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COVER PHOTO
Yellow-shouldered bats (Stylonycteris ledebouri) are important seed dispersers in the New World tropics. This one is approaching the fruit of Cecropia peltata, a fig family, known as a “pioneer” plant, one of the first to grow on cleared land in disturbed areas of the forest. Studies in both the Old and New World tropics show that, though birds also disperse seeds, there are mostly dropped beneath perches in existing forest, leaving bats as the primary source of new tree seeds in clearings. Yellow-shouldered bats are abundant members of a family known as leaf-nosed bats and are found in tropical areas throughout Latin America. © Merlin D. Tuttle, BCI / 717-3503
EARLY EXPEDITION LEADS TO LONG-TERM COLLABORATION

by John D. Mitchell and Scott A. Mori

In 1986, BCI Founder and President Merlin Tuttle presented a lecture at the American Museum of Natural History in New York City in which he highlighted the importance of fruit-eating bats to the dispersal of tropical seeds, including cashews. He captured our attention because, at that time, we were preparing a monograph of Anacardium, the genus to which cashews belong. We were so inspired by Tuttle’s explanation of the importance of bats that we invited him and former BCI Science Director Paul Robertson to join us on an expedition to central French Guiana in 1987.

Since 1976, we have been working on a plant inventory of central French Guiana as part of a New York Botanical Garden collaborative project with the Institut de Recherche pour le Développement in Cayenne. The goals of our “Fungal and Plant Diversity of Central French Guiana” project are threefold: to document the plants of central French Guiana, to understand relationships between plants and animals, and to apply what we learn to help conserve one of the last large tropical wilderness areas of the world.

As a result of our 1987 expedition with Tuttle and Robertson, we became convinced that bats and many tropical plants are inseparable. We thus embarked on a plan to document bat and plant interdependencies as a part of our project, forming partnerships with BCI and bat biologist Nancy Simmons and mammalogist Robert Voss, from the American Museum of Natural History.

Based on the work of Simmons and Voss, we know that central French Guiana harbors as many as 23 bat species that are obligate or predominant fruit eaters and 29 other species that are known or suspected opportunistic fruit eaters. In addition, eight bat species are obligate or predominant nectar consumers and 29 additional species are known or suspected of being opportunistic nectar consumers. Simmons and her research associates estimate that 102 species of bats occur in French Guiana, and have documented 54 species from central French

Top left: Short-tailed bat (Carollia perspicillata) perches while eating a Piper fruit. This bat is one of the most important seed dispersers of this genus of plants, which contains hundreds of species in the Neotropical region.

Above: Anacardium occidentale produces a small kidney-shaped fruit that contains the cashew nut. The family Anacardiaceae also includes other economically important species such as the mango (Mangifera indica L) and pistachio (Pistacia vera L). Co-author and BCI Trustee John Mitchell is an expert in Anacardium.
Guiana. They suggest, however, that there may be as many as 86 species of bats in our study area. Over 1,910 species of flowering plants comprise the known flora. Our goal is to document the ways in which this diverse assemblage of bats and plants interact in this relatively undisturbed lowland rain forest.

To accomplish our goal, we depend on students such as Heather Peckham, a Ph.D. candidate in the School of Forestry and Environmental Studies at Yale University. Peckham joined our project in 1999 and 2000 as part of her study of seed dispersal by bats. She describes her experiences in the following article. 🕊️

John Mitchell joined the Board of Trustees of BCI in 1987 and currently serves as vice-chairman. He is also honorary curator at the New York Botanical Garden.

Scott Mori, long-time BCI member, is Nathaniel Lord Britton Curator of Botany in the Institute of Systematic Botany at the New York Botanical Garden.

For more information about the bats and plants of central French Guiana, visit the New York Botanical Garden Web site: www.nybg.org/bsci/french_guiana/ under “Pollination Biology and Dispersal Biology.”
**STUDENT RESEARCH IN FRENCH GUIANA**

by Heather Peckham

Waiting patiently, I settle against the buttressed root of a large canopy tree in French Guiana. The world is black from my perspective in the middle of a 34,722-square-mile (90,000 km²) lowland rain forest. I can see the faint outlines of canopy trees towering more than 160 feet (50 m) overhead as I am lulled by the night symphony. Squeaking bats zip down the trails as they hunt for insects, fruits, and nectar, while howler monkeys bellow in the distance.

