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Grizzly/Brown Bears

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GRIZZLY/BROWN BEARS

Fig. 1. Grizzly/brown bear, *Ursus arctos*

Damage Prevention And Control Methods

Exclusion

Use heavy, chain-link or woven-wire fencing topped with barbed wire and buried at the bottom. Add outriggers and electrified wires to the outside perimeter. Metal (bar) cages and metal buildings will protect workers, food, and other attractants.

Cultural Methods

Keep threatened areas free of all attractants. Establish campsites, bee yards, and livestock bedding areas away from vegetation or other cover. Use proper solid waste management procedures. Prevent any rewards to bears, and immediately discourage all approaches by bears.

Frightening Devices

Boat horns, cracker shells, rifle shots, helicopter chases, yard lights, strobe lights.

Repellents and Deterrents

Capsaicin spray. Install "early warning" or detection systems around field stations or campsites. Use trained dogs to detect or deter bears. Use plastic slugs to deter bears.

Toxicants

None are registered.

Fumigants

None are registered.

Trapping

Use culvert traps or foot snares; for bait use only wild animal road kills and scents.

Immobilizing and Handling

Drugs used on bears are strictly controlled, require licensing, and are potentially dangerous to the animal, the drugging team, and unauthorized users. Post-immobilization care is very important.

Shooting

Weapons that offer the best protection are high-powered rifles of .350 caliber or larger, and 12-gauge pump shotguns with rifled slugs. Handguns (.44 magnum) should be carried only for quick defense.

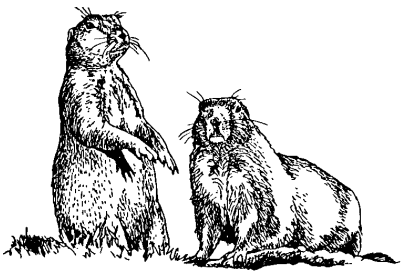
Other Methods

Aversive Conditioning. Captured and confined bears can be trained to fear and avoid humans through repeated confrontations and the use of repellents. Properly trained personnel and holding facilities designed for aversive conditioning are required.

Public Education. Implement programs to promote the prevention of bear problems.

Avoiding Human-Bear Conflicts

Avoid bear encounters by staying alert. Never approach bear cubs. Avoid high bear-use areas. Eliminate bear attractants.



PREVENTION AND CONTROL OF WILDLIFE DAMAGE — 1994

Cooperative Extension Division
Institute of Agriculture and Natural Resources
University of Nebraska - Lincoln

United States Department of Agriculture
Animal and Plant Health Inspection Service
Animal Damage Control

Great Plains Agricultural Council
Wildlife Committee

Introduction

Although wildlife management concepts were formed nearly 100 years ago, bears and their management have been poorly understood. Recent concern for the environment, species preservation, and ecosystem management are only now starting to affect the way we manage grizzly/brown bears (*Ursus arctos*, Fig. 1). Indeed, the difficulty in understanding brown bear biology, behavior, and ecology may have precluded sufficient change to prevent the ultimate loss of the species south of Canada. Grizzly/brown bears must be managed at the ecosystem level. The size of their ranges and their need for safe corridors between habitat units bring them into increasing conflict with people, and there seems to be little guarantee that people will sufficiently limit their activities and land-use patterns to reduce brown bear damage rates and the consequent need for damage control. Drastic changes may be needed in land-use management, zoning, wilderness designation, timber harvest, mining, real estate development, and range management to preserve the species and still meet damage control needs.

Identification

The brown bears of the world include numerous subspecies in Asia, Europe, and North America. Even the polar bear, taxonomically, may be a white phase of the brown bear. Support for this concept is provided by new electrophoresic studies and the fact that offspring of brown/polar bear crosses are fertile. The interior grizzly (*Ursus arctos horribilis*) is generally smaller than the coastal (*Ursus arctos gyas*) or island (*Ursus arctos middendorffi*) subspecies of North American brown bear, and it has the classic "grizzled" hair tips.

