MANAGEMENT OF BEAR–HUMAN CONFLICTS USING LAIKA DOGS

COLIN M. GILLIN,[1] Grizzly Bear Biologist, Wyoming Game and Fish Department, 260 Buena Vista, Lander, WY 82520 USA, email: cagillin@aol.com
IGOR CHESTIN, Biological Faculty, Moscow State University, Moscow, Russia, 119899, email:igor@ch.inv.bio.msu.su
PETER SEMCHENKOV, STC Ecologia, Moscow, Russia, 117312
JAMES CLAAR, U.S. Department of Agriculture Forest Service, Missoula, MT, 59807, USA

Abstract: Conflicts between brown bears (*Ursus arctos*) and humans have occurred since both species first occupied habitats concurrently. Although the nature of bear–human conflicts has remained similar, methods for resolving them have improved with technological advances, to the extent that humans and bears now have a better chance of coexistence. Conflict–resolution techniques used in the United States and Russia differ due to the population status of brown bears in the 2 countries. Various techniques including aversive conditioning, deterrents, and relocation are commonly used in the United States; bears are removed from the population with the aid of Laika dogs in Russia. Combining techniques from both countries may significantly improve techniques previously used singularly. We discuss management implications for modifying grizzly bear behavior using Laika dogs and additional conditioning reinforcement techniques in the United States.

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Conflicts between humans and large predators have existed during the last 4 million years of human existence. Early evidence of these confrontations has been discovered in prehistoric hieroglyphs, petroglyphs, and from the skeletal remains of ancestral man. Historically, conflicts were resolved by drastically reducing animal populations. Although this may be true to an extent with present-day populations of large carnivores, conflicts between humans and some species (tigers [*Panthera tigris*] in Asia, Asiatic lions [*Panthera leo persica*] from Turkey to India, and bears [*Ursus thibetanus*—Iran and Pakistan; *U. arctos arctos*—Italy; *U. a. pruinosus*—China; and *U. a. horribilis*—North American lower 48 states]) are largely caused by direct impacts from loss of habitat and displacement from human encroachment (U.S. Dep. Inter. 1990). In many situations, increased contact with humans leads to increased incidence of conflict.

Not until implementation of continental and international laws, regulations, and treaties in the 20th century (i.e., Endangered Species Act of 1973 [16 U.S.C. 1531–1544], Marine Mammal Protection Act of 1972 [16 U.S.C. 1361–1407], Convention on International Trade in Endangered Species [CITES], Russian Red Data Book) have many wildlife species been spared extinction by increasing human technology. Presently, tenuous relationships between large predators and humans are moving toward coexistence due to increased understanding by humans of wildlife behavior, public education, and improved behavior modification techniques directed at teaching wildlife to avoid humans (Gillin et al. 1992).

Although the United States of America (U.S.) and Republic of Russia (Russia) are continents apart, similarities exist between their historic relationships with large predators, specifically with brown bears. To maintain viable populations of brown bears in an environment of increasing human populations and decreasing bear habitat, conservation strategies have been designed to preserve bears and habitat. The philosophy of eliminating a species for the benefit of the other is no longer acceptable to the public or wildlife professions.

We examine past and present management techniques and philosophies of human–brown bear conflicts in the U.S. and Russia. Cooperative research resulting from this work will ultimately lead to better understanding of behavior modification techniques of brown bears in both countries and may provide additional management tools to regions throughout the world.

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INTERNATIONAL PERSPECTIVES

The area of the former Soviet Union, including Russia, has the largest brown bear population of any country

[1]Present Address: Tufts University School of Veterinary Medicine, 200 Westborough Road, North Grafton, Massachusetts 01536, email: cagillin@aol.com

worldwide, estimated at 130,000 animals (Servheen 1990). This represents >50% of brown bears worldwide. They occupy most forested habitats with occasional observations in remote tundra and steppe regions. Annual harvest throughout Russia is approximately 10,000 bears and populations are thought to be stable (Servheen 1990).

Presently, the principal method of managing brown bear–human conflicts in Russia is by destroying nuisance bears. Relocation is occasionally used to resolve human–polar bear (*Ursus maritimus*) conflicts because this species is protected by Russian (Red Data Book) and international agreements (Marine Mammal Protection Act of 1972). However, due to difficulty in relocating polar bears successfully, they are occasionally removed from the population. Human–Asian black bear (*Ursus thibetanus*) conflicts are relatively rare. If conflicts occur, hunting permits are issued by the Russian Game Department to remove nuisance animals.

