

The Kootenay Community Bat Project: Summary Report and Lessons Learned From 2004 to 2017



a

FINAL REPORT

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Submission date: February 23, 2018

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Acknowledgements

The success of the Kootenay Community Bat Project (KCBP) has been attributed to many people over the years. Mike Sarell was one of the original founders of the project and shared his knowledge and skills. Dr. Cori Lausen provided her expertise on bat ecology and was instrumental in keeping us informed about the latest research.

We thank all of the residents who reported their bat colonies, allowed us to investigate their roosts, submitted dead bats for identification, or provided us with information. We thank the many interested people who volunteered their time to count bat roosts. We are grateful for the group of hardworking Bat Ambassadors who host bat house building workshops, lead nature interpretive walks, host information displays at community events, and visit school and community groups to spread their love and interest in bats. The KCBP would not have been possible without the hardworking efforts of these individuals.

We graciously acknowledge the Columbia Basin Trust, Regional District of the East Kootenay, Regional District of the Central Kootenay, Habitat Conservation Trust Foundation, Habitat Stewardship Program, and Public Conservation Assistance Fund for providing funding for this project. The Columbia Basin Environmental Education Network, through the Wild Voices for Kids program, is critical in providing funding for bat educators to visit school classrooms and share information about bats to young people in the region. Lake Windermere and District Rod & Gun Club has provided materials and extensive volunteer time towards bat house building projects. Wildlife Conservation Society Canada is instrumental in supporting KCBP through salary and program support as well as the expertise of Dr. Cori Lausen. Thank you to Wings over the Rockies for supporting KCBP's involvement in many bat events for the festival. We are grateful to the Rocky Mountain Trench Society for partnering with us to deliver KCBP in the upper Columbia Valley. Funding for this report was provided by the B.C. Ministry of Environment and Climate Change Strategy through the Land Based Investment Strategy.



Executive Summary

The Kootenay Community Bat Project (KCBP) started in south-eastern British Columbia (BC) in 2004. It was, to our knowledge, the first community-based approach to bat conservation in North America that included outreach and education, site visits with landowners, building and promotion of bat houses, and an annual bat count.

The goals of the KCBP are to:

- 1) Work with landowners to promote the conservation and enhancement of roost sites on their property through site visits, information packages, and bat house installations;
- 2) Increase knowledge of suitable bat roost modification, bat house design and site installation for the Kootenay region and BC;
- 3) Gather baseline data and establish permanent roost monitoring sites prior to the potential arrival of White-Nose Syndrome in the Kootenay region; and,
- 4) Promote education and awareness of bats and their habitats through newspaper articles, radio interviews, public interpretive programs, school programs, and educator workshops.

The success of this project has led to other regions in BC, as well as Alberta and elsewhere, adopting a similar approach to promote bat conservation using KCBP as a model. Over the years, KCBP has tried a variety of approaches to bat conservation and modified program activities based on this experience. The purpose of this report is to share the experience and lessons learned from the KCBP and to identify best practices that can be extended to the rest of the province.

The KCBP has gone through three phases since 2004, based on three-year funding cycles with Columbia Basin Trust: 2004-06 (A New Idea); 2012-14 (Model for Community-Based Approach) and 2014-17 (Bat Conservation in Citizen's Hands).

In total, eight bat species were seen or detected in roost structures throughout the KCBP project. These species included the following: Little Brown Myotis (*Myotis lucifugus*); Yuma Myotis (*M. yumanensis*); Big Brown Bat (*Eptesicus fuscus*); Townsend's Big-eared Bat (*Corynorhinus townsendii*); Long-eared Myotis (*M. evotis*); Long-legged Myotis (*M. volans*); Silver-haired Bat (*Lasiurus noctivigans*); and Californian Myotis (*M. californicus*).

A total of 661 roost sites were identified during the KCBP project, including maternity, day, and night roosts as well as roosts that could not be classified. The roost type most frequently detected were maternity roosts (n=309) whereas night roosts were detected least often (n=87).

In general, bat roosts were detected most often in human-occupied buildings (n=393). Within these houses, bats were most often found in the upper portions of the structure, such as the roof (n=129), attic (n=116) and chimney (n=33). Bats were infrequently found roosting in patio umbrellas, behind signs, in trees or in wood piles.

Overall, regardless if species identification was confirmed or not, the *Myotis* genus was detected most often (80.6%) during site visits. If we consider only species where identification is confirmed, either by genetic analysis or inspection of a live or dead bat, we documented Little



Brown Myotis roosts most often (n=84) in both the East and West Kootenay. We documented Yuma Myotis roosts less often but still frequently (n=48), all of which occurring in the West Kootenay.

KCBP has used a number of media to advertise our program including posters, press releases, radio announcements and our website. The majority of landowners heard about the KCBP through word of mouth (friend or neighbour) and local newspapers. Internet searches, bat programs, posters, and pest control companies are other avenues where people learn about the KCBP. As well as advertising, KCBP has offered hundreds of education and outreach events including community presentations, school programs, public mist-netting nights, and bat house building workshops. KCBP has also targeted outreach to pest control professionals, roofers, builders, and realtors.

Even during the first phase of the KCBP, it became apparent that the desire for educational programs far exceeded our capacity. We offered two Bat Ambassador Training Workshops for skilled educators to learn enough about bats that they could offer educational programs. These training workshops have been extremely successful at building the capacity of the KCBP to deliver educational programs.

Another goal was to work with landowners who have bats in their buildings to promote roost stewardship. Roosts were identified by: 1) direct landowner reports (phone, email, display booths), 2) indirect reports through neighbours or friends, or 3) suspected roost site investigations by KCBP biologists. In the early years of the program (2013 survey), the majority of landowners contacted KCBP to find out where to put up a bat house (67.6%), find out what kind of bats they had (55.9%), advice to encourage more bats (50.0%) or receive advice on evictions (38.2%). Later in the program (2013-2016 survey), landowners contacted the KCBP primarily because of advice on evictions (36.84%) as well as human health and safety concerns related to bats (28.07%). Fewer landowners contacted the KCBP to inquire about bat houses (12.28%). Given this information, it appears that the reasons for which landowners contact the KCBP is changing over time from landowners wanting to enhance bats to more concerned about health and safety. This shift could be due, in part, to the phasing out of drop-in visits and promotion of landowners to contact KCBP merely to identify their bat species.

