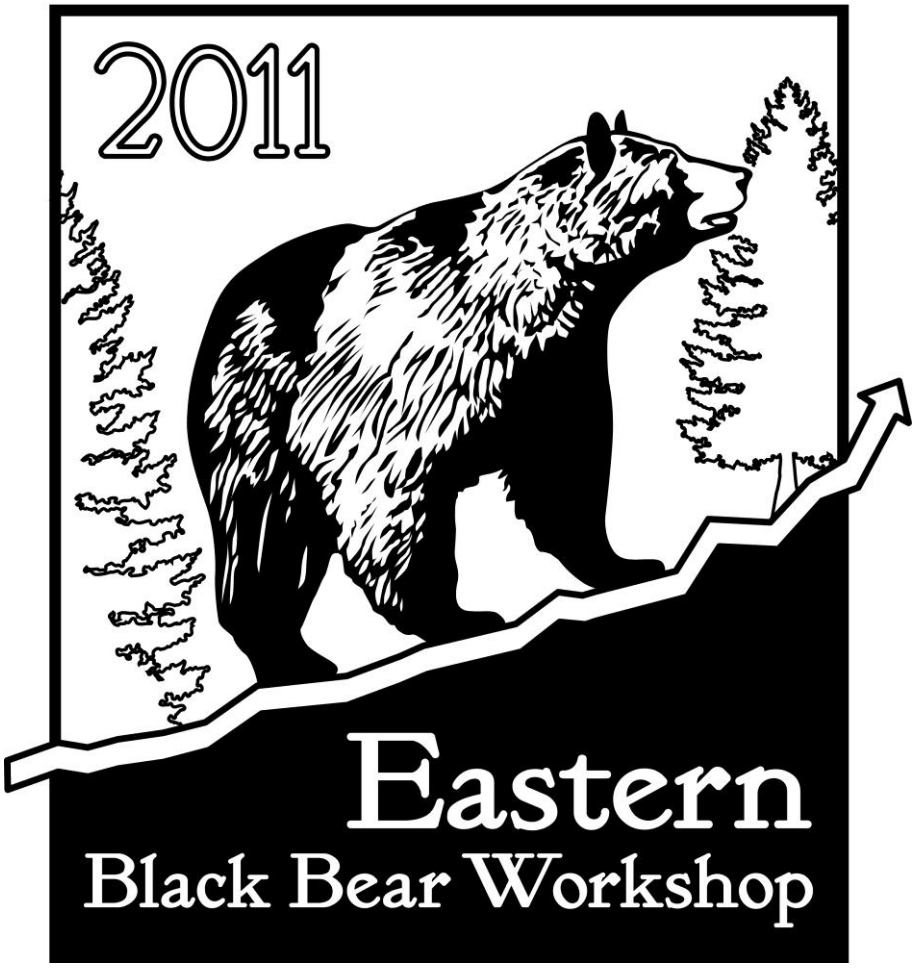
20th Eastern Black Bear Workshop Program



Kanuga Conference Center
Hendersonville, NC
May 1-4th, 2011

Hosted by the
North Carolina Wildlife Resources Commission

The 20th EBBW would like to thank our generous sponsors
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20th EBBW Meeting Agenda
Kanuga Conference Center
Hendersonville, NC
May 1-4, 2011

Sunday, May 1

Noon- 5:30 pm	Arrival and registration Location: Lobby of Kanuga Lake Inn
2:00-5:00 pm	Northeast Black Bear Technical Committee (NEBBTC) meeting Location: Minkler Grove, Jackson Classroom (Map location N, Classroom C)
3:00-5:00 pm	Southeast Black Bear Project/Program Leader Committee meeting Location: Minkler Grove, Clarke Classroom (Map location N, Classroom B)
6:00 pm	Dinner at Kanuga Lake Inn cafeteria
7:00 pm	Evening Social – Refreshments provided by New Belgium Brewing Waterfront Pavilion (Map Location AA)

Monday, May 2		**Speaker**
7:00 am	Registration; Lobby of Kanuga Lake Inn	
8:00 am	Breakfast at Kanuga Lake Inn cafeteria	

Location: Balthis-Rodwell Building (Map location "I')
Coffee, hot tea, sweet tea and water available at Balthis all day

9:00 am	Opening remarks	Deputy Director Mallory Martin (NC)
9:10 am	Tribute to John Collins	Gordon Warburton (NC)
9:20 am	Summary of State/Province Status Reports	Karen Noyce (MN)
10:00 am	North America Bear Range Mapping Project	Brian Scheick (FL)
10:30 am	Break Selected posters on display	
11:00 am	State survey on population modeling	Joe Folta (NCSU)
11:30 am	Bear population modeling in Michigan	Dwayne Etter (MI)
12:00 pm	Break for lunch	
12:30 pm	Lunch	

1:30 pm Population Estimation Workshops (1½ hr. sessions):
Please go to the workshop session number that is listed on your name tag.

1. Enhancements to Downing Reconstruction — Michelle Davis Klopfer (Virginia Tech)
   Location: Colhoun Room (Map location 'O')

2. Panel Discussion on Downing Reconstruction and other methods to estimate bear populations — Panel: John Fieberg (MN), Karen Noyce (MN), Jennifer Vashon (ME), Dwayne Etter (MI)
   Location: St. Paul's-Colhoun Gym Room (Map location 'EE')

3:00 pm Break: Refreshments located at Balthis-Rodwell Building

3:30 pm Rotate workshop session

5:00 pm Break before dinner
6:00 pm Dinner at Kanuga Lake Inn cafeteria

7: 00 pm Poster Session *Location: Balthis-Rodwell Building (Map location "I')*
Refreshments will be available
Door Prize to be drawn during poster session!

7:30 pm Evening social – Refreshments provided by Pisgah Brewing Company
Fireplace Lounge (Map Location "P")

Tuesday, May 3 ***Speaker***

8:00 am Breakfast at Kanuga Lake Inn cafeteria
Coffee, hot tea, sweet tea and water available at Balthis all day

9:00 am Morning Workshops (1 hr. sessions)
Morning sessions will occur at the classrooms at Minkler Grove (Map location N)
Please go to the workshop session number that is listed on your name tag.

