



HUMAN-BEAR CONFLICTS WORKSHOP

MARCH 20-22
MISSOULA, MONTANA

4TH INTERNATIONAL HUMAN-BEAR CONFLICTS WORKSHOP SUMMARY

ABSTRACT: This document is a synopsis of the presentations and discussions at the 4th International Human-Bear Conflict Workshop. Topics include urban and rural bear management, biological criteria for lethal removal, bear spray and firearms use for safety, hunting effects on the frequency of human-bear conflicts, habituated bear management, engaging the public to reduce human-bear conflicts, the risks and liability regarding conflict management, efficacy of outreach efforts, and best management practices for developing human-bear conflict guidelines.

*Summarized by Colleen Matt
Bear Conservation Planning
Missoula, MT*

WORKSHOP PARTNERS

*Counter Assault Bear Deterrent
Polar Bears International
Safety in Bear Country Society
US Fish and Wildlife Service
World Wildlife Fund's Arctic Programme*

WORKSHOP SPONSORS: Allied waste services, BNSF Railway, Grand Teton National Park, Living With Wildlife Foundation, National Wildlife Federation, People and Carnivores, University of Montana College of Forestry & Conservation, Yellowstone National Park

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WORKSHOP INTRODUCTION

Chris Servheen, US Fish and Wildlife Grizzly Bear Recovery Program

Servheen welcomed participants and gave a brief history of the human-bear conflicts workshops. The first workshop was held in Yellowknife in 1987. The agenda contained few references to managing the human side of the equation. The attendance was small due to the remoteness of the venue.

In 1997, Andy McMullen and Jeff Marley initiated the Second Human-Bear Conflicts Workshop in Canmore, Alberta, and attracted a larger crowd. The establishment of new diamond mines in the Northwest Territories generated a lot of interest in human-bear conflicts. Most of the 140 participants were American and Canadian field managers and biologists, and this cohort has continued to attend human-bear conflicts workshops in large numbers. At that meeting there were eight sessions related to bear management and only one session related to human dimensions. Then, as now, a small committee that was not directly affiliated with any agency or group organized the workshop.

Despite intentions to hold the next workshop within five years, the Third International human-bear conflicts workshop was held 12 years later in 2009, again in Canmore. Andy McMullen, Hal Morrison and Sandra MacDougall were instrumental in launching the workshop. Polar Bear International added a fourth day to the workshop that focused on polar bear conflict management. The 180 participants included biologists from Russia, Sweden and Greenland. There was a lot more discussion of non-lethal management of bears, signaling a transition from strictly lethal management. The workshop highlighted the role and benefits of community-based programs. A summary of this workshop is available on our workshop website.

Patti Sowka volunteered to initiate the 4th International Human-Bear Conflict Workshop in Missoula in 3 years, and she subsequently contacted Servheen. Patti and Servheen recruited some organizing committee members from earlier workshops and some new faces joined as well. There are 300 participants at this workshop and others were turned away because of limited space in this venue. It is apparent that the topic of human-bear conflict is becoming more popular, reflecting its importance.

This workshop agenda evolved to include four sessions devoted to bear management issues, five sessions focused on human dimensions, and one international session. The evolution from managing just bears to managing people illustrates our professional recognition that human involvement in managing conflicts is crucial to their reduction. Servheen welcomed participants to the workshop and encouraged them to interact and give the whole group the benefit of their observations and experience.

Servheen recognized the partners, sponsors and supporters that made this workshop possible:

PARTNERS

- US Fish and Wildlife Service Marine Mammals Program
- World Wildlife Fund's Global Arctic Programme
- Counter Assault Bear Deterrent

- Polar Bears International
- The Safety in Bear Country Society

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Allied Waste Services

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- Yellowstone National Park
- Yellowstone National Park Foundation

SUPPORTERS

- Glacier National Park
- Great Northern Environmental Stewardship Area
- Idaho Department of Fish & Game
- Mattson's Laboratory, LLC
- Montana Fish Wildlife & Parks
- US Forest Service - National Carnivore Program
- Vital Ground Foundation
- Wyoming Game & Fish Department

KEYNOTE: HUMAN-BEAR ENCOUNTERS: SOME COMMENTS ON WHAT WE KNOW

PRESENTER

Chris Servheen, Grizzly Bear Recovery Coordinator, US Fish & Wildlife Service

Chris Servheen began by reviewing the fatal attacks by black bear on people in North America published in 2011 by Herrero et al¹. These data show that black bear attacks have increased in recent decades. Eighty-six percent of the attacks between 1900 and 2009 have occurred since 1960. One hundred and forty-five million people have been added to the US and Canada since 1960. Between 1988 and 2001, the North American black bear population increased by more than 17.6%. There are more North American black bears than there are all of the other six bear species combined. The higher number of attacks is likely due to both increasing numbers of humans in black bear habitat and increasing black bear populations.

The Herrero et al. paper noted some common features of the reviewed black bear attacks. Notably, human food and/or garbage was present in 38% of the attacks, bear spray was not used in any of the fatal attacks, and most of the attacks were by predatory bears with little or no prior association with people.

Some examples of grizzly bear conflicts in the US Northern Rockies

Using the US Northern Rockies as an example, research has shown some behavioral generalizations. Higher conflict levels in spring are correlated to bears concentrated at low elevations in years with late springs and high snowpack. Conflict levels in the fall are correlated with the availability of natural foods. In some areas where there has been ongoing outreach and education to modify human behavior, conflicts related to garbage have declined. However, rural residential subdivision developments have brought a continuous flow of new residents. In the Rocky Mountains, all of the valleys are filling with houses, making it difficult for animals to cross from one range of habitat to another. Where new residents are common, conflicts related to garbage, livestock feed and human foods continue to increase. Recently, more semi-rural and urban residents are raising chickens and bear conflicts related to poultry are a now a time-consuming problem for managers.

Grizzlies are expanding their range around the Greater Yellowstone Ecosystem and the Northern Continental Divide Ecosystem, and human-bear conflicts are increasing at the edges of their range expansion. The range expansion overlaps with residents who have no previous experience or knowledge of coexistence with bears. Key factors in this dynamic are more bears, expanding bear range, more human development and natural food fluctuations, with no one factor being entirely responsible.

As bears encounter homes, ranches, and farms, they can become habituated to both structures and the presence of humans. Many long-term residents are seeing more grizzly bears as the bears' range expands, and some of the residents are frustrated. Some of these people assumed that if they secured attractants, the bears would stay away. However, some bears are now living among these residents.

In some ways, bear managers are victims of their own success; bears are now in places where they were never expected to be 10 or 20 years ago. For example, Montana Fish, Wildlife and Parks bear manager Mike Madel has witnessed a 30% decrease in conflicts on the Rocky Mountain Front between 1986 and 2005, and an increase since 2005. During the period of decreasing conflict, ranchers and farmers adopted electric fencing and relocated carcasses. Since 2005, cattle depredations have remained low; however, homesite and grain storage conflicts have increased.

¹ Herrero, S., A. Higgins, J. E. Cardoza, L. I. Hajduk, and T. S. Smith. 2011. Fatal attacks by American black bears on people: 1900-2009. *Journal of Wildlife Management* 73:596-603

Outreach and education have been most successful in areas with low, stable populations of humans. These people seem willing to adapt behaviors that help them avoid human-bear conflicts. There has been less success with outreach and education where there is an influx of new people.

Do bears adapt to humans?

Some bears are capable of adapting to human habitation to some extent. One study in the Swan Valley of Montana showed that grizzly bear use within 40 meters of roads is more than twice as high in the daytime than during the hours of darkness. Grizzly use near houses and buildings during the dark hours of the night is more than eight times the level of use during daylight hours. Residents should be aware that unseen bears are around, and that they should take care with garbage and bird feeders.

Characteristics of bear charges

Servheen summarized 83 different incidents in which people were charged by grizzly bears. The majority of people were involved in hiking and hunting. There's no real pattern for time of day when grizzlies charge. Many the charges were located in the Greater Yellowstone Ecosystem. Family groups of grizzlies were involved in 56% of the charges. In 81% of the charges, there were no injuries involved. About half of the people involved in the charges were not carrying bear spray, with 50% of the hikers not carrying spray and 65% of the hunters not carrying spray.

2010 fatal attacks in the Yellowstone Ecosystem

Unfortunately, there were human fatalities caused by bears in Yellowstone ecosystem in 2010-2011. The following is a brief examination of those four cases. If more information is needed, please consult the following website for detailed reviews: <http://www.fws.gov/mountain-prairie/species/mammals/grizzly/yellowstone.htm>.

In 2010, there were two human fatalities in the Yellowstone Ecosystem outside Yellowstone National Park. In the first case, a hiker was killed by an adult male bear that was recovering from immobilization. The hiker walked into the site where the bear was recovering. The victim was not carrying pepper spray.

In the second case, a female with three yearlings entered a campground and attacked people sleeping in three tents, killing and partially consuming one person and injuring two others. The adult female and her three yearlings were within the expected range of weights for other grizzlies captured in the Yellowstone ecosystem. The adult female had never been captured or handled, and her isotope signatures revealed she ate little meat and had no evidence of consumption of human foods. The female entered an almost full campground at 2:00 am. This was clearly a predatory attack though no motivational factor has been identified.

2011 fatal attacks in the Yellowstone National Park

In 2011, two people were killed by bears. An adult female grizzly was responsible for the first fatality and was present at the site where the second fatality occurred.

In the first case, a man and his wife encountered the bear and her two cubs while hiking. They ran from the bear and were chased for more than 170 meters when the bear knocked the man down. The bear then picked up his wife from the ground by her backpack and immediately dropped her. This bear had no history of conflicts and was not marked. The attack was considered a defensive aggression/surprise encounter and the bear was not removed.

Fifty-one days later and eight miles away from the first incident, another victim was day hiking alone in Hayden Valley. There was no evidence that this victim ran from the bear and there were defensive bites on the hands of the victim. Evidence suggests that victim probably stopped and unbuckled his pack when the attack occurred. The victim's body was found 24 hours after the fatality and had been partially consumed and cached by a bear.

A scat sample revealed that the same bear as in the earlier incident had been at the site of the second fatal attack. The female was captured and found to be in normal condition. Her presence at the site of the second attack was too much of a coincidence, so rangers killed her and her cubs were placed in a zoo. In both of the 2011 attacks the victims were not carrying bear spray. Both attacks occurred in mid to late morning. In the first incident, the victim was attacked from behind after running from the bear.

The four fatalities of 2010 -2011 were the first fatalities in the Yellowstone area for 24 years. Three of the fatalities involved females with offspring, and one attack was clearly predatory. Hikers surprised a bear in the first 2011 attack, while the second attack appeared to occur when the victim was stopped on the trail for some reason. There is no evidence to indicate that these were related by any particular factor. We do know is that human-bear encounter frequency is higher than in the past, likely because there are more bears in the ecosystem.

Increasing human-bear encounters are leading to more human-bear conflicts. Causes include growing human populations, and good professional management of populations and habitats that have allowed bear populations to grow. While bear managers have been successful at reducing human-bear conflicts, the increasing overlap of both people and bears will likely create more conflicts in the near future.

In summary, the human population in bear habitat is increasing and there are more people living, working and recreating in bear habitat. Grizzly and black bear populations are expanding in numbers and range in many areas of North America. Increasing human and bear populations lead to more human-bear encounters resulting in more human-bear conflicts. Despite increasing numbers of bears, management efforts have resulted in conflict declines in many areas. This is a mark of management success even under difficult circumstances. Outreach efforts are especially effective where the number of humans and human site developments are growing relatively slowly, and long-term residents are experienced with human-bear coexistence. Bear managers have had **less** success in areas where new subdivisions encroach on bear habitat, and where new residents have little experience living with bears. It would be most effective to target our outreach and marketing efforts to new residents on the edges of bear habitat, and to hikers and hunters. This workshop provides a forum for this discussion.

DISCUSSION

Bill Stiver, Great Smoky Mountains National Park, reported that nighttime bear management was more successful for changing a conflict-prone bear's behavior. If the managers wait until a bear is hanging around campgrounds and picnic areas during the day, the management options are fewer, and less successful.

Agnès Pelletier, Trent University, commented that people become visually habituated to warning signs. Changing colors, design and giving the messages in a variety of ways may increase interest and understanding by people entering bear country.

Shannon Downey, US Fish & Wildlife Service, commented that wildland fire mitigation outreach experts deal with the same issues regarding their target demographic. Wildland fire managers try to renew outreach programs every five years in order to reach new residents.

Larry Lewis, Alaska Department of Fish and Game, asked why the bear in the first 2011 attacked was not removed at the scene. Servheen said that the bear was not removed because the incident was judged to be a surprise encounter and the bear was not predatory. The bear was also thought to be defending her two cubs. The policy is not to remove bears exhibiting aggression because of a surprise encounter or in defense of young; however this is a case-by-case decision.

SESSION 1: MANAGEMENT OF BEARS AT THE URBAN/SUBURBAN/WILD LANDS INTERFACE

MODERATOR

Dick Shideler, Alaska Dept. of Fish and Game

CONTRIBUTORS

Jessy Coltrane, Anchorage Area Management Biologist Alaska Dept. of Fish & Game -“Managing Anchorage’s big wild life”

The 7,000 sq. km Anchorage Municipality lies adjacent to 500,000 acres of Chugach State Park wilderness. Six anadromous fish streams run through Anchorage making it great black and brown bear habitat. An estimated 250-350 black bears and 65-80 brown bears share the municipality with over 290,000 residents.

Black and brown bear are harvested outside of the densest urban areas. With the advent of a new brown bear drawing hunt, brown bear harvest numbers are slightly increased. Coltrane isn’t able to ascertain whether brown bear harvest is affecting conflict levels. Anecdotally, a year of high black bear harvest is followed by a year of somewhat fewer black bear conflicts. However, any conclusion about cause and effect needs systematic investigation.

Anchorage area education efforts focus on eradicating garbage-related problems, such as the “Safe Neighborhoods, Wild Bears” program. The Anchorage Bear Committee (ABC) is a consortium of land and wildlife agencies, wildlife advocacy groups and large businesses. The ABC helps coordinate educational programs across jurisdictional boundaries. Hundreds of new families move in and out of adjacent military bases every year, and they require ongoing education efforts.

Sean Farley, ADF&G wildlife physiologist, published Anchorage brown and black bear movement information in the local press. The results of this study have informed the public about the presence of brown bears and have helped Coltrane appeal to city administrators for support.

With the previous Area Biologist, Rick Sinnott, Coltrane is studying overlapping activity patterns of people and brown bears on city trails and parks adjacent to anadromous streams. Coltrane is currently analyzing data, but preliminary results show that bear activity increases during night hours when human activity decreases.

Coltrane has appealed to city administrators to close trails next to salmon streams during salmon spawning season. However, city political leaders are currently rejecting any closures to trails within municipal parks despite the likelihood of conflicts, previous maulings, and the high probability of fatal maulings.

Over the past ten years, and with the support of local enforcement, ADF&G has the ability to cite wildlife feeding offenders with a \$310 Negligent Feeding of Wildlife citation. Using this regulation, city police and Wildlife Troopers are now able and willing to cite residents.

Despite the high potential for conflicts, relatively few bears are lethally removed every year. Coltrane does relatively little hazing in urban areas and does not tolerate brown bear food-conditioning. Coltrane said that recent public opinion surveys show that Anchorage residents generally support current bear management where problematic individuals are removed and the rest are retained.

Pat Carr, Supervising Wildlife Biologist, New Jersey Div. Fish & Wildlife - “Management tools to address human-bear conflicts in New Jersey”

The New Jersey human population is expanding north and west, and successful species and habitat conservation has allowed the black bear population to expand south and east. The area at the interface

of these increasing populations has the most human-bear conflicts. Newer five and ten-acre lots in residential subdivisions have converted the habitat to better ones for bears. The bears adapt readily to these neighborhoods and it is common for several generations of bears to live within one neighborhood for most of the year.

In 2000, New Jersey Division of Fish and Wildlife (NJDFW) established an integrated Black Bear management strategy with many components including public education, garbage management, enforcement of a bear feeding ban, research, population monitoring, aversive conditioning, euthanasia, and bear population management using hunting in 2003.

After the NJ Fish and Game Council unsuccessfully tried to reinstate a black bear hunting season in 2000, NJDFW received funding for a large education effort that included more than 2 million pieces of information distributed statewide and more specifically to 75,000 households. Residents responded by cleaning up attractants and ultimately this behavior change reduced the number of complaints about bears in the short term.

NJDFW staff worked with garbage companies to promote bear-resistant containers with mixed results. The public seemed to have trouble operating the containers properly and resisted the features that made the containers bear-resistant. For example, some people circumvented the heavy metal lids by placing trash alongside the containers and waste management companies replaced the heavy metal lids with lighter plastic lids in response to child safety concerns.

While NJ has an “intentional feeding of black bears” ban, it is difficult to enforce. As it stands, law enforcement officers have to witness intentional feeding behavior and issue warnings first. Nonetheless, compliance has improved since the regulation was passed. An inspection of over 4,600 residential properties showed 98% compliance.

NJDFW conservation officers and biologists trained over 1,000 police officers to respond to bear complaints with appropriate non-lethal control and lethal removal. Local police responded to conflict calls 1,500 times in 2010, and in 81 cases they used non-lethal control.

On average, NJ experiences 30-40 home entries by bears each year, and about 30 bears are euthanized. When aversive conditioning is applied to nuisance bears, it does not necessarily halt the undesirable behavior permanently but bears return an average of 17-21 days later. This interval allows managers to encourage the homeowner to remove attractants before the food-conditioned bear returns.

Bears were hunted and harvested in 2003, 2005, 2010, and 2011. There seems to be a correlation between hunting seasons and subsequent declines in bear nuisance complaints, though it is not as strong in areas where the human population is relatively low. Variables include natural food availability, attractant availability, and directed hunting pressure.

In summary, NJ has many management tools, but no single action seems to solve conflict issues. However, when all the tools are applied, the state supports a relatively high bear population and a high human population.

Jason Herreman, North Slope Borough, Alaska - “Management of polar bears in northern Alaska communities”

The North Slope Borough covers the northern quarter of Alaska. Over 7,000 human residents are concentrated into eight villages, five of which are coastal communities. Polar bears prefer to live most of the year on the ice and the bears that move to shore are only there for part of the year.

Human-polar bear interactions are increasing. Causal factors include a growing human population, more oil and gas development along the Arctic coastline, and decreasing ice volume and seasonal extent due to climate change. More tourists are also visiting, especially since polar bears were listed as threatened under the ESA.

Villages are not normal polar bear habitat. When polar bears visit communities, they are usually attracted by food and garbage. Most North Slope residents subsist on the foods they harvest from the land. Spring and fall whaling produce the biggest attractant for polar bears. During spring whaling, whales are butchered on the sea ice. The near shore sea ice melts during the summer and the whale carcasses fall back into the ocean. However, during fall whaling, the near shore sea ice has not yet formed (especially in recent history), and harvested whales are butchered on beaches outside of town. Relocation of bowhead whale carcasses is a crucial human-bear conflict management tool. In Barrow carcasses are relocated about seven miles north of town. Kaktovik has a much smaller road system and can only relocate carcasses about two miles away. Bear Patrols are another key management tool. Each community defines boundaries beyond which polar bears will not be allowed to roam unmolested. Bear patrollers haze the bears outside these boundaries. Bear patrollers are local residents with knowledge of polar bear behavior. Recently, the USFWS began helping communities develop standardized training for bear patrollers.

Communities are updated and educated about polar bear issues through radio, mail flyers, and community meetings. Educational materials and classroom visits are increasingly important since the younger generation is spending less time on the land. Whenever possible, the Borough involves local residents in research and deterrence efforts. With the support of USFWS, the Borough is working with local tour guides to improve the safety and reduce negative impacts from polar bear viewing.

Biologists and local wildlife advocates have learned to reduce human-bear conflicts by trial and error over time. A few actions that didn't work include: leaving butchered marine mammal carcasses on the beach at the edge of town, placing marine mammal carcasses in the dump, applying cayenne pepper to carcasses, fencing a dump without electrification or a secure entrance, limited training for patrollers, and short (<4.5 ft.) electric fences. Polar bears are skilled at jumping. Although bear-resistant storage bins for terrestrial game and marine mammal foods were purchased, their deployment has been delayed due to local politics.

Successful outreach efforts include radio talk shows, classroom visits, and interactions with influential community groups and seem to reduce human-bear conflicts. It is particularly important to identify key community leaders and work with them consistently.

Kevin Wright, Division of Colorado Parks and Wildlife - "Managing bears in a small community, a field perspective"

The city of Aspen lies in the Roaring Fork Valley in Pitkin County. The valley offers black bears some of the best habitat in Colorado, and it offers humans stunning views and fine skiing. The recent economic downturn has caused more recreationists to use campgrounds that are now filled to capacity, taxing garbage management resources and creating nuisance bears. Colorado State University graduate student Sharon Baruch-Mordo and masters' student David Lewis have been working on the Roaring Fork Urban Bear Ecology Study for several years and are currently wrapping up their analysis. Their work has already provided many insights into human-bear conflicts.

The primary black bear attractant is garbage followed by fruit trees. The bear ecology study revealed that the bears' behavior is plastic and highly dependent on the annual availability of natural foods. It is clear that bears tend to avoid suburbs during good natural food years. Conversely, bears hang out in suburban and urban areas when natural foods are scarce. In 2009, natural food sources failed and human-bear conflicts spiked. Wright's agency spent more than \$200,000 that year addressing these conflicts.

The Division's response to bear complaint calls has worked well. When citizens call, their report is collected into a daily bear report for Wright's review. Wright or one of his staff visits the complainant and together they walk through the homeowners' property with a checklist of bear-proofing actions.

Complainants receive the checklist and a list of deterrent suggestions. Some recommended deterrents include electrified mats, nail boards, bear-resistant containers, and pepper spray. Wright feels that Polycans are much less effective than metal containers, especially when employed in areas with highly food-conditioned bears. If homes and business had round doorknobs on exterior doors, many break-ins could be avoided. In addition, Wright thinks that 80 – 90 % home entries by bears could be prevented if people just close and lock doors and windows.

When bears are trapped for the first time, they are usually marked and translocated 100-200 miles away. However, finding jurisdictions that will accept these bears is becoming harder. In addition, data have shown that only 35% of the translocated bears survive. Trapping the “right” perpetrator is very uncertain; one study revealed that four out of six trapped bears were “non-target” individuals.

Wright and the division would not be as effective without the help of the Aspen police Department, Pitman County enforcement, and Snowmass Village law enforcement. Snowmass Village implemented garbage ordinance with aggressive enforcement and it has worked well. Ordinances require community and leadership buy-in in order to work. One aspect of Sharon Baruch-Mordo’s study showed that education alone wasn’t sufficient to change behavior without enforcement.

When conflicts occur, the division posts temporary bear alert signs to remind home and business owners to keep their doors and windows locked. These signs seem to help reduce conflicts, whereas Bear Aware volunteers canvassing neighborhoods with educational materials aren’t as effective.

The division is trying to reduce the valley bear population by allowing more hunting opportunities. Some research projects and actions may help determine the size of the increasing bear population. The division is starting hair snare analysis for the purposes of density estimation. They continue to analyze the teeth of harvested and management-action killed bears. They have started analyzing stable isotopes in order to ascertain the prevalence of human foods in bears’ diets.

Humans choose where they want to live, and with that choice comes the responsibility to adapt to the presence of wildlife. Wright thinks that agencies don’t go far enough in asking residents to be accountable for human-bear conflicts. He asked the workshop attendees to help find ways to help managers get out of the “trapping cycle” wherein bears are trapped, relocated or removed while attractants are never fully cleaned up.

DISCUSSION

Brian Debolt, Wyoming Game and Fish, asked panelists how they got feeding ordinances passed and enforced in their jurisdictions.

According to Carr, the NJ state legislature passed the ordinance after years of lobbying by wildlife advocates. The law that passed has enforcement flaws since officers need to witness the feeding event and must issue warnings before issuing citations. However, compliance has increased under the new ordinance.

Wright said that in late 1990’s, Snowmass Village passed the first ordinance after conservation officers had to euthanize a sow and three cubs. Snowmass Village Animal Services enforce the ordinance. Other Colorado communities are starting to adopt feeding ordinances. Often safety is the most compelling issue. Public meetings were essential for adapting the proposed ordinance and getting it accepted. Wright suggests that agencies work within communities to create a supportive contingent. However, no ordinance will be effective without active enforcement and help from more than one enforcement agency.

Shideler said that Alaska’s feeding regulation has evolved over the years and become stricter and more enforceable. Prior to 2002, officers were required to issue warnings before citations.

Now the regulation covers negligent and intentional feeding and individuals can be cited at the first incident.

Mike Orlando asked Pat Carr about the cause behind New Jersey's depressed bear population prior to 1970. Carr stated that, prior to 1954 when bears were designated as game animals, enforcement personnel and residents considered black bears to be vermin and killed them on sight. In the seventies, New Jersey's habitat matured due to farm reversion and provided a rich source of mast year-round. The bear population exploded under these conditions.

A participant asked Jessy Coltrane if she used a photograph of a brown bear family on a trail as part of her signage. Coltrane said she and other Anchorage enforcement agents used photographs and other kinds of temporary signs to warn trail users. The Anchorage Bear Committee has set a policy and sign protocol so that all of the enforcement agents use the same approach throughout the municipality. However, recently elected politicians have forbidden any trail closures despite salmon running in streams near trails.

Dan Gibbs; Tennessee Wildlife Resources Agency, asked the panelists if they issue depredation permits to help officers manage food-conditioned bears. Gibbs said that he finds that complainants call conservation officers less often if they have to apply for their own depredation permit.

Coltrane said that not ADF&G does not issue depredation permits. Alaska has a "Defense of Life and Property" regulation that allows individuals to kill bears that destroy certain types of property including livestock.

Carr said that New Jersey issues depredation permits to remove bears causing agricultural damage.

Herreman said that the North Slope Borough wildlife department sometimes contacts local hunters when a polar bear has to be lethally removed.

Wright said that landowners with large damage claims can apply for depredation permits in Colorado.

Mike Orlando, Florida Fish and Wildlife Commission, asked the panelists about their experience with Bear Smart Communities. Florida has many new residential developments in prime bear habitat, some with a mandate to create bear aware programs.

Wright replied that, in his experience, bear aware programs vary in energy and effectiveness.

Coltrane says there is only one "Wildlife Conservation Community" in the municipality of Anchorage, though even the community administrators are unaware of the designation and the purpose.

Carr said there are no certified bear aware communities in NJ.

Shideler pointed out that British Columbia has strong Bear Aware/Bear Smart communities.

Joy Erlenbach, Washington State University, asked Kevin Wright about his techniques for catching the right bear. Wright uses identifiers like hair color, *modus operandus*, and track size and shape. However, if he doesn't catch the bear within a day or two, he is not confident that he has the right bear. Stable isotope analysis takes too long and does not help identify bears in the field.

Dean Berezanski, Manitoba Conservation, asked the panelists if wildlife feeding offenders are warned about the possibility of civil liability claims, and if their agencies have ever had civil liability claims against them as a result of their attempts to educate the public.

Wright said that nobody in Colorado has been sued for liability yet.

Carr said the liability of education programs hasn't been an issue. However, because of the verdict in the Arizona mauling case, Category I (dangerous) bears are euthanized.

Coltrane said that managers remove bears that they think pose an increased risk to the public.

Shideler said that he mentions the possibility of civil liability to business owners and they seem more willing to clean up attractants. This is especially true of the oil industry where safety is a high priority.

Hal Morrison, Parks Canada, asked Coltrane how trails are managed in Anchorage without the ability to close trails for safety. Coltrane can't close trails for a moose carcass on the trail, however, state and city parks officers are very quick to move carcasses away from trails. If moving the carcass isn't possible, parks managers post temporary signs to warn of heightened bear activity.

Michael Proctor, research scientist from British Columbia, asked panelists how their agencies were able to support bear management staff.

Carr said that New Jersey had four staff dedicated to bears, and this resulted from a 2001 state appropriation and ongoing federal aid grant to conduct management and research on the bear population.

In Colorado and Alaska, district or area wildlife biologists are responsible for conflicts in his/her area. During years with abundant conflicts, local police and sheriffs provide crucial back up.

Larry Lewis, Alaska Department of Fish and Game, asked the panelists if posting temporary "bear in area" signs discourage the public from being bear savvy when the signs aren't present.

Wright said that he thinks that temporary signs grab people's attention, especially in Snowmass Village where many residents only come for short periods. Nonetheless, he still believes that signage would be ineffective without active enforcement.

Coltrane described the multi-agency ABC policy regarding consistent signage.

Carr said that the sign policy is in flux in New Jersey.

DEMONSTRATION: CELLBASE CAMERA SYSTEM TO MONITOR TRAP SITES

PRESENTER

Tim Manley, Montana Fish Wildlife and Parks

Manley has used cellbase camera monitoring systems to monitor trap sites remotely. These systems require less of an investment of time and money. In addition, these systems can be operational around the clock in all kinds of weather conditions. Options include the following:

- Motion trigger or manual trigger
- Stills or video (operated remotely)
- Infrared and natural light (no flash)
- Almost real time monitoring (within minutes)
- The systems can run on batteries, solar or AC power

The cellbase camera monitoring systems also allow managers to monitor the activities of people, and they alleviate some concerns about the liability of setting a baited bear trap. By using cellbase systems, Manley has been able to observe pets, other mammals, and residents visiting trap sites and baits.

