

HUNTING AS A TOOL IN MANAGEMENT OF AMERICAN BLACK BEAR POPULATIONS

A position paper of the International Association for Bear Research and Management

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Preface

In July, 2016, the governing Council of the International Association for Bear Research and Management (IBA) was asked by several Association members to articulate IBA's position on the appropriateness of hunting as a tool for managing bear populations, specifically in the context of current controversy surrounding proposed American black bear (*Ursus americanus*) management in the state of Florida, USA. In this document, we, the governing Council of IBA summarize our professional opinions as bear biologists, managers, and conservationists from around the world. It is not our intent to present an in-depth review of the situation in Florida nor a literature review on the subject of hunting as a management tool. Rather, we briefly summarize the issue of changing public support for bear hunting during the course of population recovery, and the interplay between science and values in public discourse around the topics of bear management, hunting, and human-bear conflict. We broadly outline some of key arguments in scientific debates about hunting, population manipulation, and prevention of human-bear conflict, and we provide our concurrence regarding the role that hunting can have in bear management, with specific reference to the current status of black bears in Florida.

Human Role in Bear Population Declines and Recovery

The world's eight species of bears all experienced global population declines during recent centuries, and particularly in the 20th century, due to a triumvirate of factors: 1) loss of habitat through conversion of wild lands to human-exploited landscapes; 2) legal and illegal commodity hunting; 3) intentional extirpation and other human-caused mortality, often as a result of human-bear conflict (e.g., crop or livestock depredations, property damage, perceived or real threat to people, bear-vehicle collisions on roadways). Successful recovery of depleted bear populations thus rests on two practices: 1) securing the integrity of remaining habitat and/or restoring additional habitat, and 2) curtailing human-caused mortality, e.g. by closely regulating legal hunting, strengthening efforts to stop illegal hunting, facilitating safe highway crossings for wildlife, and instituting programs to reduce human-bear conflict and to reduce fear of and increase tolerance and appreciation for bears.

Among bear species, American black bears (hereafter referred to as black bears) arguably have proven to be among the most adaptable and resilient. Large populations have persisted in many places in North America despite human settlement and bears have adapted well to humans and human-altered landscapes. Where populations have been depleted, recovery efforts have met with good success. In a recent survey, 56% (19 of 34) of states and provinces in eastern North America reported that bear populations were increasing and 26 reported range expansion, largely as a result of focused management efforts implemented in the past 3–5 decades (Telesco 2013). With few natural predators and long reproductive life-spans, many remnant populations have exhibited remarkably rapid recovery once human-caused mortality was curtailed. Nonetheless, black bears still occupy only a portion of their historic range (65%-75%; Scheick and McCown 2014) and in some places still exist only in small, isolated populations.

Black bears in Florida

In the state of Florida (USA), black bear numbers and range were reduced drastically following European settlement and through much of the 20th century. By the 1970s, state wildlife authorities estimated there to be only 300–500 bears, living in 7 separate and mostly isolated subpopulations, collectively occupying only 17% of their historic range within the boundaries of the state. In 1974, the Florida Fish and Wildlife Conservation Committee (FWC) classified bears as threatened within the state. Hunting was restricted in those subpopulations considered to be at risk and eventually hunting was closed statewide in 1994. As a result of this and other conservation measures, the bear population rebounded to an estimated 2600 or more by 2002 and occupied 31% of historic range, with connectivity among subpopulations substantially increased (Simek et al. 2005).

