male. Later that year she is killed by a poacher who throws her radio collar into a river. In 2004, a federal case was made against the poacher, who was found guilty and paid a fine.

As of 2022, through genetic analysis of detected or captured bears, we know Grizzly Bear 500 produced at least one female offspring, who was last captured in 2014 and is not known to have died. This female has also produced at least two cubs (a male and a female) that made it to adulthood and were captured or detected. The female (500's offspring's offspring) is not known to be dead but was last observed in 2004.
The male offspring died in a management removal as a 7-year-old, due breaking into sheds for livestock feed.

CHAPTER 5

THE SCIENCE OF GRIZZLY BEAR MANAGEMENT

Wildlife agencies are faced with the challenge of maintaining a large enough number and wide enough distribution of bears to ensure long-term existence, while working to minimize conflicts between bears and humans. Wildlife managers rely heavily on science, technology, and mathematical modeling for grizzly bear research and management.

All science begins with a question. To manage bears and better understand bears' biological and habitat needs, biologists may create population models to answer questions of how populations grow and decline, persist or perish. Specific information must be gathered to put these models to use. Vital information includes:

1. Age-specific and sex-specific survival rates
2. Reproductive rates
3. Mean litter size
4. Age at first reproduction
5. Reproductive interval

This type of information is gathered in many ways, depending on the species. For game animals such as deer or elk, aerial surveys can be used to count herds and estimate adult/offspring ratios.

Grizzlies can be more difficult to count than fish or elk. Bears are likely to be in thick cover or in remote, rugged forests and mountains, and are often inactive midday. Unduplicated sightings of females with cubs can be used as one index of population change. Advances in DNA work have led to other effective methods of estimating populations in which individual bears can be identified.

COLLECTING DATA

One way to document demographic rates and movements of grizzly bears is through capture and radio-collar monitoring methods. When a bear is captured for research, it is sedated and often fitted with a tracking collar. Throughout the bear-handling process, biologists

Attaching a radio collar to a sedated grizzly bear.
Rob Green

COLLECTING DATA

RIGHT: Bear manager hauling culvert bear trap.
Wesley Sarmento

BELOW: Culvert trap with bear approaching.
Rob Green

BOTTOM LEFT: Rory Trimbo, FWP Bear Biologist, preparing sedation drug.
Rob Green

BOTTOM RIGHT: Grizzly in culvert trap sedated.
Rob Green

TOP: Jamie Jonkel, FWP Bear Manager collecting data by measuring a bear.
Rob Green

ABOVE: FWP Bear Managers weighing a grizzly bear.
Rob Green

RIGHT: Female grizzly wearing collar in Yellowstone National Park.

TOP: FWP plane used for aerial surveys.

MIDDLE: Tim Manley, FWP Bear Manager, doing an aerial bear survey.

LEFT: Tim Manley, FWP Bear Manager with telemetry.

monitor the bear's vitals and level of sedation. They also weigh and measure the bear, take hair and blood samples, check the bear's overall health, and pull a small premolar tooth for lab analysis of age. This aging method involves counting cementum layers in a stained cross-section of the tooth, like tree rings.

Once activated, the collar can be used to locate the bear. A traditional radio collar, called a VHF (very high frequency) collar, contains a transmitter that emits a signal at a unique, assigned frequency. This style of collar works like a car radio. The animals' signals (unique frequencies) are like the radio stations, and the car radio is like the receiver and antennae used by biologists trying to locate the animal. They can change the "station" to check for different individuals. However, modern collars have a GPS or Iridium satellite system, where the collars' computers gather and send location information through the satellite network surrounding the planet to follow individual bears and determine how they are using the habitat, without even seeing the animal. All collars contain a battery with a limited lifespan, so a cotton spacer is attached in the collar, which will rot and break apart after a certain amount of time so the collar can be retrieved, and the battery replaced. GPS and Iridium collars can be programmed to collect data at a wide range of time intervals, depending on the kind of information the biologist is trying to gather. The collar's computer can also contain a virtual fence that when a bear crosses over the "fence" it starts collecting different information, such as how

a bear chooses to traverse through the network of homes within a river valley.

Genetic Technology such as collecting DNA samples, is an important tool for bear management. Biologists can identify bear species, individual animals, sex, and more, with DNA samples from hair and droppings (scat). Without even handling a bear, scientists can estimate population size or density and determine the sex ratio for black or grizzly bears from hair collected in remote hair traps. These "hair snares" consist of a strand of barbed wire and a scent lure.

Genetic information, along with grizzly bear monitoring using telemetry, GPS radio collar, and aircraft surveys are all used to run population models. Population models are an important tool scientists use to understand wildlife population trends based on the data they can collect. They rely on models because they give us the best picture of what is happening in a population. Grizzly bears are notoriously difficult to count, and models consider a variety of data over a long period of time to identify trends.

MANAGING BEARS, MANAGING PEOPLE

To effectively prevent grizzly bears from coming into conflict with people, biologists must work closely with local communities and residents of bear country. Bears are naturally curious problem-solvers, adept at finding new food sources in order to survive. People recreating or living in bear habitat can attract grizzlies with unnatural foods, garbage, or other odors. Garbage, camping foods, dog food, bird seed, grain spills, livestock carcasses, and small animals such as poultry, rabbits, and sheep (and their foods), are all bear attractants. A hungry or curious grizzly may damage property.

One of the most significant and successful solutions to human-bear conflict has also been one of the simplest: proper storage of human food and garbage. Bears are opportunists. If new food sources become available, the grizzly is quick to locate them. This includes dead livestock, human refuse, grain spills, and beehives. Bear managers frequently respond to conflict by helping landowners remove or secure whatever food source was bringing the bears in close to people. For example, managers on the East Front regularly clean up spilled grain to prevent bears from coming near farms.

Biologists often use aversive conditioning techniques to reduce human-grizzly conflicts. These techniques include rubber bullets, paintball markers, cracker shells, specially trained dogs, scare devices, and propane guns These techniques are used to create an unpleasant experience when the bear is engaged in undesirable behavior. Ideally, these techniques result in the bear creating a strong connection between humans and the aversive techniques.

Ranchers lose livestock

TELLTALE TEETH

Believe it or not, pulling one bear's tooth can yield information about a whole bear population. New layers of "cementum" grow on a bear's tooth every year, producing annual growth rings that, under a microscope, look like the rings of a tree trunk. The number of rings reveals the bear's age. Knowing the age structure of a population is important for monitoring that population. Bear researchers usually pull the first premolar from each newly captured grizzly that is at least 2 years old. Pulling the first premolar, which is small and insignificant, does not leave a gap in the animal's jaw or affect the bear's ability to eat.

FWP Bear biologist examining bear teeth – Rob Green

A FED BEAR IS A DEAD BEAR

The grizzly's life strategy evolved to take advantage of concentrations of high-calorie foods. Human food, pet food, and livestock feed can become irresistible to bears. Once a bear discovers a good source of food, it will likely return to that source—whether in a pasture or on a porch. Grizzly bears can be aggressive in defending their food. Bears that come into conflict with people may have to be relocated, but this isn't a permanent solution. Relocated bears can be back in a matter of days. The ones that don't return may not survive in their new location because of unfamiliarity with the area's food resources or denning areas. And another bear may replace the first bear if the food attractant remains available. In any case, the life of a bear that comes into conflict with people is likely to be a short one.

Manage Bear Attractants

1. Store garbage cans and barbecue grills in secure garages or sheds.
2. Never leave dog food outside.
3. Take bird feeders down in early spring.
4. String electric fence around beehives.
5. Don't allow fruit to lay on the ground under fruit trees.

FWP Bear Managers helping clean up and better secure bear attractants on a landowner's property.

due to natural causes, especially during the spring calving season. In the spring of the year, grizzlies intensively seek out livestock carcass boneyards along the east front of the Rockies. Carcasses are now removed in much of grizzly bear range by wildlife managers and other groups. Removing carcasses prevents bears from being drawn in close to people and livestock, thus preventing potential conflicts. Regulations require livestock feed and human food and garbage be made inaccessible to bears on public lands, including national forests and national parks.

Electric fences are used to surround beehives, chicken coops, calf pens, sheep bedding grounds, and horses in outfitters' camps. When a bear tries to get through the fence, it gets a zap it does not forget. Electric fences are an amazingly effective tool to stop bears. Sometimes bears involved in conflict are trapped and relocated.

Traps are made from culvert-like pipes with a door that drops shut when the bear enters and grabs a bait. Trapping bears, however, is not usually a cost-effective way to manage the problem. It is a short-term solution to a long-term problem. For example, it's far more cost effective to put an electric fence around a bee yard than to move every bear that destroys the hives. Grizzlies have a tremendous memory and an ability to travel long distances, even hundreds of miles, to return to where they have found food. If the bear is repeatedly found in conflict, it's likely to be euthanized. That's why

Apiary with electric fencing.
Wesley Sarmento

bear managers use other tools to modify bear behavior.

Propane canon and scare devices are a tactic used with limited success. The advantage to propane canon and scare devices are that they can be set at remote locations and left unattended for days. The propane canon goes off periodically, making a loud BANG that scares animals away. Electric scare devices work by motion activation; thus, sirens go off when a bear walks up, which scares them away. However, if left too long in one spot, bears can become familiar with scare devices causing them to lose their effectiveness.

Temporary road and trail closures are occasionally used to solve the person-side of the equation in human-bear conflict issues. Closures are sometimes used when large food sources, such as dead horses or other large animals, are near a trail or campsite and their removal isn't possible. Closures keep people out of areas where bears have been active. Closures also allow bears to make better use of habitat in the absence of humans. For example, the seasonal closure in the Mission Mountains Tribal Wilderness that allows bears to feed, undisturbed, on army cutworm moths for several months each year. Whether authorities are trying to trap a bear in the closed area or simply keep humans and bears apart, closures reduce the potential for conflicts.

