

BCI Bat Conservation and Management Workshop – Barree, Pennsylvania

August 10 – August 15, 1999 (One 6-day, 5-night session)



The rolling hills and mixed agricultural fields in Central Pennsylvania gives us a perfect opportunity to see how bats and humans can coexist without conflict. Perhaps millions of little brown myotis call this area home, yet few of them are surviving in natural roosts, opting instead for man-made structures such as buildings, barns, attics, and old churches where they live and rear their young. Nearby mines and caves also provide ideal hibernation sites, critical for these and five other species of bats. We will visit both summer and winter sites during this time when colonies are beginning to break up and are on the move. Dawn returns at maternity roosts are spectacular as are the evening swarms outside area hibernacula. Coupled with netting activities

to intercept migrating tree bats, we can expect to catch up to 8 different bat species during this event.

DISCOVERING OUR NOCTURNAL NEIGHBORS

Our 1999 Bat Conservation and Management workshop in central Pennsylvania began with what is becoming our annual pilgrimage to the Juniata Valley High School. Here we learn about how tireless wildlife biologist, Cal Butchkoski with the Pennsylvania Game Commission has solved a significant nuisance problem involving a colony of thousands of little brown myotis (*Myotis lucifugus*).



Once residents of the auditorium attic, the bats are now taking up occupancy in the custom-made bat boxes, generously installed by Cal and his crack team of wildlife interns. Now the nightly emergence of bats is a watchable wildlife spectacle which gave our workshop participants an immediate exposure to and appreciation of these mysterious masters of our night skies. We gathered beneath the boxes and were delighted when the bats flitted overhead and in between us as we gawked with amazement. The gathering dusk was punctuated by the clicks and ticks of a diversity of bat detectors deployed to interpret the bats' high frequency traffic sounds as they darted off to the river to feed.



Later, we too darted off to the river, lugging our laptops and Anabat equipment so we could eavesdrop once again upon the high-frequency signals produced by the bats. This time we captured typical calls from feeding behavior and compared them to the earlier calls we saved of their emergence behavior.

Our most significant accomplishment was to balance thousands of dollars of sophisticated electronic equipment at river's edge without tipping ourselves (or our equipment) into the water. It is hard to say whether participants were more interested with the recording process or the prospect of ensuing chaos when laptops, bat detectors, and/or instructors might at any time plummet technology-first into the Little Juniata.

As laptop batteries folded for the night, we packed up and returned to the lodge for our only opportunity for an early bedtime before the netting and trapping begins in earnest tomorrow.

MR. RED BAT'S NEIGHBORHOOD

When we think of bats and bat habitat, caves immediately spring to mind. But, as our participants learned today, not all bats live in caves, and some species hardly ever enter caves at all. A trip into the field proved this point rather nicely.

By day we visited a nearby forest habitat and looked for bats behind tree bark, in hollows, under picnic shelters, in an old abandoned chimney, and amongst the vegetation of deciduous trees. (Picnic shelters and other similar structures are popular roosts for many species of bats in the Eastern U.S. Because many people don't like to picnic under a rain of bat guano, and because these structures are difficult to seal against bats, this presents interesting management problems to park staff across the region.) We also discussed the foraging needs for bats and located several water sources near appropriate roosts that would serve as both drinking and foraging sites.



One of our visits to some old abandoned sleeping porches at a former Girl Scout camp brought us face to face with three different species of Pennsylvania bats. Here Cal Butchkoski wrangles a big brown bat (*Eptesicus fuscus*) for our participants. Also in attendance were a little brown myotis (*Myotis lucifugus*) and a northern long-eared myotis (*Myotis septentrionalis*). These latter two species are easily confused and we were able to highlight the distinguishing characteristics side-by-side and under daylight conditions which participants found to be especially helpful.



After learning about habitats and likely places to encounter bats, we returned to the lodge lawn to practice setting mist nets and the mighty Ausbat Harp Trap. People were so impressed with the harp trap that they stuck around to help us re-string several strands which were loose and/or broken during last month's Pacific Northwest workshop.

