2012 Bat Roost Monitoring Report

Big browns at a barn roost. © Liz Lavender

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Introduction

The Wisconsin Bat Program's summer roost monitoring project was developed in 2007 to gather data about colony numbers and locations of bat roosts. The project was based on one created in Pennsylvania to monitor summer roosts in response to white-nose syndrome (WNS). Few counts were conducted in Wisconsin in 2007-2009, and mostly by WDNR staff. With many roosts to monitor and few WDNR staff to conduct counts, we turned to the citizen-based monitoring (CBM) program within WDNR to help gather data. In the United Kingdom, using trained citizens to collect long-term bat data has proven a cost-effective solution with successful results for gathering large-scale inventory and monitoring data.

The roost monitoring project has expanded thanks to CBM volunteer efforts, though in spring of 2010, it was decided that additional volunteers were needed to help monitor the increasing number of roosts. During this planning period, Bat Program staff set a goal of locating all known bat roosting sites in Wisconsin.

We employed several techniques to raise awareness and describe the need to gather information about bat roosts in the state. A "bats-wanted" poster was created and posted at numerous places across WI including libraries, gas stations, state parks, and nature centers. The poster explains the threat of WNS to bat populations in Wisconsin and describes the need to locate all large roosting populations in barns, attics, bat houses, caves and other structures. Several newspaper and magazine articles, newsletter articles and radio and television segments were also used to request assistance from the general public.

The request was successful, and since the 2010 effort, over 100 new sites have been added to the existing bat roost database. 2012 was another successful year for locating and counting bat roosts around the state; another 27 sites were added to the database and counted at least once over the summer.

Project Need

In 2006, a deadly disease was discovered in hibernating bats at a cave in New York State. The disease is now known as white-nose syndrome (WNS), and mortality rates of 90-100% are not uncommon in hibernating bats. WNS is caused by a fungus called *Geomyces destructans*. In five years, WNS has spread to 19 different states and four Canadian provinces.

The threat of WNS and the possibility of the disease occurring in Wisconsin as early as January 2011 expedited the need to gather baseline data about bats in the state over the summers of 2010 and 2011, with the goal of locating all known roosts in Wisconsin. Knowing the location of summer roosting sites helps assess the impact WNS is having on the state bat populations. It is important for surveyors to note any odd behavior bats may be exhibiting at summer sites. Volunteers that monitor roosting sites over several years may also experience either drastic or no noticeable drops in numbers of bats as they count annually after WNS afflicts an area. As of November 2012, neither white-nose syndrome nor the fungus that causes the disease has been recorded in Wisconsin.

In addition to gathering baseline data about bats in Wisconsin, summer roost monitoring is important because availability of summer roosting habitat is thought to limit populations of bats (Fenton et al 1980). Being in contact with landowners who have bats allows us to educate them on how important their roosting site is for bat populations, as well as to help continue Bat Conservation International's investigation of bat preferences for roosting habitat.

Background and FAQ

Wisconsin has seven species of bats, however only two are likely to use bat houses, attics, barns and other building as roosts in the summer: little brown bats and big brown bats. Little brown bats prefer hot temperatures to gestate and mature their young. As a result, these bats roost mostly in south facing bat houses and attics; however they will also use barns. Big brown bats generally prefer cooler temperatures, and tend to prefer barns, but will also use bat houses and attics.

Bats will usually return to their roost in mid-to-late spring. When exactly they emerge from hibernation depends on the species. Big brown bats will return to summer habitat as early as mid-March though typically not until sometime in April, and little brown bats emerge from hibernation beginning in mid-to-late April. Bats begin to leave their roost in mid-August after the young have matured. The adults tend to leave earlier to travel to caves and mines where they will swarm and breed. Bats will sometimes visit multiple caves and mines in the fall during swarm.

Both little brown bats and big brown bats hibernate in winter from October through March and April. Both species will make local long distance migrations to suitable hibernacula. Barbour and Davis (1965) found little brown bats to migrate up to 290 miles from summer roosts to suitable overwintering sites, however they theorized that most bats of this species migrate less than 100 miles to hibernacula. Big brown bats are thought to make much shorter migrations to hibernacula. Depending on the summer roosting site conditions during the winter, big brown bats have been known to remain in roosting sites over the winter if a summer roost maintains above-freezing temperatures. This was thought to be quite rare; however we continue to receive reports of this occurring as this project continues.

The roost monitoring project currently only obtains information about little brown bats and big brown bats even though there are five other species in the state. Lack of information about roost sites for the other five species is due to the fact that these bats are cryptically colored, often solitary, and do not usually use the same roost sites year after year. These bats will also change roost sites often over the summer, so locating a roost one day does not mean you will find the bat in that location the next day. Even though roost monitoring of these other bats may not be feasible, people who find solitary bats or small colonies roosting in trees, rock crevices and buildings should still report the information to the Bat Program. From these reports we can begin to identify and describe roost sites in Wisconsin for these species that lack basic information about summer habitat. A photograph of the bat at the site is very useful as a record and as a tool for accurate identification of species.

White-nose syndrome creeps closer to Wisconsin's hibernacula every year. Volunteers and monitors can be one of our best assets in early detection of the disease. Those with roost sites can help by taking note of odd bat behavior, especially during the winter months when bats should not be active. Flying during the day and in the middle of winter, and unusual mortality on the landscape are some of the behavioral side effects of WNS. Little is known about summer symptoms of WNS, however if you find five or more dead bats at your roost site during summer please carefully and immediately bag and freeze the specimens and submit a dead bat report. You will be contacted on how to transfer the specimens to the wildlife health department. If you find bats at your roost site in the middle of winter, whether dead or alive, please contact the Bat Program to alert the DNR of unusual behavior. More information on WNS and the dead bat report can be found on the Wisconsin Bat Program website: http://wiatri.net/inventory/bats.

2012 Roost Project Results

Since the effort established in 2010, over 400 people have informed us of roosts on their property, or roost of which they know. More than one quarter of the contacts wished to exclude the bats from their attic or other building.

A total of 56 sites were monitored over the spring, summer and fall of 2012, up from 41 monitored in 2011 and 43 in 2010. 29 sites were monitored 2010 through 2012. In 2012, 8 (14%) of the 56 monitored roosts were attics, 23 sites (41%) were barns or other buildings, 2 were bridge roosts, and the remaining 25 (45%) sites were bat houses.

Of 56 sites monitored, 36 (64%) are inhabited by little brown bats, 12 sites are used by big brown bats, and 8 sites house unknown species. Little brown bats were monitored in bat houses most often at 56% of the sites, followed by barns at 15% (see figure 1). Big brown bats were found most often in barns at 50% of sites, followed by attic roosts at 25% of sites (see figure 2).

In 2012, 15 sites were counted more than twice over the summer, and ten sites were counted two times. The remaining sites were monitored only once.