Over the years, bat houses have been promoted in three different ways by the KCBP including bat house building workshops, pre-made bat houses to donate, and a cost-reimbursement program. Bat house building workshops are excellent educational events but not an effective method for promoting bat habitat because of the low percentage of bat-houses that are actually installed, lack of appropriate locations on some participant's properties, and relatively poor design of the single-chambered bat house (which is what is typically made in workshops because of time limitations). Pre-made bat houses have been very effective in allowing us to strategically provide bat houses to those landowners who are planning an eviction and can benefit from an alternative roost site. Cost-reimbursement allows for well-constructed and designed bat houses that are always installed but has a limited uptake of only those landowners who are skilled carpenters with tools available.



In 2005, the “Annual Backyard Bat Count” was initiated by KCBP as an attempt to document bat populations over time. This method has evolved into the BC Annual Bat Count and is an excellent way to document population trends at specific roost sites. However, to ensure consistency, citizen scientists should be contacted annually, provided with feedback, and actively encouraged to participate a few weeks prior to the count.

The KCBP has not uploaded landowner roost site information to the BC Government’s Wildlife Species Inventory (WSI) database at this time. The primary concern about data uploading is that landowner permission has not been explicitly provided to share their roost site information with the provincial government. We have addressed the issue of uploading BC Annual Bat Count information by having the landowner sign a consent form to submit and share data with the provincial government. However, to ensure long-term storage of roost site information (e.g. roosts recorded from landowner site visits), these data are uploaded annually to the *Columbia River Basin Biodiversity Atlas*, a Kootenay-based mapping platform housed within Selkirk College. KCBP’s philosophy has been that it is ultimately not going to be provincial government biologists, local government planners, or any other person with access to the provincial government database who will be responsible for the conservation of these roost sites but the private landowners themselves.

This report summarizes lessons learned and provides 51 recommendations for community bat projects based on our experience.



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Introduction

The Kootenay Community Bat Project (KCBP) started in south-eastern British Columbia in 2004. It was, to our knowledge, the first community-based approach to bat conservation in North America that included outreach and education, site visits with landowners, building and promotion of bat houses, and an Annual Bat Count. The success of this project has led to other regions in BC, as well as Alberta and elsewhere, adopting a similar approach to promote bat conservation using KCBP as a model. Over the years, KCBP has tried a variety of approaches to bat conservation and modified program activities based on this experience.

The purpose of this report is to share the experience and lessons learned from the KCBP and to identify best practices that can be extended to the rest of the province. Specifically, this report aims to:

- 1) Provide background, history and evolution of the approach of the KCBP;
- 2) Summarize roost results by bat species, roost structure, and roost type in houses, outbuildings and bat houses;
- 3) Report on the success of the bat protection program including rates of people keeping bats in buildings with and without interventions;
- 4) Summarize the relative success of mitigations using bat houses;
- 5) Present reporting rates over time that may have indicated the program was approaching a saturation point;
- 6) Describe issues and recommendations for data storage and uploading by Ministry of Environment; and,
- 7) List other pertinent program observations and recommendations.

Background and History

Rationale

The Kootenay Community Bat Project originally began as the 'Slocan Valley Bat Project' in 2004 (Craig and Sarell 2004). The program was initiated for two reasons: 1. to raise awareness about bats and work with the local communities to conserve and enhance bat roosting structures, particularly for those species at risk, and 2. to conduct a broad-scale, low budget inventory of bats including their important roosting habitat (e.g. caves, barns, attics, bridges and other structures) that relied on community participation.

The Slocan Valley, a 125 km valley from Playmor Junction to Nakusp, was selected as an area to pilot this method of community-based bat inventory in 2004 for several reasons. First, there had been no previously documented inventories of bats in the area. Secondly, residents of the area were known to have strong ecological values and conservation attitude so we felt that they would be likely to participate in a project on bats. Third, mosquito populations in the Slocan Valley had been rising, causing discomfort and a community debate about spraying, leading to the discussion of enhancing populations of predators of mosquitoes, including bats.

Finally, a Townsend's Big-eared Bat (blue-listed) was reported roosting in a house in Galena Bay (Harding 1998) with the only other known populations occurring at the Pend D'Oreille, Fort Shepherd, and Creston (Vonhof and Gwilliam 2000; Schaeffer et al. 2002; Sarell et al. 2003; Hill et al. 2004). Because of this, we suspected that this species would be present in the Slocan Valley which lies between those two geographic areas. At the time (2004), Townsend's Big-eared Bats were the only provincially or federally-listed bat species likely to be found in buildings⁴.

Following the first year, it became apparent that there was a clear need for a resource for residents who had bats in buildings. In addition, there was overwhelming enthusiasm for the project from residents in the Slocan Valley and surrounding area. Because of this enthusiasm, the SVBP was expanded to the West Kootenay area in 2005 and renamed as the Kootenay Community Bat Project (KCBP). In 2006, the project expanded again to include the entire Columbia Basin in southeastern BC (Craig and Sarell 2007). The project was based on a three-year funding cycle with the Columbia Basin Trust. Given this funding model, as well as maternity leave for Juliet Craig, the project was dormant from 2007 to 2011. In 2012, when Juliet Craig was ready to begin working again, the project was reinstated at a time after the detection and spread of White-nose Syndrome (WNS). KCBP has continued its work from 2012 to present.

The goals of the KCBP are to:

- 1) Work with landowners to promote the conservation and enhancement of roost sites on their property through site visits, information packages, and bat house installations;
- 2) Increase knowledge of suitable bat roost modification, bat house design and site installation for the Kootenay region and BC;
- 3) Gather baseline data and establish permanent roost monitoring sites prior to the potential arrival of White-Nose Syndrome in the Kootenay region; and,
- 4) Promote education and awareness of bats and their habitats through newspaper articles, radio interviews, public interpretive programs, school programs, and educator workshops.

Evolution of Approach

The KCBP has gone through three phases since 2004, based on three-year funding cycles with Columbia Basin Trust.