Unlike earlier systems where managers had to retrieve camera memory cards, the photos and video are transmitted through a cellbase, which relays the images to a cell tower, which transmits to a computer. Managers can trigger the camera to take a photos or video from his or her office, or a motion-sensor can trigger photos or video.

The necessary components for these are cell phone coverage, a cellbase, at least one wireless camera, and an internet-based data management setup. Cellbase systems are expensive compared to typical remote cameras and they produce many photos that have to be managed. However, they significantly reduce the time and fuel it takes for managers to respond to remote trapping sites.

DISCUSSION

Jason Herreman, North Slope Borough asked about temperature range specifications, and whether the cameras withstand bears bites. Manley responded that he has limited experience with the system in extremely cold weather. He has not had any problems with bears chewing on the cameras.

Wayne McCrory, McCrory Wildlife Services Ltd., asked about the cost of cellbase camera systems. Ryan Alter of Alter Enterprises said that the price starts @ \$5,000 for two cameras and emailed photographs. The price goes up according the customization and number of cameras.

Jasmine Ware, Washington State University, asked Manley if he provided education when residents and their pets make trap sites untenable. Manley said that education and outreach is the main service that he provides.

Kevin Wright, Colorado Parks and Wildlife, asked about battery life. Manley said that batteries alone last 3-4 days. The systems can run indefinitely by solar or AC power.

Jay Honeyman, Alberta Sustainable Resource Development, asked what kinds of cameras are used in these systems. Manley uses Buckeye cameras but there are other manufacturers. Individual cameras cost around \$1,000.

SESSION 2: BIOLOGICAL CRITERIA FOR LETHAL REMOVAL OF CONFLICT BEARS

MODERATOR

Mike Madel, Montana Fish, Wildlife and Parks

CONTRIBUTORS

Mark Haroldson, USGS Interagency Grizzly Bear Study Team - "Relevance of body condition to decisions related to lethal removal"

Haroldson based his remarks on data gathered by member agencies of the Interagency Grizzly Bear Study Team (IGBST) in the Greater Yellowstone Ecosystem (GYE). Body condition was measured by a technique developed by Farley and Robbins (1994)² and detailed by Hilderbrand et al. (1998)³. The IGBST investigators were primarily interested in body condition trends as indicators food-conditions in the ecosystem.

As expected, investigators found that body condition varies greatly both within annual cycles and from year to year. The GYE is subject to variations in the availability of natural foods such as white pine. There are a few trends gleaned from their study that may provide information to help inform decisions regarding the removal of conflict bears, however none of these trends is sufficient to make decisions without including other factors.

² Farley, S. D. and C. T. Robbins. 1994. Development of two methods to estimate body composition of bears. Canadian Journal of Zoology 72:220–226.

³ Hilderbrand, G. V., S. D. Farley, and C. T. Robbins. 1998. Predicting body condition of bears via two field methods. Journal of Wildlife Management 62:406–409.

According to Haroldson, the data showed no significant correlations between body condition and conflicts among independent aged females (≥ 2 yrs-old). However, the data revealed that independent aged male grizzlies involved in livestock depredation tended to be in good condition, whereas males in other forms of anthropogenic conflict tended to be in poorer body condition.

In addition, a survival analysis (Haroldson et al. 2006)⁴ show very conclusively that if female bears (regardless of the type of conflict they were captured and transported for) survive ≥ 2 years past their last conflict capture, then their average annual survival equaled that of females bears that had never been captured in a conflict setting.

Bear management specialists in the GYE typically consider a number of factors when deciding whether to lethally remove bears in conflict. These factors include severity of offense, number of prior management actions, the age of the bear, and the grizzly bear population status.

Haroldson added that subjective fat index (1-5 with 1 = poor, 5 = obese) seems to work as a good estimator of body condition. Stirling et al. 2010(4) demonstrated strong correlation between the index and direct measures of body fat in captured polar bears.

Haroldson concluded with the following observations:

- Estimates of % body fat add another criteria to inform decisions regarding removal of conflict bears. However % fat alone should not be the deciding factor for lethal removal.
- Managers should use a suite of criteria, including type and severity of offense, repeat offenses, and age as it relates to reproductive value.
- Body condition does not always predict future management or contribution to the population.

Darryl Hedman, Manitoba Wildlife and Ecosystems Protection - "Lethal control decisions involving Churchill polar bears"

Hedman works for Manitoba Conservation and supervises the Polar Bear Alert Program (PBA) in Churchill, Manitoba. Prior to 1982, polar bear management was simple: when polar bears came into Churchill, conservation officers shot them. The "Polar Bear Alert" program reversed the trend of lethal removals.

The area around Churchill is divided into three priority zones according to the density of the human population. A bear captured in Zone 1 is put into "time-out" jail for 30 days. The time-out program keeps bears from harming people and it keeps people from harming problem bears. After time-out, PBA releases bears. If a bear comes back, PBA captures it and takes it 40 miles north of town. If it returns from the north, it is jailed until the ice forms. Polar bears rarely return from the north because it is closer to the developing sea ice. Hedman has observed that, after polar bears reach 6 years old, they generally don't come near Zone 1 anymore.

The PBA has followed its objectives well: 1) to protect of life and property; and 2) to reduce the unwarranted harassment and demise of polar bears of Western Hudson Bay. However, over the past year, Manitoba Conservation has made major revisions to the PBA program to address concerns by staff. The new version spells out the protocol for lethal removal decisions. The new protocol states that polar bears of the Western Hudson Bay can be removed from the sub-population by one of two ways 1) immobilized, taken out of the population and placed in the International Polar Bear Conservation Center in Winnipeg, Manitoba; or 2) lethally removed.

Polar bears can be lethally removed from the population by one of two methods: 1) immediate on-site decision by staff to prevent further actions of a polar bear (i.e., when damage or a mauling is occurring);

⁴ Stirling I., Thiemann, G.W., Richardson, E. (2008). Quantitative support for a subjective fatness index for immobilized polar bears. *Journal of Wildlife Management* 72: 568–574.

or 2) after the incident, but only when the continual observation of the polar bear has been maintained and an occupied building has been entered by the bear or a death or mauling has occurred.

The new protocol also addressed the need for prior planning and cooperative decision-making among field staff. Prior to responding to human-polar bear conflicts, staff should discuss their individual tolerances for risks and their individual ability to perform lethal removals. They should also discuss the pressures that befall the staff member who has to kill the bear. The results of this discussion will determine which staff person will perform the lethal removal.

Marc Kenyon, California Dept. of Fish & Game - “Lethal removal in developed landscapes - considerations”

Kenyon described California’s dilemma: 37 million people, an estimated 30,000 black bears, and nearly complete overlap between good bear habitat and occupied human development. There are only 160 wardens and 16 biologists that respond to bear incidents. The California Department of Fish and Game’s policy is to document and respond to human-bear conflicts. However, local law enforcement is usually first at the scene of bear conflicts.

Currently the criteria for lethal removal policy directs staff to respond lethally under a short list of conditions: 1) when a bears has physically contacted a human; 2) if there is an imminent threat to human safety taking the totality of the circumstances into consideration; 3) when a bear is human-habituated or food-conditioned; and 4) under a depredation kill permit. The lethal removal policy is not necessarily practical. In reality, Californians are very vocal about their opposition to lethal removal and the Department spends a lot of time responding to public contacts by reality.

Kenyon would like to see the department change the way they respond to both conflicts and public outcry. He suggested more public education is needed. In addition, he’d like to ask communities to develop their own trash ordinances before CDF&G dispatches officers to respond to bear conflicts. Kenyon suggested that video footage of bear conflicts might ultimately help CDF&G manage bears; if the public could images of bear conflicts, they might understand the management policies. Kenyon would like to see more DNA testing to determine if managers have the “right bear” for lethal removal. In summary, Kenyon suggests that managers share information about human conflicts and the fate of conflict bears with the public wherever possible.

Simon Gravel, Conservation Officer Service, British Columbia - “Bear Conflict in BC: Notes from the Field”

Conservation officers in British Columbia (BC) play a leadership role in bear management. In 2011 the ministry received over 20,000 human-bear conflict calls and they responded 3,000 times. In that year, 665 bears were killed, 120 were moved, and 30 cubs were sent to a rehabilitation center.

Conservation officers are guided by a strategic plan developed in 2003. The plan includes a bear response matrix that links the criteria of bear behavior, habitat type, and feeding source. The matrix provides guidance to conservation officers and protects bears and the public. In addition, the matrix helps conservation officers to articulate the rationale behind their actions. The matrix helps officers remove their emotional inclinations in a particular situation.

DISCUSSION

Jessy Coltrane, Alaska Department of Fish and Game, asked Kenyon whether officer judgment and flexibility is allowed by their wildlife-conflict response policy. Kenyon responded that “Public Safety Wildlife Guidelines” (<http://www.dfg.ca.gov/news/issues/publicsafety.html>) allow officers action options within confines of the law.

Danny Gammons, Sequoia Kings Canyon National Park, commented that his agency had guidelines that are similar to California. However, he thinks that the criteria for lethal removal are becoming more

stringent because managers are concerned about the transmission of food-conditioned behavior to cubs and other bears. Managers have assumed that removing food-conditioned bears immediately will lead to less food-conditioning in the future and consequently, increased conservation of bears. Gammons asked Kenyon if these rationales factor into California's policies. Kenyon affirmed that California's policies consider these rationales. He added that officers' heavy workload can force officers to lethally remove bears in order to conserve their time for other duties.

Shannon Downey, US Fish and Wildlife Service, asked Hedman if he had knowledge of how Indigenous people dealt with bears near Churchill prior the 1960s. Hedman said that the Native people in the area typically killed every bear they encountered. The army also had an outpost and the soldiers opportunistically shot polar bears.

Courtney Hughes, University of Alberta, asked Kenyon to assess the California public's level of bear safety and conflict education. Though he cited no studies, Kenyon assumes that most Californians know little or nothing about bears except what they see in the media. Recently, his agency has been using social media for education. For example, high school students in Tahoe developed public service announcements (PSAs) and posted them on YouTube. These PSAs were viewed over 10,000 times. Hughes also asked how the California public's tolerance for bears varies from region to region. Kenyon compared the attitudes in rural Modoc County to urban Redwood City; the former wants every bear removed and the latter tolerates no removals.

Rhonda Sparks, Alaska Nanuq Commission, commented that many Alaskan Natives use polar bears as a resource, and asked the panelists how the carcasses of lethally removed bears are disposed.

- Hedman responded that, unlike the Inuit, the First Nations people of Churchill didn't have a tradition of consuming polar bear meat. However, the ministry does try to fulfill requests for hides from First Nations people.
- Kenyon said that California officers dispose of carcasses based on the methods that are available to them, (e.g., incineration). Californians are very wary of supporting the trade in illegal bear parts.
- Gravel said that British Columbia also shares the concerns regarding illegal trade in bear parts. However, like Manitoba, the ministry typically fulfills First Nations peoples' request for ceremonial parts.
- Montana, according to Madel, uses the lethally removed grizzly bear hides, skulls, and claws for educational purposes.
- In the Blackfeet Nation, Dan Carney maintains a list of requests for bear parts for religious and cultural use.
- Stacy Courville said that he responds to the Salish Kootenai Tribes' requests as lethally removed bears become available.

Bill Stiver, Great Smoky Mountains National Park, said that his agency euthanizes bears that invade human space, e.g., homes, tents, vehicles, or individual contact. Stiver would like to know if there is a way to perform DNA identification with a quick turnaround time. Kenyon said that California has an internal wildlife forensics lab that can test DNA with a 3-4 day turnaround time.

John Hechtel, Safety in Bear Country Society, asked Hedman to describe recent polar bear removals in his area. Hedman described four situations: 1) a subadult walked up to people and was subsequently hazed by a truck that inadvertently hit the bear, causing a mortal wound; 2) another bear was shot in an empty Boy Scout Camp building (this incident was addressed by a policy revision last winter); 3. Officers removed a bear that was attempting to break into a building; and 4) two bears were killed by capture

myopathy caused by running away from helicopters (these incidents were also addressed in the policy revision).

Jasmine Ware, Washington State University, asked Gravel how the British Columbia matrix was originally developed. Gravel responded that community Bear Smart programs and experienced conservation officers developed the matrix.

SESSION 3: HUNTERS AND BEAR SPRAY... WHY AREN'T PEOPLE USING BEAR SPRAY?

MODERATOR

Mike Madel, Montana Fish Wildlife & Parks

CONTRIBUTORS

Steve Herrero, University of Calgary Professor Emeritus (by phone) - "Efficacy of bear deterrent spray from the technical and behavioral points of view"

Herrero delivered the following comments via telephone:

"We're having a panel on bear spray because it has evolved to be a fundamentally important tool regarding safety for people around bears, especially brown and polar bears. Bear spray also increases safety for bears around people. But as Stephen French said, "it isn't brains in a can." It should not be a substitute for avoiding aggressive encounters with bears.

Two research projects, and derived, refereed journal publications that I have been involved in, analyzed incidents of field use of bear spray. The raw data came from the files of wildlife and protected area management agencies. We don't think there were any misleading biases in either of these two datasets. The results showed that bear spray stopped aggression by brown, black and polar bears 80 – 90% of the time when properly deployed. Later Jim Wilder will talk about the most recent of these papers where Tom Smith is first author.

One of the unwritten details I want to stress is that bear spray can be challenging to deploy unless you have practiced using it and you have it readily accessible and have time to draw, take the safety off and direct it in front of an approaching bear. Adrenalin can complicate deployment. People relying on bear spray to deter aggressive bears should rehearse deployment until it is automatic and ingrained. Such training can help to carry users through adrenalin-charged moments. Even without this, bear spray can usually be effectively deployed; however, ineffective deployment or failure to deploy can lead to major injury.

A bear running at you at 30 mph is travelling 44 ft/sec. A bear that is 88 ft. away could be on a person in 2 seconds. The bear spray use training that I conduct has shown it takes people 2-5 sec to deploy bear spray. Bear spray is a great safety tool, but it is not a substitute for avoiding encounters.

On July 23 2011, a group of seven NOLS students were backpacking in a wildland area north of Anchorage, Alaska. NOLS had run similar excursions in Alaska for 40 years without a student being injured by a bear. Suddenly the single file group, that was neither tight nor strung out, faced a charging brown bear at close range. The details are complex. I stress that while three students carried bear spray, none of them even tried to deploy it. Four students were injured, 3 seriously.

If a person suddenly faces a charging brown bear that is closer than around 100 ft. then a decision must be made. Does one try to spray or instead play dead because you might only begin to get the spray deployed? Again, avoidance, understanding of bear behavior, and rehearsal are fundamental.

How effective is bear spray? It is very effective as I mentioned. The track record is broad and impressive. Early tests in the 1980s by people like Carrie Hunt, Gary Miller, Don Wooldridge and Lynn Rogers, and product development by Bill Pounds, were all positive, as were analyses of incidents of field use by people encountering bears.

Both datasets of field use of bear spray showed that while bear spray is most effective in stopping aggression when the bear is first sprayed, some bears required multiple sprayings for additional deterrence, and some people were injured despite what appeared to be effective delivery of spray. Not surprising, wind can be a complicating factor in spray use, but research suggests that spray users can take wind into account even if they have to spray into the wind.

A consistent finding has been that people who are sprayed don't have long term damage. Nor do bears. Tom Smith reported that bear spray residue is a powerful bear attractant. I too have observed this in field tests. Conclusion---bear spray is a deterrent, not a repellent.

There are unresolved issues for hunters who wish to carry and possibly deploy bear spray instead of trying to shoot and kill a bear running at them. Hunters, or others with firearms, have a special responsibility to not provoke unwanted aggressive interactions with brown bears. However, the nature of some hunting has one moving silently through brown bear habitat, or field dressing ungulates that may quickly become bear bait. As I see it a person hunting with a long rifle in brown bear habitat and facing a charging brown bear probably needs to have rehearsed in advance whether they will go for their spray or rifle. Bear spray is easier to use effectively. It is hard to shoot a bear lurching rapidly at you at high speed. Also some people may need two hands to effectively deploy bear spray. The two-handed rifle carry coupled with this would mean a person would need four arms and hands. I hope creatively thinking hunters are able to work out a means to use bear spray if desired and needed.

The amount of information to guide people in their purchase of a certain brand or size of bear spray has improved. Still lacking are Independent lab tests of different brands of bear spray. This would help guide purchasers to products having the most desirable characteristics based on scientific testing.

In my opinion bear spray is testimony to thoughtful design, science-based testing, and public involvement. The hackneyed reference to "better living through chemistry" comes true. Bear spray is good for people since it significantly reduces bear-inflicted injuries. It also may reduce bear deaths if it can be successfully deployed instead of using a firearm. I believe that bear spray offers people active on foot in bear habitat the opportunity to relax more and enjoy where they are and to know that if despite precautions they encounter an aggressive bear they will probably be able to deter it."

Jim Wilder, USFWS Polar Bear Team- "Efficacy of bear deterrent spray – Alaska"

Wilder presented some of the results from his co-authored paper, "The efficacy of bear deterrent spray in Alaska, 1985-2006." The authors collected 83 records from all available sources on the use of bear spray in AK from 1985-2006. Among these, they collected 11 incidents that involved the inappropriate use of bear spray (e.g., using bear spray as a repellent). Excluding those incidents, they analyzed 72 records involving black, brown, and polar bears. Their overall finding is that bear spray works and works very convincingly.

The authors defined a successful outcome as bear spray having stopped the bear's undesirable behavior. Some examples of successful outcomes might be a bear that no longer pursues a person, breaks off an attack, abandons attempts to acquire food or garbage, or turns and leaves the area. Conversely, the authors deemed spray incidents to be failures when bears showed no change in undesirable behaviors, e.g., persisted in their attempts to acquire food or garbage.

In 96% of the bear spray incidents people reported their activity. The authors found that hiking was the most common activity. Second on the list was management actions, in which agency personnel were trying

to push bears out of developed areas. These were followed by people in hard-sided structures, in their tents at camp, and working in bear country, sport fishing, etc.

The largest percentage of bear spray incidents were attributed to curious bears (62%). This was followed by surprise encounters (17%), and 3% due to persons having provoked bears in some way. Not surprisingly, the majority of bear spray incidents were reported as having had human food involved in some manner. Bear spray provides users with a valuable tool to de-escalate bear incidents that start out at a relatively slow and low level, e.g., when bears are seeking human food or “testing people”.

Single bears were the largest cohort involved in bear-spray incidents. Females with cubs of the year (COYs) were 16 times more frequently involved than were females with older dependent young, though these data may be questionable because not everyone can correctly determine the difference between COYs and older cubs.

Of all people carrying bear spray, 98% were uninjured by bears in close-range encounters. Only three out of the 175 people involved in 72 separate incidents suffered injury by bears that had been sprayed. All three of these bear-inflicted injuries involved brown bears, and the injuries required no hospitalization.

No mechanical failures of spray canisters were reported in the 72 incidents, and in the majority of instances (83%), people did not report any adverse effects from using bear spray. However, in 14% of the bear spray incidents, users reported that the spray had negative side effects, ranging from minor irritation to near incapacitation. No one in any of these incidents reported that bears took advantage of the circumstances to gain food or garbage. Wind was reported to have interfered with spray accuracy in 7% of bear spray incidents although the spray reached the bear in each instance. Exit velocities for bear spray of ~70 mph probably compensates for cross-wind effects.

The authors looked at the effectiveness of bear spray on curious, non-aggressive bears and aggressive bears as two separate groups. They labeled bears curious if they were investigating people or their belongings in a nonaggressive manner. They labeled bears as aggressive when the incident included behaviors such as charging, agonistic vocalizations, or persistent following. In 68% of black bear incidents, and in 62% of brown bear incidents, bears were either acting curious or were searching for human food or garbage. In 85% of the nonaggressive black bear incidents, and in 100% of the nonaggressive brown bear incidents, use of bear spray stopped the undesirable behavior.

In 36% of brown bear incidents, the bears acted aggressively towards people before being sprayed. In 86% of these incidents for which they had distance information, the person was first aware of the bear at less than 15 meters. In the remaining two instances, bears were first noticed at 25 meters and 50 meters, respectively. In 64% of these close encounters, brown bears charged the person(s) before being sprayed. In 86% of aggressive encounters with brown bears, bear spray stopped the bear's aggressive behavior.

Of the aggressive brown bears interactions, the majority of the bears (56%) were females with dependent young, followed by single bears (38%). In 35% of the incidents involving black bears, bears acted aggressively towards people without an apparent food-related motive. In four of these seven aggressive incidents, the bear was apparently surprised at less than 15 meters. In only one case did the black bear charge before being sprayed. In 100% of bear spray incidents involving aggressive black bears, the undesirable behavior was stopped by spraying. In some cases, the mere sight and sound of deploying a blast of bear spray was enough to deter bears. The authors noted that on ten occasions, the sight and sound of the bear spray was enough to end the encounter.

In the majority of incidents, the bear left and did not return. However, in 18% of the cases Wilder analyzed, both brown and black bears resumed their threatening behavior after having been sprayed once. Yet, in these instances, repeated spraying eventually deterred bears such that the user could escape the situation. People had to spray bears multiple times to drive them off in 24% of incidents they

studied. In six incidents, bears did not leave the area, although the spraying halted their undesirable behavior. Since this study was published, Wilder has collected nine polar bear/bear spray incidents from around the Arctic, and bear spray was 100% successful in all of them.

In summary, bears were not injured or killed in any of the analyzed bear spray incidents. The spray was 92% effective at stopping undesirable bear behavior, and 98% of the people using it were uninjured. The authors' research shows that bear spray is an effective tool to deter bears while leaving bears alive.

Frank Vitale, hunter and backcountry horseman - "A backcountry grizzly encounter with bear spray"

Vitale recounted a grizzly encounter he had along the north fork of the Flathead River in 1995. Vitale was leading a pack trip of 4 riders, with four horses, a young pack mule and a dog. While riding and leading the mule up a narrow trail on a steep slope, he saw the brown hump of a sleeping grizzly bear about 50 feet down the trail.

There was no place to turn the horses around without making a commotion or taking a lot of time. Knowing that scared horses in steep country were an issue, he quietly told his clients and partner to dismount and tie their horses on a short line to the small, subalpine fir trees. When all of the horses were tied and the group was standing, Vitale yelled at the bear. Immediately, the bear stood up, revealing two COYs. The sow was growling and the cubs were bawling. The dog ran toward the bears, but then circled back behind the party. Vitale saw the sow begin to chase the dog, and he worried that the sow would follow the dog's trail resulting in horses and men between her and her cubs. However, the sow broke off the chase, and pinned her ears back, staring at the group. She started to charge.

Vitale's partner handed him the bear spray. Vitale aimed and pressed the handle when the bear was 30 or 40 feet away. He kept the handle depressed and created a big cloud of spray. The sow ran into the cloud and abruptly stopped, wheeled, returned to her cubs and kept running. Vitale turned to his clients and said, "I guess we had a real wilderness experience." The horses had gotten excited, but they were tied so short they were only slightly cut up on the rocks.

Vitale now carries bear spray every time he hunts, whether or not he's carrying a firearm. He wishes more big game hunters were present at the workshop to discuss the benefits of bear spray.

Mike Madel, Montana Fish, Wildlife and Parks - "Summary of results from Smith et al. 2012 Efficacy of firearms for bear deterrence in Alaska"

Madel reviewed the key results from a paper by Smith et al., 2012, "Efficacy of firearms for bear deterrence in Alaska." The results from this recent paper provide insight into the successes and failures of firearms to deter or stop bear attacks.

The authors compiled, summarized, and reviewed 269 incidents of bear-human conflict involving firearms that occurred in Alaska during 1883-2009. Of these incidents, 81% involved brown bears, 11% involved black bears, and 2% involved polar bears. A total of 444 people and at least 367 bears were involved in these incidents. All 444 persons (either alone or in groups) carried guns, however about 18% did not use them while in a close encounter with an aggressive bear. Surprisingly, there was no statistical difference in outcome (whether no injury, injury or fatality) for people using firearms in an aggressive encounter versus those with firearms that did not use them, or said differently, the injury rates for people in both groups were the same....in short, guns really didn't make a difference overall.

Overall, bear-inflicted injuries occurred in 56% of the incidents compared to 2% of those carrying bear spray in Smith et al. 2008. Bears were killed in 61% of the firearms incidents (total of 172 bears killed). Madel suggested that this rate should concern managers of threatened bear populations. In contrast, no bears were killed in the bear spray incidents analyzed by Smith et al. in 2008.

When statistical models were applied to the data (i.e., the best suite of variables that successfully predicted outcomes), the authors found that the four best models did not include firearms at all in them. This means that if you go into bear country and do all of the wrong things but still encounter an aggressive bear, then the next wrong thing to do is hope to shoot your way out of that situation with a gun.

The authors recommend that all people walking in bear country, with or without a firearm, consider carrying a non-lethal deterrent such as bear spray. Bear spray's success rate under a variety of situations has been greater (i.e., 90% successful for all three North American species of bear; Smith et al. 2008) than firearms.

DISCUSSION

Jay Honeyman, Alberta Sustainable Resource Development, commented that video clips of successful bear spray encounters such as the one that Wilder presented are very helpful for educational settings such as bear safety trainings.

Bill Stiver, Great Smokey Mountains National Park, said that NPS now regulates bear spray as a repellent and not a weapon. This new categorization may mislead visitors to deploy it on objects, thereby creating an attractant. Stiver asked the panelists if we should be concerned about bear spray residue after encounter incidents. Should managers worry that the residue will attract bears?

Herrero commented that he has seen bear spray attract bears several hours after deployment, but would like to see some specific testing residue attractiveness.

Wilder was part of project to test smells and attractants at Kulik River in Alaska. Those brown bears seem very attracted to the residue.

Tim Manley asked Vitale to comment on better methods to get hunters to carry bear spray. Vitale responded that intensive education should be the first step, and if that doesn't work and as a last resort, develop regulations. Vitale is concerned that many big game hunters are inexperienced with hunting in grizzly country, and they rely on the information gleaned from TV hunting "reality" shows. As an alternative, Vitale cited *Grizzly Country* by Andy Russell as a source for understanding grizzly behavior. Russell and his colleagues, even after years of hunting grizzlies, went into the woods to photograph bears without firearms and never had a dangerous incident. Herrero added that Andy Russell recommended one key behavior essential to safer grizzly encounters: stand your ground. He said that the recent firearm research showed that didn't matter if a person discharged a firearm or not; the outcomes were roughly similar.

Larry Lewis, Alaska Department of Fish and Game, asked the panelists if there was any research on the long-term physiological effects on bears post-spraying. Chuck Bartlebaugh, Center for Wildlife Information, said that all bear spray manufacturers are required to submit independent research data about long-term and short-term effects.

Lewis also asked the panelists where the authors gleaned the records for the firearms and bear spray studies. Wilder responded that they used all the sources that were available, such as newspapers and agency records.

Gregg Losinski, Idaho Department of Fish and Game, commented that he uses a Nerf gun in his bear spray demonstrations. He challenges participants to shoot the Nerf gun at a "charging bear" (person in a bear mask). Subsequently, he asks participant to deploy inert bear spray. The superior effectiveness of bears spray becomes clear to the participants.

Jason Herreman, North Slope Borough, Alaska, asked if there's any information about the effective temperature range for bear spray. Wilder responded that he knew of no incidents in temperatures

below 40°F. However, since the 2008 paper was published, he has gathered nine polar bear spray incidents to analyze and he may find more information about effective temperatures.

Joy Erlenbach, Washington State University, suggested that managers should require bear safety classes (like hunter safety) for hunters that are new to grizzly country. Vitale agreed, but added that it is hard to convince a hunter that his chances of surviving an encounter are greater with bear spray. In reality, Vitale believes that a large percentage of charges are bluff, so standing your ground may be enough.

Danny Gammons, National Park Service, asked the panelists if it is feasible to mount bear spray on a rifle or shot gun. Dave Parker, Counterassault, said that there is someone working on this; however, he thinks that hunters will not want to attach bear spray to their \$3,000 well-balanced rifles or shotguns. The bottom line is that hunters can carry bear spray and a firearm and still be able to deploy the bear spray. It helps to practice, but it can be accomplished.

Ryan Leahy, Yosemite National Park, asked the panelists if they examined the impact of yelling as a deterrent to bear attacks.

Wilder said they did not analyze the impact of yelling in their bear spray study.

Herrero responded that he is a co-author of a paper in preparation that analyzes the reactions of brown bears to various sights and sounds.

Chuck Bartlebaugh, Center for Wildlife Information, cautioned the audience that practicing bear spray deployment is essential. The bear spray can might pivot upward in one's hand if it is not held correctly.

POSTER SESSION

Appendix IV of this document contains abstracts for the following posters.

1. Bear behaviour and trains: examining the behavioural relationship between bears and trains using loco-cam data.
2. Effect of hunting on human-bear conflict levels
3. Evaluating the efficacy of wildlife ordinances as a management technique to reduce human-bear conflicts in New Hampshire
4. Evaluation of two aversive conditioning methods on nuisance activity levels of NH black bear (*Ursus americanus*)
5. Spatial factors influencing high probability areas for nuisance black bear complaints in Arizona (2000–2010)
6. Grizzly and black bear foraging on train-spilled grain on Banff and Yoho National Parks.
7. Estimating population size, density, and sex ratios of urban black bears (*Ursus americanus*) using noninvasive genetic sampling Mono County, California
8. Managing black bear-human interaction in Washington with Karelian bear dogs: past successes and future needs.
9. 23 years of successful American black bear rehabilitation
10. Safety in Bear Country Society: Safety through education
11. Kimberley Bear Aware Education and Outreach
12. Seasonal trail restrictions to reduce grizzly bear attacks and conflicts in Banff National Park
13. Addressing human-polar bear conflicts through community-based conservation at Barter Island, Alaska
14. Restricted access in the Moraine Lake area of Banff National Park, 1999-2011.