1. Using Riskman in making mgt. decisions *Location: Jackson Classroom C*	Chris Ryan (WV) Eric Howe (ON)
2. Role of human dimensions in bear management *Location: Clarke Classroom B*	Dave Kocka (VA) Dain Palmer (NC)
3. Estimating populations in absence of harvest data *Location: Finley Classroom A*	Dave Telesco (FL) Steven Dobey (KY) Dr. Joe Clark (UT)

10:00 am Break: Refreshments located at Balthis-Rodwell Building
Selected posters on display

10:30 am Rotate workshop sessions

11:30 am Rotate workshop sessions

12:30 pm Lunch at Kanuga Lake Inn cafeteria

1:30 pm Afternoon Workshops (1 hr. sessions)
Afternoon sessions will occur at the classrooms at Minkler Grove (Map location N)
Please go to the workshop session number that is listed on your name tag.

1. Highways and bears: Update on research and recommendations *Location: Jackson Classroom C*	Dr. Frank Van Manen (UT) Dr. Michael Vaughan (Virginia Tech)
2. Regional data sharing *Location: Clarke Classroom B*	Dave Kocka (MABBSG) Gordon Warburton (SABBSG) Jeremy Hurst (NEBBTC)
3. Discussion on current research and future research needs *Location: Finley Classroom A*	John McDonald (USFWS)

2:30 pm Rotate workshop session

3:30 pm Break: Refreshments located at Balthis-Rodwell Building
Selected posters on display

4:00 pm Rotate workshop session

5:00 pm Break before evening activities

6:00 pm Pre-dinner social w/hors d'oeuvres
First Floor Inn Room (Map Location L)
Watch Sam and Skip finish cooking the pig!

7:00 pm Dinner by the lake and Evening Social
North Carolina BBQ (bear stew, bbq pig, veggie burgers)
Refreshments provided by Highland Brewing Company
Location: Waterfront Pavilion (Cunningham-Nevius Pavilion; Map location AA)

Wednesday, May 4		***Speaker***
8:00 am	Breakfast	

Location: Balthis-Rodwell Building (Map location "I')
Coffee, hot tea, sweet tea and water available at Balthis all morning

9:00 am	Wind turbines and bears	Forrest Hammond (VT)
9:30 am	Bear Harvest & Management on Private Land	Darren A. Miller (Weyerhaeuser)
9:50 am	Future of oak regeneration and forestry management	Dean Simon (NC)
10:10 am	Variable mast production & human-bear conflicts	Courtney R. LaMere (SUNY)
10:30am	Break	
11:00 am	Stable isotopes in assessing diet patterns in GSMNP	Jennapher Teunissen van Manen (Uni.Tenn)
11:20 am	Estimating Population Parameters of Louisiana Bears	Carrie Lowe (Uni.Tenn)
11:40 am	EBBW business meeting	
12:30 pm	Bagged lunch to go (located in Kanuga Lake Inn lobby)	

Adjourn-Have a safe trip home!

KANUGA CONFERENCE CENTER

KANUGA LAKE INN:
- A Front Desk-Registration, Lobby, Library, Charlie's Canteen, & Bookstore
- B Dining Rooms

LODGING:
- C Inn Rooms
- Cottages (1–39)
- D Guest Houses: (A–KatyDid-St.Mark's, B–Pritchard, C–Hartley, D–St.John's, E–St.Paul's, F–Grace-Ocala)
- E Lucia Fox Cottage
- F Harold House
- G Carter Lodge
- H Infirmary

MEETING SPACES:
- I Balthis-Rodwell Building
- J Gooch Program Building
- K St. John's Meeting Room
- L First Floor Meeting Room
- M Flanagan Center
- N Minkler Grove Classrooms: (A–Finlay, B–Clarke, C–Jackson, D–Hunter, E–Percival)
- O Colhoun Room
- P Johnson Fireplace Lounge
- P Rocking Chair Porch
- Q 2nd & 3rd Floor Common Rooms
- R Breezeway Classrooms
- S Administrative Office

WORSHIP & MEDITATION:
- T Chapel of the Transfiguration
- U Lakeside Chapel
- V St. Francis Chapel
- W The Labyrinth
- X Serenity Garden

RECREATION & OTHERS:
- AA Cuningham-Nevius Pavilion
- BB Buddy Carter Climbing Tower
- CC Baker Building
- DD Pinky Elliot Playing Fields
- EE St. Paul's-Colhoun Gym
- FF Trail Heads (See Trail Map)
- GG Playgrounds
- HH Shuffleboard Courts
- II Guest Laundry
- JJ The Point (Bonfire Area)
- KK President's Home

List of Donors

Thank you to our donors for their generosity in donating items for our workshop!

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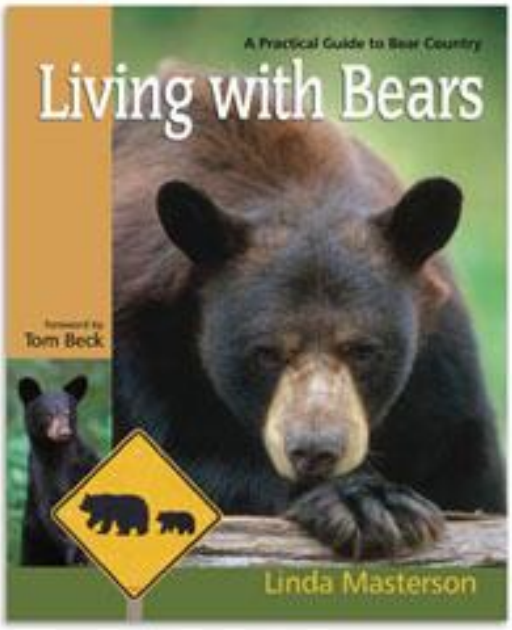

List of Donors continued…

Abstracts

(Listed in order of appearance in program)

Monday, May 2, Morning Session

Location: Balthis-Rodwell Building (Map Location 'I')

Updated Distribution of Black Bears In North America

Brian K. Scheick[1], Walt McCown[2], and Mike Orlando[3]

[1] Florida Fish and Wildlife Conservation Commission, 1526 Kelvin Avenue, Deltona, FL 32738, USA

