Bayou Bats: Success in Louisiana

Mark and Selena Kiser

Persistence Pays Off

"Whatever makes my bats happy, makes me happy," says Honorary Research Associate Bill Holloway, who has been experimenting with bat houses for six years. Holloway, who lives near the Louisiana-Texas border, has had extraordinary success with his three back-to-back pairs of nursery houses, although it has taken several years. Located within 100 yards (91 m) of Toledo Bend Reservoir, and surrounded by forest and wetlands, his houses are used year-round by more than 800 free-tailed (Tadarida brasiliensis) and big brown bats (Eptesicus fuscus). His records of ambient temperatures and movements of bats between houses have yielded valuable information.

Holloway's first attempts began in 1994 with two unpainted houses mounted 20 feet (6.1 m) high on pine trees in his yard. Although he attracted a few flying squirrels, no bats accepted his invitation. After learning about BCI, he joined the North American Bat House Research Project in February 1996, and promptly moved both houses to a new location. He erected his boxes back to back facing east and west on a 23-foot (7-m) pivot-pole of his own design. Five bats moved into that July, and by summer 1997, the colony grew to 58 bats, with most occupying the east-facing house. Wanting to attract even more bats, he installed a new back-to-back pair of larger houses in October, which he painted medium brown (south-facing house) and white (north-facing house) to create a wider range of temperature. Two bats moved into the brown house almost immediately and stayed through December.

In 1998, Holloway delighted in watching his colony grow. By June, there were 92 bats using the east/west pair. When temperatures reached 100° F (38° C) in July, bats switched to his new north/south pair, with most occupying the white house. In August, he replaced the old east/west pair with a new, much larger pair of houses, each with 11 chambers. He painted the east-facing house dark purple, the west-facing house white, and the insides of both houses black. He also treated both with a mixture of water and guano from the other houses.

Holloway admits that he was unprepared for what followed. "I think I did something right," he explained. "The bats were just waiting for me." Soon after the new houses were in place, bats began to fill them, and the number of bats skyrocketed over the next three months. By November, 580 bats moved in—a tenfold increase in one year. Holloway said, "I didn't expect so many bats so quickly. I love it!"

Not willing to rest on his laurels, he installed a new back-to-back pair of houses in February 1999 to make room for even more bats. The new houses are taller than his other designs, as they have a separate wood duck nest compartment at the top. As many as 20 free-tailed bats used this pair within the first few months, but in May, when a female wood duck built a nest in one of the boxes, the bats suddenly departed. The hen successfully

Free-tailed bats return before dawn to two of Bill Holloway's bat houses in Louisiana. Though it took several years, he now has attracted more than 800 bats and plans to expand his experiments.
raised her nestlings and left by July, but bats did not return to this pair until September. He plans to leave the wood duck nesting compartments open for another year to see if the bats and ducks will only use the boxes at separate times. In the meantime, his colony continues to grow, and reached an all-time high of more than 800 bats this summer. Not surprisingly, he has even bigger plans, with more houses, for the year 2000.

**Third Time's a Charm**

In northwestern Louisiana, years of testing and careful observations by another Research Associate also are yielding great benefits. Jack Cox joined the Project in August 1994, and like Holloway, began experimenting with bat houses on trees. In November 1993, Cox mounted four unpainted, medium-sized bat houses (9.5 in W x 9.5 in L x 22 in H/24.1 cm W x 24.1 cm L x 55.9 cm H) around a tree trunk. He later moved two of the houses to another tree to conduct a temperature preference test, with one house on each tree painted medium brown and the other left unpainted. After several years with no bats, Cox decided to remove all four houses and try again.

In July 1996, Cox repainted the houses and installed them on poles 19 feet (5.8 m) high. Continuing his tests, he arranged two houses side by side on one pole facing north—one painted light brown, the other white. He repeated this test with the two south-facing houses. Despite his efforts, all four houses remained unoccupied in 1996 and 1997. Not willing to give up, Cox tried a new strategy. For the second time, he took down all four houses in September 1997 to modify them. He combined his four medium-sized houses into two larger houses with nine chambers each (20 in W x 9.5 in L x 22 in H/50.8 cm W x 24.1 cm L x 55.9 cm H). Suspecting that the light brown and white houses may have been too cool, he repainted both modified houses dark brown and reinstalled them on the same poles, one facing north, the other south.