Phase I (2004-2006): A New Idea

During the first phase of the project, effort was placed on raising awareness about bats, letting landowners know about available resources, and developing materials and approaches. High effort was spent on press releases, radio interviews, and installing posters. Since inventory was one of the primary goals, particularly for Townsend's Big-eared Bats, we spent time doing "drop-in" visits where we would visit properties with promising roost structures, such as old

⁴ Little Brown Myotis were assessed by the Committee on the Status of Endangered Wildlife In Canada (COSEWIC) as federally Endangered in Canada in 2013 (Government of Canada 2018).



buildings and barns, and ask permission to look for bats in them. We also followed up with roost sites that we heard about through neighbours or members of the community. Finally, we stopped at every highway bridge we crossed to look for evidence of roosting. We were specifically looking for Townsend's Big-eared Bats, however, most colonies documented were *Myotis* species. This methodology was high effort but beneficial in documenting a large number of roost sites. Also, because our approach focused mainly on drop-in visits, not all roost sites documented in the first phase of the program were from reports by landowners.

Interestingly, one of the criticisms by local biologists during the first phase of the project was that we were primarily identifying roost sites for Little Brown *Myotis* and "what is the importance of that"? We felt that engaging private landowners in bat conservation, regardless of the species of bat on their property, was important in creating an ethic of bat conservation.

Phase II (2012 to 2014): Model for a Community-Based Approach

During this second phase of the project, WNS had been detected and was spreading across North America. There was a heightened awareness of the need for bat conservation, particularly for Little Brown *Myotis*, and the importance of engaging citizens in this conservation. It was during this phase that we also offered two Bat Ambassador training workshops to train educators from around the Kootenay region in delivering bat education programs.

We spent effort refining methodology for conducting annual bat counts by contacting state department staff in Vermont and other parts of the south-eastern United States. They stressed the importance of what we were doing and that we were doing it *prior* to the arrival of WNS in our area. During this phase of the project, there was also increasing interest in utilizing this approach across BC. Numerous regions of the province contacted KCBP to ask about our methodology, approach and resources. In 2014, we linked all these groups as the BC Community Bat Program so that we would not 'reinvent the wheel' in every portion of the province. We freely shared KCBP materials and resources and were instrumental in adapting them to become province-wide.

Phase III (2015 to 2017): Bat Conservation in Citizen's Hands

In 2015, Columbia Basin Trust (CBT) told us they didn't generally fund a project for more than three years and were interested in seeing KCBP phased-out of being reliant solely on their funding. In addition, provincial funding was now divided amongst a dozen regions of the province vs. KCBP alone, so relatively little provincial funding was provided to the Kootenays from the BC funding sources. We framed our CBT funding proposal to phase out the KCBP by training pest control professionals, realtors, roofers, bat house builders, and others who come across bat colonies so that they would be able to pass along the information on behalf of KCBP. The three-year funding application was entitled "Bat Conservation in Citizens' Hands" and our objectives in 2015 were to develop outreach materials for these key audiences, provide training on the BC Annual Bat Count, support Bat Ambassadors to provide educational programs, and



then play a more hands-off support and evaluation role in 2016 and 2017. However, the detection of WNS in Washington State in 2016 provided a new and urgent context for bat conservation in BC (Figure 1).

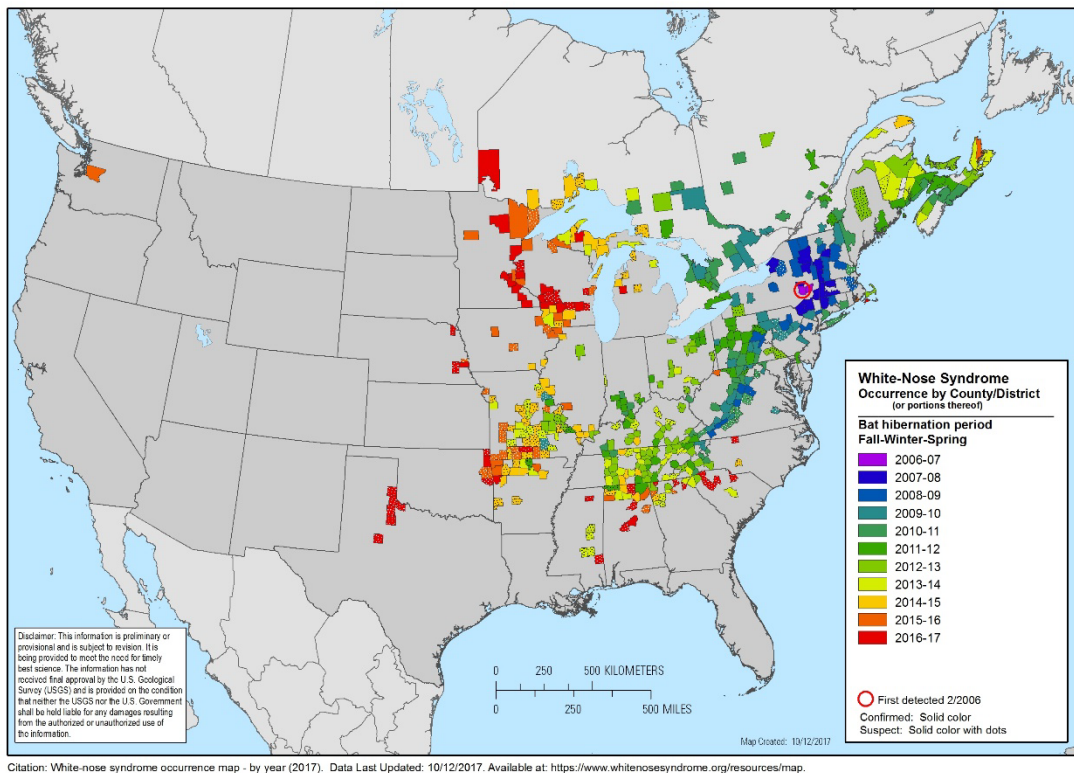


Figure 1. Map of White-Nose Syndrome spread by year (October 12, 2017). Note the new detection in Washington State. Source: www.whitenosesyndrome.org.

In 2016, there was increased pressure to identify and monitor bat roost sites, promote the public submission of dead bat carcasses, and increase bat conservation activities. Also, with the provincial media attention on bats, KCBP received more phone call and email inquiries than ever before. It became quickly apparent that KCBP could not continue without adequate resources for a paid coordinator and that ‘phasing out’ the program was not an option for the KCBP to continue.

