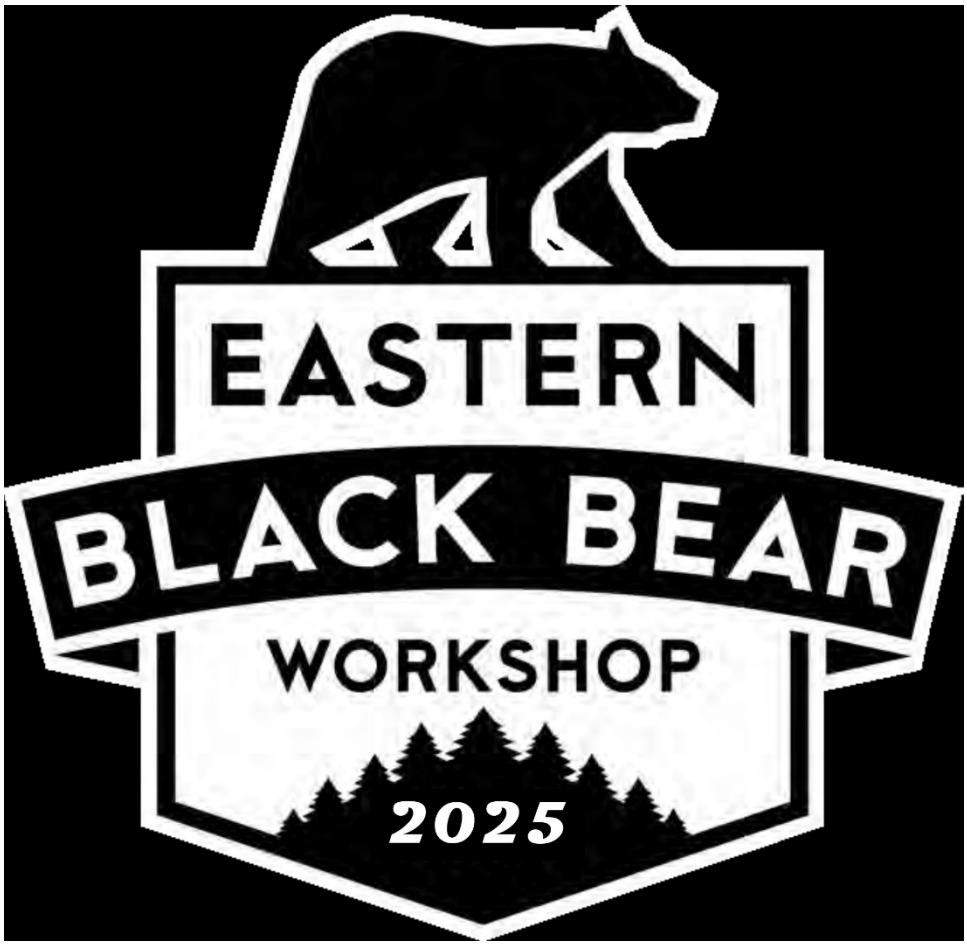
26th Eastern Black Bear Workshop



High Peaks Resort
Lake Placid, NY
April 7-10, 2025

Contents

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The Camp Fire Conservation Fund promotes wildlife conservation, habitat preservation, and sustainable outdoor traditions. Founded in 1977 by the Camp-Fire Club of America, it supports education, advocacy, and research projects ensuring the protection of natural resources and the legacy of hunting, fishing, and outdoor recreation for future generations.

BearWise® is a national program and educational campaign that provides reliable information and useful resources that help people live responsibly with black bears. BearWise was developed by bear biologists who wanted to make sure that no matter where people lived, played or traveled, they got the same consistent message about coexisting with bears.

The New York Chapter of The Wildlife Society (NYTWS) is a scientific and educational organization serving and representing wildlife professionals in New York State. NYTWS promotes the highest possible standards among those working with wildlife resources and the public that use them, strives to increase awareness and appreciation of wildlife values, and seeks to ensure that wildlife resources and their habitats are managed according to sound principles.

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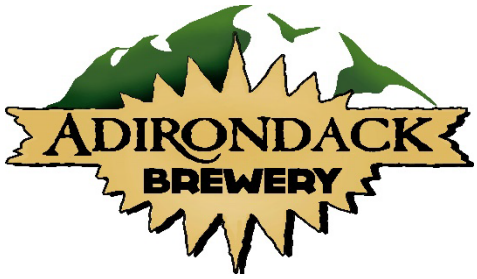

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26th EBBW Planning Committee:

Jeremy Hurst, *chair - Game Management Section Head, NYS Dept. of Environmental Conservation*

Dan Bogan - *Assistant Professor, Siena College & past-President NY Chapter, The Wildlife Society*

Brittany Delor - *Wildlife Biologist, NYS Dept. of Environmental Conservation*

Paul Jensen - *Wildlife Manager, Region 5, NYS Dept. of Environmental Conservation*

David Kramer - *Research Scientist, SUNY-ESF & NYS Dept. of Environmental Conservation*

Brendan Quirion– *Big Game Biologist, NYS Dept. of Environmental Conservation*

James Stickles - *Wildlife Biologist, NYS Dept. of Environmental Conservation*

EBBW Steering Committee:

Colleen Olfenbuttel– *Game Mammals and Surveys Supervisor, NC Wildlife Resources Commission*

Dr. Dana Morin- *Assistant Professor, Mississippi State University, Forest and Wildlife Research Center*

Jen Vashon- *Game Research & Management Section Supervisor, Maine Department of Inland Fisheries & Wildlife*

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Sunday, April 6: Travel Day for early arrival and working group members	
Monday April 7: Travel Day for regular attendees	
8:00 am	SEAFWA Large Carnivore Working Group Meeting – *till 5 pm; Algonquin Room*
	NEAFWA Black Bear Technical Committee Meeting – *till 5 pm; Wright Room*
4:00 pm	Welcome table opens
7:30 pm	Welcome Social – *The Den*
Tuesday, April 8: First Day of EBBW – *meeting in the McIntyre Range*	
7:00 am	Welcome table opens
7:00 am	Breakfast *(provided; Great Range Room)*
9:00 am	**Welcoming Remarks** – *Katie Petronis, Deputy Commissioner of Natural Resources, NYSDEC*
9:15 am	**Managers Forum** – *Jeremy Hurst, NYSDEC – Moderator* • Eastern Jurisdictional Survey – *Nathan Bowersock, MDC – 30 min* • Working Group Updates ○ SEAFWA LCWG – *Colin Carpenter, WVDNR – 10 min* ○ NEAFWA BBTC – *Dave Wattles, MDFW – 10 min* ○ Open Q&A – *10 min*
10:15 am	Break – *15 min*
10:30 am	**Managers Forum continued** – *Jeremy Hurst, NYSDEC – Moderator* • Lessons From Over the Hill (panel)
12:00 pm	Lunch *(provided; Great Range Room)*
1:00 pm	**Session 1: Trash Cans & Dumpsters** – *Mike Orlando, FWC – Moderator* • Design, Safety Standards, and Bear Resistance - discussion with industry – *Kirk Sander, Derick Foster, Stephen Mullis, Michael Recor* • Open forum discussion – *30 min*
3:00 pm	Break – *30 min*
3:30 pm	**Session 2: Trash Talk…** then **Hunting & No Hunting** – *Courtney LaMere, NYSDEC – Moderator* • When Trash Attacks: Beyond the Garbage Cans in Florida – *Michael Orlando, Florida Fish and Wildlife Conservation Commission - 15 min* ○ Open forum discussion – *15 min* • Louisiana's First Bear Season Following Delisting – *John Hanks, Louisiana Department of Wildlife & Fisheries – 15 min* • Managing human-bear conflict without hunting - Lessons from Connecticut – *Kyle Testerman and Jason Hawley, Connecticut DEEP – 15 min* • Black Bear Population Growth in the Eastern Panhandle of Florida, USA – *Shelby Shiver, Florida Fish and Wildlife Conservation Commission – 15 min* • Open forum discussion – *15 min*
5:00 pm	Adjourn
6:00 PM	Dinner *(provided; Great Range Room)*
7:30 PM	**Poster Session** – *Lake House Lobby*

Wednesday, April 9 – *meeting in the McIntyre Range*	
7:00 am	Breakfast *(provided; Great Range Room)*
9:00 am	**Session 3: Community Co-Management of Black Bears** – *Jonathan Russell, NYSDEC – Moderator* • Updates on Establishing North Carolina as a BearWise State – *Ashley Hobbs, North Carolina WRC - 15 min* • Increasing Outreach Capacity Utilizing the Virginia Master Naturalist Program – *Carl Tugend, Virginia Department of Wildlife Resources - 15 min* • Florida's Bear Response Contractor Program: Ten Year Update (2015-2025) – *Chris Boyce, Florida Fish and Wildlife Conservation Commission - 15 min* • Stakeholder Involvement in Florida Bear Management – *David Telesco, Florida Fish and Wildlife Conservation Commission - 15 min* • Utilization of Law Enforcement to Reduce Bear Conflict in New Jersey – *Michael Madonia, NJ Fish & Wildlife - 15 min* • Panel Discussion – *15 min*
10:30 am	Break – *15 min*
10:45 am	**Session 4: Reducing Human-Bear Conflicts** – *Jessica Haggerty, NYSDEC – Moderator* • Assessing the effectiveness of energized fencing to protect bird feeders from bear damage – *Hannah Leeper, Minnesota Department of Natural Resources – 15 min* • Bear-human Conflicts in the Adirondack High Peaks: History and Solutions – *James Stickles, NYS Dept. Environmental Conservation – 15 min* • Efficacy of relocation of black bears as a mitigation tool – *Ryan Williamson, Great Smoky Mountain NP; Janelle Musser, Tennessee Wildlife Resources Agency – 15 min* • Open forum discussion – *30 min*
12:00 pm	Lunch *(provided; Great Range Room)*
1:00 pm	**Optional Field Trips –** Olympic Training Center Tour or Adirondack Ecology via the Whiteface Mountain Gondola **Ad Hoc Discussion groups**
6:00 PM	Dinner (*on your own*)

