SEEKING SOLUTIONS
for wind energy

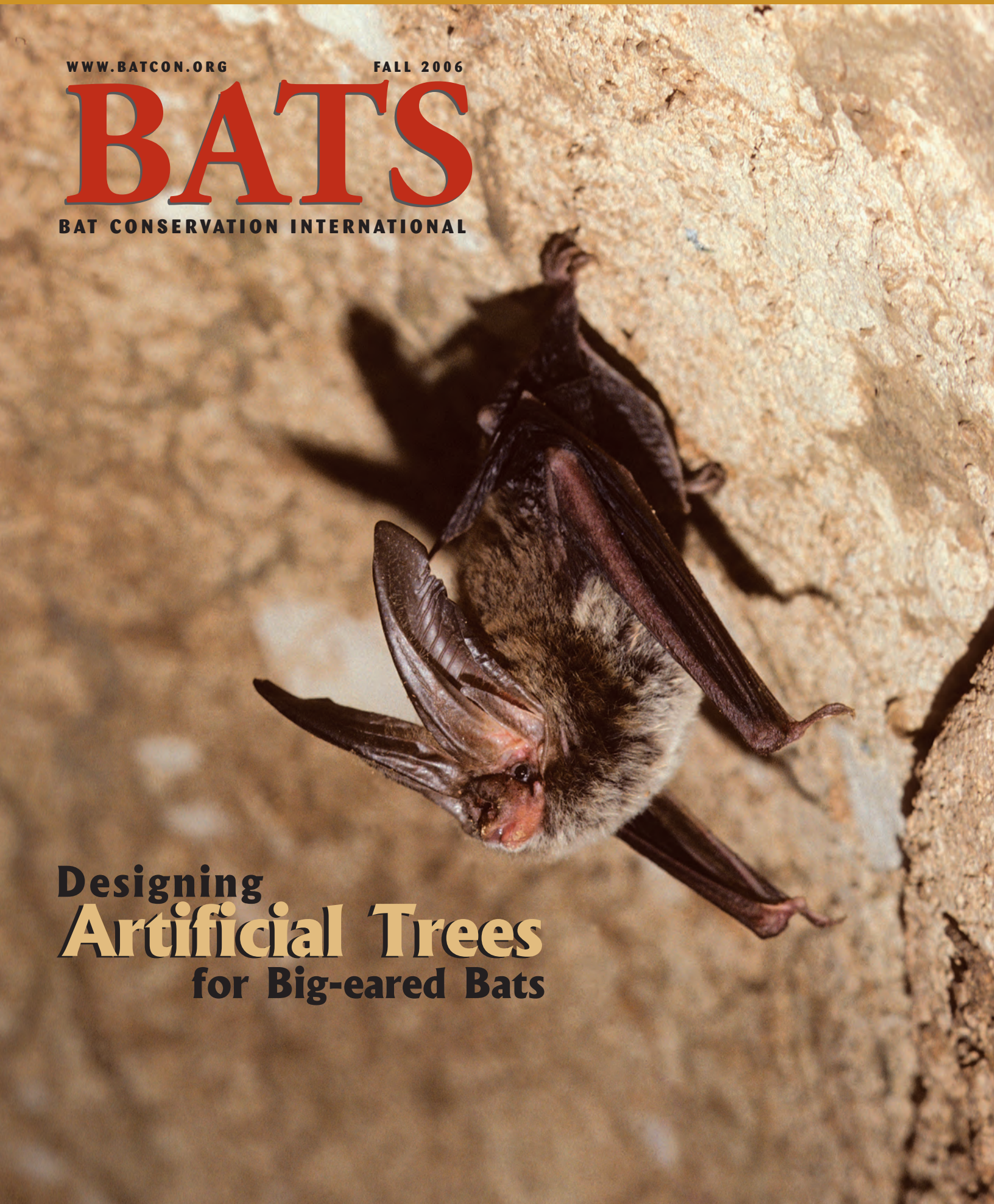
A DUTCH BAT HOUSE

FLAT-HEADED MYOTIS
is alive and well in Mexico

WWW.BATCON.ORG FALL 2006

BATS

BAT CONSERVATION INTERNATIONAL



Designing Artificial Trees for Big-eared Bats

BATS

Volume 26, No. 3, FALL 2006

BAT CONSERVATION INTERNATIONAL

www.batcon.org

P.O. Box 162603, Austin, Texas 78716

(512) 327-9721 • Fax (512) 327-9724

FEATURES

NEWS & NOTES

COVER PHOTO: The Rafinesque's big-eared bat (*Corynorhinus rafinesquii*) likes to roost in extra-large tree hollows. But such trees are fast disappearing from North American forests, so BCI's Bat House Project has been developing artificial roosts that mimic hollow trees. The lastest version is the most successful so far. (See page 9.)

BATS (ISSN 1049-0043) is published quarterly by Bat Conservation International, Inc., a nonprofit corporation supported by tax-deductible contributions used for public education, research and conservation of bats and the ecosystems that depend on them.

Bat Conservation International is dedicated to conserving and restoring bat populations and habitats around the world. Using nonconfrontational approaches, we educate people about the ecological and economic values of bats, advance scientific knowledge about bats and the ecosystems that rely on them and preserve critical bat habitats through win-win solutions that benefit both humans and bats.

A subscription to *BATS* is included with BCI membership: Senior, Student or Educator $30; Basic $35; Friends of BCI $45; Supporting $60; Contributing $100; Patron $250; Sustaining $500; Benefactor $1,000. Third-class postage paid at Austin, Texas. Send address changes to Bat Conservation International, P.O. Box 162603, Austin, TX 78716.

BATS is printed on a 50/20 chlorine-free recycled paper with a water-based coating on the cover.