Tonight, the Mighty Ausbat once again proved its worth by out-catching all other net-sets combined; leading the "competition" in both numbers of individuals and numbers of species. We trapped eight individuals of four species including the northern long-eared myotis, little brown myotis, red bat (*Lasiurus*

borealis), and the uncommon, eastern small-footed myotis (*Myotis leibii*). The other 10 nets caught only six individuals of three species; big brown bats, little brown bats, and red bats. The thickly furred and colorful red bats soon became favorites amongst our participants, and once the bats relaxed and closed their mouths, many posed beautifully for Kodak moments.

We weighed and measured our bats, practicing our species identification techniques, and recorded other pertinent data before letting the bats go and watching them dart off to resume their nighttime travels.



OF BATS AND MINES, BEAVERS, AND METEORS

Our destination for today's discoveries is the old abandoned limestone mine at Canoe Creek State Park. Sometime after the mine ceased operations in the early 1900s, bats moved in. For years, three huge entrance tunnels, designed to remove limestone via a stone-car railway, had enticed would-be explorers and posed a potential hazard. The park decided in 1978 to close the mine permanently by backfilling the entrances; what they didn't know was that the site was the winter home to a small number of Indiana bats (*Myotis sodalis*), a species that had been declared endangered only two years before. In 1985, the Pennsylvania Game Commission formally declared the mine site a protected area for Indiana bats, and three years later the entrances were fitted with specially designed bat gates.

Here, Dave Young, Environmental Education Specialist for the Pennsylvania Bureau of State Parks explains to our rainbow-colored hard-hat-clad group how the partial backfilling and new gates changed the internal temperatures of the mine. The temperatures rose slightly, enough to attract not only the Indiana bats, but also little brown bats (*Myotis lucifugus*), eastern pipistrelles (*Pipistrellus subflavus*), big brown bats (*Eptesicus fuscus*), small-footed myotis (*M. leibii*), and northern myotis (*M. septentrionalis*). Little brown bats are the most abundant. Today, the mine shelters Pennsylvania's largest known bat hibernating population. At last count, from the censuses conducted once every other winter, there were nearly 15,000 bats present.



Our group is fortunate to be allowed into this mine, and we enter through the same door in the gate used by biologists during their quasi-annual winter survey. Many different styles of entry are exhibited, including the grab-onto-the-guano-encrusted-gate-bars-and-trapeze-thru-style shown here.

In the mine, temperatures of 40-degrees F are measured. These super-cooled temperatures are critical for bats that will enter hibernation in the next several weeks. It is crucial for the bats to find cold, stable temperatures as soon as possible each fall so they can lower their metabolisms immediately and enter into an efficient

fat-burning process that can last until spring when their insect prey is once again available. The cold temperatures were too cold for our participants though, and they emerged back through the gate within an hour of their entry, thawing out in the near 80-degree temperatures of a typical central Pennsylvania summer.

The proximity of the mine to summer foraging and roosting habitat benefits many bat species in the area. Just a little over a mile away (as the bat flies), are the PA State Game Lands #166. Here, the American Beaver (*Castor canadensis*) exhibits its ecological value as a niche-maker. Our largest rodent, though often despised by farmers and foresters, is a great friend of wildlife, including bats. The dam-building activities of these shy animals transform wooded valley habitats into open ponds. When water covers the bases of trees, oxygen is prevented from reaching roots and kills trees within a few years. The resulting "snags" provide homes for many cavity-nesting birds and bats alike. The water resources provide habitat for various plants and



insects and other animals like ducks, geese, shore birds, fish, reptiles, and amphibians. Otters, raccoons, herons, ospreys, hawks, owls, bats and other predators are attracted by the rich variety of life and food. We've come here tonight to see just how many different bat species we can encounter.

Cal has been busy since last year's workshop and he's perfected a spiffy canopy net that is sure to increase our chances of intercepting the high-flying bats often frequenting the beaver pond meadow. His canopy net is certainly an engineering marvel and thing of beauty. Extendable poles can hoist a stack of three mist-nets up to 30-feet in the air. We can't wait to try it out on the local population of beaver pond bats.

