Nightwing News

The Newsletter of the Southeastern Bat Diversity Network

Volume 101, Number 2 December 2011

PRESIDENT'S ADDRESS

Submitted by Mike Lacki

As we all prepare for the New Year ahead, I extend to all the membership of SBDN a warm season's greetings. Many of you will soon be engaged (if not already) in winter field work helping to tackle the WNS problem that is plaguing our bats. Be safe and good luck in your efforts.

This year's Bat Blitz in Crossnore, NC, in early August was again a huge success as attendance far exceeded the allotted number of 60 participants. Fortunately, efforts by the local host, Mary Kay Clark, persuaded the sponsors to welcome the overflow to their facilities and blitz activities. I am grateful for the work of the Blitz Committee, lead by Trina Morris, in sustaining such an important annual event of SBDN.

On September 28th of this year I received notification that SBDN was selected by the Southeast Section of The Wildlife Society to receive an Outstanding Group Achievement Award. Past-president Darren Miller, whose efforts as President have significantly contributed to the success of our organization, received the plaque on behalf of SBDN at the SEAFWA banquet in October. Recognition of our efforts by another conservation organization is a clear indication of what SBDN has become, and the extent to which activities of SBDN represent the highest standards in ethics and professionalism. We should all be proud of this recognition and use it as further motivation to continue to work hard toward the goal of conserving all bat species.

The Executive Board has been active in response to input from the membership and individuals outside of SBDN regarding management of bat habitat, Rafinesque's big-eared bat and southeastern myotis primarily, at Noxubee National Wildlife Refuge, Mississippi. Based on comments received from multiple sources, including photographic evidence of felled potential roost trees, the Executive Board drafted and submitted a letter to the Refuge Manager expressing our concerns over whether the needs of these two rare bat species were being met by existing management activities on the refuge. We extended and offer of assistance and this led to our participation in a Summit held in Starkville, MS, in late November on management of bat and bird habitat at Noxubee and throughout the USFWS refuge system in the southeast. Darren Miller and I from the Executive Board represented SBDN and, along with member Jeff Gore who was also invited for his expertise on southeastern myotis, contributed to discussions of existing issues and concerns and the potential for new directions in management of habitats. More dialogue is planned, but SBDN was asked by the USFWS if we would be willing to form an ad-hoc committee to provide input to the refuge system for improving management of bat habitats. I will be approaching some of you in the near future about potential service on this new committee and hope that you will be willing to serve.

In a strange twist of fate, our next annual meeting is scheduled for 23-25 February 2012 in Mississippi at Lake Tiak O'Khata near the town of Louisville; not to be confused with the location of this past year's meeting in Kentucky. Fortunately, those of us in the Bluegrass State know not to pronounce the word with a "w" as do folks in Mississippi, but to correctly pronounce it with the "s" silent! All kidding aside, this year's annual meeting plans for a Plenary Session on "Incorporating Bats into Regional Conservation Plans, " with invited speakers from BCI, USGS, USFWS, MSU, and Noxubee National Wildlife Refuge. I anticipate a lively debate and hope you all make plans to attend. This session will be followed up on the last day with a field trip to the refuge for members of SBDN to view bat habitats and management activities at Noxubee National Wildlife Refuge firsthand.

Before I close I'd like to take a moment to thank J.D. Wilhide for producing once again an excellent newsletter. J.D., your efforts are most appreciated. Lastly, as President of SBDN I continue to welcome input from anyone in the membership. Should you feel strongly enough about any issue with SBDN, or wish to become more involved on committees, please do not hesitate to contact me (mlacki@uky.edu) or any other member of the Executive Board and we will do our best to assist you.

In This Issue

Board of Directors Meeting

Southeastern Bat Diversity Network
Board of Directors
Meeting Minutes
Telcon from SBDN Bat Blitz In North Carolina
03 August 2011

Attendees:
Mike Lacki, President
Tim Carter, Treasurer/BOD
Joy O'Keefe, Secretary/BOD
Michael Baker, BOD
Dennis Krusac, BOD
Katrina Morris, BOD
Darren Miller, Past President

Participating by telephone:
Nikki Castleberry, BOD
Bree McMurray, BOD
Tom Risch, BOD

Not in Attendance:
J.D. Wilhide, SBDN newsletter editor

Guest:
Mary Kay Clark – Bat Blitz Host

M Lacki called the meeting to order at 11:06 am EST.

Action Items:

- Mission Statement-Castleberry will get with Miller to dig through all history of emails and documents. Castleberry will provide to the group to be standardized for all SBDN representation.
- BEB Symposium-Carter will check if invoice was actually paid and report to BEB Symposium folks.
- For discussion at the Feb 2012 meeting, need to form Nominating and Elections Committee for 2013
- 2013 SBDN/Coll. Meeting?-ask opinions/approach the following contacts in South Carolina; Susan Loeb-USFS, Mary Bunch-DNR, Austin Trousdale-academia, John Storm-research
- Ask Awards Committee to consider suggestions of 2 awards per year, or increasing award amount to $750/student, or sponsoring a room for students at SBDN.
- Carter is to ask all past hosts again about allocations/returns of meeting/blitz surpluses. How do former hosts want to spend of allocate the left over funds in accounts?
- SWG grant support letter-Lacki will get a draft of this support letter to the BOD by Sept 15, 2011 [see later items, this falls in priority to fed lands forest management response letter]
- Morris will also look to see if a template for SWG grant support letter already exists to go from
- Carter to revisit Kathy Dickson (red bat print) issue one more time and make sure all has been taken care of
- Morris has a list of state names and numbers –state contacts, will send to Lacki. [side note, McMurray to send Morris the lists she was working from when she chaired the State Reports Committee]
- Carter is to PAY J.D. Wilhide for the newsletter work.
- McMurray will contact NASBR to inquire about their handling of event insurance. Our uses would be for both meetings and blitzes.
- Lacki will form Ad-hoc Membership Committee
- Lacki will reply to OK Bat Coordinating team asking for a contact person.
- Lacki will contact NASBR president and develop a letter from SBDN in response to the forest management on Fed lands issue.

Committees

Blitz-Trina Morris · Awards-Steven Burnett · By laws- Nikki Castleberry · WNS-Mike Baker
Database-Eric Britzke · Bat Coordinator Position-in active at this time

New: *Membership Committee*- select from academia, students and agencies. Chris Comer has agreed co-chair. Forward additional names to Lacki.

Incomplete Action Items/Old Business:

Feb 2011 meeting Action Items progress

Mission statement- We need the original to consider as a group. Action Item 1.

-WNS Committee-New National Plan:
Baker is forming/chairing SBDN WNS Committee, Risch agreed to remain on committee. (Krusac was on the Nat'l Plan Development Committee) Have SBDN review and comment on the National WNS Plan, address how this affects SBDN (e.g. decontamination). Starting point – WNS Committee to review/recommendations to BOD. Krusac suggested focusing on the National Implementation Plan and address how it affects SBDN

-Big-eared Bat Symposium:
Per Susan (Loeb?) this (proceedings) has gone to the printers. Money in the BEB Symposium acct ($8500-brief discussion of where leftover funds going). Action Item 2.

-Nominating Committee:
Not needed until 2013 election cycle, Carter has documentation to provide.
2012 BOD members (coming off the board??)-Krusac, Baker, Risch, Castleberry, O'Keefe?. Action Item 3.

-Annual Meeting 2012:
Feb 23-24, 2012 Louisville, Mississippi. Provide meals as part of registration, but keep costs reasonable. Need a meeting topic.
Some suggestions: wind power, WNS, local pertinent theme for host state, landscape cons. coop., Midwest FWS regionwide HCP(?SE region, too?), potential fed listing of additional species, status review gray and Indiana bats

Clark-send meeting invite to joint ventures and NWR folks

-2013 SBDN/colloquium meeting location:
Suggestions were FL, AL, SC. SC looking like approachable candidate. Keep AL as a second tier. Action Item 4.

Reports:

Treasurer's Report -Carter: $44,607 in the bank. 107 paid members, 488 good members on the email list serve= average for the last 2-3 years. There was a jump in numbers at the joint meeting in VA (2008).

-General Acct-up $2900, membership $1700 from meeting registration-over $1000 from Midwest Bat Working Group.

-Student travel award-$4051, the 2011 meeting was a HUGE money maker for that account-roughly $3280 just at the meeting;$1625 auction, $825 red bat prints, $390 donations via registration, $420 t-shirt profit. We basically have 8 years of $500 awards for travel. In 2010, no award was made. Discussion on use of student award money included increasing amount and/or number of awards. Pose to Awards Committee. Action Item 5.

- The 2011 joint meeting account surplus= $8900, how does that get spent? In 2008, the joint meeting had excess funds left over-Mike St. Germain-host, surplus was divided three ways: SBDN general account, Colloquium surplus account, NEBWG was offered the surplus 1/3 and they wanted it submitted to the ISU WNS fund.

-several suggestion were made about how to relegate the excess from the 2011 meeting: Consensus is Miller and Carter (2011 host, can make the call now) will talk about how much to allocate to 2012 SBDN/Colloquium to offset the cost of meals per person AND keep the remainder as seed money for the next joint bat groups meeting. Action Item 6.

Blitz Committee Report - Morris is now Blitz Committee Chair
-NC 2011 Blitz host=Mary Kay Clark. Lodging and meal costs were moderate, National Parks and local FWS office were good to work with, originally limited to 60 participants—BUT she got so many requests/complaints to raise the # of participants, so she did **[no total number given at the BOD meeting, nor the extra costs over and above what was budgeted for 60 folks]**

-Clark not expecting to be able to reimburse for travel costs for this blitz (gas prices, travel without funding)

-Clark bought brand new nets early for 2011 blitz, $6000 worth, may be able to return [some?] or offer to SBDN to purchase for next blitz host

-Morris: 2012 host potential? OH Wayne NF cannot commit to 2012 but still wants to host (currently no commitment and no funding)—NOTE: this is a Midwest state and would be a combined MWBWG and SBDN blitz-Katrina Schultes is the contact

-Morris: 2012 potential host TN-KY joint hosts at Land Between the Lakes Dave Pelren and Betina Bowers, contacts. Discussion: possible alternative at Big South Fork Recreation Area –Pelgren and Bowers will check on this possibility. TN-KY a possibility sometime in the next 2 years.

-Morris: 2012 potential host FL, Melissa Tucker and Holly Ober proposed May 20-24, 2012 on the Appalachicola NF, couple options on lodging, no committed funding yet. FL is VERY interested for 2012. Morris would be the liaison for FL.

-Morris will contact all three in the following weeks for proposals and funding potential-10 month timeline is tight (FL proposal).

-emphasis on trying to line up the next 2-3 years of blitz locations, including collaboration with the Midwest Bat Working Group

--Idea for blitzes, Carter and Morris have ideas for making decon "fun". For example, Theme Nights with throw away or Goodwill disposable clothes

CORA/MYAU Plan Update

-Lacki has the lead, has until the end of Dec 2011 to get a draft to BCI, will get a draft to SBDN BOD and BCI at the same time.

SWG Grant Program-Support Letter

-Discussed target and timeline for this letter. Morris suggests have a letter from SBDN ready to respond to requests for support/correspondence (ala the WNS support letter). -Mike Lacki will work on the template. Action Items 7 & 8.

Kathy Dickson Letter and Resolution

- Carter believes this issue has been closed and the receipt was copied to Mike Lacki. Action item 9.

Nightwing News Update and shortage of State Reports

-How do we increase participation in the state reporting?
-Suggestions: drop the "no report" format, more reminders AND initiate more personal phone contacts.
-Task J.D. Wilhide on all of this, more state contacts to Lacki, then to J.D. Action items 10 & 11.
--Mylea Bayless, BCI, contacted SBDN. The TX representative to SBDN was asked to step down and Mylea will let us know who the successor is.

Other Business-Event Insurance, etc

-Bree was to ask NASBR about their event insurance. Reactivate for Feb 2012. Action Item 12.

New Business:

Ad-hoc Committee on Membership

-How should one be structured and do we really need it? Action item 13.
-Membership is stable but only 20% of the mailing list (list serve individuals). Questions: Why are you a paid member? Why do you want to be a paid member? What do you get from membership?
-Committee would decide benefits. Suggestions: decals, bumper stickers, etc
-Of 107 paid members, only 7 or 8 are Board Members
-How do we improve recruitment? Suggestion: only paid members of SBDN are eligible for awards.
-Why do we want more members? Do we want more members? There are MANY people at the meeting that are NOT paid members, but we make it very easy to participate. Would larger paid membership help for grant support or lend more to support letters?

Oklahoma Bat Coordinating Team request

-Mike Cheney (?) contacted Lacki requesting "state membership" into SBDN. Lacki will let them know and get contact info for their group. Action item 14.

Lifetime Achievement Award recipients to receive Lifetime SBDN Membership

-Carter proposed (in email?), everyone at this meeting agreed. Miller made and motion, Carter Seconded:
Motion: Move to grant Lifetime Achievement Award recipients permanent or lifetime SBDN membership.
-Lacki called the vote, passed unanimously

Concern raised re: forest management on Federal Lands

-Jeanie Jones raised the issue to SBDN members Mary Kay Clark and Mike Lacki- Old growth cavity trees on at least Noxubee NWR are reportedly being removed to favor or support a habitat issue for neotropical migrant bird species: Partners in Flight, Joint Ventures, etc –bird groups driving force behind this to promote certain habitat types

-SBDN needs to make clear that we did not and do not approve this action.

-Evidence of trees marked as maternity roosts were being removed and on the ground. This action is destroying habitat for rare bat species under federal review to benefit species of birds that are not as rare [as the bats]

- Krusac: letter to go to the group from Nina [BCI], need to include in the "to" list the Regional FWS Director for the NWR System.

-Mary Kay offered to pull together and bulleted list [of actions/consequences?], then Lacki can develop a letter in response to this action

-this item will be given a higher priority that the SWG letter. Then get ASAP to the SBDN BOD.

-Mary Kay Clark and Jeanie Jones are to get Lacki some background/support information.

Motion to adjourn: Miller, seconded by Carter
Lacki call the vote, passed unanimously

Meeting adjourned at 12:22 pm central

10th Annual Southeastern Bat Diversity Network Bat Blitz

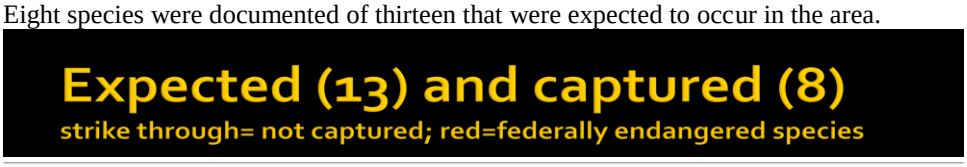
Pisgah National Forest and Vicinity
Western North Carolina
31 July – 4 August 2011

- The 10th SBDN Bat Blitz was held in August 2011 in western North Carolina within northern portions of the Pisgah National Forest and on other state (parks, natural areas, gamelands and state forest) and federal parcels (Blue Ridge Parkway) in the vicinity.
- Our base of operations was the N. C. State Forest Mountain Training facility in Crossnore, NC. A celebration of 10 years of bat blitzes was held the night of June 31st at this facility.
- Activities began with "BatFest", a public education event held on Sunday afternoon, 31 July. BatFest attracted over 100 attendees from local areas. Activities included face painting, a program featuring live bats (Vicky Smith from A-Z Animals, GA), outdoor demonstrations of field techniques, basic information on local bats and formal presentations on timely topics such as White Nose Syndrome. Boy Scout troops from the area built and gave away bat houses in hourly drawings.
- Including planning, organizing and staffing the events (Blitz and BatFest) more than 160 people were involved. Over 130 participated in the three nights of bat surveys.
- The youngest blitz participant was 7 years old, the oldest was 63. Most participants came from North Carolina and surrounding states (TN, KY,VA, SC), many attended from Gulf and Atlantic coast states (MS, GA and FL) and we had good representation from the Midwestern states as well (IN, IL, MO).
- Using mist-nets ten teams surveyed ten different sites each night over a 3 night period beginning the night of 1 August and ending in the early morning hours of 4 August 2011, for a total of 30 sites surveyed.

RESULTS

- All sites surveyed yielded captures.
- The lowest number of bats captured at a site was 1, the highest number was 49.
- 443 bat captures were recorded. (One of the largest capture rates for an SBDN bat blitz).

- Eight species were documented of thirteen that were expected to occur in the area.



~~CORA~~	~~*Corynorhinus rafinesquii*~~	~~Rafinesque's big eared~~
~~COTAvir~~	~~*C. townsendii virginianus*~~	~~Virginia big-eared bat~~
EPFU	*Eptesicus fuscus*	Big brown bat
LABO	*Lasiurus borealis*	Red bat
LACI	*L. cinereus*	Hoary bat
LASE	*L. seminolus*	Seminole bat
~~LANO~~	~~*Lasionycteris noctivagans*~~	~~Silver-haired bat~~
~~MYGR~~	~~*Myotis griscesens*~~	~~Gray bat~~
MYLE	*M. leibii*	Small footed bat
MYLU	*M. lucifugus*	Little brown bat
MYSE	*M. septentrionalis*	N. long-eared bat
~~MYSO~~	~~*M. sodalis*~~	~~Indiana bat~~
PESU	*Perimyotis subflavus*	Tricolored bat

- No federally endangered or threatened bats were captured (Indiana bat, gray bat or Virginia big-eared bat); although all of these species have been documented from western N.C. and some net sites were in close proximity to a known roost site for Virginia big-eared bats.
- Big brown bats (EPFU) and Red bats (LABO) were the two most frequently captured species.
- *Myotis* were well represented in the survey. Captures of species of this genus accounted for approximately 40% of the total captures.

- The 3 *Myotis* species that were captured (Small footed bat, Little brown bat and Northern long-eared bat) are under consideration for federal listing due to sharp and sudden declines from White Nose Syndrome.
- No evidence of WNS was observed in *Myotis* or other species using the wing index assessment, however, wing damage may not be a good indicator after bats have been out of hibernation for several months since significant healing may occur during that time.
- Sampling for WNS included both tissue collection and swabs. These samples were sent to Boston University and the University of Tennessee.

ACKNOWLEDGEMENTS

Agency partners and host team members were:

- Southeastern Bat Diversity Network (SBDN)
- Pisgah National Forest (PNF)
- N. C. Wildlife Resources Commission- Wildlife Division, Nongame Section (WRC)
- U. S. Fish and Wildlife Service, Asheville office

Sheryl Bryan, Christopher Williams, David McFee (PNF)
Gabrielle Graeter, Kendrick Weeks (WRC)
Sue Cameron, Gary Peeples (USFWS)

TEAM LEADERS

- **Sybil Amelon** Missouri
- **Dottie Brown** North Carolina
- **Jackie Belwood** Florida
- **Tim Carter** Indiana
- **Mary Frazer** North Carolina
- **Lisa Gatens** North Carolina
- **Gary Libby** Kentucky
- **Trina Morris** Georgia
- **Joy O'Keefe** Indiana
- **Merrill Tawse** Tennessee
- **Eric Winters** South Carolina

Selected Pictures from this year's bat Blitz.