[2] Florida Fish and Wildlife Conservation Commission, 1105 Southwest Williston Road, Gainesville, FL 32601, USA

[3] Florida Fish and Wildlife Conservation Commission, 908 West Voorhis Avenue, DeLand, FL 32720, USA

Abstract: In 2010 and 2011 we used an internet mapping tool to survey bear biologists in each state and province to map current occupied range of American black bear (*Ursus americanus*) in Canada, Mexico, and the United States (U.S.). The mapping tool used hexagon grids (25 km^2 in contiguous U.S. and Mexico, 50 km^2 in Alaska and Canada). Our survey included 3 levels of occurrence defined by the responding biologist: primary occupied range (i.e. frequent occurrence, breeding range, higher density, etc.), secondary occupied range (occasional occurrence, non-breeding range, lower density, etc.), and locations (sightings, tracks, etc.) since 2006 that were outside areas that the responding biologists considered occupied range. Preliminary results show bears occupying parts of 12 Canadian provinces and territories, 40 states in the U.S., and 13 states in Mexico. In Canada, the total occupied range is 6,789,050 km^2 (72.2% of Canada's total 9,396,700 km^2). Canada's higher occupied range is 6,455,700 km^2 (68.7% of Canada) and lower occupied range is 333,350 km^2 (3.5% of Canada). In the U.S., total occupied range is 3,547,850 km^2 (37.7% of U.S.'s 9,402,275 total km^2) with a 2,936,050 km^2 higher occupied range (31.2% of USA) and a 611,800 km^2 lower occupied range (6.5% of U.S.). Almost half (47.9%) of the U.S. higher occupied range is in Alaska. Ongoing studies in Mexico prohibited them from submitting data, so we used an opinion-based map from a 1997 IUCN report (occupied range only). Mexico's occupied range is 1,487,350 km^2 (42.4% of Mexico's total 3,511,850 km^2). Overall, black bear distribution in Canada is similar to 1994 and most of the historic range. Distribution in the U.S. has expanded in Midwestern and eastern states but contracted in several western states. Sightings occurred in 5 central states that do not have occupied range. Expanding black bear range despite continued development shows their versatility and ability to live close to humans.

Monitoring American Black Bear (*Ursus americanus*) Populations across North America: A Survey of State and Provincial Wildlife Management Agencies

Joe Folta*, Department of Forestry and Natural Resources, North Carolina State University, 3120 Jordan Hall, Raleigh, NC 27695-8008, USA.
*Current Address: 7625 St. Charles Bay Road, Tully, NY 13159

Abstract: Estimating wildlife population size and demographics, and analyzing trends in these statistics are important in the development of harvest limits and seasons for American black bears (*Ursus americanus*, hereafter black bear). However, budget constraints, lack of man-power, and perceived value of the data collected limit the methods that can be used to collect suitable data and limit the amount of data collected. The purpose of this study was to determine what techniques are used by the states and Canadian provinces to model and/or monitor their black bear populations. A survey was emailed to biologists/managers in 39 states and 10 Canadian provinces with a black bear population. Thirty-three states and five Canadian provinces responded to the survey. The survey showed that several models, indices, and data collection techniques are used. Only 50% (N = 19) of the respondents indicated that they use a population model to estimate populations. Forty-two percent (N = 16) indicated that they only monitor trends in the population rather than estimating population size. Population reconstruction and mark-recapture (or variations of this model) are the most commonly used population models. Biases in the collection of data were noted; however, no agency was able to sufficiently quantify those biases. For those agencies that do not estimate populations size, monitoring harvest trends and conducting mark-recapture were the most commonly used techniques.

Estimating abundance of black bears in Michigan, sifting through the sands of time

Dwayne R. Etter[1]
[1]Rose Lake Wildlife Research Station, 8562 East Stoll Rd., Michigan Department of Natural Resources, East Lansing, MI 48823-9454, USA.

Abstract: In response to increasing demand for recreational harvest of black bears, the Michigan Department of Natural Resources (MDNR) established a zone and quota system for distributing bear hunting licenses in 1990. An estimate of bear abundance was desired to maximize recreational hunting opportunities through distribution of hunting licenses. However, geographic land features (e.g., Mackinac Straits) divided the state's bear populations into two distinct regions, Upper Peninsula (UP) and Lower Peninsula (LP). In 1992, working with researchers from Minnesota, MDNR successfully developed a landscape level capture-mark-recapture (CMR) estimate of bear abundance in the UP using an ingested bio-maker (tetracycline). Simultaneously, MDNR developed empirical population models for the UP and LP to project annual population growth. In 2003, working with researchers from Michigan State University, MDNR successfully developed a landscape level CMR for the LP using microsatellite genetic markers. We discuss the combined uses of these various estimators to manage Michigan's bear

populations including establishing annual harvest quotas. We also discuss emerging population estimators being evaluated by MDNR that utilize historical age-at-harvest and auxiliary data sets.

Monday, May 2, Afternoon session

Session 1. Location: Colhoun Room (Map location 'O')

Enhancements to Downing Reconstruction

Michelle Klopfer[1]

[1] Chatham Hall, Department of Fisheries and Wildlife, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061, USA.

Abstract: Downing population reconstruction uses harvest-by-age data and backward addition of cohorts to estimate minimum population size over time. This method provides a number of benefits to wildlife biologists, such as the ability to collapse older animals into a single age class. However, the standard population reconstruction methodology will always underestimate the true population size, since it does not incorporate natural mortality into reconstructed population estimates. By including natural mortality estimates, we improve our ability to estimate the true abundance of a population and the population growth rate. In this workshop session, we will use a hands-on approach to population reconstruction, from preparing data for evaluation to choosing among options for the reconstruction to interpreting the results. This simple yet powerful population assessment approach may be a useful tool for your state, so bring your time series of harvest data.

Session 2. Location: St. Paul's-Colhoun Gym Room (Map location 'EE')

Integrated population modeling of black bears in Minnesota: implications for monitoring and management.

