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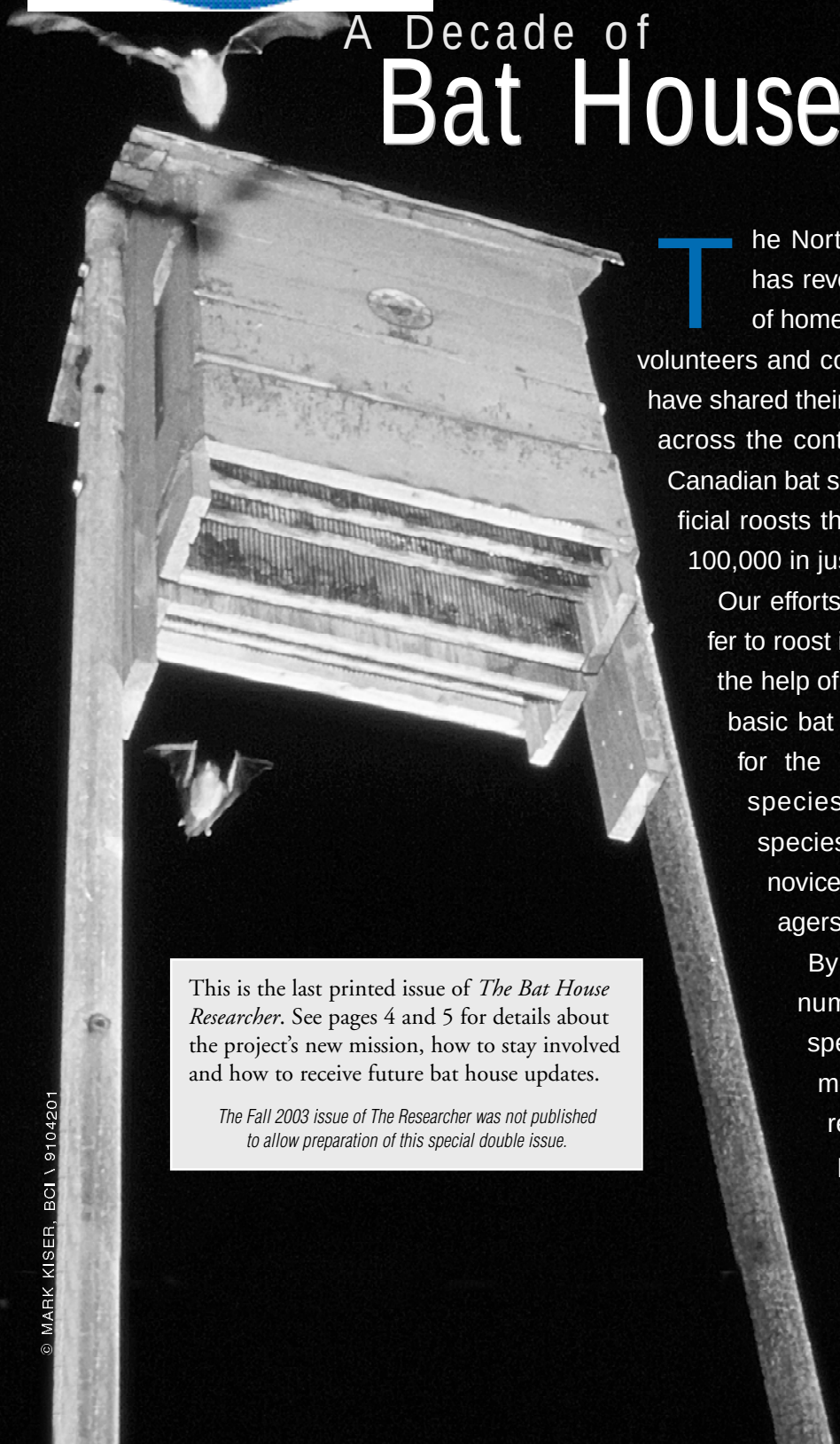
The Bat House Researcher

Newsletter of The North American Bat House Research Project



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A Decade of Bat House Discovery

Mark and Selena Kiser

The North American Bat House Research Project has revolutionized our ability to help bats in need of homes, thanks to the 7,000 Research Associate volunteers and colleagues who, over more than a decade, have shared their findings from varied climates and habitats across the continent. Today, at least 16 of 46 U.S. and Canadian bat species are using bat houses and other artificial roosts that shelter tens of thousands of bats, with 100,000 in just one extra-large structure.

Our efforts have mostly focused on species that prefer to roost in ¾-inch (19-millimeter) crevices, and, with the help of our Research Associates, we developed a basic bat house design that has proven acceptable for the majority of America's most widespread species. Such houses, which do not require species-specific knowledge, enable countless novice bat fanciers, farmers and wildlife managers to install successful bat houses.

By sharing and analyzing the results of numerous tests involving crevice-dwelling species in wide-ranging habitats and climates, we have clearly documented key requirements. As research progressed, we periodically added new, more-refined reporting categories, which limits the number of years available for cross-comparison. We are, however, able to make consistent comparisons for 1,553 bat houses reported from 1998 to 2001.

This is the last printed issue of *The Bat House Researcher*. See pages 4 and 5 for details about the project's new mission, how to stay involved and how to receive future bat house updates.

The Fall 2003 issue of The Researcher was not published to allow preparation of this special double issue.

