

## POSTER SESSION ABSTRACTS

### **1. Habitat Use by Sloth Bear (*Melursus ursinus*) in Human-dominated Areas of Jessore Wildlife Sanctuary, Gujarat, India**

**Rahul Pandya<sup>1</sup> and Nishith Dharaiya<sup>2</sup>**

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*Abstract:* Jessore Wildlife Sanctuary is known for its high density of sloth bears (*Melursus ursinus*). Although it is a protected environment, the area is subjected to anthropogenic activities, which influence the movement and habitat use of the sloth bears. Our study was conducted to understand the habitat use of the sloth bear in the human-dominated landscape of Jessore and to form the basis for further research on the sloth bear habitat. A study area of 14 km<sup>2</sup> was surveyed by conducting strip transects survey to search for indirect evidence indicating sloth bear presence. The signs of indirect evidences observed were scats, dig sites, claw marks on trees, and paw prints. The locations of each sign observed were recorded. The bear presence data were studied using geo-spatial analysis. The spatial distribution of bear presence near and around the human-dominated area was studied by subjecting evidence data to cluster analysis and proximity analysis using geographic information systems. The proximity analysis showed that the number of signs of bear presence increased as the distance from the human-dominated area increased. Similarly, the cluster analysis indicated where the evidence of the bear presence is most concentrated. The results of these geo-spatial analysis indicated that sloth bears avoid getting closer to human-dominated areas.

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### **2. Andean Bear-Human Conflicts: Identification of Socio-economic Triggers of Conflicts in Rural Communities in the East Range of Colombia.**

**I. Mauricio Vela-Vargas<sup>1,2</sup>, José F. González-Maya<sup>2</sup>, and John Koprowski<sup>1</sup>**

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*Abstract:* Habitat loss due to anthropogenic encroachment is a major threat to Andean bears (*Tremarctos ornatus*) in the Andean region of Colombia. Resulting habitat loss in this region has escalated negative interactions between human communities and wildlife, especially carnivores. Livestock predation and scavenging by bears are considered as negative interactions. These conflicts directly affect local rural economies, and farmers are prone to invest in poor conflict management misguided by anecdotal knowledge such as illegal hunting. Our objectives were to identify human perceptions of native wildlife and the causal factors of Andean bear-human conflicts to inform the best management actions and identify conflict social dynamics in the Chingaza Massif, Colombia. We conducted 64 questionnaire surveys in high-risk conflict areas identified through geographical modelling in the Calvario municipality (Colombia). Given the voluntary willingness of local participants, they answered a questionnaire about general knowledge of biodiversity, productive practices, conflict losses, and identification of wild predators in the area. Roughly 35% of people declined to participate because they did not trust due to past experiences in government agencies and other organizations that performed previous projects. On average, farmers maintain 16 cows and 29 sheep across an average of 18 hectares by farm. In this area of the Chingaza Massif, the main domestic species attacked by wildlife are sheep, with economic losses between \$600 and \$5,000 USD. We found that, that 99% of the times, people do not take management actions in the breeding season for domestic animals, and normally domestic animals are unsupervised between 3 and 45 days, depending of the distance of each farm to urban centers. Thirty-four percent of local ranchers have negative attitudes about Andean bears and believe species occupancy near their lands is a threat to them and domestic species, and these is highly correlated with the bad status of the fences in each farm. One of the key problems identified was the absence of technical assistance by governmental agencies to ranchers, and the lack of responses during negative human-bear interactions. People broadly tended to blame Andean bears for conflicts, yet only in few instances were Andean bears positively identified attacking domestic stock. In the majority of cases, ranchers found Andean bears scavenging dead carcasses. Due to the misguided management livestock practices in the Andean region of Colombia, domestic animal losses are also likely attributed to accidents (steep cliff falls), illness, or other causes. There is a great need to bring tools to local farmers for identifying attacks from different species such: Pumas, Andean bears and feral dogs, that are an active threat to



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domestic and wildlife at the Chingaza Massif. Our results can be applied to inform more accurate Andean bear-human conflict evaluation, mitigation, and resolution management plans in the east range of Colombia.