Brown bears in general are very large and heavily built. Male brown bears are almost twice the weight of females. They walk with a plantigrade gait (but can walk upright on their hind legs), and have long claws for digging (black bears and polar bears have sharper, shorter claws). The males can weigh up to 2,000 pounds (900 kg), but grizzly males are normally around 400 to 600 pounds (200 to 300 kg). Wherever brown bears live, their size is influenced by their subspecies status, food supply, and length of the feeding season. Bone growth continues through the sixth year, so subadult nutrition often dictates their size potential.

Brown bears are typically brown in color, but vary from pure white to black, with coastal brown bears and Kodiak bears generally lighter, even blond or beige. The interior grizzly bears are typically a dark, chocolate brown or black, with pronounced silver tips on the guard hairs. This coloration often gives them a silvery sheen or halo. They lack the neck ruff of the coastal bears, and grizzlies may even have light bands before and behind the front legs. Some particularly grizzled interior brown bears have a spectacled facial pattern similar to that of the panda or spectacled bears of Asia and South America.

White grizzlies (not albinos) are also found in portions of Alberta and Montana, and in south-central British Columbia. Such white brown bears may be genetically identical to the polar bear, but so far electrophoresic studies have not been completed to determine the degree of relatedness.

The interior grizzly's "hump," an adaptation to their digging lifestyle, is seen less in the coastal brown bears, polar bears, or black bears. The brown bears (including the grizzly) are also characterized by their high eye profile, dish-shaped face, and short, thick ears.

Range

The brown bears of North America have lost considerable range, and are currently restricted to western Canada, Alaska, and the northwestern United States (Fig. 2). Their populations are considered secure in Canada and Alaska, but have declined significantly in the lower 48 states. Before settlement, 100,000 brown bears may have

Fig. 2. Distribution of grizzly/brown bears in North America.

ranged south of Canada onto the Great Plains along stream systems such as the Missouri River, and in isolated, small mountain ranges such as the Black Hills of South Dakota. They were scattered rather thinly in Mexico and in the southwestern United States, but may have numbered about 10,000 in California, occupying the broad, rich valleys as well as the mountains.

A few brown bears (the "Mexican" or "California" grizzly) may still exist in northern Mexico. Occasionally, barren-ground grizzlies are found hunting seals on the sea ice north of the Canadian mainland. The barren-ground grizzlies appear to be brown bear/polar bear crosses, and could represent an intergrade form. Brown bears also occur on three large islands in the gulf of Alaska, and are isolated geographically from very similar coastal brown bears.

A nearly isolated population (the Yellowstone grizzly) occurs in southern Montana, Wyoming, and southern Idaho. There could still be a few grizzlies in the mountains of southwestern Colorado, and a few still range out onto the prairies of Alberta and Montana, where the extinct Plains grizzly used to roam.

Habitat

Grizzly/brown bear habitat is considerably varied. Brown bears may occupy areas of 100 to 150 square miles (140 to 210 km^2), including

desert and prairie as well as forest and alpine extremes. The areas must provide enough food during the 5 to 7 months in which they feed to meet their protein, energy, and other nutritional requirements for reproduction, breeding, and denning. They often travel long distances to reach seasonally abundant food sources such as salmon streams, burned areas with large berry crops, and lush lowlands.

Denning habitats may be a limiting factor in brown bear survival. Grizzly bears seek and use denning areas only at high elevations (above 6,000 feet [1,800 m]), where there are deep soils for digging, steep slopes, vegetative cover for roof support, and isolation from other bears or people. Since grizzlies select and build their dens in late September, when their sensitivity to danger is still very high, even minor disturbances may deter the bears from using the best sites. Unfortunately, the habitat types bears choose in September are scarce, and human recreational use of the same high-elevation areas is increasing.

Travel corridors connecting large areas of grizzly habitat to individual home ranges are critical for maintaining grizzly populations. Adequate cover is also needed to provide free movement within their range without detection by humans. The land uses with the greatest impact on bear habitats and populations include road development, mining, clear-cut logging, and real estate development.