Early Efforts

In the 1980s, most bat houses were small, unpainted, uncaulked and mounted in shaded locations on trees, often with roost chambers more than 1 inch (2.5 centimeters) deep (front to back). Then, in 1992, BCI's first survey of occupancy success in North America revealed that most bats prefer painted houses, with ¾-inch (19-millimeter) roosting chambers, especially when mounted in full sun on buildings and poles. These findings led to publication of *The Bat House Builder's Handbook*, which also identified important areas for further research.

Fully understanding bat needs requires numerous comparisons involving many species living in diverse climates and habitats, an impossible task without lots of volunteer help. BCI's founding of the North American Bat House Research Project enabled continent-wide sharing of consistent data.

Local testing has contributed dramatically to bat house successes, with occupancy improving from 23 percent in 1995 to 61 percent by 2000. Those who carefully follow our latest guidelines for construction and mounting are achieving success rates of 80 to 90 percent!

Lessons Learned

Though a wide range of bat house sizes and styles are still being used, we find that bats prefer larger houses and those mounted on buildings or other large wooden or concrete structures (Tables 1 and 2). Both preferences help buffer day-to-night temperature fluctuations, which appear to be a dominant concern for roosting bats, especially nursery colonies. For bat houses mounted on buildings, those with chambers at least 20 inches (50.8 centimeters) wide (side to side) were inhabited 82 percent of the time (83 of 101 houses); houses of the same width and with chambers at least 25 inches (63.5 centimeters) tall achieved 90 percent occupancy (37 of 41 houses).

Local testing remains a key element in success. Our findings suggest that the best approach is to begin by testing two or three – usually not more than six – bat houses, until the first bats move into the design and location they prefer.

Aside from basic shelter against the elements and predators, all roosts must maintain appropriate temperatures for a given species. Most colonial bat house tenants seek daytime temperatures of 80° to 100° F (27° to 38° C) for rearing young, although some tolerate even higher temperatures.

In very cold climates, testing should begin with black, unvented houses, mostly placed in the sunniest locations. In very hot areas, the opposite applies, though houses should rarely receive less than six hours of daily sun exposure anywhere. In most intermediate climates, it's best to test dark colors versus light colors or white, often side by side.

Buildings provide good mounting locations almost everywhere, but they are essential in extra cool or dry climates. In dry regions, where day-to-night temperatures may shift by more than 28° F (15.6° C), buffering from nighttime extremes is needed.

Where climates are moderate to hot with average to high humidity, it is best to test pairs of houses mounted back-to-back on poles – a light one facing north and a moderate to dark one facing south. Houses can also be tested side by side on buildings, with both houses facing the same direction, in any climate. By observing roost choices of the first occupants, bat preferences can be determined and met by varying the color or sun exposure for subsequent houses.

In intermediate to hot climates, bats typically prefer vented houses, with open bottoms, that provide a wider range of temperatures in a single house. This permits the bats to move vertically to find preferred roosting temperatures as exterior temperatures change.

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Bat House Project Coordinator Mark Kiser installs bat houses on the side of a California barn. Bat houses mounted on buildings performed best in our surveys, especially in hot, dry climates.

In the coolest climates, houses can be tested without vents and with all but ¾ inch (19 millimeters) of the sloping bottom covered; this combination increases inside temperature by reducing air circulation.

All bat houses should be caulked and painted or stained to prevent deterioration and leaks. Any leaks that develop must be repaired. Except in extreme southern Florida and the western United States, where larger species may prefer 1- to 1¾-inch (25- to 44-millimeter) crevices, ¾-inch (19-millimeter) crevices seem to be preferred. To the extent possible, locate all houses approximately 20 to 30 feet (6.1 to 9.1 meters)

from the nearest trees and at least 10 feet (3 meters) – preferably 12 to 20 feet (3.7 to 6.1 meters) – above ground (or above the tallest vegetation beneath the bat house). Those located nearest an area's largest water sources are typically the most successful, as are those in or adjacent to the most diverse or natural vegetation (Table 1).

Research Associate Brian Murphy inspects a two-chamber rocket box. Rocket boxes had slightly higher occupancy than nursery and large houses in our study, but they attracted smaller colonies on average.

Especially after local preferences are determined, erecting multiple houses is an excellent strategy. During periods of extreme weather, bats may need houses that are substantially cooler or warmer than normal. They may also switch roosts to escape parasites and some routinely move among a series of roosts, apparently as a predator-avoidance strategy. More room also means more space for a colony to expand. Options include offering different designs, compass orientations, exterior colors and hours of direct sun exposure.

Our combined surveys show that when three or more houses were installed in a group, 80 percent were successful (197 of 245 houses). Single houses succeeded only 49 percent of the time (321 of 657 houses). Multiple houses are especially important when they are relatively small. When large colonies are to be evicted from buildings, multiple or larger houses increase the odds that displaced bats will find adequate space. Varying placement to obtain more or less solar heating also helps.

Bat house designs and materials continue to evolve, but key features for all bat houses should include roost chambers at least 20 inches (51 centimeters) tall, caulked or sealed joints, well-painted or -stained exteriors, rough-surface landing areas and ventilation slots (except in cold climates). The more chambers and the taller and wider (side to side) those chambers are the better.