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### **3. PepperBall Launcher as an Effective Tool for Deterring Grizzly and Polar Bears**

**Christina Pohl<sup>1</sup> and Jim Hibpshman<sup>2</sup>**

<sup>1</sup> *BP Exploration (Alaska), Inc.*

<sup>2</sup> *Nana Management Services, Security*

*Abstract:* Protocols for deterring polar bear and grizzly bears with a PepperBall Launcher were developed to mitigate human-bear conflicts in the BP oilfields on the North Slope of Alaska. With an average of 415 bears sighted and reported per year, and 67 deterrence events per year, BP Alaska identified the need for an alternative advanced deterrence method that Security Officers would use, and that would be effective and safe for wildlife. Following an incident where polar bear deterrence with a cracker shell led to the fatality of the bear, BP gained approval to test a pilot deterrence method known as the PepperBall Custom Carbine Launcher. The launcher allows for projecting a variety of less-lethal rounds from a specialized device, and is more powerful and accurate than recreational paintball guns. Less-lethal trial rounds included inert (talcum powder), water, and two types of PAVA or capsicum (pepper) rounds. Four seasons of field trials indicate that the Launcher provides a combined sight, sound, physical contact and olfactory deterrence capability. The user does not have to reload between each firing and the device may be fired from within a vehicle, placing an additional barrier of protection between the animal and hazer, compared to shotgun-based hazing methods. The ability to haze via direct (aiming at the bear) or indirect (at the ground or a wall behind the bear) contact provides more possibilities and control when moving a bear out of an area. The device can safely be used near pipelines, process equipment, or housing areas. The team has defined effective operating parameters for Launcher use, and made improvements to the device and deterrence methods. The Launcher has been met with resounding success. It is an effective and versatile tool for both polar bear and grizzly bear deterrence with decreased risk to the animal, and is currently an authorized deterrence method in BP Alaska's hazing authorizations with the regulatory agencies.

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### **4. Survival, Movements, and Conflict Incidences of Rehabilitated Black Bear Cubs Released in North Carolina**

**C. G. Dukes<sup>1</sup> and C. Olfenbittel<sup>2</sup>**

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*Abstract:* Throughout North America, orphaned black bear cubs are rehabilitated and released back into the wild. Initially released to supplement recovering black bear populations, now cubs are often rehabilitated to fulfill the public's expectation on how this public trust resource should be managed. Historically, rehabilitated cubs were not monitored post-release due to limitations of technology. Consequently, little is known about survivorship rates, movement patterns, mortality factors, and whether these bears are more prone to cause nuisance issues. Since 1976, the North Carolina Wildlife Resources Commission (NCWRC) has rehabilitated and released 121 black bear cubs back into the wild. Starting in July 2015, the NCWRC fitted all rehabilitated bears with Vectronics GPS collars ( $n=19$ ) and released these bears on state managed lands in both the mountain and coastal plain regions of North Carolina. For 2015 and 2016 releases, the mean survival rate of rehabilitated cubs in the first 7 months after release was  $.456 \pm 0.1(\text{SE})$ . Eight of eleven mortalities were caused by legal hunter harvest. Although the estimated survival rate is lower than other reported studies, high hunter mortality may reflect higher harvest pressure than other areas. Maximum dispersal was 43.9 km from release site and minimum dispersal was 5.6 km. In 2015 and 2016, we did not find a difference in average daily movements between weeks during the 13 weeks after release ( $F_{(12,117)} = 0.592$ ,  $p = 0.845$ ). The NCWRC Wildlife Helpline received 3 calls concerning released yearlings, but only 2 bears displayed nuisance behaviors. Management response was education and hazing for these two bears. In June 2018, 9 more bears will be released and monitored. We will continue to evaluate post-release movements, mortality factors, survivorship, and the influence of environmental factors (e.g., release site) on results. Through collaboration with other researchers, combined with our data, we hope to gain better insight on the fate of rehabilitated bears that will aid in making management decisions based on sound science.