Coastal brown bears use totally different habitats than the interior grizzly. They establish home ranges along coastal plains and salmon rivers where they feed on grasses, sedges, forbs, and fish. While the fishing brown bears may use very small ranges for extended periods, almost all bears make occasional, long-distance movements to other areas where food is abundant. This far-ranging behavior often leads to unexpected human-bear conflicts far from typical brown bear range.

Social factors within bear populations influence habitat value—the removal of one dominant bear or the sudden deaths of several bears can cause the remaining bears to greatly alter their habitat-use patterns. Such changes occur simply because the social hierarchy within bear populations typically gives large bears dominance over the smaller ones, and each bear uses its range based on its relationship to the other bears in the area.

Food Habits

Food gathering is a top priority in the life of grizzly/brown bears. They feed extensively on both vegetation and animal matter. Their claws and front leg muscles are remarkably well adapted to digging for roots, tubers, and corms. They may also dig to capture ground squirrels, marmots, and pocket gophers. Brown bears are strongly attracted to succulent forbs, sedges, and grasses. In spring and early summer they may ingest up to 90 pounds (40 kg) of this high-protein forage per day. Bears gain their fat reserves to endure the 5- to 7- month denning period by feeding on high-energy mast (berries, pine nuts) or salmon. The 2 1/2- to 3-month summer feeding period is particularly crucial for reaching maximum body frame and preparing for the breeding season and winter.

Being ultimate opportunists, brown bears feed on many other food items. For example, the Yellowstone grizzlies have clearly become more predatory since the closure of the garbage dumps in the Yellowstone area. They are exploiting the abundant elk and bison populations that have built up within the park. They hunt the elk calves in the spring, and some bears learn to hunt adult elk, moose, and even bison. The ungulate herds, domestic sheep, and cows also provide an abundant carrion supply each spring—the animals that die over winter thaw out just when the bears need a rich food source.

Bears are adept at securing food from human sources such as garbage dumps, dumpsters, trash cans, restaurants, orchards, and bee yards. Some bears learn to prey on livestock, especially sheep that graze on open, remote rangeland.

General Biology, Reproduction, and Behavior

Brown bears are typical of all bears physiologically, behaviorally, and ecologically. They are slow growing and long-lived (20 to 25 years). Their ability to store and use fat for energy makes long denning periods (5 to 7 months) possible. During denning they enter a form of hibernation in which their respiration rate (approximately 1 per minute) and heart rate (as low as 10 beats per minute) are greatly reduced. Their body temperature remains just a few degrees below normal; they do not eat, drink, defecate, or urinate, and their dormancy is continuous for 3 to 7 months. The adaptive value of winter denning relates to survival during inclement weather, when reduced food availability, decreased mobility, and increased energy demands for thermoregulation occur.

In most populations, brown bears breed from mid-May to mid-July. Both males and females are polygamous, and although males attempt to defend females against other males, they are generally unsuccessful. Implantation of the fertilized ova is delayed until the females enter their dens, from late October to November. One to three (usually two) cubs are born in January in a rather undeveloped state. They require great care from their mothers, which leads to strong family bonding and transfer of information from mothers to offspring. Brown bears may not produce young until 5 to 6 years of age and may skip 3 to 6 years between litters. Because of their low reproductive potential, bear populations cannot respond quickly to expanded habitats or severe population losses.

During the breeding season, male and female grizzly/brown bears spend considerable time together, and family groups break up. The young females are allowed to remain in the area, taking over a portion of their mother's

range. They are not threatened by the males, even though they are still vulnerable without their mother's protection. The young males, however, must leave or be killed by the adult males. Many subadult males disperse into marginal bear habitats while trying to establish their own territories. This often leads to increased human-bear conflicts and the need for management and control actions.

Home ranges vary in size, shape, and amount of overlap among individuals. Abundance and distribution of food is the major factor determining bear movements and home range size. Home ranges are smallest in southeastern Alaska and on Kodiak Island. The largest home ranges are found in the Rocky Mountains of Canada and Montana, the tundra regions of Alaska and Canada, and the boreal forest of Alberta. In areas where food and cover are abundant, brown bear home ranges can be as small as 9 square miles (24 km^2). Where food resources are scattered, the ranges must be at least ten times larger to provide an adequate food base.