John Fieberg[1,2], K.W. Shertzer[3], P. B. Conn[3], K. V. Noyce[4], and D. L. Garshelis[2,4]

[1] Minnesota Department of Natural Resources, Biometrics Unit, 5463-C W. Broadway, Forest Lake, MN 55025, USA
[2] Department of Fisheries, Wildlife, and Conservation Biology, University of Minnesota, St. Paul, MN 55108, USA.
[3] National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center, 101 Pivers Island Rd, Beaufort, NC 28557, USA
[4] Forest Wildlife Populations and Research Group, Minnesota Department of Natural Resources, 1201 E. Highway 2, Grand Rapids, MN 55744, USA

Abstract: Wildlife populations are difficult to monitor directly because of costs and logistical challenges associated with collecting informative abundance data from live animals. By

contrast, data on harvested individuals (e.g., age and sex) are often readily available. Increasingly, integrated population models are used for natural resource management because they synthesize various relevant data into a single analysis. We investigated the performance of integrated population models applied to black bears (*Ursus americanus*) in Minnesota, USA. Models were constructed using sex-specific age-at-harvest matrices (1980−2008), data on hunting effort and natural food supplies (which affects hunting success), and statewide mark–recapture estimates of abundance (1991, 1997, 2002). We compared this approach to Downing reconstruction, a commonly-used population monitoring method that utilizes only age-at-harvest data. We first conducted a large-scale simulation study, in which our integrated models provided more accurate estimates of population trends than did Downing reconstruction. Estimates of trends were robust to various forms of model mis-specification, including incorrectly specified cub and yearling survival parameters, age-related reporting biases in harvest data, and unmodeled temporal variability in survival and harvest rates. When applied to actual data on Minnesota black bears, the model predicted that harvest rates were negatively correlated with food availability and positively correlated with hunting effort, consistent with independent telemetry data. With no direct data on fertility, the model also correctly predicted 2-point cycles in cub production. Model-derived estimates of abundance for the most recent years provided a reasonable match to an empirical population estimate obtained after modeling efforts were completed. Integrated population modeling provided a reasonable framework for synthesizing age-at-harvest data, periodic large-scale abundance estimates, and measured covariates thought to affect harvest rates of black bears in Minnesota. Collection and analysis of these data appear to form the basis of a robust and viable population monitoring program.

Wednesday, May 4, Oral Presentation Abstracts

Location: Balthis-Rodwell Building

Black Bears and Wind Energy – A case for including bear habitat requirements in wind energy project planning in Vermont

Forrest M. Hammond[1] and John M. Austin[2]

[1]Vermont Fish & Wildlife Department, 100 Mineral Street, Suite 302, Springfield, VT 05156-3168, USA.
[2]Vermont Fish & Wildlife Department, 5 Perry Street, Suite 40, Barre, VT 05641-0199, USA.

Abstract: Proliferation of proposals for wind energy projects in Vermont has raised concerns by the Vermont Fish & Wildlife Department (VFWD) regarding forest fragmentation generally, and impacts to important habitat for black bear (*Ursus americana*) specifically. Although many species of wildlife, including rare or uncommon species, raptors, migrating songbirds, and bats are routinely considered in the design and site selection for wind energy projects , the potential impacts to black bear habitat appears to be unique to Vermont. This paper describes the history

of Vermont's regulatory review process and the VFWD's involvement in conserving black bear habitat under Vermont's Land Use and Development Law, known as Act 250. With strong public support, VFWD has participated in the review and design of thousands of development projects resulting in the protection of thousands of acres of significant black bear habitat particularly in relation to ski resort development. Mitigation guidelines were developed to assure consistency in the review of development projects. Most ski resorts in Vermont have developed master development plans that incorporate conservation strategies for these habitats. Vermont also manages its public lands to perpetuate significant habitat and prioritizes the acquisition of black bear travel corridors and parcels containing areas of concentrated beech trees having a history of bear use. In recent years, VFWD has used this review and mitigation process for industrial wind projects proposed for remote ridgelines. For only one of these projects ─ Deerfield Wind ─ proposed to be the first wind project constructed on National Forest (USFS) , has the VFWD recommended against permitting over concerns regarding impacts to a large area of critical black bear habitat. We believe wind energy development should be planned to avoid or minimize impacts to remote ridgeline habitat and other important habitat for black bear. Effective collaboration between the wind energy industry and state and federal fish and wildlife agencies is essential.

BLACK BEAR HARVEST AND MANAGEMENT STRATEGIES ON PRIVATE LAND IN EASTERN NORTH CAROLINA: A 30+ YEAR CASE STUDY

Darren A. Miller[1], Jessica Homyack[2], Colleen Olfenbuttel[3] and Mark D. Jones[4]

[1] Timberlands Technology, Weyerhaeuser NR Company, Columbus, MS 39704, USA.
[2]Timberlands Technology, Weyerhaeuser NR Company, New Bern, NC 28586, USA.
[3] Division of Wildlife Management, North Carolina Wildlife Resources Commission, Apex, NC 27523, USA.
[4] Division of Wildlife Management, North Carolina Wildlife Resources Commission, Grifton, NC 28530, USA.

Abstract: In eastern North Carolina, black bear (*Ursus americanus*) populations increased from the 1970's through the early 2000's and have stabilized in recent years. In the central coastal plain of eastern North Carolina, forest cover for bears is primarily composed of landscapes managed intensively for loblolly pine (*Pinus taeda*) production and is dominated by a single, large landowner (Weyerhaeuser Company; hereafter, Company). The past 32 years (1977-2009) of well-documented bear management in this area provides a unique opportunity to examine response of bear harvest and hunter attitudes to changing management strategies over an extended period of time. Therefore, our objective was to qualitatively examine how cooperation between a state agency and a large, private landowner affected achieving bear management objectives in this region. We used data collected by the North Carolina Wildlife Resources Commission to estimate bear harvest from 1977-2009. We also used a survey instrument to

examine harvest on Company lands and to gauge attitudes of bear hunters leasing Company land for hunting. During the study period, harvest regulations on Company lands liberalized (i.e., changed through time from no hunting on Company lands to still hunting to hunting with dogs) in response to increasing bear populations. The registered black bear harvest in eastern North Carolina increased from 74 in 1977 to a peak of 1,327 in 2007, and 1,270 in 2009. The survey-estimated harvest on Company lands reflected this increasing trend (12 in 1993, peak of 148 in 2008, and 118 in 2009). The increasing liberalization of bear harvest appears to have helped stabilize the local bear population. The annual surveys, as reported by Miller et al. (2009), largely showed support for bear harvest management policies, including the use of dog hunting. We recommend similar cooperative efforts in other areas between state agencies and private landowners to facilitate bear management.