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### 5. Application of Hand-held Infrared Camera Systems for Detecting Bear Dens

Craig Perham<sup>1</sup> and Richard Shideler<sup>2</sup>

<sup>1</sup> U.S. Bureau of Ocean and Energy Management

<sup>2</sup> Alaska Department of Fish and Game

*Abstract:* Protocols for detecting maternal polar bear (*Ursus maritimus*) and grizzly bear (*Ursus arctos*) dens using a hand-held infrared (IR), thermal imagery camera system were developed to avoid and mitigate disturbance impacts to denned animals from industrial activities on the North Slope of Alaska. These procedures were created in conjunction with the testing of aerial IR platforms (i.e., helicopter and aircraft) to detect bear dens. We documented factors to consider when using a hand-held IR system to increase the success of identifying a bear den, such as environmental conditions, system limitations and advantages, ease of operation, and its use for various types of industrial activities. Hand-held infrared camera systems can be used for initial den detection as well as assessing current den occupancy and regularly monitoring den sites. Hand-held IR camera systems are inexpensive, readily available, and easy to use. These systems also allow operators to use them from multiple platforms. Hand-held IR camera systems also have the potential for detecting denned bears in temperate habitats as well.

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### **6. Human Food KILLS Wildlife: A New Messaging Campaign to Increase Awareness and Reduce Human-wildlife Conflict in Banff National Park**

**Susan Staple<sup>1</sup>, Steve Michel<sup>2</sup>, and David Gummer<sup>3</sup>**

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*Abstract:* Banff National Park (BNP) is Canada's first and busiest national park with over four million visitors per year and two residential communities that coexist with the full complement of native carnivores, including grizzly and black bears. In 2016, there were numerous incidents of wolves that accessed human food and garbage in campgrounds and day-use areas, culminating in destruction of two food-conditioned wolves and the collapse of their prominent wolf pack in the Bow Valley. Instances of visitors feeding black and grizzly bears have also been documented in recent years. As a result of these challenges, Parks Canada developed a wildlife messaging campaign to provide clear and captivating messaging to park visitors, residents, and businesses. We assembled a small, multi-disciplinary team that included interpretation, media relations, and wildlife specialists, to collaborate on the following objectives:

- 1) Increase awareness regarding the negative impacts of human food on wildlife (e.g. feeding, garbage, littering, unattended food), and
- 2) Increase awareness of the need to give wildlife space, to help ensure safety of both people and wildlife (e.g. when viewing roadside, within the town site area and on trails, and the importance of respecting speed limits).

Our goal was to provide consistent and coordinated communications both within and outside BNP using personal and non-personal communications tactics. We created a messaging toolkit for all park staff to ensure consistent understanding and delivery of messages. Our approach was to use powerful images and bold messaging to capture attention in hopes of eliciting an emotional response to influence and motivate positive behaviors. We launched a wide range of communication products, including rack cards, posters, stickers, magnets, and prominent signage. We also delivered the messages through in-park interpretation programs, media interviews, social media and other communication channels. Preliminary evaluation of these products and their effectiveness was conducted in 2017 and will be used to guide the growth of the wildlife messaging campaign in BNP and expansion to include other national parks across



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Canada in 2018. Our focus will be on engaging key partners and stakeholders, offering encouragement to incorporate the wildlife messaging into their publications and programming, to amplify key wildlife messages in national parks and greater park ecosystems.



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### **7. Incentive Solutions to Remove Anthropogenic Bear Attractants in Communities - Voluntary Fruit Tree Replacement Programs**

**Steve Michel<sup>1</sup>, Chad Townsend<sup>2</sup>, and Lori Rissling Wynn<sup>3</sup>**

<sup>1</sup>*National Human-Wildlife Conflict Management Officer, Natural Resource Conservation Branch, Parks Canada Agency, [steve.michel@pc.gc.ca](mailto:steve.michel@pc.gc.ca)*

<sup>2</sup>*Environmental Manager, Town of Banff, [chad.townsend@banff.ca](mailto:chad.townsend@banff.ca)*

<sup>3</sup>*Sustainability Coordinator, Town of Canmore, [lrisslingwynn@canmore.ca](mailto:lrisslingwynn@canmore.ca)*