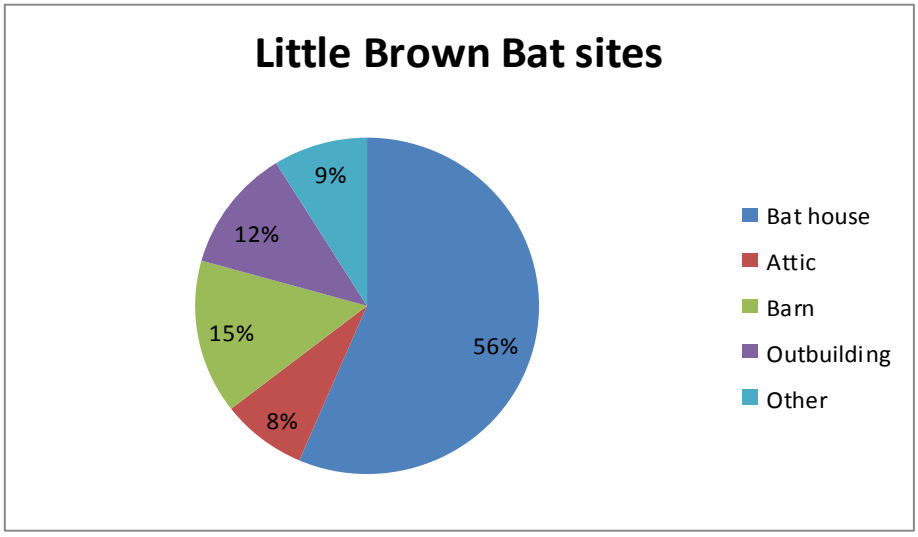


Figure 1. Little brown bat roost types

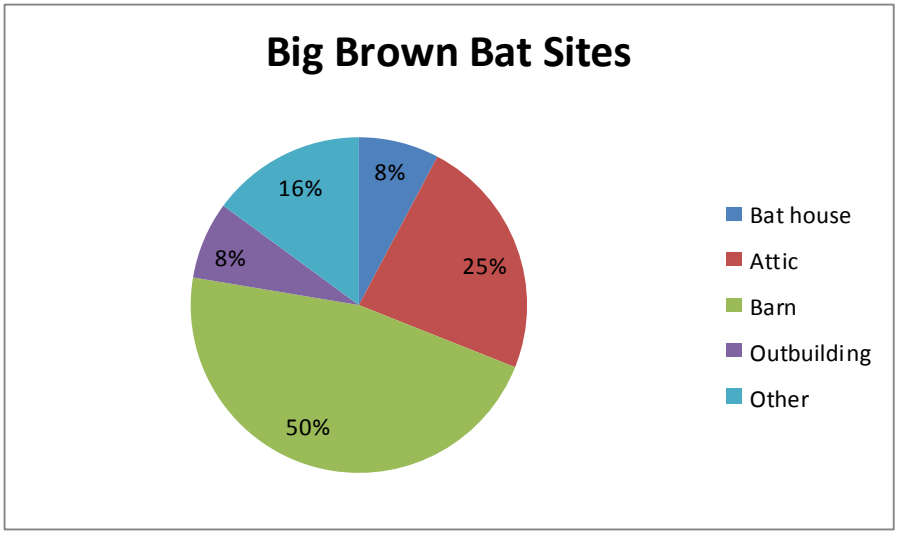


Figure 2. Big brown bat roost types

Sites counted more than twice over the summer of 2011

Colonies of greater than 500 bats

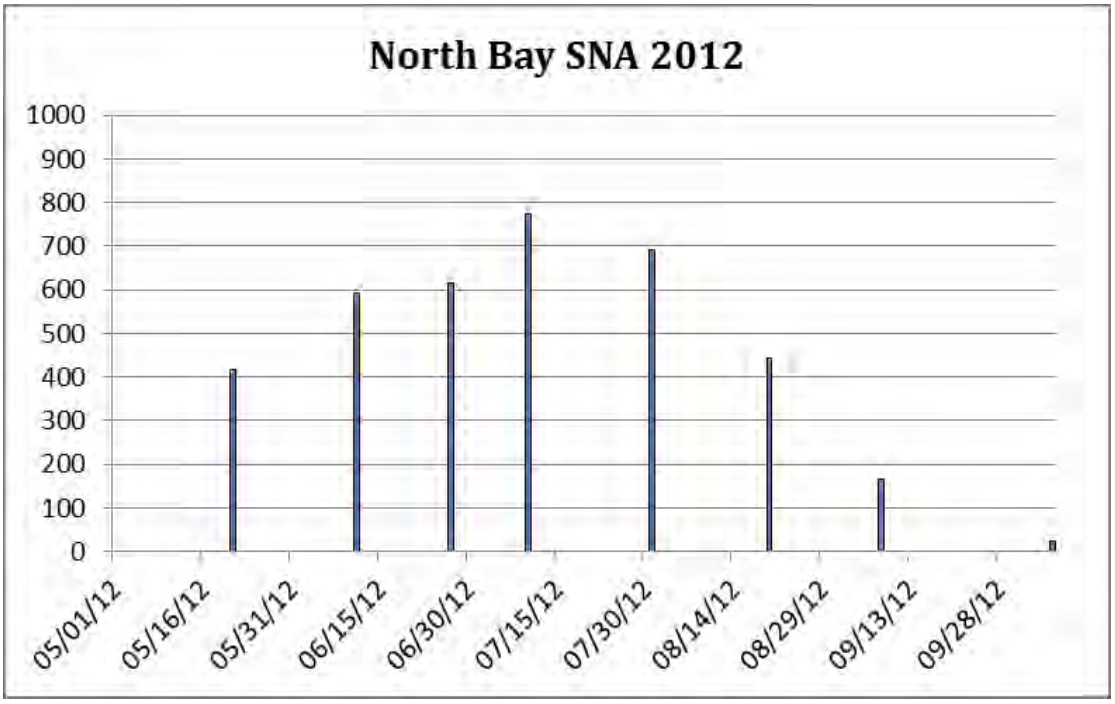


Figure 3. This barn is used by little brown bats in Door County. The bats exit through the big openings at the bottom of the barn. Volunteers enjoy sitting near the openings as hundreds of bats flutter by during counts.

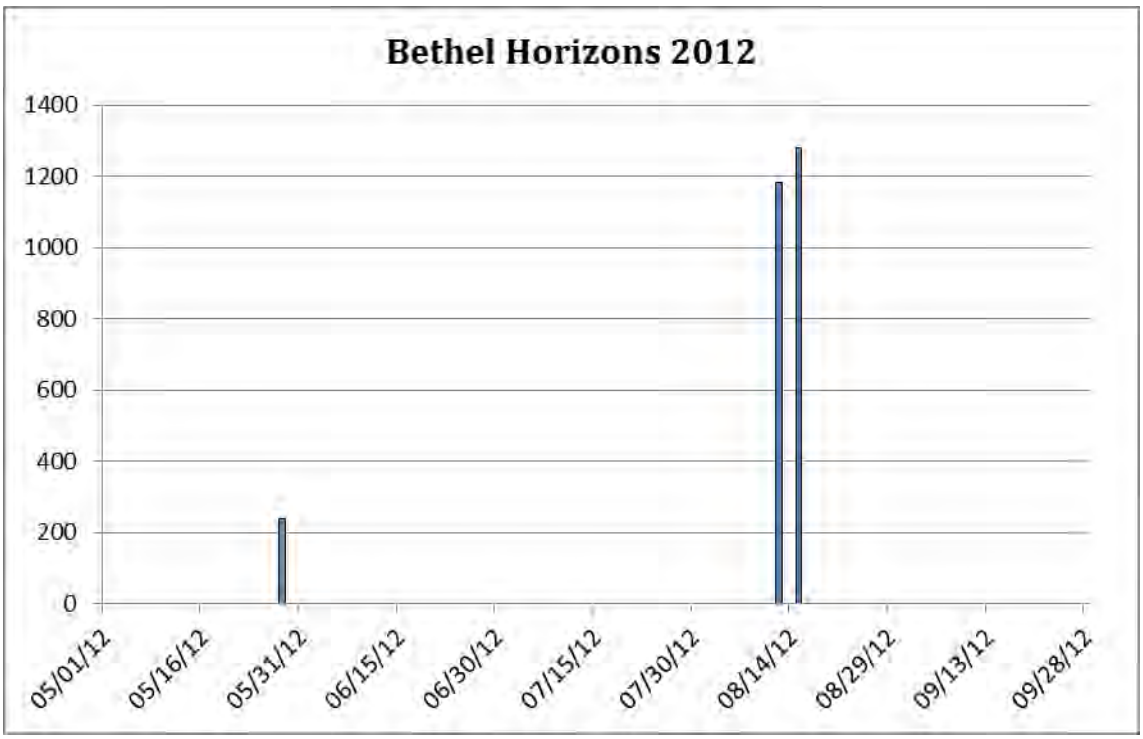


Figure 4. This site contains several bat houses located on the south side of a barn which is used for educational programs at the camp. In addition to gathering data for the bat roost project, the bat houses are also used as educational tools for the camp visitors.