EFFECT OF VARIABLE MAST PRODUCTION ON HUMAN-BLACK BEAR CONFLICTS IN THE CENTRAL ADIRONDACK MOUNTAINS OF NEW YORK STATE

Courtney R. Lamere[1] and Stacy A. McNulty[2]
[1] State University of New York College of Environmental Science and Forestry, Syracuse, NY USA.
[2]Adirondack Ecological Center of the State University of New York College of Environmental Science and Forestry, Newcomb, NY USA.

Abstract: Understanding and quantifying drivers of human-bear conflict is crucial for targeting management resources effectively. Our research shows that by using simple food abundance survey techniques, it is possible to predict summers with higher than average human-black bear conflicts in northern hardwood forests. Important soft mast species cycle food production in unison with the two year American beech mast cycle in these forests. The SUNY ESF Huntington Wildlife Forest (HWF) in the Adirondack Park has recorded qualitative fruiting phenology data on important bear foods since 1989. Fruit abundance is ranked annually on a scale from 0 (no fruit) to 4 (excellent). We compared bear nuisance complaint records in the Adirondack Park with beechnut abundance rankings from HWF. American beech is the only significant hard mast species in the region producing as many as 165,000 nuts/ha in good years and 0 nuts/ha during crop failures. Nuisance complaint records occurring inside Adirondack Park from 2000 to 2009 were compared to beechnut abundance rankings at HWF for the same 10 year period. Nuisance reports during the summer were negatively correlated to beechnut abundance in the following autumn ($r = -0.803$). These results lead to the question of how summer foraging and nuisance behavior is related to the failure of a subsequent fall food source. Comparison of the summer fruiting abundance ranking for 14 soft mast species from 1991 to 2009 to the beechnut productivity for the same 19 year period showed apple, mountain ash, and other species produce fruit in unison with the American beech, suggesting a common driver of masting. Indices of hard and soft mast abundance can serve as indicators of human-bear conflict

levels and may permit prediction of future periods of scarcity of key bear foods. Wildlife managers can use this empirical evidence to plan outreach activities and mitigate human-bear conflicts.

USING STABLE ISOTOPES TO ASSESS LONGITUDINAL DIET PATTERNS OF BLACK BEARS IN GREAT SMOKY MOUNTAINS NATIONAL PARK

Jennapher Teunissen Van Manen[1], Lisa I. Muller[1], Zheng-Hua Li[2], Arnold Saxton[3], and Michael R. Pelton[1]

[1]Department of Forestry, Wildlife, and Fisheries, University of Tennessee, Knoxville, TN 37996, USA.

[2]Department of Earth and Planetary Sciences, University of Tennessee, Knoxville, TN 37996, USA.

[3]Department of Animal Sciences, University of Tennessee, Knoxville, TN 37996, USA.

***Abstract*:** Long-term diet patterns based on stable isotope analysis may be helpful to understand changes in food selection of black bears (*Ursus americanus*) over time and guide management programs to reduce human-bear conflicts. An enriched stable carbon isotope signature indicates an anthropogenic food source in the diet and an enriched nitrogen signature indicates a higher tropic level for a species. We examined longitudinal feeding patterns from 117 hair samples of black bears live captured in Great Smoky Mountains National Park during 1980–2001 using stable carbon and nitrogen isotope analysis from hair samples. We developed a set of *a priori* models to examine if sex, age class, year, weight class, total hard mast index, white oak index (*Quercus* spp.), red oak index (*Quercus* spp.), nuisance status and hog harvest (*Sus scrofa*) affected stable isotope signatures. We used model averaging and an estimator of the unconditional variance was used to account for model uncertainty. The δ[delta]^{13}C signatures differed by weight class with above average weight, (ß[Beta] = 0.76‰; 95% CI = 0.28 to 1.23) and average weight (ß[Beta] = 0.42‰; CI = 0.06 to 0.78) showing enriched values compared to below average bears. Bears had enriched δ[delta]^{15}N signatures in years with low white oak mast production (ß[beta] = -0.19, CI = -0.34 to -0.03) and depleted when white oak hard mast was abundant. Sub adult bears had enriched δ[delta]^{15}N signatures compared to adult and older adult bears. Variation of nitrogen values was small during 1980–1991 ($\bar{x}$ = 2.57, SD = 0.28) but increased substantially during 1992–2000 ($\bar{x}$ = 2.29, SD = 0.71) when there was substantial variation in hard mast production. Bears in better physical condition appear more likely to access anthropogenic food sources. In years of low white oak acorn production, the larger bears and sub adult bears are more likely to turn to alternative food sources. The long term variation detected in this study is important in identifying which bears are potentially more likely to seek out the anthropogenic food sources when changes occur in availability of natural foods.

ESTIMATING POPULATION PARAMETERS OF THE LOUISIANA BLACK BEAR IN THE UPPER ATCHAFALAYA RIVER BASIN

Carrie L. Lowe[1] and Joseph D. Clark[2]

[1] Department of Forestry, Wildlife and Fisheries, 274 Ellington Plant Sciences Building, University of Tennessee, Knoxville, TN 37996, USA.

[2]Southern Appalachian Research Branch, USGS, 274 Ellington Plant Sciences Building, University of Tennessee, Knoxville, TN 37996, USA.