*Abstract:* As with many communities across North America, the Canadian mountain towns of Banff and Canmore, Alberta are frequented by black and grizzly bears. Although both towns introduced community-wide bear resistant garbage storage and accompanying bylaws in earlier decades, ripe fruit on ornamental trees such as crabapple and chokecherry still present a powerful seasonal attractant. This has resulted in food conditioning and bear habituation to humans and infrastructure - numerous black and grizzly bears have been translocated or destroyed as a result of concerns for public safety within the communities. In 2015, the Town of Banff, located within Banff National Park, undertook an incentive program to encourage residents to voluntarily replace their existing fruit trees with non-fruit bearing species. This cost-shared program between the municipality and the Parks Canada Agency, allowed residential property owners to have their crabapple trees replaced with an approved alternative at no cost. In 2016, the Town of Canmore followed with a similar initiative that targeted additional tree species of concern, and expanded the replacement options to increase interest in the program. Since the two programs were established, 79 problem fruit trees have been removed from the two communities, greatly reducing bear-human conflicts in those particular neighborhoods. Although programs such as these can be challenging to fund on an ongoing basis, they have significant value in raising public awareness about managing attractants and wildlife conflict reduction being a shared responsibility between residents and agencies. In the near future, community managers will explore more robust bylaw and enforcement mechanisms, in addition to ongoing public education and volunteer fruit gleaning, to complement the voluntary tree replacement programs.



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### **8. Banff National Park's Wildlife Guardian and Picnic Patrol Programs - Delivering Effective Wildlife Messaging with Visitors Where They Are in the Park**

**Susan Staple<sup>1</sup>**

<sup>1</sup> *Interpretation Coordinator, Banff National Park, Parks Canada Agency, [susan.staple@pc.gc.ca](mailto:susan.staple@pc.gc.ca)*

*Abstract:* Banff National Park welcomes over four million visitors per year and has a small vulnerable grizzly bear population estimated at approximately 60 individuals. During the summer months, the majority of visitation is day-users who visit from one of Canada's fastest growing urban centers located less than 1.5 hours from the park. Members of Banff National Park's Wildlife Guardian and Picnic Patrol interpretation team are out in the park providing safe wildlife viewing messaging and the importance of keeping clean picnic sites to visitors to help ensure the long-term survival of Banff grizzly bears. From mid-May to early September, the Wildlife Guardians assist Human-Wildlife Conflict staff with grizzly bear monitoring and grizzly bear jam management, in addition to sharing information about Banff's grizzly bears with visitors along secondary roads, at popular day-use areas, and in campgrounds. They participate in special events and community engagement activities throughout the season, sharing messaging about how to be prepared and act responsibly in areas where grizzly bears are present. Picnic Patrollers have a daily presence at popular day-use areas sharing best practices for keeping a clean picnic site, disposing of food and garbage appropriately, not leaving any food or scented items unattended, and the importance of not feeding any wildlife. This poster will share examples of the team's activities, communication tactics and successes, which have been achieved through having a strong Parks Canada presence on the ground, out in the park where the visitors are.

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### **9. The Effect of Visiting a Wildlife Park on Knowledge and Perception towards the Brown Bear**

**Stefanie Franke<sup>1</sup>, Sven Brunberg<sup>2</sup>, Andreas Zedrosser<sup>1,2,3</sup>**

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<sup>2</sup>Orsa Predator Park, Orsa, Sweden