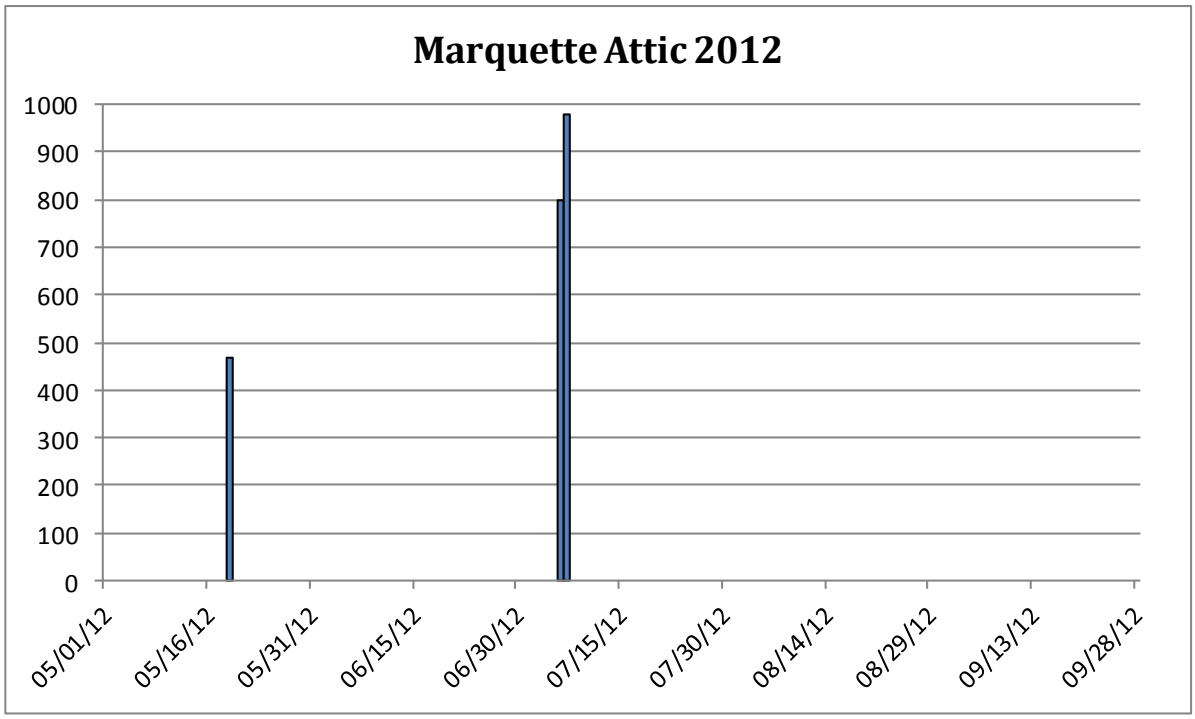
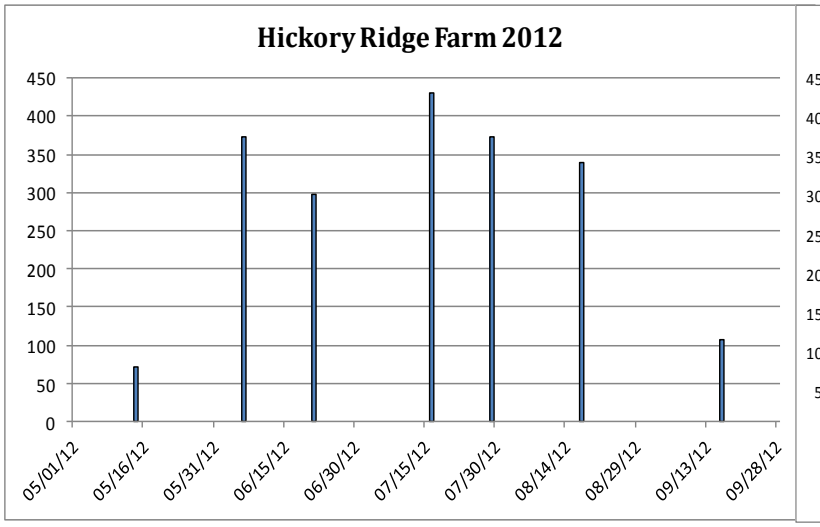


Figure 5. The little brown bats at this site roost in the attic of an old farmhouse. Counts from previous years estimated the colony to be about 400 bats. In 2012, four people counted at various exits around the house and conducted a thorough count.

Colonies of 400 or fewer bats



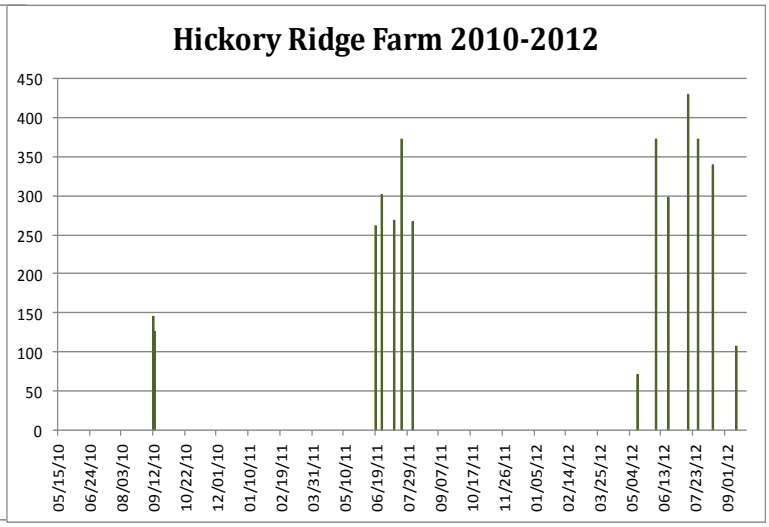
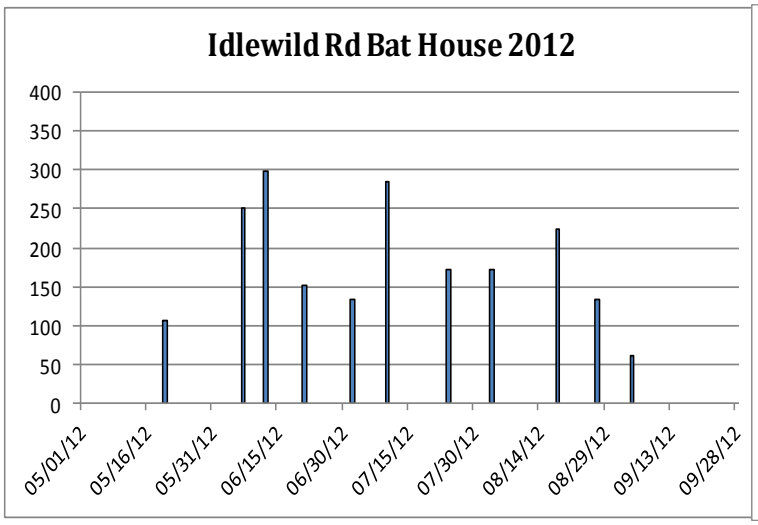


Figure 6&7. This site in Marquette County has bats roosting in the barn located on the property. It was noted that bats may use other buildings on the property, however only the barn was monitored. Species still unknown, however photos of guano and number of bats using the site indicates there are probably both big brown bats and little brown bats.



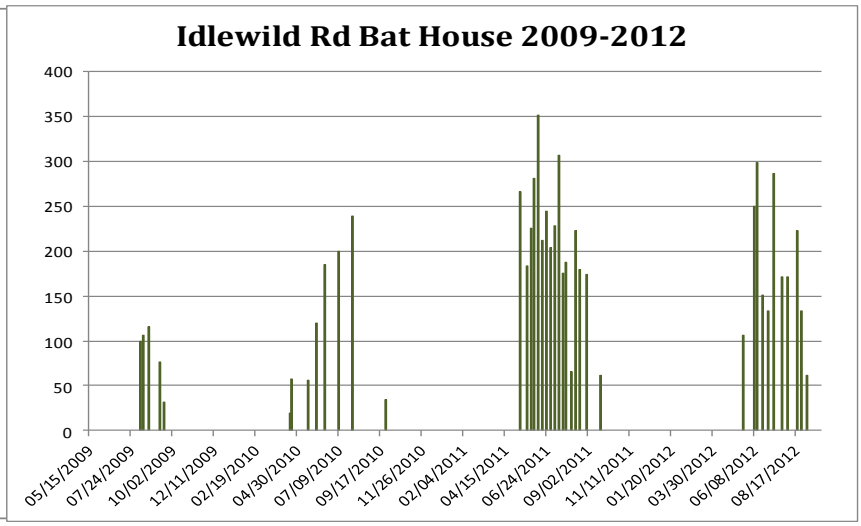
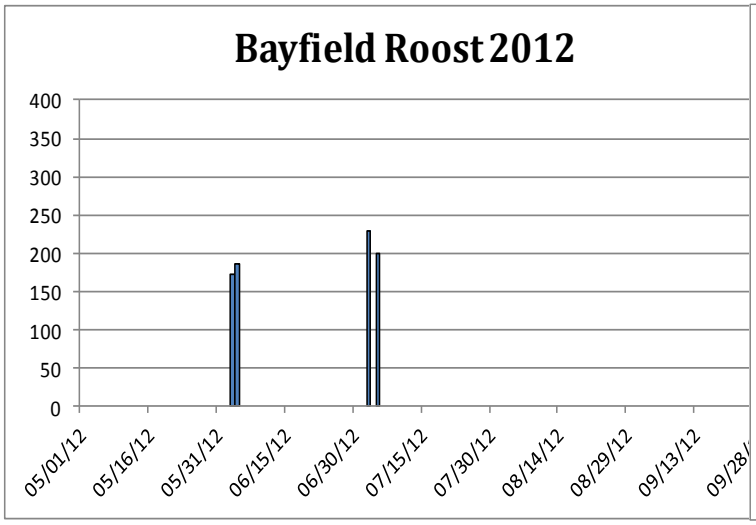


Figure 8&9. The little brown bats at this site were originally roosting in the attic above the kitchen, however the landowners successfully excluded the bats over two years, and the bats now inhabit several bat houses located on the garage.