In May 1998, his testing paid off, when big brown bats began moving into the modified north-facing house. His emergence counts indicated approximately 180 bats by summer's end, an impressive number for the first year of occupancy. He reported over 200 bats in 1999, with only six bats using the south-facing house. The bats' preference for the north-facing house may reflect that house's absorption of less solar heat, a result of the fact that its roof sloped away from the sun. Because big brown bats are less heat tolerant than most species, the south-facing house may have been too warm.

Although it took years, his patience and experimentation were rewarded, exemplifying the importance of testing local preferences. Cox will continue to monitor his houses to determine if another color might best suit the south-facing house. For now, Cox is enjoying watching the bats emerge and return with his infrared video camera, which allows him to record in total darkness without disturbing the bats. We congratulate both of these Research Associates for their achievements, and look forward to hearing of their continued success.
Bat Houses and Exclusion in British Columbia

Mark and Selena Kiser

When bats are excluded from buildings, or when old buildings collapse or are torn down, alternative roosts are not always available. By installing bat houses on or near occupied buildings, displaced bats can be encouraged to stay in the vicinity, creating a win-win solution.

In November 1997, Mike and Andrea Patterson read a newspaper article mentioning BCI, and contacted us for assistance with a bat problem. As resident caretakers at a private retreat owned by the Grant B. Culley Jr. Foundation on Quadra Island, British Columbia, they were concerned about approximately 2,000 bats (believed to be mostly little brown bats, Myotis lucifugus) roosting in several buildings. They offered to fund a project to relocate their bats, providing an excellent opportunity to field test new bat house designs.

Since the bats arrive in May and depart in September, we recommended sealing the buildings by late April. We began building and installing bat houses in mid-April 1998. However, due to a harsh winter, the primary building roosts had not yet been bat-proofed.

With expert assistance from Mike, seven houses were constructed, painted, and installed. These included a back-to-back pair of BCI nursery houses (painted black), two single-chamber houses, each four feet wide (122 cm) by three feet tall (91 cm), one black and one dark brown, and three experimental designs, including the first two-chamber rocket box [The Bat House Researcher, Fall 1998]. Three pre-built nursery houses (one wooden and two plastic) were also mounted. Due to the cool climate, vents on all but one of the houses were omitted or plugged. Where possible, houses were arranged into groups that would test bat preferences. Seven houses were placed on buildings, and the remaining three (the rocket box and back-to-back pair) on poles.

When the bats returned, several hundred immediately occupied the two-chamber rocket box, and pups were observed in late July. The bats left this box in August, and approximately 50 moved into the back-to-back nursery pair. By early September, all had departed for hibernation.

Hampered again the next winter by extreme weather, exclusion still had not been completed by the spring of 1999. Although the two main building roosts remained accessible, many bats moved into seven of the 10 bat houses, with approximately 350 mothers and their pups in just the back-to-back pair of nursery houses. Far fewer bats returned to the two buildings, and one was almost completely vacated.

One additional bat house was also used as a maternity site. The black, single-chamber house contained at least 50 bats, whereas the adjacent brown houses, both single-chamber and nursery, had only a few bachelors. The extra warmth generated by the black exteriors evidently provided the preferred temperatures for rearing young. A more thorough monitoring study is planned next year to determine the temperatures these bats prefer.

Of the original 10 houses, only two remained unoccupied by July 1999. To test if the problem with these was insufficient solar heating, one was moved higher up on the same wall where it received more sunlight. Just two weeks later, 10 to 12 bats moved into the relocated house. The extra few hours of sunlight apparently made the difference. The other unused house will likewise be moved before next spring.

To continue our experimentation, we installed three new houses in 1999, two of which were a new design from Honorary Research Associate Marvin Maberry. His plastic "Quad Boxes" are actually four houses in one—a back-to-back pair with two smaller houses in between. They allow unhindered movement between houses and are easy to install. The Quad Box fits over...

Mike Patterson checks for bats in this black, single-chamber bat house, where bats raised their pups in the summer of 1999. The brown, single-chamber and nursery houses to the left were only used by small bachelor groups, illustrating the importance of temperature. Much of the nuisance problem in this building was remedied by the bat houses, even though exclusion had not yet begun.
a 4- x 4-inch (10- x 10-cm) post, requiring only two screws for attachment. Seven days after installation, about 15 to 20 bats moved into one, and five bats used the other within two weeks. (Contact Marvin Maberry at (903) 645-7780 for ordering or other information.)