15. Can the use of a bear-resistant waste collection system to minimize bear / human conflict also be cost-effective?
16. Human-bear conflict reduction using bear resistant cans
17. Trial for human-bear coexistence in Karuizawa, Japan
18. Keeping bears out of cabins
19. Minimizing bear human conflicts between industrial activities and denning polar bears, North Slope, Alaska
20. Ahead of the conflict curve: expansion of food storage regulations on the Beaverhead-Deer Lodge National Forest, 1999-2011.
21. Polar bear den emergence video surveillance system: application of technology at the nexus of Arctic oil and gas exploration and regulatory monitoring
22. Science-based education in action!
23. Experiences with human-bear conflicts in the Carpathian Mountains of Slovakia
24. Google Analytics, measuring your message in the social media market
25. Bear-human coexistence in Meadow Creek, BC
26. Multiple uses of black bears marked with GPS equipped radio-collars
27. Design and operation of Arctic oilfields to minimize conflicts with grizzly bears.
28. Testing the effectiveness of products used to store bear attractants
29. Promoting and fostering an understanding of habituation and conditioning in bears and other wildlife in the National Park Service
30. Understanding and mitigating grizzly bear-train conflict along the Middle Fork of the Flathead River
31. Polar Bear-Human Information Management System
32. A comparative analysis between knowledge and bear safety information utilization by day hikers in glacier national park

SESSION 4: DOES PUBLIC HUNTING REDUCE, ENHANCE OR HAVE NO EFFECT ON BEAR CONFLICTS? WHAT ARE THE MECHANISMS BY WHICH HUNTING HAS THESE EFFECTS?

MODERATOR

Tim Manley, Montana Fish, Wildlife, and Parks

CONTRIBUTORS

Marty Obbard, Ontario Ministry of Natural Resources - "Can Hunting Reduce Human—Bear Conflict Levels? An Ontario Perspective"

Since Marty Obbard was unable to attend the Workshop, Tim Manley gave his presentation of a paper in preparation by M.E. Obbard, E.J. Howe, and L.L. Wall Ontario Ministry of Natural Resources.

It seems intuitive that bear population size is directly correlated to a level of conflicts, and that reducing the bear population will decrease conflict activity. A paper by Hristienko and McDonald (2007)⁵ makes this assumption. However, no convincing evidence exists, so this is still just a testable hypothesis.

⁵ Hristienko, H. & McDonald, J.E.J. (2007) Going into the 21st century: a perspective on trends and controversies in the management of the American black bear. *Ursus*, 18, 72–88.

Obbard et al.'s research presentation focused on Ontario black bears and the factors affecting human-bear conflicts levels. The Ontario biologists asked three questions: 1) "Can hunting pressure affect human-bear conflict levels?"; 2) Can hunters target the bears involved in human-bear conflicts?; and 3) How much would a population have to be reduced to affect human-bear conflict levels?"

In Howe et al. (2010)⁶, the authors analyzed the factors affecting human-bear conflicts in a relatively small area, Parry Sound. This area offered a long-term dataset (1992-2008) of natural food occurrences and human-bear conflicts. The authors found that all measures of human-bear conflicts were inversely related to natural food availability. Obbard and others widened the spatial analysis to the province of Ontario, though their dataset was derived from a shorter period (2004–2011). Human-bear conflicts varied greatly during these years in response to natural food availability. There were no apparent trends in harvest and human-bear conflicts. Yet, as in the Parry Sound study, the number of human-bear conflicts and natural food availability were inversely related.

There were additional factors affecting human-bear conflicts that layer in addition to variations in natural food availability. Widespread food failures in various parts of Ontario in 1995, 2001, 2005, and 2007 induced reproductive synchrony in adult female black bears. The presence or absence of large numbers of independent yearling bears could affect annual variation in human-bear conflicts.

It is often argued that hunters can target problem bears. Despite the fact that the majority of hunters state they are seeking large bears, records show that the majority of bears harvested are subadult males. Since subadult males are commonly involved in human-bear conflicts, there may be some merit to this argument, though many other factors are involved such as 1) high proportion of subadults in population, and 2) less wary subadult males dispersing naturally into unfamiliar habitat and hunters may not be willing to wait for a larger bear. In Obbard et al. (2008), the authors found that suspended baits can help hunters distinguish male from female black bears if they are patient and get a view of the ventral surface of a bear.

It is also argued that a spring bear season removes dispersing subadult males that may come into conflicts. However, the authors' analyses showed that spring harvest had no effect on human-bear conflict levels in that year. It seems even less likely that fall seasons will reduce human-bear conflicts.

Treves et al. (2010)⁷ analyzed black bear nuisance complaints and hunter take but did not detect an inverse relationship between total harvest and subsequent human-bear conflict in Wisconsin (1995—2004), when the harvest was 10-20% of the population. Similarly, harvest in Ontario had no effect on subsequent human-bear conflicts when harvest was estimated at 10% of the population.

While a targeted approach to hunting may affect human-bear conflict levels in some local areas, a large proportion of human-bear conflicts can be reduced by securing human garbage. Given that human-bear conflict levels are affected so dramatically by variations in natural food and so many conflicts are related to unsecured garbage, bear managers still have a way to go in terms of public education.

Several questions remain. What level of black bear harvest is necessary to affect human-bear conflict levels given the overriding variations in natural food availability? Should we spend resources and time to reduce bear populations to the extent that it affects the number of human-bear conflicts? Would society in general accept reductions of 50% (for example) in bear populations? How would this be accomplished? Would agencies ask hunters to target adult females?

⁶ Howe EJ, Obbard ME, Black R, Wall L. 2010. Do public complaints reflect trends in human-bear conflict? *Ursus* 21(2), 131-142.

⁷ Treves et al. 2010. American black bear nuisance complaints and hunter take. *Ursus* 21:30-42

Mark Ternent, Pennsylvania Game Commission - "Hunting season timing to increase harvest of conflict bears"

Pennsylvania is home to 18,000 black bears, 13 million people, and 160,000 black bear hunters. The state recently changed black bear management by altering the timing of the bear hunting season. Ternent presented the resulting effect on the number of conflict bears in the harvest and the overall impact to the black bear population.

Black bear populations have been increasing since the 1980's. Along with the bear population increase, managers have seen a significant increase in human-bear conflicts. Pennsylvania has a very good dataset of population levels and the number of conflict bears. An annual statewide tagging program allows for bears to be marked, and mandatory reporting during the hunting season provides a recapture sample enabling annual mark-recapture population estimates. Bears are classified at time of tagging as either nuisance or non-nuisance based on capture circumstances.

In 2002, managers hypothesized that changing the timing of the bear hunting season would achieve the following: 1) increase the removal of conflict bears; and 2) increase bear harvest and stabilize or reduce bear populations.

In the past, the bear season was three days long, and no bait, scents, or hounds were allowed. At that time, around 100,000 hunters harvested about 20% of the bear population. The structure of the bear hunt was conservative and intended to support bear population recovery. Deer-hunting season followed the bear hunting season with no overlap. The two-week deer season began with 900,000 hunters on opening day, and often included hunting activity in semi-rural woodlots and near small residential areas.

To test their hypotheses, managers extended the bear season to overlap with deer season in seven management areas, thereby allowing deer hunters to simultaneously harvest bears. They found the following results:

1. Harvest rates did not differ between non-conflict and conflict bears within the general bear hunting season prior to the season extension. In other words, conflict bears had the same harvest vulnerability as non-conflict bears.
2. Adding an extended season had little effect on harvest rates of non-conflict bears.
3. However, adding an extended season did increase harvest rates of conflict bears. A conflict bear was 1.48 times more likely to be harvested with an extended season. This was true across all sex and age classes.
4. The bear population growth rate in areas with no extended season was about 1.2. In areas with the extended season, the growth rate was negative, about 0.9.
5. The number of human-bear conflict complaints had no correlation with the effects of the extended hunting season.

In summary, Pennsylvania wildlife managers found that harvest of conflict bears increased when the bear-hunting season was extended to overlap with deer-hunting season. This increase was probably due to 1) an increase in the number of hunters, and 2) more hunting effort in denser residential areas where deer are commonly hunted, but where bears are rarely hunted during the traditional (non-overlapping) season. Managers also concluded that because population declines did occur with the season expansion, a reliable way to monitor population trend was imperative and they should not rely on conflict complaints to measure success.

Zach Voyles, University of Wisconsin - "The efficacy of hunting to mitigate nuisance bear activity in Wisconsin, USA"

Possible (though not proven) indirect benefits of bear hunting include reduced future conflicts, and increased public tolerance of bears. Possible direct effects include reduction in population size and reduction of individual bears involved in conflicts.

Voyles presented the knowledge he's gained while analyzing black bear population and human-bear conflict data in Wisconsin including significant contributions by Kirsten Kapp. The assumption of efficacy depends upon whether managers accept the "hunt to conserve" hypothesis. Support for this assumption comes from analyses of situations wherein hunters have helped reduce conflicts with other species such as peccaries, African elephants, and white-tailed deer.

Voyles compared Wisconsin's bear population and bear conflict complaint databases to harvest rates. He did not find any clear correlations between complaints and harvest. The data suggest that conflict bears are removed by hunting at a similar rate as non-conflict bears; however, at a smaller scale in some management areas, some positive correlations between complaints and harvest appeared. Voyles is still analyzing these data, though.

So far, Voyles has found no correlation between complaints and harvest, but he has not found that complaints are increasing despite an increasing bear population. Harvest has not reduced the bear population. Voyles is considering several variables as he continues to analyze his data: 1) the correlation of harvest to conflict complaints may be stronger when data are restricted in size (vs. the entire state); 2) one bear may cause many complaints and it may not be correct to treat one bear/one complaint as a unit of measure; and 3) complaints are not independent of management actions.

DISCUSSION

Kevin Wright, Colorado Parks and Wildlife, asked Ternent about the timing of denning in Pennsylvania and how it affects the bear harvest. Ternent said that 10% to 50% of pregnant females are already in dens during the November general hunt depending on fall mast crops. In a good mast year, pregnant females will tend to den after the hunting season. Wright also asked if Pennsylvania relocated or translocated conflict black bears. Ternent said that 300-400 bears are relocated to state-owned lands each year.

Chris Smith, Wildlife Management Institute, asked the panel if they see differences in bear behavior in hunted vs. unhunted populations. Ternent said that there are no unhunted bear populations in Pennsylvania to make this comparison. Wright added that bears that are marked in suburban conflicts seem to show up in the harvest at the same rate as other bears, perhaps because they are using the same natural foods in the fall as non-conflict bears. Voyles pointed out that bear behavior is plastic. Bears hunted in the fall are unlikely to continue reacting to hunting when they return the next summer to forage in neighborhoods.

Courtney Hughes, University of Alberta, asked the panelists how they are analyzing socioeconomic factors. Voyles is using census data as proxies such as housing density and number of seasonally occupied homes. However, he has no access to socioeconomic surveys. Ternent said Pennsylvania uses human local population trends and cultural carrying capacity (i.e., do the residents want fewer, the same or more bears) to adjust harvest management accordingly.

Brian DeBolt, Wyoming Game and Fish, commented that his department has used hunting to reduce conflicts between their expanding bear and human populations. The department has an open black bear hunting season in two areas where a few bears are expanding into marginal habitat. They've found that 100% of the bears harvested in these areas are conflict bears. DeBolt says that these conflict bears would likely have been removed through management had they not been harvested. He thinks that site-

specific hunting can be extremely effective for increasing public tolerance, giving residents a sense of ownership, and reducing the cost of agency management.

Ternent added that nonharvest mortality (e.g., vehicle collisions, illegal take) of urban bears is high. Data gathered from GPS collars have shown that the level of mortality among urban bears is not sustainable, yet every year the number of conflict bears in those areas increases. It takes more than targeted harvest to reduce conflict bears in areas where their numbers are replenished each year by dispersing bears. Education and outreach to reduce attractants are vital tools.

Jessy Coltrane, Alaska Department of Fish and Game, agrees with Voyles' assessment that many variables affect the level of complaints, e.g., one bear can generate 50 complaints in one day. Complaint calls cannot be used to assess the effectiveness of education or management efforts. Coltrane asked Ternent how Pennsylvania determines which bears to tag. Ternent said that conservation officers in bear range areas are assigned a quota of tags every year. Some conservation officers can meet their quota by tagging only conflict bears; others must set traps for research bears.

Tim Thier, Montana Fish, Wildlife and Parks, asked Voyles about the impact that baiting bears with human junk food might have on numbers or behavior of conflict bears. Voyles responded that most bear baiting takes place on public land. Most conflicts happen on private land.

Michael Proctor, Birchdale Ecological, said a session at the Ottawa IBA meeting ended with a consensus that diversionary feeding has the potential to create food-conditioning and conflicts. Proctor also noted that Obbard's presentation concluded that natural food abundance had the most impact on the number of human-bear conflicts in Ontario. Proctor posed a hypothetical scenario in which there were no human-bear conflicts in a subpopulation and no bears were removed because of conflicts. Would managers be as keen to regulate populations under this scenario? Alternatively, do managers regulate populations because of human-bear conflicts, or is human-bear conflict management a form of population regulation? Ternent responded that Pennsylvania has weighed over 70,000 bears and managers have seen no indication (change in body weights or reproduction). Pennsylvania is managing bears according to social carrying capacity, not habitat carrying capacity. He thinks that black bear management will always be driven by people's tolerance for conflicts, and not by typical wildlife population parameters. Voyles agreed.

Derek Fagone, Montana Fish, Wildlife and Parks, asked panelists if enforcement actions impact the rate of conflicts and complaints. Ternent replied that Pennsylvania has a no-feeding regulation. A recent survey of conservation officers revealed that the officers felt strongly that the regulation contributed to complaint reduction. However, Pennsylvania has no quantitative measure of the regulation's impact. Voyles responded that Wisconsin lacks a statewide feeding ordinance, though there are a few local ordinances. However, Wisconsin Wildlife Services insists that residents secure attractants in order to receive assistance with human-bear conflicts.

Mike Orlando, Florida Fish and Wildlife, asked the panelists if they know of superior indicators for successful human-bear conflicts other than the number of complaint calls. Ternent reconfirmed his conviction that complaint calls are poor indicators, especially in the absence of other data. Wisconsin provides compensation for agricultural damage, but this is not a good metric, either.

Lauri Craig, US Forest Service, asked panelists if education and outreach was provided to residents in addition to the liberalization of bear hunting seasons. Ternent said that more outreach is provided in areas where more human-bear conflict calls are received, though he has no quantitative data about the outreach response. Voyles concurred that the same was true in Wisconsin.

Mike Madel, Montana Fish, Wildlife and Parks, asked panelists if they have tried to target conflict bears by restricting hunts to the early season, or to small targeted areas. Ternent said that Pennsylvania has

tried to limit hunt areas to target local conflict bears, but found that summer conflict bears are no longer in the same local area in the fall during hunting season. Another confounding factor is that conflicts typically occur on private lands that have little or no hunter access in the fall. Voyles said that bear kill permits are rarely allocated to relieve human-bear conflicts; however, the game commission receives more pressure for liberal hunts in areas of high conflict.

Dick Shideler, Alaska Department of Fish and Game, asked panelists or participants if they know of a public survey that captured the number of people with human-bear conflicts, but did not complain. Ternent said that a 2009 Pennsylvania opinion survey asked “Have you have had a conflict with bears in the last two years?” Five per cent of the respondent said yes. The next question was “Did you contact the game commission?” and the affirmative response was very low. Therefore, the majority of people did not call about their bear conflicts. Frank Ritcey, British Columbia Conservation Foundation, said that BC has a province-wide call database that includes the types of incidents and what types of attractant were involved. Jaclyn Comeau, University of New Hampshire, recently surveyed six communities with human-bear conflicts. Over 50% of those surveyed reported damage to their property, only about 30% of those respondents said they reported the damage.

Georg Ziegltrum, Washington Forest Protection Association, said that the Western timber industry is concerned about damage to conifers by black bears during the spring months. They have found that supplemental feeding alleviates the amount of damage. He asked Ternent if Pennsylvania experiences the same problem. Ternent replied that they do not have that problem.

DEMONSTRATION: BRINGING BEAR AWARENESS INTO THE CLASSROOM

PRESENTER

Laurie Evarts, Montana Fish, Wildlife and Parks
Allie Neils-LeMoine , Corvallis High School

Evarts began by showing the first few minutes of the video “The Girl Who Silenced the World,” in which a 13-year-old girl speaks about the Environmental Children’s Organization. The organization illustrates how children are voicing their own concerns about their environment and making their own decisions.

Evarts outlined new Montana Wild (MT Wild) programs. MFWP offers a variety of presentations and hands-on activities regarding bears. The activities and presentations focus on attractant reduction, bear behavior and misconceptions, recreating in bear country, bear encounters, bear spray and the delisting process. In addition, Evarts, along with other high school teachers and the Office of Public Instruction, has developed a high school science and technology unit on grizzly bear recovery and research. MFWP trains all hunter education teachers about the use of bear spray. Last year, between MT Wild, outreach programs, and hunter education, more than 5,000 individuals received bear awareness training.

Whenever possible, Evarts uses a variety of media to teach lesson objectives. As an example, she showed a very short video of a grizzly sow and cub touching an electrified mat and then running away.

Evarts introduced teacher Allie Neils-LeMoine and students from Corvallis High School’s “Classroom Without Walls” (CWW). The students have been involved in state and federal bear ecology and management projects. In addition, the students presented their own communications products to teach people about safe behavior in bear country. The first product is a game, “Montana Wildlife Awareness: Welcome to Bear Country.” The students are also producing three instructional videos, “How to use bear spray,” “Hiking and hunting with awareness” and “Identification of Bear Species and Bear Sign.” The students will create an electric fence video in the fall with Jamie Jonkel, MFWP bear specialist. In

addition, Evarts will present an all-day grizzly bear workshop with several Corvallis high school teachers in August. The teachers plan to incorporate grizzly bears as a cross-curricular theme for the fall semester.

DISCUSSION

Courtney Hughes, University of Alberta, asked how the Montana WILD program identified worldviews, values, and beliefs. Evarts reported that Colorado State surveyed parents several years ago and categorized their values. MT Wild programs cover a wide variety of these values. Hughes asked how Montana WILD connected their programs with the state's education standards. Evarts said that she works closely with teachers and the state Office of Public Instruction when developing curriculum. Hughes asked how CWW overcame such constraints as liability and funding. Neils-LeMoine said that the Corvallis School Board is especially supportive of CWW. The program has had many positive outcomes over its long existence. The program is partially funded by a grant from the U.S. Forest Service.

SESSION 5: MANAGEMENT OF HABITUATED BEARS NEAR DEVELOPED AREAS

MODERATOR

Jessy Coltrane, Alaska Department of Fish & Game

CONTRIBUTORS

Kerry Gunther, Yellowstone National Park - "Managing habituated bears along roadsides in Yellowstone National Park: How close is too close"

Gunther began by saying that the potential for human-bear conflicts doesn't end when managers solve the problem of food-conditioning. Habituation may bring new issues. Yellowstone National Park (YNP) managers began solving food-conditioned bear problems in 1960's & 1970's through education, bear-resistant devices, food/garbage storage regulations and regulation enforcement. Today it is rare for bears to get anthropogenic foods. Their new management challenge is bear habituation. Bears have adapted to human developments and activities within the park, but humans are less adept at adapting to the nearby presence of bears. The 3.6 million annual visitors to YNP are relatively unsupervised. Gunther added a new term, "bear-jam," to define incidents of bear activity along roadside corridors that result in park visitors stopping to view bears and causing traffic congestion.

YNP provides the perfect environment for bear habituation to people. There are relatively high numbers of bears in open habitat, high numbers of people, very low levels of human-caused bear mortality, and relatively predictable human behavior. The combination of bears habituated to people and people habituated to bears means very close interaction distances between the two species.

Over the past 30+ years, the park has managed habituated bears in two different ways. From 1980 to 1990, managers actively discouraged habituation through aversive conditioning or hazing, capture and translocation or capture and removal. From 1990 to 2011, habituated bears have been tolerated, park visitors are actively managed at bear-jams, and bears are usually left unmanaged. This new policy requires staff at bear-jams. Rangers and biologists manage traffic and prevent people from approaching and/or feeding bears. Last year the park managed over 1,000 reported bear-jams.

Gunther and Mark Haroldson compared some parameters from the period of highly managed habituated bears/lightly managed visitors (1980 to 1990), and the period of lightly managed bears/highly managed visitors (1990 – 2011). They found an increasing trend in duration of bear-jams, and a decreasing trend in bear distance from road. Despite almost 10,000 bear-jams, bears involved in

bear-jams have caused no human injuries and thousands of visitors have enjoyed viewing habituated bears.

Under the new management regime, the number of grizzly bear and black bear property damages has decreased. Grizzly and black bear-inflicted human injuries have also decreased, albeit slightly. Grizzly and black bear management removals have decreased significantly.

One might assume that vehicle-strike bear mortality would increase due the extreme habituation of bears to roads. This is true, but not to the extent that might be expected. During the period that managers actively discouraged habituation, grizzlies and black bears were killed at a rate of 0.2/year. During the period that managers tolerated habituation, grizzlies and black bears were killed at a rate of 0.4/year. The total number of park personnel hours involved in managing bear-jams in 2011 was 2,542 hours. This high investment in labor begs the question, "Is current management sustainable?" The parameters that drive up the financial and personnel investment are trending upward; the duration of bear-jams is increasing, and the distance of habituated bears from roads is decreasing. More and more visitors are coming to YNP, and meanwhile the park's work force budget is shrinking. As always, park administrators are concerned about the liability implications of tolerating habituated bears.

Gunther posed the following questions to the workshop participants: 1) How close can bears and people be allowed to interact without negative consequences? 2) Can people be taught to maintain distance from bears? If so how and what is the best method? and 3) Can bears be taught to maintain distance from people? If so how and what is the best method?

Kate Wilmot, Grand Teton National Park - "Managing habituated bears in Grand Teton National Park"

Habituated grizzly bears are a relatively new phenomenon in Grand Tetons National Park (GTNP), and their presence coincides with the expanding range of grizzlies throughout the park. In 2004, a lone habituated bear began hanging out near Jackson Lake Junction. By 2011, two females and cubs were highly habituated to roadsides.

One of the park's management goals is to keep people and bears 100 yards apart. In 2007, park managers launched the mostly volunteer "Wildlife Brigade" to manage and educate people at bear-jams. They try to keep visitors in groups that form a bracket around an open space for bears to pass through groups of people unmolested, while simultaneously allowing traffic to continue moving. The Wildlife Brigade members talk to visitors and provide spotting scopes to view grizzlies at a distance. The Brigade is considered a huge success because it provides visitors with an opportunity to enjoy the park's wildlife in a relatively safe manner. Both of the habituated female grizzlies have Facebook pages created by enthusiastic visitors. In 2011, the Brigade and the park personnel spent over 1,400 hours managing wildlife viewing along the park's roadsides.

The problems presented by habituated bears are complex. Wilmot is concerned that the mixture of traffic and pedestrians makes bear-jams unsafe. Every bear-jam is a dynamic situation where visitor and bear behavior can vary. The park personnel and the brigade strive to make visitors behave predictably to avoid stimulating unwanted reactions from the bears.

In 2011, several photographers and visitors began standing on top of their cars. Female grizzlies found them threatening and bluff charged them twice. Because of this and other concerns, park administrations rewrote compendium regulations that spelled out visitor responsibilities such as maintenance of a 100-yard distance from wildlife, and the need to comply with all GTNP staff and volunteers.

Wilmot ended her presentation by asking the workshop participants, "How close is too close?" and "Is tolerance of habituation the best outcome for cubs that may range outside of protected areas like GTNP?"

Hal Morrison, Parks Canada - "Managing habituated campground bears"

Morrison manages bears and people in Banff National Park. The park is located in a mountainous area where valleys are human-dominated, with a highway, side roads, rails, hotels, golf courses, and other resort-type development. Wherever and whenever possible Morrison addresses the causal factors for human-bear conflicts, such as food and garbage bear resistant containment, natural attractant reduction and removal, education and training, facility design and re-design, trail sightline improvement, access restrictions and compliance.

Morrison focuses on defining bear management objectives with staff. It's difficult to manage bears consistently over a large area and among diverse personnel. Sometimes management involves bear-sitting or bear hazing. Parks Canada doesn't allow bears into developed areas, but they are tolerated just outside developed areas. Other bear management tools include aversive conditioning, trap with hard release on site, and trap with short distance relocation. Parks Canada has had good results from using electric fences in the Bow Valley. They have used diversionary feeding to good effect. They have not used translocation for a while because of inherent complications. As a last resort, bear managers are able to send bears to zoos or destroy them.

The electric fence at the Lake Louise tenting campground has been effective at reducing conflicts. It keeps bears out of the campground and keeps people from bothering the bears. However, the bears have habituated to the fence, a family of grizzlies has been hunting ground squirrels, and eating them within two meters of the fence with viewers lined up to watch.

Some bears are seeking habitat in the front country and have become tolerant of sharing trails with people at close distances. One female learned that people will move off the trail if she advanced toward them. Morrison is concerned about the prognosis for increasing habituation. The parks have small grizzly populations with high mortality due mostly to roads and rails, and tolerating habituation at close distances may help conserve the small population. Grizzlies are adapting quicker than managers can make informed choices to manage their new behavior. Thirty years ago, managers felt compelled to maintain certain conditions for grizzly bears because they assumed that grizzlies couldn't tolerate people. However, once managers stopped moving and shooting grizzlies, they have adapted pretty well.

Jay Honeyman, Alberta Sustainable Resource Development - "Managing habituated bears near communities"

Over 20 years ago it was considered an event for visitors to see grizzlies around Kananaskis Country and the eastern gate of Banff Park. Today, such sights are relatively common. Canmore and the Bow Valley have created formal wildlife corridors and designated wildlife habitat patches and the bears are using them. In addition, there are highway fences and wildlife underpasses located along the Trans-Canada highway. For the past ten years, Canmore and adjacent municipalities and provincial protected areas have had bear resistant garbage bins in place and Canmore has a municipal birdfeed bylaw. Nowadays, it is very rare for bears to get into human attractants. In the Bow Valley, the Government of Alberta (GOA) wildlife managers are primarily concerned with habituated bears in or near developed areas and the consequences of interacting in close proximity to people.

From an educational perspective, GOA uses a variety of approaches to bear management. The Bow Valley Wild Smart program currently publishes a bear report in a variety of media. The weekly report lets people know where general bear activity is occurring, so that people can avoid areas of high bear concentration. While there is no formal evaluation, the report is popular and seems to be working. The Wild Smart program also presents bear spray trainings that are increasingly popular. GOA has created citizen wildlife monitoring programs. Under strict guidelines, citizens monitor radio-collared bears, allowing GOA to dedicate their time to specific bear-conflict management concerns. GOA is considering expanding their management beyond the Bow Valley.

The Wind River Bear Institute has been providing aversive conditioning to the area for over ten years. Between 2001 and 2011, 41 grizzly bears were conditioned and released. While protected area translocations have been minimal, 50% of the bears that enter urban areas have been translocated.

GOA is becoming concerned about human-bear interactions at close distances, especially between bears and people on bikes, golf courses, trails, and in campgrounds. GOA compiles data on the reaction distance and response of habituated bears. A bear that moves away from people is considered a positive reaction, and a bear that is indifferent and does not move off or closes distance is considered a negative reaction.

Honeyman presented several questions for discussion during the workshop: 1) Bears are adapting, arguably, faster than managers can adapt, begging the question, "What is our next step?" 2) What are the liability concerns for agencies? If a person is attacked, will courts consider agency tolerance of habituated bears as negligence? 3) Managers have told the public surprising a bear at close distance is a problem. However, habituated bears come within 1-2 meters of people regularly. Do we lose credibility with our public messaging as a result?

DISCUSSION

Colleen Matt, Conservation Planning and Facilitation, asked Honeyman if the true definition of a negative response would be aggression. She pointed out that Honeyman and other workshop presenters have characterized habituated bears as being less likely to be aggressive. She also commented that bear behavior literature should include the observation that habituated bears are less likely to be aggressive. Honeyman affirmed that the habituated grizzlies were hard to surprise and not aggressive even in surprise encounters. The concern however, is the unpredictability of people, and when encounters are only two or three meters apart, human unpredictably becomes potentially dangerous for both people and bears. For example, hikers in the Bow Valley sometimes walk with dogs off-leash in grizzly areas. No matter what the cause, a human injured by a habituated bear may force managers to change their current bear management program.

Brianna Burley, Parks Canada, asked the panelists if managers should define the differences between habituated bear behavior and wild bear behavior.

Joe Kondelis, Yellowstone Country Bear Hunters Association, asked the panelists if habituated bears on protected lands are getting "set up" for conflicts when they go beyond protected area boundaries.