SAVE THIS DATE!!!!!!!!!!

11th SBDN BAT BLITZ

20 - 24 May 2012

Join us for Bat Fest (a public outreach event) on Sunday May 20, followed by three fun nights of mist netting in and around the Apalachicola National Forest.

Come see the splendors of the Panhandle of Florida.
(Florida's Forgotten Coast)

Registration will open in March

CONTACT: Holly Ober, 10th SBDN Bat Blitz Coordinator
holly.ober@ufl.edu

JOIN US IN FLORIDA FOR THE 11th SBDN BAT BLITZ, 20 – 24 MAY 2011

STATE WORKING GROUP REPORTS

In February and March, members from the Alabama Bat Working Group participated in state-wide inventory of priority karst resources in response to white-nose syndrome (WNS). No sign of WNS was detected.

In October, the group held its 3rd annual mini Bat Blitz at the Little River Canyon National Preserve and Desoto State Park in the northeastern part of the state. Participants included members from Alabama A&M University, Alabama Department of Conservation and Natural Resources, National Park Service, private sector, US Forest Service, and US Fish and Wildlife Service. Special thank you to Mary Shew from the National Park Service for hosting the crew.

David A Saugey

During the annual meeting in Louisville I was presented the 2011 SBDN Lifetime Achievement Award. I was beyond surprised and cherish this award more than any other I received during my career and involvement with bats. I thank the awards committee, my nominators, whomever they were, and my good friend Dennis Krusac for reading the presentation materials at the award ceremony. Bats and my participation in SBDN have allowed me to make many lifelong friends and to work in the field and share a cold beer with them and many memorable characters that have been the icing on the cake of my life. I can't quite remember what I said upon receiving this award but wanted to acknowledge one person that I know I failed to mention, not because I didn't want to but because that blurr thingy set in due to being caught completely off-guard.

In 1972 I was a sophomore at The University of Arkansas at Little Rock where I had the good fortune to make the acquaintance of and take classes under mammalogist Dr. Gary Heidt. Taking his class, "Natural History of the Vertebrates" opened my eyes to a world of animals I had never experienced and lit a fire of curiosity in me that has never dimmed. Gary included me on a long-term flying squirrel project that introduced me to fieldwork and he always took time for field trips during this class, Mammalogy, and Advanced Field Biology where we studied animals in New Mexico, Oklahoma and Texas.

Gary also was the person who encouraged me to attend graduate school at Arkansas State University that led to a thesis on gray bats under Dr. Rick McDaniel which eventually led to my career as a biologist with the United States Forest Service. I had a wonderful, long (34.5 years), enriching experience working for the Forest Service from where I retired last December. I am quite certain that without Dr. Heidt's friendship and guidance many of the wonderful things I have seen and experienced would have never happened. I often turn and look back down the road of my life and career and remind myself how fortunate I have been thanks to this friend and mentor. Therefore, I dedicate my SBDN Lifetime Achievement Award to Dr. Gary Heidt without whom I might have never explored the wonderful world of bats.

2011 Summer Interns

The 2011 GA DNR summer interns, Craig Bland and Julia Nawrocki were a great addition to the DNR staff! They continued work setting up and completing Anabat routes throughout the state. They also assisted with summer cave emergence counts. During the summer we also completed a bat survey of GA Barrier islands. They also assisted with several other small mammal projects around the state. We couldn't have done it without them and they will be missed. We'll be looking for interns next summer. Look for an announcement on the GA DNR website in the spring (http://www.georgiawildlife.com/getinvolved/career-opportunities).

Photo 1 – Craig and Julia hard at work setting up nets over a gator hole on Ossabaw Island.

2010/2011 Winter WNS Monitoring & Education Efforts

GA will continue visiting cave sites checking for signs of WNS this winter. We will be collected samples for Winifred Frick's project and have installed data loggers in some of our sites. We have been giving presentations around the state and were able to again attend the Fall TAG Cave-In. GA DNR had a booth at the event and passed out information about WNS and decontamination protocols.

Photo 2 – Nikki Castleberry, DNR Biologist at the GA DNR TAG Booth.

Elsie Holmes Nature Park Bat Kiosk

During the construction of the cave gate on private land in North Georgia, GA DNR biologists noticed a large number of people hiking on the trail at Elsie Holmes Nature Park, across the creek from the cave. Biologists knew that the gate would be visible from the trails and that people would wonder why it was there. That's when the idea for an informational kiosk came about. GA DNR applied for a small amount of additional funding to complete a kiosk along the trail. That grant was awarded in 2010.

The kiosk was designed by Matt Zbornik, an artist and builder in Athens, GA (http://mattz.com/). He has long had an interest in combining education projects with artistic design components to provide a more interesting and informative platform for educational materials. He came up with the idea to design the roof of the kiosk as an anatomically correct bat wing. We installed the kiosk this fall and it is placed so that the cave and gate can be seen directly across the creek. The gate is best viewed in the winter when the absence of tree leaves gives a more clear view of the site. Park visitors can take a trip down to the creek and learn more about bats and why projects like this are important. This is a great example of mixing art and education to give park visitors more information about conservation efforts. Matt is excited about the possibility of more projects like this one in the future.

Photo 3 – Completed Bat Kiosk at Elsie Holmes Nature Park

Photo4 – Seminole Bat on Cumberland Island, GA

Piper Roby
Biologist/GIS specialist

Copperhead Environmental Consulting, Inc.

Completed a mist net survey for a proposed wind farm in MO where we captured over 20 Indiana bats, five of which were radio-tagged. Numerous roost trees were located and at least one (maybe two) maternity colonies were identified.

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Completed a mist survey for a project in TN and captured a gray bat and a male Indiana bat. The Indiana bat was radio tracked and five roost trees were located. The Indiana bat capture was a new county record.

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Surveyed approximately 40 caves in KY as part of the 2010-2011 WNS monitoring. WNS was not found during the surveys; however in March of 2011, WNS was found by KDFWR in Cool Springs Cave, which was the first and only known WNS cave in KY.

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Conducted the third year of an Indiana bat spring migration study starting in TN using both aerial and ground telemetry crews. Five female Indiana bats from two caves were radio tagged and tracked. Several stopover roost trees were located during their migration, along with the identification of staging areas, migration paths and flight speeds. One bat was tracked for six consecutive nights into Georgia.

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Conducted an Indiana bat fall migration study in order to link bats from the Ft. Knox maternity colony to hibernacula. Tracking was conducted on 28 radio tagged bats by both aerial and ground crews. Three Indiana bats were tracked to Jug Hole Cave and one to Binkley Cave, both in southern Indiana. Continued spring monitoring of the Indiana bat maternity colony at Ft. Knox military base, KY.

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While conducting hibernacula surveys of KY caves in late 2010, Price Sewell witnessed a spring salamander feeding on a dead tricolored bat. (See Items of Interest)

The Mississippi Bat Working Group

Members of the Mississippi Bat Working Group have been very busy during the last 6 months. Below is a recap of some of our activities.

The group held their Eighth Annual Mist Net Event at Grenada Lake July 11 – 13. A total of 37 people attended and captured 35 bats (20 reds, 8 tri-colored, and 7 evening) in two nights of netting. The group also conducted bridge surveys, checking approximately 90 bridges and culverts north-central Mississippi for bats.

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Members Terri Jacobson, Dave Richardson, Chester Martin, Kathy Shelton, Becky Rosamond, Norris Smith, Mariah Cutchlow, and Adam Al Douri conducted 2 mist-netting demonstrations for participants in the Mississippi State Extension Natural Resource Summer Camps at Noxubee National Wildlife Refuge. Approximately 40 students participated and 16 bats were captured.

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Members Shea Staten, Deb Freeman, Terri Jacobson, Sandie Kilpatrick, Andrea Schuhmann, David Dunn, Carole Ann Dunn, Eva Kristofik, and Becky Rosamond conducted a "Scouting for Bats" event at Sardis Lake. The scouts were required to prepare a paper on an assigned species of bat and present it at the event. The MBWG members manned 5 stations which covered information on bat life history, identification, research, adaptations, and threats. The members then monitored mist nets and captured a bat to show the participants. A total of 40 people participated and scouts attending earned a special "Scouting for Bats" patch. This event will be featured in the Spring 2012 BCI magazine, as well as the Spring issue of "Boys' Life" magazine.

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Member Alison McCartney worked with National Geographic this year to film a bat piece in Adams County, Mississippi. National Geographic will be airing a three piece series in 2012 on wildlife surrounding the Mississippi River. One piece of the series will contain a segment on bats. National Geographic spent three days with Alison at St. Catherine Creek National Wildlife Refuge and nearby plantations filming bat colonies that she started surveying in 2001. Part of the segment will include amazing slow motion footage that was filmed of thousands of southeastern myotis bats entering a cistern roost at sunrise. This segment should be a great PR opportunity to help further the conservation of bats.

- Monitoring Activities:
  - Kathy Shelton continued monitoring caves for WNS
  - Andrea Schuhmann, Shea Staten and Ed Keiser monitored several known maternal colonies.
  - George Harris monitored bridges.
  - Chester Martin, Andrea Schuhmann and others mist-netted and monitored bat houses at Strawberry Plains Audubon Center.

- Several members conducted environmental education programs on bats:
  - Terri Jacobson – 2nd and 3rd graders, Rolling Fork Academy, 30 students
  - Becky Rosamond and Eva Kristofik – Teachers attending workshop, 50 participants
  - Zac Roth – Science Café, invited presentation, 30 participants

- The group also had displays at the following special events:
  - Pumpkin Trail Event, Clinton Community Nature Center – approximately 700 visitors

- Articles published:
  - "Bats! Mississippi Bat Working Groups Annual Mist Net Event" Summer 2011. Mississippi Wildlife. Kathy Shelton.
  - "Bats Threatened in Mississippi" Sept. – Oct. 2011. Mississippi Outdoors. Andrea Schuhmann
  - "MBWG Scouting for Bats Event Sardis Lake, MS". September 2011. Ranger Update. US Army Corps of Engineers, Vicksburg District. Deb Freeman

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Missouri Department of Conservation Summer and Fall 2011 Updates:
By Shelly Colatskie, Cave Biology Assistant
Missouri Department of Conservation

Thermal Infrared Video of Gray Bat Maternity Sites

We had a busy summer of Thermal Infrared Video surveys on Gray bat maternity sites. 12 different maternity caves twice; once during the "spring (May or June before the young are Volant)" and once during the "Summer (end of June, July or early August: after the young are Volant)". I then went to 1 additional cave during the spring, but it was so small that it was most likely a bachelor colony. I went to 1 additional cave and 1 storm sewer in the summer months. One of our caves had 201,000 bats during the summer months! This was a record maternity count for this cave as well as a record maternity count for Missouri. Four caves that we conducted thermal infrared video counts had never been done before, so we did not know what to expect. One of the caves only had 100 bats or so, so we did not come back to film in the summer. One cave we went to had 42,000 in the spring time, but only like 200 in the summer……now where did they all go?! They probably went to the big 200,000 count cave or another large cave which are both nearby. ☺ Another cave that we went to had nearly 110,000! That is a significant amount and we will be going back there every year. This cave has a proposed gate to be built next fall and I can't wait to see what the results will be after that! And the 4th cave that we went to that was not done before had about 17,000 but that was late in the summer, so we will be adding this one to our summer list as well. This particular cave was checked in November and 3 Indiana bats were discovered! While it was a known gray bat cave, these three Indiana bats were the 1st record of these guys in this cave! Yay for a new Indiana bat hibernation site! ☺

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Thermal Infrared Video of a Gray Bat Maternity Site in a Storm Sewer!

There is a storm sewer in a South Western Missouri Town that has been known to house Gray bats, but no one knew how many there were and if they were still there. So I contacted the City Manager of this particular town and went in the storm sewer to see if the bats were still there. Sure enough I could smell them and hear them, so we went outside and set up our thermal infrared video. I was expecting there to be some, but I was not expecting there to be 42,000! Wow, so that just shows you that gray bats can adapt to manmade structures if the structures are like cave conditions! We will be going back in

the spring time to see when the bats arrive and how much recruitment there may be.

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The Capture and Radio Telemetry of a Rafinesque Big Eared Bat in Missouri!

In September 2011, I got a team of people together (MDC, MODOT, USFS and Missouri State University) to do a mini blitz at Otter Slough Conservation Area in Stoddard County Missouri to try to capture and transmitter a Rafinesque Big eared bat. We captured one (myself included…in my net I may add. ☺) during the SBDN Bat Blitz at this same location (different netting site) during 2009, so we were curious to see if there were any more bats around. On Friday, September 9th, we captured one adult scrotal male CORA in the middle of some tupelo/cypress trees in the dried swamp. I was lucky enough to borrow some transmitters from the USFS (Thanks Megan!) and receivers and antennas from Missouri State University (along with the much needed help of tracking and trapping!) and we put the transmitter on him. We got 2 nights of foraging data and 10 days of roost data. He roosted for all 10 days in a hollow crevice of a large overcup oak. Either the transmitter failed or he disappeared from the general area after the 10 days. We hope to go back to that area and other areas similar to this area next spring, summer and early fall. This capture was only the 4th record of CORA in Missouri and 2 of them were from this conservation area!

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Thermal Infrared Video on a Large Indiana Bat Maternity Roost in Southeastern Missouri!

On August 17th, 2011, I headed down to Wayne County, Missouri to attempt at filming an Indiana bat maternity roost with Thermal Infrared Video. This roost on USACE property and monitored by USFS personnel had over 160 bats in this tree on this particular night. While it the Thermal Target Tracker Program had a hard time counting the bats (due to other external variables such as the trees blowing, etc), this video proved to be an excellent source of watching Indiana bat behavior (and you can still count them by yourself) and timing of when the bats leave and come back. I ended up not staying the entire night like I wanted because rain threatened…..definitely do not want to leave that equipment out in the rain! So hopefully we can go back next year if they are using this tree and see what kind of behavior we can capture!

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Thermal Infrared Video on a Big Brown Bat Bridge Roost in Downtown Springfield, Missouri

In September, I went down to Springfield, Missouri to check out some bats under a bridge in downtown Springfield. While I assumed they were big browns, we were not positive. I took pictures and observed a couple hundred Big Brown bats roosting in the expansion joints of the bridge. There was also a lot of guano under where they were roosting. I placed one thermal infrared video on each side of the bridge to count them as they were coming out. This was the first time that we had used this method on estimating bats under a bridge. I also placed an Anabat detector out and confirmed that they were all big brown bats.

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Fall Swarming Thermal Infrared Video on the 3 largest Gray Bat Hibernacula in Missouri

In September and October we went to our largest gray bat hibernaculum in Missouri. Last internal count during 2006 or so was around 500,000. Because it disturbs the bats (70 foot vertical pit cave) and there is not an easy way to estimate the bats when going in, we have been conducting Thermal Infrared Video of both the fall swarming and the spring emergence. Last fall there were 311,000 (roughly) and this past spring there was around 310,000. I am still working on this falls numbers. We have a graduate student at Missouri State University working with us on the Spring Emergence of this cave, so we will be anxious to see the timing and such of when the bats leave and how many leave each night, etc. We also put out Anabat detectors and recorded mainly gray bats, with a few other species mixed in.

We also went to the other two largest gray bat hibernacula in Missouri to conduct Thermal Infrared Videos. One has around 150,000 in the winter and the other has around 50,000 in the winter. We are still analyzing the videos from the fall swarming.

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Fall Swarming of Indiana bats at Pilot Knob Mine

At the end of September, we (MDC and USFWS) headed down to Pilot Knob Mine to conduct both Thermal Infrared Video and Near Infrared Video on 3 portals and the swarm. The swarm and the main portal were filmed in Thermal Infrared video and can be counted using the USACE Thermal Target Tracker Program, while 2 of the minor portals were filmed with Near Infrared Video and have to be counted by hand. I am still working on analyzing those videos now.

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Fall Swarming Gd Swabbing and Genetic Sample Data

We have been working with Winifred Frick and Gary McCracken, etc. on their swabbing for Gd study. Amanda Janicki (PhD student from University of Tennessee and good friend of mine) came to Missouri during October to trap bats for collecting swab samples. I took her to 4 different hibernacula……..unfortunately we only captured bats at 3 of them because the first night there was a big storm approaching and not many bats came out. However we got quite a few bats at the other 3 caves. In addition to swab samples for Gd, we collected genetic data for Sybill Amelon. We will be going back to these 4 caves again in the springtime to collect swab samples as the bats are emerging from hibernation.

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Bill Elliott: Missouri Department of Conservation's Cave Biologist, Has Retired as of November 1st, 2011.

Bill Elliott, Missouri Department of Conservation's Cave Biologist for almost 14 years has retired as of November 1st, 2011. He will be coming back in January to work half time/hourly to help on winter WNS surveys, help build a couple cave gates and help train the new cave ecologist. So while he is officially retired, he will still be with us for a little longer! ☺

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****Now we are gearing up for WNS surveys and finishing up analyzing fall swarming videos. ****

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Tony Elliott, Forest Bat Ecologist
Missouri Dept of Conservation

MDC is proposing a large-scale, 5 year survey of bat communities in areas of Missouri where wind energy development is likely, pending funding approval.

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Megan York-Harris, Wildlife Biologist
Mark Twain National Forest, Poplar Bluff Ranger District

Several folks, including Sarah Bradley and Lynda Mills (District Biologists on the Mark Twain National Forest), as well as Rod McClanahan from the Shawnee National Forest came over and helped relocated the Indiana bat maternity colony that was originally in the Brown's Hollow area. Eric Lemons and Jeremy Jackson (Wappapello Lake Project Office, Army Corps of Engineers) also helped with some trapping later in the season. On June 30, 2011 we captured 6 Indiana bats, transmittered 4 (two adult females, one juvenile female, and one male) and tracked them for 2-3 weeks.

Adult male and juveniles Indiana bat trap site

Female juvenile Indiana bat

We also captured one male later in the season. All in all, we located two "primary" trees and three other alternate trees. Four trees were on USACE lands and one was on USFS. The primary trees were large cottonwoods, 24.5 and 26" in diameter. The alternate trees were a 33" cottonwood and two shortleaf pines, 16.2 and 14.5". Surprisingly the male stayed in one of the primary trees with the gals for an extended period of time. Exit counts were conducted for all roosts, and the primary tree had 168 bats exiting on August 16. After this date, the colony seemed to disperse, but it is unknown if they left for caves or if they stayed within the area for a few weeks. The primary trees were in areas where emerald ash borer work had been conducted (lots of openings created by cutting ash trees!) so there was a lot of sunlight hitting those trees. Also, Shelly Colatskie (MO Dept of Conservation) came down and did some IR video of the exit the night we had 168 bats. I plan to present some of this data in a poster at Missouri Natural Resources Conference in February 2012.