<sup>3</sup>University College of Southeast Norway, Bø, Norway

*Abstract:* Zoos and wildlife parks play an important role in conservation and education of the general public about wildlife. Educational materials and guided tours are commonly offered in wildlife parks. We carried out a questionnaire amongst visitors about their knowledge, perceptions, and the learning outcome of a wildlife park visit, as well as the efficacy of interpretive activities and their influence on perceptions regarding the brown bear in a wildlife park in Sweden. Randomly chosen visitors were asked questions about their knowledge and perception of brown bears as well as the information tools used during their visit. We further analyzed how a fatal bear accident influenced the perception of brown bears by visitors. We surveyed 321 visitors before entering and 291 visitors upon exiting the wildlife park between July and September 2017. The results showed that visitors performed significantly better in the knowledge questions upon exiting the park. This knowledge gain was higher in repeat visitors and prevalent both in local/national as well as in international visitors. The knowledge gain was higher when interactive interpretational activities, such as guided tours or commented feedings, were visited. Unexpectedly, we did not find a change in the perception of local/national visitors towards bears even after the occurrence of a fatal accident inside the wildlife park during the study period (a bear mauled a park employee, who subsequently died from the injuries). Our findings underscore the importance of educational materials and interactive educational experiences in improving learning outcomes in wildlife parks as well as the important role of wildlife parks for education of the general public in conservation topics.

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### **10. Actions to Help Reduce Human-bear Conflicts in Glacier National Park of Canada 2016-2017**

**Tawnya Hewitt<sup>1</sup>, Sarah Boyle<sup>1</sup>, Ray Schmidt<sup>1</sup>**

<sup>1</sup>*Glacier National Park, PO Box 350, Revelstoke, BC V0e 2S0*

*Abstract:* Encounters between people and grizzly bears have been increasing over the last decade in Glacier National Park (GNP) of Canada. In 2016, there were 79 human-bear encounters; over 75% of encounters involved sibling four year old grizzly bears. To reduce the risk of conflict and conserve these bears, we adapted traditional and modern approaches to alter the behavior of visitors and the bears. These included the following: legal group size hiking restrictions for visitors to hike in groups of 4 or more, in areas where grizzly bear encounters are common; improved signage by replacing outdated signs which utilized universal symbols and provided a white space for custom messaging; Bear Ambassadors and an information tent operated at the trailhead to provide personal messaging on bear safety; and distributing five road-killed animal carcasses in secure habitat to provide scavenging opportunities for the bears away from the campground. We found that the Bear Ambassadors and Bear Tent, combined with new signage, together helped achieve over 90% compliance with the group size restriction. Having GPS collared one female bear, we were able to monitor her behavior and location, conduct hazing, and assess her responses to hazing efforts. The GPS collar provided valuable, precise information on her home range and activity patterns in areas of high human use, and the date that she moved into the alpine in preparation for denning. By conducting remote camera monitoring of our diversionary feeding site, we confirmed that at least six different bears scavenged at this site, including our target grizzly bears. There were no reported bear sightings or encounters in the campground during this time. We anticipate that increasing visitation will continue to pose significant challenges in preventing human-bear conflicts. Therefore, we recommend expanding these activities in future years to help ensure safe experiences for visitors and enable grizzly bears to use important habitat in GNP.

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**11. Putting the Sun Bear Out of the Shade: A Preliminary Survey to Appraise Myanmar People's Perception of *Helarctos malayanus* in Rakhine**

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*Abstract:* Myanmar is part of *Helarctos malayanus* native range in coexistence with another bear species, the Asian black bear (*Ursus thibetanus*). Human-bear competition for space and resources in rural areas is a cause of conflict and casualties in a large part of the country and is also one of the least studied of any form of human-bear conflict. In the Rakhine region crop raiding and sporadic bear attacks are known to happen but there are no data on frequency and causes of the accidents. The purpose of our work was to assess sun bear perceptions by local people as well as their attitudes towards the species, as understanding the nature of these conflicts may be important in reducing them and to design future strategies to increase protection of farmers' livelihoods. A structured questionnaire was prepared, with the aim of interviewing people who had at least one encounter with a bear or suffered from crop raiding events. The questionnaire, specifically simplified and administered with the help of local translators, was constructed with 27 questions divided into two parts; the first focused on crop raiding information (number of events, season, tolerance towards bears and reaction of people) and the second on the characteristics of the encounters (distance, bear's behavior, attitude). The survey was conducted in 2017 among 157 people in 28 villages within Kyeintali and Thandwe townships near the Rakhine Yoma Elephant Range Wildlife Reserve. The survey results pointed out that the Sun bear is actually the most frequently encountered bear in the study area in contrast to the Asian black bear, and that it is the bear species responsible for most crop raiding (almost half of the interviewed). An interesting result is that more than 45% of interviewed people do not consider the Sun bear as a threat to farming activity and that people's general attitude toward bears is positive; indeed, 80% of interviewed people said that they like to have Sun bears in the forest. In more than 50% of the cases, no action was taken against crop raiding bears, and in only a few cases, actively capturing the responsible bear was attempted. As for bear attitude, questions related to human-bear encounters indicated that