Abstract: In 1992, the Louisiana black bear (*Ursus americanus luteolus*) was granted threatened status under the Endangered Species Act primarily because of extensive habitat loss and fragmentation. Currently, the Louisiana black bear is restricted to 3 relatively small, disjunct breeding subpopulations located in the Tensas River Basin of northeast Louisiana, the upper Atchafalaya River Basin (ARB) of south-central Louisiana, and coastal Louisiana. The 1995 Recovery Plan mandates research to determine the viability of the remaining subpopulations. I conducted a capture-mark-recapture study during 2007–2009 to estimate population parameters for the ARB bear subpopulation by collecting hair samples (n = 2,977) from 115 barbed-wire hair traps during 8 1-week periods each summer. DNA was extracted from those hair samples and microsatellite genotypes were used to identify individuals. I analyzed encounter histories using the Huggins full heterogeneity estimator in a robust design framework in Program MARK. I compared candidate models incorporating heterogeneity, behavior, and time effects on capture using information-theoretic methods. I directly estimated apparent survival, temporary emigration, probability of capture and recapture, and probability of belonging to 1 of 2 mixtures; population abundance was a derived parameter. Apparent survival was 0.91 (SE = 0.06) and did not vary by gender or year. I modeled capture probabilities with a 2-mixture distribution for both male and females. Overall mean weekly capture probability was 0.12 (SE = 0.03) and 0.25 (SE = 0.04) for males and females, respectively. Recapture rates indicated a positive behavioral response to capture. Model-averaged mean annual abundance was 56 (SE = 4.5, 95% CI = 49–68). I calculated population density using spatially-explicit maximum-likelihood methods; model-averaged density was 0.15 bears/km^2 (SE = 0.03). My results updated previous abundance estimates for the ARB bear subpopulation and will be used in a population viability analysis to determine if recovery criteria for the Louisiana black bear have been met.

Poster Abstracts

(in alphabetical order)

A Landscape-Scale Approach for Modeling Habitat Suitability for the Louisiana Black Bear (*Ursus americanus luteolus*) in East Texas

Dan J. Kaminski[1], Christopher E. Comer[1], Nathan P. Garner[2], Gary E. Calkins[3], I-Kuai Hung[1], Daniel G. Scognamillo[1], and Daniel R. Unger[1]

[1]Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX 75962, USA
[2] Texas Parks and Wildlife Department, District 5 Wildlife Office, Tyler, TX 75707, USA
[3]Texas Parks and Wildlife Department, District 6 Wildlife Office, Jasper, TX 75951, USA

***Abstract*:** By the 1940's, the Louisiana black bear (*Ursus americanus luteolus*) was considered extirpated from east Texas. In 1992, with mounting concerns that the population was approaching the minimum viable threshold throughout its occupied range, the U.S. Fish and Wildlife Service provided federal protection under the Endangered Species Act. Since the late 1970's, reliable sightings have been recorded in east Texas with increasing occurrence. Despite these sightings, little quantitative information is known regarding the suitability of habitat. We developed a preliminary landscape-scale habitat suitability index (HSI) model for 19 counties in east Texas. Our model is based on linear regression equations from existing HSI models as well as the Texas Vegetation Classification Project (TVCP) habitat classification model and literature review. We developed a ranking system and assigned SI scores for 4 food and 2 cover variables to 98 habitat classifications within the TVCP in ArcGIS 9.3.1. We buffered low and high density urban areas and state and county roads and assigned SI scores. We combined each variable score to develop food, cover, and human impact components as well as the preliminary HSI model. We will validate our model with detailed vegetation analysis and readjust the SI scores of the preliminary model accordingly to develop a final model consistent with the results of our vegetation measurement.

Evaluation of Aversive Conditioning Using Satellite Collars on Black Bears (*Ursus americanus*) in New Jersey

Michael J. Madonia [1,2], Andrew S. Zellner [1,2], Jane Huffman[1], Kelcey Burguess, [2] Patrick C. Carr [2], and Eugenia Skirta[1]

[1]Northeast Wildlife DNA Lab, East Stroudsburg University, East Stroudsburg, PA 18301.
[2]New Jersey Division of Fish and Wildlife, Trenton, NJ 08625.

Abstract: Increased conflict and interactions among residents and Black Bear (*Ursus americanus*) continue to escalate throughout New Jersey. This is the result of increased bear

populations, encroachment of development, tolerance of human activity, and accessibility of human derived food items. As a result of these increased interactions, we evaluated the effectiveness and economic feasibility of aversively conditioning bears. We calculated distances from the capture site and if avoidance of urban areas was demonstrated after aversive conditioning had been implemented. During the months of May and June in 2008, nine nuisance adult female bears were captured in Hardyston, Vernon and West Milford Townships. An experimental group of four bears were released and aversively conditioned at the capture site utilizing rubber buckshot and dogs. Five control animals received no aversive conditioning. Each bear was outfitted with a satellite collar programmed to record GPS coordinates at a frequency of twenty-four transmissions per day for approximately 5.5 months. A total of 19,918 GPS points were compiled from all nine animals throughout the study period. Landscape analysis was performed and fixed kernel home ranges were established to determine correlation between landscape use and nuisance activity. Both groups of bears returned back to an urban setting after being released. Bears that were aversively conditioned displayed a temporary avoidance of the conditioning location but returned back to the capture site within a short period of time. Aversive conditioning may provide a temporary, short-term avoidance of the conditioning site and possibly move nuisance behavior to other locations.

Evaluation of the Genetic Diversity and Paternity of New Jersey and Pennsylvania Black Bears (*Ursus americanus*) Using Eight Polymorphic Microsatellite Loci

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Abstract: Black bear (*Ursus americanus*) populations have been expanding in New Jersey since the mid 1900s due to legislative protection and possible recolonization by individuals from Pennsylvania and New York. This study investigated the diversity found within the New Jersey black bear population and determined the genetic influence by bears from surrounding states. The paternities of New Jersey black bear cubs were also analyzed in this study. Tissue samples were collected through the New Jersey Division of Fish and Wildlife from the northwest portion of the state. Samples were also collected from northeast Pennsylvania check stations during the annual black bear hunt. DNA was extracted from all tissue samples, and using polymerase chain reaction (PCR), the primers for eight microsatellite loci (G10L, Mu50, G10P, G10H, G10O, G10J, G10C and Mu59) were amplified and later genotyped. The genotypes of black bears from both states were then compared in order to determine the genotype profile contributed by Pennsylvania black bears during the repopulation of New Jersey. An average of 9.25 alleles per locus was found in New Jersey while the average for northeast Pennsylvania was 11.13. The expected and observed heterozygosities were calculated, and a goodness-of-fit Hardy Weinberg equilibrium test was performed. Genotypes of sows and their cubs were compared to determine

whether multiple paternities exist in New Jersey black bears. Twenty-six sow-cub family units were analyzed, and three were shown to exhibit multiple paternities.