More of the conflicts are happening outside demographic monitoring areas, where there is more private land. Educating people remains the best tool for reducing bear-human conflict. State, federal and tribal agencies, schools, even some towns have programs about bears and how to be safe in bear country. The more people know about bears, the better they will be able to live and recreate in bear country.

TOP: FWP Hauling livestock carcasses. ABOVE: Bear warning sign.
Wesley Sarmento

ENDNOTES

1 https://igbconline.org/be-bear-aware/food-storage/

CHAPTER 6

REDUCING HUMAN-BEAR CONFLICT

In Chapter 5, grizzly bear management was described in detail. For many decades, wildlife managers spent much of their time helping to recover this species with the management practices detailed in that chapter. Research and monitoring continue and provide a foundation for bear management decision-making. You also learned that the grizzly bear populations in Montana have increased, and their distribution has expanded, which has expanded efforts at reducing human-bear conflict across a larger footprint of land. Reducing human-bear conflict is complex and often depends on the location, the risk to human safety, threat to livestock, and to a degree, the level of cultural and social carrying capacity. There is no single universal recipe being used by wildlife agencies. For example, an encounter with a grizzly bear while hiking in the forest is much different than an encounter with a grizzly bear on private property where people are working and living with grizzlies. Ultimately, as bear and human presence expands in Montana, we need to apply tools that are most effective in these areas.

HOW TO AVOID A CONFLICT WITH A GRIZZLY BEAR

The more one knows about bears and bear behavior, the more successful one will be in avoiding a bear conflict. It is important to bear in mind the following when it comes to reducing human-grizzly bear conflict:

1. Bears can be anywhere (assume their presence and learn how to identify their sign). Generally speaking, grizzly bears can be found anywhere west of Billings. See map on page 16.

Black bear getting into bird feeder.
Adobe Photo Stock

TOP: Hikers carrying bear spray and traveling in a group for safety.
NPS/Neal Herbert

ABOVE: Simulated bear cache at FWP education program.

2. Preventing a conflict is easier than resolving a conflict.
3. Keep food and other attractants away from bears
4. Be prepared to handle bear encounters and carry bear spray.

HOW TO AVOID CONFLICT WITH A GRIZZLY BEAR WHILE RECREATING

Avoiding a conflict is easier than dealing with a conflict. You can minimize the chance of an encounter, or at least surprise encounters, by understanding bear behavior when you recreate outdoors. Bears like to travel on game trails, human trails, and along water. They often rest in cool, dark, thick forests or brush. Often bears are resting during the mid-day when humans are most active. You can avoid most encounters by doing the following:

- Stay alert and look for bear activity, especially where visibility or hearing is limited (woods, bushy areas, streams). Signs of bear activity include tracks, scat, bear rub trees, beds or even the presence of scavengers like magpies, ravens, or crows.
- Travel in a group and keep members together (especially kids).
- Make noise whenever possible to avoid surprising a bear, especially where visibility or hearing is limited.
- Avoid traveling at night, dawn, or dusk.
- Avoid carcass sites and scavenger concentrations. Use all your senses to pick up on the smell of carrion or sounds of scavenging birds.
- Understand that anyone traveling quickly (i.e. mountain biker, trail runner) is at a higher risk of surprising a bear.

ABOVE LEFT: Stay alert for signs of bear activity, such as scat.

ABOVE RIGHT: Always carry bear spray.

- Keep food and other attractants secured and out of the reach of bears.
- Always carry bear spray in case you do have an encounter.

Special Consideration for Hunters:

- Pack meat out as soon as possible.
- Avoid cutting up carcass at dusk or night.
- If you kill an animal at dusk, be prepared to cut up carcass in the dark by carrying strong headlamps. Be extra vigilant and watch for bears.
- Properly hang meat until you can retrieve your downed game.
- If you must leave your animal, return to the site carefully. Leave it in an area that is easily observable from a distance.
- Drag gut piles at least 100 yards from your carcass as soon as possible.
- If a bear has claimed your animal, do not attempt to haze or frighten the bear away. Report any lost game to FWP.
- Bird hunters should be extra careful while walking in and along areas of brush because grizzly bears use thick cover for day beds - especially along waterways. Bird hunters should walk with the wind, carry bear spray, and keep a close eye on hunting dogs. If there is abundant fresh sign of grizzly bears in the area, consider bird hunting somewhere else.

Special Consideration for Anglers:

- Make noise when approaching streams or rivers where visibility is poor and/or rushing water makes it difficult for bears to hear you approaching.
- Carry bear spray on you, especially if you are wading or shore fishing.
- When possible, clean fish at a designated fish-cleaning station, or at home.
- If you live in bear country, place entrails and fish waste into the freezer

TOP: Bear proof garbage and recycling bins.
ABOVE: Chicken coop with electric fence.

until the morning of garbage day. Do not leave fish waste outside in garbage cans for multiple days, as bears will be attracted to the smell.

- Cut filleted fish carcasses into smaller pieces that can be easily carried away in the current.
- Toss all fish waste into deep, fast-moving currents. Do not leave entrails or other fish waste on the bank or in shallow water.
- Store fish on ice in a certified bear-proof container. Coolers are not bear proof. If you use a cooler, keep it near you and closely attend it.

HOW TO AVOID A CONFLICT WITH A GRIZZLY BEAR ON PRIVATE PROPERTY

Landowners/Residents (Permanent & Seasonal):

- Properly store garbage in a certified bear-resistant bin or

Bee apiary surrounded by an electric fence.
MTFWP

in a secured building (four walls, roof, and door with latch) at all times, until the day of disposal.

- Do not leave pet food, bird feeders and bird seed, or livestock feed out in vulnerable places.
- Keep grills and BBQs clean of food and grease. Store in a secured building when not in use.
- Bears are attracted to fruit-bearing trees and bushes, gardens, and compost piles. Install electric fencing as needed. Pick fruit immediately when ripe.
- When possible, secure vulnerable livestock (i.e. chickens, goats, sheep) with an electric fence.
- Don't let grizzly bears linger in your yard because this can lead to habituation.
- Notify your neighbors if you do observe a grizzly bear in the area to help make others aware.
- Grizzly bears can be deterred from areas near homes using U.S. Fish and Wildlife Service-approved techniques. This helps reinforce bears' fear of people.

Agricultural (Farmers & Ranchers):

As was mentioned above, agricultural producers face many challenges when it comes to living and working with grizzlies on the landscape. Below are some of the strategies livestock producers have used to reduce and avoid having a conflict with a grizzly bear.

- Stored and removed attractants such as grain spills, food waste, and scented products.
- Placed tarps under loaders when transferring grain to prevent spills.
- Disposed of old grain through sanitation services, burning, or dumping away from people, buildings, and livestock.
- Didn't leave out pet food or livestock feed and supplements.
- Secured pesticides, herbicides, biodiesel, and other similar products.
- Secured attractants in hard-sided buildings with four walls, a roof, and locking door.

- Disposed of carcasses and afterbirth through sanitation services, inside an electrified boneyard, or by distributing away from people, buildings, and livestock.
- Installed electric fences around immovable attractants, such as birthing grounds, sheep-bedding areas, bee apiaries, compost piles, gardens, fruit trees, berry bushes, or corn fields.
- Secured vulnerable animals within an electric fence when unattended by people or at night. Vulnerable livestock include young, sick or injured livestock, and small livestock such as poultry, goats, sheep, or rabbits.
- Located vulnerable livestock, calving and lambing areas away from riparian areas and heavy shrub/tree cover from spring to fall, when grizzly bears are more active and livestock are more vulnerable.
- Placed creep feeders, molasses, and mineral blocks in open areas where livestock can easily view the area before entering.
- Shifted calving seasons to earlier or later times of the year when bears are less active.
- Used range-riders, livestock guardian dogs, and/or other protective herd companions.
- Maintained shelterbelts/windows annually to improve visibility and prevent bears using them as bedding areas.
- Hazed bears using U.S. Fish and Wildlife Service's approved techniques.

Methods for Securing Attractants:

- In a hard-sided building, shed, or barn with a locking/latching door.
- In a steel drum with locking lid, or another certified bear-resistant container.
- Within an electric fence:
  - Can be portable or permanent.
  - Come in a variety of styles including mesh or multiple-strand operations.
  - Can be added to permanent fence structures.
  - For more information on electric fence design, see link in "Resources" portion of this guide. FWP can assist with design and installation.
  - Partial cost reimbursement programs are available.

BE PREPARED TO HANDLE A BEAR ENCOUNTER

There will always be times when bears and humans encounter each other. The bear's response will be determined by the situation and its previous experience with humans. The human's response will be determined by the situation, previous experience with bears, and what he or she has learned about bears and bear behavior.

- In any bear encounter, your behavior matters. Bears respond to your actions. During an encounter with a bear:
  - Never run away. You cannot outrun a bear. Running may trigger a bear to chase.

- Never approach a bear.

- Different situations call for different responses:
  - If you see a bear at a distance, the bear appears unaware of you, and you can move away undetected, do so quietly when the bear is not looking toward you.
  - If you cannot avoid a bear that sees you, stand your ground and watch its behavior. Back away when it "disengages" or becomes uninterested in you.
  - If a bear enters or reaches into your tent, use your bear spray and fight back.
- In an encounter, the bear's behavior, rather than its species, should determine how you respond.
- You can slowly back away if a bear is not actively engaged with you (looking away, ignoring you, running away, or retreating).
- If the bear is actively focused on you, see below for a more detailed explanation of how to respond.