Effort and Resources

Over the years, KCBP has received different funding levels (Figure 2). As indicated, CBT was the primary funding source during the second phase of the KCBP, however this changed as regional conservation funding programs became available (e.g. Columbia Valley Local Conservation Fund and Kootenay Lake Local Conservation Fund). Partner funding has increased significantly in the past few years, in part due to new funding sources and in part due to raised awareness of the importance of bat conservation with the spread of WNS.

The Kootenay region is large and it is important to spend time with landowners to fully understand their site, assess bats living there, and most importantly, develop a relationship

with them. As such, landowner site visits are time consuming and expensive due to travel and one-on-one contact time. Although it is less expensive in terms of effort and resources to do community presentations or other group events to provide education and awareness of bats, we are unable to provide our most effective guidance because we lack site-specific knowledge. We argue that these one-on-one visits are the most effective method for developing a roost conservation strategy with a landowner.

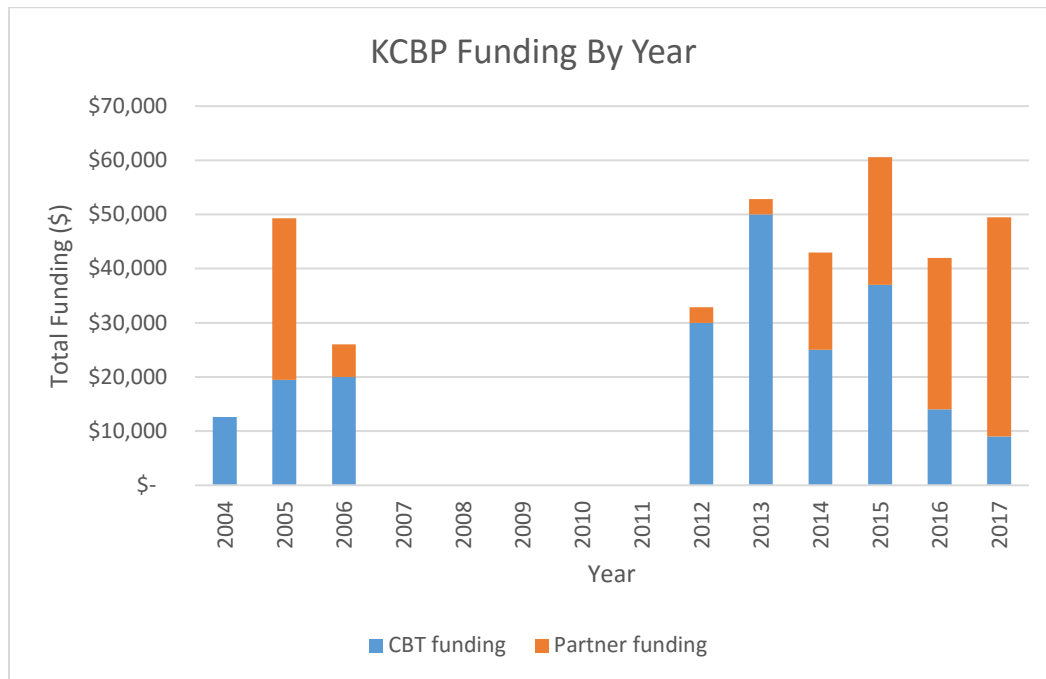


Figure 2. Columbia Basin Trust (CBT) and partner funding by year for Kootenay Community Bat Project.

Recommended approach to effort and resources

- ✓ Work to ensure funding sources are diversified. This diversification is a model that is currently being expected by funding agencies. This diversity also prevents a community bat program from being dependant on one funding source and collapsing if that source becomes unavailable.
- ✓ Prioritize landowner site visits even if resources are slim since these one-on-one face-to-face visits allow the most effective guidance and engagement.

Provincial Model

The KCBP was, to our knowledge, the first community-based bat conservation and inventory approach in North America. After the project ran its first phase from 2004 to 2006, information about the project (including funding applications, data forms, and outreach materials) was shared with Aaron Reid, (who is now a Wildlife Biologist with the Ministry of Forests, Lands, Natural Resource Operations and Rural Development) who initiated the Okanagan Community Bat Project in 2007 that ran for one year (Reid 2009) and Susan Leech who initiated the South



Coast Bat Action Team in 2011. In 2012, when the KCBP was re-initiating, interest in bats had increased in BC because of the advance and devastating impacts of White Nose Syndrome. Many regions around BC contacted KCBP to inquire about using this model in their region. To promote a unified approach to community bat programs in the province, the BC Community Bat Program formed in 2014 and included 10 regions. Every year, there has been growing interest and an expansion of the regions that are covered in BC (Figure 3). These regional programs are based, in part, on the original model of the KCBP.

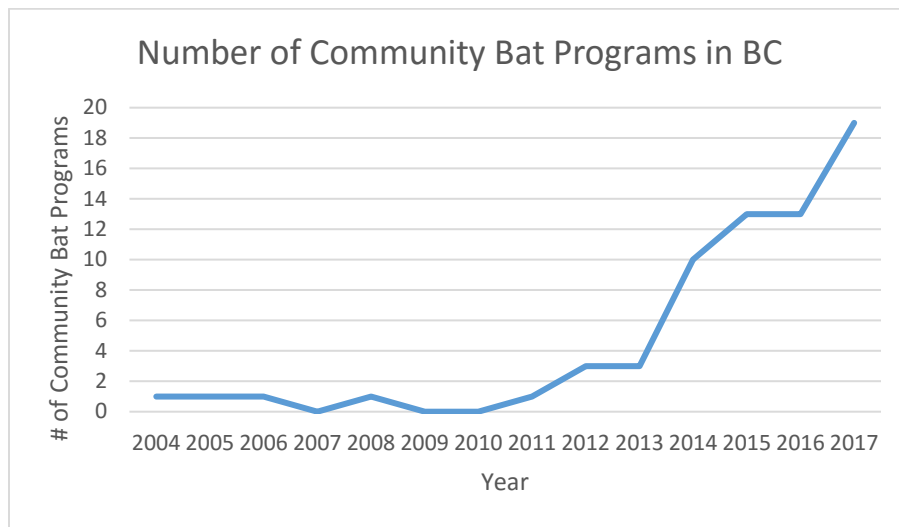


Figure 3. Number of community bat projects in British Columbia by year.