Some bears establish seasonal patterns of movement in relation to dependable high-calorie foods sources, such as salmon streams and garbage dumps. Such movements are likely to place bears in close contact with humans. In addition to finding food, bears spend considerable time in attempting to detect people, evaluating situations, and taking corrective actions to avoid conflict with humans. People, on the other hand, typically go noisily about their business, often without ever knowing that a bear is nearby.

Damage and Damage Identification

Brown bears have many unique behaviors that subject them to situations in which they are perceived as a threat to humans or personal property. They are opportunistic feeders that may switch to scavenging human-produced food and garbage if made available, becoming a problem around parks, camp grounds, cottages, suburban areas, and garbage dumps. Bears that are conditioned to human foods become used to the presence of humans and are therefore the most dangerous. Bear activity is intensely oriented to the summer months when people are also most active in the mountains and forests. Brown bear attacks have resulted in injuries ranging from superficial to debilitating, disfiguring, and fatal. Dr. Stephen Herrero documented 165 injuries to humans resulting from encounters with brown bears in North America from 1900 to 1980 (Herrero 1985). Fifty percent of the injuries were classified as major, requiring hospitalization for more than 24 hours or resulting in death. In addition to the 19 grizzly bear-inflicted deaths that Herrero reported, two Department of Public Safety employees reported 22 deaths in Alaska.

Brown bears also occasionally cause problems around orchards, bee yards, growing crops, and livestock. Some bears occasionally kill cattle, sheep, pigs, horses, goats, and poultry, but most do not prey on livestock. Bears kill livestock by pursuing them at high speed, slashing from the rear and pulling the prey down. They hold the prey with their own weight while biting the head or neck area and delivering blows. The ventral area is then ripped open, and the hide sometimes skinned, sometimes devoured along with subcutaneous and visceral fat. Bears eat large volumes of flesh and body parts, leaving many large scats. Adult brown bear scats are 2 inches (5 cm) or more in diameter. The bear will often cover the remains with all types of nearby debris—vegetation, leaves, sticks, and soil, and then bed nearby. The investigator should look carefully for (and record) all wounds, tracks, hairs, and any other sign that would prove bear predation. It is important to document accurately the cause of death, the manner of killing, and all signs in the area that would indicate predation by bears. The lack of any such evidence should preclude brown bear control.

Sheep predation may be more subtle to document since, when frightened, sheep readily stampede and injure or kill themselves on felled timber or cliffs. In such a case, examiners should look carefully for neck and head bites, or smashed skulls, as well as tracks, bear hair, bear droppings, and other sign. Survey the overall scene—the flight path of the sheep, the place of cover and possible attack relative to the flight route, the amount consumed, and the freshness of any flesh or tissues in the bear droppings.

Grizzly/brown bear attacks are often easily identified by tracks alone. The foot prints are very large, with claw marks on the front foot extending up to 4 inches (10 cm) in front of the toe marks. The toes of a grizzly are in a much straighter line than those of a black bear, and the grizzly paw includes greater "webbing" between the toes, which may show up in a mud print. Grizzly hair found in the area is another positive identifying characteristic. Look carefully on the ends of broken sticks, in rough areas on logs, under high logs, in the bark of trees, or in any pitch patches on conifers where a bear may have rubbed. Also check the barbs of any wire fencing nearby. All hair should be collected carefully in small envelopes and sent to a wildlife agency or university lab for identification.

Most bear depredations are easily identified, especially if there is wet or soft ground in the area. Bears are not sneaky—they march right in and take what they consider is theirs.

Legal Status

Grizzly bears south of Canada are protected as a "threatened species" under the US Endangered Species Act of 1973. Wyoming and Montana have limited grizzly bear hunting seasons as authorized under the act, but the seasons are currently closed pending clarification of the act through legal challenges in court and further actions by the states. Without state hunting seasons, killing of grizzlies is allowed only through official control actions or defense of self and property. North of the Canadian border, grizzlies are hunted to varying extents in Alaska,

Alberta, British Columbia, the Yukon, and the Northwest Territories.