The final house installed was a two-chamber rocket box located near the original one. Last year, overheating may have caused bats to leave the dark brown, unvented rocket box in August. For comparison, we added vents to the new one and painted it medium gray to provide cooler temperatures. We anticipate that bats will alternate between these two rocket boxes as ambient temperatures change. About 10 to 12 bats returned to the dark brown box in August and September 1999.

To date, 11 of the 13 bat houses have been used. Bats have had two full seasons to become accustomed to their new roosts, and they appear to be adapting well. Much of the nuisance problem has already been alleviated, and once exclusion is completed, bats and people will be able to coexist peacefully with mutual benefit. We thank the Grant B. Culley Jr. Foundation for protecting these bats and for funding this project.

Bat Houses in Bridges
Brian Keeley

As natural roosts have been lost, man-made structures such as bridges and culverts have provided important alternatives for bats. In some areas, bats are so desperate for roosts, they even move into new bridges still under construction. Twenty-four of the 45 U.S. bat species use bridges or culverts as day roosts, and based on known preferences, at least 13 others are likely to do so. It is estimated that 33 million bats now roost in some 3,600 American highway structures, primarily within the southern U.S. Thousands of existing bridges and culverts could easily accommodate millions more if retrofitted with appropriately designed bat houses.

The warmest, sun-exposed bridges are most likely to attract bats. Bridges act as large thermal sinks, stabilizing, and often maintaining moderately high temperatures for most of the 24-hour cycle. This helps adult bats conserve energy and foster development of their young. In partially shaded bridges, roosting often occurs only in the sun-exposed areas. Bats are most likely to be found in highway structures below 42° north latitude, probably because bridges are too cool farther north.

Retrofitting habitat into existing highway structures has become a popular and successful method of accommodating bats. Two basic bat house designs, the Texas Bat-Abode and Oregon Wedge, can be used to retrofit almost any bridge or culvert. Both designs have been tested in bridges and culverts, and each has successfully attracted bats. Plans are available in the Bats in American Bridges publication on the BCI web site (www.batcon.org/bridge/ambatsbridges/index.html). Please note that all retrofitting activities must be coordinated with appropriate transportation departments.

Design 1: Texas Bat-Abode
The Texas Bat-Abode can accommodate thousands of bats, and is easily modified to fit different bridge designs. It has been successful in four
Texas locations. Bat-Abodes have an external panel on either side and 3/4" x 1 1/2"-inch (1.9- x 3.8-cm) wooden spacers sandwiched between 1/2" to 3/4"-inch (1.2- to 1.9-cm) thick plywood partitions. Recycled highway signs are ideal construction materials. Crevices should be spaced 3/4" to 1 inch (1.9 to 2.5 cm) apart and be at least 12 inches (31 cm) tall, preferably 20 inches (51 cm) or taller. Interior surfaces need texture to provide footholds for bats on at least one side of each partition (preferably both), with irregularities at least every 1/8 inch (0.3 cm). Methods of creating footholds are discussed in Bats in American Bridges.

To ensure a proper fit, measure the exact location where the Bat-Abode is to be placed. Note that only the shape of the external panels needs to conform to spaces between the beams. The number of partitions is arbitrary and limited only by availability of materials and support for the weight of the Abodes. Because of weight, it may be easiest to assemble the pieces in the bridge. In wooden bridges, the unit should be anchored to the structure with heavy-duty, rust-resistant lag bolts.

A modified Bat-Abode design without crevices mimics roost conditions in abandoned buildings and tree hollows favored by big-eared bats (Corynorhinus sp.) and some myotis bats. The Big-eared Bat-Abode has two external panels with 1- x 2-inch braces to hold the panels together. Footholds should be created on panel walls and the ceiling using plastic mesh or other methods (see above). Big-eared bats are often found in low bridges darkened by thick vegetation growing along the sides. The Abode should be placed at least 6 to 10 feet (2 to 3 m) above the ground in a secluded portion of the bridge. However, access to the flyway entrance should not be blocked.