The "standard" models that fared best in our surveys were nursery and rocket houses (Table 2). Nursery houses – characterized by tall, multiple chambers, as opposed to a single roosting space – were used for rearing young twice as often as single-chamber houses. Rocket boxes were 6 percent more successful in attracting bats than nursery models, but 8 percent less likely to support nursery use. The high overall use of rocket boxes appears to stem from the increased temperature range available to occupants as they move between sunny and shaded sides along an extra-long vertical axis.

Nursery houses, with their large surface area, provide greater exposure for solar heating, while their multiple chambers reduce the odds of overheating young bats. Large houses, with 15 to 50 feet (4.6 to 15.2 meters) of linear roosting space, had the highest overall maternity use. While not everyone can build or erect such houses, adding height, width and additional roosting chambers appears to increase the odds of nursery use for any style of house.

The species most commonly reported in North American bat houses are the little brown myotis (*Myotis lucifugus*), Mexican free-tailed bat (*Tadarida brasiliensis*) and big brown bat (*Eptesicus fuscus*). No matter where you live in the lower 48 states and much of Alaska and Canada, you have the chance to attract at least one of these species, all of which differ in habitat and water preferences (Table 4). For example, free-tailed bats occupy houses farther from water, were less associated with forests and occurred more often in urban and suburban areas.

Time until first occupancy is reported in Table 3. Most of the occupied houses attracted bats within the first year (average: nine months), while 89 percent were used within two years. One bat house was not inhabited until 13 years, 2 months after installation.

Even in big cities, bat houses can be quite successful. Big brown bats find shelter in this suburban, backyard bat house within ⅓ mile (½ kilometer) of a busy interstate highway in Houston, Texas.

Little brown myotis pack the crevices of this bat house in Pennsylvania. Bat house enthusiasts who follow the guidelines developed over the past decade by the North American Bat House Research Project dramatically improve their chances of success.

Project Future

In order to devote more time and resources to innovative experimentation, we will no longer solicit, analyze and publish general bat house data in *The Bat House Researcher* and there will no longer be a participant subscription fee, although contributions to help support the project are certainly welcome.

We will share our research and results electronically, through our existing North American Bat House Research Project website (*www.batcon.org/bhra*), which is now called the Bat House Project to better reflect our expanding goals and international participation.

This site will be updated with new findings and test results to better serve our Research Associates and bat house enthusiasts everywhere. We will have quarterly bat house articles in BCI's free electronic newsletter (see page 5) and occasionally in *BATS* magazine (a BCI member benefit).

The savings from discontinuing our printed newsletter will be used to expand testing through small grants and on-site assistance.

We still need to improve bat house durability, ease of construction, life span and attractiveness. Improved designs, mounting strategies and/or thermostat-controlled heating techniques are needed to better meet bat needs in exceptionally cool or fluctuating climates. Refinements are also needed to better accommodate individual species, especially those that are endangered or declining.

Our past emphasis on meeting the needs of small, crevice-dwelling bats has also helped some threatened and endangered bat species, but other species have different roosting needs, such as open cavities or unusual crevices.

Help Needed

Testing bat needs over a wide range of species and climates remains a daunting challenge that can only be met by continued volunteer participation, so BCI offers new opportunities for you to partner with us. If you live in an area with special problems or species needs and are willing to conduct or monitor local experiments, please contact us. We may be able to help with a small grant or by supplying the specific kinds of

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- **Four issues of *BATS* magazine each year**
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- **Opportunities to participate in workshops and field projects**
- **Invitations to join fascinating international ecotours**

You don't have to be a member to donate to the Bat House Project.
To make a donation in any amount, go to *www.batcon.org/topdonation.html* or call (512) 327-9721.

bat houses, materials or devices you need for testing. We may even be able to come and help you design and set up your experiment. So let us hear from you so we can discuss your project.

We are always looking for new ideas. Let us know when you discover new materials that offer easier construction, greater durability or less weight. A few years ago, for example, no one would have believed that plastic houses would now rank among our most successful designs. Another new idea uses relatively inexpensive, thermostat-controlled heating devices (see "Heated Bat Houses," page 11), which hold great promise where cool nights are a problem.

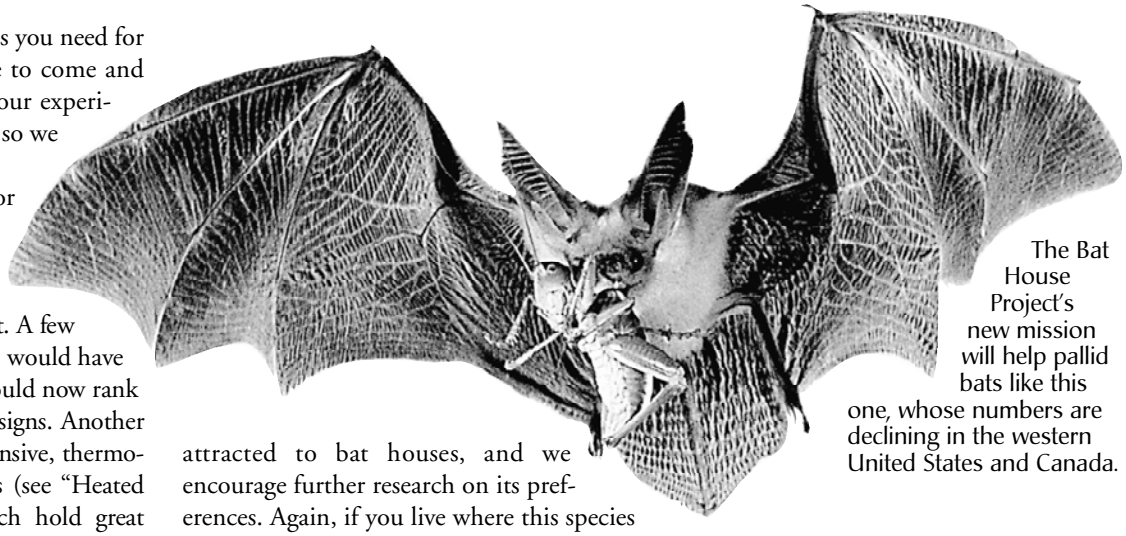
We have recently made great strides in developing artificial caves and simulated tree hollows that are needed by some species, and we anticipate additional advances to come. So contact us if you have an idea or testing opportunity.