Wrongful killing of a grizzly bear mandates a severe penalty—up to $20,000 in fines. "Taking" is being more liberally defined as court challenges establish that even habitat destruction can be interpreted as taking or killing.

Damage Prevention and Control Methods

Exclusion

The challenges of exclusion are formidable. Bears are incredibly adept at problem solving where food is concerned, no doubt as a result of their extreme orientation to food for a few short months. Brown bears will expend a great amount of energy and time digging under, breaking down, or crawling over barriers to food. They know how to use their great weight and strength to open containers. They will chew metal cans "like bubble gum" to extract the food.

To exclude bears, use heavy, chain-link or woven-wire fencing at least 8 feet (2.4 m) high and buried 2 feet (0.6 m) below ground. Install metal bar extensions at an outward angle to the top of the fence and attach barbed wire or electrified smooth wire. Also consider attaching an electrified outrigger wire to the fence.

Electric fencing is also very effective if built correctly. At a minimum, 12-gauge, high-tensile fencing should be used—nine wires high, spaced 6 inches (15 cm) at the top and 4 inches (10 cm) at the bottom, with alternating hot and ground wires. Both the top and bottom wires should be hot. Use a low-impedance charger with a minimum output of 5,000 volts.

In backcountry situations, an electric fence perimeter may be the only sure protection from grizzly/brown bear damage. Secure the camp, supplies, and livestock within the confined area. In the absence of fencing, bear-proof containers provide the best protection for food and other supplies. Use 45-gallon (200-l) oil drums with locking lids to secure all bear attractants. Backpackers in bear country should use portable bear-proof containers. Attractants (food, meat, feed) can also be hung in an elaborate, bear-proof manner, at least 20 feet (6.5 m) above ground, and free from any aerial approach. Tower caches, 20 feet high or higher, can also be constructed using heavy poles and timbers.

Cultural Methods

Once a bear has developed a detrimental behavior, it may be impossible to change it. Prevention is directed mostly at keeping the bear population wild and fearful of people. If the mothers teach their young to avoid humans, problems will be minimal, though not nonexistent. Hunting pressure automatically teaches bears to avoid humans.

Choose campsites, bee yards, and livestock bedding sites in areas not frequented by bears. Avoid riparian areas, rough ground, heavy cover, aspen groves, and berry-covered hillsides. In spring and early summer, bears frequent riparian areas, low-elevation flood plains, hillside parks, and alluvial fans where high protein grasses, sedges, and forbs are plentiful. In late June or early July, bears turn to areas with berries and other high-energy foods. Often, livestock need to be held out of such areas only an extra 2 weeks, until the bears turn to other foods. In areas with a history of bear problems, livestock should be confined in buildings or pens that are at least 50 yards (50 m) from wooded areas and protective cover, especially during the lambing or calving season. Remove carcasses from the site and dispose of them by rendering or deep burial.

Bears should never be fed or intentionally given access to food scraps or garbage. Eliminate all sources of human foods around campsites, cabins, restaurants, and suburban areas. Keep garbage in clean and tightly sealed metal or plastic containers. Spray garbage cans and dumpsters regularly with disinfectants to reduce odors. Maintain regular garbage pickup schedules and bury or burn all garbage at fenced sanitary landfills.

Frightening Devices

Boat horns, cracker shells, rifle shots, and other loud noises may frighten bears from an area. Roaring engines and helicopter chases may also be effective. Barking dogs can be very useful, but they must be trained to bark on sight or smell of a bear. In addition, good bear dogs will chase bears, but they must be trained to pursue and corner without closing on the bear.

Lights and strobe flashes are only marginally effective for bear damage prevention.

Repellents and Deterrents

Capsaicin spray has been reported to be an effective repellent. It may work only once, however, so a backup deterrent should always be available.

Well-trained dogs can provide an "early warning system" as well as a deterrence to bears. Unfortunately, not many trained dogs are available in the United States or Canada. Plastic slugs may also be an effective deterrent against bears. Bears usually move rapidly to the nearest cover when frightened, so care must be taken to avoid being positioned between the bear and escape cover.