Project Area

In 2004, the focus of the bat project was the Slocan Valley, a small area in south-eastern BC. However, with phone calls from interested residents throughout the Kootenay region, the study area of the KCBP was expanded to include the West Kootenay in 2005, and then expanded again to include the entire Columbia Basin in 2006 (Figure 4). The project area is located within the Southern Interior Mountains Ecoprovince and areas surveyed are within the Interior Cedar Hemlock (ICHdw1, ICHmw2, ICHwk1, and ICHvk1, ICHxw, ICHmw4, ICHmk1), Interior Douglas Fir (IDFdm2, IDFun), Ponderosa Pine (PPdh2) and Montane Spruce (MSdk) biogeoclimatic subzones.



Figure 4. Location of Kootenay Community Bat Project in south-eastern BC in 2004 (left), 2005 (center) and 2006 onward (right).



Areas with little coverage

Some geographic regions of the Kootenay region have had fewer bat reports and site visits than others. This geographic distribution may be partly influenced by where the Coordinating Biologist was located which was Nelson (2004 to 2016) and Kimberley (2016 to present). In particular, areas with few roost sites documented include the Elk Valley and Upper Columbia Valley. Columbia-Shuswap began its own program in 2016 so Revelstoke sites in that region are now included in that project.

Recommended approach to project area

- ✓ Select a geographic area of focus that is relatively small so that landowner visits are more feasible and travel expenses are limited. Create more than one interconnected, area-based program (e.g. East and West Kootenay) or teams in large areas.
- ✓ Use multiple regional programs (e.g. coordinator for both East and West Kootenay) to reduce time and travel costs.
- ✓ Utilize Bat Ambassadors for education and awareness activities to regionalize these programs and reduce time and travel expenses.

Bat Inventory

Species

In total, eight bat species were seen or detected in roost structures throughout the KCBP project. These species included the following:

- Little Brown Myotis (*Myotis lucifugus*; MYLU);
- Yuma Myotis (*M. yumanensis*; MYYU);
- Big Brown Bat (*Eptesicus fuscus*; EPFU);
- Townsend's Big-eared Bat (*Corynorhinus townsendii*; COTO);
- Long-eared Myotis (*M. evotis*; MYEV);
- Long-legged Myotis (*M. volans*; MYVO);
- Silver-haired Bat (*Lasiurus noctivigans*; LANO); and
- Californian Myotis (*M. californicus*; MYCA).

Overall, regardless if species was confirmed or not, the *Myotis* genus was detected most often (80.6%) during site visits (Figure 5). If we consider only roosts where species identification is confirmed, either by genetic analysis or inspection of a live or dead bat, we detected Little Brown Myotis roosts most often (n=89; 43%), followed by Yuma Myotis (n=51; 25%) and Big Brown Bat roosts (n=40; 20%).



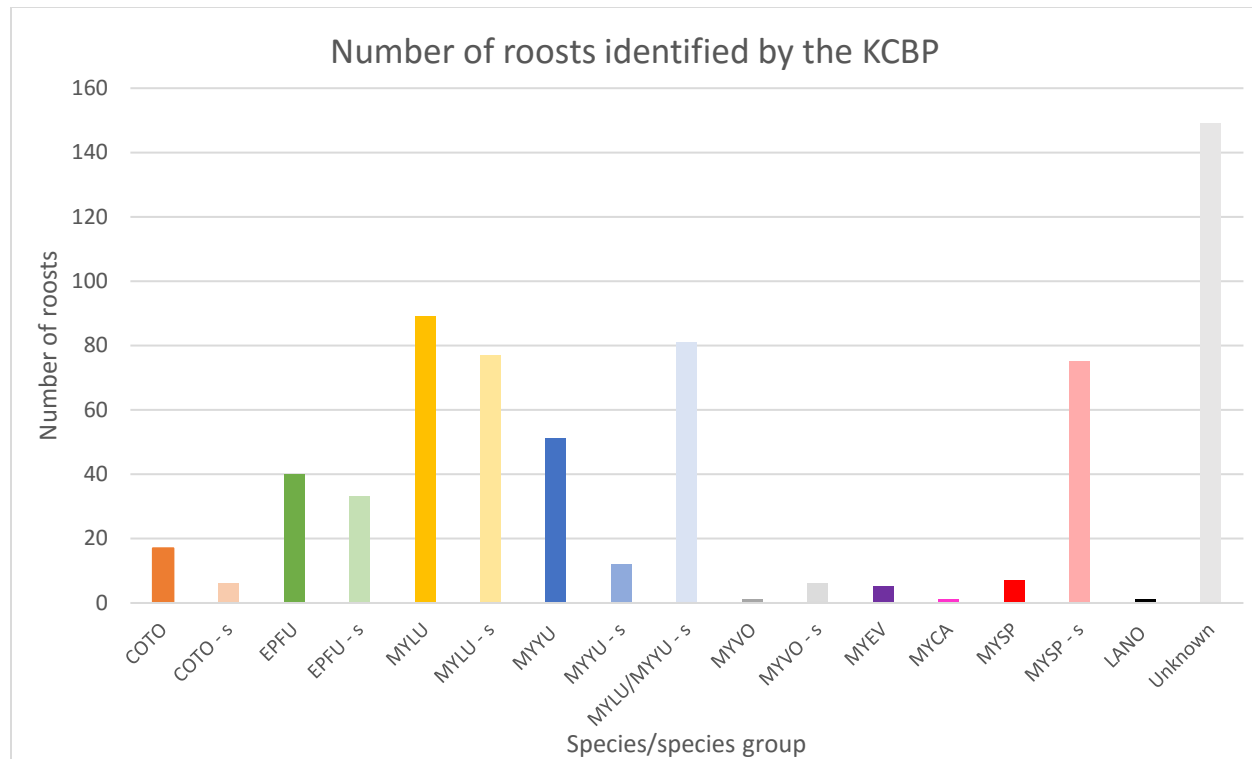


Figure 5. Summary of bat species detected during site visits from 2004 – 2017. Identification was confirmed via genetic analysis (typically of guano but sometimes wing tissue) or inspection of a live or dead bat. Suspected species are indicated by ‘- s’. MYLU/MYYU = Little Brown Myotis and Yuma Myotis; MYSP = all Myotis species.