Two hours after dusk, I finally hear angry squeaks coming from the general direction of a net and race toward the noise. With my gloved left hand, I grasp the hind feet of the captured bat, using my right hand to gingerly work the threads off its tiny body. As I continue to untangle this one, more are attracted by its distress cries. I have to untangle them quickly before they begin to defecate, because I need the precious seeds from their droppings to document the plants they are visiting. I carefully drop each disentangled bat into a numbered white cloth bag and tie the top. By midnight, I am satisfied by the string of bobbing, noisy bags hung between two trees. Bats are flying everywhere and night-blooming, bat-pollinated flowers are open, emitting their heady scents. With the bagged bats hanging from my waist, I follow the narrow trail down the ridge, across the stream, and back to camp. My night is far from over, however, because it will take two more hours to identify and release all the bats. I finally collapse into my hammock in the wee morning hours.

I wanted to understand why closely related bat species vary in their ability to eat fruit from disturbed versus undisturbed habitats. When areas are deforested, some species proliferate whereas others in the same genus disappear. I was specifically examining the diets of two pairs of closely related species, *Carollia perspicillata* and *C. brevicauda* (short-tailed bats) and *Sturnira lili-um* and *S. tildae* (hairy-legged bats), in an attempt to understand this previously observed pattern. These four fruit-eating species are vital players in the regeneration of forests because they forage on plant species that are the first to grow in openings created by natural tree falls or human cutting. On severely degraded land, bat seed dispersal...
appears to be the most important source of the seeds needed to initiate forest regeneration.

Intrigued by my early findings, I applied for and received a student scholarship from BCI. As part of my thesis research, I wanted to determine bat diversity, abundance, and the dietary habits of small fruit-eating bats in undisturbed forest versus in an adjacent abandoned agricultural plot. I was especially interested in which bat species foraged in both habitats. I wanted to test the hypothesis that bats are particularly important to forest regeneration, because they transfer seeds from one stage to the next, increasing plant diversity throughout the succession process.

When BCI awarded me a second grant, which allowed me to return to French Guiana, I worked with another graduate student, Kisi Bohn, who had been previously funded by BCI for another project. Together, we spent our nights untangling monstrous beetles and wind-blown leaves and patiently untangling one bat after another. We worked hard into the daylight hours, collecting feces from bat bags, putting seeds in glassine envelopes for future identification of species, taking notes, and drying seed collections in the afternoon sun.

Through clues from fecal samples, it became evident that bats were carrying seeds back and forth between habitat types, not just contributing the new seeds essential to forest regeneration in clearings. Many plant species can survive only in the relatively hot, dry conditions found in forest openings, and their survival, as well as that of the bat species that feed on them, depends on continued openings, for example those created by storms or by human cutting. These plants are generally referred to as “pioneer” species. My study documents that even closely related bats may specialize on the fruits of pioneer over mature forest plants, but that both habitat types are essential to maintaining a complete fauna. In turn, a full complement of bat species is essential to long-term forest health. The pioneer plant specialists drop countless seeds from clearings as they return to roosts in large hollow trees deep within mature forests. This creates a “seed bank” that can lie dormant for many years, but that can germinate rapidly in response to damage that creates new openings.

Such discoveries emphasize the need to manage tropical forests in a manner that protects a balance of mature and disturbed areas, maximizing animal and plant diversity and ensuring the forest’s ability to recover from storms, floods, fires, and logging.

Heather Peckham is a Ph.D. student at Yale University in the School of Forestry and Environmental Studies. She will next investigate the role of frugivorous bats in reforestation of degraded areas in a dry tropical forest ecosystem of western Panama.

We admit it, there is so much we still don’t know about bats. Bats make up nearly 25 percent of the mammals on earth, but scientists still know relatively little about them. To efficiently learn more about bats, while simultaneously building a force to protect them in the future, we sponsor student scholars. Every year, these inexpensive and eager scientists-in-training add important data to the worldwide collection of bat knowledge.

Please help support this invaluable program by making a donation. Go to www.batcon.org or mail us a check. Thank you.
The Short-tailed Fruit Bat
*Carollia perspicillata*

by Theodore H. Fleming

Anyone who has ever set up a mist net in a lowland Neotropical forest is likely to have captured the short-tailed fruit bat (*Carollia perspicillata*), a member of the leaf-nosed bat family (Phyllostomidae). One of the most common mammals in the New World tropics, this bat ranges from Veracruz and Oaxaca, Mexico, to southern Bolivia, Paraguay, and Brazil, and is also present on the Caribbean islands of Trinidad, Tobago, and Grenada. Throughout its range, the short-tailed fruit bat plays an extremely important role in the dynamics of tropical forest ecosystems, feeding on the fruits and dispersing the seeds of a variety of early successional plant species, the pioneer plants that are the first to colonize disturbed areas.