We are especially looking for volunteer Research Associates who live in geographical areas where tests are most critically needed, including:

1. In arid and semiarid areas of the West and Southwest, we need better methods to protect against large drops in nighttime temperatures. Similar tests are needed in extra-cool mountainous or northern regions.

2. Pallid bats (*Antrozous pallidus*) and Townsend's big-eared bats (*Corynorhinus townsendii*) in the western United States and Canada are declining, and these bats need the help we believe our project can provide. If either of these species inhabits your area and you'd like to help with tests to meet their needs, please let us know.

3. The endangered Indiana myotis (*Myotis sodalis*), which is found throughout much of the eastern United States, has recently been attracted to bat houses, and we encourage further research on its preferences. Again, if you live where this species occurs, please contact us.



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The Bat House Project's new mission will help pallid bats like this one, whose numbers are declining in the western United States and Canada.

4. In the southeastern United States, we are achieving excellent results with simulated tree hollows made from vertically stacked, concrete road culverts. We plan to expand testing where there are known populations of Rafinesque's big-eared bats (*Corynorhinus rafinesquii*) or southeastern myotis (*Myotis austroriparius*).

5. In southern Florida, a small nursery colony of critically endangered Wagner's bonneted bats (*Eumops glaucinus*) was recently found using a small bat house (page 9). We are already testing their preferences at that location and would very much appreciate hearing from potential volunteers for additional test sites. The Florida Keys also provide an opportunity to test housing for Pallas's mastiff bats (*Molossus molossus*), which use bat houses in the Caribbean.

Please keep your ideas and reports coming. As in the past, we look forward to sharing your experiments and discoveries with fellow enthusiasts and colleagues worldwide. We remain interested in any test you may be conducting or discovery that would improve bat houses in general or enhance our ability to accommodate a single species. Some results will continue to be most easily reported on our traditional data forms. These and other project materials are available online at *www.batcon.org/bhra*.

Bat house success continues to spread to other countries and continents. BCI recently provided advice and/or received reports of occupied bat houses in Colombia, Costa Rica, Senegal, South Africa and Australia. Be sure to catch BCI's electronic newsletter, *BATS* magazine and our website for the latest stories and tips from around the world.

Not everyone can buy land to protect a cave or build a steel gate to safeguard bats in a mine. But installing bat houses is one way the average person can make a real difference. Thank you for supporting the project and for helping bats find new homes for all these years. Please stay in touch with us at *bathouses@batcon.org* as we continue our journey of discovery.

Back issues of *The Researcher* **will remain available on our website at:**
www.batcon.org/bhra

Sign up for BCI's Electronic Newsletter

You can stay up to date on the latest bat news and bat house discoveries with BCI's electronic newsletter. It's quick, easy and free. Visit BCI's website at *www.batcon.org* **and click the e-newsletter button on the home page, then the "Sign up for the E-newsletter" button and follow the instructions. Bat house news, tips and more will be included quarterly in the e-newsletter.**

Your privacy is important to BCI. We will never sell, lease, exchange or lend your name or email information to any other group, organization or business. Your email information will be used by BCI only, and only for the e-newsletter or for updates relating to your stated areas of interest. The e-newsletter will be sent once a month.

OVERALL PROJECT SUCCESS AND RESULTS

1998 – 2001 COMBINED SURVEYS

Table 1: Survey Results and Factors Affecting Bat House Success

	Occupancy Rate	Number of Houses
Increasing Success		
1995 Annual Survey	23%	124 of 536
1996 Annual Survey	37%	215 of 577
1998 Annual Survey	57%	445 of 778
2000 Annual Survey	61%	388 of 636
Mounting Location		
Trees	20%	25 of 125
Poles	52%	503 of 960
Wooden/Masonry Buildings	64%	264 of 411
Roost Chamber Height		
Less than 15" (38.1 cm)	44%	98 of 222
15 to 24" (38.1-61 cm)	51%	485 of 957
25" or more (63.5 cm)	64%	239 of 374
Roost Chamber Width (side to side)		
Less than 15" (38.1 cm)	51%	179 of 348
15 to 24" (38.1-61 cm)	55%	385 of 698
25" or more (63.5 cm)	72%	84 of 117
Number of Chambers		
1 or 2	50%	243 of 490
3 or 4	50%	386 of 768
5 or more	65%	193 of 295
Urbanization		
Urban	41%	46 of 112
Suburban	42%	112 of 267
Rural	57%	664 of 1,174