Thursday, April 10 – *meeting in the McIntyre Range*	
7:00 am	Breakfast *(provided; Great Range Room)*
9:00 am	**Session 5: Understanding the Effects of Habitat Loss & Fragmentation** – *Dave Kramer, NYSDEC – Moderator* • Estimating Population Size and Managing Genetic Diversity of the Isolated Central Georgia Black Bear – *Ben Carr, University of Georgia – 15 min* • Promoting Ursus americanus connectivity across the Lower Mississippi Alluvial Valley – *Heather Clendenin, University of Memphis – 15 min* • Black Bear Habitat Selection and Movement in Response to Wind Energy – *Jaclyn Comeau, Vermont Fish and Wildlife Department – 15 min* • Open Q&A – 30 min
10:15 am	Break – *15 min*
10:30 am	**Session 6: Social Science & Decision Analysis in Bear Management** – *Ryan Rockefeller, NYSDEC – Moderator* • Advancements in Decision Analysis and Applications to Harvest Management of Recovering Black Bear Populations – *Dana Morin, Mississippi State University – 15 min* • Benefits of Value of Information Analysis to Black Bear Management – *Erin Morrison, Wisconsin Department of Natural Resources – 15 min* • Perception and trust influence acceptance for black bears more than bear density or

	conflicts – *William F. Siemer, Cornell University – 15 min* • Investigating Human Dimensions of Black Bear Management: A Social-Ecological Systems Approach in Michigan, USA – *Julie Young, Utah State University – 15 min* • Panel Discussion – *30 min*
12:00 pm	Lunch *(provided; Great Range Room)*
1:00 pm	**Session 7: Bear Mange** – *Brittany Delor, NYSDEC – Moderator* • Spatial trends in reports of American black bear (Ursus americanus) mange in the Ozark Mountain Region, Arkansas – *Jillian Broadhurst, University of Georgia – 15 min* • Impacts of Multiple Mortality Factors on Mange Affected Black Bear Populations – *Katie Martin, Virginia Department of Wildlife Resources – 15 min* • Engaging Stakeholders in Agencies' Response to Bear Mange – *Raquel Francisco, University of Georgia – 15 min* • Finding the missing link: using a multi-state occupancy model to investigate sarcoptic mange co-occurrence between coyote and black bear in the Ozark Mountains – *Marcelo Jorge, Southeastern Cooperative Wildlife Disease Study – 15 min* • Assessing and Managing Sarcoptic Mange in Arkansas Black Bears: A Five-Year Surveillance and Conservation Strategy – *Robert Edwards, Arkansas Game and Fish Commission – 15 min* • Panel Discussion – *30 min*
2:45 pm	Break – *30 min*
3:15 pm	**Session 8: Capture & Monitoring** – *Dan Ruggiero, NYSDEC – Moderator* • The Next Generation of Bear Trapping? Using automated traps to increase efficacy and efficiency of trapping black bears – *Anthony Ballard, Mississippi Dept. of Wildlife, Fisheries, and Parks – 15 min* • Using Video Camera Traps to Understand Black Bear (Ursus americanus) Interactions with Hair Snares – *Caitlin Brett, North Carolina State University – 15 min* • Open Q&A – *15 min*
4:00 pm	**EBBW Business Meeting** – *Steering Committee*
4:30 pm	**Closing Remarks**
6:00 PM	Farewell Banquet Dinner *(provided; Great Range Room)* • Notes of a career in bear management – *Jim Cardoza, Massachusetts Division of Fisheries and Wildlife (retired); Karen Noyce, Minnesota Department of Natural Resources (retired)*

Friday, April 11	
AM	Departure

Abstracts

Session 1: Trash Cans & Dumpsters

Bear cart design, safety standards, and bear resistance - *Kirk Sander[1], Derick Foster[2], Stephen Mullis[2], Michael Recor[3]; (1) National Waste & Recycling Association; (2) Rehrig Pacific Company; (3) Waste Management*

Representatives from the waste management and product design industry will explain current industry standards and the challenges of developing, producing and servicing bear carts. We will also discuss current bear cart testing standards and provide recommendations for improvement. This will be a facilitated discussion, and we hope to engage the workshop participants to open and constructive collaboration to improve bear carts functionality.

Session 2: Trash Talk… then Hunting & No Hunting

When Trash Attacks: Beyond the Garbage Cans in Florida - *Michael Orlando; Florida Fish and Wildlife Conservation Commission*

Florida has 23 million residents, over 140.6 million visitors each year and over 4,000 Florida black bears (Ursus americanus floridanus). With growing populations of both people and bears, there are more interactions. Since 2012, the Florida Fish and Wildlife Conservation Commission (FWC) has received between 5,000 to 6,000 calls each year related to bears, with the highest number (7,298) in 2023. In addition to outreach efforts, the FWC has been able to cost-share the purchase of bear-resistant equipment with local governments, resulting in over 35,000 bear-resistant residential garbage cans and hardware to modify regular trashcans to make them bear-resistant. For years the FWC has been focused on convincing the public that securing their garbage will help them prevent conflicts with bears and other wildlife and it will make their life better. As part of our outreach efforts, we occasionally ask people what is more likely to get them to change their behavior and secure their garbage: The knowledge that it will make their life better, or that it might save the life of a bear? While there are always hands for both reasons, saving bears almost always gets the majority of votes. Because of this, we have added several stories to the end of our presentations about bears getting plastic jars stuck on their heads and other incidents where access to garbage actually endangers in in some cases kills bears. After people hear all the details of how to keep attractants secure, they now hear the gut-wrenching tales of bear cub rescues and tragic endings. Our attempt to try and change human behaviors by combining the "it's good for you and it's good for bears" with real life situations seems to have some traction based on our unscientific

survey and anecdotal experiences, but have others had similar experiences, and how can we increase people's motivation to take action?

Louisiana's First Bear Season Following Delisting - *John Hanks; Louisiana Department of Wildlife & Fisheries*

To prevent subspecies extirpation, the Louisiana black bear was given protection under the Endangered Species Act in 1992. The federal protection afforded to the subspecies helped facilitate the restoration of Louisiana black bears and their habitat in parts of their historic range, and thus Louisiana black bears were delisted in 2016. In 2024, Louisiana Dept. of Wildlife & Fisheries opened the first black bear hunting season since the 1980s. A conservative lottery hunt was held in the largest and densest bear subpopulation. In this presentation, we will present the biological and administrative considerations, along with potential obstacles, in holding the hunt. Results of the hunt, lessons learned and future plans will be discussed.

Managing human-bear conflict without hunting - Lessons from Connecticut - *Kyle Testerman and Jason Hawley; Connecticut DEEP*

Human-black bear conflicts in Connecticut have followed a long-term increasing trend, with the Department of Energy and Environmental Protection (DEEP) receiving an average of 3,200 reports annually over the past five years. As the bear population expands, conflicts are increasing in frequency, intensity, and geographic range, with home entries being a particular concern. From January 2022 through December 2024, bears entered the living spaces of homes 167 times, far more frequent than in neighboring states with larger bear populations. One likely contributing factor is the absence of a regulated bear harvest in Connecticut. This presentation examines the relationship between conflict frequency, management policies, and potential strategies to mitigate escalating human-bear interactions. While conflicts may be increasing in states with bear hunting, Connecticut serves as a case study for what could occur in other areas if harvest is eliminated or reduced for extended periods.

Black Bear Population Growth in the Eastern Panhandle of Florida, USA - *Shelby Shiver, Darcy Doran-Myers, Paul Schueller, and Brian Scheick; Florida Fish and Wildlife Conservation Commission*

The Florida black bear (Ursus americanus floridanus) was listed by the State of Florida as Threatened from 1974 - 2012. By 2015, there were approximately 4,000

bears in the state. There is currently no legal harvest season for black bears in Florida and their range continues to expand. We collected data from 2016 to 2019 to assessed survival and reproduction of bears in the eastern panhandle to derive an annual growth rate of this subpopulation. Our results indicate a rapid annual population growth rate of +11.9%, driven by high adult female survival, moderately high cub survival, and typical fecundity. If these vital rates are accurate for the subpopulation, we project it could increase from 910 females in 2015 to 2,919 in 2025 (including all ages). These results highlight the ability of black bear populations to rebound when provided with suitable environmental conditions and legal protections. The implications of the rebound of Florida black bears are significant for wildlife conservation and human-wildlife coexistence in the eastern panhandle of Florida and management strategies may need to be tailored to the bear management unit in which it resides.