Gunther said that the bears that are habituated in the front country seem to be more wary in the backcountry. Anecdotally, however, people killed some of the habituated bears that were moved outside the park in the 1980s. Gunther speculates that habituated bear mortality probably is higher than wild bear mortality outside the park.

Honeyman does not like to translocate habituated bears out of Canmore where they are tolerated. It begs the question, "Should managers even translocate habituated bears?"

Hanna Stauts, Greater Yellowstone Coalition, asked Gunther and Wilmot whether issuing citations to visitors at bear-jams actually changes people's behavior. Gunther said that most of the YNP personnel issue warnings to miscreants, because writing citations takes their attention away from managing the bear-jam. Wilmot said that GTNP does the same as YNP, however they have changed their compendium regulations to make it easier to cite visitors that misbehave. The Wildlife Brigade and rangers know that most bear-jam visitors are just driving through, so citations would not alleviate future issues. Most of the regular visitors comply with the rules.

Jessy Coltrane, Alaska Department of Fish and Game asked the panelists how they are dealing with the growing numbers of mountain bikers in their areas.

Morrison said that Parks Canada has conflicting mandates. Park administrators are trying to encourage mountain biking visitors. Meanwhile, bear managers are forced to temporarily restrict access to trails when bears are in the area.

Honeyman concurred with Morrison. The bike trails seem to attract bears seeking buffalo berries in July and August. Unfortunately, the Canmore Nordic Center has become an international destination for mountain biking and offers races in July and August. Mountain biking use is skyrocketing.

Carrie Hunt, Wind River Bear Institute, commented that some Canmore females have responded to aversive conditioning over 13 years by staying away from developed areas. However, the habituated bears currently using the front country in Kananaskis became habituated as subadults. Subadults likely come to the front country to avoid the home ranges of older bears.

DEMONSTRATION: ELECTRIC FENCING TO PREVENT CONFLICTS

PRESENTER

Mike Madel, Montana Fish, Wildlife and Parks

Madel presented an electric fence exhibit that he and Russ Talmo, Montana Fish, Wildlife and Parks (MFWP) designed based on their bear management experience along the Rocky Mountain Front. The exhibit contained two kinds of fence, 1) A seven-wire, permanent alternating hot/ground high-tensile fence powered by Gallagher B100 Portable Solar Unit; and 2) A temporary five-wire alternating hot/ground polywire electric fence powered by a Gallagher B60 energizer. Both fences put out a voltage of at least 0.5 to 1.5 joules/millisecond, or 7,000 volts.

In the 1980's, Madel's used temporary electric fences around bee yards, but they were unsuccessful. Bears crawled between the hot wires with no apparent shock effect. He and his colleagues discovered that the prairie grasslands in the summer were too dry to conduct electricity. Without some moisture, the soil acted as insulator that allowed the bears to touch the wires without consequences.

Madel worked with Jeff Marley of Margo Supplies to devise two types of successful electric fence systems: 1) Alternating hot/ground wires so that when bears touch the hot wire and the ground wire simultaneously, a full 7,000 volts is delivered; and 2) Wiring the system to chicken wire that is laid on the ground on the outside of the fence. Both systems stopped bears immediately and have since been adapted for different needs.

MFWP bear management personnel tested different designs by stringing experimental fences around livestock carcasses in the backcountry. They were able to determine the optimal distance between wires to prevent cubs from slipping through. The best design features a hot bottom wire, shorter distances between the lowest wires, and high-tensile tautness. This design forces bears to squeeze through the wires and the full voltage gets through their fur.

With additional electric fence designs, MFWP discovered that amperage was important. They tested energizers and found that different fence specifications work best for various environmental and site conditions. For example, lower amperage works best in wetter environments, and higher amperage is better for dryer environments. They found that chain-link and high-tensile electric wire effectively deter bears from refuse sites.

Optimal designs for portable fence were developed through rigorous testing by U.S. Forest Service Technology and Development Program in cooperation with MFWP and the Blackfeet Nation. These systems are lightweight and invaluable for backcountry camps in bear country. The researchers

developed an optimal woven fence design with alternating hot/ground horizontal wires. The flyer, "Specifications for Portable Electric Fence Systems as Potential Alternative Methods for Food Storage" can be found at <http://www.fs.fed.us/t-d/pubs/htmlpubs/htm07232305/index.htm>

Over the past 25 years, residents and ranchers along the Rocky Mountain Front have benefitted from cost-share funding from various conservation group and agency contributors. For example, Defenders of Wildlife has contributed well over \$250,000.00 for bear-conflict prevention projects around the Northern Continental Divide Ecosystem. Currently, Defenders is offering reimbursements of up to \$500 towards electric fence projects around livestock bedding or calving grounds.

Kevin Frey, MFWP grizzly bear management biologist, *recently* stated, "I have been using bear-deterrent electric fences for about 20 years, and they are the most effective tools we have, and can adapt to nearly any situation. Electric fences systems work 24 hours a day; people, dogs, and aversive conditioning rounds do not."

DISCUSSION

A participant commented that the US campgrounds could benefit from the same type of electric fences as are used around Banff National Park campgrounds.

Dick Shideler, Alaska Department of Fish and Game, asked Madel about his recommendations for building gates. Madel said that gates could be made using alternating hot/ground wires. There are gate designs that can be adapted to landowner's needs. Some gates on sheep bedding pens can be made to open and close remotely.

SESSION 6: COMMUNICATING TO RESOLVE HUMAN-BEAR CONFLICTS. OR DELIVER YOUR MESSAGE WITHOUT GETTING MAULED BY *HOMO SAPIENS HORRIBILIS*

MODERATOR

Seth Wilson, Blackfoot Challenge

CONTRIBUTORS

Ben Long, Resource Media

Linda Masterson, author, *Living with Bears: a Practical Guide to Bear Country*

Ben Long began by describing his experience as a journalist in Montana's Glacier Country. While in that profession, he noticed that many conservation problems were based on miscommunication. He came to understand that people's perceptions are more important than reality. He suggested that in order save bears, conservationists and biologists should cease talking *about* bears. Long offered the following "rules" for better communication.

1. *Meet people where they are.* Strive to understand people's values and perspectives and don't impose your values.
2. *Values trump Facts.* Core values motivate people more than facts. Core values include sense of freedom, patriotism, love of place or love of family, and the way an individual sees themselves. Core values are what people fight wars over, not facts. If a fact doesn't fit a person's frame of reference, they will reject that fact. Scientists' minds have been trained to think about problems in a fundamentally different way that most people, which can create real obstacles to communication.
3. *Use the power of the spokesperson.* Who is talking is more important than what is being said. Credibility and trustworthiness are critical for getting messages heard and behavior changed. Though

surveys have shown that people rank the credibility of wildlife biologists highly, sometimes it is better to use a spokesperson with attitudes and values that are common within your audience.

Long presented the following additional nuances to effective communication

- Be Bilingual:** Bear conservationists and managers need to be socially bilingual. They need to explain their subjects in a way that non-biologists can understand and accept, while also maintaining the ability to speak credibly with their peers.
- Focus:** Always keep the focus on your goal. The clearer and more measurable your goal is, the more likely you will succeed.
- Repetition:** Repeat your message until you puke. Expect to say the same thing year after year, decade after decade.

The “Don’t Mess with Texas” anti-litter campaign is an example of good communication strategy. The state used the number of beer cans along highway shoulders as their metric for achieving success. They analyzed their “audience” and discovered that young white and Latino males tossed most of the cans. They developed the “Don’t Mess with Texas” slogan that appealed to their audience’s sense of pride (a core value). They chose well-known Texans like Roger Staubach and Willie Nelson as their spokespersons. Littering was reduced by 50% over 25 years.

Linda Masterson presented a series of human-bear conflict solutions that work in the real world. Masterson began by outlining the problems that used to occur in the Great Smokey Mountains National Park (GSMNP). The park is America’s most visited National Park at 10 million visitors per year. Back in the early 1990s, the park found it impossible to keep up with the volume of food and garbage visitors left available for bears. The gathering of food-conditioned bears became a wildlife spectacle. The park wildlife biologists, Kim Delozier and Bill Stiver, instituted a series of remedies. They switched from bear-resistant cans to larger dumpsters, but discovered that trash piled up and overflowed after the maintenance staff went off duty at 3:30 p.m. After persistent pressure from the biologists, park maintenance agreed to change their hours and began picking up trash in the afternoon through the evening. Park administrators also closed the worst picnic areas at 8 pm. They also replaced ground-level grills with raised ones in all the picnic areas and campgrounds, and discovered that visitors left less garbage in the raised grills. Picnic table signs warn people that chips and hot dogs are lethal to bears. If people leave coolers and food in the open, they return to find them replaced with a notice that says “We got your cooler before the bears did.” After a bear that had been allowed to forage on human food had to be killed, the park staff printed and posted an informational flyer with the heading, “Did you kill this bear?”

Masterson told the success story of a private community, Crystal Lakes, Colorado. Crystal Lakes is a community of 1,600 properties. Prior to mid-1990, bears fed at the community dump while residents watched them. After the dump was closed, bears began breaking into sheds and homes. The community eventually averaged 100 break-ins per year, at a cost of \$150,000 in property damage. In 2005, The Colorado Division of Wildlife partnered with concerned citizens to form the Crystal Lakes Bear Aware Team and began a campaign that included mandatory bear orientation for new owners, deterrence education, instructions for building nailboard mats, and a clinic about portable electric fences. The team educated people about attractant removal and protection, installed a bear silhouette sign at the community gates and posted a tally of the number of bear break-ins in the current season. The Bear Aware Team keeps in close contact with Crystal Lakes homeowners’ association and provides how-to-coexist-with-bears information through all available media.

Wintergreen, Virginia is a ski and summer resort community. After destroying nine bears in two years, concerned community members worked with VDFG to organize a seminar about human-bear conflicts.

They initiated a Bear Smart program based on Whistler's Bear Smart program in British Columbia. The volunteers began by performing a human-bear conflicts audit and presented the results to the community leaders. With leadership cooperation, the Bear Smart volunteers helped pass an ordinance banning bird feeding during non-winter months, and got the community to require bear-resistant containers. They used all the media available to broadcast their messages. When Masterson asked the Bear Smart leaders what advice they would give at this workshop they said that cleaning up bear problems has to be a grassroots effort, and that people must understand why bears do what they do.

Masterson echoed Long's advice about values. She urged bear managers to start by listening to people and finding common ground. Learn to speak their language, not yours. Give them examples of other communities' success stories. It's all about putting the responsibility on the right species. Masterson also admonished the group to show the public that that you care about bears. Most of all, don't give up!

DISCUSSION

Seth Wilson challenged workshop participants to share how they would apply some of the principles of communication to the chicken-bear conflict conundrum.

Jessy Coltrane, Alaska Department of Fish and Game, agreed that finding common ground with the public is essential. She sometimes pretends that she loves chickens, because she respects that the hobby farmers love their chickens.

Rick Mace, Montana Fish, Wildlife and Parks, suggested that bear managers and community activists work with chicken feed vendors to get conflict-prevention messages to the public.

Jamie Jonkel, Montana Fish, Wildlife and Parks, is cooperatively developing best management practices for chicken husbandry in cooperation with a community farm in Missoula. Other cooperators are 4-H clubs, youth groups, and chicken husbandry groups.

Chris Servheen, US Fish and Wildlife Service, suggested that eggs grown under bear-resistant conditions could be certified as bear-safe or wildlife-friendly as a means of promoting public awareness.

Dan Gibbs, Tennessee Wildlife Resources Agency, suggested that advocates could write bear-conflict prevention articles for the chicken husbandry magazines.

Laura Felicetti, Washington State University, commented that core values for hobby chicken farmers include land-oriented sustainability.

Wayne McCrory, McCrory Wildlife Services, commented that many chicken farmers think they cannot afford the electric fence materials, and, don't feel like they enough time or expertise to install the fences. Farmers often wait till they lose their first flock. McCrory has found that, if bear proofing is voluntary, half of the people will do it and half won't. He recommends that local governments issue mandates and by-laws about chickens and bears.

Rebecca Zwicker, Cheyenne Mountain Zoo, said that her zoo offers visitors a "chicken feeding experience." Interpreting this experience offers an opportunity to get the message out about bear conflicts and prevention.

Bill Terrill, Murdoch's ranch and home store, said that the Missoula store sold 4,000 to 5,000 chickens this year. He'd like to post a photo of a grizzly eating a chicken above the chicken feed, but thinks the store owners might resist the idea. However, he might be able to parlay the display into increased electric fencing sales. He asked biologists to work with chicken vendors to offer bear conflict solutions.

Courtney Hughes, University of Alberta, added that values are indeed measurable and that once bear managers understand hobby farmer values, they can design a message and media that are most effective.

Gillian Sanders, North Kootenay Lake Bear Smart Program, commented that most “back to the land” chicken farmers are connected with local food system networks. Such networks would make highly effective targets for outreach.

Elizabeth Manning, Alaska Department of Fish and Game, commented that she has worked with local chicken farmers to present an electric fencing workshop. Manning feels that chicken farmers accept the value that sustainability equals responsibility. However, she has heard from people that the cost of buying and installing an electric fence is a barrier.

Chuck Jonkel, Great Bear Foundation, suggested that the group focus on the much bigger and more immediate conservation concern, the rising human population (seven billion and counting). The overpopulation will cause far more severe consequences for bears than chickens.

Tim Manley, Montana Fish, Wildlife and Parks, added that bear managers may have access to bear conflict prevention funding from wildlife advocacy group such as Defenders of Wildlife. In Manley’s experience, people may want to do the right thing, but they don’t think they have the ability or expertise. He doesn’t think electric fencing will catch on unless they get help with installation. Perhaps local eagle scouts could help with installation.

Reed Kuennen, US Forest Service, said that most people don’t make the connection between their actions and the eventual death of a food-conditioned bear. Masterson agreed, saying that people must understand that their actions have consequences.

Danny Gammons, National Park Service, asked the panelists how they would convince visitors that food-conditioned bears must be lethally removed. Masterson suggested that managers explain that leaving aggressive bears is bad for the entire bear population. Managers need to harness people’s positive passions in a productive way, for good of all bears.

The panelists closed with a few admonitions for the workshop participants. Make friends with the media. Don’t let agency public relations people make all the media contacts. Show the media and the public what you want them to understand, don’t just tell them.

SESSION 7: RISK AND LIABILITY

MODERATOR

John Hechtel, Safety in Bear Country Society

CONTRIBUTORS

Kevin Saxby, Alaska Attorney General’s Office - “US case law and implications”

Most civil liability depends on state law, though some generalities apply to all states. Even on federal lands, most cases will rely on state laws to determine whether harm has occurred. Most suits regarding wild animals are based on claims of negligence. Most often, claims of negligence are based on failure to exercise the standard of care that a reasonably prudent person would have exercised in that same situation.

In order to assess liability under negligence theory, the plaintiff must be able prove four elements:

1. The existence of a duty by the person being sued to the person who is doing the suing; and
2. That the duty was breached; and
3. That the breach caused injury (i.e., but for the breach, no harm would have occurred); and
4. That the existing damages are harm (the typical damages are monetary, as is the typical remedy).

Saxby reviewed “Julie Carlson and James Carlson v. State Of Alaska,” a bear mauling case from the late 1970’s in which the State of Alaska was found negligent. The attack occurred at a roadside turnout near Valdez. The Department of Transportation (DOT) provided outhouses and garbage cans at the turnout. The garbage cans were emptied until October when Alaska winters begin. However, turnout users continued to pile garbage into and around the cans after October. Julie and James Carlson pulled into the turnout on an evening after the DOT had stopped maintaining the site, and they were attacked by a bear that had been foraging in the garbage. At issue was whether the State of Alaska could be held liable for personal injuries inflicted by a bear, when the bear was attracted to the site by garbage that had accumulated on state-owned property. The State argued that the decision to cease picking up garbage was a policy-level decision and therefore they weren’t liable because of “sovereign immunity.” The Alaska Supreme Court disagreed, saying that the decision to cease maintenance of the site was not a planning or policy-level decision, but rather an operational decision and that the state knew that brown bears could be foraging in the garbage.

The principle of governmental or sovereign immunity applies to a greater or lesser extent in most states and in the federal government. To determine whether sovereign immunity applies, it must be established whether the case is dealing with a policy decision or whether it turns on an implementation of policy. Generally, policy-level decisions are immune while the implementation of that policy is not.

It behooves natural resource managers to preserve the ability to argue, in any case, that their actions are based on policy-level decisions. Courts will look for the hallmarks such as whether a policy document specifically allows discretion by on-the-ground managers, so that any operational decisions will look like policy. Conversely, one of the hallmarks of a “ministerial” or implementation decision is the lack of discretion.

The following issues need to be considered to avoid potential liability. It is a breach of duty if an employee does not follow a statute or regulation. This is considered “negligence per se” because it doesn’t require proof to show negligence. In addition, if it can be proven that the State knows of an existing known hazard, then the state may have a duty to act, as in the Carlson case. If an attack does not occur on State land, it is less likely that a duty will be found. It is also more difficult to prove negligence when the plaintiff claims only economic loss and not bodily harm.

The same general principles apply to the federal government. Through case law, the Ninth Circuit Court of Appeals would ask, was the government’s decision to act or its failure to act a matter of choice? If yes, was the decision grounded in social, economic, or political policy? In both state and federal contexts, it is prudent to delegate the discretion to act to the lowest reasonable pay level in order to maintain the argument that discretion was being exercised.

Two federal cases illustrate this point. In *Rubenstein v. United States*, a grizzly in Yellowstone attacked a man. The plaintiff claimed that, despite being given brochures about proper conduct around wildlife and bears, a ranger assured him that he was safe from bear attacks. The plaintiff could not produce the ranger who said this. The court found for the government, saying that a reasonable person would have understood the risk of generalized danger. In *Claypool v. United States*, the plaintiff arrived at Old Faithful campground to camp. He asked the rangers if there had been any recent bear problems, and the rangers said no, despite the fact that there had been an attack in the campground the night before. The court found for the plaintiff, saying that government knew of a specific danger and did not warn the plaintiff.

Barry Benkendorf, Attorney for Parks Canada - “A Canadian perspective on liability”

Benkendorf remarked that Canadian law regarding negligence is quite similar to American law. The Crown can be sued only under the Crown Liability and Proceedings Act. Just as in the US, Tort law has the

same four elements that must be proven. However, an additional factor is the Occupier Liability Act that stipulates that occupiers of the land have the duty to make visitors to the land reasonably safe. Benkendorf used two mauling cases to illustrate these points.

In 1980, a plaintiff was mauled in Banff. The Park had just closed the dump where grizzlies had gathered, but had not secured garbage in the townsite. The bears began using a particular trail to access the garbage in town, and the trail became dangerous. On August 24, two people were attacked and one was killed. Rangers closed the trail and shot a bear, but they weren't sure if they had the right bear. Nevertheless, the rangers opened the trail four days later and the plaintiff was attacked three days after that. The court, using the Crown Liability Act and the Occupier Liability Act, found the Crown liable for two actions: not properly managing bears' access to garbage, and not knowing if they'd killed the offending bear before they reopened the trail to the public.

In 1995, two young Australian men visited Lake Louise. On their way there, they stopped at the Calgary library and read Parks Canada literature about grizzlies. The two men drove through the park gate and were given warning pamphlets about bears and saw warning signs at the kiosk. They were specifically told to not leave attractants in their tent. On September 25, a grizzly attacked the men's tent and two other tents, leaving six people injured.

Prior to the September 25 attack, Parks Canada investigated several other conflict encounters with bears. On September 5, a black bear destroyed property in an adjacent campground and was hazed away by rubber bullets. On September 20, a grizzly and cub were licking grease from a barbeque in a nearby housing development. On September 21, a bear knocked over gray-water barrels at a resort, and chased a biker at a nearby campground. On September 22nd, two grizzly bears ripped a tent in the campground where the September 25th attack would later occur, though they received no food reward.

The plaintiff argued that Parks Canada "owed them a duty to see that the Lake Louise Campground was 'reasonably safe' for them to use and that it was not reasonably safe (Brodie v. Canada 2010 ABQB 678, [36]⁸). The expert for the plaintiffs argued that in light of the prior incidents and the elevated risk evidenced by the series of incidents prior to the attack, Parks Canada should have at least posted better, more specific warnings at the campground, should have considered declaring a problem bear situation, or should have considered closing the campground where the grizzlies ripped the tent. The campground rangers had posted a sign at the campground about a bear in the area (BEAR IN AREA: TRAVEL WITH CAUTION) and warned campers specifically not to have any food in their tent. However, the rangers did not give the public specific information about the prior incidents, or the fact that two grizzlies had torn a tent there on the 22nd.

The expert for the defense said that the incidents leading up to the attacks were not unusual; however, the attack was very unusual. Even the plaintiff's expert agreed that the attacks were unusual. When the judge ruled whether there was a duty owed to give a more detailed warning, he found that the Crown was only responsible for reasonably foreseeable future, and since both expert witnesses established that the attack was unusual, it was deemed unforeseeable. In effect, the court said that the owner of property is not a guarantor of safety, but is only obliged to warn of foreseeable risks. The case was further complicated by the presence in the area of two different groups of bears fitting the profile of the attacking bear, each with a radio-collared female. These groups included problem bears that had been translocated to the Alberta border by British Columbia. Parks Canada didn't know about these marked bears. Despite examination of DNA from the bears and at the site of the attack, the plaintiff couldn't establish that either of these translocated sets of bears made the attack. The case was dismissed because

⁸ Brodie v. Canada 2010 ABQB 678, [36] is posted at <http://www.cfc.umn.edu/humanbearconflicts/presentations.html>

the court found that Parks Canada performed their duty reasonably and that the attack was not foreseeable.

The defense reconstructed what was in the mind of the bear managers prior to the attack, what they felt was significant, and what they thought might happen. It is easy to reconstruct a logical progression of events if one uses hindsight, but it is not a realistic assessment of past decisions. Regarding the adequacy of warnings, it is okay to give only general warnings when the circumstances of prior incidents don't reasonably lead managers to believe that danger is imminent in a specific place or by a specific bear.

Benkendorf encouraged bear managers to make sure they keep good notes of decisions about an event. The best defense is proper management of bears instructed by science. Managers should analyze each situation as it occurs, and not allow themselves or the public to become complacent.

Allen K. Young, Attorney - "The 2007 Utah bear attack lawsuit: the plaintiffs' perspective"

Late at night on, June 17, 2007, in American Fork Canyon, 11-year-old Sam Ives was dragged from his family's tent and killed by a black bear. Earlier that morning, at the same campsite occupied by Sam and his family, a bear had opened coolers, found food, slashed through a camper's tent, and struck another camper in the head several times before being chased off. Sam's family had no knowledge of the earlier bear encounter at that same campsite approximately twelve hours before their arrival.

Sam's biological family sued the United States under the Federal Tort Claims Act. Specifically, the Plaintiffs alleged that Forest Service employees were aware of the presence of a dangerous bear in the area and negligently failed to (1) warn campers of the presence of a dangerous bear; or (2) close the remote campsite. In the end, \$1.95 million was awarded to plaintiffs.

Young echoed Saxby's definition of the four-prong test for negligence, and the issue of discretion to act vs. policy-level decisions. Discretion is hard to define, and the test is whether that decision involves a public policy. In the Sam Ives case, Judge Kimball ruled that decision to warn people of the earlier attack was not a discretionary function but an emergency that required reasonable action by the U.S. Forest Service employee involved. Specific regulations required the federal officer to act and she did not.

Young read from Kevan Francis and Rebecca Ives v. United States of America, United States District Court for the District of Utah Central Division, Case 2:08-cv-00244-DAK-PMW, May 3, 2011. On June 16, 2007, Jake Francom and friends camped in a dispersed camping area in the Uintah National Forest approximately 1.2 miles above the U.S. Forest Service Timpooneke Campground. The US Forest Service was responsible for managing Timpooneke Road 056 and the campsites along that road. Early in the morning on June 17, 2007, Jake Francom was attacked by a bear while sleeping in his tent. Mr. Francom was sleeping against one side of his tent, and he awoke to a bear striking his head from outside the tent. Then, when Mr. Francom sat up, the bear's claw pushed him down again, and the bear's paw slashed the tent. The bear also took his pillow from the tent and slashed the pillow.

Francom and his friends noticed that the bear had raided and damaged the coolers around the camp. Francom did not have food or drink in his tent. Francom reported the bear attack to Utah County Dispatch at 9:25 am that morning. The dispatcher told Francom that she would notify the Forest Service and that Francom would also need to call the highway patrol to notify the Utah Division of Wildlife Resources (DWR). Francom called the highway patrol, and the DWR was notified of the incident. The dispatcher reported the incident to US Forest Service law enforcement officer (LEO), Carolyn Gosse at her home at 9:44 a.m. The dispatcher told Ms. Gosse about Francom's phone call and gave her Francom's phone number. LEO Gosse said that she would let her district know. Gosse also stated that she was not on duty and couldn't respond herself. She did not contact anyone or take any action. Consequently, no one else employed by the Forest Service knew about the incident, and, as a result, no action was taken to warn potential campers about the bear attack.

LEO Gosse was terminated for failure to follow U.S. Forest Service regulations:

- “The employee must remain on or return to duty not because of personal preference, but because of compelling reasons to continue the employee’s duties when failure to carry on such duties would constitute negligence.”
- “LEO’s will investigate all accidents that involve the Forest Service and result in death, injury, illness, and/or property damage.”

At approximately 10:00 am, the DWR classified the bear that attacked Mr. Francom as a Level III nuisance bear. The DWR looked for the bear for about 5 hours and were unsuccessful. There was no one at the campsite when DWR ended the search, and DWR staff did not think that anyone would camp at that site that evening because it was already 5:00 p.m. on a Sunday.

During the trial, the Uintah National Forest Supervisor, Gosse’s immediate supervisor, lived near the campground in Heber City. He was on duty on June 17. The Forest Supervisor testified that, if Gosse had told him about the Francom bear attack, he would have immediately responded by going to the area and warning campers in and around the Francom campsite (as well as people in the Timpooneke Campground) about the dangerous bear. He would also have contacted the Forest Service District Ranger.

Sam Ivey’s family (the Mulveys) passed through Timpooneke Campground on their way to the campsite. They stopped and spoke with the Timpooneke Campground host. The host had not been informed of the Francom attack at the time he spoke with Sam Ives’ family, and therefore he did not inform them about the bear.

After dinner, the Mulvey family cleaned the campsite, placed their coolers and garbage in their vehicle, and went to bed in a single tent. The tent had two "rooms." About two hours later, Sam Ives was pulled from his tent and killed. All personnel involved in the investigation, thought that bear that attacked Sam Ives was the same one that attacked Jake Francom the day before.

The federal government’s defense was that Gosse’s decision not to act was a discretionary function. Therefore, it was the U.S. Forest Service’ breach of duty that contributed to Sam’s death. Young said that courts looked at the facts of the case. In this case, the government had a duty to act and did nothing. However, Judge Kimball was careful to note that the circumstances of every case are different:

“The court notes that this finding of a duty and a breach of the duty is limited to the unique facts presented in this case. The court makes no ruling on whether a duty to warn would arise or be breached in a slightly different situation, such as if the campers had been at a nearby-but not the same--campsite as the earlier bear attack or if the campers had camped at the site several days after an aggressive bear encounter. The ruling here is limited to a situation where (1) there had been an aggressive bear encounter at the identical site where Plaintiffs set up camp; (2) the encounter had been approximately twelve hours before Plaintiffs arrived; and (3) it would not have been onerous for Defendant to have warned Plaintiffs about the earlier attack (i.e., campers heading to the dispersed sites had to travel through the designated campground check-in point; there was a gate to which a sign could have been posted; a sign could have been posted at the campsite itself; or the campsite could have been roped or taped off).

Young provided the moderator with a copy of the decision. He also offered the following “Sam Alert” to remind bear and resource managers of their duty to warn when public safety is threatened.

“When it has been determined by the appropriate state and federal agencies that a bear has been deemed a threat to public safety and therefore must be destroyed or relocated, then the responsible agencies must notify the users of the public lands that might be in jeopardy by written

and/or direct oral warning to users. The Notice should advise users of the event or events which required the agency action as well as the general location of that bear's activity which caused it to be deemed a threat to public safety."

Young also offered a Sam Alert flyer to the participants. He said that if the U.S. Forest Service had Sam Alerts, Sam Ives would be alive today.

DISCUSSION

Chris Smith, Wildlife Management Institute, posed the following scenario to the panelists: Party "A" deliberately feeds or negligently leaves food available on his property, thereby food-conditioning some bears. One of these bears visits the private property of Party "B" and either injures someone or damages his property while seeking food. Does Party B have the basis for claim? In addition, does the case change if the state has a regulation prohibiting the feeding of wildlife?

Young responded that he'd love to represent Party B. Party B may well have a claim against Party A and a no-feeding regulation might be prima facie proof that Party A was negligent.

Saxby said that Alaska has a statute that prohibits intentional or negligent feeding of wildlife. He concurs with Young that a claim of negligence could be made.

Larry Lewis, Alaska Department of Fish and Game, asked the panelists whether a field manager's decision to haze as opposed to lethally remove a bear would be considered discretionary, thereby avoiding liability.

Saxby cited a common law rule. In general, people don't have a duty to rescue someone; however, once a person begins a rescue they become responsible to do so in a reasonable manner. When a field manager or officer hazes a bear, they are precluding others from acting and are directing events. They are assuming more liability and may have to prove they acted as a reasonable person in this situation. This illustrates the necessity for agencies to give discretion to field managers to make the call as to whether to haze or kill a bear. If a field manager is mandated by policy to merely haze a bear and it later causes injury or damage, then the agency assumes liability and could be successfully sued. Conversely, if an agency asks field managers to "use your best judgment," they are more likely to avoid liability.