TOP: A charging grizzly bear.
NPS/Jim Peaco

ABOVE: Learning how to use inert bear spray.
Ken Tidy

FWP/Danielle Oyler

IF A BEAR SHOWS AGITATED/ DEFENSIVE BEHAVIOR Huffing, jaws clacking, head swaying back and forth, bellowing, swatting the ground, hopping forward, and/ or drooling	IF A BEAR SHOWS PREDATORY/ CURIOUS BEHAVIORS Follows you, or slowly, purposefully or methodically approaches you
Stand your ground. Get bear spray out and ready. Use your bear spray if you feel threatened and the bear is within range. Bear spray can be effective at 25-30 feet. Speak in a calm manner until the bear moves off. If a bear charges, or appears ready to charge: If the bear is going to touch you, go face down on the ground, cover your neck and head as much as possible, and deploy your bear spray in the bear's face. If you do not have bear spray, play dead if it is a grizzly bear, fight back if it is a black bear.	Stand your ground. Get bear spray out and ready. Use your bear spray if you feel threatened and the bear is within range. Bear spray can be effective at 25-30 feet. Get aggressive: wave your arms and shout vigorously. Fight back if it makes contact.

- Why bear spray?
  - It has a high level of effectiveness.
  - For most people, it's easy to use.
  - When rescuing a person being threatened or mauled by a bear, bear spray poses less risk of collateral damage than a firearm.

REFERENCE SECTION

GLOSSARY OF BEAR TERMINOLOGY

Aa

Age specific home range – the area where an animal spends most of its time based on its age.

Aircraft survey – using a fixed-wing aircraft or helicopter to estimate the abundance of wildlife species and the rate of population change.

Animal matter – any product or derivative of animal life.

Annual home range – the area where an animal spends most of its time on a yearly basis.

Anthropogenic foods – foods generally derived directly or indirectly from humans – usually non-natural (e.g., garbage), but can also be natural e.g., orchard fruit, artificially planted landscaping like berry bushes or trees that bear nuts.

Attractants – refers to any material that appeals to bears and draws them to an area. This includes garbage, birdseed, and human/pet food, smells, and non-food items, such as petroleum products or citronella. Attractants may also include natural foods, like berry bushes, or clover.

Aggressive behavior – actual or symbolic attack (threats), often ritualized, to settle conflict between two individuals (Herrero 1983) – bear to bear or bear to human.

Aversive conditioning – a structured program applying deterrents consistently and sustainably over an identified time period to achieve modification of an animal's behavior by pairing the undesired behavior with pain or an unpleasant stimulus (Morrison 2005).

Bb

Backcountry – land that is away from settlements or other human development, examples: national parks and national forests.

Bag limit - the number of a single species you can harvest in a single day.

Bear resistant container/bin - a fully enclosed container with a lid certified by the Interagency Grizzly Bear Committee (IGBC) or approved by FWP. The lid must have a latching mechanism or other device of sufficient design and strength to prevent access of the contents by bears.

Bluff or false charge – a type of behavior exhibited by bears that can be characterized by a bear running or moving toward a person but veering off or stopping before making physical contact; this is almost always accompanied by other ritualized displays, like huffing, jaw popping, or slapping the ground. Usually defensive or dominance behavior.

Boar – the name of a male bear.

FACING PAGE: Montana black bear
Courtesy Kurt Cunningham

Cc

Calving – to give birth to a calf.

Carcass – the dead body of an animal.

Carnivore – a flesh-eating animal.

Carrion – dead and decaying flesh.

Cementum – a thin layer of hard dental tissue covering the anatomic roots of teeth.

Community – all the people living in the same place; neighborhood; all the living things in any one place.

Conservation – the care, wise use, and management of natural resources in order to prevent depletion.

Contiguous – touching along a boundary or at a point.

Corm – a rounded, thick, underground stem, covered with membranes or scaly leaves, like a bulb.

Cub – a baby bear.

Cub of the year (COY) – cubs born that year as opposed to the older cubs still with their mother.

Curious behavior (in bears) – a bear showing interest usually in the absence of signs of stress. Often bears display curious behavior because they are young and inexperienced, interested in food, have become food-conditioned, or are predatory.

Dd

Database – collection of data, or information, that is specially organized for rapid search and retrieval by a computer.

Defensive behavior (in bears) – body language used by bears to show stress and attempt to deter a threat from causing harm. Typically bears show defensive behavior toward other bears or people in defense of cubs, food sources, or when a threat is too close. The behavior includes direct eye contact, jaw popping, huffing, swatting, lunging, and bluff or false charges.

Demographic monitoring area – the boundary within which all demographic criteria for the Yellowstone and NCDE grizzly bearpopulations are currently monitored and evaluated.

Denning – during the fall, grizzly bears will dig or find a suitable den to hibernate in. If a female grizzly bear is pregnant, she will have her cubs in the den during the hibernation period. She will not emerge from the den with her cubs until the spring.

Depredation – the act of preying upon.

Destroy – refers to the killing of a bear involved in a human-bear conflict by an official.

Deterrent – a negative stimulus intended to discourage or prevent unwanted behavior.

Distribution – the area occupied by that population or species.

Dormancy – an inactive or resting condition in which the life processes of an animal or plant are slowed down or suspended.

Ee

Ecology – the study of the interrelationships among living organisms, and between organisms and all aspects – living and nonliving – of their environment.

Ecosystem – a community of living things together with its physical environment, considered as a unit. A community of animals, plants, and bacteria interacting with each other and with their nonliving (chemical and physical) surroundings.

Endangered species – a species of animal or plant that is in immediate danger of becoming extinct.

Extinct – used to refer to species of animals or plants whose members have completely disappeared.

Extirpated – (also known as "local extinction") describes the situation in which a species or population no longer exists within a certain geographical location. Unlike extinction, whereby a species no longer exists anywhere, extirpation means that at least one other population of the species persists in other areas. (Biologydictionary.com)

Ff

Food chain – a group of animals and plants in a community through which energy, in the form of food, flows.

Food conditioning – an association formed by an animal, in this case a bear, between people or human-use areas and food.

Forage – to search for, obtain, and consume food.

Gg

Genus – a category of organisms ranking below a family and above a species.

Global Positioning System (GPS) – a navigational system using satellite signals to fix the location of a radio receiver on or above the Earth's surface.

GPS collar – tracking collars that allow for remote detection of the collared animal's position. The GPS is used to record the animal's exact location and store the readings at pre-set intervals. Locations are logged and can then be downloaded in various ways.

Grizzled – grayish; gray.

Grizzly – synonym for brown bear, silvertip, griz, grizzly bear. Their scientific name is Ursus arctos.

Hh

Habitat – the arrangement of food, water, shelter (cover), and space that is suitable for an animal's needs. A place where a living thing is naturally found.

Habituation (Tolerance) – the waning of response to a situation that brings neither positive nor negative outcomes for an animal. When bears are repeatedly exposed to a neutral situation, such as a person observing them from a certain distance, they conserve energy by muting their reaction. Tolerance, as opposed to habituation, is the baseline degree to which animals are willing to co-exist with humans or their infrastructure before responses have waned or increased due to learning – in other words, the level of acceptance for people an "individual" bear is born with (Herrero et al 2005, Smith et al. 2005).

Hazing – an immediate management response to a conflict situation, by using negative reinforcement, to move an animal out of an area or discourage an undesirable activity. Further application is not implied (Morrison 2005, Hunt 2003).

Herbivore – feeds predominantly on grass and other plants.

Hibernation – the state of being inactive during winter so that most or all of an animal's life processes are slowed down or suspended to a greater degree than in dormancy.

Hibernators – animals that pass the winter in a dormant state; to be in an inactive or dormant state.

Hierarchical – in order of importance.

Hind – back; rear.

Home range – area traversed by an animal during a defined part of its life (e.g. day, season, year, lifetime) in order to eat, find shelter, and reproduce. [Union of Forest Research Organizations, 2015]

Human-wildlife conflict (HWC) – HWC occurs when the needs of wildlife encroach on those of human populations, or the needs of human populations encroach upon those of wildlife. More broadly, interactions between wildlife and humans can cause damage or costs to both, and lead to conflicts between different groups of people (human-human conflicts) over wildlife and how it should be managed. [Collaborative Partnership on Sustainable Wildlife Management, Fact Sheet No. 4]

Hyperphagia – (pronounced hi-per fay-gee-uh)- literal translation of this word is "over-eating." Hyperphagia is a critical part of the yearly cycle of bears that hibernate, when they gain fat reserves before entering hibernation by eating more food and increasing the time spent feeding each day. The amount of time spent feeding each day increases up to about 20 hours/day, and they consume as many as 15,000 to 20,000 calories daily, in order to gain sufficient weight to survive the denning months without eating.

Ii

Interagency – taking place between different agencies.

Index – an indicator, sign, or measure of something.

Kk

Keystone species – a species that plays a large or critical role in supporting the integrity of its ecological community [IUCN, 2015].

Ll

Life history traits – includes such factors as the number, size and sex ratio of offspring, the timing of reproduction, age and size at maturity and growth pattern, longevity, and so on. All of these are heritable to some degree and thus subject to natural selection.

Lifetime range – an area where a particular species can be found during its lifetime.

Litter – the young animals produced at one time.

Livelihoods – a livelihood comprises the capabilities, assets (including both material and soil resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stress and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base. [Chambers & Conway, 1991]

Livestock – animals (such as cows, horses, and pigs) that are kept, raised, and used by people. [Collaborative Partnership on Sustainable Wildlife Management, 2015]

Lower 48 states – a term for the 48 U.S. contiguous states, excluding Alaska and Hawaii.