As dusk falls, anticipation builds. Not only are we lying in wait for the bats, but this evening marks the height of the Perseid Meteor Shower, and our netting site in the wide open meadow provides a perfect shooting-star viewing opportunity. Participants also claim that their perch directly below the canopy net will allow them to bat watch and star gaze with equal efficiency. (Research should always be this commodious.)

Our efforts are soon rewarded as bats simultaneously bang into our cleverly deployed nets. Near the forest trail, Roger Harrod wrangles a big brown bat, and at the canopy net we are rewarded with the evening's first red bat (*Lasiurus borealis*).

Besides being the engineering genius behind the prolific canopy net, Cal has turned in to a wild, crazy Anabattling, fool this year and spends most of the evening with his laptop hooked up to his truck battery, scanning the skies for echolocation calls made by the area bats. Tonight there's been an almost constant rain of high-frequency calls over our little area, indicating just what a fabulous habitat the old beaver have managed to create. (We eventually manage to drag Cal away from his high-tech toys before he drains the last electrons out of his battery and strands himself with the beaver for the night. The buddy-system is always encouraged while mist-netting at a BCI workshop.)

EL TOUR DE HOUSE BATS AND BAT HOUSES

Artificial roosts for bats are very important in helping replace some of the rapidly disappearing natural roosts throughout North America, and as our discoveries this week show us, nowhere is this more apparent than in the Northeast where large-scale logging and increasing urbanization have taken their toll on natural tree roosts across the region. Bat houses that are properly designed and placed now achieve occupancy rates of over 80%. Much of the research into bat house design and placement has been pioneered right here in Central Pennsylvania. We are fortunate to have expert bat house design professionals at our disposal during the workshop, and today, John Chenger regales us with details about bat house design and construction. He constructs BCI Bat Approved bat houses and maintains an excellent fact-filled website about all things bat-management-wise in PA and beyond: www.batmanagement.com.

Our participants learn that bat houses should be assembled using screws and not nails. This is not because it gives us an excuse to drag out the nifty power tools, but it allows for a more sturdy construction. Screws will not pull out as wood weathers and warps. But nails will. Bat houses that are nailed together will often develop undesirable air-gaps that prevent bats from trapping their body heat up at the top of the house for the warm, incubator-like conditions required by maternity colonies.

For the same reason, caulk is an important construction component. For these houses we use industrial-strength roofing cement to fill in any remaining air gaps or imperfections in the wood that may lead to a drafty attic. Jessica Morrow interprets the "use lots of caulk" instructions as an opportunity to get creative with the caulking gun. She has produced a modern-art mural



with her roofing cement depicting a scene representing diverse bat habitat. It will be a shame to cover this creativity with the roofing paper, but at least it will be securely attached.



After building bat houses, we go out into the field to look at some placement options and other experimental designs that have proven to be successful. The Shavers Creek Environmental Center (affiliated with Penn State University) is the Mecca of bat house experimentation. Here, every design from little shoe-box sized retail store creations to the new-fangled Mayberry PVC design are installed on the back of the "bald eagle enclosure." Our participants can assess the relative design merits by recording occupancy levels in each of the different houses.

Bat houses can also be successfully installed on poles. We visit a house erected in a state-created artificial wetland that

was designed by Ducks Unlimited and the US Fish and Wildlife Service as a conservation easement for the sympathetic landowners. In addition to bats, the wetland supports a diversity of plant and animal life including the much maligned but ecologically important beaver.

This house contains about 100 little brown bats (*Myotis lucifugus*), which snuggle up in between the partitions like little chocolates. (Do chocolates "snuggle?") Each bat can eat about 1200 insects in just one hour, and studies have shown that just by broadcasting bat echolocation calls over test plots of corn, the damage caused by insect pests is reduced by 50%! This is because a number of moths, including cutworms, army worms, and cotton bollworms are sensitive to bat echolocation calls and can detect them from over 125 feet away. The insects will turn away or dive to the ground upon hearing these high-intensity, high-frequency calls. With this reputation, bats make ideal neighbors for wetland-creating farmers.