Session 3: Community Co-Management of Black Bears

Updates on Establishing North Carolina as a BearWise® State - *Ashley Hobbs; North Carolina Wildlife Resources Commission*

The North Carolina Wildlife Resources Commission has used the BearWise® Program since its founding in 2018 to communicate consistent and effective messaging about how to live responsibly with American black bears (Ursus americanus). The NC Wildlife Commission utilizes the consistent, science-based information provided by the program to address human-bear interactions through social media, community outreach and educational programming. NC adopted a formal recognition program for BearWise communities, businesses, recreation areas, and campuses, totaling 15 recognized groups across NC. As human-bear interactions continue to be a significant portion of human-wildlife interaction calls statewide, the Commission is looking to expand its BearWise program through partnerships with outside agencies and community groups and identify new ways to connect NC residents and visitors to BearWise messaging.

Increasing Outreach Capacity Utilizing the Virginia Master Naturalist Program - *Carl Tugend, Courtney Hallache, Katie Martin; Virginia Department of Wildlife Resources*

The recovery and range expansion of black bears from the early 1900s to the present is considered one of Virginia's greatest conservation success stories. While bears were once only found in remnant populations in the western mountains and the refuge of the Great Dismal Swamp, today they are found across nearly 85% of

the land area in Virginia. Concurrent with expanding bear populations, human populations were also increasing in portions of Virginia. Data from the 2020 U.S. Census shows a 7.9% population increase since the 2010 census for a total estimated population of 8.63 million people. Dense human population centers are found south of Washington D.C. and along the Interstate-95 corridor as well as pockets along Interstate 81 in the western mountains. These areas of increased human population growth are also occupied bear range. Since 2013, the Virginia Department of Wildlife Resources (VDWR) has utilized a collaborative wildlife conflict helpline, staffed by USDA-Wildlife Services personnel. This resource has created a repository of bear conflict information while also providing a simple single resource for conflict abatement to the general public. Bear conflict calls have steadily increased since inception of the conflict line, topping out with 3500 calls in federal fiscal year 2020. Call types range in scope from sightings, unsecured attractants (birdfeeders, trash, etc), injury and disease reports, to elevated incidents of property damage and home entries. Helpline staff provide each caller with educational information to prevent or mitigate ongoing conflict while also referring calls to local wildlife division staff if additional follow-up is needed. A common theme that has emerged through this partnership is the need for increased education and outreach on living with black bears, particularly in areas where bears are "new" inhabitants. As a small state agency with limited field staff, the challenge was who could provide this additional outreach. In 2023, DWR's Wildlife Education and Virginia Project WILD Coordinator presented the idea of utilizing trained volunteers through the Virginia Master Naturalist Program as a way to expand our outreach potential. The Virginia Master Naturalist (VMN) program is a statewide corps of volunteers that provide education, outreach, and service to benefit natural resources and natural areas within their communities. The VMN program is sponsored by seven state agencies in Virginia, with the DWR being one of these partner agencies. The program is led by Virginia Cooperative Extension, which is based out of Virginia Tech. Requirements to become a master naturalist include an extensive 40 hour training program, final exam, and completing a number of volunteer hours each year. VMN are organized into chapters across the state based on their locality and often participate in numerous types of educational outreach programs and citizen science data collection projects. Since the creation of the Living with Black Bears project, twelve VMN chapters have completed their basic bear training and begun outreach efforts across the Commonwealth. These chapters have reported over 1,000 volunteer hours to the program and in 2024 provided information to over 13,000 people. Contacts with the public can range from tabling events at fairs or festivals to formal presentations. To ensure consistent and accurate messaging, each chapter is trained by the Virginia bear program prior to beginning outreach efforts. Standard presentations and BearWise® materials are provided for the chapters along with coordination and oversite by the Wildlife Education Coordinator. While the project requires some "up front" work by DWR staff, the benefits have thus far been well

worth it! In 2025, chapters in areas with high bear conflict calls and border areas to existing bear range are being targeted to enroll for participation. We hope these efforts will continue to foster coexistence between humans and black bears while preventing or minimizing future conflict situations.

Florida's Bear Response Contractor Program: Ten Year Update (2015-2025) - *Chris Boyce, Florida Fish and Wildlife Conservation Commission*

For the last 23 years, the Florida Fish and Wildlife Conservation Commission (FWC) has hired and trained private individuals to take part in the Bear Response Contractor (BRC) program. The BRCs provide fee-for-service assistance with field response across the state, including providing advice on how to avoid conflicts with bears, retrieve carcasses and collect biological samples, assist with necropsies, set and monitor traps, conduct outreach events, and transport and repair equipment. Since its inception as a trial project in 2002, the program was expanded to operate with approximately 20 BRCs for the last ten years. The BRC program enables quick response throughout the state in areas that are often too far for FWC staff to respond to in a timely manner and/or are assigned when staff are responding to other situations. BRCs also join staff to assist with complex response situations. Over the last five years BRCs responded to an average of 923 incidents annually, nearly double the 530 incidents we reported in 2015. As both the human and bear populations continue in increase, these individuals will continue to play an ever more important role in assisting FWC biologists to manage human-bear conflicts in Florida.

Stakeholder Involvement in Florida Bear Management - *David Telesco, Florida Fish and Wildlife Conservation Commission*

The Florida Fish and Wildlife Conservation Commission (FWC) has a history of establishing Stakeholder Technical Assistance Groups (TAGs) to assist with communication and relationship-building on high profile wildlife conservation issues. By creating a TAG, FWC recognizes the importance of stakeholder input and allows the agency the benefit of understanding concerns and incorporating those into the decision-making process before bringing proposed actions for Commission approval. The FWC created the Statewide Bear Stakeholder TAG in 2007 to draft the first Bear Management Plan. The TAG represents over 20 different federal and state partner agencies as well as non-profit organizations with an interest in bears. The TAG met regularly throughout the five-year drafting process, which was critical in getting the Plan approved in 2012. The FWC continued meeting with the TAG twice a year to provide updates on bear management and research efforts to continue regular

communication and maintain relationships. In addition to the TAG, the Plan specifically recommended the creation of seven Bear Stakeholder Groups (BSGs), one for each Bear Management Unit. Unlike the TAG, whose members must represent formal organizations, members of the BSGs could represent themselves or informally represent interest groups like homeowner's associations or outdoor recreationists. The FWC solicits BSG membership to provide local input on issues related to bears in their area. The FWC has greatly benefited over the years from input from both the TAG and BSGs as the agency has made changes in how we manage bears, including re-opening bear hunting in 2015, starting an update on the Plan in 2017, and even creating internal policies like using Tasers® on bears. In addition to providing FWC important feedback, TAG and BSG members hear directly from other members, which helps create relationships within the groups and the agency as well as an understanding of differing viewpoints.

Utilization of Law Enforcement to Reduce Bear Conflict in New Jersey - *Michael Madonia, NJ Fish & Wildlife*

NJ DEP Fish & Wildlife (NJFW) uses an integrated management strategy for managing the black bear population including lethal and non-lethal methods to minimize property damage and conflict. This approach includes population and damage prevention control methods through regulated hunting, research, educational programs, use of bear-resistant garbage containers, policies addressing dangerous bears and training to local police departments. Starting in 2001, NJ Fish and Wildlife has provided bear training to State, County and Municipal police departments to help address and expedite response to problematic bears deemed to be an immediate threat to public safety or property. Training is conducted at local police academies covering topics about bear biology, behavior, Rating & Response Criteria, Comprehensive Black Bear Management Policy (CBBMP), damage prevention methods and urban response along with a field course concentrating on safe firearm handling, shot placement and aversive conditioning. All field courses are held at a certified police training firearm range using lethal and non-lethal rounds along with pyrotechnics. Approximately two thousand law enforcement officers have received in-person training with future training being offered online with a field course scheduled after the completion of the educational course. NJFW manages the bear population at a level commensurate with available habitat, consistent with reducing risk to public safety and property. NJFW and its partners will continue to utilize lethal control on dangerous, high-risk bears and use non-lethal techniques on nuisance bears to protect and manage the State's resource to maximize long-term biological, recreational, and economic values for all New Jersey residents.

Session 4: Reducing Human-Bear Conflicts

Assessing the effectiveness of energized fencing to protect bird feeders from bear damage - *Hannah Leeper, Minnesota Department of Natural Resources*

Black bears (Ursus americanus) have evolved to capitalize on dense calorie patches on the landscape to meet nutritional needs. Bird feeders provide a food source that is widely available, regularly refilled, and high in calories. However, bears often damage the feeder, causing a negative human-bear interaction or taking a financial toll on the landowner. Additionally, when bears regularly visit bird feeders, they can become food-conditioned, lose their fear of humans, and approach humans in search of foods, sometimes leading to the bear being put down in some jurisdictions. Nearly half of all attractant-related bear complaints to the Minnesota Department of Natural Resources are about bird feeders. One solution is to remove the bird feeder, but some callers are hesitant to do so because they enjoy feeding birds. MN DNR needed to find another solution to protect bird feeders from bear damage. Specifically, we wanted to know how effective energized fences are at protecting bird feeders from bears. We created a matched pair study design, where each site had a bird feeder that was protected by an energized fence with >7,500V, and a bird feeder that was outside of the energized fence. Kaplan-Meier survival estimators were used to determine time to failure (number of days until bird feeder damage), and overall bird feeder survival (percent of bird feeders that survived the study). After the first season, we found that energized fencing was 100% effective at protecting bird feeders from bear damage (n = 14). Of the sites that had a bear visit (n = 7), none of the bird feeders inside of the energized fence were damaged by bears. After the second year of the study, preliminary results indicate that 14 out of 22 sites had a bear visit, and 5 fences were breached by bears. It appears that fences were breached as result of human error (lack of maintenance, leaving the energizer outside the fence, leaving the feeder within reach of the perimeter of the fence). Additionally, the first year of the study was a good natural bear food year, whereas the second year of the study was a poor natural bear food year, which could have caused bears to attempt to access more human-provided foods, such as the bird feeders inside of the energized fence. As energized fence kits become more available and affordable, MN DNR encourages landowners who feed birds in the summer to utilize an energized fence around their bird feeders.