Weighing about two-thirds of an ounce (about 22 grams), this bat lives in colonies of a few dozen to several hundred individuals in a wide variety of roosts, most commonly in caves or hollow trees. At sunset, the bats leave their day roosts and begin searching for ripe fruit within a mile or so (about 1.5 km) in the forest understory. Using a combination of olfactory and visual cues, these sharp-eyed bats pluck fruits from shrubs and trees and carry them to safe feeding perches—usually bower-like mats of vegetation that are safe from predators—to eat. After quickly consuming a fruit (and its seeds), each bat returns to the same group of plants to search for additional fruits. After about 15 minutes of feeding, the bat takes a nap while digesting its meal of fruit pulp. Each one repeats this basic feeding rhythm all night.

The bulk of the short-tailed fruit

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*Creating a Seed Atlas for French Guiana*

Although the species of bats dispersing seeds in tropical forests are relatively well known and can be identified with field guides, there are as yet no published guides for the identification of bat-dispersed seeds for any part of the world. To provide the tools needed for studying the impact of bat seed dispersal, BCI is partially funding development of the *Atlas of Seeds Dispersed by Bats in French Guiana*. French Guiana was chosen because of its rich flowering plant diversity and because nearly 95 percent of its tropical forests remain intact.

The atlas will include detailed descriptions and images of the seeds dispersed by bats, as well as keys for their identification, thus helping forest managers better understand the key roles of bats in New World tropical forests.

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Scott A. Mori, curator of botany at the New York Botanical Garden.
Throughout its range the short-tailed fruit bat plays an extremely important role in the dynamics of tropical forest ecosystems, feeding on the fruits and dispersing the seeds of a variety of pioneer plants, which are some of the first to colonize cleared areas.

Bat’s diet comes from fruits produced by shrubs. The most favored are those of the genus *Piper*, from the black pepper family, and such early successional trees as *Cecropia peltata* of the fig family. The number of seeds of fruits eaten in one night by a single bat may number as high as 60,000. Even if each bat averaged only 1,000 seeds nightly, just one colony of 400 would disperse 146 million seeds annually. If only one tenth of one percent of the seeds germinated, 146,000 new seedlings would result each year, helping replant the forest. If *Carollia* bats were to disappear from tropical ecosystems, rates of forest regeneration would likely slow dramatically.

Back in their day roosts, short-tailed fruit bats settle into well-defined social groups. Most males live separately from females in “bachelor” groups. Females live in small, harem-like groups of 10-20 individuals. Each harem contains one adult male, who defends his group against the intrusions of other males during the day. At night, “harem” males continue to defend their group’s roosting site while females and bachelor males are out feeding. They minimize the time away from their territories by feeding at plants near the roost.

The payoff to “harem” males for assiduously guarding their harems is nearly exclusive mating rights with the females in their groups. Mating occurs twice a year, and after a four-month gestation period, females give birth to a single baby, once in the spring and again in the summer. Females carry their babies with them while foraging for the first couple of weeks after birth. When the pups become too large to carry, they are left in the roost at night for the remainder of the six-week nursing period.

Mothers form very strong bonds with their young soon after birth, as I once learned in dramatic fashion. We were netting bats in Costa Rica when we caught a female carrying a newborn. Mother and pup accidentally became separated as we removed them from the net, and the mother escaped, only to return an hour later. I took the audibly vocalizing baby from my shirt pocket and placed it on the rough bark of a nearby tree. After a couple of aborted attempts, mom got her baby to reattach to her nipple before flying off into the night.

Once they are weaned, most young bats leave their natal roosts and have no further contact with their mothers. At this time, young females join mixed-age harems and young males join bachelor groups. Females reach sexual maturity within a year after birth and are often pregnant by their first birthday. Although they probably reach sexual maturity in their second year, males cannot reproduce until they can gain access to a harem, a process that can take several years.

Most short-tailed fruit bats live less than five years, during which time females are likely to replace themselves with at least one daughter. Some individuals live longer than this, but rarely for more than six years. [Predators such as snakes in their day roosts, owls, and even the false vampire bat (*Vampyrus spectrum*), take their toll on these common bats.] Given their relatively short life expectancies, young males are faced with a real dilemma. They need to live long enough to acquire a harem so that they can reproduce, but many males probably fail to do this, meaning that only a few end up being the fathers of most babies.

Survival of this species is essential to the health of Neotropical forests. With their help dispersing seeds across scraggly clear-cut land, forest growth can begin anew.

Theodore H. Fleming is a Professor of Biology at the University of Miami in Coral Gables, Florida. He has studied ecological interactions between fruit- and nectar-feeding bats and their food plants in tropical forests and the Sonoran Desert for more than 30 years.
Big adventure. That’s what my husband, Bruce, and I signed up for when we booked our trip along the Amazon with BCI and the New York Botanical Garden (NYBG). We weren’t members of either organization at the time, nor did we have a burning interest in bats or plants. The wild and scenic Amazon was the draw for us. Luckily, our guides were leading authorities on Neotropical birds, botany, and bats, and we’re enthusiastic about sharing their knowledge.

