

parkbreak

perspectives

## Recommendations for effective black bear management in Delaware Water Gap National Recreation Area: Expected future problems and solutions

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## Introduction

**MANAGING PREDATORS, SUCH AS AMERICAN BLACK BEARS** (*Ursus americanus*), is one of the most controversial issues in wildlife management in the U.S. (Teel et al. 2002). According to Kimberly (2007), nuisance behaviors of bears are identified as (1) utilizing any human-food resources (e.g., household garbage, dumpsters, etc), (2) eating pets and pet food, (3) causing apiary or other property damage, (4) entering or attempted to enter a home, and (5) showing aggression or territoriality within or around human residences, especially during daytime hours. In Great Smoky Mountains National Park, conflicts between black bears and visitors have regularly occurred since the park's establishment. Between 1990 and 1998, 1,414 nuisance bear incidents were reported, 18 of them including human injury and 516 involving property damage, resulting in an estimated cost of \$39,069 (Clark et al. 2002). In Florida, even though no attacks on humans by bears have been recorded, there have been many cases of bears in buildings, bears attacking livestock and pets, and other serious conflicts (Eason 2003). The annual number of reported human-bear conflicts in the state has increased from one incident in 1978 to 1,340 in 2002 (Eason 2003). Given these facts, wildlife managers and private landowners are facing a challenge to balance the need to protect and preserve bear populations with the increasing demand to ensure Floridians' safety and well being.

Delaware Water Gap National Recreation Area, located between Pennsylvania and New Jersey, is famous for having thousands of black bears. and bears are not an unusual sight in the park (USGS 2003). While black bear management is an issue for the park, it is currently but one of many challenges the park must address (Larry Hilaire, personal communication). Human development and population growth around the park has increased dramatically in recent decades and further growth is expected in the future (John Donahue, personal communication). This trend presents a real challenge to the park, especially when considering the large bear population. This case study presents a model scheme for people to coexist with big mammals, one which can be applied to other national parks and wildlife preserves facing similar development pressure.

## Current black bear management in Delaware Water Gap National Recreation Area and Pennsylvania

Delaware Water Gap is one of a few national park units that allow hunting inside the park boundaries (Laitner 2002). On the Pennsylvania side of the park, the Pennsylvania Game Commission manages bears. Hunting season dates shrink and expand by year, according to the population trends of bears. About 2,000 to 4,000 bears have been harvested annually in Pennsylvania since 2000 (Ternent 2006). Pennsylvania's estimated black bear population was 15,713 animals (with a 95 % confidence interval) in 2005, and about 23% of the male population and 16% of the female population is removed every year by hunting (Ternent 2006). According to Larry Hilaire (personal communication), a wildlife biologist from Delaware Water Gap, due to the constant hunting pressure on bears both inside and outside the park, bear populations remain low and few human-bear conflicts occur in Delaware Water Gap each year. On the New Jersey side, the New Jersey Fish and Game Council is responsible for developing black bear management policy, working closely with the Division of Fish and Wildlife (New Jersey Fish and Game Council 2005). The Council controls bear population through regulated hunting and trapping seasons (New Jersey Fish and Game Council 2005).

## A future perspective on human-bear conflicts

In Pennsylvania, the population of black bears has increased astonishingly, from around 4,000 in the 1970s to more than 15,000 currently (Ternent 2008). This is correlated with increased human-bear conflicts, including property damage and human injuries (Pennsylvania Game Commission 2008). The Game Commission

responds to these conflicts, answering more than 1,100 bear complaints annually from citizens in Pennsylvania (Pennsylvania Game Commission 2008). The most common complaint that the Game Commission receives is residential damage (Ternent 2005).

Meanwhile, the number of residents living around Delaware Water Gap is increasing dramatically. According to the website of Pike County (2008) of Pennsylvania, which covers both Delaware Water Gap and the area around the park, the population of the county increased 25.7% between 2000 and 2006, with the population estimated to increase from 46,302 in 2000 to 79,170 in 2020. Those new residents mainly come from urban areas and have little or no experience living near bear habitats, and are probably less prepared for conflicts with bears (Ternent 2005). This most likely means an increase in human–bear issues (Ternent 2005; Larry Hilaire, personal communication).

### **Recommendations for future management**

In order to prevent human–bear conflicts from happening and manage coexistence between increasing residents and bears, three recommendations are presented.

**Outreach** First, in order to decrease bear complaints and avoid producing nuisance bears, an adaptive program aiming at changing people’s behaviors that attract bears and minimizing negative interactions with these animals need to be planned. The design of this program begins with research that identifies people’s knowledge of and attitudes towards bears. By knowing what kind of information about bears people want to know or what kind of attitudes people have, rangers and wildlife managers can decide which communication tools to use, and choose target audiences for whom they will conduct education programs (Jacobson 1999; Decker et al. 2003). Because people’s beliefs and attitudes towards wildlife vary by place, the results of such a survey will help to design specific education programs effective for Delaware Water Gap (Decker et al. 2003).