Bear-human Conflicts in the Adirondack High Peaks: History and Solutions - *James Stickles, NYSDEC*

For decades, the High Peaks Wilderness Area (HPWA) of Adirondack Park was the epicenter of negative human-bear interactions in the backcountry. Improper storage

of food and waste resulted in incidents that included food loss, bluff charges, destruction of camping gear, and human contact. Standard bear hangs were not effective, therefore, in 2001, food hoist cables were installed. However, problems persisted, and the cables required more maintenance than anticipated and were removed. Using the results of a survey that investigated HPWA visitor use of food protection/storage methods and familiarity with bear issues in this area, NYSDEC partnered with the Wildlife Conservation Society to develop a regulation requiring the use of bear-resistant food canisters in a portion of HPWA and increase the local availability of these canisters for visitors in this area. These actions ultimately resulted in an approximate 80% reduction in conflicts reported from 2004 to 2006. Despite this success, a small number of bold, habituated bears continued to cause issues. Following the lethal removal of the last of these bears during the summer of 2020, reports of negative human-bear interactions have completely ceased. As visitor use of Adirondack Park continues to increase, expansion of this regulation to other backcountry areas may be warranted.

Efficacy of relocation of black bears as a mitigation tool - *Ryan Williamson, Great Smoky Mountains National Park; Janelle Musser, Tennessee Wildlife Resources Agency*

Great Smoky Mountains National Park (GRSM) in Tennessee and North Carolina, USA, has a high-density American black bear population (*Ursus americanus*) and frequent human-bear conflicts. Previous research at GRSM based on VHF telemetry and tag returns found that the fates of relocated conflict bears were largely unknown, thereby leaving many questions about the efficacy of relocation as a mitigation tool unanswered. We fitted 50 conflict bears relocated from GRSM with GPS-radio collars and released them in the Cherokee National Forest, Tennessee. Some of these bears were released in the Pigeon River Gorge (PRG), where we also collared 37 resident non-conflict bears for comparison. We used those GPS location data to evaluate survival, recurrence of conflict activity, homing rate, and settling rate for relocated and resident bears, as appropriate. Known-fate models indicated that the mean annual survival probability for relocated bears was 0.102 (95 % CI = 0.000–0.356) when we censored lost signals. Survival of relocated bears was much lower than non-relocated conflict bears in GRSM (0.869, 95% CI = 0.863–0.875) and non-conflict resident bears in the PRG (0.836, 95% CI = 0.659–1.000). Harvest was the greatest mortality risk for both relocated (0.482, 95% CI = 0.326–0.638) and resident bears (0.136, 95% CI = 0.000–0.280), and relocated bears were at greater risk of harvest than residents (β = 2.407, 85% CI = 0.948–3.866). The annual probability of relocated bears returning to their original capture location decreased with distance relocated (β = -0.025, 85% CI = -0.046–-0.004) and averaged 0.615 (95% CI = 0.341–0.889) for adults and 0.111 (95% CI = 0.000–

0.318) for subadults. The annual probability of recurrent conflict, defined as a report to agency officials by landowners, for relocated bears was 0.445 (95% CI = 0.225–0.666). Recurrent conflict increased with the level of food conditioning (β = 0.274, 85% CI = 0.036–0.511), as determined by stable isotope analysis, and decreased with distance from the release-site to the nearest urban area (β = -0.0921, 85% CI = -0.1842–0.0002). Our results suggest that public education is paramount to avoid human-bear conflicts before they begin, as relocation and other 'bear-centered' options may have only limited success.

Session 5: Understanding the Effects of Habitat Loss and Fragmentation

Estimating Population Size and Managing Genetic Diversity of the Isolated Central Georgia Black Bear - *Ben Carr, University of Georgia*

Within Georgia, there are three distinct populations of black bears (Ursus americanus). The central Georgia population (CGP) is limited to contiguous forest areas surrounded by urban sprawl and development. The CGP is the most isolated, genetically and geographically, and least abundant population within the state. The CGP continues to experience declines in habitat availability due to human development and activity. Furthermore, continued vehicular collisions and limited hunting opportunities demonstrate the need for rigorous abundance estimates for the CGP. Our research aims to develop updated, robust estimates of population size and provide an assessment of genetic diversity across the CGP, while also augmenting genetic diversity through the cross-fostering of neonate cubs from more genetically diverse populations within the state. We constructed approximately 130 hair snares across the study area and monitored them weekly during the summers of 2023 and 2024. Across both summers, 4,688 envelopes of hair were collected from hair snares. Following collection, we chose a subset of hair samples for genetic analysis. We used a more detailed and cost-effective sequencing technology that targets single nucleotide polymorphism (SNP) DNA markers, instead of the historically chosen method using microsatellites. We also conducted trapping efforts to deploy GPS collars during the summers of 2022, 2023, and 2024 where 77 bears were captured, and 35 collars were deployed. The GPS data are used to inform spatial capture-recapture models to generate better estimates and provide the opportunity to foster cubs to collared females. Across the winters of 2023 and 2024, approximately 50 den checks were conducted between North and Central Georgia and 4 cubs were fostered from North Georgia to the CGP. Together with the development of an updated population and density estimate, this research will improve bear management efforts within the CGP.

Promoting Ursus americanus connectivity across the Lower Mississippi Alluvial Valley - *Heather Clendenin, University of Memphis*

Despite being considered a species of least concern across most of their range, American black bear (Ursus americanus) populations in the southern portion of the United States experienced a range retraction of 90-95% in the late 1800s. Populations were nearly extirpated in Arkansas, Louisiana, Missouri, Oklahoma, and Texas by 1900 (Smith and Clark 1994). Losses were especially pronounced in the Lower Mississippi Alluvial Valley (LMAV), and demographic rescue via translocation was attempted in this region. Subsequent demographic recovery is producing micro-range expansions, including to the west in northern Louisiana, as well as to the east into western Mississippi. Additional habitat is required to support this demographic expansion and connect isolated subpopulations. In this study, we complemented previously collected movement analyses with genetic data and the program, RADISH, to characterize landscape resistance to effective geneflow for U. americanus across the LMAV. We use corridor analyses implemented in UNICOR to target areas within the LMAV that could be prioritized for habitat improvement or restoration. We then model changes in geneflow and functional connectivity between LMAV populations following these potential habitat improvements.

Black Bear Habitat Selection and Movement in Response to Wind Energy - *Jaclyn Comeau, Vermont Fish and Wildlife Department*

In an era marked by a global shift towards renewable energy sources, wind energy has emerged as one of the fastest growing sectors (IEA, 2024). However, this rapid growth raises concerns regarding its potential impacts on wildlife. While extensive research has focused on the impacts of wind turbines on birds and bats, far less is understood about how these developments affect non-flying species. It has been suggested that wind energy projects have the potential to influence terrestrial animals through various behavioural mechanisms, but this has yet to be largely empirically tested. Our research addresses this knowledge gap by using a long-term field experiment to analyze the effects of wind farm development on the behaviour of the American black bear (Ursus americanus). We partnered with the Vermont Fish and Wildlife Department on a multi-year field experiment involving the construction and operation of the first commercial-sized wind project in a U.S. National Forest, built within critical black bear habitat in the Green Mountain National Forest. Between 2010 and 2021, we equipped 45 black bears with GPS collars, collecting geospatial data across all three phases of the wind project development: pre-construction, during construction, and post-construction (during operation). We measure behavioural changes by examining differences in movement patterns and habitat selection using an integrated step selection analysis (Avgar et al. 2016,

Methods Ecol. Evol. 7: 619). The outcomes of this research aim to guide evidence-based decision-making for the strategic development of future wind energy projects, supporting the global transition to renewable energy while mitigating its impacts on wildlife.

Session 6: Social Science & Decision Analysis in Bear Management

Advancements in Decision Analysis and Applications to Harvest Management of Recovering Black Bear Populations - *Dana Morin, Mississippi State University*

Decision Analysis and Structured Decision Making (SDM) are increasing in use throughout wildlife management and other fields. Advocates of SDM frequently emphasize the value of incorporating social science methods including human dimensions surveys and expert elicitations in developing alternative actions to consider and weighting potential outcomes. However, the quantitative aspects underlying methods of assessing alternative actions can often be abstruse to managers. Multiple advancements specifically address decision making in the face of uncertainty regarding available information about populations and have strong potential applications for management of recovering black bear populations. I will describe several of these methods including demographic projection models to predict potential outcomes of harvest, and prescribed take level to identify robust harvest limits when population size and growth rates are uncertain or unknown. I will illustrate potential use of methods with examples from recovering black bear populations in the southeastern US. Finally, I will describe qualitative value of information and highlight the potential of this method to prioritize current research needs to reduce uncertainty and aid black bear managers in making science-based recommendations.