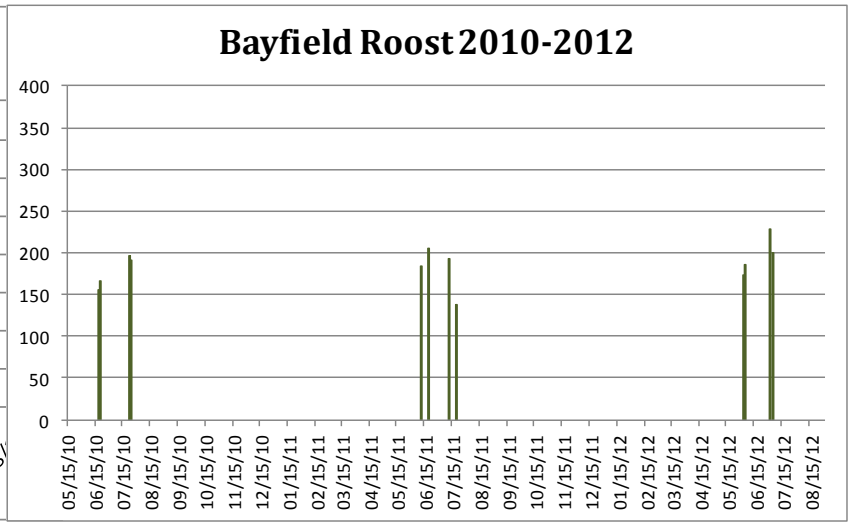
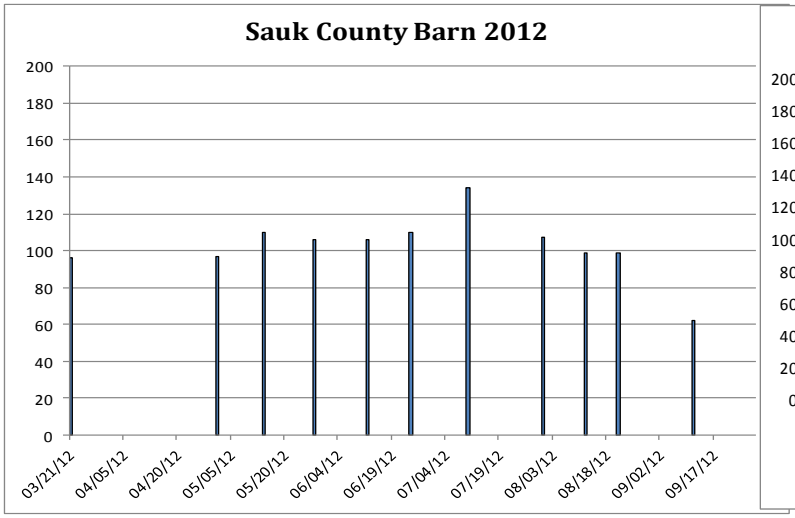


Figure 10&11. The little brown bats at this site roost between the new and old roofing on the house in Bayfield.

Colonies of fewer than 200 bats



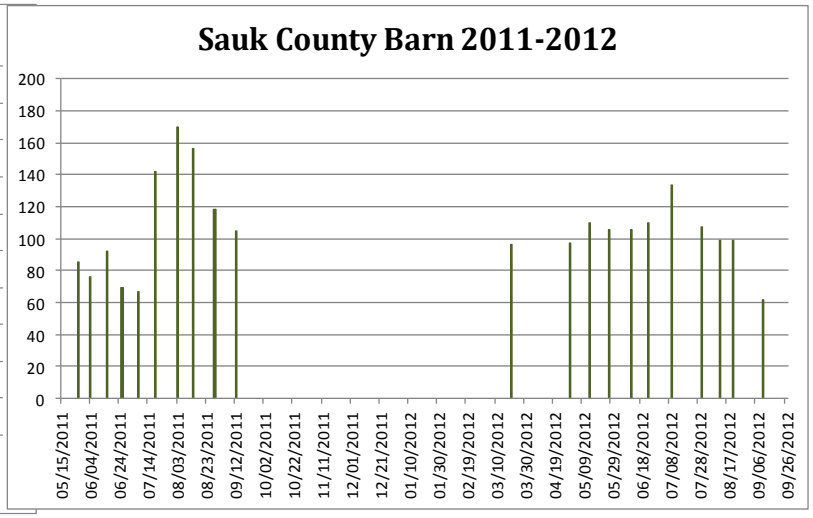


Figure 12. This site is a large white barn located in Sauk County. The big brown bats have been at this site for over 30 years. When a count was completed in April 2012, no bats were noted emerging from the site. Weather may have played a role because the temperature during the emergence count was cold: around 45 degrees.

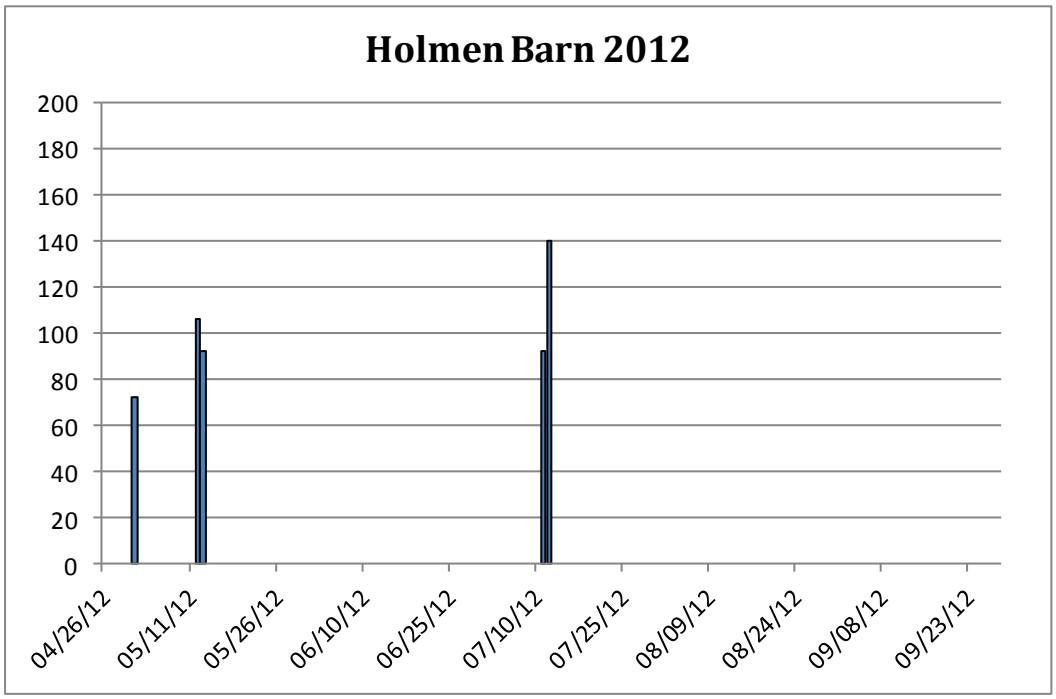


Figure 13. The colony of little brown bats had been using this barn near the Mississippi river until the spring of 2012 when they were excluded. Two bat houses were installed to offer the bats a place to live. Counts are from the bat houses.