The second stage involves conducting those education and outreach campaigns with residents. Because many people moving into areas around Delaware Water Gap may have little knowledge about how to avoid human–bear conflicts, they may feed bears or fail to manage garbage and other foods properly (Ternent 2005). This is the reason education and outreach campaigns designed for new residents are important in preventing human–bear conflicts. In New Jersey, bear education conducted by the Division of Fish and Wildlife has produced a positive effect, contributing a recent decline in nuisance complaints involving bear damage to garbage and bird feeders (New Jersey Fish and Game Council 2005). However, since 2002, a lack of funds has made it impossible to continue this bear education initiative (New Jersey Fish and Game Council 2005). In order to conduct and continue effective education, both Pennsylvania and New Jersey need to provide enough money to support educators and create educational materials, as well as design a sufficient evaluation process (Gore et al. 2006).

In the third stage, once the education and outreach campaign has been conducted, it is necessary to evaluate the success of the programs (Jacobson 1999). The Human Dimensions Research Unit in the Department of Natural Resources at Cornell University has cooperated with the New York Department of Conservation’s Bureau of Wildlife to design a “NeighBEARhood” educational program (Lang 2005). By evaluating the six-month program, researchers at Cornell have found out the effect on the community as well as individuals (Gore and Knuth 2006). After Evaluations such as this enable outreach specialists and practitioners to improve programs.

**Deterrents** To prevent bears from coming to campgrounds or residential areas, deterrents can also be used. One option that helps to maintain the appropriate distance between bears and humans is utilizing well-trained bear dogs (Wind River Bear Institute 2008 and NPO Picchio 2008). While it is important to dispose of garbage properly and to manage foods inside house for reducing potential human–

bear conflicts, it is also crucial to drive off bears who enter human settlements (Nagano Prefecture 2007). Shooting rubber bullets or fireworks to scare away nuisance bears is one way, yet experience in Japan suggests that it is sometimes too dangerous to use those tools around human settlements (Japan Bear Network 2007). Bear dogs trained and used in the town of Karuizawa, Japan, are playing multiple roles and demonstrating the usefulness of dogs in managing Asiatic black bears (*Ursus thibetanus*), which are almost the same size (50 to 75 inches) as American black bears (International Association for Bear Research and Management 2007). Trained dogs not only drive off bears but also can help inspect the areas for bear activity and educate the general public about bear management (Japan Bear Network 2007).

However, in Japan, the use of trained dogs to deter bears is facing some challenges. According to Hidetake Hayashi (personal communication), it is not effective to leash dogs and chase bears in the mountainous areas, but instead dogs can only maximize their ability when they are released from the chain and run after bears freely in open areas. Therefore, for most areas in Japan, and also in Delaware Water Gap, chasing bears with leashed dogs may not be successful. Also, training a dog to become efficient bear dog require resources (Hidetake Hayashi, personal communication).

**Road impacts** More detailed study of road impacts on bears, including roadkills, should be conducted. For any animal that requires large swaths of habitat, such as bears and many other large mammals, roadkill is one of the biggest reasons for mortality (Groom et al. 2006). In Pennsylvania, vehicle collisions account for 10% of all recorded deaths of bears, Wildlife conservation officers inspect 300 to 350 bear roadkills annually, and the number is increasing (Ternent 2005). Hitting bears can also be expensive for people, as the average vehicle repair fee for damage resulting from a deer collision is around \$1,500—and adult bears are much bigger than adult deer (Ternent 2005). According to Larry Hilaire (personal communication), the roadkills of bears reported to states is not likely shared with the National Park Service, therefore, no integrated data exist so far. In order to better manage the population of bears, the National Park Service needs to know and record the actual numbers and impacts of roadkills, and sharing of data between the Park Service and the state(s) should be done. After collecting and analyzing the data, signage for drivers should be posted. Additionally, underpasses and fences for bears and other big mammals should be built in appropriate areas (Eason 2003). In Florida, because vehicle collisions were responsible for more than 50% of adult deaths of endangered Florida Key deer, wildlife managers started projects to reduce deer–vehicle collisions, including installing highway fencing and underpasses to prevent deer from crossing the roadway (Groom et al. 2006). However, studies show that some animals hesitate to use those artificial passages (Plumb 2003; Cleverger and Waltho 2000), and building a path that bears will really use remains a big challenge for wildlife managers.

## Conclusion

Although biological and ecological research on bears, including studies on behavior, lifespan, home range, and population dynamics, is indispensable for management, it is also necessary to research the human dimensions of bear management, such as people's attitudes towards them. The three recommendations in this paper come from aspects of human dimensions: how people can change their attitudes and behaviors towards bears, how people can cooperate with dogs to drive off bears, and how drivers can avoid hitting bears on the roads.

As for intervention and educational programs, even though evaluation is critical to understand the capacity of such plans for reducing conflicts between bears and people (Jacobson 1999; Gore et al. 2006), most of the education programs in the U.S. and Canada lack an evaluation process (Gore 2004). Designing evaluations and

implementing recommendations after programs should be critical for future outreach practitioners.

Delaware Water Gap National Recreation Area is located just a few hours' drive from major metropolitan areas, such as New York City and Washington D.C., yet it still maintains a great natural environment, including a large bear population. It is expected that more and more residents will move to this area in the future, and human-wildlife conflicts might increase. However, if Delaware Water Gap successfully establishes a model that enables both humans and large carnivores, such as bears, to coexist with minimal conflicts, it can be applied to other national parks and wildlife reserves that have similar problems.

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