Benefits of Value of Information Analysis to Black Bear Management - *Erin Morrison, Wisconsin Department of Natural Resources*

Wildlife management relies heavily on empirically-derived estimates of population parameters to inform decision making. While it is often assumed that more data leads to more accurate estimates, more data may not lead to changes in management or policy decisions. Further, managers are limited in time and resources. When evaluating how to best use limited resources, it is important for managers to consider when more data collection will significantly impact management actions. Value of Information (VoI) analysis is a decision analysis method for evaluating the expected improvement that additional information will

make on management decisions. Similar to how a sensitivity analysis addresses the effect of uncertainty on a predicted outcome, VoI addresses the effect of uncertainty on a decision choice. Our objective for this study is to use VoI to assess the value of updating Wisconsin's data on black bear (Ursus americanus) pregnancy rates for younger age classes on the population model and resulting harvest quota. Current age-specific rates of reproduction were obtained from cementum annuli from harvested bears, which has several drawbacks (Allen et al. 2017). One option for reducing uncertainty in pregnancy rates could be collaring female yearlings as part of an existing reproduction study to empirically estimate pregnancy rates for younger age classes. By performing a VoI analysis first, we determine whether the potential increase in knowledge would have a significant impact on harvest quota decisions to justify expending additional time and resources needed to collect additional reproductive information. By demonstrating how VoI analysis can help determine when more data would influence decision-making, this study serves as an example of how biologists and researchers can begin to incorporate VoI analysis into their management practices to use agency resources more effectively. Maximilian L. Allen, Bruce Kohn, Nathan Roberts, Shawn Crimmins, and Timothy R. Van Deelen. 2017. Benefits and drawbacks of determining reproductive histories for black bears (Ursus americanus) from cementum annuli techniques. Canadian Journal of Zoology. 95(12): 991-995.

Perception and trust influence acceptance for black bears more than bear density or conflicts - *William F. Siemer, Center for Conservation Social Sciences, Department of Natural Resources and the Environment, Cornell University, Ithaca, NY*

To sustain black bear (Ursus americanus) populations, wildlife managers should understand the coupled socio-ecological systems that influence acceptance capacity for bears. In a study area encompassing a portion of New York State, we spatially matched datasets from three sources: human-bear conflict reports between 2006 and 2018, estimates of local bear density in 2017-2018, and responses to a 2018 property owner survey (n=1,772). We used structural equation modeling to test hypothesized relationships between local human-bear conflict, local bear density, and psychological variables. The final model explained 57% of the variance in acceptance. The effect of bear population density on acceptance capacity for bears was relatively small and was mediated by a third variable: perception of proximity to the effects of human-bear interactions. The variables that exerted a direct effect on acceptance were perception of bear-related benefits, perception of bear-related risks, perceived proximity to effects of human-bear interactions, and being a hunter. Perception of bear-related benefits had a greater effect on acceptance than perception of bear-related risks. Perceived proximity to effects of human-bear interactions was affected by local bear density, but also was affected by social trust.

Increased social trust had nearly the same effect on perceived proximity as decreased bear density. Social trust had the greatest indirect effect on acceptance of any variable in the model. Findings suggest wildlife agencies could maintain public acceptance for bears through an integrated approach that combines actions to address bear-related perceptions and social trust along with active management of bear populations.

Investigating Human Dimensions of Black Bear Management: A Social-Ecological Systems Approach in Michigan, USA - *Julie Young, Anna Miller, Taylor Peltier, Sara Fischer, Megan Stone, Tyler Petrolje, Emily Pomeranz, Cody Norton; Utah State University*

Interactions between wildlife and humans are part of a larger social-ecological system in which feedbacks occur between nested hierarchical levels and the outcomes of those interactions range from negative to positive. Recognizing important components of social-ecological systems and investigating interactions between humans and wildlife can lead to critical improvements in wildlife management. Human-bear interactions are a concern in areas where increasing black bear (Ursus americanus) populations overlap with human activities. In the northern lower peninsula of Michigan, USA, the bear population has increased by 70 percent in the past decade, alongside increased reported conflicts with humans. Our research will combine data on bear density and behavior with human perspectives and behavior to identify effective management of human-bear interactions. Our bear ecology approaches include quantifying bear movement and behavior with the use of GPS collars and estimating population density using non-invasive genetic sampling via scat-searching dogs and hair snares. Our social science approaches include key stakeholder and practitioner interviews and a survey of the general population, including an urban-to-rural gradient. We plan to integrate bear and social ecology data using Bayesian statistics and spatial analysis. Ultimately, our research aims to inform the management of human-black bear interactions in the Baldwin Management Unit and will have broader implications for bear management in other regions of the US.

Session 7: Bear Mange

Spatial trends in reports of American black bear (Ursus americanus) mange in the Ozark Mountain Region, Arkansas - *Jillian Broadhurst[1,2], Raquel Francisco[1,2], Jennifer R. Ballard[3], Amanda J. Riggs[3], Michel Kohl[1], Michael J. Yabsley[1,2]; (1)*

University of Georgia; (2) Southeastern Cooperative Wildlife Disease Study; (3) Arkansas Game and Fish Commission

Mange caused by the Sarcoptes scabiei mite is a significant parasitic disease known to cause morbidity and mortality of numerous wildlife species. Although canids were historically overrepresented in North American wildlife cases, the American black bear (Ursus americanus) is an emerging new host, with S. scabiei causing bear population health concerns in recent years. The ecology of this new host-pathogen system is still poorly understood. Thus, to identify potential risk factors predisposing bear populations to sarcoptic mange, we sought to elucidate spatial trends in locations of bear mange cases. We explored reports of mange in a select population of bears in the Ozark Mountain Region of Arkansas, which observed its first case of bear mange in 2018. Locations of bear mange reports obtained by the Arkansas Game and Fish Commission from 2018-2022 within an approximately 40,000 km2 area of the Ozark Mountain Region were analyzed. A resource-selection function model was employed to explore covariates related to increased urbanization, including distance to anthropogenic structures, human and bear population density estimates, and land cover types in reporting locations. Preliminary results show that based on these parameters, the rate of anthropogenic disturbance in an area is associated with an increased likelihood of experiencing a report of bear mange. These findings provide valuable data highlighting potential factors that may predispose bear populations to sarcoptic mange. These results may help wildlife managers predict areas with high potential for future outbreaks and inform where to concentrate mitigation efforts in order to safeguard black bear conservation and population health.

Lessons in Progress: Impacts of Multiple Mortality Factors on Mange Affected Black Bear Populations - *Katie Martin, Carl Tugend, John Tracey; Virginia Department of Wildlife Resources*

Black bears have been listed as a game species in Virginia since 1930, with regulated hunting seasons in place and the creation of mandatory harvest reporting stations in 1947. Bear seasons at this time were extremely limited and established primarily in the northern Appalachian Mountains (Shenandoah Valley area). Since then, bear hunting opportunities have expanded throughout Virginia as bear populations recovered from historic lows. Bear hunting, particularly with the use of hounds, has been a popular recreational and cultural activity in the Appalachian Mountains for generations. Due to habitat protections from the creation of the George Washington-Jefferson National Forest and refugia found on Shenandoah National Park, bear numbers in the northern Shenandoah Valley rebounded quickly through the 20th century. As bear populations increased (~9.5% per year growth

rate from 2001 to 2009) conflict calls around the Shenandoah Valley and western mountains also reached new peaks. Due to this and other factors, in 2017 bear population objectives for 6 bear management zones in western Virginia were changed from stabilize to reduce. Bear harvest seasons at the time consisted of an archery season (~45 days, Oct-early Nov), a 6-day muzzleloader season (2nd week of Nov) and a 6 week firearms season with the use of hounds. With the population objective change, a new 3-day early bear season was implemented in late September for 41 counties, primarily west of the Blue Ridge. This season allows any weapon and the use of hounds. The bag limit for Virginia has remained 1 bear per hunter. The goal of the early season addition was to create a 25% population reduction over 5 years (5% per year) within these targeted zones. Once the goals were met, this season would be removed. In 2014, 2 cases of sarcoptic mange were confirmed in black bears in Frederick County VA. From 2014 to 2017, 30 cases were confirmed within a 3-county area in the northern Shenandoah Valley. In 2018, cases began to expand south and eastward, and since 2020 have numbered over 125 each year. Roughly 30% of reported cases have resulted in a known death of the bear (humanely dispatched or found deceased). The areas of high mange reports overlap with many of the northern bear zones where population reductions were being implemented through changes in population objectives and harvest seasons. Virginia uses Downing population reconstruction to create population estimates and trends for 22 bear management zones. Mandatory tooth submission has been a staple of the harvest reporting system since 1947 with compliance rates over 80% in most years. Current trends show steeply declining (statistically significant) populations in the northern bear management zones where mange has occurred since 2014. Due to these declines, the early 3-day season was pulled from 25 counties prior to the 2023 harvest season and additional harvest season reductions are being discussed currently. This presentation will discuss how multiple factors are likely interacting (harvest, sarcoptic mange, and non-harvest mortality) within bear populations in the mountains of Virginia. Research with Virginia Tech is currently ongoing to parse out what affect mange has had on these population declines versus harvest and other competing factors. We present this as a preliminary discussion to assist bear managers with harvest season structure decisions as mange (or other novel diseases or mortality factors) emerge to impact bear populations across the country.