Banded Indiana bat

Indiana bat roost tree at dusk during exit count

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Bree McMurray, Endangered Species Specialist
Missouri Dept of Transportation

I encountered an interesting find this summer. I found a couple bridges in south central Missouri a few years ago that had bats on them day roosting in the summer and fall. Shannon County bridge check in Aug 2011 yielded yet another data point:

Pair of big brown bats under bridge deck Shannon Co, MO

AND…

While documenting the presence of cliff and barn swallow nests under another bridge in Texas County, Missouri, I found a number of surprising nest occupants.

Big brown bat in a barn swallow nest, with three bird eggs, Texas County, MO

This nest was occupied by one big brown bat and at least three eggs! Giving credence and fuel to rumors that bats "nest" and have "eggs"…surely this is how this misconception got started. But not all the bats at this bridge were using the nests, some actually had birds in them, and some of the bats were just roosting like normal, average non-delinquent bats on the same bridge. But there were several nests I could only photograph from afar and then zoom in to see bat feet or an akimbo bat arm sticking above the lip of the nest.

Big brown bat cluster day roosting under bridge

Bat feet! Texas County, MO

Bat feet and thumb and a second bat half out of nest.

AND on October 5, 2011 we found this on the outside of the Missouri Department of Transportation building where my office is in Jefferson City, Missouri: (County Record)

Single day roosting female.

Adult Indiana bat in the daylight

The Fifth Annual Meeting of the North Carolina Bat Working Group (NCBWG), in November of 2011 had 26 Attendees:

Lisa Gatens (NC Museum of Natural Sciences - NCSM), Sue Cameron (US Fish and Wildlife Service), Eric Winters (US Forest Service), Beth Evans (Fort Bragg), Wendy Foley (NC Zoo), Chris Nicolay (UNC Asheville), Trisha McCoy (Wildlife Rehabber), Dottie Brown (Independent Contractor – NC Wildlife Resources Commission, Joy O'Keefe), Susan Loeb (Southern Research Station), Janice Patten (Fort Bragg), Mike Lavoie (Eastern Band of Cherokee Indians), Ben Colvin (Wild South), Matt Owen (NC State Museum of Natural Sciences - NCSM), Ben Hess (NCSM), Bill Mullin (J.H. Carter Environmental Consultants), Mary Frazer (NC Department of Transportation), Mary Kay Clark (Moonlight Consulting), Gabrielle Graeter (NC Wildlife Resources Commission – NCWRC), David McLaughlin (Consulting company in Asheville), Cordi Diggins (NCWRC), Kendrick Weeks (NCWRC), Dixon Herman (Blue Ridge Wildlife Control), Marshal Ellis (NC Division of Parks and Recreation – NCDPR), Ed Corey (NCDPR), Ben Laseter (Fish and Wildlife Associates, Inc.), Rebecca Hoffman (UNC Asheville - undergraduate)

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Mary Kay Clark (Moonlight Consulting) – 10th Annual Bat Blitz in Pisgah National Forest Re-cap

Took place within 50 mi radius of Crossnore NC; 411 total bat captures (1 – 49 captures per night); 135 big brown bats (EPFU), 81 red bats (LABO), *Myotis* bats made up 38% of captures (MYLE, MYLU, and MYSE); no evidence of WNS using Reichard's wing index. Bat Fest, the bat education program that was held in conjunction with the bat blitz, had over 100 attendees.

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Ed Corey (NC Division of Parks and Recreation, Inventory Biologist) – Artificial Roost use in NC. Artificial roosts (up-ended concrete culverts) exist at state parks: Jockeys Ridge, Merchants Millpond, South Mountain (SOMO) and Lumber River (LURI); Bat Conservation International (BCI) contacted for funds to supply 2 bat roost for SOMO and LURI due to CORA presence in 2000. SOMO: 1 upland roost, 1 lowland roost that is more open with more sun exposure; 1st CORA sighting in May 2004LURI: 1 upper and lower roost; CORA observed in lower roost May 2004; upper roost had CORA occupancy in recent Fall 2011 check.

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Mike LaVoie with the Eastern Band of Cherokee Indians conducted mist-netting and acoustic work, and also did some WNS outreach.

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Janice Patten and Beth Evans from the Ft. Bragg US Army Installation have been conducting acoustic monitoring on base.

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Dottie Brown conducted mist-netting and tracked bats for USFS this summer. She also assisted with pit-tagging bats at Mammoth Cave and is heading to Nicaragua shortly to assist with bat surveys there.

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Wendy Foley with the NC Zoo has conducted bat education across NC.

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Susan Loeb (USFS Southern Research Station, Research Ecologist) used acoustic monitoring on the Cold Mountain Gamelands to determine the effects of forest management on bats and insects. Susan and Eric Winters also modeled the potential effects of climate change on Indiana bats, using four different climate predictions. Susan and Eric conducted bat surveys in Alaska and Susan also caught bats in Crete.

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From Sue Cameron (USFWS, Endangered Species Biologist) – NC has 4 counties that are WNS positive: Avery, Yancey, McDowell and Transylvania (one suspect from Buncombe). Affected species were little brown bat (MYLU), MYSE, and tri-colored bat (PESU); 2 CORA were suspect but tested negative.
USFWS flex fund was used by the NC Wildlife Resources Commission to repair a gate at a hibernaculum that is an old mine.

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Rebecca Hoffman (UNC Asheville, undergraduate biology student) – has adapted the Sihler staining technique for use in

viewing bat wings. The technique makes tissues clear and nerves purple; nerve breakage caused by WNS can be observed. Areas of nerve regeneration and healing may also been seen.

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Gabrielle Graeter (NCWRC, Wildlife Diversity Biologist) – NCWRC is conducting WNS surveillance, including hibernacula counts, mist-netting and acoustic monitoring.
Long-term monitoring sites in 2011 included 6 counties, 19 sites and 415 bats captured; Wing damage index showed some lesions and scarring in early spring and summer.

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Cordi Diggins (NCWRC, Wildlife Technician) – North Carolina bat acoustical monitoring program (NCBAMP)
Acoustic monitoring routes were established along roads in southern Appalachian Mountains in NC; this volunteer citizen science project was initiated in 2011 to collect acoustical data; western NC has 32 routes (NCWRC does 20, USFS – 7, Blue Ridge Parkway – 3, Eastern Band of Cherokee – 1); 2011 data had 25 routes completed (34 volunteers, 15000 sound files, 3100 bat calls); plan to complete all 32 routes in 2012; add routes in Piedmont and Coastal Plains.

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Cordie also conducted roost monitoring at bat boxes and at bridges in western NC.

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Dixon Herman, a bat exclusion specialist, conducted 40 humane bat exclusions this year.

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The 2011 recipient of the NC Golden Bat Award is Mary Kay Clark, who was instrumental in organizing the 2011 SBDN Bat Blitz in NC. In addition, she has responded to many requests for bats information that come in from the NCBWG website, and organized bat surveys in Wake County NC.

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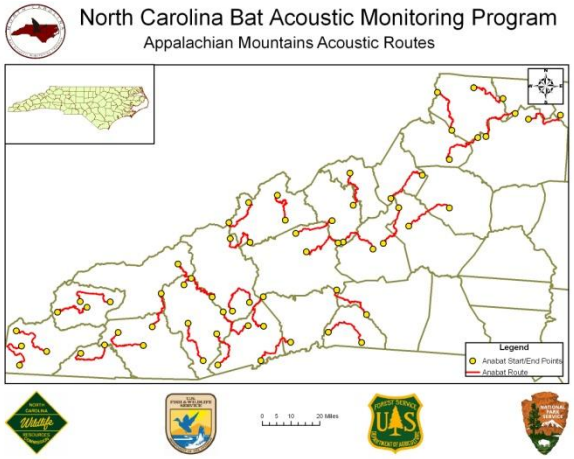
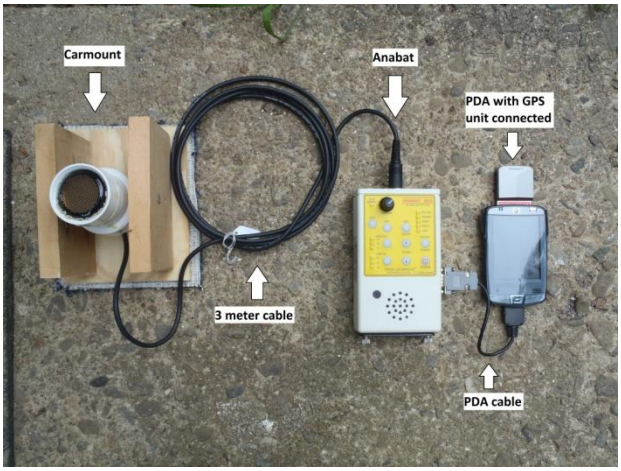
North Carolina Bat Acoustic Monitoring Program (NCBAMP) by Cordie Diggins, NCWRC

The North Carolina Bat Acoustic Monitoring Program (NCBAMP) is a statewide program that monitors bats using car-based acoustic routes. North Carolina's program is part of a national effort to monitor bat populations, especially due to White-nose Syndrome. The program in North Carolina is a collaboration between the North Carolina Wildlife Resources Commission (NCWRC), U.S. Fish and Wildlife Service (Asheville Office), U.S. Forest Service (Pisgah National Forest and Nantahala National Forest), Bureau of Indian Affairs (Band of Eastern Cherokee Indians), and National Park Service (Blue Ridge Parkway). The NCWRC and its partners are initially focusing their monitoring efforts on the mountain region of North Carolina because the mountains have the highest concentration of winter hibernacula in the state and this is where we initially expected to see White-nose Syndrome. Currently, four western counties are confirmed to be WNS positive and one county is suspect.



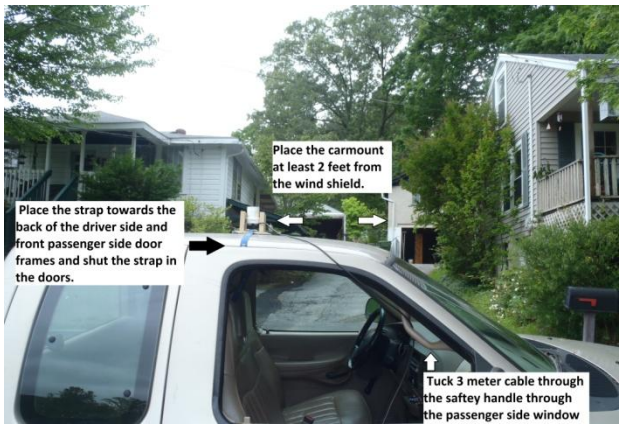
NCBAMP established survey routes all over the western region of the state. There are a total of 32 acoustic routes distributed across the mountain region in 24 counties. The start point and the direction of the route were randomly selected. Each survey route is 20 miles long. No route is in areas where the human population is greater than 500 people per square mile (e.g. downtown Asheville). Routes also do not occur on major highways for safety and noise reasons. Most routes are in rural areas where there is little traffic, no traffic lights, and appropriate bat habitat. For our surveys, we are using several different models of Anabat (II, SD1, SD2). We followed Eric Britzke and Carl Herzog's protocol for equipment set-up. The surveyor drives the route at 20 mph. Surveys begin a half an hour after sunset and the route takes approximately an hour to complete.



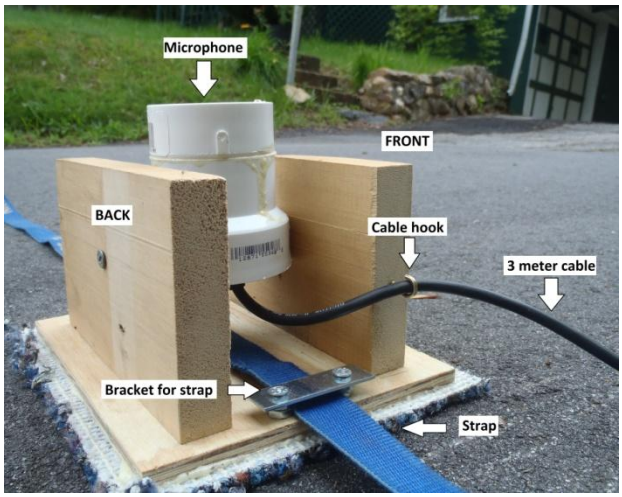
NCBAMP is a citizen-science program. We recruited volunteers from the Nature Conservancy, Flittermouse Grotto (a local caving club), various regional land conservancies, and the general public using a "Help Needed" blurb at the end of an local newspaper article about White-nose Syndrome. We held a volunteer training workshop in early May to teach volunteers how to set-up and use the equipment. We established two checkpoint stations at the USFWS Asheville Field Office and the Blue Ridge Parkway Blowing Rock Office where volunteers could pick-up equipment to run their route.

In 2011, our season ran from June 1st to July 15th and each surveyor ran their route twice. We had a total of 34

volunteers run 25 routes. Each route was surveyed twice. We additionally ran 5 of the 25 routes a third time in August to see if it was probable to survey later in the season. A total of 1,100 miles were surveyed and 3,100+ call files were recorded.



Due to weather delays and a limited number of bat detectors, we decided to extend our season by an additional week. Since insect noise drastically increases in the beginning of July, especially at lower elevations, we decided to alter our survey season for 2012 to allow for weather delays and equipment problems. The 2012 season will be from May 15th and July 15th, which allows the majority of surveys to be run when insect noise is considerably lower.



Currently we are analyzing data and preparing for the 2012 season. We plan to run all 32 routes in the upcoming season, as well as establish several routes in the Piedmont and Coastal Plain areas of the state.

NCBAMP and NCWRC would like to thank to all of the volunteers who participated in our first season, USFWS, USFS, Blue Ridge Parkway, Mike LaVoie (EBCI), NC State Parks, Carl Herzog, Eric Britzke, Susan Loeb, Janice Patton, and Flittermouse Grotto. We would also like to thank the states and federal agencies who participated in our acoustic survey questionnaire (especially Trina Morris, Craig Stihler and Leighlan Prout). All of the information you provided helped us figure out how to set-up our program in North Carolina. Any questions about NCBAMP can be directed to Cordie Diggins at corinne.diggins@ncwildlife.org.

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During the 2011 field season an Indiana State University crew worked in the southern Appalachians of Tennessee and North Carolina, netting and tracking Indiana bats. This work was part of a Joint Fire Science Program study investigating the effects of prescribed fire on Indiana bat roosting habitat led by Dr. Joy O'Keefe (ISU) and Susan Loeb (USFS). Kristina Hammond, a graduate student involved in the project, also gathered information for her thesis on landscape-scale roost selection and the effects of reproductive condition and environmental factors on body temperatures of roosting bats. Bat body temperature and environment variables were gathered through the use of several dataloggers placed a roost sites to gather continuous data to later be compared with roost characteristics. Preliminary analysis of these data suggests there are differences among reproductive classes in both body temperature and roosting behaviors.

Katherine Caldwell, Kristina Hammond, Joy O'Keefe, Dottie Brown, and Joey Weber netting in the Nantahala National Forest in southwestern North Carolina.

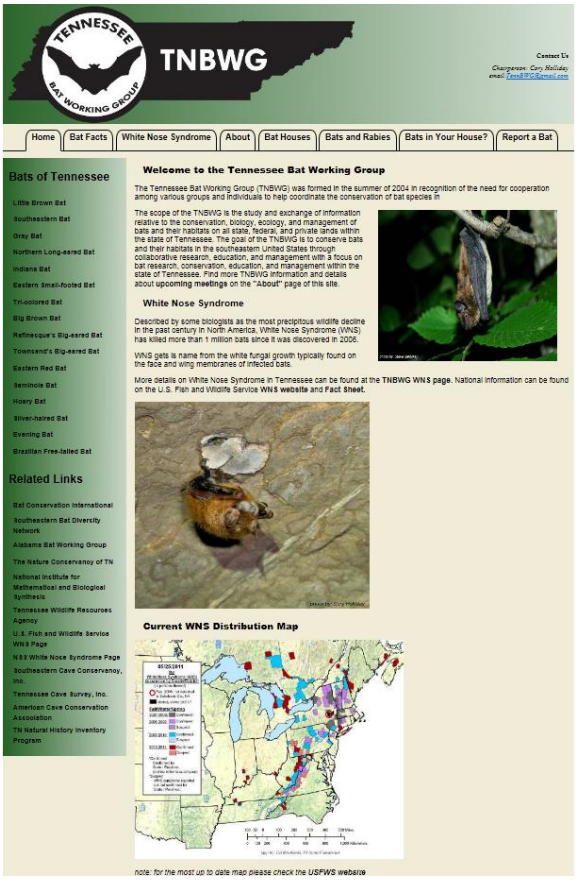
The eighth annual meeting of the Tennessee Bat Working Group was held on November 18th at Fall Creek Falls State Park, TN. Presentations covered several aspects of bat research in the area. Presentations included Indiana State University graduate student projects from the Cherokee National Forest, two presentations on acoustic surveys and devices, a FWS update on Indiana bat survey guidance and conservation funds in TN, and two presentations related to WNS in Tennessee. The full agenda can be found at the working groups new website at www.TNBWG.org. Please feel free to contact the working group with any suggestions for the website or additional links that you feel would be useful.

The Nature Conservancy of Tennessee is making progress toward their artificial cave WNS mitigation project. They have finalized the design with input from a science advisory committee and are scheduled to break ground in spring 2012.

Some exciting new research by the University of Tennessee, Knoxville aims to learn more about the spread and effects of WNS though the use of video technology, genetic testing, and acoustic monitoring.

Tara Thomson (Master's student at Indiana State University) is conducting a study on the roost ecology of the Eastern Small-footed Bat in the Cherokee National Forest, TN and the Nantahala National Forest, NC. The objective of the study is to locate and characterize natural roost sites found by radio tracking bats caught from two bridges along the Cherohala Skyway. During the summer of 2011 Tara and her field crew- composed of Jen Heemeyer (a former master's student at ISU) and Danny Schaefer (a current undergraduate student at ISU)- caught and transmittered 15 Eastern Small-footed Bats. They tracked these individuals to a variety of roosts, most of which were rocky outcrops but a few were dead white pines. Tara plans to track more bats during the summer of 2012 and possibly incorporate PIT tagging and a genetic component to the project.

White Nose Syndrome monitoring continued in Tennessee during the 2010-2011 winter season. Sixty-one caves in 25 counties were surveyed with some hopeful results. Only two caves were added to the list of affected caves with one testing positive for WNS and one listed as suspect (*G.destructans "+"*) for the syndrome. The WNS qualified status of all previously affected sites remained the same, bringing the 2011 totals to 5 suspect caves and 3 confirmed WNS caves across the state. A similar effort is scheduled for the 2011-2012 winter with additional emphasis placed on lesser known caves throughout the state.