According to Young, had the LEO in the Sam Ives case gone to the campground and discussed the bear with DWR staff, and had they concluded that it was reasonable to do nothing more, the U.S. Forest Service could have avoided liability.

Benkendorf said the concept of policy-level vs. discretionary decision-making is very high in Canada. For example, policy can mean budget resources, access to resources, etc., so that, in effect, most decisions are operational. It is always better for field managers to have discretion to act, and it is good to contact an expert if you're not sure.

Chuck Bartlebaugh, Center for Wildlife Information, described Lynn Rogers, retired US Forest Service employ, who publicly walks with, kisses and hand-feeds bears. He asked if Rogers could be held liable for the actions of food-conditioned bears.

Saxby replied that Rogers is culpable under no wildlife-feeding laws in the states where the act of feeding occurs. On the other hand, public displays of bear feeding might color a potential jury pool about the realities of the dangers. Increasingly, society is getting different messages about the dangers of bears.

Marci Johnson, National Park Service, is trying to get subsistence anglers to put electric fencing around their fish-drying racks. The National Park Service is worried that loaning out electric fencing may make

the government liable for injuries resulting from the use or misuse of the fencing. She asked the panelists for their opinion on this but since none of them is a federal solicitor, they declined to answer.

Mike Orlando, Florida Fish and Wildlife, posed another situation to the panelists: if a waste management company has been warned by the state that they have not adequately secured their dumpsters, and someone is subsequently hurt by a bear, are the waste companies liable?

Saxby replied that it depends on the facts and state laws. If there is a requirement that the state respond to potential sites for human-bear conflicts, then the state could share liability. However, most of the liability would go to the entity that left the garbage out.

Kraig Glazier, USDA-APHIS-Wildlife Services, asked the panelists if a relocated bear returns to damage property, or to physically harm a person, does the agency assume responsibility for the actions of that animal.

Saxby said there is no hard and fast answer to this question. The case would depend on minor facts, and the biases of a particular judge. So yes, there may be an increase in potential liability when the state relocates or translocates a bear. The state's counter argument would be that, weighing all the factors available to a manager at the time, the manager chose the most remote area possible for the relocation. It would also depend on whether the decision to relocate was a discretionary or policy-level decision. If you lose that battle, then you must explain how you were acting reasonably.

Benkendorf said that in the 1995 case, British Columbia was originally a defendant but that case was discontinued. Potentially, British Columbia could have been found liable if it could be proven that the mauling was foreseeable, i.e., that the bears would look for human food again.

Young agreed with Benkendorf that liability in this case, turns on the foreseeability question.

PRESENTATION: TASER ELECTRONIC CONTROL DEVICES FOR WILDLIFE MANAGEMENT; HISTORY, CASE SERIES AND RESEARCH

PRESENTERS

Larry Lewis, Alaska Department of Fish & Game

Phil Mooney, Alaska Department of Fish & Game

Lewis described the Kenai Peninsula as a place with urban, suburban and wilderness wildlife management issues. Natural resource agency and public safety officers are expected to respond to calls involving human-wildlife conflicts. Responses may include capturing, hazing or otherwise altering an animal's behavior by the safest, most effective and expedient method available. There are many aspects to consider related to controlling animals: concern for human safety, concern for the welfare of an animal, policies, regulations and statutes, public and professional perception, the balance of cost to benefit, and the availability of tools to use immediately in an emergent situation.

In 2005, Lewis and an enforcement officer were called to a construction site where a cow moose had become separated from her calves by an enclosed basement wall. When Lewis attempted to return the calves to their mother, the cow aggressively chased him and the officer. The officer Tasered the cow and she ran off while Lewis released the calves. The cow cautiously returned to retrieve her calves and was observed to be with them and feeding in the area over the course of several days. After that Lewis began researching the use of Tasers for wildlife conflict management.

Electronic Control Devices (ECDs) are designed to use propelled wires or direct contact to conduct energy to affect the sensory and/or motor functions of the nervous system. ECDs have a “zone of capture” that is the area in between the probes where nerves are stimulated. All of the muscles controlled by nerves in this area will be affected. It also stimulates peripheral sensory nerves that cause pain while the shock is being delivered, but all of these effects end when the device is shut off and the electrical charge ceases to be delivered.

Lewis worked with engineers at Taser to develop a wildlife-specific handheld device, the Taser X3W. The Taser X3W holds three cartridges for three individually delivered shots. The unit is water resistant, and is capable of a loud and visible warning arc. It can be user-programmed for hands-free use with delays of 5, 30 or 60 seconds. It is designed for use up to a 35-foot range. It comes with a dual setting for different-sized animals. On the large animal setting (animals weighing from 100 lbs upward), the amperage is .0035 amperes delivered at 29 pulses per second, on Standard setting (animals weighing between 40 and 150 lbs) the amperage is the same but delivered at 19 pulses per second.

Voltage is the pressure that pushes electrons through a conductor and voltage is typically higher when delivered via a conductor whose resistance is high. Everyday static shocks regularly exceed 30,000 volts, yet they deliver very low amounts of electric charge or amperage. High amperage causes harm, not high voltage. A 110 volt outlet delivers 16 amps and could kill a human if they are connected long enough. In comparison, the Taser X3W delivers 0.0035 amps.

There are more than 400 lab studies, and over 4,000 field studies about the effects of ECDs on humans. There have been over a million training exposures with no mortality. There are no reported observations of mortality in wildlife research and field uses. Changes such as pH, lactate, temperature, heart rate, and blood pressure in humans are less than or the same as changes due to struggling or running. Similar results are expected in the animal model, however this has not been widely tested and research is ongoing. Wildlife exposures longer than 60 seconds are currently not recommended.

ECDs have been tested on animals as large as adult Alaskan moose and brown bears. Phil Mooney and Lewis have found that, as of January 2012, all of the devices tested are 100% successful in causing highly food-conditioned, human-habituated bears to avoid sites such as waste-transfer stations and fish hatcheries when systematically applied as an aversive conditioning technique.

ECD technology may provide a new, alternative method of capture and control for situations that only require a quick fix, or for a situation that may require euthanizing an animal after examination. ECD technology will help responders by providing them an additional tool to use. Lewis reviewed video and photos of different situations he had used the ECDs for hazing and aversive conditioning. In addition, ECDs help maintain human safety when dealing with captive or free-ranging wildlife, or while radio tracking and engaging in other field activities.

Recently Alaska Department of Fish and Game researchers drafted a moose/ECD research paper. A brown bear/ECD behavioral study paper has been submitted for a peer-reviewed publication. The University of Alaska Fairbanks Institutional Animal Care and Use Committee (IACUC) is reviewing a research proposal to study the physiological/stress effects of ECD vs. drug-induced capture on ungulates. In addition, there is ongoing field use and data collection.

Lewis and Mooney, Alaska Dept. of Fish & Game, along with co-researchers from TASER International, tried using ECDs for the hazing and aversive conditioning of highly human habituated, food-conditioned bears at Port Armstrong, a fish hatchery on the south end of Baronof Island. Though electric fencing is utilized extensively at the hatchery, brown bears had found ways to go after the rich hatchery fish food. Mooney and Lewis’s objective was to teach bears to go below the weir and other easily identifiable

peripheral boundaries not near occupied buildings. The results of their aversive conditioning with Tasers were so successful that the hatchery manager wrote a testimonial.

SESSION 8: INTERNATIONAL PERSPECTIVES ON HUMAN-BEAR CONFLICTS

MODERATOR

Sandra MacDougall, Red Deer College, Alberta

CONTRIBUTORS

Gen Oshima, Picchio non-profit organization, Japan - "Human-bear conflicts of Karuizawa"

Oshima works with the nonprofit organization, Picchio, to protect Asian black bears around the town of Karuizawa. Karuizawa is in the middle of the main island of Japan next to a forested national park and wildlife protected area.

Prior to 2000, bears scavenged in the garbage throughout the town of Karuizawa. The high number of bear sightings and garbage scavenging incidents stimulated the formation of Picchio. Their organization teamed with town administrators to resolve the human-bear conflicts. They developed several tools to support co-existence with bears, including bear-resistant dumpsters, electric fence, and education.

Since its inception, Picchio has kept track of bears, charting their characteristics, survival rate, births, etc. Some bears were radio-collared, and Picchio has tracked 87 bears so far. When a bear is captured, their conflict behavior is evaluated and they are assigned a "friction criteria" level. If the bear is a risk to human safety, they are removed. Picchio divided the urban, suburban, agricultural and forest areas into zones with tiered levels of acceptance for bears. For example, in one zone, bears will not be hazed if they only visit at night. In another zone, all bears are hazed away. Compared to North American black bears, Asian black bears are shy; it is unusual to see them during the day. Using firearms at night is against Japanese law, so hazing with firearms at night is not an option. In 2003, Wind River Bear Institute's Carrie Hunt trained Picchio members to haze bears with Karelian bear dogs.

By 2007, there were 129 incidences of bears scavenging in garbage in the urban zone. In 2011, all bears were excluded from the urban zone and no incidences of garbage scavenging were reported. Oshima said their success was due to the use of bear-resistant dumpsters and hazing by Karelian bear dogs.

Femke Koopmans, World Wildlife Fund – "Monsters of God or living in harmony with nature-- another challenge to conservation success"

Koopmans gave an overview of human-wildlife conflicts addressed by the World Wildlife Fund (WWF). For many species the number of human-wildlife conflicts is increasing due to expanding human activity and associated habitat loss, and in some cases increasing wildlife numbers.

Throughout their distribution, polar bears are coming onshore more often due to shrinking sea ice and shorter winter seasons. Onshore, they are attracted by waste dumps and human foods close to human settlements. The encounters between people and bears can result in conflicts in which people are killed or injured, property is damaged, or polar bears are killed.

Local residents become alarmed at the rising number of conflicts and their commitment to conservation of large predators such as the polar bear may eventually be reduced. WWF focuses many of their conservation activities on maintaining or increasing local residents' support for the conservation of endangered, but trouble-causing species. Mitigation of human-wildlife conflicts is a social and moral responsibility.

Examples of polar bear conflict mitigation measures include support of “umky patrols” in Chukotka, Russia. The patrols work to ensure the safety of people in their villages. For example, in villages near walrus haulouts, it is important to reduce the number of walrus stampedes. When walrus stampede from beaches into the water, dead or injured walrus are left behind. The dead and injured walrus attract polar bears, causing nearby villagers to feel threatened. The umky patrols remove walrus carcasses and deter polar bears from villages, and help with the monitoring of bears and the education of residents. WWF is also working in Nunavut, Canada, to help local residents obtain bear-resistant containers and fencing. WWF has supported communication between Inuit people from Nunavut and the umky patrollers from Chukotka.

Although the efforts of WWF and other organizations seem effective, there are some needs. At this time there is no circumpolar overview of best practices which would facilitate systematic sharing of experiences across the Arctic. This communication would lead to better monitoring of conflicts and to increased effectiveness of intervention strategies.

Koopmans and WWF are convinced that conservationists can learn from wildlife conflict mitigation strategies for other species. They hope to support better communication between wildlife-conflict managers. Conflicts with potentially dangerous animals are complex; if we protect dangerous animals, we have to take responsibility for people who live near these animals.

Harri Norberg, Finnish Wildlife Agency - “Bear issues in Finland”

In the northern parts of Finland, Sweden and Norway, herders own almost 700,000 reindeer. Biologists estimate that about 5,000 brown bears roam these Nordic countries (mainly in Sweden and Finland as there are only about 200 bears in Norway), but it is not known exactly how many of these bears roam the same country as the herders. In Finland, the current brown bear estimate in the reindeer management area is about 300 individuals, and thus the main part of the population is situated in the eastern and central parts of Finland, south of the reindeer management area.

In 1993, the Finnish spring bear hunt was closed and the population grew. The Finnish population of brown bears has grown about four-fold in the past 20 years, from 400 or 500 to the current estimate of 1,700 (including cubs of the year). About 30% of the bears that live in Finland in the summer will den in Russia during the winter. Currently, bears are hunted based on a license system, which takes into account the maximum allowed quota per management area. Last year, hunters harvested 196 bears.

In 2007, a revised management plan set down the principles and measures by which the Ministry of Agriculture and Forestry manages the developing brown bear population. The plan’s goal is to maintain the population at a favorable conservation status. The plan will be updated within a couple years by the Finnish Wildlife Agency.

The main sources of human-bear conflicts are damage to livestock, including reindeer (mainly reindeer calves), sheep and bees. To a lesser extent, crop damage is also an issue. Food-conditioning and habituation are not common, even though there are indications that more bears being attracted by the garbage. However, some residents and wildlife-tourism entrepreneurs continue to feed bears for the purpose of photography. Visitors come from all over the world to see aggregations of up to 30 bears. Reindeer herders are concerned about the photography-feeding sites because they draw bears in large numbers. Currently, most of these sites are located south of the reindeer-herding area. Last year a food-conditioned bear at a feeding site was lethally removed because it became aggressive with the person who was feeding the bears.

As means to protect beehives and sheep from bears, electric fences have been used with good success. In addition, local hunters use dogs such as Karelian bear dogs to haze bears.

Robin Rigg, Slovak Wildlife Society – “Experiences with human-bear conflicts in the Carpathian Mountains of Slovakia”

Slovakia is a densely populated country of about 5.4 million people (110 humans/km²). Though the country maintains about 40% forest cover, there are 400,000 sheep, 500,000 cattle, and arable farming.

The Slovakian brown bear population has been increasing. In the 1930s, some authors thought there were less than 20 brown bears left in Slovakia. Then bear hunting was banned and remained closed for 30 years while the population expanded. Currently, managers estimate the population at 800 or 900 bears. Most of the bears live in the central area of Slovakia, with an additional disconnected population in the eastern Carpathian Mountains.

Most conflict bears target sheep, bees and crops. While there is a perception that bear-caused damages are increasing, the available data contradict this view. There have been no fatal maulings in approximately 100 years; however, there have been human-bear encounters that ended in human injury. People are largely ignorant of bear safety precautions.

Since the 1960s, the government bear-management policy has had two focuses, population control through trophy hunting, and compensation for damage. Legal hunting accounted for 72% of known mortality in 1994-2006. However, legal hunting take is probably below the maximum sustainable yield, estimated at 8.5% of population or about 70 individuals per year. Hunting take has been declining recently. Some possible causes include a perception among bear hunters that the regulations are too strict to allow for hunting success. The growing numbers of bears is controversial.

The non-profit Slovak Wildlife Society has two guiding principles: promote science-based management, and work directly with people to mitigate conflicts. The Society worked for five years to promote the use of livestock guarding dogs among shepherds. Program analyses revealed predations were reduced by 70% at the farms where the dogs were used properly. The Society also promotes attractant management through use of bear-resistant containers and electric fencing. The Slovak Wildlife Society also offers ecotourism opportunities for people to view bears.

Their greatest difficulty has been convincing government officials to use the conflict prevention measures. Their greatest need is to increase the scale of human-bear conflict interventions. They are currently sponsoring public meetings and workshops in local communities.

John Beecham, International Association of Bear Research and Management, “An Introduction to the IUCN Bear Specialist Group Human-Bear Conflict Expert Team”

Beecham, of the International Association for Bear Research and Management (IBA), is chair of the International Union for Conservation of Nature’s (IUCN) Human-Bear Conflict Expert Team (HBCET). The HBCET is composed of bear experts and social scientists from all geographical regions where bear conflicts are prevalent. The mission of the HBCET is to promote the conservation of all bear species by providing technical assistance and information to government agencies, NGOs and individuals working to reduce human-bear conflicts. Their primary goals are to 1) promote an understanding of the fundamental causes of human-bear conflicts by bear species, type of conflict, and area of occurrence; 2) provide site-specific, interdisciplinary, science-based solutions that will minimize economic losses, human injuries and fatalities, and consequent retributions against bears; 3) promote individual, community, non-governmental and governmental support for proactive methods to reduce human-bear conflicts, while balancing the needs of both bears and people; 4) share their knowledge of human-bear conflicts with affected stakeholders and governments regarding socio-economic, biological, cultural and political factors influencing the successful reduction of human-bear conflicts; 5) promote responsible stewardship of habitat shared by bears and people; and 6) promote high quality research on innovative solutions for reducing human-bear conflicts, within the Bear Specialist Group Species Expert Teams.

HBCET has several current and ongoing projects. The team recently submitted the document “Principles of Human-Bear Conflict” to the Bear Specialist Group Coordinating Team for their approval. In addition, they are designing human-bear conflicts web page for the IUCN Bear Specialist Group website. In recognition of the controversies surrounding diversionary feeding, the HBCET is producing a white paper and literature review. The paper will offer recommendations on the benefits and costs associated with feeding programs designed to reduce conflicts with bears.

One of HBCET’s chief accomplishments has been to define human-bear conflicts so that professionals have a common starting point for discussions. A human-bear conflict is any situation where wild bears use (undesirably) or damage human property, wild bears harm people, or people perceive bears are a direct threat to their property or safety.

The HBCET promotes strategies for resolving human-bear conflicts. The strategies should strive to reduce conflicts to socially acceptable levels, while simultaneously ensuring that bear populations do not decline below sustainable levels over time. The team underscores the necessity to resolve human-bear conflicts based on scientifically informed management of bear populations, responsible stewardship of habitat, and ethical and humane approaches.

DISCUSSION

Georg Ziegltrum, Washington Forest Protection Association, asked Norberg how Finnish biologists estimate bear density. Norberg said that biologists use a combination of hunter observations and trained citizen observation. They also use a technique based on the number and size of litters over time. All observations are recorded in a web-based GIS-system, wherefrom different observations on litters and individuals with different size paws can be distinguished so that the same individuals / litters are not counted several times.

Agnes Pelletier, Trent University, asked Rigg if the Slovak Wildlife Society has gone to the European Union for help in convincing the Slovakian government to prevent human-bear conflicts. Rigg said that the Society’s efforts have mostly been at the grassroots level, working with local farmers and communities.

Mike Madel, Montana Fish, Wildlife and Parks, asked Norberg and Rigg how they used carcasses for feeding, and whether conflicts increased as a result.

Norberg said that it is illegal to use carcasses for hunting in Finland, though they can be used for photography and bear viewing. While there is no record of increasing human-bear conflicts due to feeding (at remote sites), one bear was removed last year at a photographic feeding site.

Rigg said that bear hunting is traditionally done over bait in Slovakia. In the past, bait site owners used livestock carcasses, but since the year 2000 regulations have limited them to plant matter.

Brian Peterson, Bear Smart Durango, asked Rigg how the Slovak Wildlife Society convinced an apartment complex to fence their garbage cans. Rigg said that it was a question of finding and working with the right people – the apartment manager wasn’t helpful, but the community mayor was. The Society paid most of the costs for the cage construction.

SESSION 9: WORKING WITH DIFFERENT CONSTITUENCIES

MODERATOR

Craig Perham, US Fish and Wildlife Service

CONTRIBUTORS

Mike Pederson, Department of Wildlife Management, North Slope Borough - “North Slope community perspectives of bear human interactions”

The Inupiat People of the North Slope Borough (NSB) have co-existed with polar bears for thousands of years. Nowadays, the NSB constituencies include subsistence hunters, transient workers, teachers, tourists and local residents from a variety of cultures. It doesn't matter when a polar bear is sighted, people will come out to view it.

NSB's effectiveness for reducing human-bear conflicts include the polar bear deterrence program (bear patrols), reduction/elimination of attractants, and effective public outreach and education. NSB staff try to educate people who are not familiar with polar bear behavior and safe behavior around polar bears. The Borough police assist the NSB polar bear patrollers with crowd and traffic control. In villages other than Barrow, police generally respond to bear calls from 8 am-5 pm. They are usually the first on the scene and cooperate with polar bear patrollers to successfully deter or haze the bears.

North Slope subsistence hunters are allowed to harvest polar bears under the Marine Mammal Protection Act. Inupiat of the North Slope of Alaska have harvested polar bears for thousands of years for their nutritional and cultural value. Polar bears comprise a small portion of the Alaskan Native diet (1-3%). The hide, claws, and teeth are also used for making traditional handicrafts and clothing.

The NSB Wildlife Department contributes Traditional Ecological Knowledge (TEK) to government officials in charge of polar bear management. TEK has provided valuable information about abundance and distribution, habitat use, denning areas, range, health and body condition and feeding habits.

The Alaska Nanuuq Commission (ANC) is based out of Nome and is a source for TEK from the 16 Alaska Native communities that it represents. ANC is currently working on a subsistence harvest management agreement with their Russian/Chukotka partners. NSB staff are working with ANC to offer their polar bear patrol expertise and outreach materials to other communities. For the first time, ANC has sent representatives to this workshop, Ms. Rhonda Sparks, Mr. Jack Omelak and Mr. Benjamin Payenna. In the future, these people will share their expertise on human-polar bear interactions.

Subsistence hunters have an Inupiat ethic regarding the harvest of polar bears. They only take what is necessary to feed their families. Polar bears that are lethally removed are used for subsistence purposes. Culturally, polar bears have been depicted as “people in a bear hide,” and Inupiat elders teach hunters to treat the bear “as a guest” after killing it.

NSB staff are ramping up their efforts at reducing attractants near residences. A polar bear education day, sponsored in part by the World Wildlife Fund, was very successful. Cloth grocery bags were printed with local children's drawings. In addition, NSB staff have mailed brochures and developed posters. The NSB has a good record of accomplishment for minimizing interactions with people and polar bears. It is predicted that human-polar bear interactions will increase in the foreseeable future due to changes in sea ice timing and extent.

Dan Carney, Blackfeet Nation - “Experiences of a non-Native biologist working on the Blackfeet Reservation”

The Blackfeet Reservation is east of Glacier National Park, and the northern border sits on the US/Canada Border. Conifers dominate the higher part of reservation near the National Park border,

with aspens in the foothills before the land flattens out into prairie to the east. Until recently, grizzlies inhabited only the western third of the reservation. Nowadays, some grizzlies follow riparian corridors to the east even beyond the reservation boundary. Reservation residents are surprised that grizzlies are moving east into habitats they've never occupied before.

There are 10,000 residents on the reservation, most of which are tribal members. The reservation land is sovereign like any other nation and the tribal council negotiates with the US government on a nation-to-nation basis. The Blackfeet Tribal Business Council (BTBC) consists of nine members that serve staggered four-year terms. The BTBC determines fish and game regulations. Though Carney provides information to the Council, changes to the fish and game regulations can be very political.

About one-third of the reservation is private land, one-third is "allotted" to individuals though it is managed in trust by Bureau of Indian Affairs (BIA), and one-third is tribal land that is also managed by BIA. The BIA issues permits for many types of uses, and is responsible for adherence to the Endangered Species Act.

The Blackfeet Reservation residents have the same types of human-bear conflicts as other jurisdictions. Livestock depredations, particularly cows, are common and the Defenders of Wildlife will compensate the Tribe for certified grizzly predations. Bears are attracted to the carcasses of cows and horses that die of natural causes. Carney and his staff redistribute carcasses away from residences to prevent bear conflicts.

Two technicians and several game wardens help Carney manage reservation wildlife. Carney and his staff provide information and assistance to help build electric fences and deter bears. The wildlife department sells 1,200 multiple species hunting tags each year. There are only ten or twelve black bears harvested annually, which doesn't affect the population.

There is a wide spectrum of attitudes toward grizzly bears, just as in other communities. There are people who want to tolerate grizzly bears and others who want to shoot them on sight. Their attitudes are sometimes colored by cultural and religious views. Some people won't talk about bears out of respect for the animals. Carney maintains a list of requests from tribal members for bear parts from lethally removed bears.

The reservation has a food storage ordinance that makes it illegal to provide food for bears. However, the Blackfeet Solid Waste Program has a hard time maintaining the transfer dumpsters. As with other non-tribal communities, people leave garbage outside the containers and leave the lids up.

Andy McMullen, Bearwise - "Barren lands to boardrooms"

McMullen works as an independent bear education, safety and deterrent specialist in the area north of 60 degrees latitude in Canada and Alaska. McMullen focuses on educating people rather than managing bears. He serves an area with 12 indigenous cultures and languages. There are 75,000 year-round residents and many more researchers and workers during the summer months. McMullen provides education, preventative measures such as electric fences and incinerators, and deterrence training. McMullen's clients include mining companies, park agencies, hunting outfitters, subsistence hunters and gatherers, and field researchers.

After diamonds were discovered, mining companies from all over the world built camps in the far north. These temporary residents come from as far away as Australia and many of them arrive in Canada with no bear experience. Some diamond-mining camps can accommodate as many as 1,500 people. Most of the employees work shifts of only one or two weeks, making it impossible for McMullen to educate every worker. He focuses on educating the key people that can educate others.

Mining companies are McMullen's most important clients and are willing to improve their practices wherever they can. These companies were crucial for the development of Safety in Bear Country video series and they continue to be financial supporters of the Safety in Bear Country nonprofit organization. McMullen works with people to prevent property damage and avoid harming bears. He acts as a partner, not an expert. When he is called to consult on bear issues, McMullen listens to his clients' views and knowledge before sharing his ideas. Whenever possible, McMullen tries to empower his clients. He gives out free "Safety in Bear Country" videos to help disseminate education. When he installs electric fences around a camp, he mentors at least two people who are then able to help others construct fences. He often states, "With passion, conviction and a willingness to work together we can accomplish good things."

Stacy Courville, Confederated Salish and Kootenai Tribes "A Salish and Kootenai Tribal perspective on human bear conflicts"

Courville works as a wildlife biologist for the Confederated Salish and Kootenai Tribes (CSKT) on the Flathead Indian Reservation north of Missoula. The reservation was established in 1855 by the signing of the Hellgate Treaty, and is home to the Pend Oreille, Kalispell, Bitterroot Salish and Kootenai bands. The treaty effectively ceded many millions of acres of Montana, Idaho and Wyoming for 1.3 million acres centered in the Mission Valley. Mission Valley is a rural and suburban environment with a human population that is rapidly growing.

A 10-member council governs the reservation. In addition, Salish and Kootenai cultural committees guide the council and the wildlife program. These elders pass on the oral tradition, ethics and beliefs about bears and other wildlife. Courville tries to base his management decisions on these beliefs. Oral traditions tell the people that if they run into a grizzly bear, they should speak to it and tell it that they mean no harm. Then it will move away.

Some traditional "coyote" stories describe grizzly bears as the leaders of the animals before people were created. Other stories describe grizzlies as greedy and foul-tempered. Tradition has it that bears were not eaten by people. Today, some people harvest black bears, but mostly for bear grease.

Though cultural beliefs support the high tolerance for grizzly bears that exists today, times have changed since 1855. Grizzly populations are expanding in both number and range. Bears are moving down from the mountains through the riparian areas and into the agricultural lands in the valley.

Ten years ago, Courville hardly ever handled grizzly bears, in part because handling bears is disrespectful under Salish/Kootenai oral traditions. However, the grizzly population has been expanding at 3% each year, and now he spends most of his time dealing with preventing or taking care of human-bear conflicts.

With the burgeoning human population, there are new people and new issues. Grizzly bears are appearing in the daytime, getting into corn patches, and targeting commercial cherry orchards. Recently Amish people have been settling in the Valley, where they raise and butcher animals. This has caused food-conditioning among several families of grizzly bears.

DISCUSSION

Sterling Miller, National Wildlife Federation, asked Pedersen about NSB residents' feelings toward commercial polar bear hunting among the Inuvialuit in Canada. Pedersen said that prior to the enactment of the Marine Mammals Protection Act in 1972, people of the NSB rarely guided polar bear hunters, and so closure to commercial hunting didn't affect them very much. Some NSB residents have strong feelings against commercial harvest of polar bears in Canada.

SESSION 10: EFFICACY OF OUTREACH, EDUCATION AND CONFLICT PREVENTION EFFORTS

MODERATOR

Elizabeth Manning, Alaska Department of Fish and Game

CONTRIBUTORS

Seth Wilson, Blackfoot Challenge - "Building partnerships to reduce human-bear conflicts in an agricultural landscape"

Wilson acknowledged the contributions of Jamie Jonkel, Montana Fish, Wildlife and Parks, and Greg Neudecker, US Fish and Wildlife Service. The Blackfoot Challenge is made up of multiple stakeholders who live and/or work in the Blackfoot River watershed. The watershed is north of Missoula, and holds seven different communities, totaling about 2,500 people. The Blackfoot Challenge was started in the 1970s, and was formerly incorporated as nonprofit in 1993. Stakeholders include the local business community, private landowners, state agencies, corporations, conservation organizations, recreationists, federal agencies, and non-profit organizations. Some Blackfoot Challenge successes include improved weed management, improved water quality, and many conservation easements.

A hunter that was field dressing an elk was fatally mauled in 2001. At that time, the community noticed that more beehives, cattle carcass boneyards and calves were being exploited by grizzlies.

The Blackfoot Challenge has had an outreach and human-bear conflict prevention program for 10 years. The Blackfoot Challenge (led by Wilson) performed a Risk Analysis based on GIS data as its first step. Wilson used wildlife management data, verified observations, conflict histories, radio telemetry data and information from resident interviews (producer knowledge) to map conflict areas. The resulting maps helped show the residents patterns of conflicts. The systematic collection of conflict data also helped the Challenge garner funding from agencies and other nonprofit organizations.