*Continued on next page...*
We met our team of experts upon arrival in Manaus, 1,000 miles (1,600 km) up the Amazon River. Over the next 10 days, Dr. Scott A. Mori and Carole Gracie from NYBG instructed our group on some of the 50,000 plant species in the Amazon Basin, emphasizing bat-pollinated and bat-dispersed plants. Dr. Mario Cohn-Haft, a 15-year resident of the area with a Ph.D. in Neotropical birds, led our birding adventures. On the bat front, Dr. Merlin Tuttle, BCI’s founder, was the Indiana Jones of the expedition. By day he regaled us with stories of his adventures, from wrestling anaconda to living with the Yanomami, the fiercest South American tribe. By night he led a team into the forest to net bats for our evening show and tell. Wilson Uieda, a South American bat expert, helped identify the catch.

Our adventure began as our affable boat captain, Mo, greeted us at the airport and shuttled us to our boats—the Harpy Eagle for the botanists and the Victoria Amazonica for us bat people. Our floating base was handcrafted with exquisite woodworking and, while compact, included a dining area, bar, mini-library, and staterooms with private baths. The best part about cruising with Mo was being with his big-hearted, hard-working, and ever-helpful crew. The women cheerfully served lavish Brazilian buffets for breakfast, lunch, and dinner while the men navigated outboard-motor boats taking us on shore explorations and sharing our joy when sighting tree boas, tarantulas, toucans, and other wild animals.

With all the available activities there was little time for sleep. The morning wakeup call at 5:30 or so each day varied from classical music to a shout of “There’s an anaconda on the boat!” (There really was. Ivan, Mo’s skillful snake handler, brought one on board for all to see.) The daily routine featured birding at sunrise and sunset, a plant ecology excursion, presentations by the experts, and the evening bat outing and exposure. We also swam and fished in piranha-infested waters (just try it) and lazied about in the red-hued waterfalls of tributaries.

On our first day, we visited a family along the river to learn how they processed manioc, the primary food source of subsistence river-edge people. The father showed us a bat he killed the night before that he believed was a vampire bat. Indeed, blood was found on the perch of their henhouse confirming the presence of a vampire bat. But the bat they killed was a silver-tipped bat (Myotis albscens), a beneficial species. Merlin explained to the family how just one such bat can catch up to 1,000 or more mosquito-sized insects in a single hour. At a slide show on the boat we learned how important other bats are as pollinators and seed dispersers.

Then, we netted Carolla bats carrying Piper fruits and learned how just one small colony of these relatively abundant bats can disperse enough seeds to plant 100,000 or more new tree seedlings each year.

So began my commitment to saving bats. In the afternoons that followed, my batting compadres and I joined Merlin and Steve Walker, BCI’s executive director, as they scouted prime locations to net bats for study and release. On our first outing we followed the muddy tracks of a capybara, the world’s largest rodent, and set up nets for bats in a flooded forest area. The next night we wended our way to a primary forest area at the end of a long tributary where our netting site
was like a scene from *Creature from the Black Lagoon* (and even included the recently shed skin of an approximately 15-foot-long [4.5 m] anaconda). Back on the boat, we were thrilled by stunning sunsets and starlit skies.

As we set up our mist nets each evening, it was hard to resist checking out the local wildlife. Mo’s son, Junior, always on the hunt for frogs, also found a Jesus Christ lizard, aptly named for its ability to run on water, and an inch-long (2 cm-long) lizard, the second smallest in the world. Other sightings included iridescent, blue-winged morpho butterflies mating and a huge but harmless monkey spider that fell on one of our participant’s shoulders.

After setting up the nets, we each monitored a section, gently keeping a hand on a main string to detect bats as they became trapped in the net’s pockets. Primordial calls of howler monkeys, toucans, and screaming macaws serenaded us as sunset gave way to the melodic night sounds of tree frogs and giant toads. Other nights the air resonated with the high-pitched chiming of Amazonian cicadas, which sounded like alien spacecraft coming in for a landing.

As we waited at our nets, Merlin sometimes whistled like a small frog to lure frog-eating bats, or mimicked katydids or cricket sounds by scraping a comb against a dried leaf to lure round-eared bats. Each time we felt a tug on the net, we’d check it with our headlamps. Sometimes it was just a pesky beetle, and once it was a tapir that panicked and destroyed our net! In a week, we netted 31 of the 100 species of bats in the Amazon Basin.

Spotlighting our way home each night we made even more animal sightings. The first night we watched a glorious light show—click beetles setting off in bright streaks like flying torches across the sky, spider eyes glowing all around us, and yellow caimans whose eyes shone like candles in the dark.