**Design 2: Oregon Wedge**
The Oregon Wedge provides a simple, inexpensive method of retrofitting bridges or culverts with day-roost habitat. This bat house has been successful in both bridges and culverts in Oregon, Arizona, and Texas. It can shelter several hundred bats and has been accepted for day roosting by 12 species. The Wedge is made from a 1/2"- to 3/4"-inch exterior-grade plywood panel at least 18 inches high and 24 inches wide (46 x 61 cm), with three 1- x 2-inch wooden spacer strips attached along the top and sides, leaving an opening along the bottom. If larger panel sizes are used, small wooden spacers should be placed every 12 to 24 inches (30 to 61 cm) to support the plywood and prevent warping. Leave at least a 1.5-inch (3.8-cm) gap around spacers to allow movement within the panel.

The Wedge should be attached to a flat, vertical, concrete or wooden surface near the sun-warmed road slab of a bridge or culvert ceiling. On concrete structures, use concrete anchor-bolts or a fast-drying, environmentally safe epoxy cement (such as 3M Scotch coat 3-12). The transportation department should install the panels if anchor bolts are used. If using epoxy, it is easiest to first attach only the top strip. After the epoxy has cured, fasten the panel to the firmly anchored strip. Although footholds can be provided on the wooden panel, bats usually roost on the concrete, which often has adequate foothold texture. If the panel is to be attached to wood, use appropriate rust-resistant wood screws. As a precaution against flooding, a 1.5-inch gap can be left at each upper corner, where the support strips join. This provides an escape route in the event of fast-rising water.

Roadway structures on public lands, such as parks or national forests, are especially good candidates for bat habitat enhancement programs. In most cases, transportation department costs are minimal. In fact, local businesses are often willing to donate materials to assist schools or private organizations in building roost structures. Media coverage and positive publicity of such projects has been extraordinary. For example, when 33,000 Mexican free-tailed bats became a nuisance in the attic of the Canadian Middle School,  

This Texas Bat-Abode installed in a bridge in Central Texas shelters more than 1,000 Mexican free-tailed bats and cave myotis (Myotis velifer). Retrofitting bridges and culverts is an economical method of creating roosting habitat for large numbers of bats.
teachers and students in Canadian, Texas, collaborated on a project to provide alternate roosts in a nearby bridge. After receiving an Environmental Challenge Program grant from the Texas General Land Office and H-E-B Grocery Company, the school worked with Bat Conservation International and the Texas Department of Transportation to build and mount their Bat-Abodes.

In the protected environment of a bridge or culvert, a properly constructed and installed bat habitat made of quality materials should last as long as the highway structure. To initiate a successful retrofitting project, we recommend the following steps. Gather information from Bats in American Bridges and The Texas Bats and Bridges Project reports on BCI’s web site. Attract local support from schools, businesses, and state wildlife officials. Then, contact district transportation department biologists for project assistance and approval. Contact Brian Keeley at bkeeley@batcon.org or (512) 327-9721 if you need additional information and please let us know about your project’s success!

Attracting Pallid Bats

Mark Kiser

The pallid bat (Antrozous pallidus) is recognized by its more than one inch-long ears and light yellowish fur. It lives in arid and semi-arid areas from Mexico and the southwestern United States northward to Washington and British Columbia (Figure 1), mostly at elevations below 5,000 feet. Unlike most insectivorous bats, it catches much of its prey on the ground, including crickets, grasshoppers, June beetles, leafhoppers, centipedes, and even scorpions.

Pallid bat colonies typically include only 12 to 100 individuals. At night, they often roost under porches and overhangs, where they drop wings and other parts of large insects while eating. Day-roosting sites are usually in rock crevices, bridges, buildings, and occasionally in caves, mines, or hollow trees. The extent to which pallid bats are able to use bat houses, however, is not well understood. Do their needs differ from other bats, or are people just not reporting or identifying them?

During BCI’s first hut house survey in 1992, we received just one report of a bat house used by pallid bats. It was located near Prescott, Arizona and was installed on a masonry building from which the bats had been excluded. It was mounted under a deck facing southeast, was 12 inches (30.5 cm) wide and 18 inches (45.7 cm) tall, and included two roost crevices, each two inches (5.1 cm) wide. The bat house sheltered 30 to 50 pallid bats and was located 1/2 mile (800 m) from the nearest freshwater source in mountainous, desert habitat at about 5,000 feet (1.5 km) elevation.