The Blackfoot Challenge set goals for the outreach program from the bottom up. They surveyed 35 landowners in the core area with the most bear activity. The results of the survey showed that the community wanted to focus on managing human behaviors to reduce risks. The goals were to prevent conflicts, protect human safety, and protect livelihoods.

From 2003 to 2011, the Challenge implemented human-bear conflict prevention projects including beehive fences, calving areas fences, livestock carcass removal, composting facilities, and waste transfer sites. These projects were cost-shared with landowners, foundations, and public agencies. Neighbor networks were formed so that residents could share observations and news about bear activity through e-mail and phone trees. The Challenge also loans out bear-resistant trashcans and bear poles for hanging game at hunting camps.

There are several indications that the outreach projects have been successful. Grizzly bear conflicts have decreased by 96% from 2003 to 2010. Grizzly bear mortality has declined by 80% from 2003 to 2010. The grizzly bear population is increasing at approximately 3% in the Northern Continental Divide Ecosystem and grizzly observations (verified and unverified, 1990-2011) outside the recovery areas have increased. Preliminary evidence from Montana, Fish Wildlife and Parks suggests that grizzlies are using the Blackfoot Valley and having few conflicts with people. However, observations of grizzlies foraging in cereal and irrigated crops during the daylight hours are increasing, and this may be the next challenge for the residents of the watershed.

Regarding the efficacy of outreach and education, Wilson recommended that managers increase community ownership and stewardship to sustain positive changes for bear (or carnivore) populations.

Blackfoot Challenge strives to move their outreach projects beyond the “Expert Dependency Model” toward community ownership and peer education. Ultimately, coexistence with bears must be part of local culture in order to be sustainable and durable.

Jessy Coltrane, Alaska Dept. of Fish & Game - “Public opinion surveys in Anchorage to assess support for bear management program”

Coltrane has struggled with measures of success for human-bear conflict prevention. Thousands of calls regarding human-bear conflicts come to her office every summer. Coltrane does not believe that wildlife call data are valid measures of bear conflict rates. The proliferation of cell phones in part probably accounts for recent increases. A valid quantitative relationship between the number of calls and the actual rate of human-bear conflicts remains elusive.

The Municipality of Anchorage covers 1,961.1 mi² (5079 km²), larger than the state of Rhode Island. There are 500,000 acres of state park, most of it in the Chugach Mountains. The human population is 291,000, which is 2/5 of the population of Alaska. Salmon and moose draw both black and brown bears into town.

In 2008, the department launched the “Safe Neighborhoods, Wild Bears” program. With a waste management company and other partners, they loaned bear-resistant tipper carts to several high conflict neighborhoods. After the two-year program, some neighborhoods continued to use the carts. In other neighborhoods, the residents stopped using the carts.

In an effort to get at the social forces that drive the high number of calls and the variable number of defense of life and property (DLP) bear killings, the Alaska Department of Fish and Game (ADF&G) decided to repeat a human dimensions survey of public opinions about wildlife. In 1996 and 2009, the Department implemented a public survey to examine public responses to bear and moose management strategies. Responsive Management conducted the “Anchorage Resident Opinion Survey on Bear and Moose Population Levels and Management Strategies” for the Alaska Department of Fish and Game (ADFG) on both occasions. The goal was to determine Anchorage residents’ opinions about bear and moose populations, bear and moose conflicts, and the management of these populations in the Anchorage area. It is important to note that there were several maulings in the Municipality in 2008, the year before the second survey was implemented. There had been no maulings in the prior nine years. ADF&G staff wondered if the recent maulings would skew responses to the survey.

Designing the phone-based survey was a yearlong process entailing focus groups. The response rate was over 1,200, about 50% among the eligible numbers. The results of the wildlife values and knowledge of wildlife inquiries revealed that the majority of residents felt that moose and bear population issues are important, and though they had some concerns, they held generally positive attitudes toward wildlife. They thought that wildlife is an important part of community. The majority indicated that wildlife encounters, despite potential dangers, make life interesting and special.

ADF&G was interested in the social carrying capacity for bear populations. They found that most residents do not want to see wildlife populations increase; they would like to see bear and moose numbers remain the same. Overall, the residents were more tolerant of black than brown bears. The majority of residents were tolerant of black bears living in city. About half of the residents were tolerant of brown bears living in the city. Before 2006, when ADF&G released the results of a brown bear movement study to the local media, most people didn’t know that brown bears came into Anchorage.

Anchorage has large municipal parks and a huge state park with over 1,000 miles of trails. Survey respondents said they were comfortable with bears in the parks on the edge of town. The possibility of encountering moose and/or bears does not prevent the majority of residents from using trails and parks in Anchorage.

When asked to evaluate wildlife management in the Municipality of Anchorage, the respondents supported current management practices. Specifically they wanted the Department to maintain current population levels of bears, deal with “problem” bears on an individual basis, maintain or increase hunting opportunity, and restrict human access when risk is high due to bear activity. Most residents support temporary trail closures when the risk of encountering brown bears is high.

The survey respondents reported that black bear problems were more common, but only a few people reported having problems themselves. The residents overwhelmingly agreed that most problems with bears could be prevented by taking a few simple precautions. Most people support the levying of fines for not storing garbage properly, in addition to ticketing food-conditioning incidents after the fact.

The majority of residents supported legal regulated hunting in parks to control moose and bear numbers. Answers to wildlife management questions showed that, while the majority of people support hunting in the large parks, the majority opposes having wildlife authorities destroy some bears and moose yearly to reduce the populations. The large majority support having wildlife authorities destroy specific bears at their discretion when bears pose a threat to human safety.

The results of this survey have helped Coltrane support her management decisions and regulatory action. In addition, when some callers demand that ADF&G remove all the bears from the city, Coltrane tells them about the survey results supporting the presence of wildlife. These callers are surprised and at least somewhat mollified.

Steve Cain, Grand Teton National Park - “Recent examinations of bear behavior, safety, and food storage knowledge among Grand Teton National Park visitors”

Cain summarized the results of two studies, “Evaluation of the ‘Be Bear Aware’ messaging program in Grand Teton National Park (GTNP),” and “Hikers in bear country: a study of knowledge, fear, and protection motivation.” Grand Teton is part of the Greater Yellowstone Ecosystem. The park draws almost four million visitors each year.

The “Evaluation of the ‘Be Bear Aware’ Messaging Program in Grand Teton National Park” was conducted by Patricia A. Taylor, Professor and Faculty Affiliate, and Nanette M. Nelson, Assistant Research Scientist, both from the Wyoming Survey and Analysis Center, University of Wyoming. GTNP’s “Be Bear Aware” program includes an integrated strategy consisting of public information and education, removal of human food sources, and enforcement of food storage regulations. Methods include signs, flyers and brochures.

The study was designed to answer the following questions: 1) Are park visitors seeing the “Be Bear Aware” information? 2) Where are they seeing it? 3) Do visitors comprehend the information and do they act on it? and 4) What level of bear knowledge do visitors have? The survey instrument was a questionnaire administered to visitors at front country campgrounds and picnic areas.

The surveys were conducted in 2010. The research team surveyed 634 visitors. Almost 50% of the visitors had never been to GTNP before. They stayed an average of four days, and about 60% of the campers were in tents and pop-up camps. The respondents saw the picnic table signs (89%) and the trash can signs (86%) with the greatest frequency. Fewer respondents reported seeing road signs (76%) and signs posted in restrooms (66%). Even fewer people reported seeing the signs in campgrounds, picnic areas and trailheads (36%). A remarkably low number of visitors saw trail closure signs (11%).

The questionnaire asked visitors to agree or disagree with a series of belief statements about bears. The majority respondents answered the statements with a high degree of accuracy with two notable exceptions: about 16% thought that it was a good idea to drop food or a daypack to distract a bear in an encounter, and 12% thought they could predict bear behavior. Nonetheless, the knowledge level at 80% and above is good, though there is room for improvement. The authors analyzed the data and

came up with three categories of bear awareness: Highly Aware (49%), Aware (48%), and Unaware (3%).

The survey allowed the researchers and park administrators to make some generalizations. Almost half of survey respondents were on their first visit. Their knowledge about bear behavior was reasonably high, but there were some notable misapprehensions. Their knowledge about food storage was moderately good. About 3% of the respondents were clueless.

Cain reviewed the results of the study “Day hikers in bear country: A study of knowledge, fear, and protection motivation,” conducted by Ariel Blotkamp, from the University of Idaho. Blotkamp, a park interpreter at GTNP, wanted to create customized messages targeted at specific user groups, under the social science principle that messages that build on existing knowledge and beliefs will be more effective. The goal of the study was to obtain a better understanding of day hikers in order to create customized messages for them.

Blotkamp used “Protection Motivation Theory” as a platform for her study design. This theory has been used in a variety of human behavior studies, but never in relation to wildlife issues. The Protection Motivation Theory proposes that we protect ourselves based on four factors: the perceived severity of a threatening event, the perceived vulnerability, the effectiveness of the recommended preventive behavior, and the perceived belief in their own competence.

The study questions focused on what extent do day hikers 1) have misconceptions about bear behavior and proper human behavior that could affect their well-being; 2) have past experience with black and grizzly bears; 3) perceive themselves to be vulnerable to bear-inflicted injuries; and 4) how severe do they perceive these injuries might be. Blotkamp also wanted to know how day hikers perceive the effectiveness of the recommended bear safety behaviors, the ease of adopting the recommended behaviors; and which recommended bear safety behaviors day hikers adopted.

The visitor questionnaires were personally administered at four trailheads in GTNP during 15 sampling days in the summer of 2010. Regarding bear relevant knowledge, the average score was 62%, with three primary misconceptions: that bear bells were effective warning devices, that hiking with food is dangerous, and that a bear on its hind legs is about to charge or attack. In addition, Blotkamp asked respondents whether they or someone they knew had a potentially unsafe experience with a bear, personal property damaged by bear, had a bear get into food, or been injured/attacked by a bear.

Blotkamp ask respondents whether they strongly agreed or disagreed with statements about their assessment of vulnerability or severity of seeing a black bear, seeing a grizzly bear, being attacked by a black bear, or being attacked by a grizzly bear. Results showed that the respondents felt equally vulnerable to attack by black bears and grizzly bears, which was an odd result. The severity perceived for an attack by a grizzly bear was higher, which is true.

The respondents said that carrying bear spray was somewhat effective and relatively easy to use. Making noise seemed more effective and easy to use. They perceived staying within reach of food and avoiding hiking at dawn and dusk as relatively more difficult and somewhat less effective. The respondents self-reported that they followed some bear-safe hiking behaviors: stayed in reach of bear attractants (86%); made noise (31%); carried bear spray (28%); and carried bells (7%).

Blotkamp found a few relationships worth noting. The perceived effectiveness and ease of use tended to be correlated with their experience with bears and self-reported bear-safe hiking behavior. In addition, their bear-relevant knowledge was somewhat correlated with self-reported bear-safe hiking behavior.

Blotkamp made two practical observations based on her results: hikers are aware of risks, but do not perceive negative bear encounters to be likely, and hikers are more likely to adopt bear-safe behaviors that they perceive as being easy and effective. She suggested that park managers address the three

primary misconceptions listed above. In addition, bear safety communication should emphasize vulnerability, and address the effectiveness and degree of ease of each bear-safe behavior. Bear safety signs should be conspicuous and separate from other information, and emphasize visitor safety, in addition to well-being of bears, in messages.

DISCUSSION

Sterling Miller, National Wildlife Federation, asked Coltrane if ADF&G accounted for the biases inherent in telephone surveys, e.g., many people no longer have landlines and cell phone numbers are not published and available for surveyors. Coltrane said that Responsive Management performed both surveys and accounted for biases. They chose phone surveys in 2009 because they could expect a higher response rate.

Dean Berezanski, Manitoba Conservation, asked Coltrane to clarify how the survey respondents could support hunting in parks, but oppose lethal removals by wildlife officials. Coltrane clarified that most people supported hunting in parks in order to manage population size, but didn't want wildlife officials to cull animals for population management.

Chris Smith, Wildlife Management Institute, asked Coltrane if the municipal administrators that opposed trail closures had seen the survey results wherein the public supported trail closures. Coltrane said that she told the municipal park superintendent the results. However, the policy against trail closures continues. Nonetheless, Coltrane will continue recommending incidental trail closures if it seems prudent for public safety.

Marc Kenyon, California Department of Fish and Game, asked Wilson if the Blackfoot Challenge's peer-to-peer education and self-policing had ever gone too far. For example, a bear advocacy group in California monitors police scanners and public permits for lethal removal. Members of this group have closed bear traps and harassed people in an effort to save bears. Wilson said that the Blackfoot Challenge hasn't had any of these kinds of problems.

Bill Stiver, Great Smoky Mountains National Park, asked Coltrane if their survey offered a definition of bears that poses threats to human safety. For example, at Great Smokies, such a bear is defined as a "bear that invades human personal space." Coltrane responded that the survey didn't offer a definition, but each question described common situations such as bears in trash, etc. If a bear is lethally removed, the department uses the situation to educate the public about how the bear came to its demise. There is less public support for lethal removal of cubs after sows have been removed.

Linda Masterson, Living with Bears, commented that the online company, Survey Monkey, is useful for polling a small group for which email addresses are known. Coltrane responded that, in her experience, Survey Monkey is good for limited situations but for a truly unbiased survey, experts like Responsive Management are needed. Manning added that she used Survey Monkey with a trail-user stakeholder group to help design better safety messages.

Masterson also responded to Kenyon's situation where a bear advocacy group had run amuck. She said that, in her experience, bear advocacy groups will devise their own solutions if wildlife officials don't work with them. These people have a passion about bears and can sometimes be difficult to work with, but communication with them is imperative so that they don't get oppositional. There are many good examples of citizen wildlife organizations that work well with wildlife agencies.

Gillian Sanders, North Kootenay Lake Bear Smart Program, asked Wilson to describe the optimal distance to remove carcasses and offal so that bears don't associate the remains with livestock. Wilson responded that he did not have an easy answer. Each situation is spatially and temporally contextual. He

suggested that Sanders speak with some of the bear managers that work with carcass removal in a variety of situations.

DEMONSTRATION: SATELLITE TRAPSITE CHECKING

PRESENTER

Lori Roberts, Montana Fish, Wildlife and Parks

Roberts works on the Grizzly Bear Population Trend Monitoring project (GBPTM) for the Northern Continental Divide Ecosystem (NCDE). Roberts' responsibilities include trapping and collaring female grizzly bears in the NCDE. Satellite trap site transmitters make it more efficient to accomplish other duties while checking traps from a computer.

The GBPTM researchers hypothesized that satellite transmitters coupled with still or video cameras would enable remote trap site checking. They obtained ARGOS satellite transmitters from Telonics and protected them in a PVC pipe. These and trail cameras were placed at trap sites and bait sites. The trail cameras can take infrared still pictures or video, though photos are not transmitted by satellite. The satellite transmitters send a signal when the magnet is pulled from the transmitter, usually within 3-20 minutes. Biologists log onto the ARGOS website to observe date and time signals, and these signals can be mapped on Google Earth.

The fixed-antenna transmitters cost about \$1,200. This cost should be compared to the cost of a technician driving to trap sites in remote areas on a regular basis. The cost of the web-based signal database is up to \$36/month. The infrared still/video cameras cost about \$280/each.

There are several advantages for satellite trap site transmissions. They help biologists know when an animal is captured, enabling them to respond sooner. The signals also help biologists prioritize their time so that the occupied traps get checked first. From a research standpoint, the satellite transmitters are more efficient for detecting target animals in a low grizzly density area where traps are rarely triggered. In addition, the satellite transmitters can be used at bait sites.

There are also several limitations to these systems. An internet connection is required and may be difficult to obtain in extremely remote areas. Some biologists might prefer the reassurance of a VHF system that sends out a slow signal indicating it is still working even when it is not triggered. In areas with no internet connection, it may be necessary to use both a VHF trap site transmitter and a satellite trap site transmitter. Unlike the cellbase systems, the satellite transmitters don't transmit photos or video, so that the traps always need to be checked if the trigger is tripped. In addition, the fixed antenna is more fragile than a flexible antenna and must be protected. While the satellite transmitter system price may seem high, the costs are recouped by reduced travel and staff time.

WORKSHOP: DECISION TREES, MATRICES OR GUIDELINES?

BEST MANAGEMENT PRACTICES FOR HBC RESPONSE PLANNING

CO-FACILITATORS

Colleen Matt, Bear Conservation Planning

Sandra MacDougall, Red Deer College, Alberta

Jessy Coltrane, Alaska Dept o f Fish & Game

John Paczkowski, Alberta Tourism, Parks and Recreation,

Matt introduced the interactive workshop session's goal of collectively developing a list of key elements for human-bear conflict response guidelines. Conservation officers and wildlife managers are asked to respond appropriately and safely to human-bear conflicts. The basis for their decisions varies widely between provinces, states, protected lands, and communities. Usually they work under protocols, guidelines, and response matrices that support and/or hinder their discretion.

The workshop attendees were asked to participate in two exercises: 1) evaluate the advantages and disadvantages of an example HBC response guideline matrix; and 2) create a list of the key elements of an ideal set of HBC response guidelines. The latter list may support conservation officers' efforts to improve their own guidelines and effectiveness.

For the first exercise, each table group was given a generic HBC response matrix and one of three conflict scenarios: rural, urban, or protected area. They responded to the question, "What are the advantages and disadvantages of the example matrix?" The following list summarizes their responses.

1. A. ADVANTAGES OF THE EXAMPLE HUMAN-BEAR CONFLICTS MATRIX

- Gives officer or manager discretion or judgment
- Allows a fair amount of flexibility for professional judgment
- If used as a risk assessment for a conflict, gives a conservation officer a record of the decision-making process
- Considers the age of a bear as a factor affecting the management response
- Relatively easy to follow
- A conservation officer can make a decision based on root of issue, evaluate the key components and then use matrix
- Open-ended, gives lots of latitude
- Defines the bear's behavior, an important element for inexperienced responders
- Takes emotion out of decisions
- By identifying possible actions, it provides a good place to start
- Explains the conservation officer's response and actions to the public, supervisors and politicians
- Lays out options
- Might increase consistency in decision-making amongst officers

1. B. DISADVANTAGES OF THE EXAMPLE HUMAN-BEAR CONFLICTS MATRIX

- Many of the management responses are not appropriate in every situation, e.g., translocation for black bears
- Allows too much discretion by the conservation officer
- Lacks gender and age categories for the conflict bear
- If a situation escalates into more serious conflicts, the guidelines don't prioritize responses or flexibility
- There are fewer response options as the seriousness of the conflict increases.
- Doesn't evaluate the history of the conflict bear
- Doesn't evaluate human factors, e.g., should people be warned? Should you recommend deterrents? If so, what type?
- The conflict categories are confusing and overlapping, they don't isolate the crux of the problem that must be addressed by appropriate responses.
- Lacks a conflict timeline and history, and a response timeline and history
- Lacks a method to assess whether human negligence was a factor
- Allows for too much latitude and provides too many response options for inexperienced conservation officers

- Lacks responses aimed at changing public's behavior, e.g., education
- The recommended actions are too subjective since they are based on observations that might not come from experienced observers, e.g., species, gender, size, etc
- Would be easier to use if color was used to define response categories
- Provides identical responses despite differences in bear behavior, i.e., need to tailor responses to each different kind of bear behavior or conflict situation
- Allows the misperception that there is a smooth continuum of management responses, when reality is messier
- Doesn't address polar bears
- Isn't designed for agricultural damage conflicts where the principle impact is economic
- Doesn't factor in the condition of the animal
- Doesn't incorporate the relative amount of public tolerance
- The situation categories are too broad and not inclusive enough, some are missing
- Lacks definitions for the management responses

2. COMPONENTS OF IDEAL HBC CONFLICT GUIDELINES

For the second exercise, each table group listed the key components of "ideal" human-bear conflict guidelines that would provide guidance for new conservation officers and/or wildlife managers. The following list summarizes their responses.

- A defined matrix that promotes consistent decision-making while allowing discretion
- Need to include age and gender categories for bears
- Must allow for conservation officer discretion
- Should include recreational use level
- Must be reviewed by the public, and contain public input
- Includes standard terminology and definitions that are acceptable to all stakeholders
- Provides several response options for each conflict event, but should highlight the preferred option (i.e., the most typical or common response)
- Should require that the conservation officer document his response (e.g., if the officer decides not to respond, he or she should still document the decision)
- Must define the root of the conflict so that the conservation officer doesn't get sidetracked by details that don't fit the situation
- Should contain simple headings and color-coding for ease of use
- Includes a caveat that the guidelines are a tool, but are not the definitive answer to every conflict situation
- Should be useful for both inexperienced and experienced conservation officers
- Should have public education as an appropriate response
- Recommended responses should take resource limitations into consideration (e.g., funding)
- Should be clear and understandable so that local law enforcement and non-professionals can use it
- Should provide training for using the guidelines
- Should be reviewed and revised periodically to account for new technology and new methods
- Should be developed with the entire context in mind, beyond bear management, e.g., setting, activities of the people involved in the conflict, etc.
- Might include "zones" wherein some habituation is acceptable and responses are different
- Should account for variability in the availability of natural foods
- Should include different levels of food-conditioning and habituation, e.g., a bear in an apple orchard is different than a bear breaking into a house

- Conservation officers and biologists from outside the agency should participate in developing the guidelines
- Should be organized clearly, e.g., a dichotomous key or flow chart that helps inexperienced responders define the type of conflict
- Includes the condition of the bear in the conflict
- Includes the land use context
- Recommends a minimum degree of response required for each level of conflict
- Ultimately, the guidelines should minimize liability and maintain flexibility

DISCUSSION

Sylvia Dolson, Get Bear Smart Society, said that the Society developed some guidelines that offered a much more three dimensional description of responses. Their response guidelines also include a force continuum. See the Get Bear Smart Society for an example of their response guidelines.

Zach Turnbull, Wyoming Game and Fish Department, said that the list of ideal traits would produce guidelines that are too long and complex to be useful. He suggested a simple guideline: “Liberal amounts of department discretion in management decisions based on the totality of the circumstances and professional experience.”

Jonah Evans, Texas Parks and Wildlife, just completed a revision of their management guidelines. They found that the defined categories of bears (e.g., nuisance, predator, etc.), were not as useful as categorizing the behavior of the bear in the incident. Texas tried to make the behavior categories mutually exclusive and exhaustive so that the appropriate response is very clear to inexperienced biologists.

Pat Carr, New Jersey Fish and Wildlife, said that it would advantageous to test a set of guidelines by observing biologists using the guidelines to respond to a hypothetical bear conflict scenario.

WORKSHOP WRAP-UP

PRESENTER

John Waller, Glacier National Park - “Workshop reflections and considerations for the future” -

The organizing committee asked John Waller to review what he had learned in the three days of the workshop. Waller characterized his role as “the guy with the broom at the end of the parade, sweeping up the horse apples.” Waller observed that human-bear conflicts occur in a wide range of social contexts, from the North Slope of Alaska to the suburbs of New Jersey. The first session, “Management of bears at the urban/suburban/wild lands interface,” demonstrated that human-bear conflict management was remarkably similar, no matter what the venue.

During the session, “Biological criteria for lethal removal of conflict bears,” Waller learned from Mark Haroldson that we couldn’t conclude that skinny bears are more apt to get into conflicts than fat bears. Waller observed that the panelists, despite their scientific investigation, were unable to establish biological criteria for lethal removal. Typically, management protocols rely on social or behavioral criteria. Waller recommended that bear researchers investigate biological criteria for lethal removal further.

Waller noted that seminal papers regarding the efficacy of bear spray and firearms were presented during the session, “Hunters and bear spray...why people aren’t using bear spray?” However, an answer to the question, “Why aren’t more hunters carrying bear spray,” remains elusive. There is clearly a need

to understand the social context and the barriers to using bear spray. Waller remarked that Jim Wilder's video of a polar bear being sprayed could be a very effective educational tool about the efficacy of the spray.

Waller observed that several of the studies outlined in the session, "Does public hunting reduce, enhance or have no effect on bear conflicts?" included large-scale samples from which strong inferences could be made. The contributors could not conclude that hunting bears reduces human-bear conflicts at the state or population level. However, there was some evidence that that bear hunting could affect conflict levels in specific areas and with targeted hunts. Waller thought that it is important to let bear managers know that just increasing general hunting seasons and bag limits may not affect conflict levels. Waller also noted that, despite expectations, the relative number of bear-conflict calls is not a good indicator of effect human-bear conflict management.

During the session, "Management of habituated bears near developed areas," Waller was struck by the high amount of labor going into managing bear jams in National Parks. He wondered if this investment is sustainable. Waller admired Hal Morrison's analogy about the future of increasing habituation, "It's like riding a grizzly. You don't much care for the ride, but you worry more about what's going to happen when you get off." Jay Honeyman made the comment that habituated bears present a conundrum; management of aggressive or food-conditioned bears is straightforward, but what do you do with calm bears that eat natural foods? Waller said that the passive behavior of habituated bears is documented but not well understood. He also wondered if wildlife managers lose credibility when they tell people to stay away from all bears because they are dangerous, yet people at bear jams can hang out with bears at close distances every day.

Linda Masterson and Ben Long outlined some great communications strategies with real-life results. Linda described two community/agency partnerships that have nearly eliminated human-bear conflicts in their areas.

Waller reviewed some important messages that he gleaned from the "Risk and liability" session. First, protection from liability results from proper management, informed by science with ongoing analysis. Second, reasonable attempts to balance access with safety are seen in a favorable light by the courts. Third, liability can be managed; agencies will generally prevail in court if we do our jobs and pay attention to detail. Waller also noted that in the 1995 Banff mauling case, experts on both sides called the event "unforeseeable." The Canadian judge ruled that that the owner of property does not guarantee safety, but is only obliged to warn of foreseeable risks.

The panel on international human-bear conflicts illustrated that controlling attractants is crucial for all venues and all species. Waller reflected on how securing attractants seems like a simple problem to solve, and paraphrased Marty Obbard, "The ironic thing is that most conflicts are caused by something we don't really care about or value, and that's garbage." Waller said that we learned that food and garbage storage was a problem before WWII, and 50 years later, we are still trying to solve the same problem.

From the session, "Working with different constituencies," Waller learned more about the wide variety of Native American perspectives on bears and bear management, sometimes within tribes. In the session, "Efficacy of outreach, education and conflict prevention efforts," Seth Wilson described a common result of growing grizzly bear populations—Blackfoot Valley grizzlies are becoming habituated to ranches, farms and dwellings. Though these bears are seeking natural foods, they cause concern by residents. From the same session, Waller observed that the recent Anchorage public opinion survey by the Alaska Department of Fish and Game was a solid framework for getting things done, and it provides proof that the public supports their management. In Steve Cain's summary of Blotkamp's survey of park visitors bear

knowledge, hikers said they were more likely to adopt bear-safe behaviors that they perceive as being easy and effective. This perception challenges outreach professionals to relay the ease and effectiveness of safe hiker behaviors and carrying bear spray.

Waller ended by saying that bear managers in North America are victims of their own success. Despite better management of human-bear conflicts, the expanding bear and human populations provide bear managers with job security in the coming years.

APPENDIX I: TERMS USED IN BEAR-PEOPLE CONFLICT MANAGEMENT

These working definitions are for use at the 4th International Human-Bear Conflicts Workshop, Missoula, MT, 20-22 March 2012. Definitions are provided by the Workshop organizing committee and session contributors.

Anthropogenic food: any source of food that derives from humans or human activity, including but not limited to garbage, human food, pets or livestock or their food, apiaries, wild bird food, grain (stored or in the field), hunter-killed carcasses, sanitary waste, cultivated fruit, fish hatcheries or fish food.

Attack: intentional contact by a bear resulting in human injury. Bear attacks are a subset of *incidents*.

Attractant: anything that draws a bear into an area including natural foods (e.g., berries, fish, hard mast, or ungulate carcasses), *anthropogenic foods*, or items humans would consider inedible (e.g. industrial materials such as motor oil, antifreeze, fertilizer, coatings on power cables). Under broadest definition could be anything that bears find interesting.

Aversive conditioning (AC): a form of *operant conditioning* in which an aversive agent is systematically applied to an animal as it performs a behavior in order to reduce the frequency or performance of the behavior. In bear conflict management, AC is a structured program to systematically apply an aversive agent (e.g. treating with noisemakers, projectiles, dogs, vehicles) when a bear approaches or has entered an area of human activity followed by removal of the aversive agent when the bear retreats to suitable habitat or area. See also *hazing*.

Back-country: areas accessible primarily by hiking or 4 wheel drive vehicles, quads, skidoos, airplanes or boats.

Bear human conflict: includes *interactions*, *encounters* and *incidents* in which people perceive or experience a threat to life or property.

Bear-resistant: describes an object's composition or qualities that help to prevent bears from accessing something. Usually implies some sort of container or device that helps prevent bears' access

Bear-resistant container (BRC): containers that are *bear-resistant* but not necessarily bear-proof. In the USA, containers officially designated as BRC's in grizzly bear habitat have successfully passed the Interagency Grizzly Bear Committee's Bear Resistant Testing Protocol.

Bear spray: type of *non-lethal* deterrent, most notably capsaicin spray.

