

CONSERVING AND MONITORING LITTLE BROWN BAT (*MYOTIS LUCIFUGUS*) COLONIES IN YUKON: 2012 ANNUAL REPORT

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**Yukon Department of Environment
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Key Findings

- Little brown bats (*Myotis lucifugus*) have been assessed as an *Endangered* species.
- They are susceptible to dramatic population declines due to introduced disease, climate change, and human persecution.
- Roost-sites provide important locations for large maternity colonies of little brown bats to give birth and raise their young.
- Bat houses can provide a location for maternity colonies that are excluded from buildings.
- Seven new bat houses were established in key locations in southern and central Yukon in 2012. The number of bat houses established since 2007 by Environment Yukon is now 17.
- The focus in the future should be on
 - monitoring use of the existing bat houses,
 - consider establishing new bat houses at important areas of bat conservation and at select Yukon government campgrounds and recreation sites, and
 - promoting bat viewing and population monitoring at bat house locations.

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Introduction

Little Brown Bats (*Myotis lucifugus*) are currently assessed in Canada as an *Endangered* species. The fungal disease, White Nose Syndrome, is the main threat to populations across North America (Frick et al. 2010, Foley et al. 2011). While the fungus is not yet recorded in western Canada, it is anticipated to affect Little Brown Bat populations across the continent in the near future. In addition, the distribution and abundance of Little Brown Bats is likely determined to a large degree on climate, and changes in climate may have large consequences for Little Brown Bats in northern regions (Humphries et al. 2002). Other threats to Little Brown Bats include loss of roost-sites and persecution by humans.

Little Brown Bats are often considered a commensal species (Fenton and Barclay 1980) and have been recorded using a variety of human-built structures as roost-sites in Yukon, including occupied homes, abandoned cabins, sheds, and campground picnic shelters (Slough and Jung 2008, Randall et al. 2014). Diurnal roost-sites are an essential component in the life cycles of bats because they provide protection from poor weather and predators, as well as a location for thermoregulation, raising pups, and possibly for other social interactions (Kunz 1982, Barclay and Kurta 2007).

Bats are heterothermic and in cool northern ecosystems, they may primarily choose roost-sites that confer thermal advantages, such as those that receive more solar insolation than others (Barclay and Kurta 2007). Therefore, roost-site selection could influence survival and fitness and conservation strategies for bats should consider ensuring appropriate roost-sites as a key habitat element (Fenton 1997).

Bats in buildings often present a challenge for property owners and managers. In many instances, we are eager to exclude bats from buildings, where they may become a nuisance or there is a concern for the spread of disease (Nielson and Fenton 1994, Brittingham and Williams 2000, Tuttle et al. 2004, White 2004). On the other hand, many are eager to keep bats in the vicinity because they are believed to be an excellent means to reduce populations of mosquitoes (Culicoidea; Whitaker and Lawhead 1992, Rydell et al. 2002) and other agricultural or forest insect pests (Long et al. 2006, Boyle et al. 2011). In addition, bats in southern Yukon are a readily viewable species with broad public appeal, and bat houses provide locations for focusing bat viewing opportunities. The establishment of bat houses is a means to providing alternate roost-sites for bats where they pose a problem in buildings, or where property and land managers would like to attract bats for the purposes of insect control or wildlife viewing (Nielson and Fenton 1994, Tuttle et al. 2004).

In Yukon, bat houses have been established by a variety of individuals for various purposes. Many Yukon property owners are interested in installing bat houses on their property and the Yukon Fish and Game Association hosts popular bat and bird house building events for the public.

Monitoring of bat houses by local biologists for the collection of scientific data began in the late 1990s. Environment Yukon began monitoring bat houses in 2004 and establishing a limited number of bat houses in key locations in 2007. Here, we document the establishment and monitoring of bat houses in Yukon during 2012. The focus of our work in 2012 was to:

- establish a number of new bat houses;
- monitor existing bat houses for occupancy; and

- intensively monitor a select number of bat houses to obtain data on population structure and size (reported in Jung 2013) and survival.

We also provide recommendations for where to erect additional bat houses.