Roost types

Overall, 661 roost sites were identified during the KCBP project for bats where species identification was suspected and confirmed (Figure 6). The roost type most frequently detected was maternity roosts (n=309, 46.7%) whereas night roosts were detected least often (n=87, 13.2%). A total of 173 (26.2%) day roosts were identified. It was not possible to confirm the roost type for 92 roosts (13.9%).

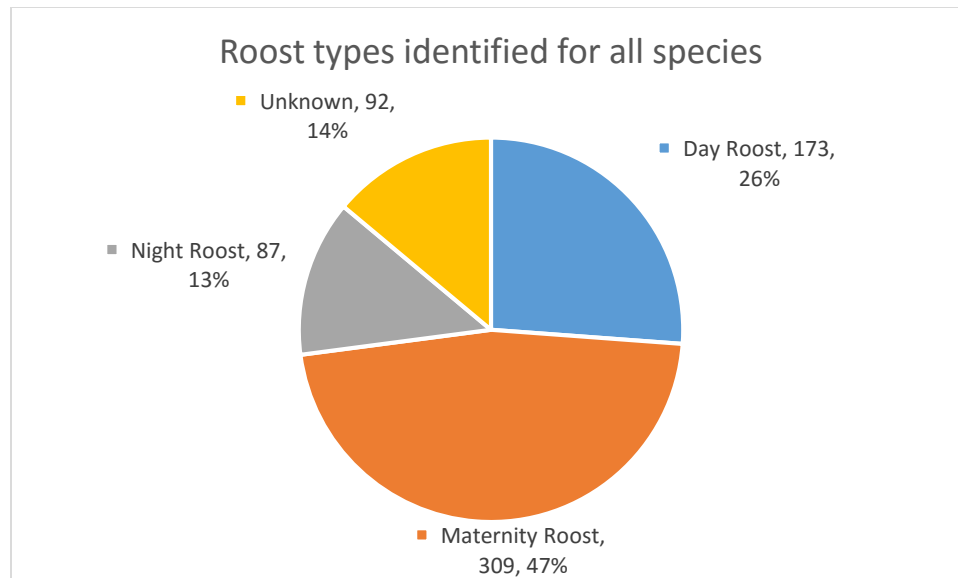


Figure 6. Summary of the types of bat roosts detected during site visits for all bat species, where identification is suspected or confirmed for all species/species groupings. Shown are sample size and percent of the total for each roost type.

If we focus our summary of roosts where species are confirmed or where Little Brown/Yuma Myotis are strongly suspected, we detected a total of 299 roosts (Table 1; Figure 7). The majority of these were maternity roosts, particularly for the Little Brown Myotis ($n=53$, 17.7%) followed by maternity roosts for the Little Brown/Yuma Myotis species assemblage ($n=47$, 15.7%).

Table 1. Summary of roost types (i.e. maternity, day, night, and unknown) as identified by the KCBP from 2004-2017. Roosts for confirmed species are shown as well as roosts where MYLU/MYYU are strongly suspected.

Species	Day roost	Maternity roost	Night roost	Unknown roost	Grand Total
COTO	14	2		1	17
EPFU	15	20	5	1	41
LANO	1				1
MYCA	1				1
MYEV	2		1	2	5
MYLU	21	53	11	9	94
MYSP	4	1	1		6
MYVO	1				1
MYYU	8	35	2	6	51
MYLU/MYYU - suspected	18	47	7	10	82
Grand Total	85	158	27	29	299

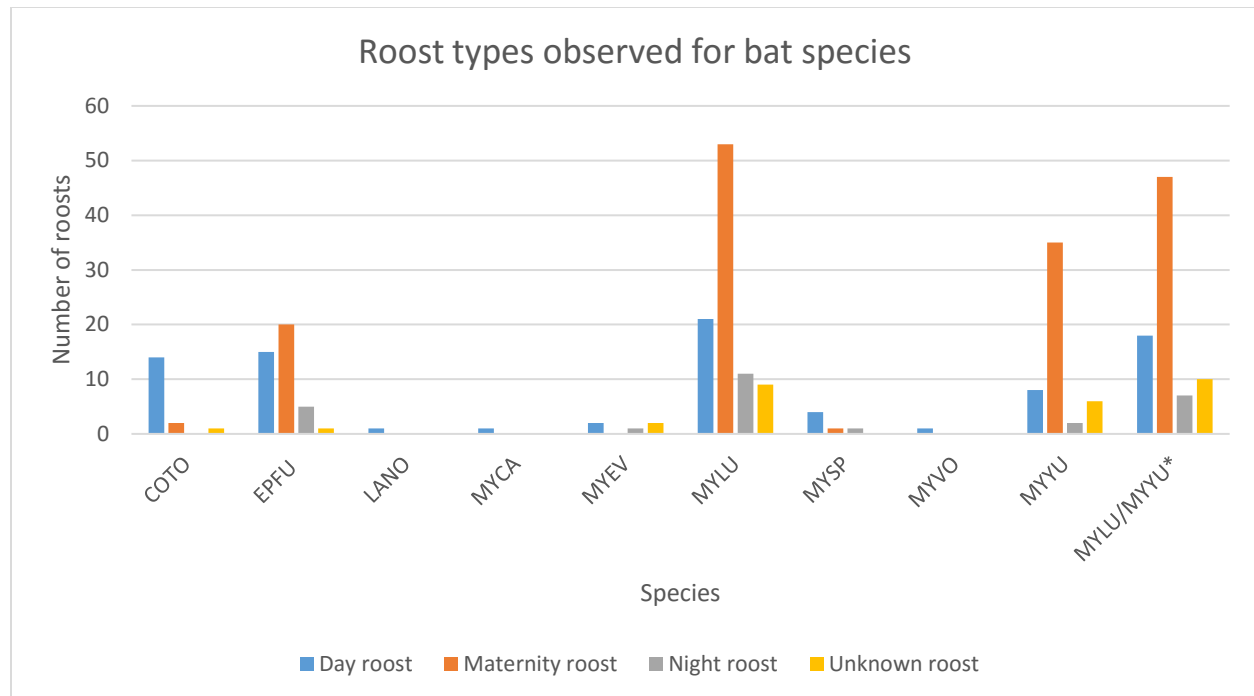


Figure 7. Summary of roost types observed by species as identified by the KCBP from 2004-2017. Roosts for confirmed species are shown. * = roosts where MYLU/MYYU are strongly suspected.