As our bat house tour ended and we turned for home to make preparations for the evening's netting activities, we were greeted with increasingly dark and gloomy skies. Thunderstorms were forecast, but we crossed our fingers that the wicked weather would wend its way away from our immediate area. All optimism was dashed however, when halfway through dinner, the heavens opened forth with a re-enactment of the Johnstown Flood. Lightening flashed, winds howled, and the rain pounded down in dousing, impenetrable sheets. With the area under a severe drought all summer, it was ironic that water should gush forth during one of the four nights BCI chose to mist-net. We figured that the deluge would be short lived, and as soon as the pounding precipitation subsided a bit, we slogged over hill and dale to our planned net site at Canoe Creek State Park. Our efforts were in vain however, and we had to turn back due to fallen trees and an second surge of severe weather. But this was not before half the group was soaked thru and had the pleasurable experience of slogging through a summer downpour (complete with too-close lightening punctuating the chaos) of a magnitude that is usually reserved for more tropical mist-netting efforts.

Many participants (and staff) took our rain-out as an opportunity to catch up on sleep. Others watched videos, bat videos of course, in the parlor.

GOING TO CHURCH WITH BATS

Today's wanderings bring us to a little country church with a congregation of bats. The church, just outside the entrance to Canoe Creek State Park, was turned over to the park as a separate unit in 1993. Long abandoned by people, the church attic has been occupied by about 10,000 little brown myotis



(*Myotis lucifugus*) for at least the past decade. Since being protected, and since bats continue lose barn and attic roosts in the vicinity, the colony has grown exponentially. Now close to 20,000 little brown myotis rear young here, making the church Pennsylvania's largest known maternity colony of bats. This is a very significant colony to protect in perpetuity because of its proximity to the abandoned limestone mine in which the bats can hibernate. Little brown myotis can spend the summer in the church attic rearing young, then travel no more than a mile (as the bat flies) to an ideal hibernation site in which to spend the winter. This helps to significantly reduce the bats' annual energy budgets and allows them to thrive.

Brave workshop participants climb the extension ladder to gain access to this roost so they can see what

the bats find so attractive about this old attic. Despite outside temperatures in the 70s on the day of our visit, temperatures at the apex of the roof were over 100F.

Cal Butchkoski (Pennsylvania Game Commission) has also installed additional "roosting baffles" so more bats can be accommodated in the attic. Barry Genzlinger checks out the bats that have sandwiched themselves between the large sheets of plywood making up the baffles.



Cal has used what we've learned from the roosting behaviors of the bats in the church attic to design a large scale bat house dubbed the "Pennsylvania Game Commission Bat Condo." Located just across the street from the church, the condo stands 10-feet off the ground and measures 8-foot square by 8-foot tall. It can accommodate thousands of bats and will serve as an important safety net in case the church should become damaged by weather or disaster, making it unsuitable for continued use by bats. Three other condos like this have been built in the area; two along the Susquehanna River and one in Ohio. Bat condos may become important bat management tools in the future.

Though cloudy skies prevailed today, our mist-netting efforts were not dampened by precipitation as they were last night. We remained dry and happy as we ventured to two unique "swarming sites" along the Juniata River. In the fall, bats congregate at cave and mine entrances and exhibit what biologists call "swarming" behavior. This may be a precursor to the fall mating season or may simply serve to acquaint young-of-the-year bats with the area hibernation sites. The exact reasons for the swarm are still unknown. Bats will swarm sites that are not used as hibernation sites, and bats like red bats (*Lasiurus borealis*) that don't hibernate in caves or mines, can also often be found participating in the swarm. So what's up with this?





Janet's favorite site is Huntingdon Rocks just outside the town of the same name. It is an impressive and imposing crag of cliff that juts out over the river and railroad tracks. The trail to the site is steep and rocky, but the view is tremendous, and usually the netting is excellent. The cleft in the cliff shown in this picture implies a cryptic entrance to a large cave system, but in reality, only 2-3 people can fit into the actual cavern at a time, and few bats are ever found roosting in the simple cave during summer or winter surveys.

Bats seem drawn to the site in the fall however, and beginning around 9:30pm, our single 18-foot net stretched about 30-feet back from the entrance is being peppered with bats. We spend the next two-and-a-half hours removing, identifying, and measuring our catch.