Bat House Installations

In 2012, we established 7 new bat houses at various locations in southern and central Yukon, including at: Tagish Narrows Campground, Fox Lake Campground, Dezadeash Lake, Agay Mene Territorial Park (Tarfū Lake), Judas Lake, Wye Lake, and Mayo (Figure 1).

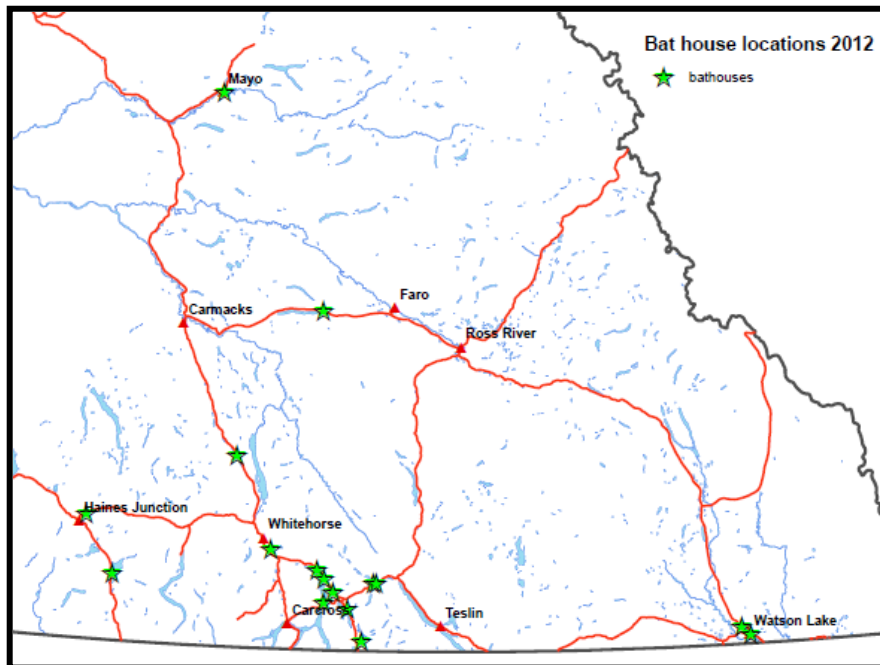


Figure 1. Locations of Yukon Department of Environment established bat houses, 2007-2012.

Table 1. Summary of bat houses that have been established or monitored by the Yukon Department of Environment.

Location	Coordinates ^a	Year Established	Bat House Type ^b	Land Ownership / Management	Evidence of Use by Bats
Chadburn Lake Day Camp	N 60.647°, W 134.960°	unknown	4	City of Whitehorse	Yes – well used
Little Atlin Lake	---	unknown	4	Private	Yes – well used
Salmo Lake (2 houses)	N 60.446°, W 133.563°	2007	1	Carcross/Tagish First Nation	Yes – well used
Drury Creek Highway Camp	N 62.201°, W 134.390°	2007	1	Yukon Government	Yes – well used
Squanga Lake Campground	N 60.447°, W 133.602°	2008	1	Yukon Government	Yes – well used
Watson Lake Airport	N 60.112°, W 128.824°	2008	1	Yukon Government	Yes – minor use
Army Beach Recreation Site	N 60.560°, W 134.447°	2008	1	Yukon Government	Yes – minor use
Swan Haven	N 60.547°, W 134.507°	2009	1	Yukon Government	Yes – minor use
Teslin Lake Campground	N 60.232°, W 132.911°	2009	2	Yukon Government	Yes – minor use
Pine Lake Campground	N 60.802°, W 137.486°	2010	2	Yukon Government	No
Wye Lake	N 60.067°, W 128.699°	2012	2	Town of Watson Lake	No
Mayo	N 63.604°, W 135.844°	2012	2	Na-Cho Nyak Dun First Nation	No
Tagish Campground	N 60.316°, W 134.262°	2012	1	Carcross/Tagish First Nation	No
Tarfu Lake Campground	N 60.064°, W 133.754°	2012	2	Yukon Government	No
Judas Lake	---	2012	2	Private	No
Fox Lake Campground	N 61.244°, W 135.460°	2012	3	Yukon Government	No
Dezadeash Lake Campground	N 60.398°, W 137.044°	2012	1	Yukon Government	No

^a Detailed locations of some bat houses are not made public in this report because they are on private property.