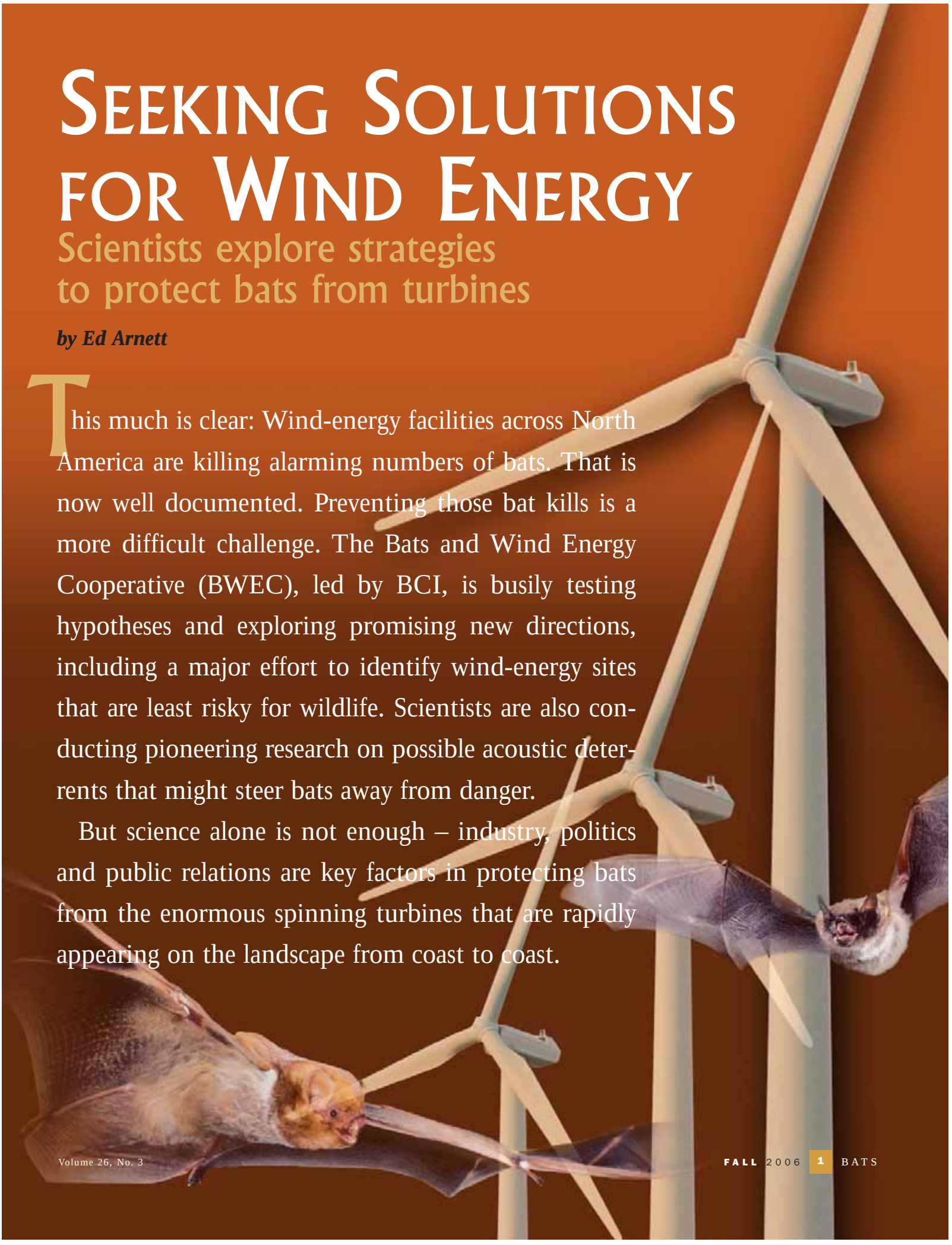
Seeking Solutions for Wind Energy

Scientists explore strategies to protect bats from turbines

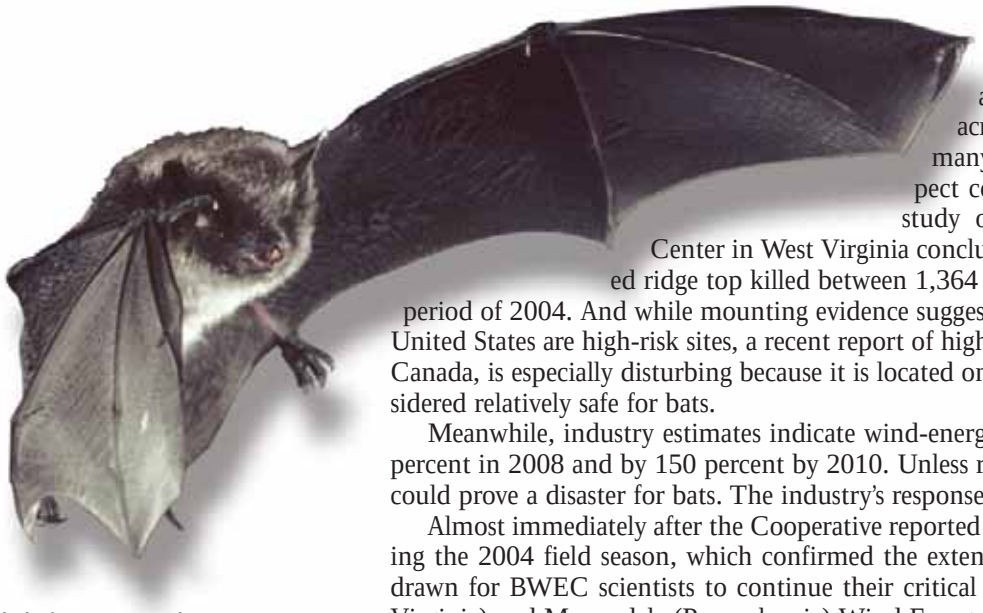
by Ed Arnett

This much is clear: Wind-energy facilities across North America are killing alarming numbers of bats. That is now well documented. Preventing those bat kills is a more difficult challenge. The Bats and Wind Energy Cooperative (BWEC), led by BCI, is busily testing hypotheses and exploring promising new directions, including a major effort to identify wind-energy sites that are least risky for wildlife. Scientists are also conducting pioneering research on possible acoustic deterrents that might steer bats away from danger.

But science alone is not enough – industry, politics and public relations are key factors in protecting bats from the enormous spinning turbines that are rapidly appearing on the landscape from coast to coast.



Project Coordinator Ed Arnett of BCI (*inset*) prepares the acoustic-monitoring system used in determining bat activity at a proposed wind farm in south-central Pennsylvania. Eight wind turbines are planned through a strip mine in the foreground (*dashed red line*), and 15 others will be placed on the forested ridge on the distant horizon (*black dotted line*).



Little brown myotis are common residents of the Pennsylvania wind-energy site.

Research by BWEC and others has documented bat fatalities at all wind-energy facilities studied across North America and Europe, many with kill rates that scientists suspect could put entire species at risk. Our study of the Mountaineer Wind Energy Center in West Virginia concluded that its 44 turbines on a forested ridge top killed between 1,364 and 1,980 bats in just one six-week period of 2004. And while mounting evidence suggests that forested ridges in the eastern United States are high-risk sites, a recent report of high bat kills at a wind farm in Alberta, Canada, is especially disturbing because it is located on open prairie, which had been considered relatively safe for bats.

Meanwhile, industry estimates indicate wind-energy installations could increase by 50 percent in 2008 and by 150 percent by 2010. Unless real solutions are found quickly, this could prove a disaster for bats. The industry's response has been mixed.

Almost immediately after the Cooperative reported the tremendous progress made during the 2004 field season, which confirmed the extent of bat kills, permission was withdrawn for BWEC scientists to continue their critical research at the Mountaineer (West Virginia) and Meyersdale (Pennsylvania) Wind Energy Centers (*BATS*, Fall 2005).

That setback forced me, as coordinator of the Cooperative, to completely refocus and redesign our research program on very short notice. One major new direction is pre-siting risk

Continued on page 4

An ounce of prevention

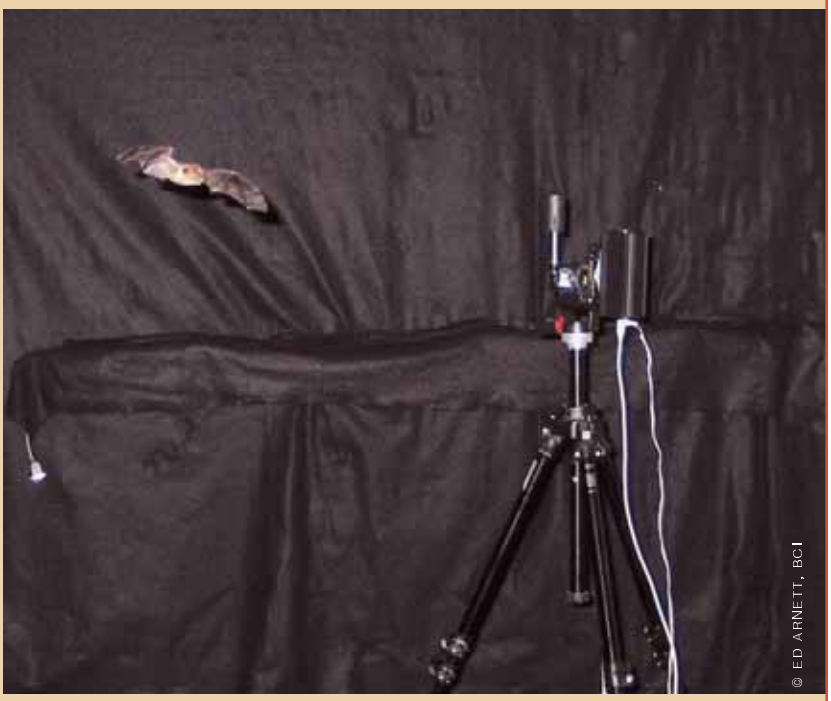
Some tiger moths have evolved a neat trick: When an attacking bat makes its final pursuit, its echolocation sonar pinging like mad, the moth suddenly directs a rapid series of ultrasonic clicks back at the bat. The countermeasure often works, and the moth escapes, leaving a hungry bat behind.