TNBWG
Contact Us
Chairperson: Cory Holliday
email: Tennbf@Gmail.com
Home
Bat Facts
White Nose Syndrome
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Bat Houses
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Bats in Your House?
Report a Bat
Bats of Tennessee
Little Brown Bat
Southeastern Bat
Gray Bat
Northern Long-eared Bat
Indiana Bat
Eastern Small-footed Bat
Tri-colored Bat
Big Brown Bat
Rafinesque's Big-eared Bat
Townsend's Big-eared Bat
Eastern Red Bat
Seminole Bat
Hoary Bat
Silver-haired Bat
Evening Bat
Brazilian Free-tailed Bat
Related Links
Bat Conservation International
Southeastern Bat Diversity Network
Alabama Bat Working Group
The Nature Conservancy of TN
National Institute for Mathematical and Biological Synthesis
Tennessee Wildlife Resources Agency
U.S. Fish and Wildlife Service WNS Page
NBS White Nose Syndrome Page
Southeastern Cave Conservancy, Inc.
Tennessee Cave Survey, Inc.
American Cave Conservation Association
TN Natural History Inventory Program
Welcome to the Tennessee Bat Working Group
The Tennessee Bat Working Group (TNBWG) was formed in the summer of 2004 in recognition of the need for cooperation among various groups and individuals to help coordinate the conservation of bat species in
The scope of the TNBWG is the study and exchange of information relative to the conservation, biology, ecology, and management of bats and their habitats on all state, federal, and private lands within the state of Tennessee. The goal of the TNBWG is to conserve bats and their habitats in the southeastern United States through collaborative research, education, and management with a focus on bat research, conservation, education, and management within the state of Tennessee. Find more TNBWG information and details about upcoming meetings on the "About" page of this site.
White Nose Syndrome
Described by some biologists as the most precipitous wildlife decline in the past century in North America, White Nose Syndrome (WNS) has killed more than 1 million bats since it was discovered in 2006.
WNS gets is name from the white fungal growth typically found on the face and wing membranes of infected bats.
More details on White Nose Syndrome in Tennessee can be found at the TNBWG WNS page. National information can be found on the U.S. Fish and Wildlife Service WNS website and Fact Sheet.
Current WNS Distribution Map
note: for the most up to date map please check the USFWS website


Texas


Virginia


West
Virginia

AWARDS AND RECOGNITION

"Past-President of SBDN, Darren Miller, accepts the Wildlife Management Excellence Award from Southeastern Section of The Wildlife Society (SE-TWS) President Steve Rockwood on behalf of SBDN. This award, the highest honor given by SE-TWS, was given in association with the Southeastern Association of Fish and Wildlife Agencies annual meeting in Nashville, TN in October 2011. The award recognized SBDN's commitment to bat conservation and management in the southeastern U.S."

SBDN SERVICE AWARD

Purpose: To recognize outstanding service and contributions to the Southeastern Bat Diversity Network.

Nomination Procedure: The SBDN awards committee will call for nominations in September or October of each year through the SBDN mailing list. Nominations will be submitted to the committee by December 1. Nominations can be submitted by any SBDN member, including members of the Board and the Awards Committee. Nominations will consist of a letter that describes the nominee's service to SBDN. The committee will review the nominations and evaluate them based on significance of the contributions to SBDN. One name will be forwarded to the SBDN Board of Directors for final approval by January 1. If no worthy nominees have been submitted for consideration, no name will be forwarded to the Board.

Award Process: The awardee will be announced at the SBDN annual meeting, usually held in February. A plaque will be presented to the awardee by the previous recipient or the SBDN president. The Awards committee will be responsible for obtaining the plaque and funds will be provided by SBDN. A copy of the nomination letter and pictures of the award presentation will be deposited in the SBDN archive.

SBDN LIFETIME ACHIEVEMENT AWARD

Purpose: To recognize individuals who have made significant contributions to the conservation of southeastern bats through research, education, or management efforts. The intent of this award is to recognize more senior individuals who have amassed a variety of accomplishments throughout their careers. The award is SBDN's highest honor. The award may not be given every year.

Nomination Procedure: The SBDN awards committee will call for nominations in September or October of each year through the SBDN mailing list. Nominations can be submitted by any SBDN member, including members of the Board and the Awards Committee. Nominations will be submitted to the committee by December 1. Nominations will consist of: 1) a letter that describes the nominee's accomplishments and how they have impacted bat conservation in the southeast, 2) the nominee's Curriculum Vitae. The committee will review the nominations and evaluate them based on the totality of the accomplishments and their impact on bat conservation and/or our understanding of bat ecology. The committee will forward one name to the SBDN Board of Directors for final approval by January 1. If no worthy nominees have been submitted for consideration, no name will be forwarded to the Board.

Award Process: The awardee will be announced at the SBDN annual meeting, usually held in February. A plaque will be presented to the awardee by the previous recipient or the SBDN president. The Awards committee will be responsible for obtaining the plaque and funds will be provided by SBDN. A copy of the nomination letter, the awardee's CV, and pictures of the award presentation will be deposited in the SBDN archive.

2nd JOINT MEETING NORTHEASTERN BAT WORKING GROUP,
MIDWEST BAT WORKING GROUP (3rd annual),
SOUTHEASTERN BAT DIVERSITY NETWORK (16th annual),
and
21st COLLOQUIUM ON THE CONSERVATION OF MAMMALS
IN THE EASTERN UNITED STATES

ABSTRACTS

THE INFLUENCE OF MOUSE (*PEROMYSCUS* SP.) SCENT ON SHERMAN LIVETRAP CAPTURE SUCCESS

Stephanie A. Rutan and Dr. Tim C. Carter.
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Sherman live-traps have been extensively used in small mammal research. Investigators have noticed that capture success varies depending on both bait and scent of previous captures (Boonstra and Krebs 1976; Mazdzer, Capone, and Drickamer 1976; Drickamer 1984). Traps that have previously captured small mammals tend to have higher capture numbers than traps that have been cleaned or never captured animals before (Boonstra and Krebs 1976; Gurnell and Little 1992). However, it is still unclear if clean traps can be inoculated with the scent of other mice to increase trap success, while reducing the likelihood of contracting diseases associated with rodent excreta found in dirty traps. In this study, small mammals were captured using Sherman live-traps to determine if a lab collected mouse scent placed in clean traps would attract animals in the same way as dirty traps that have caught animals in the past. Scent from wild male and female *Peromyscus* were collected on shredded paper towel in lab cages that was later placed in the back of clean Sherman traps to serve as "experimental" traps. Brand new Sherman traps or traps disinfected with detergent were used as "clean" traps, and "dirty" traps were used that have captured animals before. One of each trap type was placed together in woodland habitats to offer small mammals a choice as to which trap type to enter on any given night. Significantly more animals were caught in dirty traps than clean, however, capture numbers between dirty and experimental taps were not significantly different, indicating that mouse scent in clean traps can be used to attract small mammals in a similar way as dirty traps. Further research could illuminate even stronger connections between the uses of fresh mouse scent to capture small mammals to reduce the likelihood of contracting certain zoonotic diseases.

A FORENSIC PATHOLOGY APPROACH TO DIAGNOSING BAT MORTALITY AT WIND FARMS

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Although wind farms are generally considered an environmentally friendly method of energy production, many are associated with the death of relatively large quantities of migrating bats. Barotrauma is a phenomenon in which pressure changes cause tissue damage to air-containing structures (e.g., lungs, ears) and was proposed to be the primary cause of bat mortality at wind farms based on lung changes. Using mice as a model organism, we examined lung tissue to determine its utility as a marker of barotrauma fatality. We found that routine freezing of mice carcasses and post mortem decomposition, for as short a time period as a few hours after death, produced artifactual lung changes that mimicked lesions of edema and hemorrhage seen in bats at wind farms and claimed to be diagnostic of pulmonary barotrauma. If these tissue artifacts can be unambiguously excluded, the presence of traumatic injuries (e.g., bone fractures) in addition to lung hemorrhage should routinely default the forensic cause of death to blunt force trauma. Importantly, the lack of detectable external injuries at gross examination does not completely rule out blunt force trauma as a cause of lung hemorrhage. Collision with moving wind turbine blades, being the most parsimonious hypothesis for bat mortality at wind farms, should be initially diagnosed under all circumstances where it cannot be unequivocally excluded as cause of death.

EFFICIENT REPEATABLE APPROACH TO QUANTITATIVE IDENTIFICATION OF BAT ECHOLOCATION CALLS

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Since the inception of bat detectors, researchers have attempted to identify bats based on their echolocation calls. The excepted method of identification is to qualitatively compare the calls to a known library. Identification is subject to the individual tasked with interpretation, making it difficult to be represented as repeatable science. Additionally, manually traversing thousands of call files is time prohibitive. Our goal was to produce a program capable of emulating the qualitative analysis of an experienced researcher. The program, currently named Bat Call Identification (BCID), interacts with AnalookW to filter noise and extract call parameters. Using a known call library, collected over 10+ years from eight states by several universities using light tags, hand releases, and passive monitoring where only a single species was present, extracted parameters are compared to quantitative ranges for parameters produced by species known to exist in the region. Individual chirps are then assigned a species and the dominate species present in the sequence

is the predicted value. If no species dominates, a value of unknown is assigned. BCID analyzes approximately 2580 calls/min. The following accuracy rates were obtained: Low - 100% correct species group, 88.71% correct species, 1.08% unknown, 10.22% misidentified (Eptesicus fuscus, Lasiurus cinereus, Lasionycteris noctivagans) (n = 186), Mid – 97.24% correct species group, 88.95% correct species, 1.66% unknown, 9.39% misidentified (L. borealis, Nycticeius humeralis, Perimyotis subflavus) (n = 181), Myotis – 95.88% correct species group, 86.60% correct species, 2.06% unknown, 11.34% misidentified (Myotis sodalis, M. septentrionalis, M. grisescens, M. lucifugus, M. leibii) (n = 291). The overall performance of the software with these species is: 97.42% correct species group, 87.84% correct species, 1.67% unknown, 10.49% misidentified. BCID allows individuals with no experience to obtain meaningful results, while those with extensive experience are able to adjust settings in order to suit their needs.

A NON-INVASIVE ACOUSTIC MONITORING TECHNIQUE FOR WHITE-NOSE SYNDROME SURVEILLANCE

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Interior surveys of hibernacula are currently the most effective method of White-Nose Syndrome (WNS) surveillance; however, possibility of human transmission, increased disturbance to hibernating bats, and/or the large number of hibernating sites serves to easily overwhelm resource managers. As early reports documented abnormal activity (e.g., below freezing and daytime bat activity) at hibernacula entrances, we investigated the ability of Anabat II detectors to record differences in bat activity levels at WNS symptomatic (infected) 2011 Eastern Bat Working Group and Mammal Colloquium Meeting 21 and asymptomatic (assumed WNS-free) hibernacula. We deployed Anabat systems from 21 December 2009 to 13 April 2010 to automatically record bat activity at 7 hibernacula (3 – second-winter infected sites, 2 – first-winter infected sites (one only PCR confirmed), and 2 – asymptomatic sites) in Pennsylvania. Second-winter WNS sites had higher activity than both first-winter and asymptomatic sites during January and February, although in March activity for a first-winter infected site, visibly confirmed fungus, had surpassed even second-winter infected sites. Similarly, mean daytime activity and activity below freezing were lower for asymptomatic sites than the other two groups, although the PCR positive site had similar activity levels to the asymptomatic sites. This may suggest that abnormal behavior is only demonstrated after the fungus has progressed to a certain level within a colony. We also sampled the same sites during the winter of 2010-2011 and preliminary results will be discussed. While more data is needed on the relationship between the degree of WNS infection and activity rates, acoustic monitoring appears to offer a non-invasive, effective, and affordable approach for WNS surveillance.

EFFECTIVENESS OF USING A BAT HAT REFLECTOR PLATE OR PVC TUBE IN PRECONSTRUCTION ACOUSTIC SURVEYS TO ACCESS BAT ACTIVITY AND SPECIES COMPOSITION

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Large numbers of bats being killed at wind energy facilities encourages preconstruction surveys of bat activity using acoustic monitors. Several different monitoring designs are currently in use that have varying levels of success. This study explores the differences between Anabat Detectors (Titley Electronics, Australia) in waterproof boxes utilizing either a 90 degree PVC elbow or the Bat Hat with reflection plate. This study was done as part of a preconstruction survey from August to October of 2010 at a potential construction location. At two meteorological towers, bat hats with reflection plates were placed at 3 meters (low) and 55 meters (high). Ten ground based detectors employing the 90 degree PVC elbow were placed across the project area. An additional ground based detector was affixed with the bat hat and reflection plate and placed next to one of the PVC tube ground detectors. An automated bat call identification software program was used to identify call sequences. The side-by-side comparison of the bat hat versus the PVC tube show 46% more 2-pulse bat passes using the PVC tube set up (PVC=3891 bat passes, bat hat=1772 bat passes). Using 5- pulse call sequences, 2,062 more species specific identifications were made using the PVC tube (PVC=3111, bat hat=1049). Ground detectors using the PVC tube recorded 59% more 2- pulse sequences/detector night, and 42% more 5-pulse sequences/detector night as compared to bat hats at the low placement at met towers. These results indicate that these two setups are not equivalent and cannot be used interchangeably. Further more, using a bat hat reflector plate appears to result in an underestimation of total and relative bat activity.

IMPACTS OF DIFFERENT FOREST TREE-HARVEST METHODS ON POPULATIONS AND DIETS OF INSECTIVOROUS FOREST BATS.

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The Hardwood Ecosystem Experiment (HEE) in central Indiana presents an excellent opportunity to study species reactions to different forestry practices. These different practices include clearcutting, shelterwood cutting, and single tree selections. My master's thesis focuses on the change in diets of the different insectivorous bat populations in each of the HEE management units. Species in this study are bats and include *Myotis septentrionalis, Lasiurus borealis, Eptesicus fuscus, Perimyotis subflavus, Myotis sodalis, Myotis lucifugus,* and *Lasionycteris noctivagans*. Since insectivorous bats are theorized to not simply eat whatever is available, it is hypothesized that the diets of these bats will not change despite their changing environment. Guano has been collected between years 2006-2010. I have analyzed 440 guano samples. The invertebrate parts in the guano are identified to as low a taxonomic level as possible; this is most often to family, but always order for the highly digested Lepidopterans. Species can be determined in some

insects with very unique colorings. The data are compared within each species: before and after treatment, across treatment types, between males and females, between adults and juveniles, and across different months. The data are also compared between species, i.e. which one changed the most. Preliminary results suggest that despite a significant change in numbers of captured bats and therefore a probable affect of forestry practices on the local bat populations, there is no significant change between bat diets before and after treatment. This result reinforces previous theories about bats specifically selecting their diets and not simply eating available foods.

COMPARING PRE- AND POST-CONSTRUCTION BAT ACTIVITY TO BAT FATALITY RATES AT A WISCONSIN WIND PROJECT

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Pre-construction acoustic surveys for bats at a proposed wind project in central Wisconsin yielded two different estimates of relative bat activity with two different implications for predicted fatalities. One estimate, derived from ground-based Anabat™ detectors at met towers, suggested relatively low fatality rates. However, the addition of data from a "reference" location within the proposed project site yielded a much higher estimate of bat activity, and therefore suggested the possibility of relatively higher fatality rates. Fatality searches at 30 turbines from July to October 2008 and from March to May 2009, yielded a higher than expected estimate of approximately 25 bats per MW during the study. In addition to the surprising level of fatalities, species composition deviated from that generally observed at other wind projects, with a relatively high proportion of non-lasiurine fatalities. We are currently completing re-analysis of the pre-construction acoustic data to incorporate species identification where possible, and including post-construction bat acoustic data that was collected concurrently with fatality searches to determine if there are significant correlations with overall activity levels, species activity levels, species presence histories, or spatial or temporal correlations. Results will be presented in the context of the predictive value of preconstruction bat activity data and suggestions for future study design will be discussed.

BAT USE OF FOREST STANDS IN RESPONSE TO SILVICULTURAL TREATMENTS IN THE DANIEL BOONE NATIONAL FOREST

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Previous studies have shown that forest management techniques that reduce forest clutter may have a positive effect on foraging bats. The objective of this study was to further assess bat community response to forest management practices by comparing bat response to various silvicultural treatments. Anabat II ultrasonic detector systems were used to determine bat activity in 30 study units (7-19 ha) on the Cold Hill Area of the Daniel Boone National Forest, Kentucky. Bat activity was monitored in each unit for two consecutive nights a month from May through August 2006-2010. Sampling occurred for two to three years pre-treatment and two to three years post-treatment, depending on when treatments were implemented. Five treatments were implemented: shelterwood with reserves, oak-shelterwood, thinning, woodland-thinning, and control. Analook software was used to filter echolocation calls and calls were identified to species using a discriminant function analysis. A one-way Analysis of Variance was used to test whether bat activity differed pre- vs. post-treatment for each treatment and whether post-treatment activity differed among treatments. Bat species detected within the study area were big brown bats (*Eptesicus fuscus*), evening bats (*Nycticeius humeralis*), little brown bats (*Myotis lucifugus*), northern bats (*M. septentrionalis*), tricolored bats (*Perimyotis subflavus*), and red bats (*Eptesicus fuscus*). Posttreatment bat activity was significantly greater than pre-treatment activity in shelterwood with reserves, thinning, and woodland-thinning units ($P<0.05$). Post-treatment bat activity in shelterwood with reserves, thinning, and woodland-thinning stands was significantly greater than in oak-shelterwood and control stands. Overall, big brown bat, evening bat, tricolored bat, and red bat activity increased across the entire study area in response to the treatments, while northern bat activity did not vary throughout the study. These results suggest that treatments which greatly reduce clutter increase the overall suitability of forest stands for foraging bats in this region.

EFFECTS OF INTERCROPPING SWITCHGRASS AND LOBLOLLY PINE ON THE DIET AND TROPHIC POSITION OF *PEROMYSCUS LEUCOPUS*.