From the early 1800s to the turn of the century, grizzly (brown) bear populations decreased in much of the United States south of Canada due to the encroachment of western settlers. Human–bear encounters, including livestock depredation control, protection of human life, habitat deterioration, commercial trapping, and sport hunting were responsible for most of the decline (Stebler 1972, Martinka 1976, Brown 1985). The grizzly population in the lower 48 states as estimated between 50,000 and 100,000 between 1880 and the turn of the century. By 1975, <1,000 grizzlies were estimated to occupy <2% of their former range (U.S. Fish and Wildl. Serv. 1992).

Prior to 1975, grizzly bears that caused problems in the U.S. were killed by hunting, trapping, and poisoning. However, when populations dropped to alarmingly low levels and grizzly bears were subsequently protected as a threatened species under the 1973 Endangered Species Act, alternative management methods were needed to reestablish viable populations.

MANAGEMENT STRATEGIES

To stop decline of grizzly bears in the U.S., direct management strategies were incorporated by state and federal agencies under the direction of the Interagency Grizzly Bear Committee. These strategies included: reducing all causes of human–induced mortality (hunting, poaching, accidents), proactively reducing human–grizzly bear conflicts through prevention (public education, food and garbage storage regulations, backcountry law enforcement patrols), relocating or removing nuisance bears that were habituated to humans or conditioned to human foods, and behavior modification of young bears or individuals as they first enter into nuisance situations.

In North America, management of nuisance black bears (*Ursus americanus*) is primarily resolved through removal of the animal, although relocation and deterrent methods (e.g., electric fencing) are occasionally used. Removal of nuisance animals is also used as a management tool with Russian brown bears. Management actions are directed toward protecting people, livestock, and agricultural interests from bears.

In the Russian Republic, approximately 3,500 licenses are sold to game hunters annually. However, the few dozen bears harvested in nuisance situations are insignificant compared to the harvest from legal bear hunting, and removal of nuisance bears is not considered a significant influence on the population.

Hunting problem bears has not been highly effective in either country due to the difficulty in determining which bear is the nuisance. Managers presume that some bears are mistakenly shot as nuisance animals when they are simply the first bear encountered. The problem bear may thus elude harvest and continue its nuisance behavior.

During drought years in the eastern portions of Russia, low precipitation resulted in poor forage production and increased bear–human conflicts. When these conditions exist, bears in poor physical condition approach settlements and prey on livestock and humans.

During 1962, one of the worst bear food years on record, 767 brown bears were shot in Tuva (south-central Siberia) and >200 died due to cannibalism by other bears. Wildlife officials estimated about 67% of the population was eliminated from this region in 1 year (Zyryanov and Smirnov 1992). A similar situation was observed in 1984 in Magadan Oblast (north–eastern Russia) and in other regions of Russia (M.A. Krechmar, Institute of Biology of the North, Magadan, Russia, pers. commun., 1991).

During these catastrophic food years, bear conflicts were not easily solved by removing nuisance bears because nearly all bears were involved in conflicts. Food availability conflicts in Russia were alleviated (partially) by providing an artificial food supply.

BEHAVIOR MODIFICATION

Behavior modification of laboratory animals has been successful (Pavlov 1927, Karpicke et al. 1978, Rescorla 1988). These methods have been adapted for use on free-ranging wildlife in an attempt to address conflicts between humans and wildlife using behavioral conditioning (Gillin et al. 1992). In recent years, behavior modification research on bears in the U.S. included the use of taste aver-

sions (Hastings and Gilbert 1981, Hunt 1984), auditory conditioning (Woolridge and Belton 1980, Greene 1982), airborne spray repellents that irritate mucous membranes (Miller 1980, Hunt 1984, Rogers 1984), electric fencing (Dacy 1939, Robinson 1961, Wynnyk and Gunson 1977), and aversive conditioning using non-lethal projectiles (Clarkson 1989, Dalle-Molle and Van Horn 1989, Shideler and Hetchel 1991, Gillin et al. 1992). These studies had mixed results but all indicated some level of success if negative reinforcement was applied frequently and when the offending animal was engaged in nuisance behavior. The highest success in modifying bear behavior occurred when the negative reinforcement was applied when the nuisance animal was engaged in the initial conflict incident and was not severely habituated or conditioned to human foods (Gillin et al. 1992). Other factors, such as animal condition, influenced success of conditioning experiments.