^b 1 = large two-post; 2 = small single post; 3 = medium two-post; 4 = small building-mounted.

^c Well used means that a colony has established within the bat house. Minor use means that there is evidence of a small number of bats making occasional use of the bat house, but it does not yet appear that a colony has moved in.

This increased the number of bat houses established by Environment Yukon since 2007 to 17 (see Table 1).

Locations for the establishment of bat houses were chosen based on several criteria. In most cases, establishing a bat house fulfilled more than one of these criteria; thus, making them ideal locations for the establishment of a bat house. The criteria included:

Conservation value. The first criteria was an assessment of the conservation value to little brown bats; that is, if it was believed that a bat house would provide an important alternate location for large maternity colonies to relocate to if their current roost in a building was no longer available to them (e.g. Nielson and Fenton 1994, Brittingham and Williams 2000, Tuttle et al. 2004).

We are only aware of a small number of large (>100 bats) summer maternity colonies in Yukon and these are critical for the status of this long-lived species with a low reproductive rate. In these instances, bat houses were established as a safe-guard to protect these maternity colonies (Figure 2).

Property protection. Another criterion for establishing bat houses was for situations where bats posed a significant concern to Yukon government infrastructure and property managers wanted to exclude bats.

For example, this would include Yukon government campgrounds where bats have established maternity colonies in picnic shelters. In these cases we provided information on how best to humanely exclude bats from Yukon government buildings and offered to establish a bat house to provide an alternate location for these bats to roost during the breeding season.



Figure 2. A near-full bat house that served as an alternate roost site after an abandoned cabin that housed a large colony of little brown bats (*Myotis lucifugus*) near Salmo Lake, Yukon, was demolished.

Educational value. A third criteria for deciding upon priority locations for establishing bat houses was if the site held good potential for providing public bat viewing opportunities. Interest in bat viewing appears to be high in Yukon and we wanted to have some bat houses at safe, public locations where they could be viewed emerging at night (Figure 3). At these sites, it was important that the bat houses were accompanied by a panel describing why a bat house was of value and a little bit about the natural history of bats. Often these sites were located in roadside campgrounds or other public recreation sites, and these locations also provided an added benefit of having bats as a natural form of mosquito control.

Monitoring value. A final criterion applied for the location of some bat houses was that the site should be easy to access by biologists so that the colonies could be monitored for their health and status. Bat houses are ideal for monitoring large numbers of little brown bats efficiently (Figure 4).

Again, public campgrounds easily fulfilled this criterion. In actuality no bat houses were established solely to fulfill this criterion, but it was a consideration in making our final choices for locations in 2012.



Figure 3. A bat house attached to a cabin near Chadburn Lake, Yukon, makes for an ideal location to host wildlife viewing events.



Figure 4. A harp trap set to a bat house near Salmo Lake, Yukon, provides an ideal site to monitor little brown bat (*Myotis lucifugus*) populations.

Bat houses were built by Yukon Parks Branch or the non-profit organization, Challenge Community Vocational Alternatives. They were largely built along the lines of drawings provided by Tuttle et al. (2004), however we varied the size to fit local circumstances (see Slough and Jung 2008). All bat houses were substantially larger than those commercially available for residential property owners. Larger bat houses can hold more bats and can build up and retain higher temperatures than small houses, which is an important consideration for bat house design (Brittingham and Williams 2000, Tuttle et al. 2004, White 2004), particularly in northern regions.

To further increase the ability of our bat houses to provide warm roosting conditions, all bat houses were painted black and located to maximize solar exposure. All bat houses were erected on wooden poles. Bat houses were erected by hand (Figure 5), or in some cases with the aid of machinery (Figure 6).



Figure 5. Bat houses being erected near Salmo Lake, Yukon, in 2007.



Figure 6. A loader is used to raise a bat house near Watson Lake, Yukon, in 2008.

Tagish Narrows Campground

Tagish Narrows Campground was chosen as a site for a bat house because it met multiple criteria.