Back on the *Victoria Amazonica*, Merlin, Steve, and Wilson would showcase our catch. It was fascinating to learn about each bat’s adaptations, such as how vampire bats feed and how fishing bats use their huge feet, flattened toes, and sharp claws to catch fish. The paparazzi photographers on board worked to capture each bat’s endearing expression, while Merlin repeatedly demonstrated their gentleness. Once released, they’d never bite. In fact, they often paused to finish the fruit or sugar water we gave them before flying back to their forest.

In our 10 days, we got more than just big adventure. We came to understand many of the amazing interconnections between plants and animals along the Amazon, and certainly got hooked on bats! We now intend to help bats do their work by supporting BCI in its efforts to conserve them and their habitats around the world.

Laurie Lakin is a BCI member and former elementary school educator from New Jersey who "discovered" bats on BCI’s 2001 Founder’s Circle Trip to the Amazon. She is enthusiastically working with teachers to incorporate bats into environmental education programs.
Suddenly the bat detector emits a series of faint clicks. The clicks grow stronger, the repetition rate increases, and the series of clicks ends with a buzzing sound, “ZZHHHHHTTTT.” The bat just caught an insect! Hearing a bat for the first time is a fascinating experience, and a murmur goes through the workshop participants gathered around our bat detector.

Thanks to bat detectors, small electronic devices that make ultrasonic sounds audible to humans, we can “eavesdrop” on bats that use high-frequency sounds (echolocation calls) to maneuver and catch prey in the darkness. Using detectors, we can usually tell where the bat is and, often, what it is doing. We also gather clues that help us determine its identity. Each species makes unique calls identifiable by differences in frequency and rhythm. However, it is always a good idea to use all available information, including visual observations of flight style, when identifying bats with detectors. Complex bat calls may need to be further analyzed using special sound analysis programs on personal computers. Recent advances in technology have been instrumental in helping scientists identify new species that look very similar but make different sounds [BATS, Winter 2000]. Without a bat detector, this would have been extremely difficult.

There are a number of different methods for converting ultrasound into audible sound; therefore there are different types of bat detectors. The most common detector types are heterodyne, frequency division, and time expansion, each with advantages and disadvantages. A heterodyne bat detector converts a limited range of the full ultrasonic information into audible sounds. Just like a radio receiver, a tuning control is used to select the frequency. Relatively inexpensive yet sensitive, heterodyne detectors are able to detect bats at long distances. The sound from a heterodyne detector can have tonal qualities, which means that a call may sound like a “plip” or a “plop,” which helps determine the type of call. With a heterodyne detector, it is also possible to immediately determine the approximate frequency of the ultrasound. One disadvantage is that you will only be able to cover a limited range of frequencies for each setting of the tuning control. If there is a signal outside of this range, you will miss it.

In contrast to a heterodyne detector, a frequency division detector does not have to be tuned—it is a broadband type. It converts the entire ultrasonic range into a convenient, audible, frequency range. A frequency divi-
sion detector is less sensitive than a heterodyne detector, so the bats must be closer to the detector in order to be heard. The name “frequency division” stems from the fact that the frequency of the converted signal is a fixed fraction (e.g., one-tenth) of that of the original signal. There are subtypes of frequency division detectors: those that retain the amplitude, or range, of the original signal and those that do not.

Time expansion detectors also use a broadband technique, although the sensitivity of such detectors is higher than that of a frequency division detector, which records the signal, then plays it back at a slower speed (e.g., ten times slower). Time expansion bat detectors use digital memory rather than magnetic tape, but the principle is the same. This means that the signal you hear is actually the original (slowed down) signal. Using the original signal is particularly important if you intend to analyze the signal on a computer. In such cases, time-expanded signals are very useful. The fact that the signal is slowed makes it possible to hear the tiniest details of the sound, which are not audible with other conversion techniques. This helps when identifying the species. Because digital memories are limited in size, it is only possible to work with a small segment of the signal with this method. A storage time of a few seconds is common with time expansion detectors but this is usually sufficient to allow a detailed analysis in the field or on the computer. Many detectors offer more than one conversion option. For example, with stereo headphones it is possible to listen to a heterodyne signal with one ear and a time expansion signal with the other.

Although it is advisable to do as much of the species identification work as possible in the field, some species may require further analysis for a positive identification. The most

(above) A Daubenton’s myotis (Myotis daubentonii) emerges from its roost.