Mm

Mandatory – required.

Mesic – an environment or habitat containing moderate amount of moisture.

Model – a three-dimensional representation of a person or thing or of a proposed structure, typically on a smaller scale.

Montane – of or inhabiting mountainous country.

Nn

Natal dispersal – Natal dispersal is when juveniles undergo permanent dispersal to another location. [Laurence Mueller, in Conceptual Breakthroughs in Evolutionary Ecology, 2020]

Niche – in ecology, the term "niche" describes the role an organism plays in a community. An ecological niche refers to the interrelationship of a species with all the biotic and abiotic factors affecting it.

Nourish – to make grow; keep alive and well with food.

Nuisance – causing trouble, annoyance or danger.

Oo

Omnivore – an animal that eats both meat and plant life.

Outfitter – a business providing equipment, supplies and guides.

Open-pit garbage dumps – garbage dump that does not contain any fencing and allows bears to easily access garbage.

Opportunist – a species with a low level of specialization that is either capable of adapting to varied living conditions, or that gives priority to reproduction over survival.

Pp

Poaching – killing game illegally.

Population – a subset of individuals of one species that occupies a particular geographic area and, in sexually reproducing species, interbreeds.

Population density – the concentration of individuals within a species in a specific geographic locale.

Predator – an animal that lives by preying on other animals.

Preserve – to protect or save.

Protein – one of the substances containing nitrogen; a necessary part of the cells of plants and animals; contained in foods such as meat, milk, cheese, eggs, and beans.

Rr

Radio collar – a wide band of material-being fitted with a small radio transmitter and battery.

Reciprocity – the practice of exchanging things with others for mutual benefit, especially privileges granted by one country or organization to another.

Recovery zones – the geographical area where a grizzly bear population is being recovered as a threatened species.

Reproductive interval – amount of time between birthing young.

Reproductive output – the average product of abundance representing the reproductive effort of an individual, which is strongly related to intrinsic population growth rate and demography.

Range – an area where an animal frequents, includes the extreme limits of this area.

Relocation – moving an animal, in this context, a bear to a new location.

Removal – destruction of (euthanizing or otherwise killing) a bear or taking a bear out of the wild population (example: cubs being placed in a zoo because they can't live in the wild).

Ss

Scat – animal fecal droppings (poop).

Scavengers – animals that feed on dead or decaying matter.

Seasonal altitudinal migration/migrants – short-distance animal migration from lower altitudes to higher altitudes and back. Altitudinal migrants change their elevation with the seasons making this form of animal migration seasonal.

Sex ratio – the ratio of females to males in a species population.

Sexual dimorphism – condition where the sexes of the same species exhibit different characteristics, particularly characteristics not directly involved in reproduction. The condition occurs in most animals and some plants.

Snapshot – samples collected at one site over a continuous period of time.

Sow – a fully grown female bear.

Species – a group of organisms generally capable of interbreeding, represented in taxonomic nomenclature by a Latin term for its genus followed by an adjective for its species, as in Homo sapiens. A group of related living things that have certain basic common characteristics.

Subadult – bears that are independent from their mother, but not yet sexually mature – less than 4 to 6 years old.

Subspecies – a taxonomic category that ranks immediately below a species.

Survive – to live longer than; to continue to exist or live; to remain.

Tt

Talus slopes – steep slope usually found at the base of a mountain.

Telemetry – remote recording of behavioral, physiological, and environmental data by means of electronic tags attached to animals.

Terrain – an area of ground with a particular physical character.

Territory – land; region; an area such as a nesting ground in which an animal lives, roams, and keeps out others of its kind.

Territorial – any area defended by an organism or a group of similar organisms for such purposes as mating, nesting, roosting, or feeding.

Threatened – a species present in its historic range but whose long-term survival is in peril because of a reduction in numbers – in all or part of this area.

Torpor – a temporary drop in body temperature and metabolic rate often accompanied by failure to eat or expel waste – is an adaptation of mammals and birds that enables them to survive the energetic demands of cold temperatures.

Tracking – keeping track of; following with electronic equipment to observe or monitor a trail that a bear follows.

Travel corridor – an area of habitat connecting wildlife populations separated by human activities or structures (such as roads, development, or logging).

Tribal Nations – an American Indian or Alaska Native tribe, band, nation, pueblo, village, or community that the Secretary of the Interior acknowledges as a federally recognized tribe pursuant to the Federally Recognized Indian Tribe List Act of 1994, 25 U.S.C. 5130, 5131.

Vv

Very High Frequency Collar (VHF) - collars that send out a radio signal that researchers can listen to remotely with a signal receiver and an antenna.

Ww

Wilderness – a wild place; a region with no people living in it; a place untrammeled by man. When capitalized in documents in the United States, this word typically refers to political designation given to federal lands (in accordance with the Wilderness Act of 1964) that restricts certain types of human activities such as roads and the use of motorized equipment, and more.

Wildlife population trend – assessing trends in wildlife populations involves estimating whether those populations are stable, increasing or decreasing, and trends can infer the success or failure of management.

Yy

Yearling – a 1-year old animal.

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White, P.J., Kerry A. Gunther, and Frank T. van Manen. *Yellowstone Grizzly Bears: Ecology and Conservation of an Icon of Wildness*. Yellowstone Forever, Yellowstone National Park, 2017

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Poole, H.W. *Grizzly Bears* (*Nature's Children*). Children's Press, 2018

Rechlin, Ted. *Silvertip: A Year in the Life of a Yellowstone Grizzly*. Riverbend Publishing, 2011

Sartore, Joel. *Face to Face with Grizzlies*. National Geographic Kids, 2009.

BEAR CURRICULA

Bears of Alaska – A Teacher's Guide

Alaska Department of Fish and Game

www.adfg.alaska.gov/static/education/educators/curricula/pdfs/bears/bears_of_alaska_teachers_guide.pdf

The Bear Essentials Curriculum Guide for Teachers

Bear Trust International

https://www.beartrust.org/copy-of-grizzly

Grade Level: K-8

The Bear Essentials Curriculum Guide includes nine STEM lessons designed to help teach ecological and conservation concepts, meet National Science standards, and engage students in the scientific process.

Get Bear Smart Society

https://www.bearsmart.com/about-bears/resources-teachers-kids/

Website for teachers providing online curriculum resources, kits, books, other written materials, and songs.

Grizzly Bears: Ready for Delisting?

Bear Trust International

https://www.beartrust.org/grizzly

Grade Level: 9-12

Using six real-world data sets, students work individually, in three Science Teams, then as a class to determine whether or not the grizzly bear population in the Greater Yellowstone Ecosystem is biologically ready for delisting.

National Park Service Bear Activities/ Lesson Plans/Distance Learning

National Park Service

https://www.nps.gov/teachers/index.htm

Teachers resource web page. Can search for "bears or grizzly bears," subject (language arts, math, science, or social studies), grade level, and Common Core standards.

Project WILD – K-12 Activity Guide

Western Association of Fish & Wildlife Agencies Council for Environmental Education 2021

https://www.fishwildlife.org/projectwild/step-stem-and-wild-work

Bear Lessons or Lessons Easily Adapted for Bears:
Limiting Factors/How Many Bears? - Page 26
What Bear Goes Where? - Page 195
First Impressions - Page 278
Back from the Brink - Page 414
Interview a Spider - Page 15
Natural Delmas - Page 297
Map that Habitat - Page 73

The Importance of Grizzly Bears in Our Environment

Grizzly Bear Foundation, BC

https://grizzlybearfoundation.com/pages/teachers-corner

Grade Level: 4

The unit contains five 45-minute lessons and accompanying teaching tools, including colorful visuals, fun activities, lesson plans, and background information sheets.

Boone and Crockett Club Trail Camera Curriculum

https://www.boone-crockett.org/new-trail-camera-virtual-curriculum

Grade Level: 5-8

These colorful HD images highlight real-world wildlife research going on in Montana on a working cattle ranch! Teach your students about the science, technology and mathematical components of being a wildlife biologist while looking at actual trail camera photos!

BEAR RESOURCES

EDUCATIONAL TRUNKS

Traveling Grizzly Library

This educational trunk is housed in bear-resistant food lockers of the type used in backcountry camps. Contents include a complete curriculum, books, videos, posters, and workbooks. Materials are geared toward raising awareness of grizzly bears and related issues.

- Grade level: K-8
- Contact: Brown Bear Resources, 222 N. Higgins, Missoula, MT 59802 406-549-4896
- Cost: Shipping costs only

Bear Box

Grizzly and black bear trunk is available for pick-up only at various Montana, Fish, Wildlife & Parks locations, including all FWP Regional Offices. It includes bear hides, skulls, tracks, replica scat, inert bear spray, and other hands-on materials

- Grade level: K-12
- Contact: FWP offices near you.