A proposal to develop single nucleotide polymorphism (SNP) markers for black bears (*Ursus americanus*)

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Abstract: Black bear (*Ursus americanus*) population genetics have been studied in many populations using both mitochondrial sequences and bear specific microsatellites. This information has provided managers with estimates of differentiation between populations and can be used to describe predicted patterns of past dispersal. Between 1958-1969 the state of Arkansas relocated 254 black bears from Minnesota, USA and Manitoba, Canada to the Ozark and Ouachita mountain ranges. In the decades that followed this population expanded to over 2500 individuals which expanded their range and established new populations in Missouri and Oklahoma. The genotypes from contemporary Minnesota and Manitoba bears are difficult to distinguish from that of bears in Arkansas, and now Missouri. Thus, we propose development of fine-scale genomic markers based on single nucleotide polymorphisms (SNPs). Currently, we are identifying SNPs in genic and intergenic DNA sequences and developing screening assays. Following development we plan to screen DNA samples from black bear populations to 1) compare population differentiation within a genomic framework, 2) evaluate markers compared to microsatellites, and 3) look for adaptive differences between disparate populations. We expect to present preliminary analysis of objective 3 at conferences in 2012. We are interested in discussing future collaborations with others who want to contribute to the development of SNP based black bear datasets and expand the analysis of genomic population structure within a regional context.

Colonization of American Black Bear in Mississippi

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Abstract: Reductions in American black bear (*Ursus americanus* spp.) distribution and abundance in the southeastern United States are often attributed to habitat modification, sport and illegal hunting, and trade. Black bears are native to Mississippi and historically occurred throughout the state. Earlier bear research in Mississippi emphasized their historic range,

stakeholder perceptions, identifying suitable habitats with emphasis on public land, and assessments of human attitudes toward reintroducing bears. In 2008, a 5-year study of black bears was initiated in partnership with the Mississippi Department of Wildlife, Fisheries, and Parks to refine the existing black bear habitat suitability model, evaluate black bear dispersal, and predict black bear colonization across Mississippi. We are capturing bears throughout Mississippi, emphasizing the Delta and Coastal regions. Using data from ≥20 bears equipped with GPS radio collars, we will estimate home range size and use Environmental Niche Factor Analysis to estimate bear habitat selection. Models including least cost path and zonal corridor analysis will be evaluated using bear location and habitat data to define potential corridors. We will estimate, delineate, and rank corridors suitable for bear movement and potential habitat conservation. From the refined habitat use map, corridor estimations, bear movements, and dispersal we will predict the spatial trajectory or colonization potential of this bear population. This study will provide insights into the ecological processes of a colonizing large carnivore species in a human-altered landscape. Knowledge of black bear habitat selection and colonization potential in Mississippi will help managers refine existing and future habitat restoration and species management efforts. Predicting where and when black bears will become established will help to prioritize public information efforts to increase awareness and reduce negative human-bear interactions and provide baseline data to assist managers in determining the feasibility, based on habitat, of sustaining a viable bear population in Mississippi.

Florida's Contest to Make Wildlife Feeders More Bear-Resistant

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***Abstract*:** Feeding animals for hunting and wildlife viewing is legal on private lands in Florida. Florida black bears have caused significant damage to wildlife feeders in some areas. In response, Florida Fish and Wildlife Conservation Commission (FWC) provided a design that can prevent bear access to wildlife feeders. While effective, FWC's design is not mobile and is difficult to construct in remote areas. FWC decided to hold a contest to collect alternative ideas, and recruited a graduate student from the Bear Management Program's internship program to create the contest. The student collaborated with FWC staff to formulate, market, and launch a "Bear Proof Your Wildlife Feeder" contest in November 2010. The contest was advertised in two magazines popular with outdoor enthusiasts and promoted at public events. In addition, a webpage was created to both promote the contest and provide details on submission details. Entry requirements included: 1) photograph or sketch of the design, 2) detailed instructions on how to construct the design, and 3) estimates on cost and labor time for construction. The contest concluded on April 22, 2011 and received 10 entries. While many were variations on FWC's original design, several plans had some unique adaptations, such as: 1) greasing the pole,

2) wiring an electric fence charger to the pole, 3) using two poles, and 4) using different materials for construction. Most designs relied heavily on height (8' or more) to keep bears from accessing the feeders. Prices for materials ranged from $100 to $250, which was substantially lower than commercially-available designs ($600). Construction time ranged from 1 to 48 hours and the level of skill required to build the design also varied. While the winning entries will not be announced until June, FWC feels the contest has already been a success. The frequent appearance of the original design in the entries reinforced FWC's confidence in the advice they have been providing. The adaptations to the FWC design could increase its use among hunters and wildlife viewers. The alternative designs offer additional options to individuals experiencing bear damage to their feeders. FWC is committed to engaging with stakeholders to develop practical solutions to resolve human-bear conflicts.

Multi-scale den-site selection by American Black Bears in Mississippi

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Abstract: Knowledge of den-site selection by American black bears (*Ursus americanus*) at multiple spatial scales is necessary for effective conservation of bear habitat. Currently, there is no quantified information on den-site selection by black bears in Mississippi, including the state- and federally-listed Louisiana black bear (*U. a. luteolus*). Consequently, our objectives are to describe: 1) black bear denning chronology and den characteristics, 2) scale-dependent den-site selection, and 3) effects of disturbance on den-site selection by black bears in Mississippi. We are evaluating den-site selection of radio-collared bears statewide during 2009-2011 and characterizing den sites used and located previously (2005-2009). We will summarize and compare dates of den entrance and emergence by bear age-sex class. We are classifying dens as tree or ground and measuring den dimensions and presence of bedding material. For scale-dependent den-site selection, we are evaluating habitat and topographic characteristics at 3 spatial scales: den sites (15-m radius area), den areas (100-m radius area), and den landscapes (1,000-m radius area). Habitat characteristics include percent horizontal and vertical cover, basal area, and number of potential den trees. Topographic characteristics include aspect, slope, and elevation. The den site, den area, and den landscape scales will then be compared to those of a randomly selected point located within each bear's home range. To estimate effects of disturbance on den-site selection, we will estimate the proximity of dens to natural and anthropogenic sources of potential disturbance (e.g., rivers, roads, and agricultural fields) and compare the distances to the respective mean distances obtained from annual and autumn home ranges. Our study will provide improved understanding of factors influencing selection of den sites by black bears in Mississippi. Understanding these factors will allow managers to identify existing suitable denning habitats and prescribe appropriate management for these habitats.