We had received numerous reports of bats in Tagish. Carcross/Tagish First Nation (CTFN) and other residents had reported many cases of nuisance bat colonies, and bats are regularly seen hunting at night in the Tagish Narrows area. There was concern that several large maternity colonies in the Tagish area may be excluded from their current locations in buildings. Providing bat houses in the area gives excluded bats an alternate place to give birth and raise their young. The campground also had high potential for wildlife viewing and population monitoring activities.

The campground is located on the east side of Tagish River and it is operated by CTFN.

On 22 May 2012, we erected a large double-post bat house in Tagish campground (Figure 7). We obtained a permit for the bat house from CTFN Lands Department in 2011, and it was re-confirmed in 2012 (L. Kerr and T. Hamilton, Carcross/Tagish First Nation, personal communication). CTFN was consulted during the process of site selection and bat house erection. Because of the education potential of the site, an interpretative panel was also installed (Figure 8). CTFN provided assistance erecting this bat house.



Figure 7. Bat house installation at Tagish Narrows Campground, Yukon.

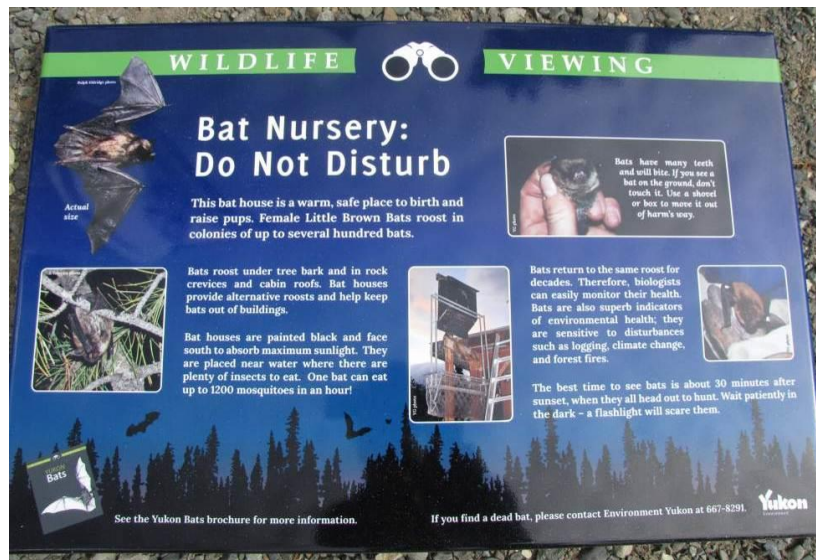


Figure 8. Detail of interpretative panels that accompany some bat houses that were established in 2012.

Tarfu Lake Campground

The site at Tarfu Lake Campground was chosen primarily because we were interested in promoting bat monitoring within Agay Mene Territorial Park.

In addition, we chose this campground for its potential as an interpretation site, given that it is a well-used campground. Campers have occasionally seen bats in the campground but we are unaware of any existing roosts in the area. However, relatively large numbers of little brown bats have been caught by us and others nearby at Lubbock River (Jung et al. 2011).

On 28 May 2012, a small, single-post bat house was set up near the outhouses at the campground boat launch (Figure 9). The post hole was drilled with a bobcat and post-auger. An interpretative panel was also installed.

The campground is operated by Yukon Parks and permission was obtained to use this site (G. Vantell, Yukon Parks, personal communications). Yukon Parks provided machinery and assistance in erecting this bat house.

Judas Lake

The site at Judas Lake was selected because of its conservation value to bats. The area hosts several large colonies of little brown bats in buildings. We had an opportunity to provide a safe-guard from exclusion for these maternity colonies through the establishment of a bat house. In addition, the site has potential as a good population monitoring site. Given that it is private property, we may have the potential to undertake specific studies that require leaving sensitive monitoring equipment on site for extended periods, without the concern theft or vandalism.

On 7 June 2012 we established a bat house on a site on an esker overlooking Judas Lake (Figure 10).



Figure 9. Bat house installation at Tarfu Lake Campground (Agay Mene Territorial Park), Yukon.



Figure 10. Bat house installation at Judas Lake, Yukon.