Exactly why this acoustic defense works is a matter of some debate among bat biologists. It may interfere with, or "jam," the bat's own echolocation signal, startle the bat long enough for the moth to escape or advise the bat that this particular moth tastes horrible (which is apparently true). But for whatever reason, it is effective.

And that suggests an intriguing option for scientists trying to prevent bats from flying into the lethal, spinning blades of wind-energy turbines. Could an ultrasound signal (beyond the reach of human hearing) act as a "No Trespassing" sign to keep bats away from turbines? The jury is still out, but research is under way.

BCI's Bats and Wind Energy Cooperative (BWEC) Coordinator, Ed Arnett, teamed with acoustics expert Joe Szewczak of Humboldt State University and Cindy Moss of the University of Maryland's Auditory Neuroethology Lab to explore the possibility of acoustic deterrence.

The scientists suspect they'll get the best results from high-amplitude "jamming" sounds. They also are testing the hypothesis that, up to some threshold, the signal may actually attract curious bats. Bats should avoid anything above that threshold, however, because the deterrent sound drowns out their own echolocation signals.



A big brown bat in a flight cage flies near an acoustic-deterrent device that is turned off. The bat avoids the area when the device is turned on.

Laboratory tests at the University of Maryland show that captive-raised big brown bats (*Eptesicus fuscus*) avoid such a sound-emitting device during flight trials. Also, captive big browns trained to take mealworms on the fly were unable to do so when the prototype deterrent device was turned on.

Initial field tests with an acoustic deterrent suggest the device does impact bat behavior. This notion needs more research, testing and fine-tuning, but results so far suggest some version of this device might help prevent bat kills at wind turbines.

Szewczak and Arnett also tested concerns of some biologists that ultrasound emissions from the turbines themselves might actually attract bats into the blades. Although wind turbines are routinely monitored for audible sounds, emissions too high for humans to hear had not been measured.

The researchers monitored seven types of turbines at six wind-energy sites in Nebraska, Pennsylvania and Wyoming. They found only relatively weak signals and concluded that "ultrasound emissions (as measured at ground level) from these wind turbines do not likely play a significant role in attracting bats."

Scientists hope acoustic deterrents will reduce the number of bats, such as this little brown myotis, that are killed at wind-energy facilities.

Continued on page 4

Continued from page 3

However, bats may be attracted from even greater distances in response to the turbines' lower-frequency sounds that have yet to be studied.

Other research strengthened a 2004 proposal that has the potential to dramatically reduce bat kills at wind farms. BWEC's pre-siting risk-assessment study in Pennsylvania documented that bats are more active on low-wind nights. In fact, activity decreases by 11 to 39 percent for each meter-per-second increase in wind speed. Similar findings have been reported from studies in Wisconsin and New York.

These results suggest even more strongly that "feathering" turbine blades (turning them parallel to wind so they remain essentially immobile) on low-wind nights can save a great many bats. This strategy desperately needs to be tested to determine its effectiveness and economic viability.

Since low winds mean low electricity production, the experiment should not be financially prohibitive, but BCI and BWEC were unable last year to find a single wind-energy facility that would test the concept.

BWEC Project Coordinator Ed Arnett sets up an experimental acoustic-deterrent device for testing in the field.

Nevertheless, we are hopeful now that proactive companies already cooperating with BWEC on other research will soon host feathering experiments so we can move forward in protecting bats and the "green" image of wind energy.

Continued from page 2

assessment: a systematic attempt to identify potential wind-energy sites that pose minimal hazards to bats. The challenge of accurately gauging risk requires extensive tests of the techniques and tools to study bat behavior at specific sites and to correlate that data with bats' often-fatal interactions with wind turbines.

Fortunately, some "green-energy" companies recognize the value of working with scientists to understand and solve wind-energy threats to bats. PPM Energy, a Scottish firm with U.S. headquarters in Portland, Oregon, has offered its full cooperation for BWEC to study several proposed wind sites in the eastern United States. With the help of PPM Energy's Sam Enfield and Andy Linehan, I was able to quickly design and implement the most extensive study ever conducted to evaluate the use of acoustic detectors to predict bat kills at a proposed wind farm.

So our bat detectors, placed up to 144 feet (44 meters) above a forested ridge in south-central Pennsylvania, were listening when a lone little brown myotis (*Myotis lucifugus*) emerged from its roost under the loose bark of a dead oak tree. The detectors heard the foraging bat send its ultrasonic hunting beeps into the evening in search of its insect prey. Suddenly, the beeps became a buzz. The bat homed in on a moth, dove at it and scooped up the hapless insect. Then the bat flew off in search of its next victim.

This little drama – along with thousands of others – was recorded and is being analyzed and correlated with mounds of other data. That hungry little brown myotis may well

Joe Szewczak of Humboldt State University inspects bat detectors deployed on a 72-foot (22-meter) telescoping tower.

have contributed to its own future safety and that of countless other bats in Pennsylvania and around the country.

This unprecedented study of bat activity was developed in partnership with ecologist John Hayes, formerly of Oregon State University and now with the University of Florida, and statistician Manuela Huso of Oregon State University. The goals are to precisely document the levels and patterns of activity of bats at the site before construction begins and to correlate activity with weather and other environmental variables. Then we will determine if (and how) pre-construction monitoring of bat activity can predict post-construction fatalities at this and other proposed wind facilities.

We attached Anabat II acoustic detectors on meteorological towers that are used by energy developers to record such weather variables as wind speed and direction, temperature and barometric pressure. The "met" towers allowed us to record bat calls as high as the lower sweep of the turbine rotors (144 feet [44 meters]). We also used 72-foot (22-meter)

Continued on page 6

Biologist Adam Harpster (*right*) and Project Coordinator Ed Arnett raise a portable, telescoping tower to monitor bat activity in Pennsylvania.

A UNITED FRONT

Eight leading wildlife-conservation organizations are formally urging investors to encourage "green-energy" firms to cooperate with scientists and conservationists in assessing risks to wildlife and seeking ways to reduce those risks. Investors, the groups agreed, should put their money in companies that prove, by supporting such research, that they deserve to call themselves green.

Bat Conservation International and the Ornithological Council called a meeting of organizations and professional societies in March 2006 to address growing concerns over this issue.

This official statement resulted from that meeting:

The undersigned groups support the development of clean, renewable energy sources. Minimizing and mitigating the harmful impacts to wildlife is an important element of "green energy." Developers of green energy sources should cooperate with independent scientists and natural resource agency specialists in developing and testing methods to minimize harm to wildlife. Investors should encourage this cooperation by investing in companies that support this research in all ways.

To date, BCI, Defenders of Wildlife, Izaak Walton League, National Council for Science and the Environment, Ornithological Council, Society for Conservation Biology, Audubon Washington and The Wildlife Society have signed on as co-sponsors of this joint statement of concern.

A key goal of this unified concern is to raise awareness within the investment community and, ultimately, to work toward an endorsement and reward system that provides incentives to companies that cooperate in protecting wildlife by supporting solution-oriented research.

We will continue to meet with conservation leaders to rally support and develop a unified voice for wildlife conservation and responsible wind-energy development. You can help by encouraging conservation organizations and investors in green energy to endorse the need for cooperation, access and credible processes to gather and disseminate data needed to solve problems and develop wind energy responsibly.

BCI is asking members of wildlife-conservation organizations that have not signed this statement to encourage these groups to formally join us in this important effort.

Acoustic detectors were mounted on portable, telescoping towers at 5 feet (1.5 meters) above the ground and at 72 feet (22 meters), well above the tree canopy.