By 2012, multiple lines of empirical evidence suggested continued population growth and expansion. Concurrent with this were increases in the number of human-bear conflicts, especially in the number of bears showing up in towns and residential areas. The FWC completed and adopted a Black Bear Management Plan focused on 4 objectives: 1) population conservation; 2) habitat conservation; 3) human-bear conflict management, particularly the removal of attractants (e.g. human-generated sources of food) that typically underpin conflicts; and 4) other outreach and education to increase public tolerance for living with bears. The plan stated that FWC would explore the option of hunting but did not delve into the topic further. Once the plan was adopted, black bears were removed from the state's Threatened List. In 2015, the FWC reinstated a controlled bear hunt, with the stated intent to slow and eventually halt, but not reverse, population growth in some of the seven delineated Florida black bear subpopulations. Hunting was intended to also provide recreational opportunity for hunters at a sustainable level and, by removing some bears, complement the conflict-reduction actions implemented under the plan and already underway.

A total of 304 bears were killed during the 2015 hunt. Some segments of the public opposed the new hunting season, contending that: 1) the FWC's information was not adequate to assure that hunting would not cause population decline; and 2) that if reducing complaints was the primary objective, a general hunt was not an effective or efficient way to do so, as it would not specifically remove "problem bears" from the population. After the 2015 hunt, FWC postponed any further hunting until data from a new DNA-based population survey conducted in 2015 were analyzed for a new estimate of population size. Analysis was completed in 2016 and results indicated continued population growth and expansion since 2002, with bear numbers estimated at ≈4200 animals. An updated range map indicated that bears had expanded to over 45% of their historic range, with improved connectivity among most subpopulations.

Despite the new estimate of population size, opposition to hunting bears continued, and in the spring of 2016, the FWC convened an external, independent panel of scientists, charged with the task of reviewing the methods and results of the 2015 population survey and judging the merits of Florida's bear management program, including proposed hunting seasons. The independent panel presented its review in May, 2016, concluding that "...FWC is employing quality long-term data and scientific research to manage Florida's black bears..." With respect to hunting, the scientific panel stated its opinion that, "The FWC implemented a responsible, science-based bear hunting plan in 2015.....Regulated hunting is an effective tool that is widely used to manage, conserve, and sustain black bear populations, which is supported by the North American Model of Wildlife Conservation. We unanimously concur that hunting is an appropriate response to address human-bear conflicts in Florida, in addition to the conflict-specific mitigation and prevention measures currently employed by FWC."

From recovering to recovered: patterns of support for population protection, conservation, and management

To recover a severely depleted and fragmented population of bears, measures to curtail excess mortality and secure habitat and habitat connectivity are key. Within the context of an informed human public and a societal culture that is broadly supportive of wildlife conservation, such measures often find support across a wide swath of the populace, including people with disparate personal opinions about hunting. As long as bear populations face serious threats, both hunters and opponents of hunting can come together to support a ban on bear hunting: hunters, because they value measures that will rebuild bear populations to a point where they can again be sustainably hunted; hunting opponents, because of their philosophical opposition to killing wildlife, and both groups because of their equally strong passion for living in a world rich with wildlife. In these circumstances, only those who actively dislike bears, are afraid of bears and concerned about human safety, are intolerant of the economic impacts (e.g., damage to crops, livestock, or property) or the inconveniences (e.g., securing bear attractants, bear encounters) that they experience from bears, or who do not believe that bears are, indeed, threatened are likely to oppose protective measures.

However, once protective measures are in place and a bear population starts to recover, it is predictable that friction points develop among previously aligned groups due to differences in their motivating values. As bear numbers in core protected areas grow, more animals disperse into surrounding lands with lower bear density, including human-dominated landscapes, farmlands, suburban, and even urban areas that border wilder refugia. These can provide surprisingly high-quality habitat for black bears in terms of food and cover. By temperament, black bears readily adapt to rural human-dominated landscapes, many of which present bears with abundant agricultural food sources such as farm crops and fruit orchards. In more suburban areas, where garbage bins, bird feeders, and fruit and nut trees draw bears into people's yards, some bears become habituated to human presence, which increases the potential for real or perceived human-bear conflict and for human discomfort with the close proximity of bears.