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Rodents are an important energy link between producers and higher trophic consumers. While effects of traditional timber management on vertebrates are well studied, effects of management of forests for biofuels production on rodents are poorly understood. Intercropping switchgrass (*Panicum virgatum* L., a native C4 grass) in existing loblolly pine (*Pinus taeda*) plantations is being considered as a sustainable method for producing biofuels feedstocks. We conducted a study of a common native rodent, the white-footed mouse (*Peromyscus leucopus*), to examine if they would use planted switchgrass as a food source, or if they would maintain a diet of existing food resources associated with pine. Rodents were live trapped in four replicates of three different treatments: (1) pine with residual woody biomass removed, (2) pine with biomass removed and intercropped with switchgrass and (3) switchgrass-only. We assessed the diet and trophic position of mice using carbon (δ13C) and nitrogen (δ15N) stable isotope analysis

of ear tissue samples collected in 2009. We hypothesized that there would be a treatment effect of intercropping switchgrass on the dietary preference and trophic position of *P. leucopus*. Analysis of 2009 samples showed that diet was heavily influenced by C3 plants. However, there was no treatment effect on the mean δ13C and δ15N values of skin samples. In contrast, there was a seasonal effect on the mean 2011 Eastern Bat Working Group and Mammal Colloquium Meeting 24 δ13C and δ15N values when comparing the summer and fall months. Mouse tissue was more enriched in the summer and became more depleted in the fall. Enriched values suggest some influence of C4 plants, potentially switchgrass, in the diet. For δ15N, mouse tissue was more enriched in the fall than in the summer, which suggests mice were eating at a higher trophic position in the fall. We are currently analyzing data from the 2010 field season and will discuss combined results from 2009 and 2010.

THE USE OF BRIDGE EXPANSION JOINTS AS MATERNITY ROOSTS BY *MYOTIS LEIBII* (EASTERN SMALL-FOOTED BAT) IN WEST VIRGINIA

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Myotis leibii (Eastern Small-footed Bat) is considered a "Species of Management Concern" and has recently been recommended for federal protection. In addition, *Myotis leibii* is one of the six (6) bat species in which there have been documented mortalities as a direct result of White Nose Syndrome. Artificial or man-made structures are known to provide roosting habitat for several species of bats. The most common artificial roosts include houses (attics, eves, siding, and shutters), barns, buildings, shelters, cisterns, culverts, and bridges. Bats roosting in bridges are typically located underneath the structure. However, *Myotis leibii* appears to show a preference for roosting within narrow crevices ("expansion joints") on the upper sides of concrete bridges. This phenomenon was first documented for *Myotis leibii* in the 1960s in Pulaski/Laurel County, Kentucky. This colony still persists. Since that time a few other bridges within the range of this species have been found to harbor *Myotis leibii*. Some bridges contain only a single bat, a small number of bats (usually males and nonreproductive females), or a large number (20 – 50) of bats (maternity colonies). During 2010, eight (8) bridges containing *Myotis leibii* were documented in West Virginia. Three (3) of these bridges are maternity colonies. Observations, video recordings, and ultrasonic recordings at these bridges showed that *Myotis leibii* is a species that utilizes passive (nonflight) foraging during the daytime. This strategy has been documented in a few other bat species. While I do not necessarily advocate the incorporation of artificial bat roosts into bridge construction or replacement projects, information gleamed from this study and other bridge surveys can serve as an indicator for the health of this species (for which there is a notable lack of solid population data) and also to guide artificial bat roost construction efforts.

IDENTIFICATION OF INTEGUMENTARY DEGRADING PROTEASES IN *GEOMYCES DESTRUCTANS* BY PEPTIDE MASS FINGERPRINTING

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Geomyces destructans is a dermatophytic agent isolated from cave-dwelling bats and is the putative pathogen responsible for White-Nose Syndrome (WNS) and the associated mass mortality of North American cave bats. Dermatophytosis normally requires the fungus adhere to the extracellular matrix of a host organism, which consists of hard cornified insoluble structural proteins. The fungus can then activate a suite of genes expressing proteolytic enzymes thus degrading and metabolizing the host integument. One clinical sign of WNS is 2011 Eastern Bat Working Group and Mammal Colloquium Meeting 25 necrosis of fragile wing tissue of bats. We hypothesize that *G. destructans* secretes extracellular proteases that are responsible for lesions observed in infected host tissue and play a critical role in pathogenicity. We are attempting to identify putative proteases based on structure using matrix assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS). Enzymes secreted by *G. destructans* grown *in vitro* in protein-limited culture media were separated by SDS-PAGE. Protein targets were digested with trypsin and peptide mass fingerprints (PMF) were acquired by MALDI-TOF MS. The PMF data will be processed and evaluated with the annotated genome sequence for *G. destructans* (soon to be available at www.broadinstitute.org.) These studies will aid in the identification of possible virulence factors released by *G. destructans*.

DEMOGRAPHIC AND BIOMETRIC CHANGES IN *MYOTIS LUCIFUGUS* WITH THE ONSET OF WNS IN VIRGINIA: PRELIMINARY RESULTS

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White-Nose Syndrome (WNS) was first discovered in Virginia in February 2009. In response we initiated a banding effort to document demographic and biometric changes in bats potentially affected by WNS. From May 2009 to November 2010 we banded 2,632 bats at 15 sites. Bats were banded during the fall swarm (729) and early (1079) and late hibernation (824) periods. We recaptured 91 individuals 95 times for a recapture rate of 3.6%. Of these, 82 (86.3%) were captured during early hibernation, 7 (7.4%) in late hibernation, and 6 (6.3%) in fall swarm. Eleven (12%) of the recaptures were banded during fall swarm, 33 (36.4%) in early hibernation, and 51 (51.6%) in late hibernation. The percentage of *Myotis lucifugus* captures during fall swarm declined between 2008 (45.3%), 2009 (33.7%), and 2010 (18.6%) at four sites sampled annually as well as across all sites combined, 45.3%, 23.3%, and 19.1%, respectively. The male to female sex ratio for *Myotis lucifugus* during fall swarm was similar between 2008 (7.3:1) and 2009 (7.9:1), $X2 = 0.03$, df = 1, $P = 0.85$, but declined significantly in 2010 (1.5:1), $X2 = 18.9$, df = 2, $P < 0.001$. This decline was also

documented in the early hibernation surveys, 2.2:1 in 2009 and 1:1 in 2010, $X2 = 24.7$, df = 1, $P < 0.001$. Body Mass Index (BMI) for adult male *Myotis lucifugus* in October was significantly different at some sites compared to pre-WNS sites. For example, the BMI at a second year WNS site did not differ significantly between 2008 (0.25, pre-WNS) and 2009 (0.24, 1st yr. WNS), $t = -1.27$, $P = 0.21$, and between 2008 and 2010 (0.25, 2nd yr. WNS), $T = 156.0$, $P = 0.72$, while the BMI at a first year site was significantly different between 2008 and 2010 (0.21), $T = 2476.0$, $P < 0.001$. For all sites combined, BMI was not significantly different between 2008 (0.25) and 2009 (0.24), $t = 1.72$, $P = 0.09$, but was significantly different between 2008 and 2010 (0.21), $T = 4716.5$, $P < 0.001$, and between 2009 and 2010, $T = 5689.5$, $P < 0.001$.

ZERO-INFLATED COUNT MODELS FOR IMPERFECTLY DETECTED INVASIONS: IMPLICATIONS FOR WHITE NOSE SYNDROME SURVEILLANCE

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Zero-inflation describes distributions for count data in which the proportion of zeroes exceeds that expected for an ordinary distribution. Early in the course of invasions, counts of invasive organisms may be characterized by zero-inflation of two origins: true zeroes recorded at locations beyond the margins of the invasion, and false zeroes due to imperfect detection of invading organisms. One such imperfectly detected invading organism is *Geomyces destructans*, the infective agent implicated in White Nose Syndrome (WNS) of bats. Imperfect detection may be accommodated by using mixture models, such as occupancy models. These models typically rely on repeated measures sampling schemes, but such intensive samples are not always available, particularly when working with disturbancesensitive organisms such as hibernating bats. We tested zero-inflated negative binomial mixture models for imperfectly detected invasions using independent, non-repeated measures data. We used simulated data where population parameters were known. We found that the proportion of false zeroes could be estimated when covariates of both true zeroes and detection probability were measured and included in the models. Models including these covariates were reliably selected by Akaike's Information Criterion over intercept-only models suggesting that covariates of detection can improve the reliability of occurrence estimates from WNS surveillance data.

EVALUATING CHANGES IN BAT ACTIVITY AND SPECIES COMPOSITION FROM WHITE NOSE SYNDROME AT FIXED ACOUSTIC MONITORING LOCATIONS IN VERMONT

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White Nose Syndrome (WNS) was first documented in southeastern Vermont during the winter of 2007/2008. This syndrome has since spread throughout the region causing unprecedented mortality in certain bat species over the past three winters. In Vermont, mortality associated with WNS has been documented at 80-90 percent in selected hibernacula. It is vital to verify and model expected declines in northeastern bat populations due to the possible future extirpation of local or regional populations. With that in mind, Stantec augmented a two-year acoustic survey of bat activity on Grandpa's Knob in Vermont conducted in summers 2007 and 2008 with a third and fourth summer of acoustic surveys in 2009 and 2010 to document changes in acoustic activity potentially related to the onset of WNS. Five Anabat detectors were deployed in the same locations each year and passively recorded activity data from June 1 to July 31 to target the residency period of WNS-affected species. Recorded files containing pulses with minimum frequencies above 30 kHz were used in a discriminant function analysis to assign species identification, and files were summarized by year and species. Monthly and yearly detection rates varied among identified species, but were lowest in 2010. Because data collection began before WNS spread into Vermont, these studies provide an opportunity to compare pre- and post-WNS acoustic activity, and represent the most intensive acoustic survey conducted in Vermont to date.

CAPTURE AND REPRODUCTIVE TRENDS OF SUMMER BAT COMMUNITIES IN WEST VIRGINIA: ASSESSING THE IMPACT OF WHITE NOSE SYNDROME

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Although the short-term impacts are evident, the long-term impact of white-nose syndrome (WNS) on bat communities in the eastern United States is largely unknown. However, "historical" (pre-WNS) capture records and individual reproductive observations provide baseline data about bat communities. In West Virginia, WNS was first detected in Spring 2009 and spread along the extent of the Ridge and Valley east of the Allegheny Front where most of the state's caves occur and where many bats summering west of the Allegheny Front presumably hibernate. Therefore, we examined trends in summer (15 May – 15 August) capture success and reproductive patterns before (1997-2008; 10,000 captures) versus after (2010; 1,300 captures) detection of WNS across the state. We predicted that capture success (no. individuals captured/ net-night) would decrease in 2010. Moreover, we posited that the presumed energetic strain of WNS would cause females to delay reproduction, denoted by a greater proportion of pregnant/lactating females later in the summer. Female reproductive failure also could be noted by a lower relative proportion of juvenile captures in the mid-late summer post-WNS. From >5000 records where capture success could be calculated, we found a dramatic drop in capture rates of little brown (*Myotis lucifugus*), northern long-eared (*M. septentrionalis*), small-footed (*M. leibii*), and tri-colored (*Perimyotis subflavus*) bats. In all cases, 2010 capture rates were < 50% of pre-WNS rates. Conversely, capture success of big brown (*Eptesicus fuscus*) and

red (*Lasiurus borealis*) bats significantly increased in 2010, and together comprised 55% of all captures (pre-WNS captures = 11% each). Data acquisition and reproductive analyses are on-going. Results may further elucidate short-term impacts and help us envision long-term consequences of WNS. Data may also be used to track temporal population trends and predict regional extirpations similar to recent studies of the little brown bat in the northeastern Unites States.

USE OF ACOUSTIC BAT DATA TO CHARACTERIZE LARGE-SCALE MIGRATION PATTERNS FOR LONG-DISTANCE MIGRATORY BAT SPECIES IN THE NORTHEASTERN U.S.

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Stantec has collected acoustic bat data from over 20 distinct sites in the northeastern United States proposed for commercial wind development between 2007 and 2010. Results and analysis of 2007 and 2008 monitoring have been presented previously, although Stantec has now incorporated results from 2009 and 2010 monitoring to increase the rigor of analyses and conclusions drawn from these data. Nightly acoustic activity rates from each site were compared within and among regions to determine spatial and temporal activity patterns on a regional scale, which were then used to characterize large-scale migration patterns. Whereas the utility of acoustic bat data collected at a single site to document migration events is confounded by numerous sampling biases, simultaneous collection of acoustic data at multiple sites in a large area dramatically increases the analytical power and relevance of this survey method for characterizing bat migration. The addition of two years of acoustic data will improve not only the temporal but the spatial scope and accuracy of the analysis. This dataset is the largest of its kind available for the northeast region and will help understand patterns of regional movement and therefore risk of mortality of long-distance migratory bats at wind projects.

ACOUSTIC SURVEY OF OFFSHORE BAT ACTIVITY AND MIGRATION IN THE GULF OF MAINE

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While migratory bat species are known to cross large bodies of water and have been documented far offshore, little quantitative data exist on the seasonal movements and activity patterns of bats in the offshore marine environment. In 2009 and 2010, we coordinated and conducted the first regional offshore acoustic bat monitoring effort to occur along the northeast Atlantic coast. Paired detectors were placed in lighthouses and on temporary towers in locations along an approximately 180-mile offshore transect in the Gulf of Maine to assess species presence and regional patterns of seasonal offshore activity. Acoustic activity was monitored on a nightly basis between mid July and early November at each location, and data were summarized to document species-specific activity patterns during the fall migration period. Migratory bat species were documented at all survey points, including sampling locations up to 20 miles offshore. Temporal and spatial patterns of acoustic activity suggested that large-scale migration events may occur offshore, and that timing of offshore migration is similar to that documented inland. In addition to facilitating better understanding of seasonal movement and activity patterns of bats offshore, implications of these data include predicting and mitigating potential risk of bat mortality at offshore wind energy developments.

A SURVEY OF THE MAMMALS AT RUSSELL CAVE NATIONAL MONUMENT

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A survey of the mammals at Russell Cave National Monument (RCNM) in Jackson County, Alabama, was conducted during the summer and fall of 2009 and spring of 2010. Sampling procedures included live trapping, bait/camera stations, scent stations, mist netting, spotlight surveys, and general observations. Twenty-nine species, representing 8 orders and 14 families, were verified to occur on the site. Results reflected the presence of 1 species of opossum (Virginia Opossum, *Didelphis virginiana*), 1 species of shrew (Northern Short-tailed Shrew, *Blarina brevicauda*), 1 species of mole (Eastern Mole, *Scalopus aquaticus*), and 6 species of bats (Gray Myotis, *Myotis grisescens*; Northern Myotis, *Myotis septentrionalis*; Tri-colored Bat, *Perimyotis subflavus*; Big Brown Bat, *Eptesicus fuscus*; Eastern Red Bat, *Lasiurus borealis*; and Evening Bat, *Nycticeius humeralis*). Other species documented included: Nine-banded Armadillo (*Dasypus novemcinctus*), Eastern Cottontail (*Sylvilagus floridanus*), 11 species of rodents (Eastern Chipmunk, *Tamias striatus*; Woodchuck, *Marmota monax*; Eastern Gray Squirrel, *Sciurus carolinensis*; Southern Flying Squirrel *Glaucomys volans*; American Beaver, *Castor canadensis*; White-footed Deermouse, *Peromyscus leucopus*; Cotton Deermouse, *Peromyscus gossypinus*; Hispid Cotton Rat, *Sigmodon hispidus*; Allegheny Woodrat, *Neotoma magister*; Woodland Vole, *Microtus pinetorum*), Domestic Dog (*Canis familiaris*), Coyote (*Canis latrans*), Gray Fox (*Urocyon cinereoargenteus*), Raccoon (*Procyon lotor*), Eastern Striped Skunk (*Mephitis mephitis*), Feral Cat (*Felis catus*), and White-tailed Deer (*Odocoileus virginianus*). One endangered species (Gray Myotis) was recorded during the survey.

RESULTS OF A LARGE SCALE MIST-NETTING SURVEY OF THE PINE CREEK GORGE AREA, TIOGA AND POTTER COUNTIES, PENNSYLVANIA

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During the summer of 2010, a large-scale mist-netting survey was conducted along the west rim of the Pine Creek Gorge, located in northcentral Pennsylvania, as part of a survey for Indiana bats. One hundred thirty sites were mist-netted using the USFWS Standard Protocol for surveying for Indiana bats. The habitat ranged from deciduous forest along ridgetops and the sides of small valleys, stream corridors with mixed forests and edge habitat along agricultural fields or other openlands. All surveys consisted of triple-high

nets (6m to 12m wide) set in appropriate corridors and opened for not less than 5 hours. All sites were netted for 2 nights. Other established White Nose Syndrom were guidelines followed included assessing bats for wing damage as well as decontamination protocols. A total of 1,835 bats of 7 species were captured over the course of the project including 790 *Myotis septentrionalis*, 648 *M. lucifugus*, 166 *Eptesicus fuscus*, 122 *Lasiurus borealis*, 56 *L. cinereus*, 45 *Lasionycteris noctivagans* and 2 *M. leibii* with 6 bats not identified. The totals for both *Lasiurus cinereus* and *Lasionycteris noctivagans* are presently thought to be the historically largest single season capture numbers for these two species in Pennsylvania and include a lactating *Lasiurus cinereus.* The number of captured silver-haired bats may indicate a resident population within the Pine Creek Gorge area, which would support a change in status of this species from non-resident migrant to resident. In light of ongoing declines in bat populations due to WNS, this project should provide a good baseline comparison for future reference should someone undertake to duplicate this particular study.

SEVENTEEN YEARS OF BAT HIBERNACULA MONITORING IN WISCONSIN

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Since 1994 and 1995 through 2009, censuses of hibernating bats have been conducted in three abandoned lead mines and one railroad tunnel in southwestern Wisconsin have been censused. Originally intended to determine whether a non-standard gate on one of the abandoned mines was suitable to protect cave bats, this study has provided the first long term trend data of Wisconsin cave bats. The census protocol calls for all counts to be taken during the last week of January or first week of February, with each site being checked as close to the same calendar date as possible to previous visits. Sites were generally checked every other year, (range 1-6 years). Search effort was also recorded. While the results are variable from check to check, some long term trends have emerged, some significant. *Myotis lucifugus* counts have remained stable to slightly increasing. *Perimyotis subflavus* counts have significantly increased, corresponding to reports elsewhere in the United Stated that this species seems to be expanding its range. The numbers counted of *Myotis septentrionalis* and (except for one site) *Eptesicus fuscus* have been too small characterize trends. The railroad tunnel contains hundreds of *E. fuscus*, but the numbers fluctuate greatly each year. Given the crevice roosting of hibernating *M. septentrionalis* and the mobility of *E. fuscus* during the winter, these censuses are not adequate for describing trends in these two species. Censuses should be conducted in 2011 and data from those will update these results. With the imminent arrival of White Nose Syndrome, which has not yet been documented in Wisconsin, 2011 may mark an inflection point in the trend data.