Roost location

Overall, bats were observed in 638 roosts. This includes roosts where species where identification was confirmed, suspected, or unknown. [NOTE: differences in total sample size differs from Roost Type because of missing data in some cases].

Bat roosts were detected most often in human-occupied houses (n=393, 61.6%; Figure 8). Within these houses, bats were most often found in the roof (n=129, 32.8%), attic (n=116, 29.5%) and chimney (n=33, 8.4%) regions. Bats were infrequently found roosting in patio umbrellas, behind signs, or in wood piles. The next most frequently observed roost structure were bat houses (n=56, 8.8%) followed by outbuildings (n=50, 7.8%).

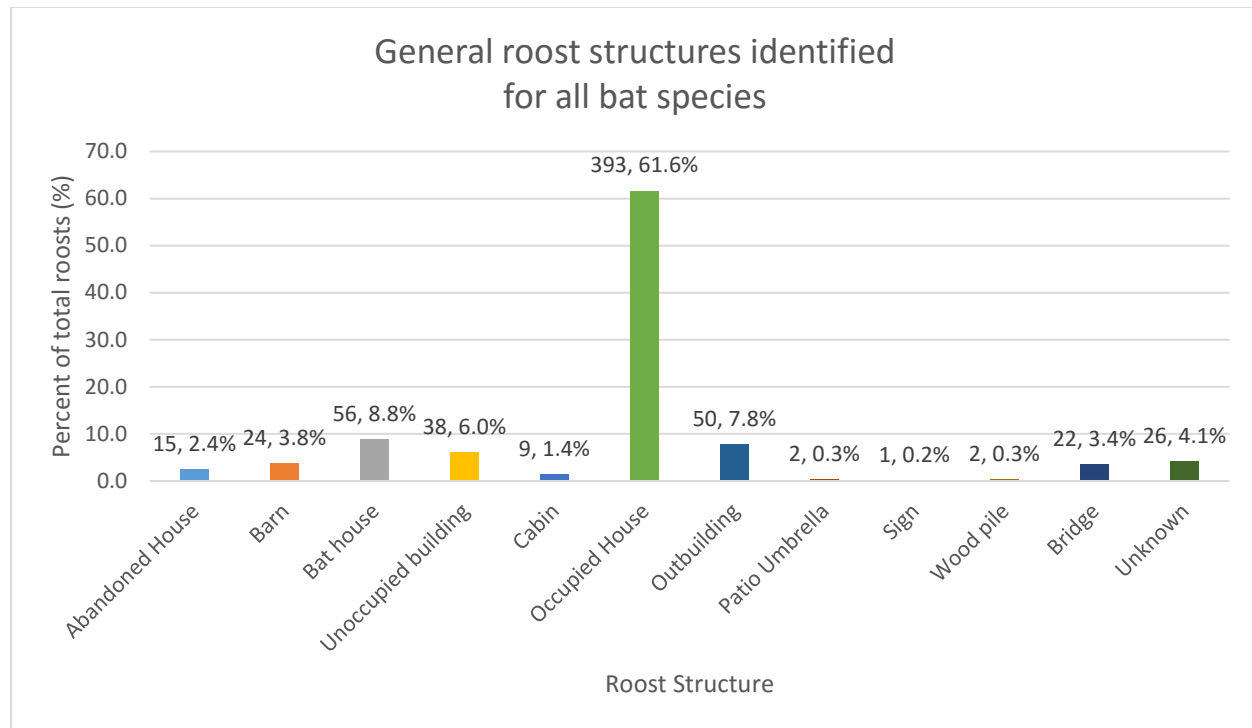


Figure 8. Summary of general bat roost structures detected during KCBP site visits. Shown are the results for all bat species observed – either confirmed, suspected, or unknown. The percentage of each roost structure is shown along with the actual number of roost structures per category.

Summary of Bat Species

Of the eight species documented throughout the work of the KCBP, the species most frequently encountered during site visits include the following: Little Brown Myotis, Yuma Myotis, Big Brown Bat, and Townsend’s Big-eared Bat. The remaining species: Long-legged Myotis, Long-eared myotis, Californian Myotis and Silver-haired Bats were encountered less frequently.

Little Brown Myotis (*Myotis lucifugus*): Endangered

The most notable change in the last 13 years since the KCBP’s inception has been the federal listing of Little Brown Myotis as federally endangered. This was due primarily to the devastating impact of WNS on Little Brown Myotis populations in eastern Canada. This listing raises the importance of community bat programs because Little Brown Myotis is the one of the most common building-roosting bat species in BC. Based on site visits, Little Brown Myotis colonies were confirmed at 84 roosts in 44 communities in the Kootenay region. The majority of these confirmed roosts occurred in the West Kootenay vs. East Kootenay region (n=49, 58.3% and n=35, 41.7%, respectively).

Large colonies occur in an attic of a house in Creston (n=600), an abandoned house in the Creston Valley (n=500), and an old church that is now occupied as a residence in Edgewood (n=500). The largest non-occupied structure that contains a mixed colony of Little Brown and Yuma Myotis appears to be the Creston Bat Condo with approximately 3,000 bats. Because Little Brown Myotis can form mixed colonies with Yuma Myotis, it is important to confirm

species identification using genetic analysis (e.g. guano sampled from throughout the roost) or acoustic recordings.

What becomes immediately apparent is that Little Brown Myotis occur most often in occupied houses. (Figure 9; Table 2). In this general location, Little Brown Myotis were most often detected in the attics (n=17, 20%) and roofs (n=13, 17%) of occupied houses. Little Brown Myotis also use bat houses (n=12, 14.3%), unoccupied buildings (n=8, 9.5%) and outbuildings (n=7, 8.3%). Other roost structures, such as abandoned houses, barns, and cabins are used to a lesser extent for roosting.