© ED ARNETT, BCI

Continued from page 5

portable, telescoping towers to deploy a vertical array of detectors for acoustic sampling. We monitored planned turbine locations on a forested ridge and an open-country ridge.

We detected nearly 10,000 echolocation calls from August 1 to October 31 in 2005, and were back at the site from April through October this year. Bat activity was highest from mid-August through mid-September with brief peaks in October. An intriguing observation: This pattern of rising and falling activity over time is similar to that seen in bat kills recorded at existing wind farms.

The study found that activity patterns differ among species groups. Bats that emit echolocation calls at frequencies greater than 35 kilohertz, such as the little brown myotis, tended to be detected more often near ground level. Lower-frequency echolocators, such as the hoary bat (*Lasiurus cinereus*), were more often found higher up. The two species groups showed roughly the same activity at an altitude of 72 feet (22 meters).

Different species of bats sharing the same environment have been shown to forage at different altitudes, a strategy that probably helps them partition food resources. Scientists are finding similar patterns at additional facilities.

Researchers also correlated bat activity with a number of weather variables. For example, total bat activity increased with rising nighttime temperatures up to about 66 to 70 degrees F (19 to 21° C), after which activity began to decline. However, this temperature-related difference in bat activity generally declines with altitude up to 144 feet (44 meters), where it has no observable impact. The temperature correlation is similar for both species groups and in both forested and open habitats.

Two seasons into this five-year study, we have a great deal of important data awaiting intensive analysis. At this very preliminary stage, some intriguing observations are emerging, but their importance for wind-energy siting decisions is not yet clear. Much work remains.

Our team will be back at the Pennsylvania site next year to collect acoustic data while the facility is being built. Then bat activity and kills will be monitored from April through October in 2008 and 2009. When our analyses are complete, we will know if acoustic surveys can predict the risk of bat kills at proposed turbine sites.

Until we learn to identify where turbines can be safely placed – or develop devices or strategies for keeping bats away from the spinning blades – wind energy will continue to kill bats at rates that could ultimately threaten their survival and the health of ecosystems they support.

ED ARNETT is BCI's Co-director of Programs and Coordinator of the Bats and Wind Energy Cooperative.

The Flat-Headed Myotis is Alive & Well

'Extinct' bat is rediscovered in northern Mexico

PHOTOS COURTESY OF JOAQUÍN ARROYO-CABRALES

by Joaquín Arroyo-Cabrales, Rodrigo A. Medellín and Oscar J. Polaco

The tiny, elusive flat-headed myotis weighs just 2.5 grams (about as much as two peanuts), and has a distinctively flat forehead and a known range that's barely two-thirds the size of Mexico City. Only three of these bats had ever been reported to science, the last one 36 years ago. IUCN, the World Conservation Union, declared it extinct in 1996.

A researcher removes the first flat-headed myotis captured since 1970 from a mist net stretched across a pond in Coahuila, Mexico.

Then we found not one, but eight of these elusive bats in the same forested region of northeastern Mexico where the species was originally discovered. This was not a chance event, but the result of a carefully planned scientific effort to determine whether these bats survived and, if so, to learn enough about them to conserve this critically endangered species, as well as other bats with similarly limited distribution. The work was supported in part by Bat Conservation International's North American Bat Conservation Fund.

The flat-headed myotis (*Myotis planiceps*) is one of the smallest bats in the world and its range is also among the smallest – less than 385 square miles (1,000 square kilometers). The species was first described in 1952, after an individual was collected in Coahuila state from a heavily grazed valley surrounded by forested mountains with elevations of more than 10,000 feet (3,000 meters). The second-known flat-headed myotis was found in Nuevo León under the bark of a Douglas fir in 1966. Then a juvenile female was captured over a dry arroyo in a pine forest in Zacatecas. Except for those three bats, there were no other records or studies of the species.

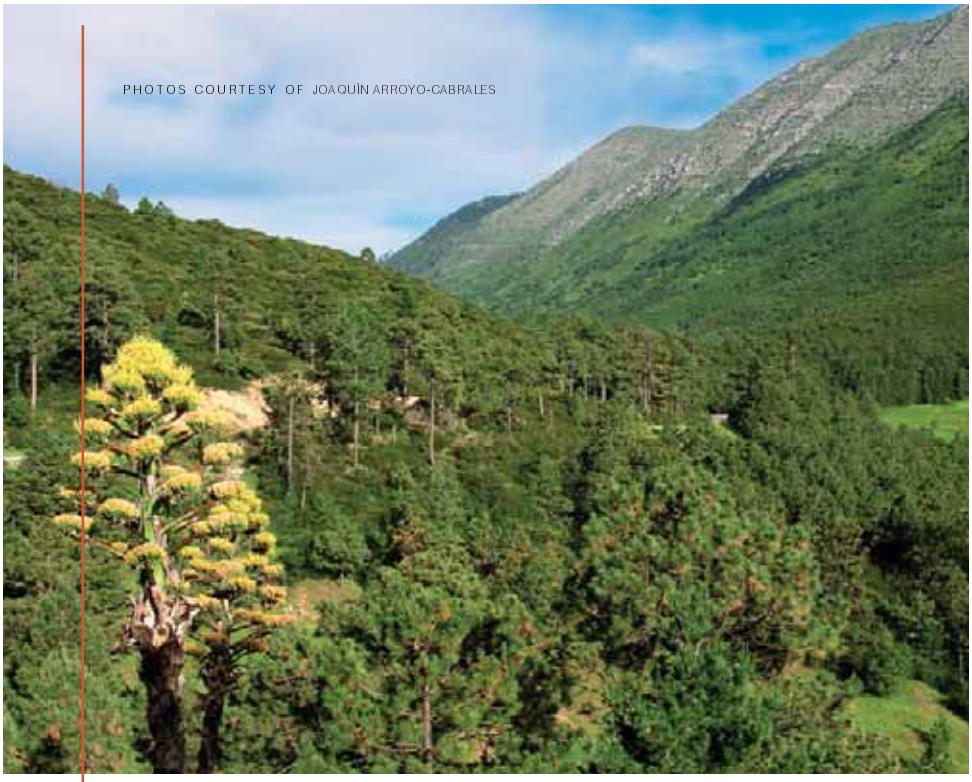
Our scientific team, through the Program for the Conservation of Bats of Mexico (PCMM), began focusing on the flat-headed myotis in 1997. Our first objective, of course, was to conduct intensive field surveys to determine if any living populations still existed.

After demonstrating that the flat-headed bat is not extinct, our second phase is to study this elusive species. This includes molecular assays and detailed studies of population, dietary habits and roosting behavior and requirements, as well as echolocation calls and habitat information. Understanding the biology and conservation needs of the flat-headed myotis will guide us in preparing a recovery and management plan.

All available documents regarding the species were examined, and a field team conducted initial surveys to assess the current status of the areas where the three flat-headed myotis were previously collected. The surveys suggested that the most likely habitats for mist netting were in transition zones between arid scrubland and high-country pine forest, places where yuccas grow with piñon pines. We selected several likely sites.

We acquired special mist nets with a very small mesh and

PHOTOS COURTESY OF JOAQUÍN ARROYO-CABRALES



This forested countryside of northeastern Mexico is home to the flat-headed myotis, which was thought to be extinct.

took to the field in June 2004, setting our nets over streams and ponds. The nets were opened at sunset and checked periodically for three hours. We also surveyed for possible roost sites, in caves, crevices and gaps beneath the bark of Douglas fir and other trees.

For each bat taken from our nets, we recorded habitat data and detailed physiological information and took photographs. We also collected tiny tissue samples and external parasites from some individuals.

The first flat-headed myotis that became tangled in our net at the Los Pinos site was discovered at about 9:20 p.m. on June 14. Although the bat's flat forehead immediately produced some excitement, we were pleased to have on hand Richard LaVal, a leading expert on myotis identification and classification, who confirmed our identification. The flat-headed myotis had indeed survived in its tiny sliver of Mexico!