We've filled up 7 data sheets with 111 individuals, including 76 little brown myotis, 23 big brown bats (*Eptesicus fuscus*), 7 eastern pipistrelles (*Pipistrellus subflavus*), 3 red bats, and 2 northern long-eared myotis (*Myotis septentrionalis*). This more than makes up for the rain-out the night before, and gives participants ample experience with untangling bats from nets and species identification. As midnight approaches we climb off the cliff and trudge back to the vehicles, headlamps lighting our way. Some of us will tumble straight into bed, before the 4am wake-up call for our final bat activity of the week . . . the dawn return at the Church. (Others of us will stay up all night, seeing little need for such a short nap when there are bat netting and other life experiences to relive and re-tell amongst our new found colleagues.)

FINAL IMAGES FROM A BAT-FILLED WEEK

The barest hint of dawn found our sleepy group re-assembled amongst ancient tombstones in the graveyard behind Canoe Creek Church. Within moments, bats began to fill the skies, building to a whirling vortex of wing-flaps and silent squeaks. Over the next hour our group was delighted with the early morning acrobatics as the colony of church bats whirled, swirled, and looped their way back into their roost. A dawn return of little brown myotis is much different from the nightly emergence. At dusk the bats have one thing on their minds; to get out, get water, and start feeding. At dawn however, they seem to be more concerned about socialization, perhaps finding their kin or comparing notes on feeding success and foraging areas. Whatever the reason, the bats mill around the entrance to their roost long before making the final entry for the long day ahead where they will rest and regroup for another late fall foraging and swarming bout.



Speaking of "group" we'd like to acknowledge the fine assembly of people who participated in this workshop and helped to make our discoveries such a success. From left to right, pictured below are: Mark Kiser (Bat Conservation International, Texas), John Pilcicki (Vista Technologies, Virginia), Dave Carlini (Pennsylvania Game Commission), Cal Butchkoski (Pennsylvania Game Commission), Jessica Morrow (AD Marble and Co., Inc., Pennsylvania), Steve Joule (Department of Defense, Fort Drum, New York), Joan Donnelly (Artisan, Ontario CANADA), Barry Genzlinger (Bat House Builder, Vermont), Selena Kiser (Bat Conservation International, Texas), Pat Barbosa (Wildlife America, Inc., Pennsylvania), Ling-Ling Lee (National University, TAIWAN), John Cheek (Vista Technologies, Virginia), Cheryl Hough (Wilson College, Pennsylvania), Geoff Billington (Greena Ecological Consultancy, UNITED KINGDOM), and hidden behind Geoff is Blu Lambert (trying to anonymous from Connecticut), Roger Harrod (Burnet Park Zoo, New York) and Dorothy Barr (Burnet Park Zoo, New York).



Not pictured (because he helped to take the group picture for each of the participants pictured above) is Hal Korber, technology wizard with the Pennsylvania Game Commission and inventor of the soon to be patented Carlini-Korber Bat-Attracting Whip-Antenna Unit. A demonstration of which was given during our nite of beaver pond netting. By affixing a moth-like substitute made from duct-tape to the top of the antenna and waving it in front of our canopy net set, Hal purports to have attracted four of the evening's eight bats. On-lookers (when not gazing for meteors) confirm his talents. Being biologists of the highest caliber, I am sure we will begin a double-

blind, control study, whip-antenna acid test and publish our results in time for next year's field season.

Finally, special thanks to the staff, seasonal biologists, and everyone associated with the [Pennsylvania Game Commission](#) and to Dave Young from the [Pennsylvania Department of Natural Resources Bureau of State Parks](#), and everyone associated with [Canoe Creek State Park](#). Without these people and partners that continuously and consistently go above and beyond the call of duty on behalf of bat conservation and on behalf of the annual BCI field workshop, we would be unable to bring such memorable experiences and training opportunities to over 20-participants a year at this venue. This is an area of extraordinary bat habitat and a critical spot to highlight how bats and people can and should live in harmony with each benefiting from the association.

For more information about BCI's workshops, please contact Education and Workshops Coordinator, Kari Gaukler (workshops@batcon.org), 512-327-9721. Learn more about the workshops on BCI's website: www.batcon.org