To be clear, it is crucial not to ignore the role of human population growth in increases in human-bear conflict. Fundamentally it has been the historic and continuing increases in human population size and reach into wild bear habitats that are the root problem for bear conservation. Markel et al (2017), in their recent modeling work to help quantify this effect, noted that, "...because the landscape is finite, increasing the size of the urban area means decreasing the natural area, leaving less natural food for the bear to select". Their modeling demonstrated that "... a small change in the size of the [human] community can have a much larger effect on the number of conflict bears around the community." As long as human population increases, so will challenges to bear management.

Education and outreach campaigns geared towards preventing conflicts and increasing human understanding of, and thereby tolerance for bears can go a long way towards preventing and mitigating problems. Removing and/or securing bear attractants (e.g., garbage, bird-feeders, beehives, orchards, livestock) are crucial for reducing human-bear conflict to a minimum. These measures can greatly increase the probability of successful co-existence of humans and bears in a landscape. Still, if either human or bear numbers continue to increase, human-bear conflicts are likely to continue to increase as well, despite education and abatement measures, because not all attractants can be fully removed or perfectly secured. As bear numbers increase and populations saturate remote habitats, bears, particularly subadults, are more likely to venture into neighboring areas where human densities are higher. Eventually, real and/or perceived

human-bear conflict can reach a level that is objectionable to a critical mass of people ("social carrying capacity"). Wildlife management agencies are then called on to mitigate the increasing problems and to mollify a divided public. At this point in the recovery of a bear population, it is often proposed by the hunting public and/or bear managers to reinstate a hunting season. Hunting wildlife has a long tradition in North America, especially in rural areas, and the privilege to hunt remains a core value for many citizens. Once a protected species has sufficiently recovered, continued policies of full protection are likely to be challenged.

This marks a point at which initial coalitions that supported full protection (when the population was in danger) are likely to disassemble, due to the increasing gulf in values among people who fundamentally oppose killing bears for human use and those that do not, or who disagree regarding when and under what circumstances it is acceptable to kill bears. Such differing opinions can arise from varying sources, including misinformation of many sorts. However, much of the fundamental disagreement among people over hunting relates to differences in their core values and may have little to do with factual data about the bear population. For this reason, the reintroduction of hunting into public discourse as a conservation or management option marks a particularly volatile nexus around which storms of conflict between science, scientific uncertainty, and personal values revolve.

Hunting as a management tool

The responsibility of wildlife agencies is first to restore threatened populations to the point that they are sufficiently robust to withstand normal demographic or environmental stochasticity that could endanger the population again. Once that is achieved, the paradigm must shift for wildlife agencies, i.e., from protection and population recovery, where maximum survival and population growth rate are the focus, to population management, where controlling population dynamics around chosen management goals (e.g., population size, levels of human-bear conflict, amount of hunting opportunity) is the focus. In the North American model, population management for bears typically involves allowing people to hunt them, at least in some parts of their range during specified times of year - a proposition that, as we noted, is likely to meet with public opposition from those who disagree with the morality of killing wildlife as a commodity or for convenience, as well as those uncomfortable with scientific uncertainty who may not be convinced that the population has not yet sufficiently recovered to withstand hunting. These two groups realign into a new coalition, despite their differences in motivating factors, to face off against hunting advocates.

Once almost universally accepted by American society, hunting now has many opponents on moral or emotional grounds. Nevertheless, it currently remains a highly valued traditional past-time in most states and provinces. Regulated hunting is used in black bear management programs for several reasons: 1) when properly monitored, it offers the public an opportunity for recreational and/or subsistence use of wildlife, providing direct "value" of the species without endangering the population; 2) it can be used to manage population size around articulated goals; 3) depending on circumstance, it can provide a tool to help manage levels of human-bear conflict. Notably, in North America, black bear population growth has often been greatest in jurisdictions where legal bear hunting was well-established (Garshelis 2002).