(inset) A typical Daubenton’s myotis call viewed in a sonogram produced by playing the call into the BatSound computer program. Graphs of amplitude (top graph) and frequency (bottom graph) help measure call characteristics. The Daubenton’s call sweeps down through a range of frequencies (from 64.1 to 38.8 kHz) similar to a trombone sweeping from a high note to a low one. Calls are fairly quiet, short, and the repetition rate is fast, like rapid gunfire.
common method is to use a cassette tape recorder to record the audible output of the bat detector, then analyze these signals in the laboratory. This is a compact and lightweight solution suitable for fieldwork. It is also possible to use a laptop computer for immediate analysis in the field. In either case, you must use a suitable sound analysis program. Such a program can analyze signals in a variety of ways. For instance, the signal can be displayed as a spectrogram (sonogram), in which the frequency of the signal is shown versus time. The spectrogram also contains information on the sound level, represented by different colors or shades of gray. An oscillogram shows amplitude variations versus time.

From the spectrogram and oscillogram, many call parameters can be extracted, such as maximum and minimum frequencies, the frequency at the energy peak of the signal, the signal duration, and the interval between pulses. These parameters can help in distinguishing different species. Some programs are able to extract these parameters automatically, while in others, it must be done manually. There are also a number of advanced capabilities, such as automatic recording systems for remote collection of bat calls and systems recording the original, ultrasonic signals, which are not covered here.

Bat detectors are important tools for researchers, but they can be fun and easy to use for any bat enthusiast. Inexpensive models are available through the BCI catalog. Every year, BCI’s Bat Conservation and Management Workshops provide participants with first-hand field experience and a chance to experience the nocturnal world of bats with their ears. For more information on bat detectors and workshops, visit the BCI website: www.batcon.org, or call 512-327-9721.

Lars Petterson lives in Sweden and owns Pettersson Elektronik, which sells a variety of bat detectors and BatSound acoustical software for analyzing echolocation calls. He is one of BCI’s 2001 Distinguished Service Award recipients and helped lead BCI’s BatSound-Acoustic Monitoring Workshop in Arizona in 2000. He is also an Assistant Professor in Electrical Engineering and Signal Processing at the University of Gävle, Sweden.

For more information on BatSound software, visit www.bahmbof.se/~pettersson/

For information about BCI’s upcoming Bat Echolocation System and Tutorial, scheduled for April 15-17, 2002, visit their website at www.batcon.org/batcon2002/index.html
It's okay to be a fly-by-night operation... 

...as long as it's every night

MAKE A BEQUEST to Bat Conservation International, and become a part of BCI’s Legacy Circle helping ensure the enjoyment and benefits of bats for generations to come.

TO FIND OUT MORE about the numerous ways you can create a lasting legacy, contact Denise Meikel, Development Director, at 512-327-9721, or email us at dmeikel@batcon.org.

Please cut or copy form below and mail to BCI

To find out more about making a planned gift to BCI, contact your financial planner or write to BCI to receive printed material at no obligation.

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Please send to: Bat Conservation International, P.O. Box 162603, Austin, TX 78716. Thank you for your interest and support!
North American Bat Conservation Partnership (NABCP)

- Co-sponsored the fifth Cave Gating Workshop held in June in conjunction with the USDA Fish and Wildlife Service, the American Cave Conservation Association, and the USDA Forest Service. The 14 participants included representatives from six state and federal agencies and cavers from West Virginia, South Dakota, Tennessee, and Missouri. In hands-on training sessions, the group gated the entrance to McDowell Cave in Lake of the Ozarks State Park in Missouri. As a rich archeological site, the cave was subject to frequent vandalism that also disturbed maternity roosts of resident endange red gray bats (Myotis grisescens).

Latin American Initiatives

- Conducted surveys at four important maternity caves on the Paraguana Peninsula in the state of Falcón, Venezuela, where human disturbance and resort development threaten approximately 200,000 lesser long-nosed bats (Leptonycteris curasoae). BCI is now working with the Venezuelan Association for the Conservation of Natural Areas, through BCI Scientific Advisor Dr. José Ochoa, to develop education programs in communities surrounding the caves, as well as management plans to protect each site.

- Co-sponsored two bat conservation workshops in Venezuela. Participants at the Neotropical bat workshop in Mérida City included 22 students and professionals from Venezuela, Colombia, Mexico, and Bolivia who learned about the value of Neotropical bats in ecosystems and how to identify bat species; they also cooperated to develop conservation priorities for the region. The second workshop, in the state of Bolivar, promoted conservation of bats in lowland rain forests, teaching 16 indigenous tribal leaders the value of bats to their communities along the Caura River, and helping them initiate bat education programs in local schools.

Bats & Mines Project

- Assisted Unimin Minerals Corporation and the Illinois Department of Natural Resources with installation of a second bat-compatible gate at Illinois’ Magazine Mine, a critical hibernation site for 15,000 to 20,000 Indiana bats—the state’s largest known Indiana bat (Myotis sodalis) colony. The first gate was installed in 1996, but the second entrance to the fragile silica sand mine required steel supports. The additional gate was installed in May, protecting not only Indiana bats but also little brown (Myotis lucifugus), big brown (Eptesicus fuscus), pipistrelle (Pipistrellus subflavus), and northern long-eared (Myotis septentrionalis) bats.