Ready 2 Read Goes Wild Bear Trunk

The Ready 2 Read Goes Wild Bear Trunk was created with assistance from FWP and uses a variety of bear-focused activities from the Growing Up Wild and Project Wild activity guides, which are correlated to the National Association for the Education of Young Children (NAEYC) and Head Start standards. It is designed for educators, librarians, caregivers, and parents, and features 27 field-tested, hands-on, nature-based activities that include crafts, art projects, music, conservation activities, reading and math connections, and more. Currently, there are five public libraries in Montana that have Ready 2 Read Goes Wild Bear Trunks available for check out:

- Madison Valley Public Library in Ennis
- Lincoln County Public Library in Libby
- Choteau/Teton Public Library in Choteau
- Darby Community Public Library in Darby
- Stillwater County Public Library in Columbus

ON-LINE BEAR RESOURCES

The International Association for Bear Research and Management
www.bearbiology.org

Montana Fish, Wildlife & Parks—Be Bear Aware
fwp.mt.gov/fishAndWildlife/livingWithWildlife/beBearAware/

U.S. Fish & Wildlife Service
www.fws.gov/species/grizzly-bear-ursus-arctos-horribilis

Interagency Grizzly Bear Committee
www.IGBConline.org

Bear Trust International
www.beartrust.org

Get Bear Smart Society
www.bearsmart.com/

Great Bear Foundation
www.greatbear.org

Deterring Bears with Electrified Fencing: A Beginner's Guide
fwp.mt.gov/binaries/content/assets/fwp/conservation/wildlife-reports/bears/mfwp_electric-fencing-guide_march-2017.pdf

2020 Perceptions About and Management of Grizzly Bears (umt.edu)
cfc.umt.edu/research/humandimensions/files/hd_grizzlybear_report20200323.pdf

Results of a 2020 Survey of Montanans Regarding the Topic of Grizzly Bear Management in Montana Costello, Nesbit, Metcalf, *et. al* 2020.
final-hd-research-summary-no-47-grizzly-bear-final-1.pdf (umt.edu)

Dietary Breadth of Grizzly Bears in the Greater Yellowstone Ecosystem. Gunther, Kerry A., *et al.* Ursus, vol. 25, no. 1, 2014, pp. 61–73. JSTOR
www.jstor.org/stable/24643797. Accessed 9 Sep. 2022

GRIZZLY BEARS OF MONTANA QUIZ

NAME:

True or False?

T F 1. Grizzly bears attack people on sight.

T F 2. Grizzly mothers usually give birth to two cubs at a time.

T F 3. If grizzly bears see people in the area, the bears will probably leave them alone.

T F 4. The grizzly bear is strictly carnivorous, feeding only on the meat of elk, deer, bison, and other animals.

T F 5. Grizzly bears are always seen in groups of 6 or 7 bears.

T F 6. The grizzly bear is omnivorous, feeding on mostly vegetation (roots, berries, grass) and lesser amounts of meat.

T F 7. Grizzlies hibernate in the winter, so they cannot be wakened by changes in the weather or disturbances near their den until spring.

T F 8. Except during the mating season or when mothers have cub, grizzlies are solitary (prefer to be by themselves), although they sometimes eat at the same places.

T F 9. Grizzlies use the same den every winter.

T F 10. In general, cubs leave their mother after emerging from the den.

T F 11. At birth, grizzly cubs weigh about one pound.

T F 12. Grown-up grizzly females weigh around 800 pounds.

T F 13. Grizzly bears spend the winter in snug, relatively warm dens.

T F 14. When cubs come out of the den in spring, they with around 10 pounds and gain about 30-40 more pounds by fall.

T F 15. Grizzlies are not interested in eating garbage.

T F 16. Grizzlies fish and hunt small mammals more often than they hunt large animals such as elk and bison.

T F 17. Cubs stay with their mothers until they learn to live on their own.

T F 18. Grizzly bears prefer mountaintops to valleys and stay in the high country all summer long.

T F 19. Grizzly bears forage for food in the winter in order to survive.

T F 20. Grizzly bears do not like water and cannot swim.

T F 21. Male grizzlies are larger than females, usually weighing between 300 and 850 pounds.

T F 22. Like humans, grizzlies are only active during the day and sleep at night.

T F 23. Grizzly bears like to be in open spaces, so they almost never go into forests.

T F 24. Cubs are born in January or February and live on their mother's milk until they come out of the den in April.

T F 25. Grizzly mothers do not protect their cubs and often lose track of them.

T F 26. The grizzly's long claws are only used for killing animals.

T F 27. Grizzlies are an endangered species.

T F 28. The future of grizzlies lies with people.

T F 29. If you encounter a bear, run.

T F 30. Grizzlies are a good indicator of ecosystem health.

T F 31. Grizzlies are carnivores.

T F 32. Grizzlies are blonde, black bears are black.

T F 33. Humans can outrun bears when running downhill.

T F 34. A good rule to remember, if a grizzly attacks, play dead.

T F 35. It is illegal to hunt grizzlies in Montana.

T F 36. A grizzlies diet is mostly plant matter.

GRIZZLY BEARS OF MONTANA QUIZ

ANSWER KEY

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GRIZZLY BEAR WORD SEARCH

NAME:

C Y A F V G N I N N E D Y L F X A K
O N R M O O C F E K O P D B W T N C
N O S T W R H O W N E U T U T U X O
S I L O N X A K R D O H R R Q O O T
E T S P M U O G F R B T A I H G Z S
R A P P C C O M E S I C S A S J F E
V D V O S A O C U F T D B Y Z H O V
A E H R J F R B K A T I O Z E T G I
T R T T E F P N N C T M M R C K H L
I P A U N U V T I A A C A R C A S S
O E C N P L S Y T V D B R P X T Y I
N D S I Z B B R R R O A Y L O R Y T
E C O S Y S T E M E O R C P O F N G
A F O T I V R K Y B V M E T S E B R
S S E N R E D L I W N O A C R E N I
M D A Z G S T A N I N D C R V L T Z
O J A Z E G N A R A N U E E T F J Z
E V I S S E R G G A B T V X R P B L
R O T A D E R P M Q E W E F K S N E
T E L E M E T R Y D Z E Y P T J D D

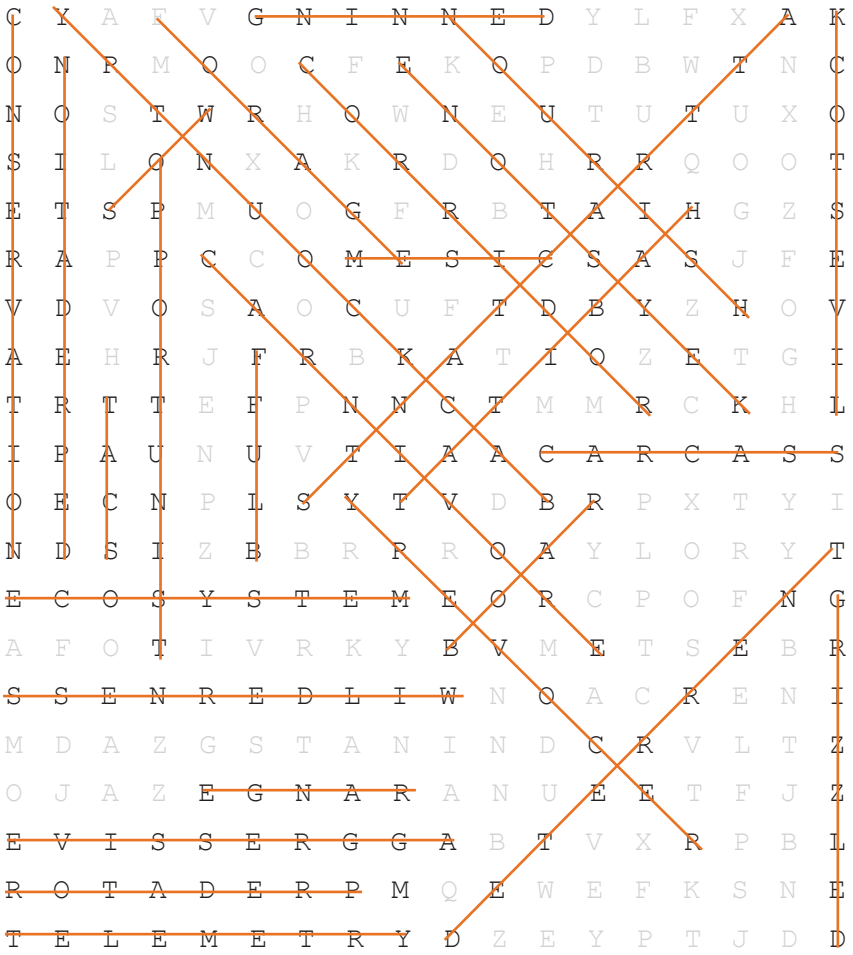
© Robert Spannring

Find the following 29 words in the grid at left. They can be forward, backward, diagonal, up, or down.