BROWN BEARS AND LAIKA DOGS

In Russia, Laika dogs are currently trained to locate, deter, and protect humans from brown bears. The dogs were developed in Russia and used historically to drive off large predators from human habitations. More recently the dogs have also been used for hunting many types of game animals, including brown bears. Laikas are from a variety of dogs known as Spitz; similar to the Siberian husky, they appear slimmer (25–31 kg), taller (50–60 cm), and are not as deep through the chest. The coat is generally brown or gray with white markings on the head, throat, chest, and feet. Fur is moderate-length, dense, and straight. The ears are erect and short and the tail is upturned and curved.

Laikas are known for great courage, aggressiveness, and obedience to their master. The dogs are quite intelligent and respond to commands given by the handler during hunting or field trial situations. During confrontations with bears, the dogs bite the bear from behind and avoid front claw strikes and bites. Russian bear hunters generally prefer several well-trained dogs to an armed companion hunter. In the U.S., various hound breeds are used for locating black bears for harvest. However, U.S. dogs are generally not trained to respond to commands by the dog handler while trailing a bear (J. Ertel, Wyoming Game and Fish Dep., Lander, pers. commun., 1991).

Individual brown bears react differently toward attacking dogs. These reactions include escape behavior or defensively attacking the dogs depending on circumstances of the contact. The reaction of bears to dogs is often similar to the bears reaction to humans. If a bear is not afraid of humans, it may not be fearful of dogs.

In confrontations with dogs, bears will generally escape to cover. However, experienced dogs are wary of following bears into dense cover where they cannot effectively and safely attack and where they lose their advantage of maneuverability.

Not all Laika dogs are suited for deterring nuisance bears. As with any working or sporting dog breed, individual Laikas possess different behavioral and personality traits. Some Laikas may fear bears or be indifferent or aggressive toward them. Less aggressive dogs will bark at a bear 25–30 meters away. Results of Laika dog trials held by the Russian Game Society with captured bears showed 15–20% of the dogs to be relatively aggressive. The dogs harassed the bear by barking from short distances of 2–3 meters and were considered useful for hunting and locating bear dens. A small percentage of the dogs (2–3%) were more aggressive and bit the bear while attacking. These were considered effective in all situations, including providing safety to humans (B.P. Zavatzkiy, Sayano-Shushenskiy State Nature Reserve, Krasnoyarsk region, Russia, pers. commun., 1991). The use of >1 dog provided the strongest negative stimulus to a bear. In actual conflicts, the use of several dogs had higher success at deterring a bear permanently from a conflict site than use of a single dog.

MANAGEMENT IMPLICATIONS IN THE UNITED STATES

During most encounters in the U.S., bears avoid human contact (Herrero 1985). This is also true in Russia. Other human confrontation behaviors exhibited by bears include non-aggressive curiosity and defensive aggression (Herrero 1985). Zavatzkiy (1986) evaluated several hundred encounters in Russia and showed that aggressive bears represented 1.6% of population. Conflicts usually arose when a bear was surprised by humans. During such an encounter, a bear may regard the human as a threat, and attack defensively (Herrero 1985). In both countries, the most prevalent causes of attacks include sudden encounters, food guarding, protection of cubs by females, and provocation from harassment and close encounters by humans (e.g., photographers, tourists, etc.). Many bear–human conflicts involve bears that have received human foods or are habituated to humans along roadsides and in developments (Gillin et al. 1992). Reactions of bears vary depending on the situation and the bear's habituation to humans (Dalle-Molle and Van Horn 1989, Gillin et al. 1992).

Conflict Situations

During 1992, 24 conflicts involving humans and grizzly bears occurred in the Yellowstone ecosystem. These situations could have been effective tests of Laika dogs in deterring bears. Dogs may have been useful in deterring or preventing sheep and cattle depredation, roadside bears, property damage, and bear visits to backcountry camps, roadside camps, and trail heads. The following situations are several examples where Laikas might be used in management of human–bear conflicts.

Yellowstone National Park has recurring problems with bears entering and occasionally receiving food rewards in campgrounds and developed areas (K. Gunther, Yellowstone Natl. Park Bear Manage. Off., Mammoth, pers. commun., 1991). Human-habituated roadside bears, feeding on natural forage, have also created problems with tourists and photographers approaching dangerously close to bears. Aversive conditioning techniques using Bear Deterrent Cartridge rubber bullets (AAI Corporation, Hunt Valley, MD 21030) has had little effect, and many of the bears continued feeding after being struck with the projectile. Several of the bears that did not react to rubber bullet aversive conditioning had been habituated to humans for a good portion of their adult lives (Gillin et al. 1992). Harassment of these bears by Laikas could teach the bears to forage further from sites used by or visible to humans or the bears may forage at night when humans are not present.