Mayo

A bat house was established on the property of Na-cho Nyak Dun First Nation (NND) in Mayo. This location was of interest because it met 3 of our criteria. The main reason, however, was because bats were known to roost in a NND office that was due for demolition. The regional biologist worked with NND to delay demolition until such time that the bats had left to hibernate and we could erect a bat house.

In addition, as the northernmost known site for little brown bats in Yukon, the site was important from a monitoring perspective. The location is one that also could be valuable for bat viewing activities in the Mayo area.

A bat house was established overlooking a small pond near the NND office on 17 May 2012 (Figure 11). Permission from NND was secured prior to installation (M. O'Donoghue, Yukon Fish and Wildlife Branch, personal communication).



Figure 11. Bat house installation on Na-cho Nyak Dun First Nation property in Mayo, Yukon.

Wye Lake

Bats abound in Watson Lake. They appear to be numerous and readily viewable. At least 2 species occur in the area (Jung et al. 2006) – little brown bat and the northern long-eared bat (*Myotis septentrionalis*) – however, only the little brown bat is known to use bat houses. We already had one bat house in Watson Lake, at the airport.

However, we were interested in a site near Wye Lake because we wanted to provide a safeguard for a large colony of little brown bats that roost in the nearby building of a local business (Talerico et al. 2008).

In addition, the site is a local recreational area, managed by the Town of Watson Lake, and has excellent potential for bat viewing and monitoring.

On 4 May 2012 we installed a single-post bat house adjacent to Wye Lake (Figure 12). Permission to establish the bat house was obtained from the Town of Watson Lake (D. Law, Town of Watson Lake, personal communication), and the town provided assistance in the setup.



Figure 12. Bat house established at Wye Lake in Watson Lake, Yukon.

Fox Lake Campground

Based on acoustic monitoring data and observations by campers, the Fox Lake campground seems to be an active area for little brown bats, particularly in the late summer. Our interest in establishing a bat house at this location was primarily to provide a roost site for migrating bats that may stopover at the campground for the day (we had received several reports of bats trying to roost in camper's tents, tarps, and RVs). As well, the campground provides some good bat habitat and a great location for bat viewing and monitoring.

On 14 June 2012, we set up a bat house at the campground (Figure 13).

The site is managed by Yukon Parks and permission was obtained prior to installation (G. Nassiopoulos, Yukon Parks, personal communication). Yukon parks provided assistance in the setup. An interpretative panel (Figure 7) was also installed near the bat house.



Figure 13. Bat house established at Fox Lake Campground, Yukon.

Dezadeash Lake

One of the first recorded maternity colonies was in the Dezadeash Lake area (Youngman 1975), and the area still maintains at least one large maternity colony in a private facility. The Dezadeash Lake campground was chosen because it has the potential to provide a good safeguard for the nearby maternity colony, should they be excluded or otherwise need to switch roosts. In addition, it appeared to be an ideal site for bat viewing and monitoring activities.

On 12 October 2012 a bat house was established in the middle of the campground loop road behind the kitchen shelter and outhouses (Figure 14). The campground is operated by Yukon Parks and prior permission was obtained (G. Nassiopoulos, Yukon Parks, personal communication). Yukon parks provided assistance in the setup.



Figure 14. Bat house established at Dezadeash Lake Campground, Yukon.

Bat House Monitoring

In 2012, we monitored several of the existing bat houses. Results are as follows:

- We conducted intensive bat monitoring at 4 bat house sites: Salmo Lake, Squanga Lake, and Little Atlin Lake. A mark-recapture study was conducted at these sites and is detailed in a separate report (Jung 2013).
- We captured 1035 bats at 3 bat houses. At the Squanga/Salmo colony we captured 517 individual bats 705 times during 4 capture sessions. At the Little Atlin Lake colony we captured 518 individual bats 568 times during 3 capture sessions. Details of these captures are provided in Jung (2013).
- The Chadburn Lake bat colony was the site of 2 wildlife viewing events, where the public had an opportunity to join in the monitoring.
- Bat houses at Drury Creek, the Watson Lake Airport, and the Marsh Lake recreation site were inspected for bat occupation. The bat house in the Highways and Public Works facility at Drury Creek showed signs of heavy use but the bat house was empty at the time of inspection; the bats had already departed for migration.