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the most frequent bear reaction consist in running away (more than 65 people) and aggressions are very rare (only one person said he was attacked). These data will provide baseline information for future research on sun bear-human interactions and in particular to accidents and casualties, aiming at the mitigation of the human-bear conflict.

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**12. Using GPS/VHF Radio-Collars to Determine Nuisance Black Bear (*Ursus americanus*) Relocation Success Rates in Great Smoky Mountains National Park.**

**Gregory R. Grieco<sup>1,2</sup>, Ryan H. Williamson<sup>1</sup>, Joseph D. Yarkovich<sup>1</sup>, and William H. Stiver<sup>1</sup>**

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*Abstract:* From 1990-2015, Great Smoky Mountains National Park (GRSM) captured and relocated 213 American black bears (*Ursus Americanus*) for management reasons. Bear behaviors warranting relocation consisted of food conditioning, property damage, and severe human habituation. Relocated bears were ear tagged and released in remote areas within GRSM or transferred to Tennessee or North Carolina state wildlife agencies and released in state managed lands. Park wildlife managers regarded these relocations as successful based on low rates of recapture for repeat nuisance behavior. However, other than a small percentage (18%) that were legally harvested, reported road-killed, or euthanized, the fates of the majority of these bears (82%) are unknown. Since November 2015, GRSM staff fitted six relocated bears (5 male, 1 female) with Vectronic GPS/VHF collars to determine their movements and fates. Five bears (83.3%) have been legally harvested in TN or NC, and one (16.7%) was killed in a car accident. All six bears were killed during the same year of their relocation. These preliminary results demonstrate how GPS radio-collars can provide accurate data on the movements and final outcomes of relocated bears. GRSM managers will continue to fit GPS radio-collars on relocated nuisance bears. Future results will allow managers to determine relocation success rates and reevaluate whether or not it is viable management alternative to euthanasia or labor-intensive hazing.

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**13. Comparison of Ketamine-Xylazine and Butorphanol-Azaperone-Medetomidine to Immobilize American Black Bears (*Ursus americanus*)**

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**ABSTRACT:** Wildlife anesthetic protocols must offer rapid inductions and recoveries, be physiologically safe, and be minimally regulated. With this in mind, we evaluated differences in induction and recovery times and physiological parameters in 33 American black bears (*Ursus americanus*) anesthetized with ketamine-xylazine (KX) or immobilized with a commercial drug combination of butorphanol, azaperone, and medetomidine (BAM). Dose was based on mass estimated from field observations. Bears were housed at Appalachian Bear Rescue, Townsend, Tennessee or free-ranging within the Great Smoky Mountains National Park (Tennessee and North Carolina) and chemically immobilized for management purposes. From 11 April–29 June 2016, we immobilized bears with injection via pole syringe or disposable dart projected from an air-powered dart rifle. Once immobilized, we measured each bear's temperature, respiration (breaths/min), heart rate (beats/min), hemoglobin oxygen saturation (via pulse oximetry), arterial blood gases, and mass (kg). We found no differences in the induction parameters, partial pressures of CO<sub>2</sub>, and rectal temperatures. The BAM-treated bears had lower heart and respiratory rates that lead to lower hemoglobin oxygen saturation levels (from blood gas analysis, SaO<sub>2</sub>). The SaO<sub>2</sub> after treatment with BAM (91.1±0.8%) was lower than with KX (93.4±0.9%). After handling, we reversed KX-treated bears with a  $\bar{x}$ =0.2±0.02 mg/kg yohimbine and BAM-treated bears with  $\bar{x}$ =1.5±0.1 mg/kg atipamezole and 0.8±0.1 mg/kg naltrexone. We found no differences in the recovery times to increased respiration, and to the bear assuming a head-up position. The BAM-treated bears stood and recovered quicker than did KX-treated animals. Based on our observations, BAM appears to offer safe, predictable immobilizations with fewer drawbacks and faster recovery times than KX-treated bears.