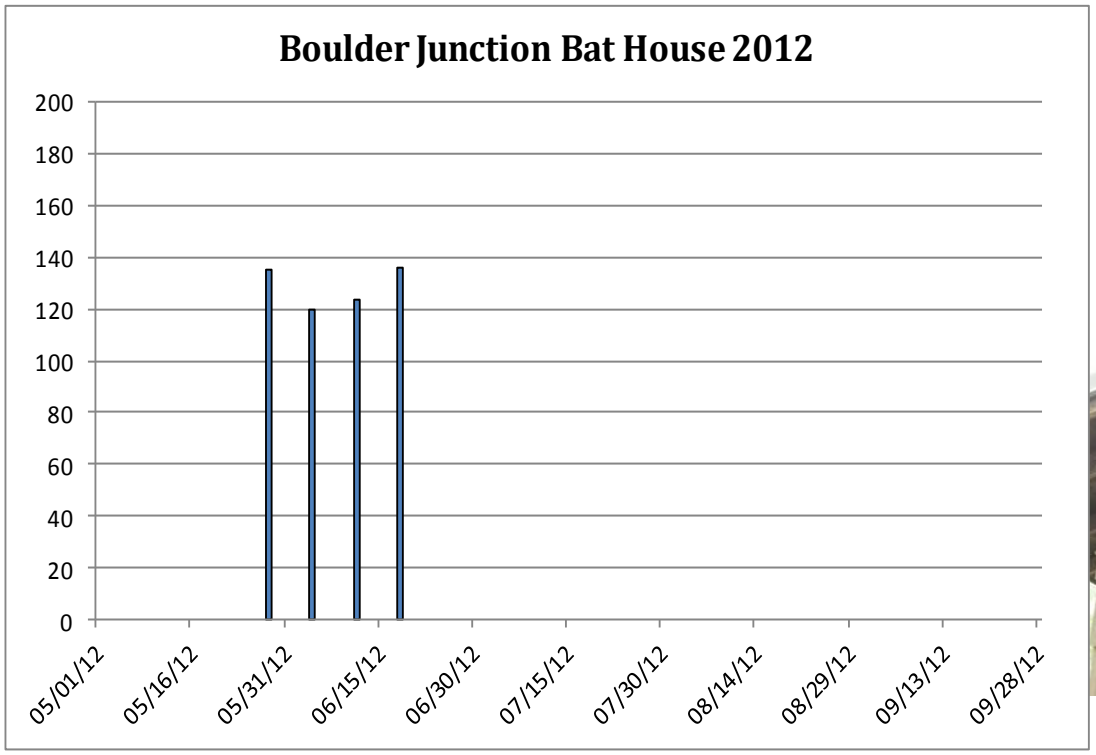


Figure 14. The bats have been using the siding on the outbuilding for over 20 years, and are now using a bat house. Species is unknown, but given the location and number, little brown bats are suspected to use the site.

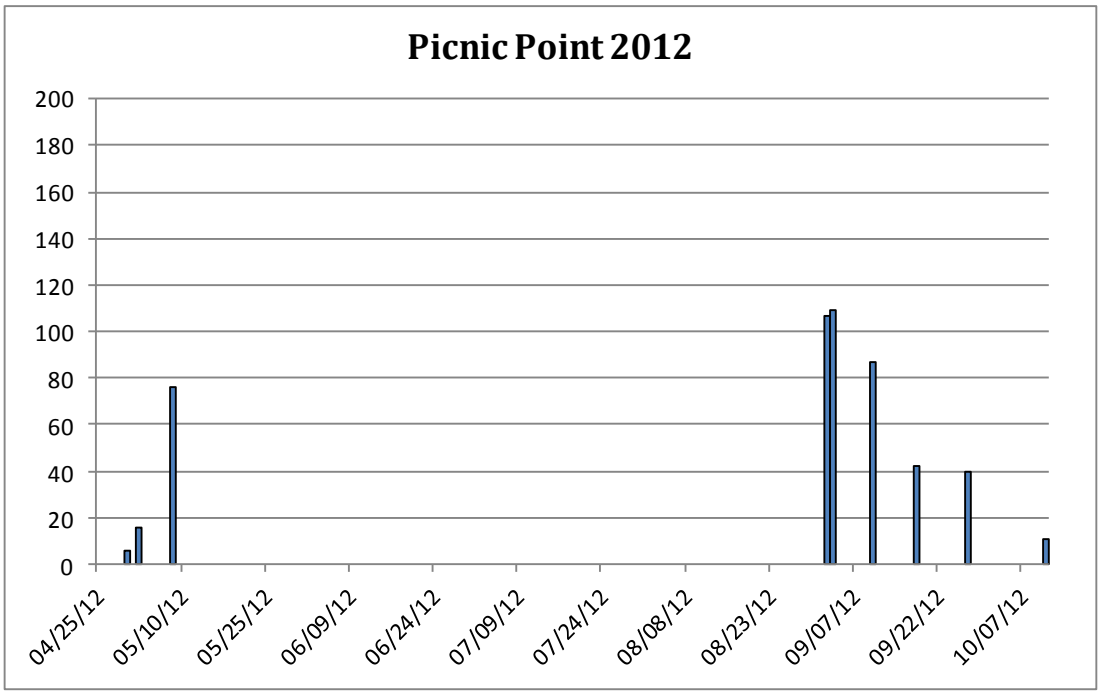


Figure 15. The little brown bats in this bat house have used the site for several years. In 2011 it was noted that the bats appeared to only be using the site during spring and fall migration. Unfortunately, no counts were completed during the summer to confirm this theory. An effort will be made in 2013 to complete summer counts.

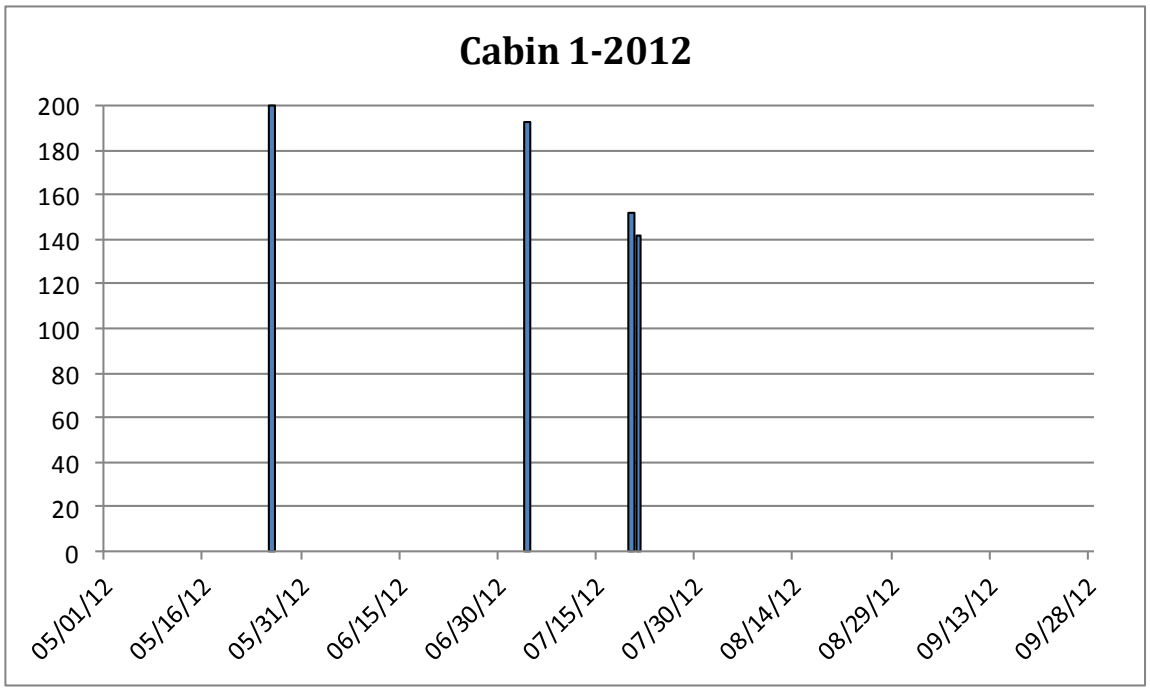


Figure 16. The little brown bats at this site were originally roosting in the attic of the cabin, however they were successfully excluded, and now use a bat house on the garage.