Classical conditioning: a form of associative learning in which the conditioned stimulus (e.g. ringing bell) is repeatedly paired with and precedes the unconditioned stimulus (e.g. smelly food) until the conditioned stimulus alone is sufficient to elicit the response (e.g. salivation) independent of performance of a behavior. Also called *Pavlovian conditioning*.

Conditioned Taste Aversion (CTA): a form of *classical conditioning* in which animals learn to associate the taste of a specific food with an illness that occurs after (up to 12 hours) its consumption. CTA can occur and be resistant to extinction after only one trial.

Day-active: management term that refers to bears that approach humans or human activity during daylight, or other periods of frequent human activity.

Detection systems: systems capable of recording the presence of a bear and warning people. Used to protect human safety and to preclude the need for harassing or killing a bear.

Deterrence: the act of dissuading a bear from reaching a goal that people don't want it to reach.

Diversionary feeding: a planned management action for limited periods of time to provide alternative foods or to relocate existing food items and intended to attract bears away from potential locations or situations where they can get into conflict with humans.

Encounter: synonymous with *interaction*.

Food-conditioning: form of operant conditioning in which bears learn to associate sources of food with humans or their infrastructure.

Front-country: areas accessible by vehicle on surfaced roads (pavement or chip seal).

Generalization: a behavioral process that is a potential result of operant conditioning in which the animal no longer discriminates among multiple stimuli. Although undesirable in many animal training situations, it is the goal where we are applying aversive conditioning in order to “train” bears to avoid conflict situations, or using CTA to eliminate conditioning to certain anthropogenic attractants.

Habituation: type of learning in which bear no longer responds to presence of a stimulus; “learned indifference.”

Hard release: see *On-site Release*.

Hazing: application of aversive agents (e.g., noisemakers, projectiles, dogs, vehicles) to a bear that is approaching or has approached a conflict situation. May consist of one or many such events, but, in contrast to *aversive conditioning*, the goal is to remove the bear from the immediate conflict situation and not necessarily to permanently modify the bear’s behavior. Further application is not implied nor necessarily consistently applied every time.

Incident: interaction between a bear(s) and a person(s) in which the bear acts aggressively. Bear incidents are a subset of bear–human interactions and have outcomes ranging from benign to injury.

Interaction: when a person(s) and bear(s) are mutually aware of one another. Bears may react with seeming indifference, by leaving the area, or approaching the person. Synonymous with *encounter*.

Intrinsic values: in relation to ecosystems, means those aspects of ecosystems and their constituent parts which have value in their own right, including: (a) Their biological and genetic diversity; and (b) The essential characteristics that determine an ecosystem’s integrity, form, functioning, and resilience. [From Resource Management (Simplifying and Streamlining) Amendment Act 2009]

Less-lethal: a type of deterrent, mostly used in the context of projectiles fired from a firearm, that if used properly will not injure or kill the animal, but has the potential to be lethal or injurious if used improperly.

Lethal projectile: firearms ammunition (rounds) composed of a metal projectile for the intent of killing.

Mauling: an *attack* resulting in death, or injuries that require medical attention.

Night-active: management term that refers to bears that are wary of humans and do not approach human activity or facilities until “night” (or periods of reduced human activity in northern latitudes with near-continuous daylight).

Non-lethal: a type of deterrent (e.g., bear spray or stationary noise-makers such as air horns) that will not injure or kill a bear even if misused.

On-site release (OSR) or hard release: capture and release of a management bear in the same location or very near to site of capture, usually with intensive hazing associated with the release. Often, but not necessarily always, includes immobilization and marking individual.

Operant conditioning: a type of learning in which the behavior of an animal is affected by consequences of performance of the behavior either by positive reinforcement (e.g. “clicker training”) or by punishment

(*aversive conditioning*). Positive reinforcement increases the probability of the behavior or improves its performance. Punishment reduces the probability of the behavior.

Overt reaction distance (ORD): replaces terms such as individual distance or personal space. ORD refers to the distance at which a bear overtly reacts to another bear or a person (after Herrero et al.2005). A bear may react internally before reacting in a manner people can observe.

Problem bear: a bear that requires a management action or expenditure of human and/or financial resources. This term covers a broad spectrum, from bears that require periodic monitoring because they are near human infrastructure, to bears that require intensive hazing or lethal removal.

Relocation: capture and release of bear at a distance within its home range, if known, or a distance corresponding to the ordinary home range size of bears in the area (also see *translocation*). Often, but not always, the intent is to remove bear temporarily from a conflict situation.

Sighting: when a person sees a bear, but the bear is apparently unaware of the person.

Supplemental feeding: intentionally placing natural or artificial food in the natural environment for use by bears on an annual, seasonal, or emergency basis to provide additional nutrition or make up for natural food shortages. The intent is to prevent starvation, increase reproduction, improve condition of individual bears, or conserve vulnerable bear populations.

Translocation: capture and release of bear at a distance beyond its home range, if known, otherwise beyond the ordinary home range size of bears in the area. The intent of translocation is to force the bear to establish a new home range far removed from the conflict situation. (Also see *relocation*)

APPENDIX II: CONTRIBUTORS

John Beecham has been involved in bear research and management since 1972. He is a past president of the International Association for Bear Research and Management (IBA). John worked for the Idaho Department of Fish and Game for over 29 years, including 12 years conducting research on black bears. John recently completed a series of white papers including papers on Rehabilitation and Release Guidelines for Orphan Bear Cubs, and on Global Human-Bear Conflicts. He continues to work as a consultant on efforts to release orphan bears back to the wild, as well as, conducting fieldwork on brown bears in Greece and Turkey. John currently serves the IUCN Bear Specialist Group as the Chair of the Human-Bear Conflict Expert Team and continues to be involved in issues related to the release of orphan bears.

Barry Benkendorf graduated from University of Alberta Law School. He became a member of the bar in 1995. After 5 years in private practice, Barry began working for the Civil Litigation Section of the Canadian Department of Justice where he has been ever since.

Steve Cain is the senior wildlife biologist for Grand Teton National Park in northwest Wyoming, where he has directed wildlife conservation, research, and management programs since 1989. He received a BS in Zoology from Humboldt State University and a Masters in wildlife biology from the University of Montana. In previous positions Steve coordinated peregrine falcon reintroduction programs for the National Park Service's Rocky Mountain Region, studied bald eagles, peregrine falcons, and other birds throughout Alaska for the U.S. Fish and Wildlife Service, worked as a bear biologist in Yosemite National Park, and researched native salmon and steelhead populations for the State of Oregon.

Dan Carney is a Tribal wildlife biologist for the Blackfeet Indian Reservation and has been working for the tribe and with the Blackfeet Tribal Council on grizzly bear issues for 25 years. He has developed a comprehensive management and research program that serves the needs of Tribal members and non-Tribal members on the Reservation, while at the same time recovering the grizzly bear and working with human-bear conflicts. Dan has a B.S. from the University of Montana and an M.S. from Virginia Tech.

Patrick Carr is currently a Supervising Wildlife Biologist for the NJDFW's Bureau of Wildlife Management, directing budget, personnel, federal aid and special projects, as well as overseeing the activities of the State Pheasant Farm. He previously was the Black Bear Project Leader, directing the research, monitoring and control activities for black bears in the state. Pat earned his B.S. from the Pennsylvania State University in 1980 and M.S. from the University of Tennessee at Knoxville in 1983 (his thesis was entitled "Habitat use and seasonal movements of black bears in the Great Smoky Mountains National Park."). His past experience includes working on black bears for the Pennsylvania Game Commission and U.S. National Park Service, analyzing data on giant pandas for the New York Zoological Society and serving as the State Administrator for the NJDFW Hunter Education Program.

Jessy Coltrane is the Area Wildlife Biologist for the Alaska Department of Fish and Game in Anchorage. She has a B.S. in Biology from Davidson College, a M.S. in Wildlife Ecology and Conservation from the University of Florida, and a Ph.D. from the University of Alaska Fairbanks. As the area biologist, Jessy manages populations of both black and brown bears, as well as all of the human-bear conflicts within the municipality of Anchorage.

Stacy Courville has been a wildlife biologist for the Federated Salish Kootenai Tribes for 17 years. He is responsible for the management of bears, forest carnivores, furbearers and big game. For the last 7 years, his focus has been on grizzly bear and wolf management and human-bear conflicts. He is a University of Montana graduate and currently resides in Polson, Montana.

Simon Gravel moved to British Columbia in 2004 with a Master's degree in Philosophy from Montreal University. He started his public service career as a park ranger and moved to the Conservation Officer

Service in 2009. He first worked in Whistler as a bear response officer and now serves as a general duty office in the Vancouver area. He and three other C.O.s receive over 3000 calls a year related the bears and humans conflicts.

Kerry Gunther is the Bear Management Biologist for Yellowstone National Park and a member of the Interagency Grizzly Bear Study Team for the Greater Yellowstone Ecosystem. He has worked in grizzly bear and black bear research, monitoring, and conflict management in Yellowstone National Park for 28 years. Kerry received his Bachelor of Science degree in biology and earth science from Northland College in Wisconsin, and his Master of Science in Fish and Wildlife Management from Montana State University.

Mark A. Haroldson is a supervisory wildlife biologist for the USGS Interagency Grizzly Bear Study Team, based in Bozeman, Montana. He has been involved in bear research for 37 years, and has worked for the study team in the Yellowstone ecosystem since 1984. Current duties include supervising field studies and field crews, database management, analysis, and writing.

John Hechtel has a B.A. in Zoology and an M.S. in Wildlife Biology from the University of Montana. He worked for the Alaska Department of Fish and Game from 1980-2008 on grizzly and black bear research and management, human-bear conflict management, bear safety education, bear viewing and refuge management. He also spent 2 years working as the bear biologist for Yukon Territory. John now consults and provides training on bear management, bear safety, human-bear conflict prevention, and aversive conditioning.

Daryll Hedman is Regional Wildlife Manager for Manitoba Conservation. Among other duties, he is responsible for management of the polar bear population in western Hudson Bay, and oversees the Polar Bear Alert program at Churchill. This program has become a model for management of polar bear conflicts where the goal is to balance human and bear safety with the needs of a major commercial bear viewing industry.

Stephen Herrero is emeritus professor of environmental design for the University of Calgary. He has had a long and fruitful association with the University of Calgary, studying how bears interact with one another and how this translates to their interactions with people. He is the author of *Bear Attacks: Their Causes and Avoidance*. Although Steve left university full-time teaching in 1997, he continues several research projects on bear-human interactions.

Jay Honeyman currently works as a bear conflict biologist in the southern Canadian Rockies for Alberta Environment and Sustainable Resource Development - Fish and Wildlife Division. He has worked in the field of human-bear conflict for over 20 years and received his MSc. in Environmental Management at Royal Roads University in Victoria.

Marc Kenyon coordinates the black bear, mountain lion and wild pig programs for the California Department of Fish and Game. He has worked with the Department for five years, after working as a private lands biologist for Ducks Unlimited, a bear biologist for the National Parks Service in Yosemite and as a Wildlife Specialist with the Cooperative Extension Program in Montana. Marc has a B.S. Degree in wildlife biology from UC Davis and an M.S. Degree in Animal and Range Sciences from Montana State University, Bozeman.

Femke Koopmans assessed human-polar bear conflicts in East Greenland for World Wildlife Foundation. She currently works for WWF-Netherlands and is involved in the Global Arctic Programme of the WWF Network.

Ben Long is senior program director for Resource Media, a non-profit PR firm that works with groups advocating conservation and public health across the country. For more 15 years as a print journalist, Ben

covered wildlife and natural resource issues for local newspapers in Idaho and Montana, as well as writing books and magazine articles for a national audience.

Sandra MacDougall has been a biology instructor at Red Deer College since 1996. Sandra's research interests include grizzly bear habitat use, bear-human interaction risk assessment, and animal-vehicle collision reduction. She has worked with Parks Canada reviewing public bear education programs and bear management policies for a variety of northern protected areas.

Mike Madel has been involved in grizzly and black bear management and research programs throughout northwestern Montana for the past 32 years. He worked as a field biologist with collecting bear capture, telemetry, and habitat research data for the Mission Mountain Grizzly Bear Study and Cabinet Mountains Grizzly Bear Study. During those studies, Mike developed methods to accurately delineate seasonal grizzly bear habitat components and designed a cumulative effects analysis process for the Cabinet-Yaak Ecosystem. Mike currently works for Montana Fish, Wildlife & Parks as Grizzly Bear Management Specialist on the Rocky Mountain Front where he implemented the states' first human-grizzly bear conflict management program.

Tim Manley Tim began mapping grizzly bear habitat for the Forest Service in 1982. In 1984 he started working on the Cabinet Grizzly Bear Project based in Libby, Montana, and in 1989, he worked on the South Fork Grizzly Bear Project in the Swan Range. Tim developed and built some of the first remote cameras to be used on that project. Since 1993, Tim has been the Grizzly Bear Management Specialist for NW Montana. He manages grizzly bears by working with landowners to prevent conflicts, and by capturing bears for both the population trend and augmentation projects.

Elizabeth Manning is a regional wildlife education specialist with the Alaska Department of Fish and Game. She has a B.A. in Anthropology from U.C. Berkeley and a M.A. in Journalism from the University of Texas at Austin. She worked for many years as a newspaper reporter for the Anchorage Daily News covering natural resources and wildlife issues, and came to work for ADF&G in 2006. Elizabeth works closely with ADF&G biologists implementing bear education efforts for Anchorage and other communities in Southcentral Alaska.

Linda Masterson was a creative director for a big advertising and public relations firm in Chicago where she crafted communication programs for clients ranging from Procter & Gamble to Campbell's Soup. She has been motivating people to peacefully coexist with bears since joining Colorado's Bear Aware Team in 2001. She recently created a new communications package for the Colorado Division of Wildlife. Her book, *Living with Bears: A Practical Guide to Bear Country*, has become the bear reference book of choice for many wildlife agencies, biologists, parks, forests and communities

Colleen Matt currently works as a conservation research, planning and facilitation consultant, specializing in bear issues. She worked as a bear viewing guide, land manager and education specialist for Alaska Department of Fish and Game for 16 years. Colleen also held the position of Chief of Natural Resources for Lake Clark National Park and Preserve. At present, she resides in Missoula, Montana.

Andy McMullen has over 30 years of experience working with bears, 14 as a wildlife officer in the Northwest Territories and Nunavut, Canada. He is the chair of Safety in Bear Country Society and is currently the owner, boss, and employee of BEARWISE, which helps communities and companies mitigate bear-human conflicts.

Sterling Miller finished his BS at the Univ. of Montana and his MS and Ph.D at the University of Washington. After a stint in the Peace Corps he spent 21 years as a bear researcher with the Alaska Department of Fish and Game and was elected to terms as President, Secretary-treasurer, and VP (Americas) of the International Association for Bear Research and Management. Sterling currently is a

Senior Wildlife Biologist for the National Wildlife Federation in Missoula. His wife SuzAnne runs the Dunrovin Guest Ranch just outside Missoula and this ranch was a co-sponsor of this workshop.

Hal Morrison is the Wildlife Human Conflict Specialist for Yoho, Kootenay and half of Banff National Parks with the Parks Canada Agency. He has worked for Parks Canada for 31 years and for the last 16 years has been responsible for delivering a program to reduce wildlife human conflict with the goal of preserving viable wildlife populations while allowing for safe visitor experiences in three busy, high profile Rocky Mountain National Parks (Yoho, Kootenay, Banff).

Harri Norberg is a biologist specializing in semi-domestic reindeer and large carnivores. He graduated as M.Sc. from the University of Oulu in 2002 and is preparing, in addition to the current work in the Finnish Wildlife Agency, his PhD on the role of predation in mortality of semi-domestic reindeer calves and its subsequent impacts on the profitability and viability of reindeer herding, a northern traditional livelihood. Harri is currently working as a senior planning officer in the Finnish Wildlife Agency focusing on large carnivore issues in the Finnish reindeer management area.

Gen Oshima attended graduate school in Nunavut, Canada. After graduation, Gen worked as a human-sea turtle conflict specialist in Guatemala. After returning from Guatemala, he worked as human-brown bear conflict specialist in Shiretoko, Japan. He currently works for the non-profit organization "Picchio" as a human-bear conflict specialist in Karuizawa.

John Paczkowski is a biologist working for Alberta Parks, in Kananaskis Country and is based in Canmore Alberta. Over the last 20 years, John has worked with large carnivores including bears, wolves and Amur tigers in Canada and Russia, focusing on research, conservation and conflict prevention. John has been involved in developing human-bear conflict prevention plans in Alberta, British Columbia and the Russian Far-East.

Mike Pederson is the Subsistence Research Coordinator for the North Slope Borough Department of Wildlife in Barrow, Alaska and manages the polar bear patrol program, which mitigates human-polar bear conflicts throughout the Alaskan North Slope communities. He has been working on subsistence and wildlife issues for the Borough since 1990, dealing with migratory birds, ice seals, and whales.

Craig Perham is the Polar Bear Incidental Take Coordinator for U.S. Fish & Wildlife Service in Alaska. He has studied Arctic polar bears for the last 11 years. Craig is currently the coordinator for the Service's marine mammal incidental and intentional take program, where the majority of his work revolves around human-bear conflicts management and resolution. His most recent work has focused on developing and refining techniques used for detecting maternal polar bear dens near industrial activities.

Robin Rigg is a UK-born conservationist and researcher who has lived in Slovakia since 1996. He has a Bachelors degree in natural science from Cambridge University, and a Masters in zoology from the University of Aberdeen in Scotland. The focus of his work is on the long-term conservation of large carnivores through improving coexistence and reducing conflicts with local people. He has set up and led several innovative projects in his adopted country, including the Protection of Livestock and Conservation of Large Carnivores, The BEARS Project and the Slovakia Wolf Census Project. He established the Slovak Wildlife Society in 1998, and currently serves as chair. Robin also serves in the IUCN-IBA Bear Specialist Group's expert teams on Human-Bear Conflict and European Brown Bears.

Lori Roberts has worked with both black and grizzly bears for the past 9 years. Starting as a technician in YNP and then moving to the NCDE working Bear Management on both sides of the divide. She now works in research on the NCDE Grizzly Bear Trend Monitoring Project with Rick Mace.

Kevin Saxby graduated with a degree in forest management from Colorado State University in 1979 and from law school at the University of Wyoming in 1986. Like most Alaskans, he has had a few bear encounters. He has represented the Alaska Dept. of Fish and Game, the Alaska Board of Game, The

Alaska Dept. of Natural Resources, and the Alaska Big Game Commercial Services Board since 1992. However, as of May 2, 2012, Kevin will be starting from the bottom all over again as the newest State Superior Court Judge, sitting in Anchorage, Alaska.

Chris Servheen has been the Grizzly Bear Recovery Coordinator for the US Fish and Wildlife Service for 30 years. In addition to grizzly bear conservation, Chris has worked on the conservation of Asian and European bears since the late 1980s and has worked on bear conservation in Japan, Malaysia, China, Taiwan, Laos, Greece, Austria, France, and Spain.

Dick Shideler has been involved in bear-human conflicts, primarily associated with industrial development, since 1979. Beginning in the early 1990s, he has conducted a project investigating grizzly bear use of the oilfields on Alaska's North Slope, and more recently is collaborating with the US Fish & Wildlife Service on a project evaluating methods to detect denning grizzly and polar bears. He was on the organizing committee for the 2nd and 3rd HBC workshops in Canmore, Alberta in 1997 and 2009, respectively.

Rebecca Shoemaker graduated from UM in Missoula with degrees in Wildlife Biology & Botany. She currently works for the USFWS Grizzly Bear Recovery Program as a Policy Biologist. She and her husband own a wildflower seed farm north of town and she hopes to become a full-time farmer sometime in the not-too-distant future.

Kate Smith has worked for the Grizzly Bear Recovery Program for 7 ½ years and currently holds the position of Operations Director. Kate received her MBA from UM in 2010. She and her husband and their 2 dogs and 2 cats live on the north side of Missoula.

Patti Sowka is Founder and director of the Living with Wildlife Foundation and holds a M.N.S. degree from Arizona State University. She has worked for the past 13 years to minimize human-wildlife conflicts with an emphasis on prevention of bear conflicts. Patti coordinates the Interagency Grizzly Bear Committee Bear-Resistant Products Testing Program and produces the *Living with Predators Resource Guides*, a four-volume set of references containing information about ways to avoid conflicts with predators. Patti also managed the State of Montana's wildlife rehabilitation center from 2006 until 2009 and she still works as a volunteer wildlife rehabilitator in Montana and Arizona.

Mark Ternent holds a M.S. degree from University of Minnesota. He monitored grizzly bear populations and black bear harvest management for the Wyoming Game and Fish Department's Trophy Game Section. In 2000, Mark began working for the Pennsylvania Game Commission as black bear project leader, and currently has statewide responsibilities for black bear research and harvest monitoring.

Frank Vitale makes his living as a farrier (horseshoer), but he lives for hunting, and riding and packing his mules in the backcountry. For more than 30 years, Frank has resided, hunted and recreated in grizzly bear country along the North Fork of the Flathead River and the Rocky Mountain Front. He has crossed paths with many grizzlies and black bears; and most of his encounters have been exciting, but uneventful. He says he'll take his chances in grizzly bear habitat any day over walking (or driving) the streets of a big city.

Zach Voyles has a B.S. in Wildlife biology and a B.A. in Communication Studies from the University of Montana. He is currently an M.Sc. candidate in Conservation Biology and Sustainable Development at University of Wisconsin – Madison. Zach is working on spatiotemporal patterns of black bear nuisance complaints in Wisconsin and evaluating the effectiveness of the current black bear nuisance program in Wisconsin.

John Waller is the large carnivore biologist for Glacier National Park. He has specialized in research and management of grizzly bears for 23 years. He holds bachelor and doctoral degrees in wildlife biology from the University of Montana and a master's degree in fish and wildlife management from

Montana State University. John got his Ph.D. studying grizzly bear movement across Highway 2, and his M.S. studying grizzly bears in the South Fork of the Flathead.

Jim Wilder has worked with bears for 13 years. From 1999-2003, he conducted the first black and brown bear research in Wrangell-St. Elias National Park, and worked throughout Alaska on other bear projects for the National Park Service, including in Glacier Bay, Kenai Fjords, Katmai, Denali, and Lake Clark. Jim began working with polar bears in 2003, and now works on various aspects of polar bear management and conservation in coordination with the other polar bear Range States, as well as a multitude of domestic partners.

Kate Wilmot is the Bear Management Specialist for Grand Teton National Park, where among other duties since 2007 she has been responsible for supervising the park's Wildlife Brigade, a team dedicated to managing the human-bear interface, including bear jams and food storage compliance. Prior to coming to Grand Teton Kate worked as a law enforcement park ranger with an emphasis on bear management in Glacier National Park and Katmai National Park and Preserve. She also worked as a biological science technician with the Glacier Bear DNA project and with the Glacier Wolverine Project.

Seth Wilson is a conservation biologist and coordinates the Blackfoot Challenge's Wildlife Committee and co-founded People and Carnivores. He brings an applied research approach to human-bear conflict reduction and has been working nationally and internationally on HBC for more than a decade.

Kevin Wright has a BS degree from Iowa State University and an MS degree from Colorado State University. Since 1984, he has worked for Colorado Parks and Wildlife, in the Roaring Fork River Valley. Kevin has assisted a black bear research study in Aspen for the past five years.

Allen Young has been a trial lawyer in Utah County, Utah for over 30 years. He is currently the senior partner at the law firm of Young, Kester, Black & Jube located in Provo, Utah. In February of 2011, Allen tried the case of *Francis et al. v. United States of America*. The plaintiffs were awarded judgment in the amount of \$3 million for the wrongful death of young Sam, reduced to \$1.95 million by comparative negligence. The United States appealed this decision to the United States 10th Circuit Court of Appeals. In January of 2012, Defendant U.S. dismissed the appeal and paid the entire \$1.95 million to the Plaintiffs.

APPENDIX III: POSTER ABSTRACTS

1. Bear behaviour and trains: examining the behavioural relationship between bears and trains using loco-cam data.

Briana Burley, Parks Canada

Railway mortality of grizzly bears is not uncommon throughout Banff and Yoho National Parks. Between 1991-2011, there were 12 confirmed grizzly bear rail mortalities in Banff National Park. An underused approach to better understanding bears and railways is to use camera footage collected from the fronts of locomotives – ‘loco-cams’. This footage can be used to determine bear behaviour prior to strikes, near misses and successful fleeing events. For this project, loco-cam data will be analysed to determine grizzly bear behaviour patterns (e.g., fleeing actions, time under chase, acknowledgement of train, effect of family groups) prior to strikes , near misses and successful fleeing events in the presence of moving trains. Secondly, this project will investigate these behavioural events while considering such factors as; presence/absence of grains or other attractants on the tracks, topography, soundscapes, sightlines, vegetation, linear design of the tracks, pinch points, water ways and other limiters such as bridges and barriers to safe travel. This information will be useful in creating a foundation for railway mitigation actions. This project will examine existing loco-cam data from Canadian Pacific Railway as well as new data collected from camera equipment outfitted on the locomotives.

2. Effect of Hunting on Human-Bear Conflict Levels

Patrick Carr, New Jersey Division of Fish & Wildlife

New Jersey Division of Fish and Wildlife (NJDFW) implemented a more aggressive integrated black bear management strategy in 2000 as the black bear population increased in size and expanded in the Garden State. The strategy included an enhanced educational effort, increased research, bear feeding ban, nuisance complaint tracking, aggressive control measures and population reduction by hunting. The strategy was codified as the Comprehensive Black Bear Management Policy; it included a limited hunting season in 2003, 2005 and 2010. NJDFW recorded a drop in bear nuisance complaints in each year following a hunting season. Specifically, damage and nuisance calls were reduced by 37%, 15% and 9% after the 2003, 2005 and 2010 seasons, respectively. While some of the reduction can be attributed to varying natural food availability, NJDFW's education program and proper garbage management, Category I bear euthanization thereby eliminating further negative behaviors by those animals and an increased public tolerance of bears, the harvesting of nuisance bears and the population decrease achieved by the hunting season played a role in lower bear nuisance complaints. Hunting can be an effective tool to reduce bear nuisance complaints when used as part of an overall integrated black bear management strategy.

3. Evaluating the efficacy of wildlife ordinances as a management technique to reduce human-bear conflicts in New Hampshire

Jaclyn Comeau, M.S. Candidate, University of New Hampshire

Human-black bear (*Ursus americanus*) conflicts are a consistent problem for wildlife managers and residents in New Hampshire. Despite 15 years of managing nuisance behaviors in bears and educating the public, human-bear conflicts continue to annually average ~ 700 complaints. In response to this problem 3 towns have passed wildlife ordinances that attempt to restrict bear access to anthropogenic food sources. We are currently evaluating the ecological and sociological effectiveness of wildlife ordinances at reducing anthropogenic food attractants through analysis of human-bear conflict trends, human behavior, and human attitudes in 3 towns with wildlife ordinances and 3 towns without wildlife ordinances. Reported human-bear conflict complaint trends are being analyzed and wildlife ordinance compliance/enforcement is being evaluated through monitoring of dumpsters, curb-side garbage pick-up, and police logs. Self-administered surveys were sent to ~ 3,700 landowners in the 6 study towns and an

adjusted response rate of ~ 37% was achieved. Surveys gathered data on landowner's attitudes, and behaviors toward black bears, human-bear conflicts, and human-bear conflict management techniques. Preliminary results indicate decreases in the number of reported complaints after enacting a wildlife ordinance and overall supportive attitudes toward wildlife ordinances.

4. Evaluation of two aversive conditioning methods on nuisance activity levels of NH black bear (*Ursus americanus*)

Nancy Comeau, USDA Wildlife Services

Human-wildlife conflicts caused by black bears (*Ursus americanus*) accessing anthropogenic food sources are an increasing challenge for wildlife managers. During 2007-2009, we tested two commonly used aversive conditioning (AC) methods (rubber buckshot and trained bear hounds) on NH black bears exhibiting persistent nuisance behavior in residential communities.

Twenty-four (24) bears were trapped and fitted with VHF/GPS collars. All bears received a soft release with no treatment from day 1-7 (pretreatment period) while each animal was monitored by telemetry and locations were recorded. Bears were equally assigned to a treatment group and were treated each time they were located within a predefined area 8-28 days (treatment period) after capture.

Four (4) bears received rubber buckshot treatments on 4-15 occasions and 4 bears were chased/treed 2x each by hounds. Bears chased with hounds traveled a greater average distance (3.4km) from treatment locations than bears shot with rubber buckshot (0.6km). Similarly, bears chased with hounds stayed out of the community 3x longer than bears hazed with rubber buckshot. The time that elapsed before bears returned to the community averaged 37.6 hours for the hounds group and 12.6 hours for the rubber buckshot group. Neither method was successful in deterring long-term repetitive nuisance activity.

5. Spatial factors influencing high probability areas for nuisance black bear complaints in Arizona (2000–2010)

Ron Day, Arizona Game & Fish Dept.

The Arizona Game and Fish Department (Department) annually receives hundreds of calls regarding human–bear conflicts. Resulting actions by the Department include information, capture and release, or euthanization. These actions are often controversial and the loss of individual bears through euthanization is undesirable. We analyzed data associated with 1,471 nuisance bear complaints, defined as a human–bear encounter followed by a complaint to the Department. We assigned variables describing the population, physical location, and type of complaint to affected and unaffected points in a logistic regression analysis. A training set of 1,800 points was 87.9% accurate in discerning between affected and unaffected areas, whereas as a test set of 1,142 points was 85.3% accurate in discerning between the types of areas. As development increases, we expect human–bear conflicts to increase. Identifying locations where nuisance complaints are expected will help managers, elected officials, and private citizens determine actions to reduce conflicts. This predictive model will serve as a baseline to identify areas where actions such as education may reduce conflicts. Modifying human behavior through education should be the first priority to reduce human–bear interactions.