Finding the missing link: using a multi-state occupancy model to investigate sarcoptic mange co-occurrence between coyote and black bear in the Ozark Mountains - *Marcelo Jorge, Southeastern Cooperative Wildlife Disease Study*

Sarcoptic mange, caused by Sarcoptes scabiei, is a parasitic disease that impacts wildlife worldwide. Although mange is endemic in North American canid populations,

such as coyotes (Canis latrans), its recent emergence and spread in black bears (Ursus americanus) is less understood. In the Arkansas Ozark Mountains, a geographically distinct black bear population has experienced sarcoptic mange cases since 2018. This study investigates whether mange in coyotes increases the probability of mange occurrence in black bears, leveraging non-invasive camera trap data and a multi-state occupancy models to evaluate patterns of co-occurrence. Preliminary data from 2021 to 2022 were collected at three closely situated camera grid locations in northwest Arkansas, USA, spanning Newton and Searcy counties. The Erbie study site in Newton County lies to the west, Tyler Bend in Searcy County to the east, and the Gene Rush Wildlife Management Area (WMA), which bridges both counties, is centrally positioned between them. The data demonstrate 929 independent black bear detections, with 66 (7%) exhibiting clinical signs consistent with mange. Mange in black bears was observed solely at the Erbie site, with a prevalence rate of 10%, while no mange cases were noted in bears at Tyler Bend or Gene Rush WMA. In contrast, there were 3,077 independent coyote detections, of which 452 (14%) exhibited clinical signs consistent with mange. Mange was present in coyotes across all three sites: Erbie exhibited the highest prevalence at 23%, followed by Gene Rush at 8% and Tyler Bend at 3%. By analyzing these data, the multi-state occupancy model will quantify the relationship between coyote and black bear mange occurrences, accounting for detection probabilities and habitat overlap. Early results highlight the potential role of sympatric coyote populations in influencing black bear mange dynamics, particularly in areas of shared habitat like Erbie. This study provides critical insights into sarcoptic mange epidemiology, supporting targeted management strategies to mitigate its spread. Findings will inform future wildlife conservation efforts, offering a replicable framework for assessing disease transmission dynamics in shared landscapes.

Engaging Stakeholders in Agencies' Response to Bear Mange - *Raquel Francisco, University of Georgia*

Sarcoptic mange, caused by Sarcoptes scabiei, is a zoonotic and emerging disease affecting North American black bears (Ursus americanus), particularly in the eastern United States. Since the early 1990s, cases have increased, raising concerns about long-term population health, inconsistent management strategies, and rising pressure from hunters and the public for action. We conducted surveys to understand agency perspectives, stakeholder expectations, and how to enhance engagement. We surveyed agency personnel (n=32), hunters (n~600), and the public (n~1,400), aiming to identify barriers and opportunities for effective communication and management of bears with mange. Most agency respondents agreed on best practices for mange management, citing challenges like limited

resources, public misconceptions, and varying regulations. However, outreach efforts were generally perceived as inconsistent or inadequate. Public respondents often expected agencies to capture, treat, and/or relocate bears with mange, reflecting emotional distress and limited understanding of the disease's ecological implications. In contrast, hunters expressed interest in assisting with the dispatch of severely affected bears, though agencies supported this only under specific conditions to ensure safety and compliance. Ordinal logistic regression revealed that factors such as trust in wildlife agencies, acceptance of euthanasia as a humane option, and recognition of mange as a natural occurrence significantly influenced stakeholder support for agency management. The discrepancies between agency policies and public expectations underscore the urgent need for clearer communication strategies. Aligning public perception with scientific management practices and fostering greater stakeholder engagement will be crucial for developing a more cohesive and effective approach to managing mange in wildlife.

Assessing and Managing Sarcoptic Mange in Arkansas Black Bears: A Five-Year Surveillance and Conservation Strategy - *Robert Edwards, Arkansas Game and Fish Commission*

Historically, black bears (Ursus americanus) were so prevalent in Arkansas that the state was informally dubbed the "Bear State." However, overharvest and habitat destruction by early settlers led to a severe population decline, with estimates suggesting fewer than 50 individuals remaining statewide by the 1930s. In response, regulatory protections, habitat restoration, and repopulation efforts facilitated recovery. Today, an emerging threat - sarcoptic mange - represents a significant topic of interest for black bear conservation in Arkansas, particularly in the Ozark Mountain region. It remains unclear whether sarcoptic mange will have long-term population-level effects. To monitor mange occurrence and assess its impact, the Arkansas Game and Fish Commission (AGFC) actively records observational data on affected bears statewide. When feasible, skin scrapes are collected for microscopic confirmation of Sarcoptes scabiei mites. Additionally, a literature review of more than 40 scientific studies is underway to inform evidence-based management strategies. Since the first documented case in Arkansas in early 2018, passive surveillance has identified 134 clinically affected bears across 14 counties. In response, AGFC is developing a five-year management plan to provide historical context, increase public awareness, establish standardized policies, enhance detection methods, and advance research. A critical decision lies ahead: does sarcoptic mange in black bears require active intervention? The five-year plan must address these uncertainties by increasing data collection, refining surveillance methodology, and establishing an adaptive decision-making framework. However,

further research is needed to clarify transmission dynamics, predisposing factors, and potential treatment options to inform future management strategies.

Session 8: Capture & Monitoring

The Next Generation of Bear Trapping? Using automated traps to increase efficacy and efficiency of trapping black bears - *Anthony Ballard, Mississippi Dept. of Wildlife, Fisheries, and Parks*

Culvert and Cambrian-style traps are commonly used throughout North America for live-capturing black bears for conflict and research purposes. These traps require the bear to manipulate some type of trigger mechanism (treadle, arm, cable, etc.) to release the door and allow the trap to close. While their efficacy has been long established, there are many shortcomings of this method. A manually activated trap allows no selectivity, no control over time of capture, and can pose a safety risk to cubs following sows into traps. In June of 2023, the Mississippi Department of Wildlife, Fisheries, and Parks began the in-house design and construction of a trailer-mounted Cambrian style bear trap that incorporated remote live streaming and gate activation capabilities. From August 2023 to December 2024, there have been 43 trapping events across 14 counties. The ability to remotely monitor and trigger the trap door has drastically decreased the man-hours associated with bear trapping. The average time to trap a bear was 57.3 hours in the field and less than seven man-hours of effort associated per catch. In addition to better efficiency, we could also better plan logistics, estimate weight (for drug dosages), and monitor the bear during drug induction. Since they can only be closed remotely, these traps can avoid non-target captures thereby reducing trap shyness. There are currently two designs: a mobile, trailer-mounted trap and a mobile trap with retractable wheels that can be transported in the back of a pickup truck. Our newer trap has also incorporated a roll-out floor for safely removing anesthetized bears from the trap for workup. We hope these and other design improvements to existing bear traps can make managers and researchers safer, more effective, and more efficient in capturing black bears.

Using Video Camera Traps to Understand Black Bear (Ursus americanus) Interactions with Hair Snares - *Caitlin Brett[1,2], Fabian Jimenez[3], Dana Morin[3], Colleen Olfenbuttel[1], Daniel Greene[4], Joseph Clark[5,6], Nathan Hostetter[2,6]; (1) North Carolina Wildlife Resources Commission; (2) North Carolina Cooperative Fish and Wildlife Research Unit at North Carolina State University; (3) Mississippi State University; (4)*

Weyerhaeuser Company; (5) University of Tennessee – Knoxville; (6) U.S. Geological Survey

Non-invasive sampling via hair snares is a well-established, effective method for collecting genetic data from wildlife populations, particularly black bears (Ursus americanus). Hair samples provide information on population demographics and genetic structure but are blind to fine-scale temporal patterns (e.g., when bait is accessed or hair deposition occurs) and behavioral mechanisms (e.g., snare avoidance) that may affect hair deposition. Camera trapping is a resource-effective and non-invasive approach to provide temporal and behavioral information. Camera footage alone may be insufficient to distinguish between individuals over multiple visits, but it can identify family units, quantify distinct bear-snare interaction events, and contextualize timing of events between weekly hair sampling visits. The objective of this study is to quantify interactions with hair snare sites to better understand mechanisms affecting hair sampling data. This is part of a larger black bear project in coastal North Carolina using baited hair snares. We placed passive infrared camera traps facing 99 hair snare sites in June-July 2024, set to record a 20-second video with no capture delay. Interaction events were a) quantified over time within sampling weeks, b) compared with hair sample data, and c) classified for behavioral analysis (e.g., method of entry, number of wire contacts, method of bait access, sex of bear). Results showed that in approximately half of all observed interaction events, bears did not appear to contact the hair snare wire. Wire contacts were generally correlated with the number of hair samples collected each week. Bait was typically removed by bears on the first or second bear-snare interaction event, but the removal of bait did not seem to affect subsequent wire contact rates with the site. Understanding how bears interact with hair snares can help researchers more effectively collect, analyze, and make inferences from hair snare data.