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### **14. Tennessee Cooperative Black Bear Management Agreement**

**William H. Stiver<sup>1</sup>, Mary C. Miller<sup>2</sup>, and Dan Gibbs<sup>3</sup>**

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<sup>2</sup>*Forest Wildlife Biologist, USDA Forest Service, Cherokee National Forest, 2800 North Ocoee Street, Cleveland, TN 37312*

<sup>3</sup>*Black Bear Program Leader, Tennessee Wildlife Resources Agency, Region IV, 3030 Wildlife Way, Morristown, TN 37814.*

*Abstract:* Combined, the Cherokee National Forest (CNF) and Great Smoky Mountains National Park (GRSM) provide in excess of 1.1 million acres of black bear habitat in east Tennessee. Black bears within the CNF are managed by the Tennessee Wildlife Resources Agency (TWRA), whereas bears in the GRSM are managed by the National Park Service. Recognizing that black bear management issues regularly cross jurisdictional boundaries, the three agencies have a long history of working together through a formal cooperative bear management agreement. The primary objective of the agreement is to successfully manage black bears while enhancing public safety in the GRSM and on TWRA/CNF managed lands. The agreement identifies the responsibilities and cooperative actions the three agencies deem necessary to accomplish this objective. Establishment of this agreement has resulted in bears being managed on a regional scale rather than an agency scale, which benefits all parties, including the public. Other benefits include frequent communication between agencies on bear management issues in Tennessee, as well as the ability to build strong relationships with employees within agencies by working together on common projects/goals.

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### 15. Development of Technology to Help Reduce Human-Polar Bear Conflicts

Femke Hilderink<sup>1</sup>, Melanie Lancaster<sup>1</sup>, Sybille Klenzendorf<sup>1</sup>, Elisabeth Kruger<sup>1</sup>, Pete Ewins<sup>1</sup>, Gert Polet<sup>1</sup>, Kaare Hanssen<sup>1</sup>, Ivan Mizin<sup>1</sup>, Alasdair Davies<sup>2</sup>, and Stephanie O'Donnell<sup>3</sup>, Geoff York<sup>4</sup>, BJ Kirschhoffer<sup>4</sup>

<sup>1</sup>*World Wide Fund for Nature (Netherlands, Canada, USA, Denmark, Russia)*

<sup>2</sup>*Arribada Initiative*

<sup>3</sup>*WILDLABS/ Flora & Fauna International*

<sup>4</sup>*Polar Bears International*

*Abstract:* Human-bear conflict demands new and innovative solutions. Although there are measures and tools in place to prevent it from electric fencing, light and sound deterrence to active aversion techniques. WWF (World Wide Fund for Nature) and PBI (Polar Bears International) support various technology and approaches to help reduce conflicts between people living and working in the Arctic and polar bears. However, these methods have proven inadequate in fully preventing interactions between humans and bears. In response, WWF and WILDLABS harnessed the combined skills and knowledge of engineers, designers, and nature lovers from around the world to help solve this pressing conservation issue. WWF's first international Human Wildlife Conflict Tech Challenge sought innovative solutions to detect wildlife in an early stage to prevent conflict. PBI is testing the use of Compact Surveillance Radar in the community of Churchill, Manitoba, to detect approaching bears. We discuss the experiences gained with a Human Wildlife Conflict Tech Challenge, the CSR, and other field-tested technology, challenges and recommendations.