Colonies of fewer than 100 bats

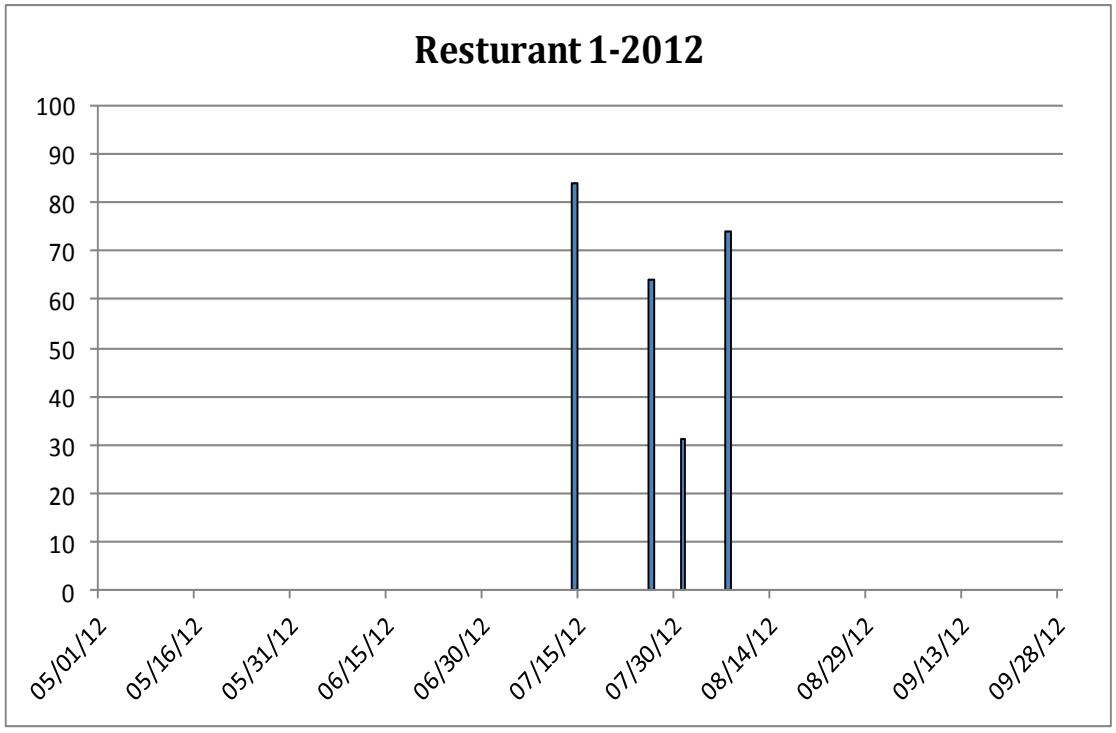


Figure 17. This colony of bats roosts behind a light-up sign for a restaurant in Madison. Species is unknown.

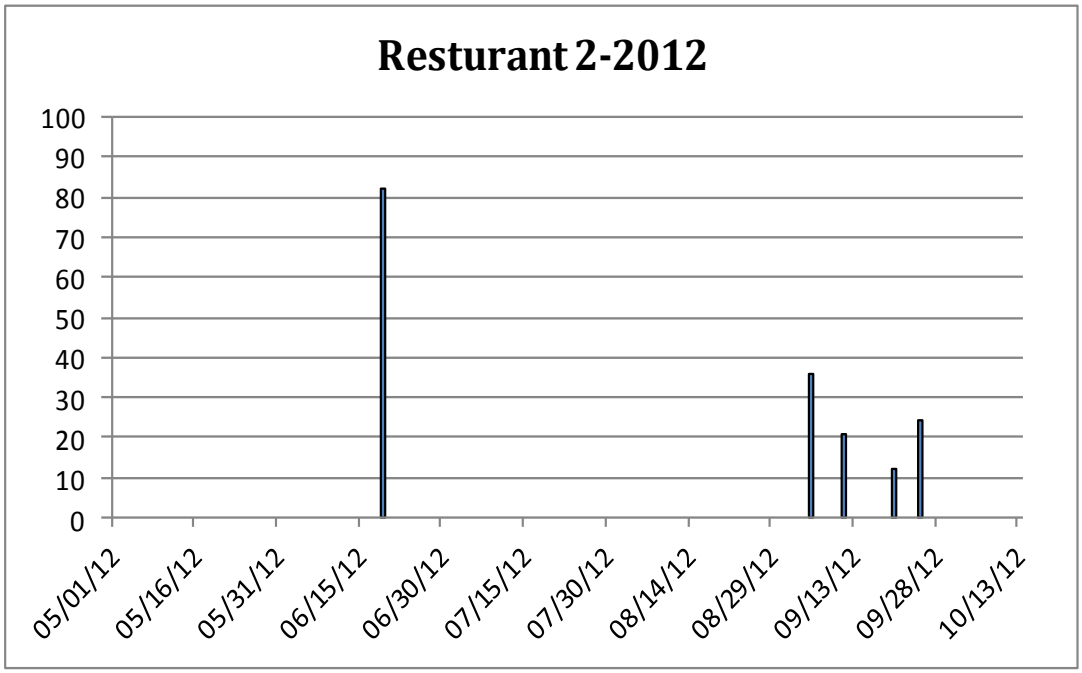


Figure 18. This big brown bat colony uses a small outbuilding near a restaurant in Fitchburg. It is common for volunteers to conduct a count while waiting for dinner. The colony was also counted in 2010.

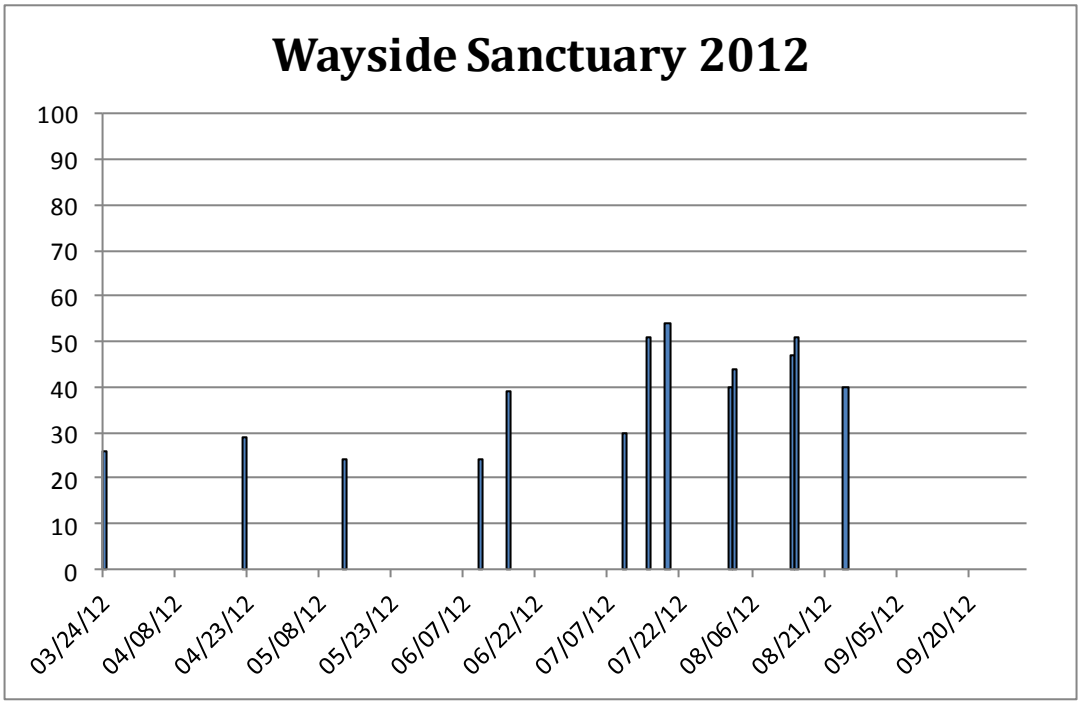


Figure 19. This colony has been using bat houses on the side of an outbuilding for several years now. Species is unknown.

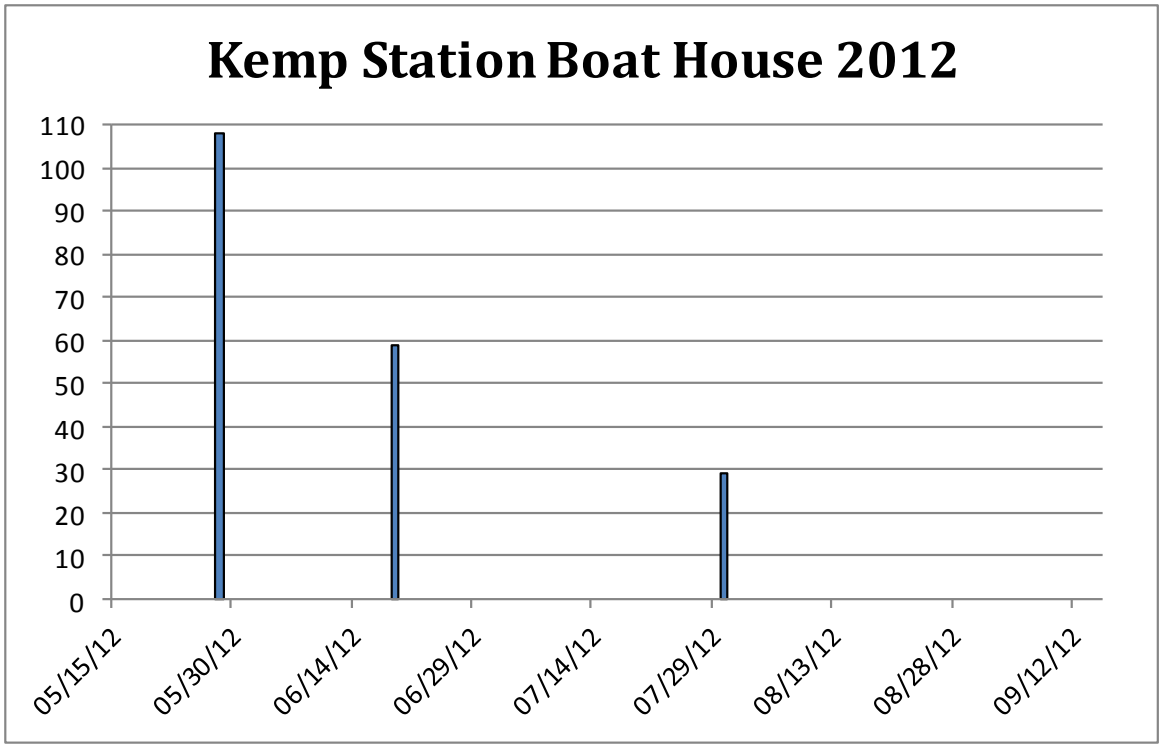


Figure 20. The little brown bats have roosting in the boat house at Kemp Natural Resources Station for several years. They are in the process of encouraging bats to move to bat houses. We are not sure of the reason for the drop in numbers over the course of the summer. Perhaps it is due to surveyor error (it can be difficult to see the bats as they emerge out over the water, and different volunteers surveyed each night), or perhaps disturbance in the building has increased in the building causing the bats to find a different location.