The third point above—the efficacy of hunting as a means of reducing nuisance complaints—is subject to considerable scientific debate and is situation-dependent. Some studies have linked hunting and trapping to reduced human-wildlife conflict, suggesting that they reduce populations from biological carrying capacity, remove some problem individuals from the population before they would ordinarily die, and alter the behavior of wildlife (Conover 2001). In New Jersey, the occurrence of a hunting season was linked to decreases in human-bear conflicts the following year (Raithel et al. 2016), and in one Ontario study area,

nuisance complaints increased substantially during the 5 years following the closure of a spring hunting season (Hamr et al. 2015), though neither study considered the likely confounding effects of local food conditions on complaint numbers. Conversely, studies in Wisconsin and across Ontario as a whole found no evidence that increasing harvest reduced subsequent human-bear conflict; instead, conflict levels were tied to underlying population growth in Wisconsin (Treves et al. 2010), and, in Ontario, to annual variation in natural foods, with complaints increasing in years of poor food supply (Obbard et al. 2014).

Thus, some argue that the only way for lethal measures to effectively mitigate human-bear conflict is if they directly target individual animals involved in conflicts. Conceivably, too, this might help maintain positive attitudes towards bears among those experiencing human-bear conflicts and increase their tolerance for higher population levels by demonstrating agency responsiveness to their individual hardships and by giving some measure of control to landowners. However, targeting individual animals is labor-intensive for management agencies and often not successful (target bears are often not apprehended). Moreover, lethal control of animals involved in conflict situations can, in some cases, *damage* public support for bear management programs and agencies, especially if the control action involves killing cubs or females with cubs and/or if the "infringement" by the bear is viewed by the public as trivial. Because most bears destroyed in conflict situations are not subsequently eaten by people, this type of killing can be viewed as being a "waste"; many hunters and non-hunters share the belief that killing a bear is "better" if its meat is used by people rather than if it is discarded. Although many argue that a general hunting season does nothing to disproportionately target conflict bears, there is some evidence to the contrary in some situations. Particularly where hunters use bait to attract bears, a general hunting season can be biased to some degree towards the same bears who are, at other times of year, most attracted to baits and indifferent to or conditioned to human activity. By extension, depending on the types of bait used and other particulars of the situation, these can be the same bears that are most likely to end up in conflict situations (Noyce et al. 1998, Garshelis and Noyce 2007).

Both sides of this debate have merit, depending on the specific situation and management goals. Achieving a reduction in complaints through a *geographically widespread, generalized* hunt potentially requires substantial decline in bear numbers and density. Obbard et al. (2014) cautioned that, "Given the variation in natural foods, harvest is unlikely to prevent elevated levels of HBC [human-bear conflict] in years of food shortage unless it maintains bears at low densities—an objective that might conflict with maintaining viable populations and providing opportunities for sport harvest." Robust populations of black bears can be sustained at densities well below biological carrying capacity. Indeed, most hunted black bear populations in the US are, and this occurs precisely through agencies providing opportunity for sport hunting. Where reduced population growth or lower-density population is consistent with management goals, then hunting that either slows population growth or reduces population size and spatial extent can, arguably, contribute to stabilizing or lowering levels of human-bear conflict. This has been the experience in Minnesota in recent decades, where significant population decline due to increased harvest through the early 2000s was accompanied by dramatic decreases in complaints that were not entirely explained by changes in conflict management or natural food availability (Minnesota DNR, unpublished data). Depending on the situation and the preferred management objective, reduction in human-bear conflict can occur either by reducing bear density at the core of the range, thereby removing the pressure for range expansion, or by targeting the fringe of the range with heavier hunting to reduce the number of resident bears living in or adjacent to areas of dense human population..