Poster Abstracts

Impact of Sarcoptic Mange on American Black Bear (Ursus americanus) Population Dynamics in Appalachian Mountains of Virginia, USA - *Fang Chen, Virginia Tech*

Sarcoptic mange, caused by the mite Sarcoptes scabiei, is a contagious skin disease that severely impacts wildlife by causing skin lesions, hair loss, secondary infections, and even death. Sarcoptic mange has been shown to significantly reduce survival and reproductive success in many species, such as red foxes and raccoon dogs, but its impact on American black bear (Ursus americanus) populations has not been documented. To understand how sarcoptic mange influences population dynamics of American black bears in Appalachian Mountains of Virginia, we are

monitoring survival and reproduction in both mange-affected and non-affected populations using GPS and VHF tracking technologies. Using integrated population models (IPMs), we will estimate black bear population growth rates by combining data on survival and reproduction with historical reproduction records, harvest data, and population size estimates. Further, we will conduct a population viability analysis (PVA) to project future population trends under various mange outbreak and harvest scenarios. By doing so, we aim to understand the disease's impact on black bear population viability. We hypothesize that mange will significantly reduce survival and reproductive success, with affected bears displaying poorer body condition, lower fertility rates, and higher mortality. As such, bears from the mange-affected site are expected to exhibit worse outcomes than those from the control site due to added environmental stressors and disease burden. We aim to provide insights into how mange impacts black bear populations and inform targeted conservation strategies, ensuring long-term sustainability of this ecologically and economically important species.

Population Genomics of the Eastern Lineage of American Black Bears - *Heather Clendenin, University of Memphis*

The geographically widespread Eastern lineage of the American black bear (Ursus americanus) encompasses populations differentially impacted by anthropogenic habitat loss and fragmentation. Northern populations are distributed across habitat that has retained large tracks of contiguous forests. However, southern populations have been substantially impacted by a combination of direct and indirect anthropogenic factors, such as carnivore persecution and land use change, resulting in both declines in total area of appropriate habitat as well as habitat fragmentation. We investigate population structure and how genomic diversity varies across the Eastern lineage using whole genome resequencing from 174 bears. Although three genetic clusters are best supported by the data, our genomic analyses suggest high drift and purging of deleterious load among small subpopulations in Louisiana are driving these results. An analysis of divergence timing shows that Louisiana subpopulations began diverging from the Southeast at the start of the Last Glacial Maximum, and that Tensas and the Lower Atchafalaya subpopulations in Louisiana accelerated population divergence around 5,000 years ago. We measured inbreeding as the proportion of the genome within a run of homozygosity (ROH) and observe that bears in most populations contain 2-15% of the genome within an ROH. This measure of inbreeding decreases in the high diversity populations around the Great Lakes (0.5-10%) and substantially increases in subpopulations in Florida (20-30%) and Louisiana (15-45%). Per population heterozygosity ranged from .15-.24, with subpopulations in Florida and Louisiana falling 2.5-6.25% lower than the mean elsewhere in the Eastern lineage. Combined, our results show how

the unique ancestry clustering of southern populations in the Eastern lineage is driven by low diversity, making them appear as outliers not due to genetic distinction but because of long-term loss of genetic diversity.

Black bear density and space use in the Northern Lower Peninsula, Michigan - *Sara Fischer, Julie Young, Anna Miller, Taylor Peltier, Megan Stone, Cody Norton, Tyler Petroelje; Utah State University*

Populations of black bears (Ursus americanus) have been increasing and expanding their range. The Baldwin Bear Management Unit in the Northern Lower Peninsula (NLP) of Michigan, is experiencing such an increase, and human-bear interactions in this unit have subsequently been increasing. While population trends from harvest records suggest a population increase, black bear density and behavior are largely unknown even though these two factors may influence the likelihood of human-bear conflicts. To better understand where and when conflicts occur, we aim to estimate black bear density and behavior of black bears in the Baldwin Management Unit of Michigan. Population estimates will be derived from non-invasive genetic data obtained via scat detector dogs and hair snares, while behavior will be quantified from GPS collar data to create a behavior state interaction model using Hidden Markov Models. Determining density and understanding black bear behavior in this unit will allow managers to better navigate human-bear interactions while effectively managing the population.

Utilizing Tri-Axial Accelerometers to Classify Behavior of Free-Ranging American Black Bears - *Brogan Holcombe, Virginia Tech, PhD Student*

Tri-axial accelerometers are commonly used in wildlife studies to monitor animal behavior. Accelerometers record animal movement across three axial planes (X, Y, and Z), generating millions of data points over short time frames. However, raw accelerometer data is not immediately relatable to behavior as it requires associating tri-axial data with direct observation of specific behaviors. In contrast with captive animals, direct behavioral observation of free-ranging, elusive wild animals is often challenging if not impossible. Nevertheless, new biologging technologies, such as video cameras onboard GPS collars, now allow for remote observation of behaviors simultaneously with accelerometer data collection. Machine learning methods, such as supervised classification, can then be combined with direct observations of behavior to create a continuous stream of behavioral classifications throughout the entire GPS collar deployment. We utilized a dataset from the Virginia Appalachian Carnivore Study in Bath County, Virginia, which included continuous monitoring of American black bears (Ursus americanus; n=15) using 16 Hz tri-axial accelerometer

data paired with video camera data collected onboard GPS collars. The collars captured videos (9-20 seconds every 20-60 minutes) during daylight hours, providing a vast known set of behaviors for training and testing classification models. Using just over 135 hours of video data we identified 12 behaviors and used machine learning methods to classify behaviors within and throughout the entire GPS collar deployment. Preliminary models were 62.76% to 75.42% accurate when classifying observed behaviors to accelerometry readings. With further model refinements, including adding pre-classification parameters and incorporate additional variables, to aim to improve accuracy to >95%. Our research demonstrates the potential of tri-axial accelerometer data and machine learning to classify black bear behavior, which, when combined with GPS data, could provide information important to managing the species, such as behavior-specific resource selection, time and energy budgets, and disease prevalence.

Developing a Range-wide American Black Bear Single Nucleotide Polymorphism Panel for Population Monitoring - *Fabian Jimenez, Mississippi State University*

American black bears are distributed across large spatial scales and natural resource agencies often employ hair snares to monitor populations. Historically, microsatellites (a type of genetic maker) have been used to identify individuals from hair-derived DNA and create mark-recapture data sets to estimate population size. However, genotyping of microsatellites can be subjective when comparing across different labs making regional comparisons such as identifying dispersing individuals, assessing genetic relatedness, or estimating immigration rates difficult. Single nucleotide polymorphisms (SNPs) are an alternative genetic marker that can be used for individual identification that are genotyped using bioinformatics and allow comparisons of genotypes from different labs without concern of subjectivity while reducing processing time. Use of SNP panels are increasing in wildlife studies, but the markers selected for one black bear population may not work for another (e.g. they may be homozygous in some populations making them uninformative for distinguishing individuals, or there may be mutations in the primer flanking regions in some populations causing the marker to not amplify). We developed a SNP panel with the intent to produce consistent genotypes from black bear hair derived DNA samples across the species range. First, we used high quality DNA extracted from black bear tissue samples collected from three populations across North America (North Carolina, Mississippi, and Montana) to develop genomic libraries and identify a candidate set of SNPs capable of distinguishing individuals across all populations. Second, we optimized the panel for use with low quality DNA from hair samples. For the last step, we are using the SNP panel we have developed to test how well it works on samples from other regions to assess if the panel can be used range-wide.

Application of the range-wide panel would allow for greater regional collaborations and comparisons among data sets.

Serum progesterone and reproductive ultrasounds provide further insight on American black bear (Ursus americanus) pregnancy development - *J. Bernardo Mesa Cruz, East Stroudsburg University*

American black bears (Ursus americanus) are the result of exceptional gestational adaptations. After mating in the summer, fertilized embryos experience obligate delayed implantation for over 100 days. Thereafter, in the late fall, embryos resume their development to complete an active gestational phase that times parturition with hibernation. However, actual embryo reactivation and implantation timelines are lacking for black bears. We aimed to determine timing for embryonic implantation and fetal growth in black bears through transabdominal ultrasound analysis and serum progesterone measurements. From 2001-2016, we collected samples from 17 pregnant individuals at 10-day intervals from November until birth, which occurred in January or February. We scanned and measured fetal structures from ultrasounds using ImageJ. We compared different growth models, non-asymptotic and asymptotic, to describe fetal growth patterns. We measured progesterone using commercially available radioimmunoassay kits (ImmuChemTM, MP Biomedicals, LLC. Orangeburg, NY). We first visualized embryonic structures approximately 33 days before parturition and 13 days post-progesterone peak. Progesterone reached peak concentrations after approximately 28-day period of gradual increase above baseline. Fetal growth followed a logistic growth pattern with an average growth rate of 0.1 cm/day. Model intercept indicated that embryo size at reactivation were ~ 0.45 cm x 0.23 cm. Near term, fetuses reached sizes of ~ 9.3 cm L x 3.83 cm H. Therefore, we propose that embryonic reactivation starts with the rise in progesterone in the fall, implantation occurs approximately 28 days later, coinciding with the progesterone peak, and cubs are born approximately 46 days post-implantation. Relative to previous research, we documented a shorter active gestational phase (60 vs 46 days) in black bears, which could further our understanding of pregnant female denning chronology.