Aggressive
Attractants
Backcountry
Bluff
Boar
Carcass
Carnivore
Conservation
Corridor
Cub
Denning
Depredation
Deterrent
Ecosystem
Forage
Grizzled
Habitat
Keystone
Livestock
Mesic
Nourish
Opportunist
Predator
Recovery
Range
Scat
Sow
Telemetry
Wilderness

GRIZZLY BEAR WORD SEARCH

ANSWER KEY



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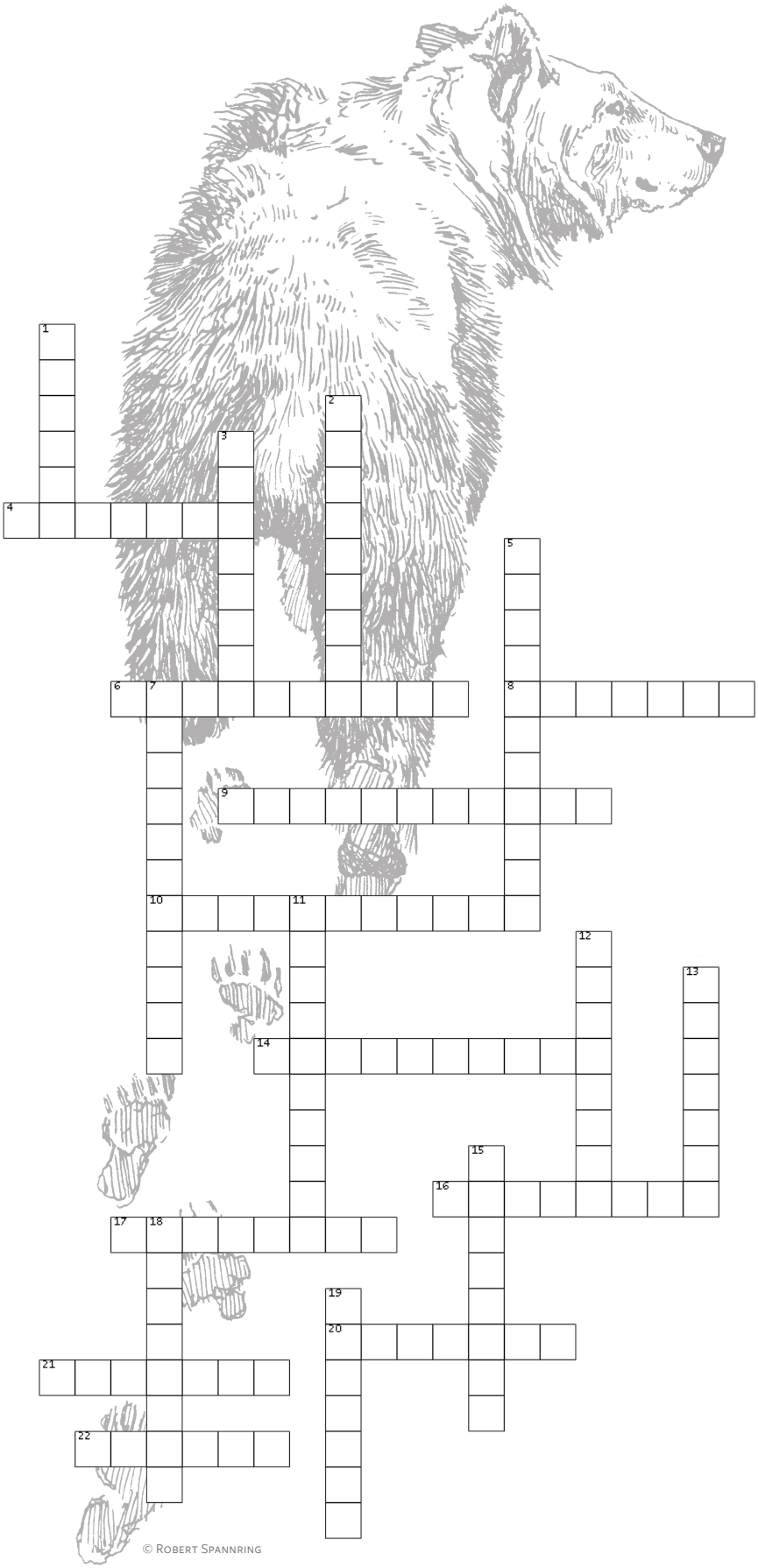
GRIZZLY BEAR CROSSWORD

NAME:



Use the clues to fill in the words above. Words can go across or down. Letters are shared when the words intersect

ACROSS

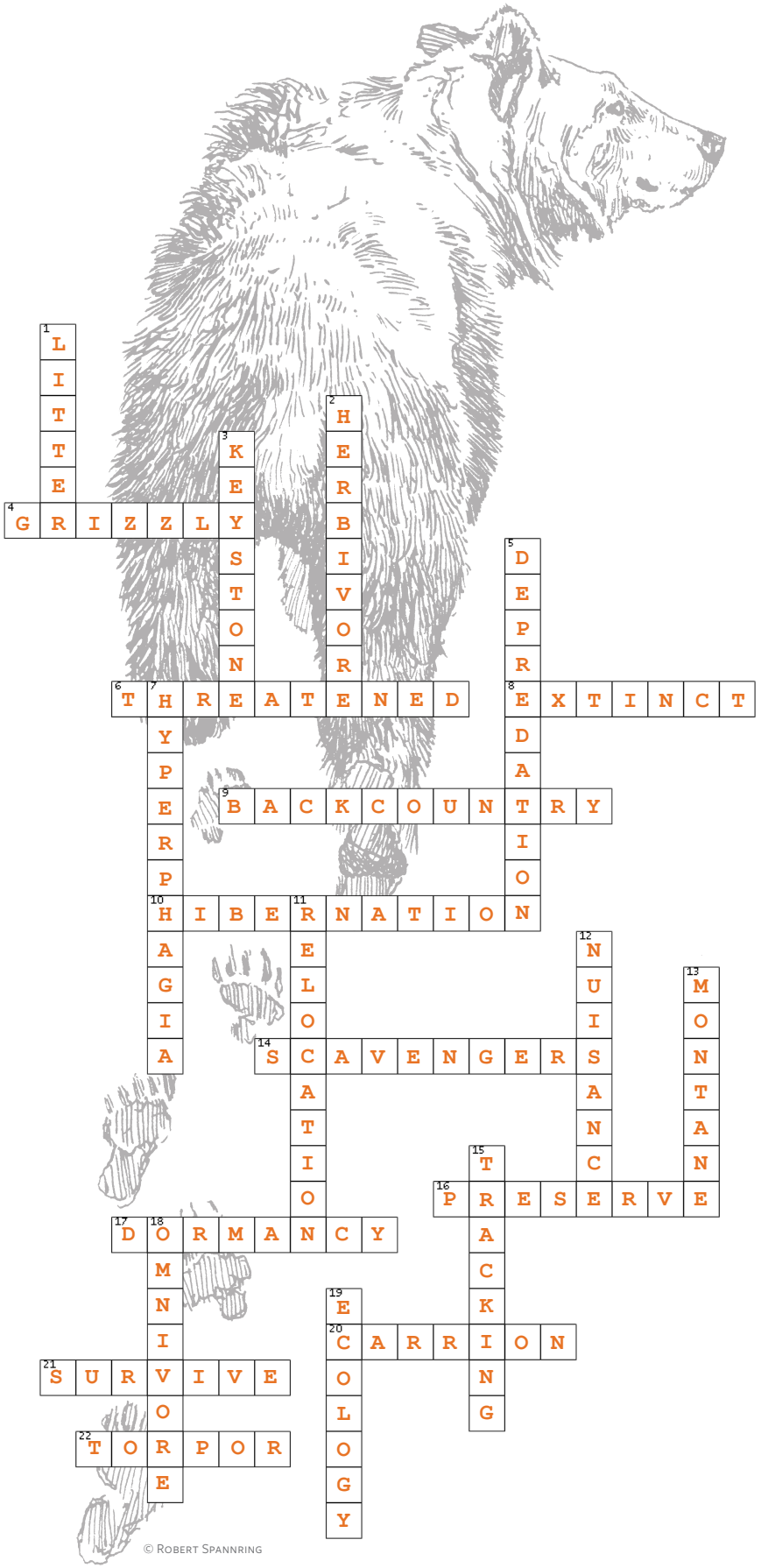
4. A synonym for brown bear or silvertip
6. A species present in its historic range but whose long-term survival is in peril because of a reduction in numbers—in all or part of this area
8. A species of animals or plants whose members have completely disappeared.
9. Land that is away from settlements or human development
10. State of being inactive during winter so that most of an animal's life processes are slowed to a greater degree than in dormancy
14. Animals that feed on dead or decaying matter
16. To protect or save
17. An inactive or resting condition in which the life processes of an animal are slowed down
20. Dead and decaying flesh
21. To live longer than; to continue to exist or live; to remain
22. A temporary drop in body temperature and metabolic rate often accompanied by failure to eat or expel waste

DOWN

1. The young animals produced at one time
2. Feeds predominantly on grass and other plants
3. A species that plays a large role in supporting the integrity of its ecological community
5. The act of preying upon
7. A critical part of the yearly cycle of bears when they gain fat reserves before entering hibernation
11. Moving an animal, in this context, a bear to a new location
12. Causing trouble or annoyance
13. Of or inhabiting mountainous country
15. Following with electronic equipment to observe or monitor a trail that a bear takes
18. An animal that eats both meat and plant life
19. The study of the interrelationships among living organisms, and between organisms and all aspects—living and nonliving—of their environment

GRIZZLY BEAR CROSSWORD

ANSWER KEY



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GRIZZLY BEAR DOUBLE PUZZLE

NAME:

DIRECTIONS
Unscramble each of the words/phrases at right. Copy the letters into the numbered cells to the corresponding numbered cells in the answer below.