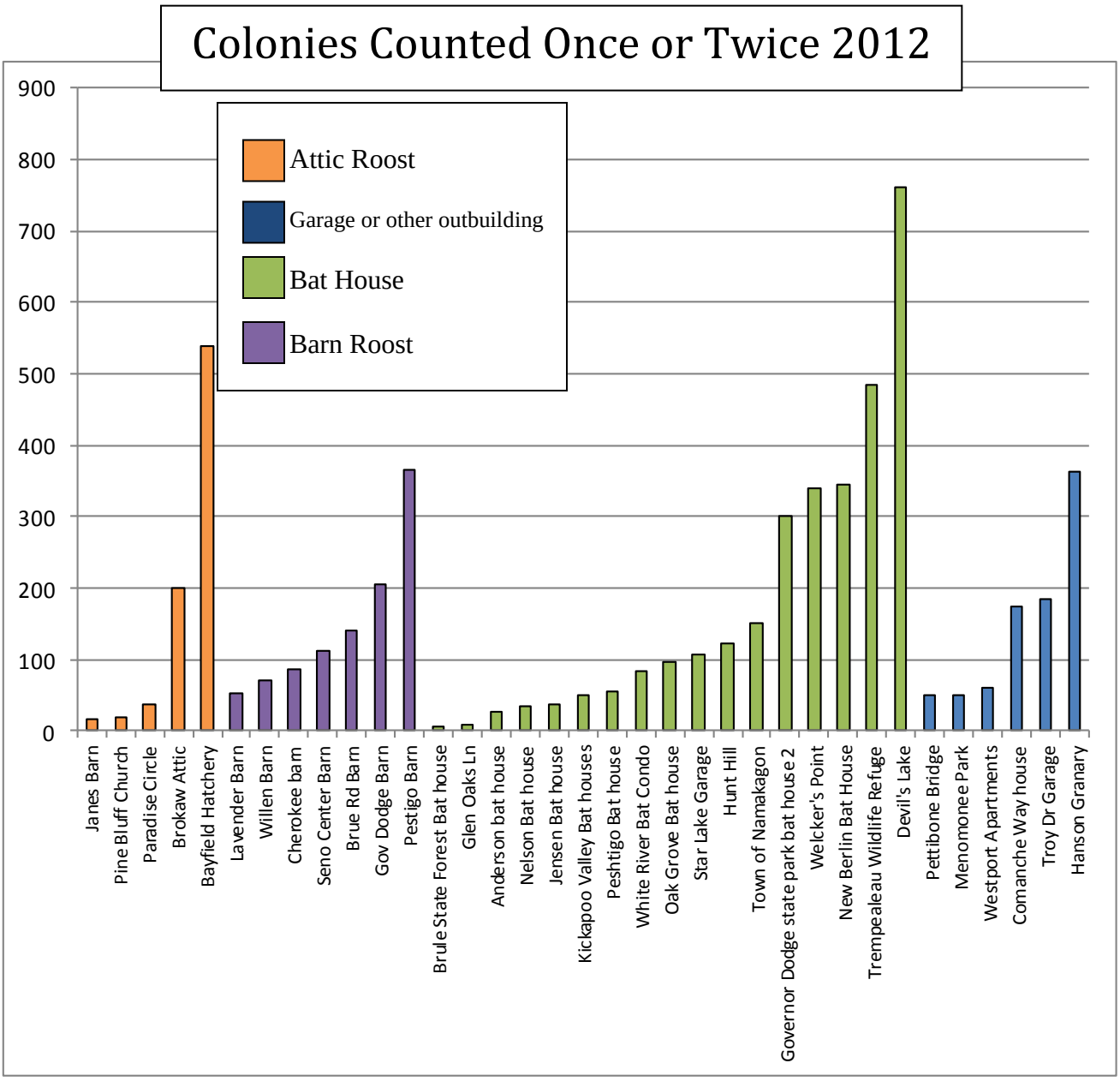


Figure 21. Colonies counted once or twice over the summer are summarized below. For counts conducted twice, the count closest to mid-July (when pups begin flying) is represented to estimate the number of bats using a site. Yellowstone Lake State Park counts were omitted from this graph due to the large number of bats using the bat houses: over 4000 bats call Yellowstone Lake SP home.