The next two hours of netting produced four more flat-headed myotis over an artificial pond at Los Pinos, in Coahuila. All five bats were females, and at least two were lactating. Four nights later, we caught another female flat-headed myotis (along with individuals of six other species) over the pond. We later caught another female and a male over water in two other sites.

We recorded flat-headed myotis' echolocation calls under both captive and field conditions and also monitored calls of foraging bats at all three sites where the bats were captured.

The sites that produced the flat-headed myotis are all in or very near the proposed Protected Area of Sierra de Arteaga, which is being set aside to protect foraging and nesting areas of the endangered maroon-fronted parrot (*Rhynchopsitta terrisi*). Documenting the presence of the endangered flat-headed myotis provides more ammunition for promoting the conservation of this area.

The rediscovery of this species that was presumed to be extinct offers us a second chance to study this fascinating little bat, about which almost nothing is known, and to apply our knowledge to systematic conservation efforts. We are studying the behavior and habitat of the flat-headed myotis and exploring its diet, roosting ecology and acoustics. Tissue samples allow us to analyze its genetics to determine just where it fits into the evolutionary tree of myotis bats. We also hope to better understand the genetic diversity of such a geographically restricted species.

We have proven that the flat-headed myotis still exists. Now we must act to ensure its survival for generations to come.

JOAQUÍN ARROYO-CABRALES is with the Subdirección de Laboratorios y Apoyo Académico, INAH, in Mexico City and the Programa para la Conservación de Murciélagos de México (PCMM). RODRIGO A. MEDELLÍN represents PCMM and the Instituto de Ecología, UNAM, in Mexico City; OSCAR J. POLACO is with the Subdirección de Laboratorios y Apoyo Académico, INAH.

Bat Conservation International's North American Bat Conservation Fund supports critical research projects like this one throughout Mexico, the United States and Canada. Your help makes this kind of progress possible. To contribute to the North American Bat Conservation Fund, please contact BCI's Department of Development at *development@batcon.org* or (512) 327-9721.

The authors wish to thank The Smithsonian's Abbott Endowment Fund, BCI's North American Bat Conservation Fund, the Wildlife Trust and the Whitley Fund for Nature for their financial support. Our field work was supported by Arturo González, Director of the Museo del Desierto; Ariel González, Chair of the Environmental Education Department, Instituto Coahuilense de Ecología; and individuals from both Coahuilan institutions. Our friends and collaborators, Richard K. LaVal and Bernal Rodríguez-Herrera, both from the Program for Costa Rican Bat Conservation, kindly helped during our field work. Students Iván Alarcón, Javier Banda, Claudia Galicia, Diego García, Nashieli Jau, Leonardo López-Damián, and Francisco J. Navarro contributed critical field work and effort toward accomplishing the project's goals.

Joaquín Arroyo-Cabrales, Bernal Rodríguez-Herrera and Richard LaVal celebrate the capture of the first flat-headed myotis.

COURTESY OF LAURIE LOMAS

Designing Homes for Forest Bats

Moms and pups accept artificial trees

by Mylea Bayless

The first pups were born in mid-May. The maternity roost was a ramshackle old farmhouse tucked into the thick pine forests of the Trinity River National Wildlife Refuge in East Texas. Thirty to 45 Rafinesque's big-eared bats (the species' second-largest colony known in Texas) had been roosting in the long-abandoned structure at least since March. They mostly snubbed the two 14-foot (4.3-meter) cinder-block towers that we had built for them nearby.

By late May, we counted 40 bats in the farmhouse, but only one in the tower roost that sits mostly in the sun and features a heat-absorbing black roof. Not a single bat was inside the cooler tower at a shadier site.

Then things took a curious turn.

When she checked on the little colony on June 26, U.S. Fish and Wildlife Service Biologist Laurie Lomas counted 40 bats in the farmhouse, then found another 16 mothers and pups nestled inside the warmer cinder-block tower. Only one bat was in the cool tower. Another month passed, and the house held 35 bats, the warm tower 15 and the cooler tower 18. As the pups are learning to fly, Lomas concluded, they are moving into the tower roosts with their mothers. Glimmers of success for our artificial tree hollows!

Fast-forward to early September: The colony had grown to 73 bats, but their roost selections had changed radically. Only four bats still favored the farmhouse, the warm tower hosted just one. The other 68 mothers and pups were all roosting in the cool tower.

There seems to be a pattern to the bats' roost selections through the hot Texas summer, a pattern driven apparently by seasonally changing temperature needs. Early in the season, greater warmth helps pups grow rapidly. Then, when the young have reached adult size, lower temperatures help them build stores of fat in preparation for winter.

The key to fully accommodating nursery colonies of Rafinesque's big-eared bats (*Corynorhinus rafinesquii*) may lie in providing multiple roosts that offer a range of temperatures. Additional temperature monitoring, with comparisons among various roosts, will help us document the species' exact needs.

© MYLEA BAYLESS, BCI

Rafinesque's big eared bats (*top*) roost on the ceiling of an artificial tree hollow in Texas. Laurie Lomas (*above*) of the U.S., Fish and Wildlife Service steps out of the artificial roost.

The 2006 results at Trinity River clearly demonstrate the promise – and progress – of the experimental roost designs that the BCI Bat House Project and its partners are testing. This latest version is the most successful so far at mimicking Rafinesque's big-eared bats' traditional roosts: extra-large cavities in old-growth trees that are fast disappearing.

This is a forest-dwelling species that naturally roosts in small colonies (typically 5 to 50 females, rarely more than 200) in hollows of old-growth black gum, water tupelo, American beech and bald cypress trees. In a healthy forest, Rafinesque's big-eared bats typically alternate among several roosts, probably in part to reduce parasites and confuse predators, although our latest results suggest temperature also is an important part of the puzzle.

This now-rare species faces widespread loss of natural habitat and roosting sites and is believed to be in rapid decline rangewide. Displaced bats frequently turn to abandoned cabins and barns as roosts of last resort, but these old buildings (like the farmhouse at Trinity River) are often at risk of collapse or marked for dismantling. Hence the pressing need for our artificial tree hollows.


COURTESY OF LAURIE LOMAS

Cinder-block tower roosts in the Trinity River National Wildlife Refuge in East Texas are showing great promise as Rafinesque's big-eared bats like these move from one to another while pups are being reared.

Real success will come when bats choose the tower roosts throughout their entire active season. The birth of pups in the towers will demonstrate full acceptance.

The evolution of BCI's tower roosts followed a twisting path. In August 2000, BCI and Walter Sedgwick collaborated, with on-site supervision by Laura and Tom Finn of Fly by Night, Inc., to install the first three towers in Thomas County, Georgia. Each consisted of a pair of standard concrete culverts, 3 feet (0.9 meter) in diameter and 8 feet (2.4 meters) long, stacked one atop the other with a concrete cap on top and an opening cut into the side. A pregnant Rafinesque's big-eared female occupied the new roosts in May 2002, gave birth to a single pup and moved among the three culvert roosts.

Since then, BCI and its partners have installed 19 additional tower roosts of various designs in five other states. Early designs using concrete highway culverts and manhole shafts, while simple in concept, required cranes or other heavy equipment for installation. This was not only expensive, but limited locations to areas accessible by roads that could handle large trucks. Experiments continued with lighter aluminum culverts, concrete-fiber drainage pipes and cinder blocks.

Each of these designs attracted Rafinesque's big-eared bats during at least one season. The current cinder-block version, however, attracts more bats for longer periods and is much easier to install. Several other species, including big brown bats (*Eptesicus fuscus*), southeastern myotis (*Myotis austroriparius*), eastern pipistrelles (*Pipistrellus subflavus*) and Mexican free-tailed bats (*Tadarida brasiliensis*), have also used the artificial tree hollows.