The bat house at Watson Lake airport showed no signs of use, although limited use has been noted in some years. At the Marsh Lake recreation site, limited bat house use was evident by a few droppings on the structure, but the nearby maternity colony was not yet using the house as a primary roost-site.

- We did not monitor the bat houses that were established in 2012 because it would be extraordinary for bats to occupy them in the year that they are established. Most bats should have already formed maternity colonies prior to when we set up the bat houses.

We had to remove a previously established bat house at the Teslin Lake campground because it was damaged by red squirrels (Figure 15), and occupied by tree swallows. This bat house had only seen limited use by bats since its establishment in 2009, so its loss will not affect any maternity colonies when bats return in the spring.



Figure 15. Tree swallows occupying an unoccupied bat house at the Teslin Lake Campground, Yukon, after a whole was chewed in the bat house by a red squirrel.

Recommended Future Directions

The following are suggested priorities for the establishing and monitoring bat houses in Yukon:

- Effort should be made to check each of the bat houses established by Environment Yukon for occupancy by bats. Checks should be made in mid-summer when they may be used by maternity colonies, and again in the early fall when they may be used by migrating bats. In addition to checking for bat use, annual inspections are useful to ensure that there is no damage to the structures from wind, wildlife, vandalism, or other. Yukon Parks officers may be interested in checking on the bat houses at campgrounds during their regular visits to these facilities. If so, a protocol for bat house monitoring and inspections and some basic training should be provided to them.
- New bat houses should be considered where there is an urgent conservation concern, such as an important maternity colony that will be excluded or the building they roost in will be demolished. For example, the building that one of the largest colonies we monitor may soon be taken down, with an unknown impact on this important colony. This site would be a very high priority for a bat house.
- Another priority for considering additional bat houses would be at select Yukon government campgrounds and recreation sites. Bat houses at these campgrounds provide an excellent opportunity for wildlife viewing, natural mosquito control, and population monitoring.

In addition, they may discourage use of picnic shelters by bats (a common problem in campgrounds in southern Yukon). Bat houses in campgrounds should have an interpretative panel to explain what the structure is and to educate campers about bats. Currently, 8 campgrounds have bat houses. There are over 15 campgrounds and recreation sites that are candidates for new bat houses. In addition, a bat house should be re-established at Teslin Lake campground.

- Several habitat protection areas encompass large wetlands, which are likely important habitats for bats. Bat houses could be established at select habitat protection areas (e.g. Lewes Marsh HPA) to enhance their use by bats.
- Interpretative signs (Figure 7) should be placed at all bat houses established at easily accessible sites. Particular focus should be to have these signs erected at bat houses located at Yukon government campgrounds. Bat houses at Yukon government campgrounds currently without interpretative signs include: Squanga Lake, Pine Lake, Dezadeash Lake, and Army Beach recreation site. Other bat house locations with easy public access should also be candidates for an interpretative sign (i.e. Wye Lake, Mayo and the Watson Lake airport).
- Wildlife viewing events should continue to use existing bat house sites as the focus of their events, given that a number of bats are readily viewable in safe environment. Where possible, these events should coincide with biologists capturing and monitoring bats, so that the public can see the animals up close.
- Temperature is a critical factor in the success of bat houses (Lorenco and Palmeirim 2004, Bartonicka and Rehak 2007). However, there are no data available from Canada on the 24-hour temperature profile of bat houses. We propose that a small study should be undertaken to monitor and compare the temperature of occupied and unoccupied bat houses. These data may be useful in determining how to increase the chance of our bat houses being used by bats.

Bat houses have proven useful for monitoring bat populations (Jung 2013). Yukon-based studies on bats should make use of the easily monitored colonies in our bat houses. Specifically, studies on the population trends and demography of bats in relation to White Nose Syndrome or climate change may be possible at these sites.