LANDSCAPE METRICS OF INDIANA BAT (*Myotis sodalis*) HABITAT IN CENTRAL NEW YORK

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Indiana bat (*Myotis sodalis*) habitat has most frequently been defined in the literature in terms of roost structure metrics. The limited research on Indiana bat habitat at broader landscape scales has tended to focus on arbitrarily defined spatial extents. Organisms select habitat at multiple spatial scales, however, so it is important to understand habitat metrics for a given species at multiple spatial scales in order to develop useful models for identifying potential habitat for that species. Spatial scales should be related to specific ecological processes of the species being studied if the resulting data are to be relevant, useful, and applicable to habitat modeling. Radio telemetry data were used to define ecological neighborhoods for roosts, foraging areas, and seasonal dispersal regions of Indiana bats in Central New York. I measured 5 independent physiographic landscape metrics for each neighborhood type relative to patch size, complexity, arrangement, and distance to fixed landscape features. I compared variation among those metrics with those found in randomly selected areas of equal size to determine which metrics varied least, suggesting selection based on that metric. Results of this analysis will be presented to illustrate how each metric varied relative to random locations and whether any of the metrics might be used to model Indiana bat habitat in Central New York.

HABITAT ASSOCIATION OF FORAGING BATS ON GEORGIA'S BARRIER ISLANDS

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While bat habitat associations have been studied across much of the Southeast, few studies have focused on foraging habitat associations of bats on barrier islands of the Atlantic coast. We examined habitat associations of foraging bats on Jekyll, Sapelo, Little St. Simons, and St. Simons Islands, Georgia, in summer 2010 using active acoustic transects with Anabat II detectors. As a secondary objective, mist netting and acoustic data were compared for their ability to determine species richness for Sapelo and Little St. Simons Islands. Each acoustic route was run approximately 30 minutes after sunset while foraging activity was high. A GPS unit was connected to the detector to record the location of each recorded call. Analook software was used to identify species from each call. Using Arc GIS we plotted call locations onto a vegetation cover map obtained from Georgia Department of Natural Resources. We created 100 m and 500 m buffers around each location and examined habitat attributes within each buffer. Attributes included percentage of each habitat type, percentage of area developed, and linear road distance within each buffer. Most calls were recorded along the edge of hardwood stands with freshwater or swamp/marsh nearby. Comparison of methods suggest that active acoustic transects detect greater species richness than mist nets. With the demand for increasing development of coastal areas, conservation of freshwater wetlands interspersed within forested habitats is an important consideration in bat conservation.

HABITAT AND POPULATION FEATURES OF THE VIRGINIA OPOSSUM (*DIDELPHIS VIRGINIANA*) IN WESTERN TENNESSEE

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Habitat and population features of the Virginia opossum (*Didelphis virginiana*) were investigated over a 10-year period. The study was conducted at the Meeman Biological Station in western Tennessee. Sampling (during winter) was carried out on a trapping grid of 50 traps spaced approximately 150 m apart in a 5 x 10 pattern. Trapping (utilizing mark/recapture techniques) was for 40 nights during each year, which resulted in about 20,000 trap nights during the investigation. Population density, sex ratio, total length, and body weight were determined from captured animals. Additionally, captures were assessed in light of selected habitat variables. The population was found to be dynamic across years. Values for natural-history traits and habitat features are discussed in light of previous reports.

ROOST SITE DENSITIES NEEDED BY INDIANA BAT (*MYOTIS SODALIS)* MATERNITY COLONIES

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The proposed density of snags per hectare needed to support a maternity colony of *Myotis sodalis* (Indiana bats) is based on 1 study in Illinois from the 1980s. It was determined that there were 64 snags per hectare in upland areas and 41 snags per hectare in floodplains (Garner and Gardner 1992). Therefore, land managers have taken these recommendations and used them to base their subsequent manage decisions. With the population numbers of *Myotis sodalis* again declining, it is increasingly important to understand the habitat requirements of these maternity colonies. Therefore, this study aimed to further investigate the relationship of snag densities (i.e. potential roost sites) to maternity colonies. In the summer and early fall of 2009 and 2010, a total of 10 sites were surveyed for snags, 3 hydric areas and 3 non-hydric areas in Indiana, 2 hydric and 2 non-hydric areas in Illinois. At each location, multiple transects (300m x 30m) were surveyed for snags. A suite of variables were used to determine if each snag was a suitable as a potential roost. The density of snags for both hydric and non- hydric areas in Indiana and Illinois were drastically less than the densities presented by Garner and Gardner (1992). At least in these study areas, it appears that significantly fewer snags are needed to maintain *Myotis sodalis* maternity colonies. Additionally, the snag density between hydric and non-hydric areas did not show a clear trend. This suggests that snag density may not be a driving force behind habitat selection of *Myotis sodalis.*

WINTER ROOST SELECTION AND ACTIVITY PATTERNS BY BATS IN A CYPRESS-GUM SWAMP IN GEORGIA

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Knowledge of winter roosts and activity of southeastern bats lags understanding of summer roosting ecology despite their importance to bats' persistence. Rafinesque's big-eared bat (*Corynorhinus rafinesquii*) and southeastern myotis (*Myotis austroriparius*) are species of concern whose winter tree roost selection is constrained by seasonal flooding typical in cypress-gum swamps. Additionally, as tree roosting bats, they must survive the winter in roosts that are less buffered against temperature changes than typical cave hibernacula. Our goals were to locate winter roosts for these bat species, compare them to summer roosts, and relate temperature data to roost selection and activity levels. We used basal hollow searches, arborist climbing techniques, and radio telemetry at River Bend WMA in Laurens County, Georgia to identify and characterize diurnal winter roosts. We measured characteristics of potential roosts and compared them to winter roosts and previously measured summer roosts. We also measured the temperature profiles of 22 hollow trees and 10 bats. We used logistic regression to predict roost tree occupancy and bat activity from temperature data and used Akaike's information criterion to select the most parsimonious models. We identified 149 potential roost trees and we were able to inspect the interior of 46. We also radio tracked 10 bats with temperature sensitive radio transmitters. We located 23 Rafinesque's big-eared bat roosts and 5 southeastern myotis roosts. For Rafinesque's big-eared bats, winter roost trees were similar to available trees and summer roost trees. For southeastern myotis, winter roost trees were smaller than available trees and summer roost trees. The best supported hypotheses were that bat activity increased with maximum ambient temperatures and that roost occupancy was unrelated to roost temperatures. Rafinesque's big-eared bat roost selection appeared to be less affected by seasonal flooding, while activity levels were more affected by winter temperatures, relative to southeastern myotis.

SUMMER ROOSTING HABITAT SELECTION OF THE NORTHERN YELLOW BAT (*LASIURUS INTERMEDIUS*) ON SAPELO ISLAND, GEORGIA

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Anecdotal evidence suggests that the northern yellow bat (*Lasiurus intermedius*) typically roosts solitarily in Spanish moss (*Tillandsia usneoides*) along the Georgia coast and on Eastern barrier islands. However, few quantitative data are available regarding roost tree and landscape level factors affecting northern yellow bat roost site selection. We examined roostselection by 4 northern yellow bats on Sapelo Island, Georgia summer 2010 using radio telemetry. Bats were captured 18 May-2 June in mist nets set over water sources. For each captured bat, sex, reproductive status, age, forearm length, weight, and wing condition were recorded and a 0.33 g transmitter was attached using surgical adhesive. Roosts were located daily using a telemetry receiver and a 3-element Yagi antenna. A random tree was paired with each roost tree identified. For each roost and random tree, species, DBH, tree height, roost height, roost description (foliage, moss, bark, etc.), and whether the tree was dead or alive were recorded. The number of midstory trees and the

DBH and height of each overstory species was recorded within a 0.04-ha plot around each roost and random tree. Landscape metrics including distance from capture site, distance to roads, distance to water, and distance to varying stand types were determined in ArcGIS for all roost trees and random trees. All bats in our study roosted in Spanish moss hanging in hardwood trees and all were located within 1 km of their capture sites. Results suggest that northern yellow bats select roost trees that have a larger DBH and are taller than random trees. Males (n=3) showed a greater tendency to switch roost trees than pregnant females (n=1). Due to the small sample size, reliable trends between sexes may not be discerned from this study. However, because little roost selection data exists for this species, this work will be the foundation for future studies.

OBSERVATIONS OF GOLDEN MOUSE (*OCHROTOMYS NUTTALLI*) VISITATION OF SWAINSON'S WARBLER (*LYMNOTHLYPIS SWAINSONII*) NESTS

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In the Southeast, the distribution and habitat of *Ochrotomys nuttalli* and *Lymnothlypis swainsonii* greatly overlap. Swainson's warbler (*Lymnothlypis swainsonii*), a species of high management concern, is a medium-sized neotropical migrant that breeds in the southeastern United States and winters on Caribbean islands, the Yucatan Peninsula, and in eastern Mexico. It is considered a "dead-leaf" specialist that is dependent upon dense understory vegetation within forests to forage for arthropods by flipping over dead leaves on the ground. Its cup-shaped nest of leaves, moss and pine needles is built up to 3m above the ground in this dense vegetation; much like the nests of *O. nuttalli*. In fact, *O. nuttalli* often move into abandoned *L. swainsonii* nests. In a recent study investigating factors influencing Swainson's warbler, *L. swainsonii*, breeding biology at the Roanoke River National Wildlife Refuge, Bertie CO., NC, infrared video cameras were used to continuously monitor nests for parental activity and nest depredation. Field work was conducted during breeding seasons of 2006 through 2009. From thousands of hours of video, four events of the visitation of *L. swainsonii* nests by *O. nuttalli* were documented. The recording of one such event seems to document the partial scavenging of a non-viable chick.

SOCIAL NETWORKS OF RAFINESQUE'S BIG-EARED BAT (*CORYNORHINUS RAFINESQUII*) IN KENTUCKY

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The nature of social interactions among colonial bat species has been an area of interest for researchers and land managers for several years. Understanding the relationships between individuals within and among bat colonies holds important insights to conservation efforts, but is difficult to observe. To date, methodologies used to examine these relationships have been limited in their ability to provide insights beyond the understanding that many bat species exhibit non-random, fission-fusion colonial behaviors. Our study aimed to describe the nature of colonial behavior in a socially roosting bat species, Rafinesque's big-eared bat (*Corynorhinus rafinesquii*), using social network analysis. Data was collected concurrently in a bottomland hardwood landscape and an upland karst landscape, where use and availability of day-roosts differed. We radiotagged 85 of Rafinesque's big-eared bats from 2009 through 2010, tracking radiotagged bats to 101 day-roosts in the two study areas. Data were analyzed using the computer program UCINET to examine the properties of social networks of bigeared bats, including centrality, homophily, clustering and cohesion. Data will be presented for network analyses based on characteristics of radiotagged bats as well as analyses based on properties of day-roosts. Data will be analyzed and presented for both study areas. Potential differences in social behaviors between study areas, and differences in individual bats' attributes within the social network will also be presented.

SELECTION OF ROOSTS BY MALE EASTERN SMALL-FOOTED BATS (*MYOTIS LEIBII*) IN NEW HAMPSHIRE: IMPORTANCE OF TEMPERATURE AND SIZE OF CREVICES

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Roosting ecology of the eastern small-footed bat (*Myotis leibii*) is poorly understood. We studied physical dimensions and temperature profiles of 28 roosts of 7 male *M. leibii* in New Hampshire and compared these characteristics to an equal number of nearby randomly selected crevices. Most roosts (*n*=23) were in crevices between boulders on a dam resembling a natural talus slope, with fewer roosts occurring on cliffs 50-m to 4-km from the dam. Bats typically roosted alone and moved to new roosts each day. Roosts on the dam were narrower, but longer and deeper, and were more likely to occur on South facing slopes and have openings that faced Southwest, relative to random crevices. Crevices on the dam generally reached temperatures that averaged 9.4°C higher than maximum ambient temperature. However, roosts obtained maximum temperatures that were significantly farther above ambient than those reached by random crevices. Maximum temperature of crevices was positively correlated with depth of crevices, but was random with respect to remaining variables. Results suggest that exposed rock formations are substantially warmer than alternative habitats. Furthermore, male *M. leibii* apparently selected some attributes of crevices for thermoregulatory benefits but other characteristics likely were chosen for different reasons, such as protection from predators. Researchers seeking to locate *M. leibii* should focus their efforts close to exposed, and probably South facing, rock formations.

VARIATION IN THE ECHOLOCATION CALLS OF THE EASTERN RED BAT AND THE IMPLICATIONS FOR SPECIES IDENTIFICATION

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Identification of bat echolocation calls to species is becoming increasingly important, particularly in monitoring the spread and long-term effects of White-Nose Syndrome and in assessing the risk to sensitive bat species posed by wind development. However, bat call

identification is a complex process, often made difficult by highly-variable echolocation calls and overlap in call characteristics between species. The stereotypical echolocation call of the eastern red bat (*Lasiurus borealis*) has been described by many authors and calls of this species are generally thought to be relatively easy to identify. However, the eastern red bat has an extremely variable vocal repertoire, much of which is quite distinct from the stereotypical red bat call. I compiled a preliminary call library of eastern red bat calls which was designed to encompass the entire range of call variation exhibited by this species, excluding social calls. All calls included in the call library were passively-recorded by the Anabat ultrasonic detectors (Titley™ Scientific, Australia). First, I quantified the level of call variation in this species and compared it to other species of bats. Second, I highlighted nonstereotypical calls of the eastern red bat and examined the extent to which these types of calls may be confused with other species of bats. Finally, I used quantitative call analysis to: 1) examine how often non-stereotypical calls are misidentified and 2) explore ways to deal with the call misidentification.

SPRING MIGRATION OF FEMALE INDIANA BATS (*MYOTIS SODALIS*) FROM CAVES IN EASTERN TENNESSEE

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We used active radio telemetry tracking to conduct a spring migration study of female Indiana bats (*Myotis sodalis*) from hibernacula in eastern Tennessee. Female bats were followed intensively with both ground and aerial support to determine staging areas, migration direction and routes, flight duration and speed, stopover roosts, and link to summer and winter populations. We conducted three distinct tracking phases: one in spring 2009 and two in spring 2010. A total of 15 female Indiana bats were radio-tagged from three caves. Radiotelemetry efforts tracked 6 of the 15 bats for 1-3 days. None of the bats stayed in Tennessee. Most moved north as expected with one bat linked to a newly discovered maternity colony 233 km in Kentucky. However, one bat migrated southwest into Alabama. The latter traveled a total distance of 280 km over three nights before being lost as it continued towards Birmingham, Alabama. Bats followed the same absolute direction as they started and they appeared to follow landscape features such as streams, rivers, mountain ranges, and roads. One bat also took advantage of a mountain gap to pass from one side to the other. Bats traveled an average distance of 76.0 ▪ }32.6 km during a night. Flight duration ranged from 0.5-8 hrs and may have depended upon ambient temperature. Some evidence suggested that bats foraged and night roosted for short periods along their route. Minimum flight speed for bats during a nightly migration averaged 19.2 km/hr (range 12.2-32.0 km/hrs). Five stopover roosts were located: three Acer spp. (2 *A. saccharinum*, 1 *A. rubrum*), one *Robinia pseudoacaia*, and 1 *Carya tomentosa*. Mean dbh and height of all trees was 37.92 ▪ }13.38 cm and 13.4 ▪ }4.7 m, respectively. Roosts were located under bark of three trees and within the crevices of two split topped trees. Trees were used for one night while bats were migrating. These records represent one of the first descriptions of spring migration of Indiana bats within the southern portion of the species range.

ECOLOGICAL CORRELATES OF DIETARY VARIATION IN THE WIDESPREAD INSECTIVOROUS BATS *EPTESICUS FUSCUS* AND *MYOTIS LUCIFUGUS*

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Foraging and niche partitioning by insectivorous bats likely is shaped by large-scale ecological factors such as availability of prey and interspecific competition, however, these factors are difficult to measure and there is little empirical evidence for either. Diet is the most common measure of foraging and diet *Eptesicus fuscus* and *Myotis lucifugus* are particularly well studied. We examined diet of these species using published descriptions from various regions of North America and our own data from New England to better understand intraspecific variation in use of prey, and to test whether use of prey corresponded with climatic variables (an indicator of availability of prey), and species richness of bat communities (a measure of potential competition). Both species of bats ate significantly more beetles and fewer other prey in regions with the greatest mean monthly precipitation and temperature during summer. However, each also consumed significantly fewer beetles and more other prey when present with greater numbers of potential competitors. Results suggest diet is influenced by limited availability of prey in regions with cold dry summers, but also by interspecific competition. These relationships may explain why diets of *E. fuscus* and *M. lucifugus* are substantially in western North America compared to eastern North America, and generally support past hypotheses about niche partitioning. Dietary investigations clearly are valuable resources that should continue to be conducted, particularly for species of bats that are understudied. Additional insight may be gained by broad-scaled analyses of lower taxonomic levels of prey.

IS CONSERVATION GENETICS A WASTE OF TIME? A POWER ANALYSIS OF GENETIC POPULATION MONITORING

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The monitoring of genetic diversity has become an important tool in conservation biology, with the loss of diversity at neutral loci being used as a proxy for the loss of individuals. Furthermore, corresponding decreases in genetic diversity at coding regions may lead directly to a loss of evolutionary responsiveness or cause detrimental effects from inbreeding in threatened species. While genetic data may provide a means of monitoring populations particularly when traditional mark-recapture methods are unsuitable, the utility of genetic tools under specific models of population decline have not been fully explored. Are we, under some circumstances, asking more of a genetic-based monitoring approach than it can deliver? I used coalescent-based simulation analyses to determine the

efficacy of genetic data as a monitoring tools for short-term population declines. Specifically, I addressed several questions: (1) which type of molecular marker (DNA sequence data vs. microsatellite genotypes) responds more quickly to population declines?, (2) over what time spans do population declines become statistically detectable?, (3) how does population structure affect our power to detect population declines?, and (4) which analytical tools are most useful for detecting population declines? These questions are addressed using biologically realistic population parameters from two species recently of conservation concern in North America, eastern red bats (*Lasiurus borealis*) and little brown bats (*Myotis lucifugus*).

ASSESSMENT OF MERCURY ACCUMULATION IN BAT TISSUES IN THE NORTHEASTERN UNITED STATES

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Anthropogenic inputs of mercury (Hg) in surface water across the Northeastern United States have potential to created hotspots which may have long-term impacts on ecological and human health. Bats were captured and tested for Hg accumulation in blood and fur tissues to assess the mercury levels in contaminated and uncontaminated areas. Bats were chosen because their foraging behavior and long life spans make them potentially susceptible to high Hg exposure. During 2006-2009 tissue samples were collected in 7 northeastern states at 57 individual sites. A total of 2163 tissue samples were analyzed for Hg, including 1418 fur samples and 693 blood samples. Fur samples were analyzed for all years and Hg concentrations ranged from 0.1 to over 700 ppm. Little brown (*Myotis lucifugus*), tricolored (*Perimyotis subflavus*) and northern bats (*Myotis septentrionalis*) were species with some of the highest accumulation in the fur and blood.