Trapping

The capture and translocation of bears can be effective in damage control. Unfortunately, relocation often only moves the problem to another site, and bears have been known to travel great distances to return to a trapping site. The handling process, if done correctly, is itself sufficiently traumatic to teach the bears to avoid humans. Use culvert traps or foot snares to capture bears. Care must be taken in baiting to avoid conditioning bears to people—use only natural scents and baits such as wild animal road kills. Only properly trained personnel should be assigned to such work. The Ursid Research Center in Missoula, Montana, offers courses in capturing and handling bears. Consult state regulations and wildlife agency personnel before implementing any bear-trapping program.

Immobilizing and Handling

Bears are occasionally captured by injection with an immobilizing drug administered from a syringe dart fired from a capture gun. Bears have been successfully immobilized with darts fired from close range. Bears can be approached on foot, from vehicles, and from helicopters. The drugs most commonly used include a mixture of ketamine hydrochloride and xylazine hydrochloride (Ketaset-Rompun). This mixture has a high therapeutic index and results in little distress to the animal.

The drugs chosen, the degree of sanitation, the approach to the set, the weapons carried, and the size of capture crews are extremely crucial in tending the animal. Interning with a recognized expert, or attending a certified course should be required before attempting to capture brown bears.

Shooting

Many grizzlies have been killed in response to livestock depredations, as allowed under the US Endangered Species Act. Over time, public tolerance for this approach has declined and fewer bears are now being killed or removed. Currently, shooting is used most often on adult males, since they are not considered essential in a population. This may, however, be short-sighted, considering that all other bears in an area modify their own behavior based on the activities of the dominant adult male bear. Left alone, a bear often will not kill livestock again, or could be trained through aversive conditioning not to attack livestock again.

Firearms should be carried by people working with bears or in areas where the risk of bear attack is high. The best protective weapons are high-powered rifles of .350 caliber or larger and 12-gauge pump shotguns with rifled slugs. Handguns (.44 magnum) should be carried for quick defense only.

Aversive Conditioning

Aversive conditioning may be effective in teaching bears to fear humans. In Montana, problem bears were captured and brought into holding facilities where they were repeatedly confronted by humans and repelled with chemical sprays. Treatment was complete when the bear fled instantly to the "sanctuary" portion of an enclosure. The bear was then quickly returned to the wild. The captive process, called "bear school," lasts only 4 to 6 days. This method can only be conducted by fully trained personnel. Field treatment may follow, using radio collars, 24-hour monitoring, and firearm backup. Aversive conditioning may cost up to $6,000 per animal, but it may be cost-effective, considering the alternatives.

Public Education

Public attitudes are crucial in determining what damage prevention or control is practical. The State of Montana now has two staff members authorized to work closely with people in grizzly range not only to solve bear problems but to meet with the public and listen to their concerns. They talk in schools and at rural functions and work with individual ranchers to solve special problems or help in emergencies.

Avoiding Human-Bear Conflicts

Preventing Bear Attack. Grizzly/brown bears must be respected. They have great strength and agility, and will defend themselves, their young, and their territories if they feel threatened. They are unpredictable and can inflict serious injury. NEVER feed or approach a bear.

To avoid a bear encounter, stay alert and think ahead. Always hike in a group. Carry noisemakers such as bells or cans containing stones. Most bears will leave a vicinity if they are aware of a human presence. Remember that noisemakers may not be effective in dense brush and near rushing water. Be especially alert when traveling into the wind since bears may not pick up your scent and may be unaware of your approach. Stay in the open and avoid food sources such as berry patches and carcass remains. Bears may feel threatened if surprised. Watch for bear sign—fresh tracks, digging, and scats. Detour around the area if bears or their fresh sign are observed.

NEVER approach a bear cub. Adult female brown bears are very defensive and may be aggressive, making threatening gestures (laying ears back, huffing, chopping jaws, stomping feet) and possibly making bluff charges. Bears have a tolerance range which, when encroached upon, may trigger an attack. Keep a distance of at least 100 yards (100 m) between you and bears.