© MYLEA BAYLESS, BCI

The generosity of these partners has made BCI's artificial tree program possible: Angelina National Forest, Lower Suwannee National Wildlife Refuge, Lumber River State Park, Mammoth Cave National Park, National Fish and Wildlife Foundation, Offield Family Foundation, Pebble Hill Grove, Saint Catherine Creek National Wildlife Refuge, Arthur A. Seeligson Conservation Fund, Walter Sedgwick, Shangri La Botanical Gardens and Nature Center, South Mountains State Park, Texas Parks and Wildlife, Trinity River National Wildlife Refuge, and Alison Sherman (Mississippi Museum of Natural Sciences).

Much work remains to perfect these alternative roosts, but we are constantly gathering critical data. Wildlife researchers from Stephen F. Austin State University, Texas A&M University and Texas Parks and Wildlife are collaborating on an East Texas study to identify in detail the habitat needs and distribution of Rafinesque's big-eared bats. And Trinity River National Wildlife Refuge biologists, with help from a Science Support Grant from the U.S. Geological Survey, are studying the local population.

Both studies are recording conditions inside current bat roosts (both natural tree roosts and artificial roosts) and defining habitat conditions around the roosts. Results from these studies will greatly aid BCI's Bat House Project in improving artificial roosts.

Artificial roosts are not a substitute for good habitat management, especially the preservation of snags, natural tree cavities and caves. They can, however, provide a solution where natural roosts have already been destroyed. Vast stretches of forest habitat along the Gulf Coast have been devastated by recent storms, dramatically increasing the need for artificial roosts.

MYLEA BAYLESS is Coordinator of Bat Conservation International's Bat House Project.

COURTESY OF LAURIE LOMAS

As natural roosts in large tree hollows disappear from American forests, countless Rafinesque's big-eared bats need a viable alternative. BCI's Bat House Project is developing artificial tree hollows to fill this need.

The Bat House Project continues developing and improving its tower roosts. A new installation is planned for the Village Creek State Park near Beaumont, Texas, where hurricanes in 2005 destroyed a number of known roost trees used by Rafinesque's big-eared bats. Each artificial roost costs approximately $3,000. To help support this project, please contact BCI's Department of Development at *development@batcon.org* or (512) 327-9721.

The Evolution of Tower Roosts

Artificial roosts that mimic the big tree hollows that Rafinesque's big-eared bats and some other forest species prefer have evolved dramatically since 2000, when BCI built the first one in Georgia, with support from Walter Sedgwick.

© MARK & SELENA KISER, BCI

2000

The original tower roost was made of two highway culverts stacked one atop the other. Three were built on Sedgwick's Bar-M Plantation in southern Georgia.

© ELAINE ACKER, BCI / 9165402

2003

Sections of less-expensive manhole shafts were stacked to build four roosts in North Carolina, two each at South Mountains State Park (left) and at Lumber River State Park.

© MARK & SELENA KISER, BCI / 0010680

2003

At St. Catherine Creek National Wildlife Refuge in Mississippi, tower roosts were made of concrete-fiber pipe normally used for storm drains.

© MARK & SELENA KISER, BCI / 0010956

2004

The current version, built of inexpensive cinder block that does not require heavy equipment for installation, is the most promising design that's been tested.

A Bigger Bat House for the Netherlands

COURTESY OF ERIK KORSTEN

A Dutch conservationist puts BCI plans to the test

by Erik Korsten

"In America," according to a common saying in the Netherlands, "everything is bigger." The cars are bigger, the skyscrapers taller, even some American trees are among the largest in the world. And, as I discovered, that's also the case with bat houses.

Bat houses in Europe grew out of the discovery that bats were using bird boxes placed in forests. Building on that idea, European bat houses almost never exceeded about 20 inches (50 centimeters) high by 12 inches (30 centimeters) wide. (This is a bit smaller than the bare minimum Bat Conservation International recommends.) Some people experimented with different models and materials, but bat houses were mostly small and located almost exclusively in forested areas.

Although some forest species, such as brown long-eared bats (*Plecotus auritus*), use these bat houses for nursery roosts, the European style simply does not provide enough space for large nursery colonies – not in forests or rural areas, and certainly not in urban areas.

But as more European bat workers encounter BCI's Bat House Project, bat houses in Europe are changing. I was fortunate enough to be among the first to put BCI's ideas to the test in Europe.

I discovered a roost of common pipistrelles (*Pipistrellus pipistrellus*) in a Tilburg Water Company (TWM) building just outside the city of Tilburg, the Netherlands. On that evening in May 2001, 46 bats emerged from a damaged ventilation joint in the building's brick wall. A year later, I counted 104 bats emerging from the same joint.

COURTESY OF ERIK KORSTEN

This Dutch bat house, extremely large by European standards, is mounted on a building where planned renovations threatened a nursery colony of common pipistrelle bats. The bats, such as the one in the top photo, moved into the bat house within two years.

COURTESY OF ERIK KORSTEN

Workers put finishing touches on the bat house before installing it on a Tilburg Water Company building that contained a colony of common pipistrelles. The house was adapted from a design in BCI's *Bat House Builder's Handbook*.

TWM ecologist Jaap van Kemenade was delighted to have a colony of bats living in the building, but he was also concerned. The crack from which the bats were emerging was getting bigger every year, and reconstruction would soon be required. That, of course, could be a problem for the bats living in the cavity.

When Jaap asked me how we could make sure the bats were safe, I immediately thought about the big nursery houses I had seen in BCI's *Bat House Builder's Handbook*. I could think of no reason why a "large nursery house" would not meet the needs of the pipistrelle bats in the TWM building.

The bat house, built by TWM, is 5 feet, 11 inches (1.8 meters) wide and 3 feet, 3 inches (1 meter) high. It has three chambers, each about three-quarters of an inch (2 centimeters) wide. The house is mounted on laths to the building's wall, creating a fourth chamber between the bat house and the wall.

The top half of the third chamber is filled with insulation. Bats can move from one chamber to another through narrow slits. The interior of the house is lined with plastic mesh to provide footholds for the bats. The bat house exterior is painted black, and a ventilation slit was cut into the front panel.

The bat house – extremely unusual by European standards – was mounted in March 2004 just around the corner and about three feet (about one meter) from the crevice roost in the wall. We hoped the bats would discover and use the bat house voluntarily rather than force us to exclude them from the original roost.

Only two pipistrelles used the new bat house that first summer; the rest stuck with the old roost. But in July 2005, we counted 84 pipistrelles emerging from the bat house. And many of them were returning within an hour or so, possibly to feed their youngsters.

We examined the bat house in August and found at least 60 bats inside, with all the chambers occupied by at least some bats. Reconstruction work on the walls began a few days later. Although it was very noisy and taking place just outside the bat house, the bats did not leave. The workers managed to keep the old roost entrance open, so the bats could return to their old roost if they wished.

This past summer left no doubt about the value of the big bat house. We counted 111 bats emerging from it on June 8, while just three were still using the wall crevice. A close look on June 16 revealed many pipistrelle mums that were feeding their pups inside. We did not count the youngsters, but on July 8, we watched 235 common pipistrelles emerge from the bat house!

COURTESY OF ERIK KORSTEN

Common pipistrelles established a nursery colony in this extra-large bat house in the Netherlands. In the center of this group, a mother nurses her pup.

Our oversized bat house and its popularity with bats caught the attention of many other bat workers. At least five are now building multi-chambered bat houses. Mine remains the only one in the Netherlands housing a nursery roost, but I'm sure that many more will follow.

ERIK KORSTEN is Chairman of the Bats Workgroup of the Province of North Brabant, the Netherlands, and an active member of the Dutch Mammal Society (VZZ). He works parttime as a bat ecologist.