	Occupancy Rate	Number of Houses
Dominant Land Use Within 1-mile (1.6-km) radius		
Cattle Ranching	48%	32 of 66
Residential	48%	146 of 306
Farms/Natural Vegetation	57%	272 of 474
Natural Vegetation	59%	304 of 519
Dominant Farm Type Within 1-mile (1.6-km) radius		
Row Crops	24%	18 of 76
Pastures/Row Crops	52%	156 of 298
Pastures	53%	140 of 265
Orchards	67%	37 of 55
Pastures/Row Crops/Orchards	68%	103 of 152
Dominant Natural Vegetation		
Wetland	28%	19 of 67
Desert	31%	25 of 80
Forest	54%	409 of 753
Grassland	55%	142 of 259
Overgrown Field/Shrub	61%	132 of 217
Nearest Freshwater Source		
Marsh (all sizes)	38%	32 of 85
Stream (less than 50' wide)	50%	229 of 454
Pond (less than 25 acres)	51%	234 of 463
River (greater than 50' wide)	60%	110 of 184
Lake (greater than 25 acres)	61%	190 of 313

[50 feet = 15.2 meters; 25 acres = 10.1 hectares]

Table 2: House Design versus Occupancy and Use Type

Design (Linear Roost Space)	Occupied With Maternity Use	Number of bats: Average	Number of bats: Range	Overall Occupancy	Number of houses
Small/Single Chamber (<2.5')	13%	19	1-150	36%	96 of 269
Medium (2.5' to 7')	28%	31	1-300	46%	109 of 236
Nursery (3' to 15')	27%	74	1-500	56%	439 of 782
Large (15' to 50')	44%	225	1-1500	58%	45 of 77
Rocket (1.5' to 5')	19%	24	1-133	62%	73 of 118

[Linear roost space = total length (side to side) of all roost chambers combined; 1 foot = 30.48 centimeters]

Table 3: Time Until First Occupancy (735 occupied houses)

Average: 9 months. Range: 0 to 158 months.

Time	Percentage of Occupied Houses	Number of Houses
<1 month	13%	98
1 to 6 months	48%	354
7 to 12 months	15%	111
13 to 24 months	13%	92
25 to 36 months	5%	36
37 to 48 months	3%	22
>48 months	3%	22

Table 4: Differences Among Three Most Common Bat House-Using Species

Urbanization	Rural	Suburban	Urban
Little brown myotis (175 houses)	91%	8%	1%
Big brown bat (104 houses)	83%	9%	8%
Mexican free-tailed bat (122 houses)	58%	21%	21%

Dominant Land Use	Residential	Farms/ Natural Vegetation	Natural Vegetation	Other
Little brown myotis (175 houses)	5%	38%	54%	3%
Big brown bat (104 houses)	19%	15%	51%	15%
Mexican free-tailed bat (122 houses)	44%	34%	15%	7%

Distance to Water	Less than 1/4 mile	1/4 to 1 mile	More than 1 mile *[1 mile = 1.6 kilometers]*
Little brown myotis (175 houses)	93%	6%	1%
Big brown bat (104 houses)	84%	16%	0%
Mexican free-tailed bat (122 houses)	66%	13%	21%

Dominant Natural Vegetation	Desert	Grassland	Overgrown Field/Shrub	Forest	Other Vegetation/ Mixed
Little brown bat (175 houses)	0%	12%	14%	74%	0%
Big brown bat (104 houses)	0%	27%	26%	42%	5%
Mexican free-tailed bat (122 houses)	11%	29%	12%	20%	28%

This bat house full of Mexican free-tailed bats is located where grasslands are the predominant vegetation. In our surveys, free-tailed bats used bat houses in grasslands more than any other natural vegetation type.

BAT HOUSE HALL OF FAME

The North American Bat House Research Project – and countless bat colonies – have benefited immensely from the innovations and dedication of these early pioneers. We owe them a great debt for sharing the knowledge they worked so hard to obtain.

FRANK AND TERESA BIBIN, Georgia – The first organic growers to demonstrate the value of bats for pest reduction in pecan orchards.

KENT BORCHERDING, Wisconsin – Attracted one of the largest little brown myotis colonies to bat houses and contributed the most data report forms to the project.

LOIS BLUMENTHAL, Cayman Islands – Founded an extensive project to provide homes and test preferences for excluded Pallas's mastiff bats.

CAL BUTCHKOSKI AND LISA WILLIAMS, Pennsylvania – Pioneered the use of vents and larger nursery designs; among the first to demonstrate the importance of bat houses for little brown myotis and big brown bats excluded from buildings.

JACK DAVIS, Michigan – Demonstrated the importance of dark exteriors and solar heating in northern climates.

DAN DOURSON AND JOHN MACGREGOR, Kentucky – Co-invented the rocket box, which has attracted at least eight species across North America.

LAURA FINN, Florida – Conducted one of the first large-scale experiments to determine design and temperature preferences in the southern United States; demonstrated the importance of bat houses for excluded evening bats and free-tailed bats.

TONY KOCH, Oregon – An early experimenter (1980s) with materials, house dimensions and mounting strategies; one of the first organic farmers to demonstrate the benefits of bats for pest reduction.

AMANDA LOLLIAR, Texas – Documented roost preferences of Mexican free-tailed bats and championed community-wide bat house installation in conjunction with exclusion.

MARVIN MABERRY, Texas – Developed the first plastic bat houses and many associated innovations; attracted the largest colony of big brown bats to a bat house.

JOHN RAGAN, Michigan – Confirmed the importance of landing areas, dark exteriors and solar heating in northern climates.