PRELIMINARY RESULTS OF A COMPARISON OF FORAGING BEHAVIOR BETWEEEN LITTLE BROWN BATS (*MYOTIS LUCIFUGUS*) AND INDIANA BATS (*MYOTIS SODALIS*)

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The purpose of this research is to compare the foraging behavior, focusing on summer home ranges, of little brown bats (*Myotis lucifugus*) and Indiana bats (*Myotis sodalis*) in order to determine whether behavioral differences between the species exist. This information will be used to determine if using little brown bats as surrogates for Indiana bats is a reliable management tool as well as increase the knowledge on the infrequently studied foraging behavior of little brown bats. Additionally, this study will be conducted before white-nose syndrome (WNS) decimates the bats' populations in order to gather information for future comparisons with post WNS populations. In the summer of 2010 little brown bat and Indiana bat populations were studied at 2 sites in Illinois' Mississippi River floodplains: Oakwood Bottoms Greentree Reservoir and Bluff Lake/ Union County Conservation Area. Simultaneous triangulation radio telemetry was used to track bats and obtain location points for each species to determine home range and habitat use. Both the minimum convex polygon and adaptive kernel methods will be used to determine home range sizes for each individual bat. The home range sizes of each species will be compared using an analysis of variance (ANOVA). Approximately 5 little brown bats and 6 Indiana bats have been tracked to date. A total of 254 radio telemetry locations were estimated for little brown bats and 371 for Indiana bats. Preliminary observations show that little brown bats have larger home ranges than Indiana bats due to faster, more rapid movement over large areas. This could show a behavioral variation between the 2 species and lead to the conclusion that little brown bats are a poor surrogate for use in Indiana bat management.

COMPARISON OF THREE ACOUSTIC SURVEYING TECHNIQUES FOR DETECTION OF ADIRONDACK BAT SPECIES RICHNESS AND FORAGING ACTIVITY

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I present results of acoustic bat surveys conducted at Huntington Wildlife Forest, in the central Adirondacks, NY. Determining bat species composition is common in acoustical surveys, but no comparison between acoustical surveying methods has ensured these techniques are equivalent. Transects have been developed throughout the Adirondack Park to monitor for the effects of White Nose Syndrome on *Myotis* populations through mobile surveying. This investigation uses four Anabat II detectors to compare the efficiency of mobile surveys to traditional active and passive techniques. I identified nine species acoustically over 43 nights at 12 stations along four routes, on the basis of call signatures using Analook and Bat Call Identification (BCID) software. Only calls recorded within three hours after sunset were analyzed, and calls were averaged each night as number detected per hour, for each technique. Significant differences between techniques were found using an ANOVA test in minitab (P-level < .001 for both Technique and Species, and interaction of species richness x method, P = .002). Mobile recording detected five species, (55% of the species detected by either passive or active), but did detect a greater number of big brown (*Eptesicus fuscus)* and hoary bat *(Lasiurus cinereus*) calls. Passive and active detected significantly more little brown bat (*Myotis lucifugus*) and Indiana bat (*Myotis sodalis)* calls. Passive detectors recorded the greatest activity but significantly more unknown calls and noise files. Results indicate active detectors record proportionately more identifiable calls due to longer call sequences and higher-quality recordings, but fewer total calls. Results suggest difference in methodology may yield different species richness, call quality, and activity data. Standardized survey methods for obtaining reliable information on bat populations are particularly crucial as the federally endangered Indiana bat is an Adirondack resident.

ACOUSTIC MONITORING OF WINTER BAT ACTIVITY AT CAVE ENTRANCES: A PRELIMINARY REPORT

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Ozark National Scenic Riverways (ONSR) contains over 300 caves across more than 80,000 acres in South Central Missouri. It is at the front of the expanding range of white-nose syndrome (WNS), making it a critical area for monitoring the potential impacts of this disease. Acoustic surveillance with Anabat ultrasonic detectors is currently being performed at cave entrances within ONSR to gather critical baseline data on normal winter bat activity levels pre-WNS exposure. This surveillance also monitors for unusual bat activity, including flight during daylight hours in winter. During the end of November 2010, a passive, solar powered Anabat detector was placed approximately 10 meters away from the entrance at each of five known Indiana (*Myotis sodalis*) and gray bat (*Myotis grisescens*) hibernacula and/or maternity caves. Three of these cave locations are WNS-unaffected sites and two were PCRpositive for the syndrome. Temperature and relative humidity data loggers have been placed near each detector to determine if these environmental influences correlate with bat activity. Each detector is set to record continuously until April 30, 2011. A preliminary report of species group dynamics and total bat activity will be presented. As of Jan. 1, 2011, no abnormal bat activity levels have been detected at any site. Some bat activity occurs near sunset/sunrise and no mid-day bat activity has been detected. Monitoring of bat movement, particularly of listed species, will provide critical trend information on the progression of WNS and identify potential problem areas with the goal of preventing or delaying the spread of this disease.

AUTUMN BAT ACTIVITY LEVELS IN THE SOUTHERN APPALACHIAN MOUNTAINS

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Autumn bat activity levels in the southern Appalachian Mountains were assessed by doing acoustic surveys using AnaBat II detectors and ZCAIM recorders during the fall of 2010. The study took place in and near Blacksburg, Virginia in Montgomery County. Two stations were placed in an urban setting on the campus of Virginia Tech and two more were located in a forested environment within Jefferson National Forest. All stations were over or near a body of water. The following species were examined in this study: *Corynorhinus townsendii*, *Eptesicus fuscus*, *Lasionycteris noctivagans*, *Lasiurus borealis*, *Lasiurus cinereus*, *Nycticeius humeralis*, *Perimyotis subflavus*, and four species of *Myotis* (which were lumped together for analysis - *M. grisescens*, *M. lucifugus, M. septentrionalis,* and *M. sodalis*). The Activity Index (AI) was calculated for each station after running species filters on the recorded data to identify bat echolocation calls. This study expected to find a time of "demergence" for hibernation, especially in cave hibernating species, by recording nightly activity levels between mid-September and mid-November. However, no strict date was found. Instead activity levels fluctuated throughout the fall, closely related with temperature (urban stations $P<0.001$; forest stations $P<0.05$). Peaks in activity levels were found throughout the study, although these gradually decreased in magnitude by mid-November and did give a decreasing trend between date and AI ($P=0.003$ and $P<0.001$for the two urban stations). Species specific differences in activity levels in autumn have been noted in other studies, but none were seen here.

USING STABLE ISOTOPES TO IDENTIFY POPULATION DYNAMICS OF BATS AT ACADIA NATIONAL PARK, MAINE

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Bats in northeastern North America face anthropogenic challenges such as heavy metal contamination, habitat loss and degradation, white-nose syndrome, and wind power development. Little information is known about the natural history and coastal usage patterns of bat species in Maine, facilitating the need for baseline natural history data for these species. We used several methods—banding, acoustic recording, and stable isotope sampling—to better understand spatial and temporal bat activity along the coast of Maine and monitor variance in the population at Acadia National Park. In 2009 and 2010, we captured and banded 909 bats, sampled 256 for stable isotopes, and recaptured 10. We also passively recorded echolocation calls in 2010 from April 4th to September 30th at two distinct high activity sites. Though stable isotope and acoustic recording data have not yet been analyzed, capture data reveal a substantial population of little brown (*Myotis lucifigus*, n=533), northern long-eared (*Myotis septentrionalis*, n=244), and eastern small-footed (*Myotis leibii*, n=122) bats at this coastal refuge. Temporally, little brown and eastern small-footed bats shared an inverse relationship: *Myotis leibii* dominated captures in April, May and September whereas *Myotis lucifigus* dominated in June, July and August. *Myotis septentrionalis* maintained stable representation during capture efforts from April through September. Our data provides a natural history baseline for a population of bats at one geographic location, indicating further need for quantitative studies on specific issues in similar bat populations. Acadia National Park may be at the convergence of many age-old coastal movements and migrations, thus a stronghold for these *Myotine* species—which have all recently been petitioned for listing under the Endangered Species Act.

FIRST-YEAR RESPONSES OF FOREST BATS AND THEIR ARTHROPOD PREY TO PRESCRIBED FIRE DURING THE SWARMING PERIOD AT MAMMOTH CAVE NATIONAL PARK

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Prescribed fires in the mixed-oak forests of ea stern North America are hypothesized to have positive effects on foraging and roosting habitat that may outweigh the risks to forest bats from smoke and heat exposures during fires. Our ongoing project focuses on testing hypotheses about the relationships between effects of fire on insect prey availability and canopy structure and the relationship to selection of foraging areas by bats during the swarming and staging periods at Mammoth Cave National Park. We monitored bat activity and insect occurrence concurrently in paired burned and unburned land parcels from August- October 2010. Burns were implemented the previous April. Acoustic surveys (Anabat II) over 53 nights demonstrate higher bat activity (echolocation pulses / night) in unburned land parcels ($P < 0.05$). Insect surveys using blacklight traps on 9 nights suggest varied responses to prescribed fire across common prey taxa. Though no differences were detected for coleopteran or dipteran abundance ($P > 0.05$), lepidopteran abundance was greater in unburned parcels ($P < 0.05$). We also considered variation of predator and prey due to survey period. Bat activity declined as the season progressed ($P < 0.05$). Abundance of Coleoptera, Diptera, and Lepidoptera all declined as the season progressed ($P < 0.05$). These first-year data suggest consistent responses for predator and prey as the dormant season approaches. We will continue to provide a stronger scientific basis for fire management as we build a more robust data set that spans a wider window of time post-burn.

AVOIDING AND MINIMIZING IMPACTS TO STATE-LISTED MAMMALS FROM WIND ENERGY DEVELOPMENT IN PENNSYLVANIA

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The Pennsylvania Game Commission, under its jurisdiction from Title 34 (Game and Wildlife Code), has the authority to manage and preserve wildlife in the Commonwealth. The Pennsylvania Alternative Energy Portfolio Standards Act, signed in 2004, requires that 18% of electricity sold to retail customers come from renewable energy sources within 15 years. The wind power industry has competed for a substantial portion of Pennsylvania's alternative energy market. To further understand, avoid, and minimize potential impacts to wildlife and its habitat from wind energy development, the Game Commission worked collaboratively with the wind industry to develop a Voluntary Wind Energy Cooperative Agreement (Cooperative Agreement) in 2007. Survey data gathered through the Cooperative Agreement is coupled with the state's natural heritage data and best available science-based knowledge to protect Pennsylvania's mammals from potential threats posed by wind energy development. Of utmost concern are those Pennsylvania mammal species that have already been listed as endangered or threatened in Pennsylvania, such as the Indiana bat (*Myotis sodalis*, state and federally endangered), eastern small-footed bat (*Myotis leibii*, state threatened), Allegheny woodrat (*Neotoma magister*, state threatened), and northern flying squirrel (*Glaucomys sabrinus*, state endangered). The cumulative impacts to bats from wind energy development and other threats, especially White Nose Syndrome, have elevated the Game Commission's concern for all Pennsylvania bat species. The Pennsylvania Game Commission has and continues to work with wind energy Cooperators to avoid and minimize impacts to these species to the greatest extent practicable. However, additional research on migratory tree bat population ecology, efficacy of bat deterrents at multiple wind sites, economic and ecological viability of curtailment at multiple wind sites, and effects of forest fragmentation on Allegheny woodrat and northern flying squirrel populations would greatly enhance our ability to protect imperiled species from wind energy development.

HEY YOU …TAKE THE DAMN PICTURES! WHY ADAQUATE WNS SURVAILANCE DEMANDS PHOTOGRAPHY

Alan C. Hicks, Carl J. Herzog, Ryan I. von Linden, Kathleen E. O'Connor. *New York State Department of Environmental Conservation. Albany, NY 12233*

Photography has always been the cornerstone of Indiana bat winter surveys in NY and has slowly gained recognition as the methodology of choice across the species' range. It creates a record that allows for detailed analyses that are not otherwise possible, and one that can be revisited for answering new questions. Photography provides the same strengths for WNS investigations but, regrettably, it has not yet been widely applied. To date, photographs of bats in hibernacula provided the earliest record of the disease in North America, a year before any other symptoms were recognized. It was the basis for suspecting Europe as a likely source (and a long time reservoir), and that these fungal infections did not occur in NY prior to the other symptoms of WNS. It provided the first clear evidence that the disease affects species differently, and that visible infections occur rapidly after exposure. The review of photographs has repeatedly proven to be far more accurate than on-site observers for counting bats and for detecting animals visibly infected with *Geomyces destructans* in hibernacula. It is generally quicker and requires less illumination than on-site inspections, thus potentially reducing stress to the animals. Measuring changes in overall numbers, in cluster sizes, or visible infection rates within colonies all are more accurate using photography. It offers the opportunity to track the status of marked individuals without handling, and to quantify the intensity and extent of visible infection on individuals by species, group size, micro habitat, time of year, or year of infection. The taking of photographs should be a standard part of all winter surveys regarding WNS.

SUMMER MIST-NETTING ON THE MONONGAHELA NATIONAL FOREST: A TOOL FOR ASSESSING BAT POPULATION RESPONSE TO BROAD-SCALE THREATS AND CONSERVATION/RECOVERY EFFORTS

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The Monongahela National Forest (MNF) in West Virginia has conducted summer bat mistnetting for 14 years, collecting annual demographic data for bat species across the Forest. This baseline database provides a unique and valuable tool for evaluating potential impacts to bat populations on the Forest and surrounding lands and for assessing the efficacy of conservation and recovery efforts for these species. In the face of White-Nose Syndrome (WNS), the need to continue this data collection, in conjunction with other monitoring efforts, is particularly important. Such data also help us to target management and conservation efforts across the Forest and will allow assessment of long-term population responses to such efforts. To date, over 10,000 individual bats of ten species have been captured as part of this monitoring effort, from 1997-2010, at approximately 400 sites across the forest. While the number and location of sites varies annually, the Forest has conducted consistent monitoring efforts at several long-term sites to allow for comparisons across years. Preliminary analyses of these long-term site data indicate decreases in capture rates for several species (including the little brown bat, *Myotis lucifigus*, and the northern myotis, *Myotis septentrionalis*) before and after 2008, though specific demographic parameters did not show obvious changes; WNS was first observed in WV caves in Pendleton County in the winter of 2008-09. However, if the disease continues to spread in the coming years, we anticipate seeing more dramatic shifts in data from that collected during pre-WNS monitoring.

COMMUNITY ECOLOGY OF BATS ON THE MATERNITY RANGE: A COMPARISON PRE- AND POST-WHITE NOSE SYNDROME

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Since the onset of white-nose syndrome, species of hibernating bats in the northeast have experienced massive die-offs. Much attention has been given to the declines witnessed in winter hibernacula, but little data has been available to document the impact on maternity colonies. From 2006-2010, maternity season mist netting was conducted at Great Swamp National Wildlife Refuge (Basking Ridge, NJ) as a part of thesis research examining roost selection of Indiana bats *(Myotis sodalis.)* Following USFWS guidelines, mist net surveys were conducted between May 15 and August 15 along potential flight corridors such as streams, roads and trails. Nets were checked at 10-15 minute intervals between 2100 and 0200; species, age, sex, reproductive status, weight, and forearm length was recorded and each bat received a uniquely numbered aluminum band. Bats were examined for external parasites, scarring, frostbite damage and other injuries in order to determine general health. Following the January 2009 onset of white-nose syndrome (WNS) in NJ, wing scores were also recorded. Lastly, transmitters placed on *M. sodalis* permitted the identification of roost trees at which emergence counts were conducted. A total of 1177 bats of 7 species were captured over 5 years. Peak emergence counts of 252, 164, 214, 97 and 60 showed a potential decline in *M. sodalis* colony size from 2006-2010 (respectively.) Few bats showed evidence of wing scarring, however, significant changes in both the bat population and in the proportion of reproductive females were evident following the onset of WNS ($p<0.0001$.) While expected, these results indicate that the impacts of WNS on maternity colonies may be difficult to detect in the absence of baseline information and without significant mist-netting efforts.

LOOKING AT POPULATION DECLINES OF CAVE BATS THROUGH SUMMER MIST NETTING

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Many studies have reported apparent losses of bats at winter hibernacula in the region affected by white-nose syndrome (WNS). Confidence that these apparent declines accurately represent regional population trends varies by species. Furthermore, the extent to which declines noted at hibernacula due to WNS result in changes in the abundance of bats on the surrounding summer landscape has not been well demonstrated. We examined the results of mist net surveys done in New York from 2003-2010 to see the extent to which observations of WNS impacts at hibernacula might be supported. Observed changes in catch-per-unit-effort for little brown bats (*Myotis lucifugus*) and northern bats (*Myotis septentrionalis*) agree with declines seen in winter survey data, i.e., losses of 90% and 99%, respectively. Mist net captures for big brown bats (*Eptesicus fuscus*) show no clear trend over the study period, also consistent with winter survey data.

INDIANA BAT ROOST TREE SELECTION IN THE SOUTHERN APPALACHIAN MOUNTAINS

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The Indiana bat (*Myotis sodalis*), a federally endangered species distributed throughout much of the eastern U.S., is now threatened by white-nose syndrome in the Northeast. A better understanding of roost ecology may facilitate conservation of healthy populations in the southern part of the species' range and could be critical to the overall survival of the species. In their core range in the Midwest, female Indiana bats typically roost in large dead hardwoods in riparian areas. However, data suggest that Indiana bat maternity colonies primarily use conifer snags in the southern Appalachians. From May–August 2008–2010, we measured characteristics of Indiana bat day roosts in southeastern TN and southwestern NC. We attached 0.32–0.42 g radio transmitters to 3 adult males and 31 adult females, and measured characteristics of trees (e.g., species, diameter, height, and bark) and 0.1 ha plots (e.g., tree counts and basal areas, and percent canopy closure estimate) for 48 day roosts and associated random trees. Roosts were mainly yellow (*Pinus* subgenus *Diploxylon)* or white (*P. strobus*) pine snags in mixed pine-hardwood stands. Roosts were taller, larger in diameter, and in a

lower state of decay than random trees. White pine roosts were typically larger in diameter and height than yellow pine roosts and tended to house more bats. There is a consistent pattern for Indiana bats to use tall low decay snags as roosts. Most yellow pine snags on the landscape are in advanced decay and recruitment is low. We may be witnessing a shift in which white pines become the dominant roost type used by Indiana bats in this region.