Since the North American Bat House Research Project began in 1993, we have received just two other reports of pallid bats in bat houses. In 1996, Research Associate Doug Allen observed two occupied houses near

Retrofitting projects have many appealing features for habitat enhancement. They can be:

- adapted to almost any structure
- placed where they will have a high potential for success
- placed to minimize disturbance from maintenance workers or vandalism
- sized to accommodate small or large colonies
- beneficial to agriculture
- inexpensive (e.g., constructed from recycled materials)
- expanded by adding additional units if initial efforts are successful
- easily moved if necessary
San Diego, California. Both were single-chamber models with a roost crevice width of 1 1/2 (3.8 cm) inches from front to back. One house was mounted on a wooden pole on a patio and was used by six to eight pallid bats. This house faced north and received no direct sun. The other was installed on the south side of a wooden building where it received six to seven hours of daily sun. It sheltered up to 20 pallid and myotis bats. Allen found large numbers of moth wings and parts of scorpions on the ground underneath these houses, a tell-tale sign of pallid bat use. Both houses were occupied within two months of installation, but were used only as night roosts. Allen noted that the bats arrived in March and departed in late May when ambient temperatures reached 105-110°F (41-43°C). He suspected they moved to higher elevations during the summer to escape the heat. The bats did not return to these houses in subsequent years.

In May 1999, BCI biologist Brian Keeley and Texas Parks and Wildlife biologist Arunika Keeley discovered a colony of 75 to 100 pallid bats roosting in an extra-large bat house at Fort Leaton State Historical Park in Presidio County, Texas. The 8- by 8- by 8-foot (2.4- by 2.4- by 2.4-m) wooden structure has a beige stucco exterior and was built as an alternative roost for bats excluded from the historic buildings. With 84 crevices and a variety of crevice sizes to choose from, the pallid bats appeared to prefer crevices between 1 and 2 inches (2.5 and 5.1 cm).

Given the pallid bat’s size, and based on these reports, we suspect they prefer crevice sizes of 1 1/4 to 2 inches (3.2 to 5.1 cm) which are larger than most of our houses provide. We encourage Research Associates in western areas where pallid bats may occur, to conduct experiments with these crevice widths in mind. Because wasps can be a problem in houses with larger crevices, you may wish to add a restriction plate on the bottom of each house (use hinges to facilitate cleaning), leaving a 3/4-inch opening for bats to enter. Please let us know if you succeed in attracting these bats. Pictures would be greatly appreciated!

Misplaced your old copies of *The Bat House Researcher*? Find back issues in the Bat House Project archives section of BCI’s web site at: www.batcon.org/bhra/bhmaster.html
A Note to Research Associates Who Are Also BCI Members
Amy McCartney, Membership Manager

Occasionally, there seems to be confusion regarding renewal notices and renewal contributions for Bat House Research (BHR) Associateship and BCI Membership. Below is an explanation of the differences in renewals in these two very different programs.

BHR Associateships and BCI Memberships are run as two separate programs at BCI, using different databases. Not all BCI Members are Research Associates, and not all Research Associates are BCI Members. Because of this, and the fact that renewal notice mailing schedules for these programs are not simultaneous, you will not receive renewal notices for both of these programs together. Using only one check or credit card transaction to renew both your BHR Associateship and BCI Membership at the same time is acceptable even if you have not received renewal notices for both. Just be sure to note which amount is for BCI Membership renewal and which is for BHR Associateship renewal, so that we can process each appropriately (BHR Associateship renewals are always $10.00). If you send in a BCI Membership renewal amount that includes an extra $10.00 for BHR Associateship and do not include a note with your payment stating this, we will not know whether you are renewing your Associateship or making an extra contribution. Please do not hesitate to contact us if you have any questions or need clarification.

Data Forms and Stories Needed

As the 1999 bat house season comes to a close, the deadline for sending Data Report Forms is approaching. Whether or not bats used your bat houses this year, we would like to hear from you. Please use only the 1999 forms (one form per bat house), and submit them no later than January 15, 2000. If you need a new form, please contact Selena Kiser at skiser@batcon.org or (512) 327-9721. The Data Report Form and instructions are also available online at www.batcon.org/bhrform/dataform.html. BCI thanks you for your participation and support! We would also appreciate input from Research Associates for upcoming issues of The Bat House Researcher. All ideas are welcome. We encourage our Research Associates to write and send us success stories and helpful tips, which we may use in The Researcher. Please write to us or send an e-mail to skiser@batcon.org. We look forward to receiving your stories and suggestions.