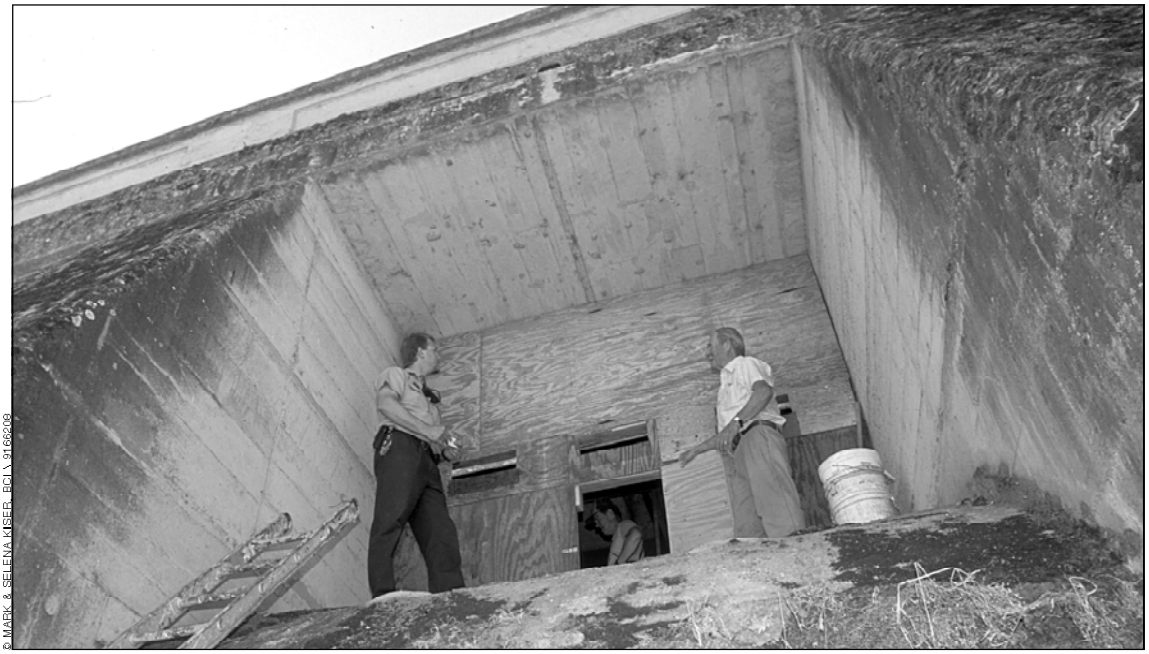
ERNIE STEVENS, Florida – Demonstrated temperature preferences of free-tailed and evening bats.

In addition, a select group of Research Associates has supported the project through controlled experiments, sharing data on large numbers of houses or providing information on new species. Many have also protected large colonies through educational outreach and by installing bat houses in conjunction with exclusion efforts.

We recognize these outstanding individuals for service to the project and their communities by helping both bats and people.

BLAIR ACTON, British Columbia
CAROL & BAXTER ADAMS, Texas
ANNIE BAND, Wyoming
STEVE BARLOW, Florida
WILLIAM BURR, California
TIM CARTER, Illinois
BRUCE EHRESMAN & LISA HEMESATH, Iowa
DAVID GEDEON & TOM MANTEY, Ohio
BARRY GENZLINGER, Vermont
KEN GLOVER, Florida
TOM HARADEN, Utah/Wyoming
HARRY HARNISH, Arkansas
BILL HOLLOWAY, Louisiana
ROLLIE HUFFMAN, Nebraska
BOB LUCE & VICKI HERREN, Wyoming
RACHAEL LONG, California
JIM & MICHELLE MCCAULLEY, New Mexico
HUGH MCLAURIN, South Carolina
PATRICIA OTTO, Washington
GARY REYNOLDS & SUE BOUNOUS, British Columbia
GREG TATARIAN, California
BOB WISECARVER, California

We also thank everyone who supported the project and contributed data, photos and observations.



Hall-of-Famer "Bat House Bob" Wisecarver (right) inspects the "bat cave" he helped build with the East Bay Municipal Utility District at Pardee Reservoir near Sacramento, California. A Research Associate since 1995, Bob has built and reported on more than 50 bat houses. More than 5,000 Yuma myotis (*Myotis yumanensis*) and free-tailed bats call the bat cave home.

RARE WAGNER'S BONNETED BAT FOUND IN BAT HOUSE

Mark and Selena Kiser

The Wagner's bonneted bat (formerly known as Wagner's mastiff bat) is Florida's largest and rarest bat. Listed as endangered in Florida, it occurs only in the southern tip of the state. It is about 70 percent larger than the Mexican free-tailed bat, with a wingspan of up to 18.8 inches (47.8 centimeters) and a body length of 5 to 6.6 inches (12.7 to 16.8 centimeters). Wagner's bonneted bats roost in Spanish tile roofs, tree hollows and dead palm fronds. Colonies are small, with the largest reported at just 32 individuals.

In Florida, this species has been seen only a few times since the 1960s, mostly in the Miami metro area. Habitat loss and heavy pesticide use are believed responsible for the decline.

The last-known roost was the hole of a pileated woodpecker (*Dryocopus pileatus*) in a longleaf pine tree (*Pinus palustris*) in Charlotte County. This tree, which contained eight bats, was felled for a road construction project in 1979. In the 1990s, a few injured individuals (including a pregnant female) were found and taken to wildlife rehabilitators, but no roosts were located.