New homes for middle-school bats

Ask a current or former student of La Grange, Texas, Middle School (formerly La Grange High School) about bats, and you're likely to hear tales of bats spicing up a basketball game, flying down hallways, roosting above the school's stage or freaking out a parent or two.

BCI Member David Vogel, who grew up about 100 miles (160 kilometers) to the southeast in Houston but now lives in La Grange, learned of the notorious middle-school bats from *The Fayette County Record*. The newspaper reported that the school board was planning to get rid of 500 to 1,000 bats that lived part of each year in the middle school's gym.

Vogel's interest in bats began several years ago and was especially piqued when he discovered Bat Conservation International. He recently earned a Texas Master Naturalist rating from Texas Parks and Wildlife and the Texas Cooperative Extension Service. The program trains volunteers to share their knowledge of nature and wildlife through local projects. So he was ready to go to work when he learned of the bats.

"I talked to Mike Michalka, [the school district's] director of operations (and my neighbor) to see if he could shed some light on the winged and furry nocturnal creatures that sometimes call La Grange Middle School home," Vogel said. "Mike told me where he had last seen bats emerging from the gym, and I took up surveillance at the appropriate time and place on a number of evenings in June. But no bats were to be seen."

Michalka noted that the bats typically are sighted for a couple of months in the spring and again in the fall. Vogel suspected this was a transient colony of migrating bats. He checked with Mylea Bayless, Coordinator of BCI's Bat House Project, who agreed that his suspicions were probably correct. She said many bats migrate northward through Texas. Along the way, she confirmed, some bats may remain in an area for a while before resuming their journey. Then they change directions and return south in the fall.

Bats around the world are rapidly losing their natural roosting sites to urban and agricultural development. Some species adapt to disappearing habitat by moving into structures built by humans. Sometimes the humans object.

The La Grange visitors are most likely Mexican free-tailed bats (*Tadarida brasiliensis*), which readily roost in bat houses. Working with Bayless, Vogel came up with a plan to erect bat houses near the bats' entry points at the gym. The district had already sealed entry points on all but the south side of the building, ensuring enough openings remained for any lingering bats to escape.

Four bat houses are installed in La Grange, Texas, as part of an exclusion and education effort led by BCI Member David Vogel.

In the meantime, Vogel set to work educating his neighbors about the benefits and safety of bats. With BCI's help, he provided a series of bat articles for *The Fayette County Record* and also spoke to teacher Nancy Hajek's fourth-grade class when school resumed in the fall.

Vogel says he "told Gary Nietsche, General Manager of the Fayette Electric Co-op, about our plan to exclude bats from the school buildings, and his response was, 'I know bats have been there for at least 40 years, because they were there when I was in school.'"

Nietsche quickly offered to have the Co-op purchase the bat houses, four of which were ordered through BCI's online catalog. The new artificial roosts were installed on the gym's south brick wall, directly under the bats' entry points.

Now when the bats return in the fall, they'll still be able to use at least part of the gym but, Vogel notes, "they'll have an opportunity to check out their new digs.

"Over the winter months, school personnel will complete the process of sealing the entry points. Next spring, the bats will return to inhabit their new homes and stay happily outside the gym. That, at least, is The Bat Plan."

Oklahoma's official flying mammal

The Mexican free-tailed bat "is good for Oklahoma," state Senator Owen Laughlin declared. "It brings tourist dollars to our state, provides a learning experience for observers and helps cut down on the insect population."

To celebrate those contributions to the well being of his constituents, the legislator sponsored a bill to recognize the Mexican free-tailed bat (*Tadarida brasiliensis*) as Oklahoma's official flying mammal. The measure was passed by the Legislature and signed by the governor last March.

Laughlin noted that the Selman Bat Cave Wildlife Management Area in Freedom, Oklahoma, has become a major tourist attraction. "Tourists from all over the country visit the caves to observe the bats as they exit the cave for feeding at night. It really is a rare sight." A freetail maternity colony of approximately 1 million spends its summers in the cave, where female bats give birth and raise their pups.

The passing of friends
Donald Frederic Stabler 1948-2006

Fred Stabler's legacy includes literally millions of bats now roosting safely in the hundreds of abandoned mines that, partly through his efforts, are protected as bat sanctuaries. As a wildlife biologist with the U.S. Bureau of Land Management, Fred was a powerful advocate for bat conservation and for BCI.

An avid fly fisherman, Fred died in a boating accident last June. He was 58. His commitment to bat conservation survives his passing: His wife, Johnnye Stabler, asked that, in lieu of flowers, memorial donations be made in his name to BCI.

BCI Founder Merlin Tuttle praised Fred as one of our most dedicated and effective partners in bat conservation. "He will be deeply missed by all his colleagues, especially those of us here at BCI," Tuttle said. "His commitment to protecting mines that are used by bats has become a vital conservation ethic that will continue long into the future."

Fred Stabler (*left*) received a Distinguished Service Award from BCI Founder Merlin Tuttle in 2000.

In 1993, Fred was a key player in establishing the Bureau of Land Management partnership with BCI that led to the North American Bats & Mines Project. This program has protected and gated mines used by countless bats throughout the continent – and continues to do so.

He attended a BCI Bat Conservation and Management Workshop in Pennsylvania in 1994 and became committed to BCI's tradition of accomplishing conservation through partnerships with government and industry. He helped translate that vision into the North American Bat Conservation Partnership, which he proposed and championed. The NABCP developed continentwide priorities and regional plans for bat conservation and worked cooperatively to implement them.

In recognition of his years of conservation efforts, BCI honored Fred Stabler with its Distinguished Service Award for the year 2000.

Fred retired from the BLM in January 2005 and moved with Johnnye to Gautier, Mississippi, a coastal community where his passion for fishing could be sated.

Upon receiving his BCI award, Fred summed things up: "A lot of it has been being in the right place at the right time. And it's been fun. Still, the bats I like best are the ones buzzing around my head when I'm fly fishing in the evening."

Attention Students!

Bat Conservation International is now accepting applications for its 2007 Student Research Scholarships. This important program has, since 1990, supported 216 students working in 51 countries on scientific research that contributes to bat conservation.

Projects typically should be focused on the roles bats play in maintaining healthy ecosystems (through pollination, seed dispersal, pest control or maintenance of biodiversity, for instance) or on habitat requirements that are critical to conservation.

The U.S. Forest Service International Programs is continuing its Bats in International Forestry Scholarship Fund, which supports up to 10 BCI scholarships for research conducted in developing countries. Students at any university worldwide are eligible to apply, but only for research that will be undertaken in developing countries.

This fund has increased the number of scholarships BCI can award in 2007. Other BCI Scholarships remain available for conservation-relevant research in any location.

All BCI scholarships are competitive. Research proposals will be evaluated by an international panel of expert reviewers. Most awards will be for approximately $2,500, but some may be as high as $5,000.

The deadline for applications is Dec. 15, 2006. Information and applications are available online at *www.batcon.org/bcigrants/scholarintro.asp.*

Information about BCI's other grant programs – the North American Bat Conservation Fund and Global Grassroots Conservation Fund – is also available at BCI's website, *www.batcon.org*. The deadline for NABCF applications is also Dec. 15, while Global Grassroots proposals are considered year-round.

A gating success in Death Valley

With some bat species, especially in Eastern and Midwestern states, success in mine gating and cave restoration is often measured by thousands, even hundreds of thousands of bats (such as the gray myotis) that gradually move into a roost. The yardstick is different in the semiarid expanses of the American West.

Consider the Townsend's big-eared bat (*Corynorhinus townsendii*), which forms small colonies, typically fewer than 150 bats, that roost in caves, mines and buildings. Conserving important habitats for this state-recognized Species of Concern requires broad collaboration at numerous roosts.