Student Work in Progress: Social Dimensions of Human-Black Bear Interactions in Michigan, USA - *Taylor Peltier, Anna Miller, Julie Young, Sara Fischer, Megan Stone, Emily Pomeranz, Cody Norton, Tyler Petrolje; Utah State University*

Human-bear conflict is a significant conservation concern and can incur high costs for both wildlife and human populations. To encourage human-bear coexistence, natural resource managers must first understand the costs and benefits of bears to

local communities, ensuring varying interest group representation and inclusion. This work aims to characterize the social dimensions of human-black bear (Ursus americanus) relationships in the Northern Lower Peninsula of Michigan, an area that has experienced an increase in the abundance and distribution of black bears across the past three decades, growing by roughly 70% in the last decade alone. Specifically, we will identify the costs and benefits of black bears to a broad range of interest groups, including agriculturalists, hunters, and recreationists. We conducted ethnographic, qualitative interviews to gather preliminary data on tolerance, behaviors, and perceptions from key informants in our study system. We will next deploy a wide-spread survey to quantitatively estimate levels of tolerance across space and time. This study will uncover important thematic strands and variations in interest group relationships with bears. Identifying the individual (e.g. attitudes, motivations, etc.) and societal factors (e.g. underlying societal inequalities) that contribute to carnivore attitudes and tolerance can also help align management decisions with public support.

Preliminary Analysis of Camera Trap Data from the Virginia Bear Mange Study

- *Isabella Sciarrino[1], Brogan Holcombe[1], Madison Thurber[1], Marcella Kelly[1], Katherine Martin[2], Carl Tugend[2]; (1) Virginia Tech; (2) Virginia Department of Wildlife Resources*

Sarcoptic mange (Sarcoptes scabiei) is a poorly understood emerging, zoonotic disease that is increasingly threatening American black bears (Ursus americanus) in the Appalachian Mountains of Virginia. The Virginia Bear Mange Study (VBMS) was initiated in 2024 as a collaboration between Virginia Tech and the Virginia Department of Wildlife Resources to address the impacts of sarcoptic mange on black bears. The primary objectives are to understand whether areas in the Appalachian Mountains with mange have lower bear densities than those with no mange detection, and to understand the effects on bear health and behavior. In the 2024 summer field season, we set 73 hair snares in an area with high mange prevalence (Bath, Alleghany, Botetourt, and Rockbridge Counties) to collect genetic material found in hair follicles from black bears for the purpose of genetic capture recapture for density estimation. Due to the lack of evidence of bears with mange interacting with hair snares, or whether single versus double strand snares or rub trees would be most effective, we paired snares with motion triggered camera traps to visually identify and score mange-afflicted bears and determine the most effective snare. Preliminary results indicate that bears with mange do use both single and double-strand hair snares, but that rub trees were ineffective for collecting hair. We are currently summarizing the number and severity of bears with apparent mange, compared to healthy bears, and will create heat maps to visualize mange prevalence across the study area. This research aims to contribute to the sparse literature on

black bear mange and inform management decisions on Virginia's black bear population.

Results of A Novel Method to Monitor Bear Cub Survival - *Shelby Shiver and Brian Scheick, Florida Fish and Wildlife Conservation Commission*

We are monitoring adult female Florida black bears (Ursus americanus floridanus) and cubs in southwest Florida to estimate annual survival for calculating the subpopulation's growth rate. Bears in Florida do not hibernate deeply, only pregnant females consistently den, and they leave their den when approached. Methods used to calculate cub survival elsewhere are impossible. Seeking an alternative method, we glued VHF transmitters to the rumps of cubs in spring 2022 and 2023. Transmitters were epoxied to mesh fabric prior to deployment (mean weight 12.8g). In 2022, transmitters had an internal antenna and were attached with Gorilla Glue. Transmitters in 2023 had an external antenna and epoxy was applied over the glue once it became tacky. Hair was pulled through the mesh using a crochet hook and then glued to itself and the mesh. Overall, we located the natal dens of 15 GPS collared females and examined 33 cubs; none of the bears were immobilized. One cub was abandoned at the den and removed from further analysis, five cub mortalities were documented, 15 transmitters dropped, and 12 transmitters were never recovered. Excluding mortalities, transmitters remained on cubs for an average of 74 days (range 16-148 days) with high variation between years. We found that adding epoxy to the fur increased retention time from 43 days in 2022 to 92 days in 2023. However, we determined that doubling mean retention time was still insufficient to provide annual survival rate useful for a matrix model of the subpopulation. In addition to retention issues, the VHF signals were not strong enough even with external antennas. However, cub hair was long enough (about 2.5 cm), and transmitters were not pulled off in the den, demonstrating the potential of gluing transmitters to cubs. To our knowledge, this is the first use of this technique to monitor black bear cubs and further testing is needed to improve transmitter retention and performance. We currently recommend this method for short-term use only.

Student Work in Progress: A Social-Ecological Systems Approach to Understanding Recreation and Black Bear Management in Michigan - *Megan Stone, Utah State University*

Outdoor recreation and wildlife managers are often tasked with mitigating conflict between humans and the natural environment, such as decreasing scenarios that result in human-wildlife conflicts. This task has become increasingly important to the

outdoor recreation and wildlife managers in Michigan's Northern Lower Peninsula (NLP) as black bear (Ursus americanus) populations have been increasing in recent years, alongside increasing reports of human-black bear conflicts. My research will focus on understanding the social-ecological system (SES) of human-black bear interactions in Michigan's NLP with an emphasis on the viewpoints of natural resource managers and what they see as the main sources of conflict and current successful mitigation strategies. I will develop a more comprehensive understanding by using an SES approach to highlight the successful management of human-black bear interactions in Michigan. Results will enable outdoor recreation and wildlife managers to increase positive interactions between humans and black bears and decrease negative interactions.

Assessing the Impact of Mange on Black Bear Densities in the Appalachian Mountains of Virginia - *Madison Thurber, Virginia Tech*

Sarcoptic mange is a widespread disease affecting domestic and wild animals, including black bears in Virginia. The first mange-affected black bear in Virginia was diagnosed in 1994, although no additional cases were confirmed until 2014 when the Virginia Department of Wildlife Recourses (VDWR) began receiving reports from the public of severely mange-affected bears in Frederick County in northwestern Virginia. Since 2018, mange cases in black bears have increased in frequency and geographic range, with confirmed cases of mange in 24 counties as of July 2024. Visible symptoms in black bears have raised public concerns, particularly among hunters reporting fewer bears in formerly high-density areas. To understand how mange is impacting black bear density, our study employs spatially-explicit capture recapture models using DNA from hair samples collected at barbed-wire corral traps (i.e., hair snares) in two distinct black bear populations in Virginia: one where mange is frequently observed in black bears (northern study area) and one where it is undetected (southern study area). In 2024, we deployed 73 hair snares in the northern study area and 77 in the southern study area (150 total) spaced ~3.4km apart. We collected 632 hair samples in the northern study area from 68 of 73 (93%) hair snares and 779 hair samples in the southern study area from 61 of 77 (79%) hair snares for a total of 1,411 hair samples collected in summer 2024. Following subsampling methods, hair samples are currently being extracted for DNA found in hair follicles to identify individuals to produce density estimates. This research investigates whether the area with mange has lower bear density than the area where mange is undetected and aims to provide managers with information useful for potentially adjusting harvest regulations.

Evaluating the Human Dimensions of BearWise®: Insights into Knowledge, Attitudes, and Behaviors in Urban Bear Management - *Sarah Wyrick[1], Nils Peterson[1], Emily Griffith[1], Jennifer Strules[1], Nick Gould[1], Colleen Olfenbuttel[2], Christopher DePerno[1]; (1) North Carolina State University; (2) North Carolina Wildlife Resource Commission*

State agencies are increasingly implementing BearWise® (bearwise.org) to reduce negative human-bear interactions, but research on its effectiveness remains limited. We conducted a before-after control impact (BACI) study to evaluate the effects of a 12-month BearWise® campaign on residents' knowledge, attitudes, and behaviors related to black bears (Ursus americanus) in Asheville, North Carolina. Using mailed surveys, we achieved response rates of 46% and 38% pre- and post-campaign, respectively. Results indicate the campaign led to a 6.4% increase in residents modifying their trash bins to exclude bears (Mean Difference: 0.064; p=0.053) and a 14.5% increase in the support of refraining from feeding birds and wildlife year-round (Mean Difference = 0.145, t(df)=310, p=0.030). However, while support for limiting bird feeding year-round increased, actual reductions in bird feeding behavior were not statistically significant (p=0.159). Waste management practices, such as placing bins curbside on the morning of service, remained stable at 84% adherence (Mean Difference = 0.015, t=0.66, p = 0.509). Post-campaign, perceptions of risk increased significantly, particularly concern about risks to property (Mean Difference 0.271, $p < 0.007$). These results suggest BearWise® promotes awareness and encourages preventative behaviors like waste management modification. However, ingrained behaviors (e.g. bird feeding) require more targeted interventions. Continued research is needed to explore the social factors influencing human-bear interactions and develop strategies to foster coexistence.

Thank you for your participation and contribution!