This past summer, however, produced an exciting discovery with great potential for this species. Susan Trokey, a biologist with the U.S. Fish and Wildlife Service, installed a single-chamber bat house in her backyard in Lee County in June 2000. Mounted on a pole 17 feet (5.2 meters) above ground, it had a 1½-inch (38-millimeter) roost chamber with a partial bottom creating a ¾-inch (19-millimeter) opening. Up to 75 Mexican free-tailed bats had used the house for three years. Then one evening in February 2003, the Trokeys noticed several large bats emerging from the house. Convinced they were of a different species, Susan asked Cyndi and George Marks with the Florida Bat Center to investigate. They recorded the echolocation calls with a bat detector and later netted one of the mysterious bats as it emerged. To everyone's surprise and delight, the bat was a Wagner's bonneted bat.

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The rarely seen Wagner's bonneted bat turned up in a backyard bat house in Florida last year. This first-known use of a bat house bodes well for the species' future.

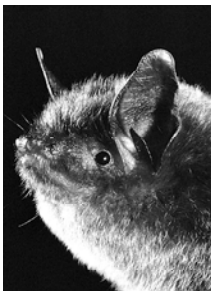
Not only was this the first roost located in 24 years, it is also the first record of Wagner's bonneted bat in a bat house and gives reason for optimism about the future of this species.

An estimated 11 bonneted bats, including an albino, used the bat house in 2003. The Trokeys are testing three new houses, each with a different chamber spacing, to determine if these bats have a preference.

Stay tuned for future updates!

NEWS & NOTES

INDIANA MYOTIS RAISING YOUNG IN ROCKET BOXES



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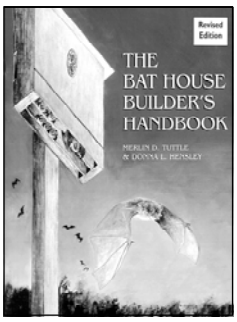
Southern Illinois University graduate student Tim Carter has confirmed that endangered Indiana myotis are raising young in two rocket boxes [*TBHR*, Fall 2002]. One of the boxes is a two-chamber rocket box and the other is a single-chamber box built around an 8 x 8-inch (20 x 20-centimeter) wooden post. These are the first known bat houses to be used as maternity sites by Indiana myotis.

NEW PLYWOOD RECOMMENDATIONS FOR BAT HOUSES

When using plywood to build bat houses, BCI now recommends ACX and BCX grades, along with T1-11 siding. Look for sheets with four or more plies and the American Plywood Association "Exterior" stamp. According to the trade group, CDX exterior plywood is actually rated for temporary outdoor applications only ("Exposure 1" as opposed to "Exterior") and will not last as long. For bat house exteriors, ½-inch (13-millimeter) or ⅝-inch (16-millimeter) thicknesses are ideal; ⅜-inch (10-millimeter) is a good choice for partitions. Cal Butchkoski recommends ¾-inch (19-millimeter) plywood for roofs to minimize the risk of warping.

2003 REVISION OF *BAT HOUSE BUILDER'S HANDBOOK* AVAILABLE



The Bat House Builder's Handbook, first published by BCI in 1993, is now in its seventh revision and includes species accounts, photos and ranges for each of the 14 North American bat species documented as using crevice-style bat houses.

The *Handbook* is available from BCI's catalog at *www.batcon.org/catalog* or call 1-800-538-BATS.

RESEARCH ASSOCIATES IN ACTION: HUGH MCLAURIN

Mark Kiser

Hugh McLaurin has achieved remarkable results with his home-built bat houses on South Carolina's coastal plain. About 2,100 Mexican free-tailed bats reside in four triple-wide houses, while another 800 to 1,000 have used 10 additional houses. This active Research Associate has experimented and reported his results every year since 1997. His enthusiasm for bats even caught on with the local power company.

It all started seven years ago, when Hugh built four unpainted nursery houses for his lakeside property. He mounted them as two back-to-back pairs (facing north/south) on a large steel pole. His first four bats moved in barely a month later and by 1998, 80 bats had moved into one pair of houses. The following year, both pairs had maternity use and the 450 to 700 bats stayed all winter long [*TBHR*, Spring 2000].

In March 2000, Hugh added a third, identical pair (this time painted dark brown) between the first two pairs. Two months later, he built four extra-large nursery models (4 feet tall by 2 feet wide [1.2 by 0.6 meters]), each with eight chambers. He installed these as two back-to-back pairs (one dark brown, the other dark green) on a massive steel pole near the first six houses.

The hot summer of 2000 presented an unexpected opportunity for Hugh to experiment. Bats abandoned all six of the smaller houses in July, apparently because of high temperatures. He decided to repaint the large, dark brown pair and one of the smaller pairs light beige to give bats some options. When bats returned two weeks later, after temperatures had dropped, he saw no immediate preference. But in October, most of the bats switched to the larger houses – one bat appeared in one of the tall, beige houses, followed by about 600 others a few days later. After several more weeks, another lone bat moved into one of the large dark-green houses. It was soon joined by 400 more. Bats disappeared for weeks at a time in December 2000 and January 2001 when cold spells occurred but always came back when temperatures warmed up.

By this time, Hugh was "really having fun with the bat houses" and wanted to get more involved. He contacted Santee Cooper Power (from which he had retired) and convinced them to try using bats for pest management at the company's lakeside recreation area.