FIDELITY OF BATS TO FOREST SITES REVEALED FROM MIST-NETTING RECAPTURES

Roger W. Perry, *USDA Forest Service, Southern Research Station, P. O. Box 1270, Hot Springs, Arkansas 71902*

Although site fidelity to permanent roost structures by bats is generally known, long-term fidelity to areas such as foraging or drinking sites is unknown. Furthermore, mist-net recaptures of bats over multiple years are rarely reported. Therefore, I used recaptures of forest bats from 8 years of extensive mist netting in the same forested area of Arkansas to investigate long-term site fidelity. Among 1,717 banded individuals of eight species, five species were recaptured over spans ≥1 year, including eastern red bats (*Lasiurus borealis*), Seminole bats (*L. seminolus*), evening bats (*Nycticeius humeralis*), tri-colored bats (*Perimyotis subflavus*), and northern long-eared bats *Myotis septentrionalis*. I recaptured no hoary bats *L. cinereus*, silver-haired bats *Lasionycteris noctivagans*, or big brown bats *Eptesicus fuscus*. I recaptured some individuals multiple times over multiple years, and the maximum span over which a bat was captured was 1 year for Seminole bats, 2 years for tricolored bats, 3 years for evening bats, 4 years for eastern red bats, and 5 years for northern long-eared bats. My results indicate some eastern red bats, Seminole bats, tri-colored bats, evening bats, and northern long-eared bats either remain in the area year round or return to the same forested location each summer.

INDIANA BAT (*MYOTIS SODALIS*) MIST NET CAPTURE EFFICACY ON THE MONONGAHELA NATIONAL FOREST

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On the Monongahela National Forest (MNF) in West Virginia, the United States Forest Service (USFS) has conducted bat monitoring, focusing on endangered species, for over a decade. From the year 2000 to the present day, Sanders Environmental, Inc. has performed the annual summer mist-netting on the MNF. This dataset catalogs 11 years of mist-netting data from a single National Forest, providing a rare opportunity to examine, on a large, longterm scale, which netting tactics are most effective at catching bats, specifically, the federally endangered *Myotis sodalis*. During this study, 8960 bats of 10 species were captured. Of these, 33 individuals were *sodalis*. This poster will use two separate datasets (both taken from the 2000-2010 MNF data) to evaluate the efficacy of different netting techniques. First, all of the site setup and capture data will be used to examine the frequency and success of various netting tactics. Next, the data pertaining specifically to *sodalis* will be analyzed to determine which methods are most effective for sampling Indiana bats. Overall, this poster will demonstrate which nets (by length and height), configurations (the use of multiple nets as a single "set"), and placements (road vs. water way vs. forest, etc.) result in the most captures, and the best results.

THE IMPORTANCE OF HETEROGENEITY IN PROTECTED AREAS FOR BAT SPECIES

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Summer foraging requirements for bats, a taxa of conservation interest, are poorly understood, especially in areas that are highly fragmented, located in an urban/suburban matrix, or in critically endangered oak savanna habitats. To increase our understanding of these habitat requirements, we are collecting data on bat species assemblages and relative foraging activities for The Oak Openings Region of Northwest Ohio, which includes all three conditions. As urban parks become refugia for species it is important to understand the critical characteristics to species persistence within these areas. Therefore, we conducted a fine scale survey of bat activity in two protected areas within the Oak Openings Region. Established methods of echolocation monitoring using an Anabat monitor were employed from June-September of 2009 and 2010. Data at the microhabitat, local, and landscape scale were also collected. Specific species composition included *Myotis* spp, *Perimyotis subflavus*, *Eptesicus fuscus, Lasionycteris moctivagans, Lasiurus borealis, L. cinereus*, and *Nycticeius humeralis*. The presence of *Eptesicus fuscus, Myotis lucifugus* and *Lasiurus borealis* was also confirmed with mist netting. Preliminary results of acoustic data indicate that microhabitat characteristics were more critical to relative activity than composition at the local or landscape level, and that within park heterogeneity was important to maintain species diversity. Acoustic surveys of oak savanna and oak woodland also highlighted the importance for habitat heterogeneity as these areas are widely and differentially used. The findings of this research will increase our ecological knowledge and aid management of the region in promoting biodiversity.

DESIGNING AND ASSESSING AN OUTREACH CAMPAIGN TO REDUCE THE HUMAN-MEDIATED TRANSMISSION OF WHITE NOSE SYNDROME (WNS)

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White Nose Syndrome (WNS), a fungal disease affecting bats and first noted in the U.S. in 2006, has resulted in mass mortality of cave-dwelling bats in North America and is continuing to spread across the continent. Although WNS has not been documented in Iowa, the fungus

has been found as close as northern Missouri. We are working with the Iowa Department of Natural Resources (IDNR) to develop an outreach campaign to help reduce human-mediated transmission of WNS. We are targeting three stakeholder groups because of their occupational exposure to bats: Iowa Department of Public Health employees, Veterinarians and Wildlife Rehabilitators, and Nuisance

Control Operators. Our main objectives are to: 1) assess current beliefs, attitudes and behaviors of stakeholders toward bats and WNS, 2) inform stakeholders and other segments of the public about WNS and any actions they should take involving infected bats, and 3) assess beliefs, attitudes and behaviors of stakeholders after implementing an outreach campaign. To date, we have designed Web pages with content for the IDNR Website about bats and WNS aimed at our specific audiences, and have administered a pre-intervention questionnaire. Upon questionnaire completion, individuals will be sent a brochure which includes information on Iowa's bats and WNS and the URL for our newly launched WNS Web pages. We will present the results of our pre-intervention questionnaire, Web pages development and content, brochure development and content and an educational presentation that we have developed for use by naturalists and other educators. A post-intervention questionnaire will be administered in spring 2011 and used to assess the campaign. Our results can be used to assist Iowa and other states in developing persuasive and comprehensive outreach campaigns aimed at reducing any human-mediated spread of WNS and heightening awareness of the threat WNS poses to North America's cave-dwelling bats.

INDIANA BAT (*MYOTIS SODALIS*) HOME RANGE SIZE IN FRAGMENTED HABITAT DOMINTATED BY AGRICULTURE

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While it is known that Indiana bats occupy distinct home ranges, few studies have estimated home range size (Garner and Gardner 1992, USFWS 2007). Understanding home range size is important for both impact assessment and conservation. To address this knowledge gap, we present home range estimates for three lactating female Indiana bats that utilized maternity roosts in a rural area dominated by agriculture in central Ohio. Telemetry data were collected for each bat from10 July through 21 July, 2008. Point locations were determined using simultaneous triangulation from at least two separate telemetry stations. Points were recorded every five minutes from approximately dusk until 02:00. Data errors and outliers were discarded from analysis, and the resultant points were run through "Outlier Removal" tool using ArcView 3.3 (ESRI 2002) and the Animal Movement extension (Hooge and Eichenlaub 2000), resulting in a 95% minimum convex polygon describing the approximate home range utilized by each bat during the study period. The mean number of points used to calculate home range was 180 (range=142-232). Mean home range size for Indiana bats tracked during this study was 381.5 ha (range=812.2-157.6 ha). Results from this study are generally consistent with previous findings, however, observed distances from roost trees to the furthest point within the observed home ranges tended to fall toward the upper end of the range of distances cited in existing literature. Based upon overlap of some home ranges and use of at least one roost tree by multiple transmittered bats, it appears likely that the Indiana bats tracked during this study are part of a single large colony.

EVALUATING THE EFFECTIVENESS OF MOBILE ACOUSTIC TRANSECTS CONDUCTED ON ROADS AND RIVERS

Michael Whitby, Scott Bergeson, Dr. Timothy Carter. *Department of Biology, Ball State University, Muncie IN 47306.*

Understanding population status and trends of any species is essential to conservation and management of that animal. However, landscape level population status of many bat species is not well understood. Recent threats (e.g. White-nose Syndrome and wind energy development) to the bat population have exacerbated the need to better understand the status of bat populations and provide baseline information to monitor population trends. Monitoring bat populations has always been a challenge for researchers. In an effort to resolve this issue, especially with emerging threats, a national mobile acoustic monitoring protocol was developed to monitor summer bat populations. Monitoring transects were established along roadways by many state and federal agencies; however, when conducted on the Shawnee National Forest, Illinois, this protocol was unable to detect species known from a decade of mist netting records to be abundant along the transect. Since many bats are known to occur near or along river corridors, mobile transects conducted from boats may provide a more accurate picture of the bat community on a landscape. Three mobile acoustic transects along roadways were established in 2009 at the Shawnee National Forest following the national mobile acoustic monitoring program developed by Britzke and Herzog. In 2010 mobile transects along nearby rivers were also conducted. This study compares bat activity and diversity detected along those rivers and roads to determine the most effective method at gathering population data. While data has not yet been analyzed, simple number of files recorded indicates that mobile transect on rivers gather 2.5 more files than those on roadways. Results will help managers choose the appropriate technique to monitor summer bat populations.

FORAGING RESOURCE SELECTION OF AN INDIANA BAT MATERNITY COLONY IN NORTHEASTERN MISSOURI

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Foraging studies focused on Indiana bats during summer have documented the high variability between individuals within and between colonies. However, no study has looked at difference in resource selection between reproductive groups within the same maternity colony. Bats display high site fidelity; therefore, to fully understand the impacts of land management practices, long-term monitoring of specific colonies will provide more information compared to monitoring many colonies throughout the species range. Our study took place in the summers of 2008 – 2010 at Charles Heath Memorial Conservation Area owned by the Missouri Department of Conservation in Clark County, Missouri. We asked questions which sought to understand how foraging resources where selected within an Indiana bat maternity colony (*Myotis sodalis*). We also wanted to determine if there were differences in resource selection based on reproductive condition (i.e., pregnancy, lactation, and post-lactation). We used radio telemetry to monitor

individuals throughout the night and triangulated foraging locations using GTM3. We evaluated *a priori* hypotheses using an objective model selection criterion for small sample size (Akaike's Information Criteria, AICc) to rank the candidate models in terms of their ability to explain the empirical data for each individual bat. We used individual Indiana bat point data along with the random points that we generated and input both into Proc MDC (Multinomial Discrete Choice; SAS 9.1) to determine resource selection. The overall goal of our study was first to provide for a more complete understanding of resource needs during summer allowing for management decisions to be based on more aspects of habitat needs of this species. Secondly provide information that will aide in reducing the population loss of Indiana bats in Missouri. In the preliminary results, we have found that there does seem to be a difference in resources selected between reproductive groups.

ASSESSMENT OF MERCURY CONTAMINATION IN BATS AT THE GREAT DISMAL SWAMP NWR, VIRGINIA

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In order to assess the potential impacts and injury to invertivore mammals at the Great Dismal Swamp National Wildlife Refuge (GDSNWR), we initiated an investigation to determine Mercury (Hg) concentrations and potential effects on the local bat community. Results will be used to expand knowledge of biota impacted by atmospheric deposition of Hg, as most studies focus on the piscivorous food chain and not the insectivorous food chain. GDSNWR is critical to evaluate because Hg may be more bioavailable than at other habitat types due to the unique conditions of the wetland environment (low dissolved oxygen and low pH). The study area encompasses the 112,000 acre GDSNWR. The refuge is in both Virginia and North Carolina. All sampling locations are within the cities of Suffolk and Chesapeake, Virginia. Bats were captured from 2007 to 2009. A total of 218 bats, representing 8 species, were captured from six locations in the GDSNWR. Fur was taken from 188 bats consisting of 94 adults and 94 juveniles. Hg concentrations ranged from 1.1 to over 49.2 ppm. Big brown bats (*Eptesicus fuscus*) and evening bats (*Nycticeius humeralis*) had the highest Hg concentrations of all species sampled.

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Membership pending		

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Member	Affiliation	E-Mail
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BAT DATABASE

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Susan Loeb	Clemson University	sloeb@clemson.edu *or* sloeb@fs.fed.us
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Brian Carver		bcarver@fhu.edu

Items of Interest

Hello,

I thought you might be interested in these photos and story of a baby Red Bat. I go on a yearly bat survey in Southeast Missouri with my sister-in-law who works for the Forest Service. One day I received a phone call from someone I know about a bat and her four babies that this person rescued from her cat. The bat couldn't "take off" she says. I know a little about bats enough to know that they don't take off like birds. They have to leave from an elevated location even if it's just your hand raised in the air. This person had the bat for a night and day. I knew that if I didn't get her water and get her to a location free of cats she and her babies would most likely die. I took thick leather gloves, a shoe box with a soft hand towel in it, water and a clean water color paint brush. I researched how best to get the water in her and dipping a clean small paint brush into the water then putting it near her mouth seemed most credible.

When I got there she was hanging in an old birdcage with no bottom sitting on a concrete porch. I knew immediately it was a Red Bat given my experience with them at the bat surveys. There was a little boy observing the bat and what I was doing. I did my best to educate him on everything I knew about bats. I tried the water and it worked!! She slurped it up. One of the babies was on the side of the cage so I gently took it and gave it back to the Momma. I looked at her wings to make sure the cat had not damaged them. There were only three babies when I moved the Mom to the shoe box. I did not see the fourth but the lady that called said there positively were four to start with. I called my sister-in-law to ask where the best release location was for this kind of bat. Deciduous trees she said is where they live. So I brought her back to my property in the country with water close, trees and plenty of bugs. I placed the Momma Red bat along with her clinging babies onto an Oak tree a little bit away from my house. While she climbed up the tree there was a little twig that caught one of the babies tail membrane and caused it to be detached from its Mom.
I hoped she would come back for it. The babies were grabbing onto her everywhere making it difficult for her to climb. She fell from a small height to the ground. I checked her and placed her back on the tree. This time she went right past the baby clinging to the tree. We were very sad.

(Photos by: Jennifer Perren)

The next morning the baby was in the same spot on the tree. I had hoped she would come back for it. There was some debate in my household leave it to nature to take care of it. i.e. let it die or try to find someone to come and get it. So I opted for number two. I wrapped a towel around my broom and gently coaxed to baby onto the towel. I called around and finally found Lee and Linda Branum in Birch Tree, MO Licensed Wildlife Rehabilitators who came and got the baby. I received a phone call six days after I had received the Mom and babies that said they thought the baby was doing well but it died that morning. My three girls were with me on this journey and they got one heck of an education from this experience.

Sincerely,

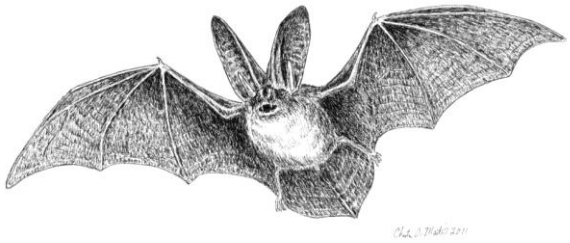
Jennifer Perren - Fairdealing, MO
P.S. I DO love bats!! :)

Spring Salamander Observed Eating A Carrion Tricolored Bat In A Cave In Wayne County, Ky.

In December of 2010, while conducting a hibernacula survey in a cave in Wayne County, KY, I looked down in the stream I was walking through and saw the tail and hind legs or a spring salamander (*Gyrinophilus porphyriticus*) protruding out from under a rock "ledge" in about one inch of water. The salamander's head and front legs were covered by the ledge and not visible. It appeared to be writhing and seemed to be pushing against something. Because I live at a mental age of about nine years old, my brain never got past wanting to catch the salamander, so rather than try to look under the ledge and figure out what it was doing, I stuck my finger under the ledge attempting to tease the animal out. I felt a small, wet, soft, furry mass that the salamander was pushing into at the back of the rock ledge. My attempt to tease the salamander out was successful, and I grabbed it and looked it over. After the salamander escaped and wriggled away I peered under the ledge. A dead tricolored bat (*Perimyotis subflavus*) was at the back of the ledge. Its body cavity was open. Apparently the salamander was pushing its head into the open gut of the dead bat to get the tasty innards. I pulled the bat out and although it looked recently deceased, my nose told me otherwise. It seems that spring salamanders have a taste for rotting bat.

Price Sewell
Biologist/Project Manager
Copperhead Environmental Consulting

UPCOMMING MEETINGS



23-25 February 2012
2012 SBDN AND COLLOQUIUM ON THE CONSERVATION OF MAMMALS IN SOUTHEASTERN US
Louisville, Mississippi

The 17th Annual Meeting of the Southeastern Bat Diversity Network, and 22nd Colloquium on Conservation Of Mammals in The Southeastern United States will be held at Lake Tiak O'Khata, Louisville, Mississippi.

FIRST CALL FOR ABSTRACTS!!

92nd Annual Meeting of the American Society of Mammalogists
June 22-26, 2012
Peppermill Resort Spa & Casino
2707 South Virginia Street
Reno, Nevada

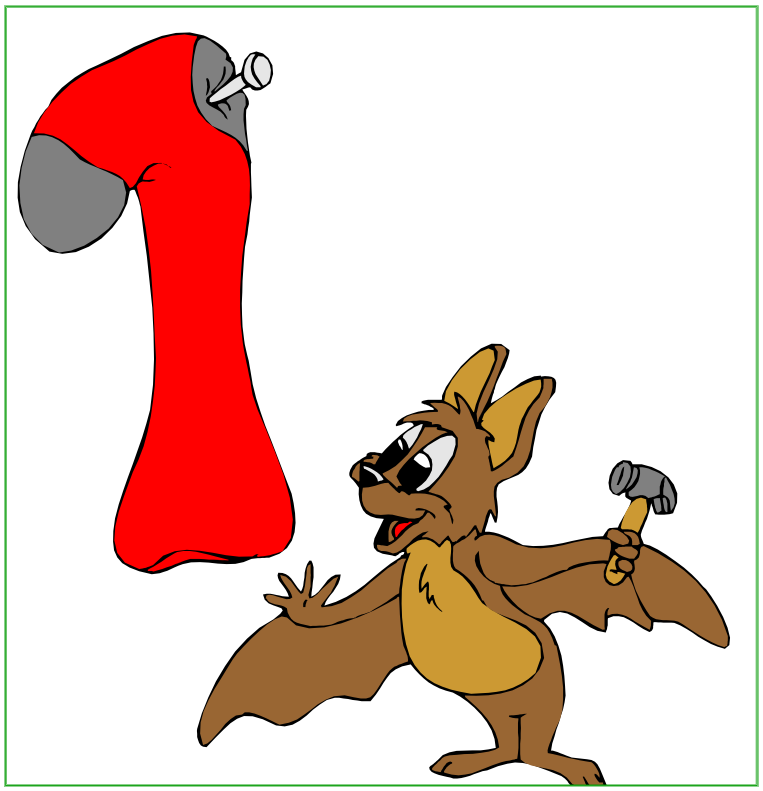
11th SBDN Bat Blitz
20-24 May 2012
Apalachicola National Forest, Florida.

42th North American Symposium of Bat Research
Annual meeting
Dates TBA
San Juan, Puerto Rico

19th Annual Conference of The Wildlife Society
Portland, Oregon
13-17 October 2012

You all did a great job!

I think we are really producing a very interesting newsletter!



Again, this year, a very special

"Thank You!!"

to all of you who sent in items, you truly made this issue a real success.

Send all your interesting bits to J.D. Wilhide (jd_wilhide@cmli.net)

From all of us to all of you:

Merry Christmas and a Happy New Year!!!