Bears are omnivorous, eating both vegetable and animal matter, so don't encourage bears by leaving food or garbage around camp. When bears associate food with humans, they may lose their fear of humans. Food-conditioned bears are very dangerous.

In established campgrounds, keep your campsite clean and lock food in the trunk of your vehicle. Don't leave dirty utensils around the campsite, and don't cook or eat in tents. After eating, place garbage in containers provided at the campground.

In the backcountry, establish camps away from animal or walking trails, and near large, sparsely branched trees that can be climbed should it become necessary. Choose another area if fresh bear sign is present. Cache food away from your tent, preferably suspended from a tree that is 100 yards (100 m) downwind of camp. Use bear-proof or airtight containers for storing food and other attractants. Freeze-dried foods are lightweight and relatively odor-free. Pack out all noncombustible garbage. Always have radio communication and emergency transportation available at remote base or work camps in case of accidents or medical emergencies.

Don't take dogs into the backcountry. The sight or smell of a dog may attract a bear and stimulate an attack. Most dogs are no match for a bear. When in trouble, the dog may come running back to the owner with the bear in pursuit. Trained guarding dogs are an exception and may be very useful in

detecting and chasing away bears in the immediate area.

Bear Confrontations. If a brown bear is seen at a distance, make a wide detour. Keep upwind if possible so the bear can pick up human scent and recognize human presence. If a detour or retreat is not possible, wait until the bear moves away from the path. Always leave an escape route and never harass a bear.

If a brown bear is encountered at close range, keep calm and assess the situation. A bear rearing on its hind legs is not always aggressive. If it moves its head from side to side it may only be trying to pick up scent and focus its eyes. Remain still and speak in low tones. This may indicate to the animal that there is no threat. Assess the surroundings before taking action. There is no guaranteed life-saving method of handling an aggressive bear, but some behavior patterns have proven more successful than others.

Do not run. Most bears can run as fast as a racehorse, covering 30 to 40 feet (9 to 12 m) per second. Quick, jerky movements can trigger an attack. If an aggressive bear is met in a wooded area, speak softly and back slowly toward a tree. Climb a good distance up the tree. Adult grizzlies don't climb as a rule, but large ones can reach up to 10 feet (3 m). Defend yourself in a tree with branches or a boot heel if necessary.

Occasionally, bears will bluff by charging within a few yards (m) of an unfortunate hiker. Sometime they charge and veer away at the last second. If you are charged, attempt to stand your ground. The bear may perceive you as a greater threat than it is willing to tackle and may leave the area.

As a last resort when attacked by a grizzly/brown bear, passively resist by playing dead. Drop to the ground face down, lift your legs up to your chest, and clasp both hands over the back of your neck. Wearing a pack will shield your body. Brown bears have been known to inflict only minor injuries under these circumstances. It takes courage to lie still and quiet, but resistance is usually useless.

Many people who work in or frequent bear habitat carry firearms for personal protection. Although not a popular solution, it is justifiable to kill a bear that is attacking a human.

Economics of Damage and Control

The US Endangered Species Act dictates that the bear be favored and protected. In terms of a natural resource, individual grizzlies are considered worth $500,000 by some accounts, and the $20,000 penalty for a wrongful death underscores the importance of management. In terms of tourism, recreation, film making, photography, hunting, and all the other cultural and art values of the grizzly, each bear is certainly worth the half million dollars cited above. Yet in Montana, where the future of the grizzly is in jeopardy, their value was only recently raised from $50 to $500. Bear parts have illegally sold for as much as $250 per front claw, $200 per paw, $10,000 for the hide, $500 for the skull, and $30,000 for the gall bladder. Poachers would likely be fined only $10,000 if caught.

One hope for brown bears may be found in the private sector—people who value bears highly and contribute to organizations that support proper bear management. Damage prevention and control costs could also be met by such organizations. Because hunting is no longer widely practiced, revenues for bear management have declined. Wildlife agencies must develop a higher value for the brown bear and divert fees collected from hunting other species to meet the rising costs of bear management.

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Figure 1 drawn by Clint E. Chapman, University of Nebraska.

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