A cattle ranch in the southern portion of the ecosystem had grizzly bears entering building and corral areas during spring calving periods to feed on afterbirth in 1992. The bears were seen daily by ranch personnel during predictable times. During the summer months, the problem progressed to cattle depredation on public and private property. It was unknown whether the same bears were involved in the conflicts during the spring.

Along the southwestern and northeastern portions of the Yellowstone ecosystem, sheep grazing practices lured grizzly and black bears into conflicts during 1991 and 1992. When black or grizzly bears located a domestic sheep herd, they often followed the herd and killed and fed on sheep until the bears were relocated or the herd left the range of the bear (Wyoming Game and Fish Dep. Conflict–Resolution files 1991, 1992, Lander, unpubl. data).

During August 1992, a grizzly bear entered an unoccupied U.S. Forest Service cabin where the bear foraged on available food. After the incident, the cabin was cleaned of all food and secured with locked doors and heavy wooden window shutters. However, the bear returned, destroyed the shutters, and entered through the window. During this second visit by the bear, Laika dogs may have been used to condition the bear to avoid backcountry cabins through association of the cabins with the dogs.

Much of the Yellowstone ecosystem is roadless wilderness with backcountry hiking, camping, and hunting increases annually. Increased human use of these areas provides increased opportunity for bears to conflict with humans through improperly stored food and harvested game. These types of conflicts are reported 1–2 times every year. The immediate conflict is often resolved by securing food and game carcasses from grizzly bears. However, bears that have been rewarded by food in back country camps will often visit other camps and may be rewarded again (Wyoming Game and Fish Dep. Conflict–Resolution files 1990, Lander, unpubl. data, Gillin et al. 1992).

Combining Negative Reinforcement Techniques

During the symposium on "Human–Large Predators: strategy of relations" held in Moscow in 1985, bear specialists stressed that it is critical to encourage acceptable behavior in large predators to avoid elimination of predator populations. However, the use of Laika dogs as a technique cannot be considered a panacea for all bear–human conflicts. Human behavior must also be controlled by avoiding development in bear habitat and eliminating all sources of human food to bears. This would also be true if the Laika dogs were used in the U.S.

During some encounters in Russia and the U.S., other breeds of dogs have been known to provoke bears to attack people. In these situations, a bear defending itself from a dog may turn on a human as the dog seeks protection near its master. To avoid injury to humans, Laikas will need to be trained to stop a bear under any situation from attacking the human dog handler or bystanders.

Combining additional negative reinforcement techniques with the use of dogs may be more effective in modifying behavior for nuisance bear situations. A hypothetical situation may include a bear that entered a campground and during its initial contact with humans was rewarded by food. The next time the bear returned to the conflict site, Laika dogs could be released by the handler on the bear while it is near the campground, provided the site was cleared of campers and other humans. As the dogs harassed the bear, additional audible, visual, or physical negative reinforcement techniques could be applied.

The additional negative reinforcement or deterrent measure will require that it be specific to the bear and not

affect the dogs. This limits the use of airborne spray irritants. An audible frequency that acts as an unconditioned stimulus may prove useful, but barking dogs will also serve in this capacity.

Firing projectiles at the bear might also be considered. This could be accomplished using a Thumper Gun system (a Model 267 Smith and Wesson gas and flare gun converted to a 32 mm bore) (Gillin et al. 1992), 12-gauge shotgun Bear Deterrent Cartridges, or a crossbow deterrent round. Other methods that may succeed are electric shock, fencing, or the use of a loud and intimidating visual display (e.g., high pressure CO_2 canister used in fire extinguisher).

In Russia and the U.S., research efforts designed to develop effective behavior modification techniques for brown bears using Laikas may prove to be a useful management tool. These techniques should cause bears to avoid humans and not injure the bears.

Currently, research proposals are being developed to evaluate the use of Laika dogs in modifying bear behavior using captive animals in Russia. Russian research facilities will be used for conducting controlled experiments to evaluate the use of additional negative reinforcement while using Laikas. The facility will also be used to breed and train Laika dogs specifically for the task of deterring nuisance bears. Presently, Russian and U.S. researchers are planning to culminate these efforts with field trials using trained Laika dogs and other negative reinforcers on free-ranging bears in the U.S. during 1993 or 1994.

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