In the fall of 2003, a BCI gating workshop, cosponsored by Rio Tinto Minerals (formerly U.S. Borax), Death Valley National Park, California Department of Conservation and U.S. Bureau of Land Management, built a bat-friendly cupola gate over both entrances to Devil's Hole #2 Cave in Death Valley National Park. The new cupola replaced a pair of earlier gates blamed in part for a continuing decline of a Townsend's big-eared bat maternity colony in the cave.

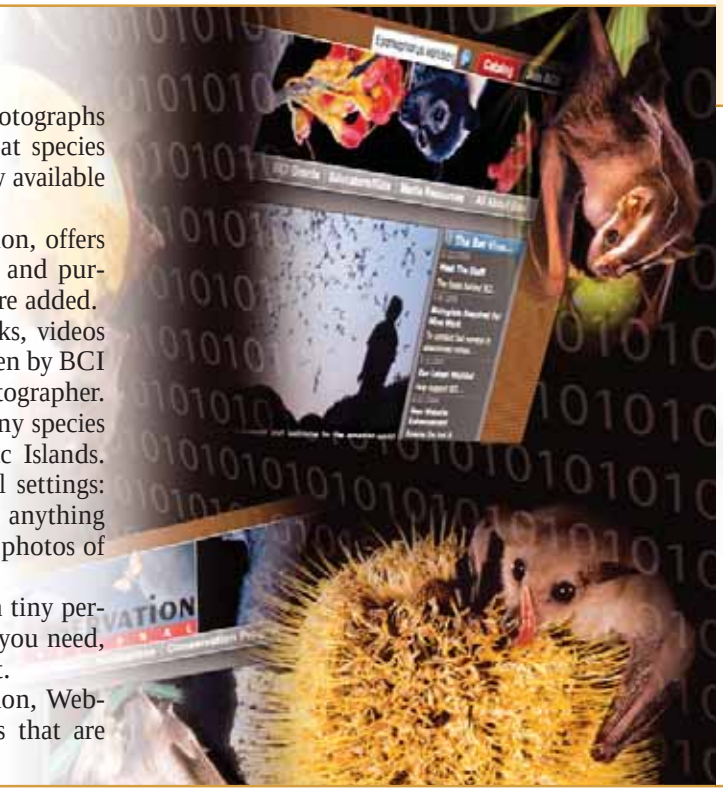

© DAVE WALDIEN, BCI

BCI volunteer Mike Rauschkolb of Rio Tinto Minerals (see Spring 2004 *BATS*) led a four-year monitoring project that began at Devil's Hole #2 just before construction of the new gate. He has now documented a 275 percent increase in the maternity colony – from 20 bats in 2003 to 75 bats in 2006, the largest-known Townsend's maternity colony in the Death Valley area.

Such systematic monitoring at key bat roosts is an extremely important part of roost gating and restoration projects. It not only documents the success of such collaborative conservation efforts but also provides invaluable data for resource managers if further work is needed.

David L. Waldien

BCI photos go online



Bat at Conservation International has the largest collection of bat photographs in the world – roughly 75,000 professional-quality images of bat species from every continent but Antarctica. The best of those photos are now available online at BCI's website: *www.batcon.org*.

The BCI Photo Gallery, made possible by the Beneficia Foundation, offers previews of several thousand images that may be browsed, searched and purchased. And the gallery is growing almost every day as more images are added.

BCI photos have been published in magazines, newspapers, books, videos and websites around the world. Most images in the collection were taken by BCI Founder Merlin D. Tuttle, a biologist and award-winning nature photographer.

You'll find photos of every North American bat species and of many species from Europe, Asia, Africa, Australia, South America and the Pacific Islands. These images include portraits and bats in a broad range of natural settings: roosting, flying, hunting, feeding, drinking, nursing and just about anything else that bats do. The collection also includes many bat-conservation photos of working scientists, bat houses, mine gates and much more.

As this is a work in progress, your comments are welcome. Only a tiny percentage of the collection is now online, so if you don't see the photo you need, feel free to contact BCI at *photolibrary@batcon.org* with your request.

The photos displayed in the online photo gallery are low-resolution, Web-quality images. BCI fulfills orders with print-quality digital images that are professionally color-corrected and cropped to fit your needs.

Bomb-shelter bats in Iraq

Bats in embattled Iraq are making homes wherever they can find them, which often means in an assortment of human-made structures (*BATS*, Fall 2004). Joshua Nicholson of the U.S. Navy says he's stationed in Iraq and "we have some [bats] that live in part of our building." He photographed these bats (of uncertain species) roosting in "kind of a hardened bomb shelter" and offered to share the photo with BCI members.

Too many toes

This cave myotis (*Myotis velifer*) doesn't seem bothered by the fact that it has two extra toes on its left foot. Still, Charles Pekins, Wildlife Biologist for Fort Hood, Texas, couldn't resist taking a picture of this unusual bat encountered on the U.S. Army post.

The Wish List

Your help with any of these special needs will directly improve BCI's ability to protect bats and bat habitats. To contribute or for more information, contact BCI's Department of Development at (512) 327-9721 or development@batcon.org.

Eastern European Bats

Bat conservation is finally taking root in Eastern Europe. BCI Science Advisor Herman Limpens of the Netherlands is playing a major role through bat-detector workshops that are helping biologists from Azerbaijan, Armenia, Georgia, Poland, Romania and Ukraine turn their scientific attention to bats. Partly as a result of the three workshops, the Georgia conservation group Campester and its partners are launching a conservation program for cave bats in the Caucasus Mountains.

Limpens, of the Dutch Society for the Study and Conservation of Mammals, hopes to support this effort through two additional training workshops. The project desperately needs additional Pettersson Model D-240X bat detectors. Each detector costs $1,475.

High-Tech Cave Maps

LIDAR is a laser-based remote-sensing technology that's used for surface and aerial mapping, monitoring glaciers and even examining Mars from orbiters and landers. Now BCI and several partners plan to explore LIDAR's value in precisely mapping and managing bat caves.

The initial test will be at the Devil's Sinkhole in Central Texas, the summer home of some 3 million Mexican free-tailed bats. In addition to detailed maps and better estimates of the bat population and the volume and stability of the cave, the data will be used for a digital reconstruction of the cave – a 3D computer model you could "fly through," rotate and zoom. The next step could be a similar project at BCI's Bracken Bat Cave. BCI's share of this project's cost is $1,000.

Conservation in Jordan

The big payoffs in bat-conservation efforts depend largely on who is targeted for education. In Jordan, the non-government Royal Society for the Conservation of Nature is aiming at groups that promise dramatic returns on a small initial investment.

The Society plans to train wildlife biologists at three national preserves on the importance of bats and techniques for monitoring their populations. It also will conduct workshops on bats for selected science teachers around the country. Educational materials for children will be developed and distributed to about 1,000 existing Nature Conservation Clubs in schools. The group requests a BCI Global Grassroots Conservation Fund grant of $2,000.

Powering our Wind Initiative

One of the gravest threats facing bats today is wind energy as it is now being developed. This crisis and our efforts to resolve it are detailed in this issue of BATS. BCI and a few admirable industry partners are seeking science-based solutions to minimize bat kills caused by wind-energy facilities.

But time is running out and we need your help. If you are a member of other organizations committed to wildlife, please encourage them – strongly – to take a public stand against the widescale killing of bats at wind-energy facilities.

You can also help by donating to BCI's special Bats & Wind Energy Initiative. Simply visit www.batcon.org, then go to the *Donate* icon. In the Comments section, please specify that you'd like your gift applied to the Wind Initiative.

Or call Sarah Gerichten at at BCI's Department of Development at *(512) 327-9721, ext. 42.*

BAT CONSERVATION INTERNATIONAL
P.O. Box 162603
Austin, TX 78716-2603 U.S.A.

NONPROFIT ORG.
U.S. POSTAGE
PAID
AUSTIN, TEXAS
PERMIT NO.
1530

ADDRESS SERVICE REQUESTED