In summary, the development and articulation of clear management goals with regards to population size or trend, numbers or trend of human-bear conflicts, amount or types of hunting or non-consumptive viewing opportunity, is critical for agencies in gaining public support as they implement management practices

in response to changes in population status. Equally important is a clear understanding and articulation of underlying assumptions regarding social support for practices that management will employ and/or allow. Depending on the specific context, evidence shows that:

1. Properly regulated hunting provides opportunity for recreational and subsistence use of black bears by people without endangering the population; this opportunity is highly valued by many.
2. Where populations are severely depleted and the primary bear management goal is population recovery, then hunting is likely not an appropriate management practice. However, once populations are sufficiently recovered, there is no biological reason that well-managed hunting cannot be re-introduced.
3. Where the primary management objective is to slow population growth or limit population size or distribution, then increasing human-caused mortality is the only option. A regulated and monitored hunt can do this effectively and is typically the most practical and socially acceptable way to achieve this. Rates of reproduction and natural survival of black bears in most North American habitats are sufficient to sustain stable or growing populations concurrent with well-regulated hunting pressure. Hunting can be structured to address different population goals (e.g. reduction, stabilization, growth) in different parts of a jurisdiction.
4. Conversely, if the primary management goal is to reduce human-bear conflict, the crucial and, arguably, only efficient and long-term way to do so is through education, outreach, and implementation of practices and regulatory policies that remove bear attractants. Proactive, preemptive actions that help landowners, farmers, and ranchers to secure their bear attractants through investments in time, expertise, and financial assistance (e.g., providing cost-share electric fencing and other food securing assistance) can help realize large and lasting dividends in conflict reduction.
5. Where non-lethal methods do not reduce conflict to acceptable levels, hunting can be an additional tool, augmenting efforts to school the public in attractant management. In some cases, hunting can be structured to specifically target individual bears involved in conflict situations (e.g., via special hunting licenses) or to concentrate hunters in particular areas.
6. In addition, to the extent that high bear densities are a contributing factor to high numbers of human-bear conflicts, increases in general hunting can contribute to managing conflict levels over the long run, either by slowing population growth (and stemming future increases in human-bear conflict) or by lowering population size and/or density, either range-wide or in particular areas. Whether a population can responsibly be reduced to the degree that conflict levels decrease is situation-dependent.
7. Even with all measures in place, there will likely be times when levels of human-bear conflict exceed social tolerance, particularly where bear numbers are growing and/or expanding from source areas into human-dominated landscapes. Natural bear foods typically fluctuate widely; inevitably, periodic severe failure of natural food crops will drive more bears to seek human-created food sources.
8. In nearly all conflict situations, if the problem of bear attractants is not first addressed, regulated hunting will have limited value in alleviating human-bear conflict; as long as there are bears present or in a neighboring source population, new bears will continue to find their way to unsecured sources of food.
9. A key point that is often ignored in the public discourse around bear management is that human population increase is historically the primary driver of human-bear relations, impacting habitat, human-bear encounter rates, demographics (e.g. car-kills), movements and activity patterns of bears, and food supplies. As long as this continues, it will continually raise new challenges to bear conservation. Wildlife management agencies have little power to affect human population growth, thus typically they do not address it. However, agencies can provide an important service

- to wildlife conservation by bringing the issue into public discussions, clarifying the long-term implications for conserving wildlife, and offering technical guidance regarding the relationships among community spatial design, human behavior, and human-wildlife interactions.
10. Finally, where hunting is part of bear management, it can provide a flexible tool if monitored and applied with care. Management practices, including hunting regulation, must be flexible and agencies must be committed to periodic review to assure that all goals are being met.

Conclusion

Species conservation and management plans are both scientific and cultural documents. They exist to present accurate information, summarize scientific options, and prescribe a suite of effective tools to achieve a plan's specific goals. However, the assumptions and values underlying these goals are societal agreements (e.g., do we want bears here and how many; is it acceptable to kill problem bears; is it acceptable to have sport hunting and, if so, under what circumstances and what methods are humane). Plans reflect the values of those who write them, whether an individual, an agency committee, a legislative body, or a broader coalition of public groups. In essence, species conservation and management plans codify prevailing societal norms about how humans are to interact with wildlife in a particular place and time. Because not everyone shares the same normative values, creating broadly accepted plans is typically contentious. For this reason, agencies sometimes present alternative plans, from which a “preferred alternative” is chosen, considering public feedback.