- Conducted the Idaho Mine Assessment for Bats Workshop in July, training 35 participants from the USDA Forest Service, the USDA Bureau of Land Management, the U.S. Army Corps of Engineers, and Idaho state agencies in survey techniques, mine safety, and bat-friendly gating methods.

- Gated Minnesota’s largest mine, Tower Soudan, in August, providing a permanent haven for thousands of little and big brown bats that hibernate there. The state now plans educational programs and will promote the mine as a “Watchable Wildlife” site for bat watching during fall swarming.

- Conducted a follow-up survey of Rose Guano Cave and Mine in Nevada in conjunction with Pete Bradly of the Nevada Department of Wildlife. The entrance was first gated in 1996 when approximately 70,000 bats were present. During the September survey, an estimated 75,500 emerged.
Bat House Research Project

- Distributed 50 copies of the *Building Homes for Bats* video to the University of California’s Davis Cooperative Extension for farmers participating in BCI’s study of bats in integrated pest management in California’s central valley. The project is being conducted in conjunction with the Organic Farming Research Foundation.

- Installed a “Bridge Lodge” beneath a bridge along Interstate 35 near Buda, Texas. Designed by Marvin Maberry, the lodge is a reliable, cost-effective bat house design for bridges. It provides roosting spaces for colonies of 3,000 to 5,000 bats. In addition, transportation departments in Pennsylvania and Florida are planning to test this new design.

- Created a training video for bat house installation in conjunction with the Wildlife Habitat Council and Enron while installing experimental bat houses along pipelines in Louisiana. The video will be used by Enron employees to install additional houses along pipelines in Arizona, New Mexico, Kansas, Iowa, Minnesota, and Florida. The data reported from these diverse sites will help BCI evaluate the best ways to provide alternative habitats for bats.

Bats and Buildings

- Consulted with the Alaska Department of Fish and Game on Kodiak Island on how to exclude little brown bats roosting in U.S. Coast Guard housing. The Coast Guard is simultaneously building and installing bat houses as alternative roosts.

Global Grassroots Conservation Fund

- Funded 12 projects in 10 countries, awarding more than $30,000 for local efforts ranging from conservation of bat caves in Romania to field education programs for high school students in the Cayman Islands.

Education and Workshops

- Distributed 185 packets of bilingual children’s books, workbooks, posters, bat fact cards, and other educational materials to public libraries, schools, radio stations, and nature centers in Texas’s Rio Grande Valley. Schoolchildren and local communities there are learning about the value of bats in agricultural pest control and the importance of conservation.

- Hosted 55 participants from more than a dozen U.S. states and Canadian provinces at BCI’s Arizona- and Pennsylvania-based Bat Conservation and Management Workshops. Representatives from eight federal, state, and local agencies, museums, and universities participated along with teachers and other conservation-minded individuals who learned to conserve bats and conduct educational activities.

Outreach

- Delivered keynote address at the 2001 Association of Zoo and Aquarium Docents Conference in Chicago, Illinois, on September 3. BCI’s Bob Benson hosted more than 750 people who attended from the U.S. and Canada, learning about the need for bat conservation and how they, as volunteer educators, can help. Many purchased BCI educational materials to use in implementing bat programs in their home communities.

- Addressed the annual Wildlife Society Meeting in Reno, Nevada, sharing the latest findings from BCI’s research on hibernation requirements of endangered Indiana bats.

- Consulted with NASA on production of an illustrated book entitled *Echo the Bat*, which teaches elementary school children about biodiversity, mapping technology, and other scientific concepts. The book follows the initial success of NASA’s “Echo the Bat” interactive Web site, which tracks Echo on his seasonal migration.

- Appeared on the Web in *National Geographic Online’s* feature about greater long-nosed bat (*Leptonycteris nivalis*) research in Texas’s Big Bend region. The article reached approximately one million Web viewers and emphasized the importance of agave plants to sustain bats with pollen and nectar during migration.

For more information about these programs, or to receive a copy of the BCI Annual Report, visit our Web site at [www.batcon.org](http://www.batcon.org) or call 512-327-9721.
2002 Members’ Nights at Bracken Cave

We’re offering BCI members the unique opportunity to witness the emergence of 20 million Mexican free-tailed bats from Texas’s Bracken Cave. BATS readers know that BCI bought and protected this home of the world’s largest bat colony in 1992. Since then, hundreds of members have visited the site to view the awesome spectacle of the bats’ emergence.