6. Grizzly and black bear foraging on train-spilled grain on Banff and Yoho National Parks

Ben Dorsey, MSc Student, Montana State University

In Banff and Yoho National Parks, trains are the largest source of human caused mortality for grizzly bears (*Ursus arctos*). The Canadian Pacific Rail line transports agricultural grains originating in the USA and Canada, including wheat and barley to ports in British Columbia. Some of these grains leak onto the rail bed along this route. Studies have documented the foraging habits for bears in this region. However, no study has documented bears foraging on wheat or barley seeds. Train-spilled grain density was

monitored between 2008 and 2010 to test for relationships between grain, bears foraging on grain and train strikes. Time-lapse photography and strip transects were used to estimate bear foraging rates over time and space. Grain density was related to track design characteristics: grade and curvature which affect train speeds. Ninety percent of bear scats (n=341) detected along strip transects contained wheat or barley seeds, and bear foraging was positively correlated with grain density. However, at small spatial scales (<5km) no relationship was detected between historic bear strikes and current grain density. These results highlight the need for national and international planning and awareness related to the impacts of transportation infrastructure and traffic on bears.

7. Estimating population size, density, and sex ratios of urban black bears (*Ursus americanus*) using noninvasive genetic sampling Mono County, California

Jonathan Fusaro, M.S. Candidate, Utah State University

Beckmann and Lackey (2008) discovered the Lake Tahoe Basin black bear population is functioning in a source-sink dynamic where the effects of the human-altered landscape are depleting the wildland bear population. The goal of bear management, in areas akin to the Lake Tahoe Basin, should be to reduce bear density in urban environments and increase it in wildland areas. To do so, managers need an economical way to estimate bear density accurately in both of these types of environments. The main objective of this project is to examine if this can be accomplished by implementing a DNA-based, mark-recapture method of estimating black bear populations by using hair-snares. My study areas are Mammoth Lakes, CA and nearby wildland areas. I also seek to determine if the city of Mammoth Lakes is functioning as a sink for the black bear population in nearby wildland areas, and to determine if the city is a source for creating habituated black bears.

8. Managing black bear-human interaction in Washington with Karelian bear dogs: past successes and future needs.

Brian Kerston, Washington Dept. of Fish & Wildlife

Richard Beausoleil, Washington Dept. of Fish & Wildlife

Chris Moszeter, Washington Dept. of Fish & Wildlife

Nicolas Jorg, Washington Dept. of Fish & Wildlife

Bruce Richards, Washington Dept. of Fish & Wildlife

Biological concerns and public opinion often necessitates the use of non-lethal responses to interactions between black bears (*Ursus americanus*) and people in Washington. Since 2004, the Washington Department of Fish and Wildlife (WDFW) has utilized specially trained Karelian bear dogs (KBD) for capture and aversive conditioning of black bears in residential communities throughout the Puget Sound region. When deemed appropriate, WDFW responds to bear reports by capturing the offending animal in a culvert or cage trap followed by release on or off site with hazing in the form of cracker shells, non-lethal projectiles, and KBDs barking at, and chasing bears. To date, WDFW officers and biologists have hazed > 150 bears with KBDs, estimating approximately 80% of bears do not reoffend following a single treatment. Beyond direct management applications, KBDs provide a highly valuable tool for conducting proactive education and outreach activities focused on reducing the potential for conflict. We will discuss our use of KBDs to manage black bear-human conflict in Washington focusing on response criteria and techniques, outreach successes, and the value of KBDs for timely response to bear conflicts. Additional discussion will focus on the development of future KBD-based strategies and an evaluation of their efficacy.

9. Twenty-three years of successful American black bear rehabilitation

Valerie LeBoeuf, Idaho Black Bear Rehab, Inc.

The American Black Bear can be successfully rehabilitated at facilities near urban areas. Essential to success are opportunities to socialize with other cubs, good body weight and condition at time of release,

release into sustainable habitat, and low potential for human interactions during the first thirty (30) days post-release.

At Idaho Black Bear Rehab, Inc. (IBBR), additional methods include a variety of enclosure designs, customization of dietary and medical protocols, remote observation tools, and cub-appropriate caregiver techniques. Over the past twenty-three (23) years, radio collar tracking and postmortem retrieval of ear tags have shown that few IBBR bears (< .022) have become involved in nuisance situations within one year of release, and most bears (> .96) are considered successfully released. Based on recovered data, IBBR bears have survived, on average, more than 10 months (> 10.94) post release.

Despite release success, differing ideas in management policies can impede the effectiveness of black bear rehabilitation. Ethical and science-based protocols for rehabilitation should be incorporated into regulations and management plans. Agencies should integrate the fluid nature and adaptive needs of rehabilitation when drafting policies and procedures. Black bear rehabilitators should contribute to black bear management policies as they affect black bear rehabilitation.

10. Safety in bear country society: safety through education

Grant MacHutchon, Safety in Bear Country Society

The Safety in Bear Country Society (SIBCS) is a non-profit group dedicated to educating the public about safety around bears and, by doing so, reducing the unnecessary killing of bears. To achieve this goal the SIBCS developed four video programs, Staying Safe in Bear Country, Working in Bear Country, Living in Bear Country, and Polar Bears: A Guide to Safety. All profits from video program sales go into future education efforts of the SIBCS. Staying Safe in Bear Country is a 30 minute program that includes the consensus opinion of leading experts on grizzly and black bear behavior and its relevance to human safety and is for anyone living, travelling, or working in bear country. Working in Bear country is a 20 minute module to Staying Safe in Bear Country that provides more detailed information for anyone working in bear country. Living in Bear Country is a 22 minute program that provides practical advice on ways to minimize problems with bears in the places that people live. Polar Bears: A Guide to Safety is a 27 minute program that contains important information on how people can reduce their chance of encountering a polar bear and how to best respond if they do meet a bear.

11. Kimberley Bear Aware education and outreach

Shaunna McInnis, East Kootenay Wildlife Aware

The City of Kimberley, BC has hosted a bear-human conflict reduction education program for 13 years. The program was started in 1999 following the fencing of our landfill site when over 30 garbage habituated bears were destroyed. The program has run annually since this time with the support of a variety of organizations including the Wildsight, British Columbia Conservation Foundation, Ministry of Environment, the Columbia Basin Trust and the City of Kimberley. The education program visits schools, community groups, local fairs and events and homes in high conflict neighbourhoods. Currently, the program is in a transition phase, working to address conflict between humans and all species of urban wildlife.

12. Seasonal trail restrictions to reduce grizzly bear attacks and conflicts in Banff National Park

Steve Michel, Banff National Park

Susan Staple

Stephenie Zyvatkaskas

Kimo Rogala

In 2006, Banff National Park managers introduced seasonal closures and human use restrictions in the Lake Minnewanka area, following two serious bear attacks on hikers. In subsequent years, another three serious conflicts involving grizzly bears and mountain bikers occurred on a trail immediately adjacent to

the original restricted area. Incident reviews indicated: all the events took place during the mid-summer buffaloberry feeding season; all the incidents involved female grizzly bears accompanied by offspring; the involved visitors were all travelling alone or in pairs, and none were carrying bear spray.

In 2011, following stakeholder consultation, the geographic area and scope of the proactive seasonal restrictions (July 10 to September 15) was expanded to include: a backcountry campground closure, a cycling prohibition, a dog prohibition, minimum hiking group size of four, and mandatory carrying of bear spray. The intent of these restrictions is two-fold: to reduce serious grizzly bear conflict incidents, and to reduce disturbances to female grizzly bears and their offspring during a critical feeding season. Significant investment in communication and outreach efforts to promote an understanding of the new restrictions is ongoing. Monitoring of management effectiveness and visitor compliance using remote technology continues during the summer months.

13. Addressing human-polar bear conflicts through community-based conservation at Barter Island, Alaska

Susanne Miller, US Fish & Wildlife Service

Barter Island, Alaska is home to both the Inupiaq Eskimo village of Kaktovik and to large aggregations of polar bears that feed on unused remains of bowhead whales taken by Alaska Native subsistence hunters. Additionally, feeding bears have been attracting a growing number of tourists and photographers to the area. As a result, the U.S. Fish and Wildlife Service developed a community-based partnership with the village of Kaktovik to address human safety and polar bear conservation concerns. Efforts to date include: 1) biological monitoring; 2) minimizing attractants within the village; 3) implementing a deterrence program, 4) conducting education and outreach activities both within the community and with the bear viewing public; 5) development of polar bear viewing guidelines; 6) providing guide training to village residents; and 7) helping to organize a workshop on the potential use of diversionary feeding (moving bone pile further away from the community) as a management option for reducing human-bear conflicts. These efforts have resulted in consistent and open dialogue between the Service and local residents, and increased a sense of stewardship within the community.

14. Restricted access in the Moraine Lake area of Banff National Park, 1999-2011.

Hal Morrison, Parks Canada

The Moraine Lake area of Banff National Park, Alberta, Canada, is one of the most popular tourism destinations in Canada. The area attracts about 400,000 visitors/yr between June and October and is also an important area for grizzly bears (*Ursus arctos*). Restricted access was piloted in 1999 reducing the need for area closures while addressing visitor safety. Visitors were legally required to hike in a tight group of 6 or more. From 2002 – 2006 opportunistic patrols of the area recorded group of 6 compliance ranging from 51% - 69% ($X = 62\%$). During the same 5 year period grizzly bear threat encounters were low ($n = 5$).

In 2007 the group of 6 restriction was re-evaluated with the objective of raising group compliance. A decision to adopt a group of 4 restriction was made and implemented for 2007. The decision was based largely on analysis of data by Stephen Herrero, which determined that the majority of injurious grizzly bear incidents (where party size was known) consisted of 1, 2 or 3, people. From 2007 – 2011 opportunistic patrols of the area recorded group of 4 compliance ranging from 63% -77% ($X = 68\%$). During the same 4 year period grizzly bear threat encounters were low ($n = 3$).

15. Can the use of a bear-resistant waste collection system to minimize bear- human conflict also be cost-effective?

Dennis Neufeldt, Haul-All Equipment Systems

Located in the Rocky Mountains west of Calgary, Alberta, and east of Banff National Park, the Town of Canmore has experienced steady population growth. As the town grew into the surrounding wilderness, there came a problem with managing the residential curbside waste collection program specifically, how to limit wildlife, particularly bear, access to the waste.

In 1996, after tendering a proposal for collection, the municipality made the decision to convert to a semi-automated container system which was not only bear-resistant, but was also more cost-effective than the curbside collection system the town was using.

Through an open and public process, the Waste Management Committee was able to alleviate the concerns of the citizens of Canmore. This process was made easier by the fact the containers would be conveniently located throughout the town allowing 24 hour accessibility. That, and the modular design, enabled aesthetic placement so as to not distract from the natural beauty of Canmore. The committee also promoted the benefits of semi-automated collection which eliminates workers having to lift heavy containers.

16. Human-bear conflict reduction using bear resistant cans

Mike Orlando, Florida Fish and Wildlife Conservation Committee

The Florida Fish and Wildlife Conservation Commission (FWC) is focused on reducing human-bear conflicts. Wild bears traveling through neighborhood areas should not be a safety concern. However, bears that linger in neighborhoods can become a problem. Access to unsecured garbage encourages bears to remain in neighborhoods and create conflicts and is greater than 60% of the bear complaints received by FWC.

FWC conducted a pilot program to see how effective the use of bear-resistant trash cans can be in reducing bear conflicts when all residents in a community secured their trash. The project was paid for by the Wildlife Foundation of Florida using funds from the Conserve Wildlife license plate. The program was able to show that a community-wide effort to secure trash was successful. Survey results indicate that 75% of residents had bears in their garbage before the cans were delivered and only 5% after. These findings help encourage local governments to request bear-resistant cans and waste service companies to more readily provide them to communities.

17. Trial for human-bear coexistence in Karuizawa, Japan

Gen Oshima, NPO Picchio

Karuizawa has been one of the most popular and prestigious summer resorts in Japan which is visited by about 7.7 million tourists each year. Second home areas are located between urban residential areas and wild forested bear habitat. Under such geographical circumstances, we have been trying to co-exist with bears by using several methods.

As a result of 14 years of experience on picchio's bear management includes the improvement of the dumpster design and introducing the Wind River Bear Institute basic Bear Shepherding® methods, the frequency of garbage scavenging by bears plunged from 129 (1999) to 1 (2010), with the number of human injuries caused by bears staying low at 7 (over 10 years from 2001 to 2010).

These activities have helped Karuizawa maintain rich forests inhabited by bears alongside residential areas and develop into "a town where people and bears can coexist", which is unique even by world standards.

18. Keeping bears out of cabins

Tim Peltier, Alaska Dept. of Fish & Game
 Bruce Dale, Alaska Dept. of Fish & Game
 Doug Hill, Alaska Dept. of Fish & Game

Bear-human conflicts are not uncommon in south-central Alaska and are expected to increase as the human population continues to grow and expand. Seasonal recreational cabins are common throughout much of the state. Annually the Alaska Department of Fish & Game receives a numerous complaints about damage caused by marauding bears, however relatively few of these complaints come from the Susitna Valley, in south-central Alaska. In 2010, 30 recreational cabins were damaged by bears in the Susitna Valley. This was a very significant increase in the number of incidents reported to the department. Department staff and volunteers quickly assembled materials for two public workshops to help remote cabin owners reduce property damage and increase safety. The material presented consisted of advising homeowners on ways to ‘bear-resistant’ their cabins, houses, and other structures. Numerous deterrents were presented that may be incorporated into cabin design or added to existing structures. The information from these workshops was added to the department website, and will be part of our future outreach efforts.

19. Minimizing bear-human conflicts between industrial activities and denning polar bears, North Slope, Alaska

Craig Perham, US Fish & Wildlife Service

The U.S. Fish and Wildlife Service (Service) works with stakeholders, such as the oil and gas industry, to manage polar bears and minimize bear-human interactions. One way the Service accomplishes this task is to implement mitigation measures to limit disturbance and minimize impacts to denning polar bears.

Under the authority of the Marine Mammal Protection Act (MMPA) the Service uses a proactive and reactive approach, where the system is designed to use measures that decrease the potential for conflicts with denned polar bears from industry while at the same time allowing human activities to continue through the denning season.

Proactive measures are used to find maternal dens prior to the initiation of industry activities. They include the use of denning habitat maps to define high quality habitat and den detection surveys – Forward Looking Infrared (FLIR) imagery surveys (aerial and hand-held) and scent-trained dogs.

If a polar bear emerges from a den during ongoing activities, reactive measures are implemented. They can include: restricted activities within one-mile of the den, ice road closures or reduced traffic and speed limits, 24-hour den monitoring, and altered airport traffic patterns. These mitigations remain effective until the female naturally abandons the den site.

20. Ahead of the conflict curve: expansion of food storage regulations on the Beaverhead-Deerlodge National Forest, 1999-2011.

Steve Primm, People & Carnivores
 Jay Frederick, Beaverhead-Deerlodge National Forest
 Rebecca Skeldon, Beaverhead-Deerlodge National Forest
 Jonathan Klein, Beaverhead-Deerlodge National Forest

Grizzly bear (*Ursus arctos*) recolonization of historic range in southwest Montana increased in the mid-1990s. In response, the Beaverhead-Deerlodge National Forest and non-governmental organization (NGO) partners undertook a proactive strategy of expanding bear-safe food storage and attractant management practices beginning in 1999. The strategy first focused on building food storage infrastructure (e.g., “bear poles”) and encouraging voluntary steps to secure attractants. During this phase, Forest Service and NGO partners cultivated partnerships with affected outfitters. Next, food storage and sanitation regulations were expanded to parts of the Forest beyond the Yellowstone Grizzly

Bear Primary Conservation Area. Concurrently, partners undertook an intensive program of information and education, giving the affected public a two-year period to adjust to the new regulations. Partners also upgraded and expanded infrastructure, including installation of steel bear boxes at many campgrounds. Expansion of food storage regulations to approximately one million acres of public land has been highly effective, with remarkably little social or political controversy. This poster explores the conditions that have led to this outcome, provides recommendations for land managers in similar situations, and discusses future steps for maintaining this successful program.

21. Polar bear den emergence video surveillance system: application of technology at the nexus of Arctic oil and gas exploration and regulatory monitoring

Christopher Putnam, US Fish & Wildlife Service

The US Fish & Wildlife Service Marine Mammals Management Office (Service) developed a video surveillance system to monitor the emergence of polar bears from maternal dens located in proximity to oil and gas industry (industry) activity in northern Alaska. The system is arctic hardened and records high definition digital video of activity at polar bear dens near industry activity. In spring 2011 the Service deployed the camera system to monitor a female polar bear and cub emerged from their den on an artificial island constructed for industry exploration in the Beaufort Sea north of the Alaska coast. This marked the first time such technology was used by Service to create a record of industry compliance with regulatory requirements of the Marine Mammal Protection Act. We will also use these video records to enhance our understanding of polar bear den emergence behavior in proximity to industry activity. The development and novel application of this technology has provided the Service with a valuable tool to ensure regulatory compliance by industry and the conservation of polar bears.

22. Science-based education in action!

Melissa Reynolds-Hogland, Bear Trust International

Steve Mendive, Alaska Wildlife Conservation Center Bear Trust International and the Alaska Wildlife Conservation Center (AWCC) are developing and implementing science-based education programs rooted in wild bear research. Innovative lessons link directly to field research on wild bears, target high school learners, help youth develop conservation awareness through scientific inquiry, address STEM (Science, Technology, Engineering, and Math; a US campaign to help our students become more competitive in science and math) goals, and meet National Science Standards. Several lessons focus explicitly on human-bear conflicts, with direct links to timely research done by bear scientists. Currently, Bear Trust is piloting Volume I of this program, the Curriculum Guide to *The Bear Book*, with 1,500 students and teachers in seven states. The success of the program is being measured using a statistically valid survey tool. Bear Trust is currently developing Volume II of this program. Volume II will include real data from bear studies worldwide. Lesson will be project-based, web-based, and free. In addition, AWCC will house this science-based program in their upcoming BEARS (Bears Education Awareness Research Sanctuary) facility. At the BEARS facility, AWCC and Bear Trust will provide interface systems with connections to bear studies being conducted around the world in real time.

23. Experiences with human-bear conflicts in the Carpathian Mountains of Slovakia

Robin Rigg, Slovak Wildlife Society

Thanks to a 30-year moratorium on hunting, the brown bear (*Ursus arctos*) recovered from near-eradication in Slovakia to re-occupy much of its former range. Hunting resumed in the 1960s with the goal of limiting population growth and human-bear conflicts. The state also began to compensate verified damage. Numbers continued to grow to a current estimate of c.800–900 bears at a mean density of c.5 inds./km² (c.10/km² in core areas). Public debate and management actions have focused on population size and hunter harvest, with less attention on non-lethal conflict mitigation. Local residents and tourists have little knowledge of appropriate behavior and practices in bear country. The Slovak

Wildlife Society has been testing and implementing a variety of measures from traditional livestock guarding dogs to electric fences and bear-resistant containers, whilst raising awareness through an education program (www.medvede.sk). Hunting and nature conservation bodies continue to disagree on the goals and methods of bear population management, impeding the adoption of more effective practices and possibly also resulting in increased illegal killing. We therefore initiated a process aimed at achieving reconciliation and consensus among diverse interest groups through a series of facilitated workshops to elaborate a management plan accepted by all key stakeholders.

24. Google Analytics, measuring your message in the social media market

Frank Ritcey, BC Conservation Foundation

We have all turned to the use of the internet to get our messages out to our target audiences, but few of us know how effective we have been in this effort. By employing a free, and surprisingly, easy-to-use piece of software from Google we can:

1. Measure who, when, where, how, and possibly why, people are visiting our site, and then
2. We can fine-tune our delivery based on the above to insure we reach and engage our intended audience.

The poster I propose to present would cover: the need for analytics; the mechanics of setting up an account; analyzing data beyond hit counts; techniques for testing your message and the delivery of your message; and finally, what specific actions can you take from the use of Google analytics to improve your chances of having your message heard and responded to.

The poster will draw on our experience with our own Bear Aware site and will include, along with the poster itself, a laptop with a demonstration of the techniques involved.

25. Bear-human coexistence in Meadow Creek, BC

Gillian Sanders, North Kootenay Lake Bear Smart Program

The Meadow Creek Less-Lethal Bear Management Project combines bear management, research, and education to reduce human-bear conflicts and associated grizzly bear mortality in the community of Meadow Creek BC. Situated at the confluence of the Lardeau and Duncan river valleys, this community is endowed with rich spring bear habitat that provides linkage between the Selkirk and Purcell mountain ranges. The Meadow Creek Kokanee Spawning Channel brings grizzly bears into the community each fall to feed on spawning and dead salmon. Conflict between residents and grizzly bears near the spawning channel has resulted in >2 grizzlies shot annually from 1967-2007. This project integrates improved attractant management, use of electric fencing for livestock, and community education with less-lethal management tools. GPS and VHF collars are used to track the success and failures of management actions. This five year pilot project has completed a successful first season with strong community and government support. Partners of this project are the BC Conservation Officer Service, grizzly biologist Dr. Michael Proctor, North Kootenay Lake Bear Smart Program Coordinator Gillian Sanders, and the community of Meadow Creek. The goal of this project is to create a model of human/grizzly coexistence by educating both human and ursine residents.

26. Multiple uses of black bears marked with GPS equipped radio-collars

Anthony Crupi, Alaska Dept. of Fish & Game

Chad Rice, Alaska Dept. of Fish & Game

Kristen Romanoff, Alaska Dept. of Fish & Game

Neil Barten, Alaska Dept. of Fish & Game

Ryan Scott, Alaska Dept. of Fish & Game

Since 2003, a sample (n=14) of black bears (*Ursus americanus*) have been captured in urban areas around Juneau, Alaska and marked with GPS equipped radio-collars as part of a low cost community outreach effort demonstrating the movements of human food-conditioned black bears. While outreach

efforts were the primary focus of this project, the information has been used to improve our understanding of urban black bear habitat selection and movement patterns, and assisted in planning for development projects. Tangible products from GPS location data are invaluable when discussing urban black bear activity with community residents and municipal agencies. Insight into seasonal and daily black bear activity in and around urban settings help residents more fully understand bear activity which can lead to improved human understanding and appreciation of bears, which translates into more responsible refuse handling. On a broader scale, these data demonstrate the interface between black bears and human development. GPS locations, both daily and seasonally were plotted for specific neighborhoods in Juneau. Home range estimates were made using minimum convex polygons, and travel corridors and movement rates were determined between capture and release locations. Urban black bear capture operations have provided valuable data beyond community outreach efforts.

27. Design and operation of Arctic oilfields to minimize conflicts with grizzly bears

Dick Shideler, Alaska Dept. of Fish & Game

Grizzly bears inhabit the entire Alaskan Arctic region where oil and gas exploration and production occur. Experience with grizzly bear interactions with oil development in Alaska's North Slope oilfield region has shown that site design and operations can reduce bear conflicts. Three major approaches—structural design features, modifications of human behavior, and modifications of bear behavior—have been used. Structural design features such as barriers to access, increased lighting, and reduced anthropogenic cover minimize bear occupancy around human activity. Operational features including management to reduce grizzly bear attractants and measures to affect bear behavior, such as hazing bears from human activity, can be effective if applied early in oilfield development and maintained consistently thereafter. Incentives and disincentives for workers to take personal responsibility for proper waste management are important, but are the weakest link in the chain. The goal of oilfield operations should be to minimize the impact on bears while maintaining safety of its personnel. This does not appear to be an unreasonable goal if planning and operations occur with grizzly bears in mind.

28. Testing the effectiveness of products used to store bear attractants

Patti Sowka, Living With Wildlife Foundation

Bill Lavelle, Living With Wildlife Foundation

Effective containment of bear attractants is critical to reducing conflicts between humans and bears worldwide. The Interagency Grizzly Bear Committee (IGBC) Bear-Resistant Products Testing Program provides a consistent way of determining the effectiveness of a wide range of products used to store food, garbage, livestock feed and other potential bear attractants. Products including backpacking containers, panniers, coolers and garbage containers are subjected to a combination of standardized mechanical testing and a live bear test. Testing is conducted at the Grizzly & Wolf Discovery Center (GWDC) in West Yellowstone, Montana. Products are baited with sauces, bones, fish and/or dog kibble and are placed into the bear enclosure at the GWDC. Captive grizzly bears are then released into the enclosure. Containers that are not breached within 60 minutes pass the captive bear test. Of the 186 different products that have been tested since 2004, 41% passed the first time tested. Thirty-five of those products were redesigned and retested and of those, 63% eventually passed. Product testing clearly helps prevent ineffective products from reaching the marketplace and helps agencies determine which products are acceptable for use to meet grizzly bear food storage orders on public lands in the Lower 48 States.

29. Promoting and fostering an understanding of habituation and conditioning in bears and other wildlife in the National Park Service

Kirsten Leong, Biological Resource Management Division, National Park Service
 Lauren Barish, Biological Resource Management Division, National Park Service
 Pat Owen, Denali National Park
 Bill Stiver, Great Smoky Mountains National Park

A common management practice in the National Park Service was once to feed bears from garbage dumps, for the enjoyment of visitors. While this is no longer an accepted form of visitor engagement with wildlife, bears across the park system are still getting anthropogenic rewards (i.e. food), either intentionally or unintentionally, resulting in animals becoming food-conditioned. In other cases, bears feed naturally but in close proximity to humans resulting in animals becoming habituated. The Human-Wildlife Habituation steering committee was established to address habituated and food conditioned wildlife in national parks. Visitor expectations of wildlife encounters in national parks affects the way people behave towards wildlife, and in some cases changes the behavior typically seen in bears and other wildlife. Wildlife-dependent recreation is a fundamental component of a national park experience, yet little consistent guidance exists outlining how to address these human-altered behaviors in bears and other wildlife. Our purpose is to create a community where managers can access resources about learned behavior changes in bears and other wildlife, learn how to recognize and manage those behavior changes, and access tools to manage human-wildlife interactions that result in habituation/conditioning of wildlife in parks. This poster will summarize our efforts to date.

30. Understanding and mitigating grizzly bear-train conflict along the Middle Fork of the Flathead River

Lindsey Stutzman, Montana Fish, Wildlife & Parks

Human expansion into previously unpopulated areas has increased greatly over the past fifty years. Conservation of corridors is vital for preserving wildlife populations. The Middle Fork of the Flathead River Corridor is part of the Northern Continental Divide Ecosystem (NCDE) grizzly bear recovery zone and provides areas for movement between Glacier National Park and the Bob Marshall Wilderness. The Burlington Northern Santa Fe (BNSF) railroad runs directly through this corridor. The railroad creates various bear attractants through grain dribbling, train derailments, and rail-killed ungulates causing one to two bear mortalities per year. My project will determine the main causes of bear mortality and provide ways to mitigate for those losses within the corridor. I will use historic bear movement and mortality data and collect data about bear-train conflict sites to understand the causes of bear mortality. I will also incorporate new innovative technology to keep bears off the railroad tracks. My project will provide practical data to guide management actions in the Middle Fork of the Flathead corridor.

31. Polar Bear-Human Information Management System

James Wilder, US Fish & Wildlife Service

A primary management goal of The Polar Bear Range States' (Canada, Greenland, Norway, Russia, and the U.S.A.) for polar bears is to ensure their safe coexistence with humans. This involves identifying and minimizing potentially dangerous bear-human interactions. To achieve this, a formal, coordinated information system is needed to record encounters and attacks. However, one of the difficulties in understanding and managing polar bear-human interactions is that they are poorly documented. To date, polar bear attacks on humans have been rare, but when they do occur, they evoke strong public reaction. To prevent escalating conflicts between polar bears and humans, bear-human interaction plans need to be developed and implemented based on relevant data. To implement sound management strategies for polar bears, and to adequately protect people living, recreating, and working in polar

bear country, it is imperative that polar bear managers assemble critical information related to bear-human interactions.

In order to address these issues, we developed the Polar Bear-Human Information Management System (PBHIMS). This system enables a realistic assessment of bear-human interactions throughout their range and provides a scientific framework for mitigating bear-human conflicts in the future.

32. A comparative analysis between knowledge and bear safety information utilization by day hikers in Glacier National Park

Phil Zumstein, The University of Montana

The purpose of this study was to identify Glacier National Park backcountry day users' bear safety information source utilization, obtain their knowledge level of bear safety, and identify any differences in knowledge level when compared to sources used. The study was conducted within Glacier National Park in Montana during the summer of 2011. A quantitative survey was given to 540 backcountry day users during their day hikes within the park. A bear safety quiz section was included within the survey to obtain user knowledge level.

The results indicated that the backcountry users utilized Glacier National Park information sources more than any other source. Of the entire park provided information materials, text based information was found to be most commonly used to gain bear safety knowledge. Backcountry day users were found to know an average of 70 percent of the bear safety material provided by Glacier National Park.

Respondents who primarily utilized Glacier National Park bear safety information were not more likely to have better knowledge than any other respondent. In fact, the highest knowledge level was of backcountry day users who primarily utilized bear safety information from other parks.