Whereas societal norms at one time promoted or condoned the killing of bears, norms of the 21st century in North America support conservation of bears. The right to hunt bears and other wildlife for recreation and subsistence is still highly valued by many people in North America and still has broad societal support. However, the right to kill bears for profit, sport, food, and/or convenience (e.g., to prevent bear damage to property) each have received increasing scrutiny in North American wildlife management. Some practices, such as killing bears for market sale and some methods of kill, are now considered ethically unacceptable. As non-consumptive users of wilderness and wildlife comprise a growing proportion of the North American public, re-examination of the consumption bias in North American wildlife policy is on-going (Feldpausch-Parker et al, 2017). Non-lethal means of reducing human-bear conflict (e.g., Bear-Smart or Bear-Wise community programs and other attractant management programs) receive greater emphasis than in the past and have proven fundamental to reducing human-bear conflict and altering human attitudes to increase tolerance for bears (Eason and Eggeman, 2017). These programs cannot, however, entirely ameliorate human-bear conflict. Nor can hunting, though it can help under some circumstances. Hunting does, however, provide a means for wildlife management agencies to manage wildlife population growth.

Members of the International Association for Bear Research and Management comprise a diverse collection of bear researchers, managers, conservationists, and educators and represent a broad spectrum of values and beliefs. However, as members of IBA, we share values articulated in our statements of mission, goals, and objectives. We believe that: 1) bears are a valuable component of our natural world and inherently deserve to persist; 2) populations should be conserved where present and restored to suitable places where they once lived but were extirpated; 3) conservation and management plans must be built upon a foundation of scientific fact and demonstrated principles; 4) although it is imperative to distinguish between science and values, successful conservation is conducted within a cultural context; societal values help shape effective conservation goals and direction.

We believe that regulated hunting can be an important and beneficial tool in management of bear populations. It must be monitored, biologically sustainable, compatible with conservation goals and public ethical values, and flexible - that is, adaptive to indications of changing population status. The International Union for the Conservation of Nature (IUCN, 2000), the world's premier wildlife conservation organization, recognizes that " a) the use of wild living resources, if sustainable, is an important conservation tool in many settings because the social and economic benefits derived from such use provide incentives for people to conserve them; b) when using wild living resources people should seek to minimize loss of biological diversity; c) enhancing the sustainability of uses of wild living resources involves an ongoing process of improved management of those resources; and d) such management should be adaptive, incorporating monitoring and the ability to modify management to take account of risk and uncertainty". We concur with these statements.

With regards to the current situation in Florida, whether or not to hunt bears is essentially a public decision, as it involves resolving differences in values as much as science. As the public debates this question, however, it is as imperative for the discussion to consider the biological and social consequences of *not* hunting bears as to consider as the consequences of hunting bears. Such a discussion would include information on natural processes that occur as bear density increases, such as the increased competition among bears for resources, increased cub and juvenile mortality, and increased incidence of cannibalism (Czetwertynski et al. 2007, Laufenberg et al. 2016).

Assessments by the State of Florida in 2011 and the U.S. Fish and Wildlife Service in 1998 and 2016 concluded that Florida's black bear populations are not at risk of extinction, and thus do not need to be listed by the state or Federal government as Threatened. Population estimates conducted in 2002 and 2015 indicate that population goals for sustainability have been met. An independent panel of black bear conservation and management experts reviewed the methods, analysis, and conclusions of the most recent estimate and found them to be state-of-the-art and scientifically sound. Primary importance is being given to attractant management, nevertheless human-bear conflicts remain at the highest levels since monitoring began. Under these circumstances, we believe that proposals to integrate well-planned and regulated hunting into black bear management plans and practices are reasonable, responsible, and scientifically defensible.

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