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### **16. The Unique Challenges of Managing Human-bear Interactions in the Adirondack Park, New York**

**Ben Simpson<sup>1</sup>**

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*Abstract:* As biologists, we face the challenge of managing human-bear conflicts and interactions in a unique area of the country. The state of New York's wildlife is managed by the New York State Department of Environmental Conservation. The state is broken up into 9 regions with Region 5 containing the majority of the Adirondack Park. The Adirondack park covers over 5.8 million acres of land in the northern half of New York State. The park consists of 2.9 (50%) million acres of private land and 2.6 (44%) millions acres of public. The mix of public and private land and a bear population over 4,500 has led to serious conflicts year after year. In Region 5, we receive between 150-200 phone call complaints per year, mostly regarding bird feeder and residential trash. The Adirondack Park is a destination for hikers and backcountry enthusiasts, with the High-Peaks Wilderness being the most popular destination. In the last 5 years (2013-2017) the high-peaks have seen, on average, 120,879 trail visitors per year. These visitors include day users and overnight campers. A state law requiring the use of bear canisters has curbed some conflict issues but the sheer number of visitors across a huge landscape continues to have its problems. Along with requiring bear canisters for overnight stays in the High-Peaks Wilderness, we have used other means of managing bear-human conflicts throughout the region. We have utilized electric fencing, electric backpacks, trapping, removal, hazing, and public education. I present some of the means we use to deal with these conflicts as well as show some of the unique challenges we face as managers.



## POSTER SESSION ABSTRACTS

### **17. Characteristics of Black Bears Euthanized for Management Reasons in Great Smoky Mountains National Park**

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*Abstract:* Great Smoky Mountains National Park (GRSM) is the most visited national park in the United States with more than 11 million visits annually. It also has the highest estimated density of American black bears (*Ursus americanus*) in North America, with approximately 1,800 bears or nearly one per square kilometer. As a result, human-bear conflicts are common, particularly during summer months. GRSM managers use a variety of techniques to mitigate human-bear conflicts; however, when a bear exhibits behavior that poses a threat to visitor safety, it is often euthanized. We collected records of bears euthanized for management reasons from 1990-2016 and examined sex, age, capture location, and behavioral history of bears to determine demographic and behavioral trends. We did not include bears euthanized due to illness or injuries (e.g., vehicle collisions). A total of 55 black bears were euthanized in this study period. We summarized these results and provide bear managers with useful data that can aid in the development or revision of bear management protocols.



## POSTER SESSION ABSTRACTS

### 18. Historic Human and Black Bear Encounters in Big Bend National Park

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*Abstract:* Encounters between National Park visitors and large carnivores can result in positive or negative experiences. Big Bend National Park (BIBE) considers an encounter to be any interaction with wildlife experienced by a person (track, auditory, sighting, and physical contact); an incident is an encounter involving contact with human property, aggressive behavior, or attack on a person. The goal of this study was to examine historic interactions between humans and black bears in BIBE with the use of natural history field observation cards. Observations from 1950-2016 were ranked and categorized spatially and temporally. Of the 7,226 black bear encounters with ranking recorded, only 167 (2.31%) were ranked as incidents by BIBE. Most black bear encounters occurred while hiking and negative incidents occurred most often at backcountry campsites, mainly in the Chisos Mountains. Long-term visitor observation data provides park managers at BIBE with unique information to aide in the conservation of the black bear population while addressing human safety concerns.



## POSTER SESSION ABSTRACTS

### **19. Minimizing bear-human conflicts in Nunavut**

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*Abstract:* The Wildlife Deterrence Program helps mitigate human-wildlife conflict in Nunavut. Human-wildlife conflicts have negative social and economic impacts. Between 2000 and 2017, hundreds of defense of life or property kills occurred in Nunavut in order to protect people and their property. Wildlife patrols are primarily carried out by Conservation Officers, with support from the Hunters and Trappers Organization, Municipalities, and NGOs. Polar Bear Guard (PBG) training provides exposure to deterrence equipment and safe practices that can build capacity to mitigate human-wildlife conflict in communities and provide employment in the tourism and mining sectors. Experimental conflict mitigation measures discussed in the presentation include electric fencing, live traps and luring stations. The Wildlife Damage Compensation Program issues direct compensation to property owners whose property has been damaged by wildlife. The Wildlife Damage Prevention Program provides funding to individuals and non-profit organizations to take steps to prevent property damage by wildlife. Community-based bear-human conflict mitigation plans encourage key stakeholders within communities to collaborate and develop community specific mitigation efforts.