LEAFS RAECGH
40 47 12 18 45

RASSCAC
13

MCOTINYUM
36 41 23 29 10

FDVIEENES IERABOVH
21 25 11 30 6

FDOO NCAHI
22 39 42 24 26 15 34

IGZHNA
8 4

ERDRTOPA
32 1

DRAOI OLRCLA
27 5

EOERRYVC SOEZN
7 43 28

PASTSNHO
46 16 2 17

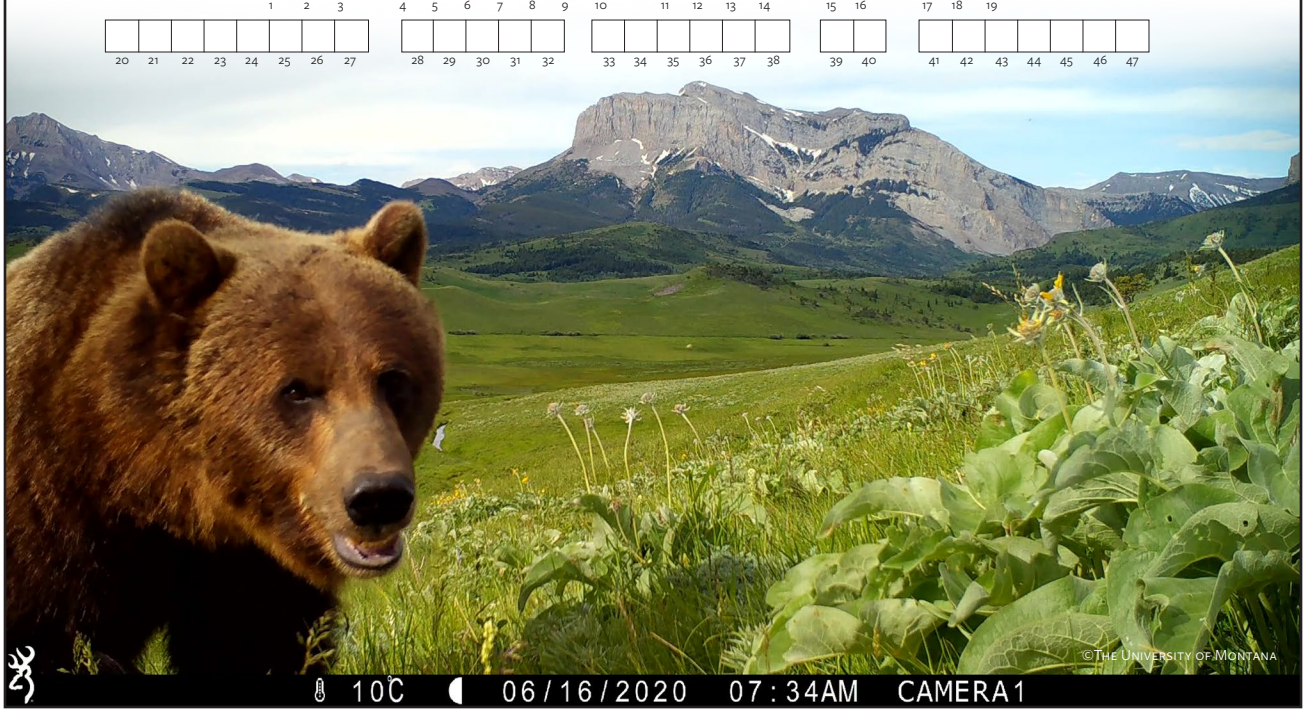
ELVTRA RIORROCD
44 37 19 9 35 14

UASTL ESPOLS
31 33 38 20 3

MESSAGE

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47



GRIZZLY BEAR DOUBLE PUZZLE

ANSWER KEY

DIRECTIONS
Unscramble each of the words/phrases at right. Copy the letters into the numbered cells to the corresponding numbered cells in the answer below.

LEAFS RAECGH — FALSE (40 47 12) CHARGE (18 45)

RASSCAC — CARCASS (13)

MCOTINYUM — COMMUNITY (36 41 23 29 10)

FDVIEENES IERABOVH — DEFENSIVE (21 25) BEHAVIOR (11 30 6)

FDOO NCAHI — FOOD (22 39 42) CHAIN (24 26 15 34)

IGZHNA — HAZING (8 4)

ERDRTOPA — PREDATOR (32 1)

DRAOI OLRCLA — RADIO (1 2 3 4 5) COLLAR (27 5)

EOERRYVC SOEZN — RECOVERY (6 7 8 9 10 11 12) ZONES (7 43 28)

PASTSNHO — SNAPSHOT (46 16 2 17)

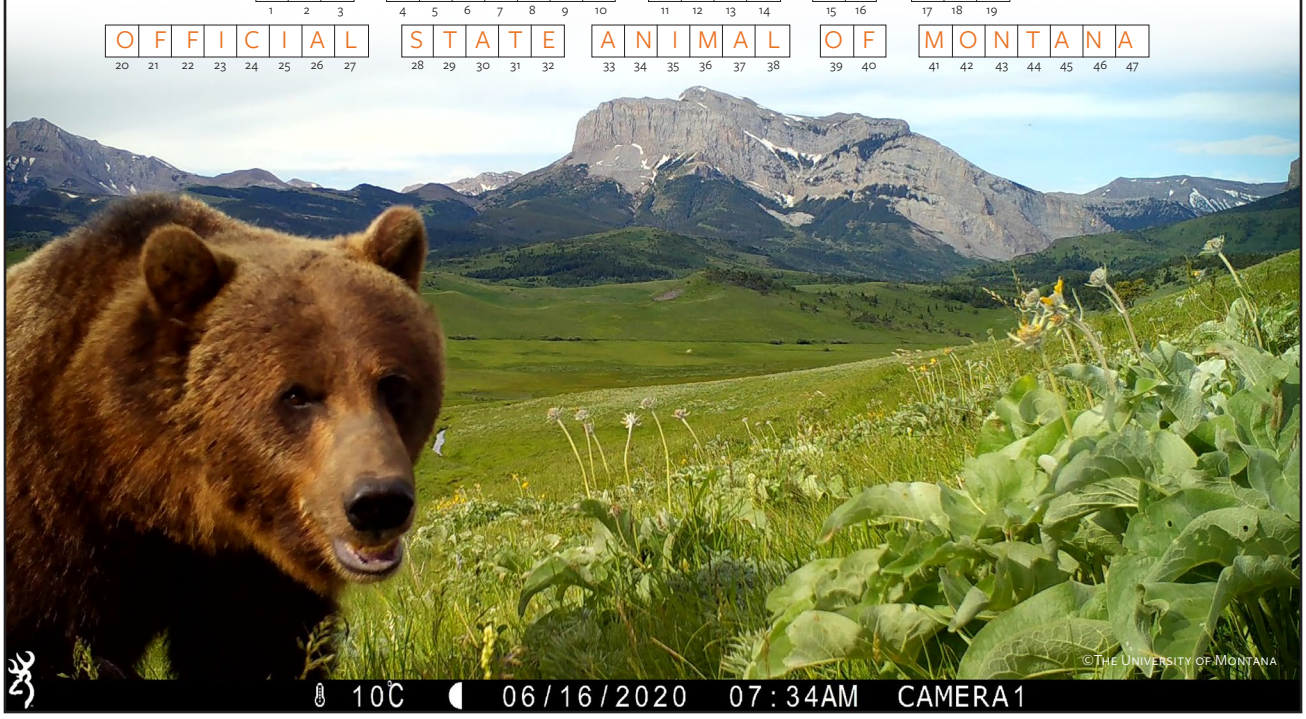
ELVTRA RIORROCD — TRAVEL (44 37 19 9) CORRIDOR (35 14)

UASTL ESPOLS — TALUS (31 33 38) SLOPES (20 3)

MESSAGE

THE (1 2 3) GRIZZLY (4 5 6 7 8 9 10) BEAR (11 12 13 14) IS (15 16) THE (17 18 19)

OFFICIAL (20 21 22 23 24 25 26 27) STATE (28 29 30 31 32) ANIMAL (33 34 35 36 37 38) OF (39 40) MONTANA (41 42 43 44 45 46 47)



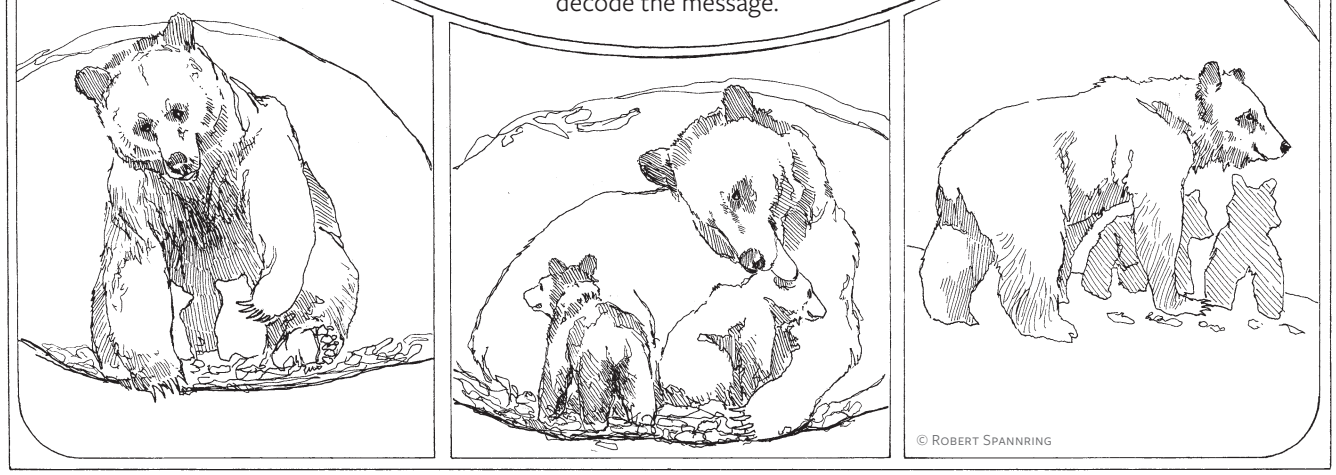
GRIZZLY BEAR CRYPTOGRAM

NAME:

8	14	12	15	19	16	19	23	11	12	5	16	17	12	S 13	15	4	21	12	6	4	14	23	H 20	4	19
H 23	20	12	D 22	12	19	4	19	26	16	19	25	16	14	3	O 23	18	23	4	19	3					
H 20	12	17	8	17	12	S 13	S 13	1	25	6	S 13	.	H 23	20	12	6	17	4	19	D 22					
D 22	12	8	12	19	D 22	12	19	23	1	25	6	S 13	19	25	14	S 13	12	O 18	19	14	4	1	H 20		
5	4	17	7	H 23	20	16	23	4	S 13	23	24	12	19	23	3	O 23	18	11	O 18	14	23	3			
8	12	14	1	12	19	23	11	16	23	.	H 20	25	5	16	19	5	4	17	7						
O 1	18	19	23	16	4	19	S 13	O 11	18	25	14	8	12	14	1	12	19	23	11	16	23	.			
S 1	25	6	13	O 15	14	18	24	O 11	14	18	5	O 18	19	12	O 8	18	25	19	D 22	16	23				
6	4	14	23	H 20	O 23	18	16	O 6	18	25	23	12	4	15	H 20	23	O 8	18	25	19	D 22	S 13			
H 24	20	12	19	H 23	20	12	3	12	5	12	14	15	12	11	O 14	18	5	H 23	20	12	D 22	12	19		
D 16	19	22	25	8	O 23	18	H 23	20	4	14	23	3	8	O 18	25	19	S 22	13	6	3					
S 13	25	5	5	12	14	.	H 24	20	4	17	12	H 23	20	12	5	O 18	23	H 20	12	14					
Z 15	Z 14	4	9	9	17	3	24	16	7	S 12	13	11	O 14	18	5	H 20	12	14	22	12	12	8			
S 13	17	12	12	8	O 18	1	1	16	S 13	4	O 18	19	16	17	17	3	,								
14	S 12	13	12	16	14	1	H 20	12	14	S 13	16	14	12	19	O 18	23	S 13	25	14	12	23	H 20	16	23	
S 13	H 20	12	12	21	12	14	11	25	17	17	3	1	O 18	5	S 12	13	O 18	25	23	O 18	11				
H 20	4	6	12	14	19	16	23	4	O 18	19	25	19	23	4	17	23	H 20	12	S 13	8	14	4	19	15	.
H 20	O 18	24	12	21	12	14	,	H 23	20	12	1	S 25	6	13	19	12	21	12	14						
H 20	4	6	12	14	19	16	23	12	.	4	19	S 13	23	12	16	D 22	,	H 23	20	12	3	S 13	8	12	19	D 22
H 23	20	12	4	14	11	4	14	S 13	23	24	4	19	23	12	14	D 22	14	4	19	7	4	19	15		
O 5	18	H 23	20	12	14	'	S 13	5	4	17	7	D 16	19	22	O 15	14	18	24	4	19	15				

DECODE THE MESSAGE.

Each letter in the phrase has been replaced with a random number. To help you get started we provided the answers to 5 letter/number combos. Try to decode the message.



A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
			22				20							18				13							9

GRIZZLY BEAR CRYPTOGRAM

ANSWER KEY

P	R	E	G	N	A	N	T		F	E	M	A	L	E	S		G	I	V	E		B	I	R	T	H		I	N
8	14	12	15	19	16	19	23		11	12	5	16	17	12	13		15	4	21	12		6	4	14	23	20		4	19

T	H	E		D	E	N		I	N		J	A	N	U	A	R	Y		T	O		T	I	N	Y
23	20	12		22	12	19		4	19		26	16	19	25	16	14	3		23	18		23	4	19	3

H	E	L	P	L	E	S	S		C	U	B	S	.		T	H	E		B	L	I	N	D
20	12	17	8	17	12	13	13		1	25	6	13			23	20	12		6	17	4	19	22

D	E	P	E	N	D	E	N	T		C	U	B	S		N	U	R	S	E		O	N		R	I	C	H
22	12	8	12	19	22	12	19	23		1	25	6	13		19	25	14	13	12		18	19		14	4	1	20

M	I	L	K		T	H	A	T		I	S		T	W	E	N	T	Y		T	O		F	O	R	T	Y
5	4	17	7		23	20	16	23		4	13		23	24	12	19	23	3		23	18		11	18	14	23	3

P	E	R	C	E	N	T		F	A	T	.		H	U	M	A	N		M	I	L	K
8	12	14	1	12	19	23		11	16	23			20	25	5	16	19		5	4	17	7

C	O	N	T	A	I	N	S		F	O	U	R		P	E	R	C	E	N	T		F	A	T	.
1	18	19	23	16	4	19	13		11	18	25	14		8	12	14	1	12	19	23		11	16	23	

C	U	B	S		G	R	O	W		F	R	O	M		O	N	E		P	O	U	N	D		A	T
1	25	6	13		15	14	18	24		11	14	18	5		18	19	12		8	18	25	19	22		16	23

B	I	R	T	H		T	O		A	B	O	U	T		E	I	G	H	T		P	O	U	N	D	S
6	4	14	23	20		23	18		16	6	18	25	23		12	4	15	20	23		8	18	25	19	22	13

W	H	E	N		T	H	E	Y		E	M	E	R	G	E		F	R	O	M		T	H	E		D	E	N
24	20	12	19		23	20	12	3		12	5	12	14	15	12		11	14	18	5		23	20	12		22	12	19

A	N	D		U	P		T	O		T	H	I	R	T	Y		P	O	U	N	D	S		B	Y
16	19	22		25	8		23	18		23	20	4	14	23	3		8	18	25	19	22	13		6	3

S	U	M	M	E	R	.		W	H	I	L	E		T	H	E		M	O	T	H	E	R
13	25	5	5	12	14			24	20	4	17	12		23	20	12		5	18	23	20	12	14

G	R	I	Z	Z	L	Y		W	A	K	E	S		F	R	O	M		H	E	R		D	E	E	P
15	14	4	9	9	17	3		24	16	7	12	13		11	14	18	5		20	12	14		22	12	12	8

S	L	E	E	P		O	C	C	A	S	I	O	N	A	L	L	Y
13	17	12	12	8		18	1	1	16	13	4	18	19	16	17	17	3

R	E	S	E	A	R	C	H	E	R	S		A	R	E		N	O	T		S	U	R	E		T	H	A	T
14	12	13	12	16	14	1	20	12	14	13		16	14	12		19	18	23		13	25	14	12		23	20	16	23

S	H	E		E	V	E	R		F	U	L	L	Y		C	O	M	E	S		O	U	T		O	F
13	20	12		12	21	12	14		11	25	17	17	3		1	18	5	12	13		18	25	23		18	11

H	I	B	E	R	N	A	T	I	O	N		U	N	T	I	L		T	H	E		S	P	R	I	N	G	.
20	4	6	12	14	19	16	23	4	18	19		25	19	23	4	17		23	20	12		13	8	14	4	19	15	

H	O	W	E	V	E	R	,		T	H	E		C	U	B	S		N	E	V	E	R
20	18	24	12	21	12	14			23	20	12		1	25	6	13		19	12	21	12	14

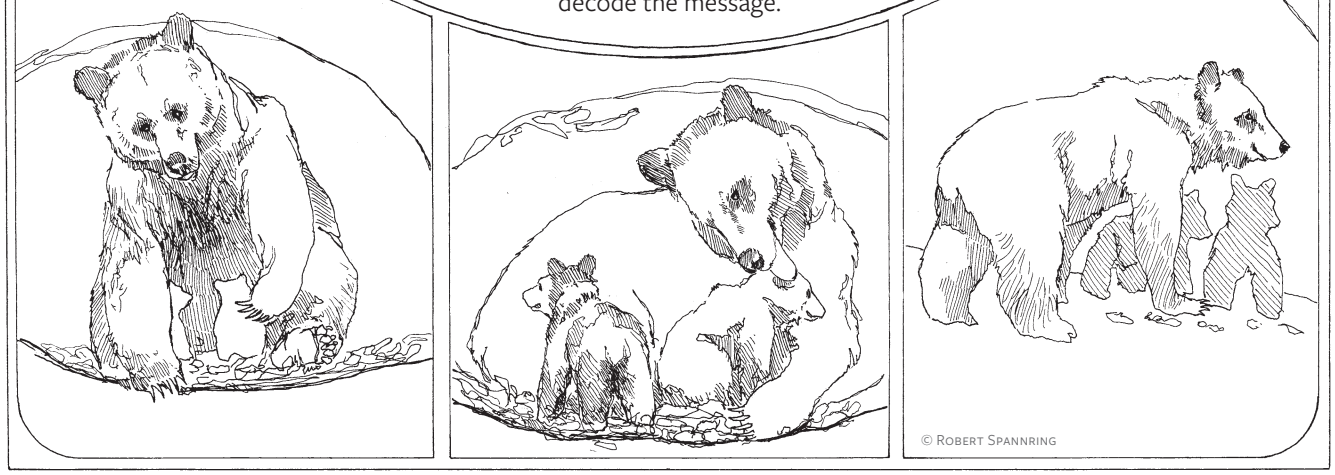
H	I	B	E	R	N	A	T	E	.		I	N	S	T	E	A	D	,		T	H	E	Y		S	P	E	N	D
20	4	6	12	14	19	16	23	12			4	19	13	23	12	16	22			23	20	12	3		13	8	12	19	22

T	H	E	I	R		F	I	R	S	T		W	I	N	T	E	R		D	R	I	N	K	I	N	G
23	20	12	4	14		11	4	14	13	23		24	4	19	23	12	14		22	14	4	19	7	4	19	15

M	O	T	H	E	R	'	S		M	I	L	K		A	N	D		G	R	O	W	I	N	G	.
5	18	23	20	12	14		13		5	4	17	7		16	19	22		15	14	18	24	4	19	15	

DECODE THE MESSAGE.

Each letter in the phrase has been replaced with a random number. To help you get started we provided the answers to 5 letter/number combos. Try to decode the message.



A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
16	6	1	22	12	11	15	20	4	26	7	17	5	19	18	8	2	14	13	23	25	21	24	10	3	9

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