Abundance and distribution of American black bears in Missouri

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Abstract: American black bears (*Ursus americanus*) are an important wildlife resource in Missouri, yet little information is known about their population status. We will conduct the first quantitative population estimate of black bears in Missouri. Abundance will be derived using DNA-based capture-mark-recapture (CMR) methodology over a 29,774 km^2 area. Seven microsatellite primer sets will be used for individual identification and the sex-specific marker Amelogenin will be used to determine sex from hair samples. We will investigate heterogeneity in capture probability using sex and temporal variation as covariates. Unlike previous CMR studies, data collected from GPS-collared black bears, remote cameras, and hair snares will be used to investigate variability in detection. Assessing the magnitude of detection biases is critical for accurate population estimates. We will provide information necessary to implement black bear management objectives for Missouri. Estimated population size and sex ratios will be used by the Missouri Department of Conservation (MDC) to manage black bears consistent with available habitat while minimizing human conflict.

Cognition vs. Context: How important are bears in decisions of management action acceptability?

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Abstract: The ability to predict stakeholders' acceptance of different wildlife management actions allows wildlife managers to work more efficiently by using appropriate management actions which are less controversial. Sociodemographic, cognitive, and contextual variables have all been linked to the acceptance of lethal control management actions (i.e., age, gender, education, attitudes, and risk perceptions). The objective of this research was to investigate the comparative affect cognitive and contextual antecedents have on the acceptability of lethal control actions. A statewide mail survey of Ohio adult residents was implemented to measure the acceptability of five common bear management actions in three different contexts (N = 9,400). The three contexts elicited were common human-bear encounters varying in severity. Our results show previous conflicts with bears and perceived likelihood of future conflicts with a bear have

less of an influence on the acceptability of lethal control actions than cognitive factors related to bears; such as attitudes, existence value orientations for wildlife, and risk perception. We conclude that in our study population the acceptability of lethal control actions to manage bears is influenced more by general perceptions than previous experience with, or perceived likelihood of future conflict with bears. Managers may want to focus more effort on understanding their stakeholders' perceptions of bears to more accurately predict their support for different management strategies.

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History of the Eastern Black Bear Workshop

The first official Eastern Black Bear Workshop was held in Delmar, New York in July 1972. The meeting was hosted by the New York State Department of Environmental Conservation, Wildlife Research Lab; 31 attendees represented 10 states and one federal agency. Since 1972, the Workshop has had a consistent and successful track record of 18 biennial meetings hosted by 15 states and one Canadian province. Attendance has ranged from 31 at the first meeting to 146 at the 12th Workshop, with an average attendance of 85. State/provincial representation has ranged from 9 to 25 (mean = 18) out of a potential 35 Eastern states or provinces. Three states have been represented at every Workshop since 1972- North Carolina, New York, and Virginia. Unfortunately, the track record for Workshop proceedings has not been so consistent; 2 Workshops did not produce a written record (1982 and 1988). However, proceedings were produced from the rest of the meetings and provide an informative and interesting history of black bear management and research in eastern North America for the past 34 years. Considering the fact that there has never been an organizational body governing the Workshop, its track record is remarkable. Between 1978 and 1983 attempts were made to bring some consistency and continuity to the Workshop by developing guidelines; these attempts were not successful. Thus, all of the accomplishments to date have been done informally among the various states and provinces. As time has passed, it is evident that some form of structure and guidance is necessary to keep the Workshop viable and productive. Consequently, a Steering Committee was formed in 2005, which developed Guidelines for conducting a workshop.

Number of Eastern Black Bear Workshops attended by state/province from eastern North America, 1972-2007 (excludes 1982 Workshop hosted by Michigan; no proceedings or records available).

State/ Province	No. attended	% attended
NC/NY/VA	18	100
FL/GA/SC/WV	16	89
AR	15	83
ME/NH	14	78
MI/VT	13	76
MA/PA/TN/QE	12	67
ON	11	61
MD	10	56
KY	9	50
LA/WI	8	44
MN	7	41
NB	6	33
MS/NJ/NS/OH	5	28
NF	4	24
CT/OK	3	17
MB/MO	2	11
AL/RI/TX	1	6

List of hosts and attendance at Eastern Black Bear Workshops, 1972-2009

Year	Host	No. of states/prov. attending	No. of attendees	Dates
1972	NY	10	31	18-19July
1974	TN	9	39	16-18April
1976	PA/WV	10*	--*	28-28April
1978	ME	17	10	13-6April
1980	NC	12	68	17-20March
1982	MI***	**	**	**
1984	FL	22	73	26-28March
1986	VA	21	108	18-21Feb
1988	ON***	17	81	4-7April
1990	AR	21	92	2-5April
1992	NH	18	106	1-3April
1994	TN	25	146	2-5April
1996	VT	22	79	28April-1May
1997	MS	21	100	13-16April
1999	MA	22	80	28-30March
2001	SC/GA	21	119	25-28March
2003	NJ/NY	19	99	2-5March
2005	FL	19	95	3-7 April
2007	MD/PA/WV	22	110	10-12 April
2009	MB/MN/WS		Canceled	

*Based on reports published in Workshop proceedings; no attendance list provided.
* * No proceedings published or records available.
*** No proceedings published.

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This collar could supplement your existing research project, help jump start a new research study or be used to monitor the movements of a nuisance bear!

Submit this entry form page during the Tuesday Afternoon Workshop Session on "Current Research and Future Research Needs," conducted by John McDonald (*Location: Finley Classroom A)*.

Name:_____

Agency/Organization:_____

Agency/Organization's Contact Name (if different from entry):_____

Agency/Organization Mailing Address:_____

_____

City, State, Zip Code:_____ Country:_____

Phone No (home/cell):_____ Phone No (office):_____

E-mail Address:_____