Literature Cited

- BARTONICKA, T., AND Z. REHAK. 2007. Influence of the microclimate of bat boxes on their occupation by the soprano pipistrelle *Pipistrellus pygmaeus*: possible cause of roost switching. *Acta Chiropterologica* 9:517-526.
- BRITTINGHAM, M. C., AND L. M. WILLIAMS. 2000. Bat boxes as alternative roosts for displaced bat maternity colonies. *Wildlife Society Bulletin* 28: 197-207.
- FENTON, M. B., AND R. M. R. BARCLAY. 1980. *Myotis lucifugus*. *Mammalian Species* 142: 1-8.
- FOLEY, J., D. CLIFFORD, K. CASTLE, P. CRYAN, AND R. S. OSTFELD. 2011. Investigating and managing the rapid emergence of white-nose syndrome, a novel, fatal, infectious disease of hibernating bats. *Conservation Biology* 25:223-231.
- FRICK, W. F., J. F. POLLOCK, A. C. HICKS, K. E. LANGWIG, D. S. REYNOLDS, G. G. TURNER, C. M. BUTCHKOSKI, AND T. H. KUNZ. 2010. An emerging disease causes regional population collapse of a common North American bat species. *Science* 329:679-682.
- JUNG, T. S., B. G. SLOUGH, D. W. NAGORSEN, T. A. DEWEY, AND T. POWELL. 2006. First records of the northern long-eared bat, *Myotis septentrionalis*, in the Yukon. *Canadian Field-Naturalist* 120:39-42.
- JUNG, T. S. 2013. Estimating little brown bat (*Myotis lucifugus*) colony size in southern Yukon: a mark-recapture approach. Yukon Fish and Wildlife Branch Report TR-13-13. Whitehorse, Yukon, Canada.
- JUNG, T. S., C. L. LAUSEN, J. M. TALERICO, AND B. G. SLOUGH. 2011. Opportunistic predation of a little brown bat (*Myotis lucifugus*) by a great horned owl (*Bubo virginianus*) in southcentral Yukon. *Northwestern Naturalist* 92:69-72.
- LONG, R. F., W. M. KISER, AND S. B. KISER. 2006. Well-placed bat houses can attract bats to Central Valley farms. *California Agriculture* 60:91-94.
- LOURENCO, S. I., AND J. M. PALMEIRIM. 2004. Influence of temperature in roost selection by *Pipistrellus pygmaeus* (Chiroptera): relevance for the design of bat boxes. *Biological Conservation* 119:237-243.
- NEILSON, A. L., AND M. B. FENTON. 1994. Responses of little brown myotis to exclusion and to bat houses. *Wildlife Society Bulletin* 22:8-14.
- RANDALL, L. A., T. S. JUNG, AND R. M. R. BARCLAY. 2014. Roost-sites and movements of little brown bats (*Myotis lucifugus*) in southwestern Yukon. *Northwestern Naturalist* 94: in press.

- RITZI, C. M., B. L. EVERSON, AND J. O. WHITAKER, JR. 2005. Use of bat boxes by a maternity colony of Indiana myotis (*Myotis sodalis*). *Northeastern Naturalist* 12:217-220.
- RYDELL, J., D. PARKER MCNEILL, AND J. EKLÖF. 2002. Capture success of little brown bats (*Myotis lucifugus*) feeding on mosquitoes. *Journal of Zoology, London* 256:379-381.
- SLOUGH, B. G., AND T. S. JUNG. 2008. Observations on the natural history of bats in the Yukon. *Northern Review* 29:127-150.
- TALERICO, J. M., T. S. JUNG, R. M. R. BARCLAY, AND K. S. MELTON. 2008. Aberrant coloration in a little brown bat (*Myotis lucifugus*) from the Yukon. *Northwestern Naturalist* 89: 98-200.
- TUTTLE, M.D., KISER, W.M., KISER, S.B. 2004. *The bat house builder's handbook* (2nd ed.). Austin, TX: University of Texas Press. 35 pages.
- WHITAKER, J. O., JR., AND B. E. LAWHEAD. 1992. Foods of *Myotis lucifugus* in a maternity colony in central Alaska. *Journal of Mammalogy*. 73:646-648.
- WHITE, E. P. 2004. Factors affecting bat house occupancy in Colorado. *Southwestern Naturalist* 49:344-349.