This year, Members’ Nights will be on Saturdays: June 29, July 6, 13, and 20, and August 3 and 10. One additional night, July 27th, will be reserved for members who have never before had an opportunity to experience the wonder of Bracken Cave. Registration for all nights will begin on May 1, 2002. To register, on or after May 1, please send BCI your name, address, phone number, number attending, and your first and second choice for dates. Space is limited. Please make your reservations as soon after May 1 as possible. When your space on a specific day is confirmed, you will receive a map and additional information.

Send an email to bracken@batcon.org, or fax 512-327-9724 to the attention of “Members’ Night Coordinator,” or call BCI at 512-327-9721 during our regular business hours (7:30 A.M. to 4:30 P.M. Mon-Fri), on or after May 1.

Symposium on Cave and Mine Protection

BCI, the USDI Fish and Wildlife Service, and the USDI Office of Surface Mines are hosting a symposium on cave and mine protection options, to be held in Austin, Texas, March 4-6, 2002. There will be an optional field trip on March 7. A downloadable flyer, registration materials, conference agenda, and a list of current sponsors are available on the Web at www.batcon.org/home/cavesymposium/index.html. The proceedings from this meeting will include a gating manual for cavers, biologists, and resource managers. Contact Jim Kennedy for more information at jkennedy@batcon.org, or call 512-327-9721.

WISH LIST

Your help with any of the following special needs would greatly increase our effectiveness. To make a donation, or for more information, contact Bob Benson at bbenson@batcon.org or at (512) 327-9721, ext. 27.

Office Efficiency: Laser Printer

BCI growth continues to place high demands on our two office printers. Employees and volunteers often must wait in the line for print-outs causing delays. Another HP Laserjet 4 printer would significantly reduce this traffic jam ($1,900).

For the Web: Internet Software

In an effort to better serve our members, BCI requests a copy of WebTrends software. This interactive program will enable BCI to test, track, and evaluate our Web messages and measure their effectiveness. The program generates reports and graphs on the number of unique visitors who come to our site, which pages they visit, length of use, what countries and cities they come from, and what information they download. Donations to help cover the purchase would be greatly appreciated ($2,500).

THANK YOU

Our sincere gratitude goes to Carole and Bill Haber of Westport, CT, for making our winter holidays come true. Their gracious $5,000 contribution covered the cost of all the equipment listed in our fall issue. We’re also grateful to Greg Contas, of Hartford, CT, and an anonymous donor, for their thoughtful contributions toward a Canon EOS-3 camera and a Harp Trap.
The Bat Mola

Panama has a wide variety of handicrafts, and one of the most famous is the mola. What is a mola? It is a brightly-colored, multi-layer fabric design used to make the traditional blouses worn by Cuna Indian women. The Cuna women wear one mola on the front of the blouse, and one on the back, often with a similar theme.

Of course, molas also make wonderful art, and many are sold framed and mounted to be hung on the wall. Typical designs include brightly colored animals such as parrots and butterflies, but occasionally a craftswoman will use a different theme, such as a bat. The mola pictured here was purchased from the Cuna woman who made it, in the town of El Valle de Antón, Panama. It features a beautiful rendering of the fishing bat (Noctilio leporinus). The fishing bat, known locally as el pescador, the fisherman, is a well-known species among the indigenous tribes. It is shown with its exceptionally long legs, and a fish held tightly in each foot.

—Keith and Jen Christenson

Workshop Reminder

Don’t forget to register for BCI’s 2002 Field Study Workshops being hosted this summer in Arizona, Pennsylvania, and Belize [BATS, Fall 2001]. For more information, including application forms, visit BCI’s Web site: www.batcon.org/trips/toptrips.html.

Best Pictures

Dr. Merlin Tuttle’s photograph of the fringe-lipped bat (Trachops cirrhosus) was selected as one of National Geographic’s 100 Best Pictures. The Collector’s Edition Vol. 1 includes powerful, award-winning images that have made National Geographic synonymous with remarkable photography. This photo was taken in Panama in 1979 and shows the bat approaching a poisonous toad. At the last second, the bat detected that the toad was poisonous and veered away without harming the toad.

This collector's edition magazine costs $9.95 and is available for purchase at local book stores or online at www.nationalgeographic.com.
It is important for donors to know that the charities they entrust with their money (and with the missions closest to their hearts) are serving as wise stewards of that responsibility.

Bat Conservation International (BCI) is again proud to report that we spend a greater percentage of the donations we receive on direct conservation actions than seven of the 10 largest environmental organizations.

This means that 86.2 cents of every dollar BCI raises goes toward direct conservation, science, and education efforts—not to administrative expenses. If you want more information about BCI’s efficiency, please look at our annual report online at www.batcon.org or ask us to mail you a copy.

We know that you make a conscious choice to support bat conservation. BCI is honored by your investment and we take it seriously. Thank you. With your continued help, we can safeguard bats and the ecosystems that rely on them for future generations.

Bat Conservation International
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