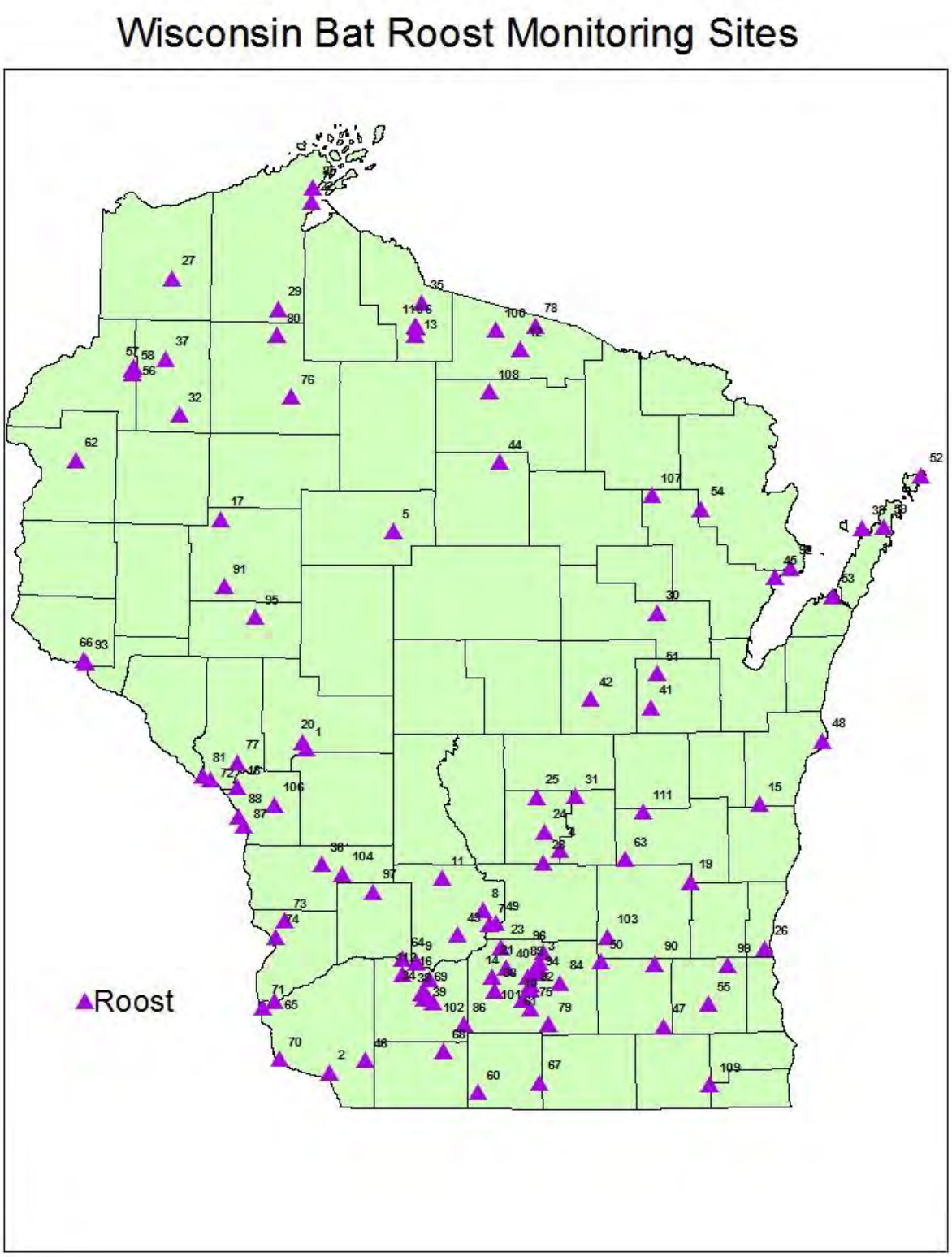


Figure 21. Known bat roosts around Wisconsin monitored at least once since 2007

Wisconsin Bat Roosts by Colony Size

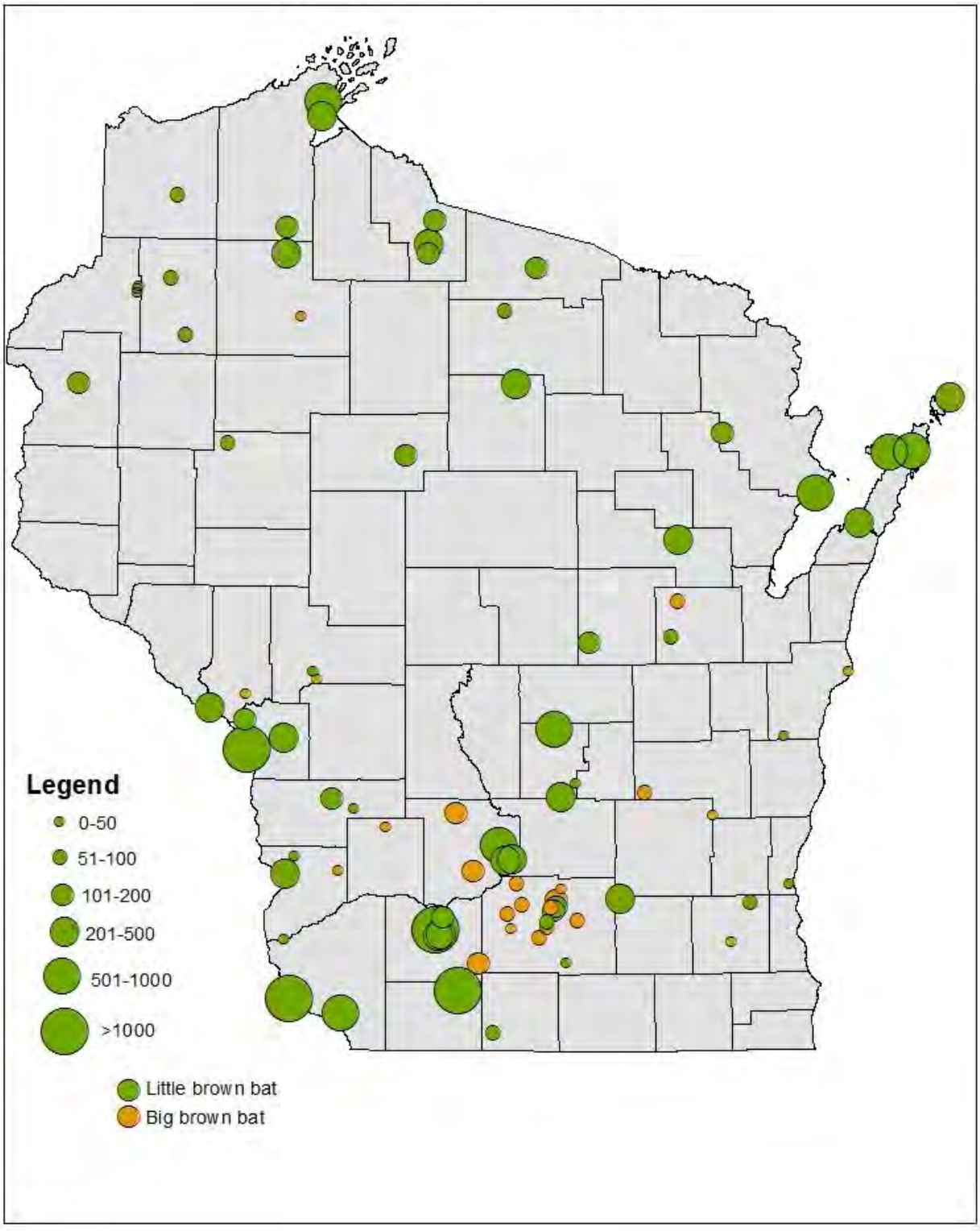


Figure 22. Roost site by colony size and species.

Discussion and next steps

The early warm weather in March 2012 may have affected when the bats began returning to their summer sites. For example, the big brown bats at the Sauk county barn returned early in large numbers (96 bats on March 21). More research is needed on what cues bats use to emerge from hibernation, but since big brown bats seemed to react to the early warm weather, we can perhaps infer that temperature plays a role in timing of emergence. Little brown bats, however, were not recorded earlier than normal. In fact, when the Bat Program conducted underground surveillance in late March 2012, the little brown bats were still deep in hibernation. Most reports from those monitoring the phenology of their colony in 2012 did not record little brown bat activity until late April. These anecdotal notes show the importance of gathering phenology data from colonies.

In 2010, the WI bat roost project set out to find all known roosting locations for bats in Wisconsin using posters and articles. This goal is ambitious and will be difficult to complete due to the fact that it is unlikely we will ever locate all known bat roosts in the state. In 2013, the Bat Program aims to have a monitored colony in every county in the state. Only 25 counties still need recorded and monitored bat roosts.

It should be noted that multiple data points are more useful in determining colony fluctuations within a season and long term trends. While single counts are useful information for getting a general idea of how many bats are at a site, multiple counts are required to accurately assess a colony at a site and determine recruitment. It is apparent from the counts conducted on consecutive nights that the number of bats emerging even a night apart can differ quite greatly due to weather, individual behavior and other unknown factors.

The United Kingdom's Bat Monitoring Programme has over 10 years of data from roosts which allows them to investigate yearly population trends, and measure how many bats are using a site on an annual basis. As Wisconsin's roost project continues, it becomes just as important to gather data from consecutive years as it is to find new roost sites. We are encouraging current volunteers to conduct counts over multiple years at their site.

There are several roosting sites on public land, including many state parks, which have never been counted, or counted only once. In order to complete surveys at these sites, the program will work with state park personnel to incorporate roost monitoring into naturalist programs, and introduce roost monitoring to campers as an activity that can be done in the evening. The Bat Program is also contacted by volunteers who wish to participate but do not know of bat roosts. We had several dedicated volunteers count both public and private roost sites over the summer of 2012.Many landowners do not have the time or interest to put towards monitoring their colony, but interested volunteers have been able to begin picking up monitoring of sites around the state. Unfortunately, interested volunteers tend to be concentrated in populated areas, so roosts in Madison for example, get counted many times over the summer while sites outside of the city still lack any information other than location. The Bat Program is also working towards creating school programs for student interested in participating in environmental research at a local level.

The Bat Program will continue to send out "bats-wanted" posters and articles asking for bat roost locations. In addition, we will offer interested volunteers roost sites available for monitoring. As bat awareness increases for the public because of WNS, we may receive additional reports from landowners who have bats roosting in their buildings and bat houses. The "bats-wanted" poster is attached at the bottom. Please feel free to print it out and post it in your area.

For more information about Wisconsin bats and the Citizen-based monitoring projects visit:
http://wiatri.net/inventory/bats

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References:

Davis, Wayne H. et al. 1965. Biology and Migration of the bat, *Myotis lucifugus*, in New England. Journal Mammalogy, 46(2).

Fenton, Brock et al. 1980. *Myotis lucifugus*. Mammalian Species, 142 p 1-8.

WANTED

A STUDY OF THE BATS OF WISCONSIN IS BEING CONDUCTED. INFORMATION IS NEEDED ON THE LOCATION AND SIZE OF BAT COLONIES.

WHITE-NOSE SYNDROME IS A FUNGAL DISEASE THAT IS LETHAL TO BATS... THIS UNPRECEDENTED DISEASE IS CURRENTLY SPREADING TOWARD WISCONSIN AND SEVERELY THREATENS OUR CAVE-BAT POPULATIONS

BATS OF WISCONSIN

IF YOU KNOW OF LARGE NUMBERS OF BATS IN CAVES, MINES, BARNS, BRIDGES, CHURCHES, SCHOOLS, OR OTHER BUILDINGS

Contact

Wisconsin Bat Program

DNRbats@wisconsin.gov

(608) 266-5216

http://wiatri.net/inventory/bats