COURTESY OF HUGH MCLAURIN

Research Associate Hugh McLaurin puts the finishing touches on two pairs of extra-large bat houses mounted side by side at his lakeside property in South Carolina. His 14 boxes shelter an estimated 2,700 free-tailed bats.

Hugh and company employees built and installed four extra-wide houses in March 2001. Each house was 3 feet tall by 4 feet wide (0.9 by 1.2 meters) with eight chambers. They were mounted in pairs facing north/south on a 5-inch diameter (12.7-centimeter) steel pole. Like his other large houses, one pair was painted dark green and the other light beige.

The first tenants arrived 14 months later. Hugh says about 100 bats inhabited each house that summer, with a total of 2,100 bats in the four houses by fall 2003. Some of the bats from his original houses may have moved to the recreation area (just a few miles away), as bat numbers at Hugh's property dropped to about 600 in 2003.

Although bats consistently use all seven pairs of houses, most seem to prefer the tallest and widest models. His success shows once again that having multiple houses of different designs and exterior colors provides alternatives for bats to choose from throughout the year.

Keep up the great work, Hugh!

HEATED BAT HOUSES

From Canada to Florida, bats can sometimes use extra help staying warm ...

Mark and Selena Kiser

It's so cold in the Yukon Territory that little brown myotis are active for only five months of the year (May to September). Long summer days help some bat houses stay warm enough even this far north, but new techniques being tested in Northern Canada and elsewhere may help improve occupancy by keeping temperatures warmer and/or more stable in both warm and cold climates.

Near Whitehorse (60°36' N), wildlife biologist Brian Slough is conducting an innovative cold-weather experiment. Although small colonies of little brown myotis inhabited several houses he built, another received only occasional use as a night roost. He wondered if extra heating might help.

Brian replaced the little-used house in 2001 with a new nursery house built to BCI's cold-climate specifications [*TBHR*, Fall 2000]. He attached this new house to the south side of a wooden building in the same location as the previous one. At the top of the back chamber, he affixed a 9 x 19-inch (23 x 48-centimeter) heating mat of the type used by plant nurseries for seed germination. The heating mat was connected to a programmable thermostat (Electronic Temperature Control model # ETC-111000, Ranco Corp., *www.ranco.invensys.com*), which plugs into a standard 120-volt AC outlet. The thermostat's temperature sensor, on the end of a long cable (up to 400 feet [122 meters] is possible), was inserted into the top of the back chamber. He programmed the thermostat to turn the heating mat off when the chamber reached 86° F (30° C).

COURTESY OF BRIAN SLOUGH

Wildlife biologist Brian Slough checks the guano shelf beneath the experimental heated bat house he's testing in Whitehorse, Yukon Territory.

Brian monitors occupancy with a bat detector, chamber and emergence counts and a guano shelf below the houses. Up to three bats inhabited the heated house as both day and night roosts in 2001. Later that year, he added an identical – but unheated – bat house beside the first to see if bats had a preference. Three bats used only the heated house in 2002, and last year he counted at least five bats consistently using the heated house. The adjacent, unheated house had only sporadic use by one or two bats. Brian recorded temperatures up to 122° F (50° C) inside the heated house (within the tolerance for this species), but again, the heating mat is programmed to turn off long before that point. We will keep you informed about this test as new information becomes available.

Mexican free-tailed bats, meanwhile, live in warm climates and are poor hibernators. Many populations stay active year-round by migrating to Mexico. Eastern and some West Coast populations are nonmigratory; they survive winter by slowing their metabolism as needed in what's known as daily torpor. Small numbers of free-tailed bats (typically first-year males) in Central Texas also do not migrate. Sometimes this gamble proves costly.

Kinney and Tyra Kane in Comfort, Texas, have free tails overwintering in a large, five-chamber nursery house on their ranch. When temperatures fall below freezing for extended periods, some of the bats succumb to the cold, fall out of the house and die from exposure. The same phenomenon has been reported with this species in Florida.

Last winter, the Kanes sought ideas for alleviating the problem. Barbara French, BCI's Science Officer and a bat rehabilitator, suggested supplemental heat in the form of a red light bulb. Using an ordinary outdoor lamp clamped on or next to the bat house, heat is directed onto the front of the house. The Kanes tried this during the winter of 2002-03 and lost no bats to freezing temperatures.

Some landlords argue that passive heating methods are best. Research Associate Dean Gallagher in Florida believes new designs for overwintering free-tailed bats are needed. Insulation, partial bottoms and/or new materials with higher thermal mass could prove effective. We encourage people to test separate, insulated houses or new designs alongside conventional houses as winter quarters for free-tailed bats and to report their results.

In Idaho, Jay Price has been experimenting with a method of his own design using black plastic pipes filled with paraffin wax. He attaches the pipes underneath special houses made of thick foam insulation. The houses and pipes are exposed to direct sunlight during the day. The paraffin likely stores considerable heat, then releases it into the bat house at night. His insulated houses probably retain much of this heat, keeping temperatures relatively stable over a 24-hour period. Jay reported one remarkable case with one of these bat houses he installed outside a mine at 6,000 feet (1,829 meters) elevation. About 80 to 90 little brown bats quit using the mine and moved into his bat house instead.

We welcome additional suggestions, comments and experiences involving temperature manipulation. Please contact us at *bathouses@batcon.org*.

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