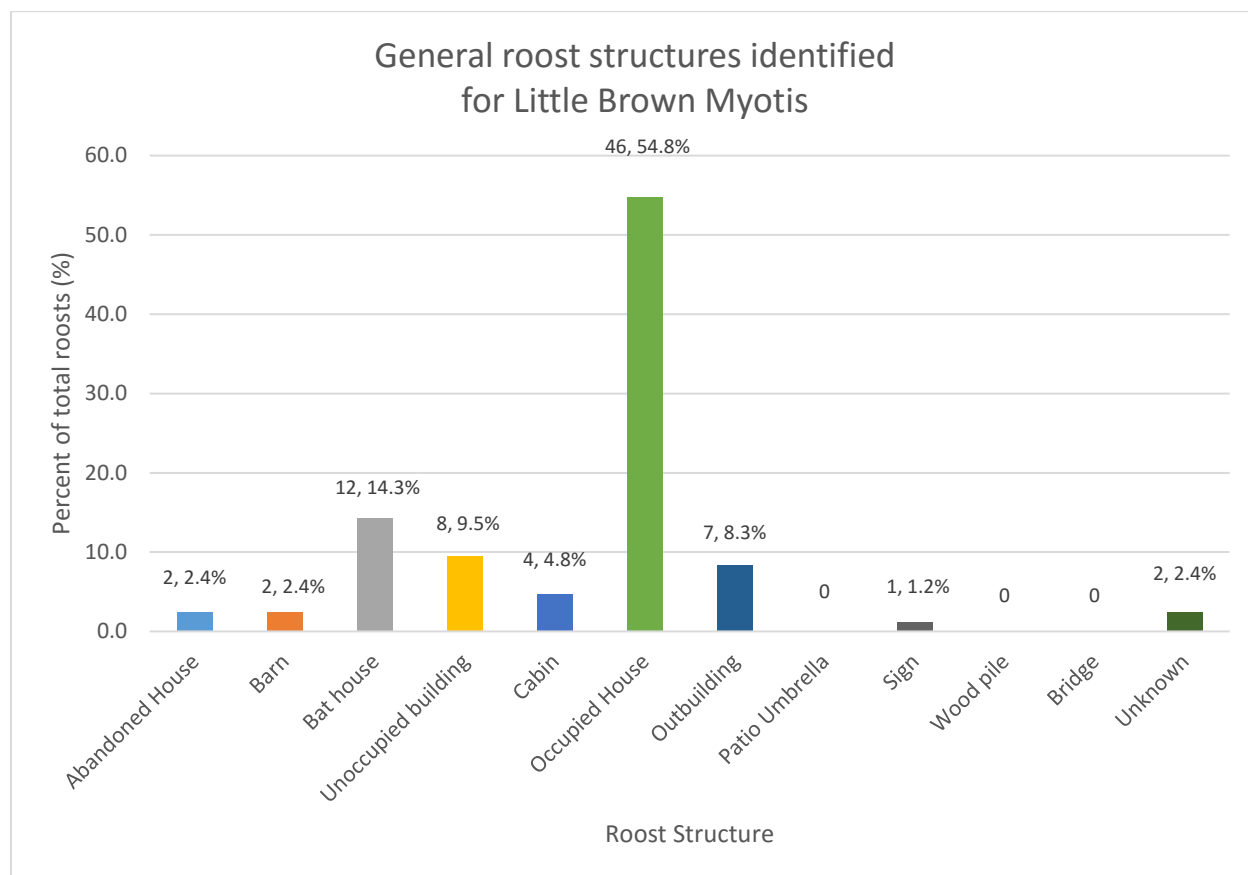


Figure 9. Summary of general bat roost structures used by Little Brown Myotis (confirmed identification) identified during site visits by the KCBP. Shown is the percentage of each roost structure along with the actual number of roost structures per category.

Table 2. Summary of roost structures used by Little Brown Myotis (confirmed identification) identified during site visits by the KCBP.

Roost structure	Number of roosts	Percentage of Total
Occupied House	46	54.8
Bat house	12	14.3
Unoccupied building	8	9.5
Outbuilding	7	8.3
Cabin	4	4.8



Roost structure	Number of roosts	Percentage of Total
Abandoned House	2	2.4
Barn	2	2.4
Unknown	2	2.4
Sign	1	]
Patio Umbrella	0	0.0
Wood pile	0	0.0
Bridge	0	0.0
TOTAL	84	100%

Yuma Myotis (Myotis yumanensis)

Yuma Myotis is another building-roosting bat that suffers from WNS. Currently, there is no federal listing for this species and it is yellow-listed in BC. Yuma Myotis is also widespread throughout the Kootenay region, and presence was confirmed at 48 colonies in 25 communities. Interestingly, the vast majority of confirmed Yuma Myotis colonies occurred in the West Kootenay region whereas one colony occurs in a house attic in Revelstoke (technically in the Columbia Shuswap region) and there are no confirmed colonies of this species in the East Kootenay.

Like Little Brown Myotis, Yuma Myotis can form large maternity colonies. More large colonies (i.e. >200 bats) were found of this species than compared to Little Brown Myotis (9 colonies over 200 bats). The largest colony of confirmed Yuma Myotis is approximately 2,000 bats in the chimney/attic area of an old school house museum in Crawford Bay on the east shore of Kootenay Lake (as counted by residents). Mixed colonies of Little Brown Myotis and Yuma Myotis occur in the region so it is very likely that this roost could be a mixed one.

Because Yuma Myotis colonies can be mixed with Little Brown Myotis, it is important to confirm species identification using genetic analysis (e.g. guano) or acoustic recordings. Although genetic analysis can provide definitive species identification, in many cases, it is completed on one pellet of guano. Acoustic monitoring follow-up should be considered for colonies where species identification is important to complement genetic testing.

Like Little Brown Myotis, Yuma Myotis occur in most often in occupied houses (n=26, 54.2%; Figure 10; Table 3). Like Little Brown Myotis, Yuma Myotis also roost in bat houses (n=12, 25%) and to a much lesser extent in other structures such as abandoned houses (n=3, 6.3%), unoccupied buildings (n=2, 4.2%) and outbuildings (n=2, 4.2%). As described above, the largest non-occupied structure that contains a mixed colony of Yuma and Little Brown Myotis appears to be the Creston Bat Condo with approximately 3,000 bats



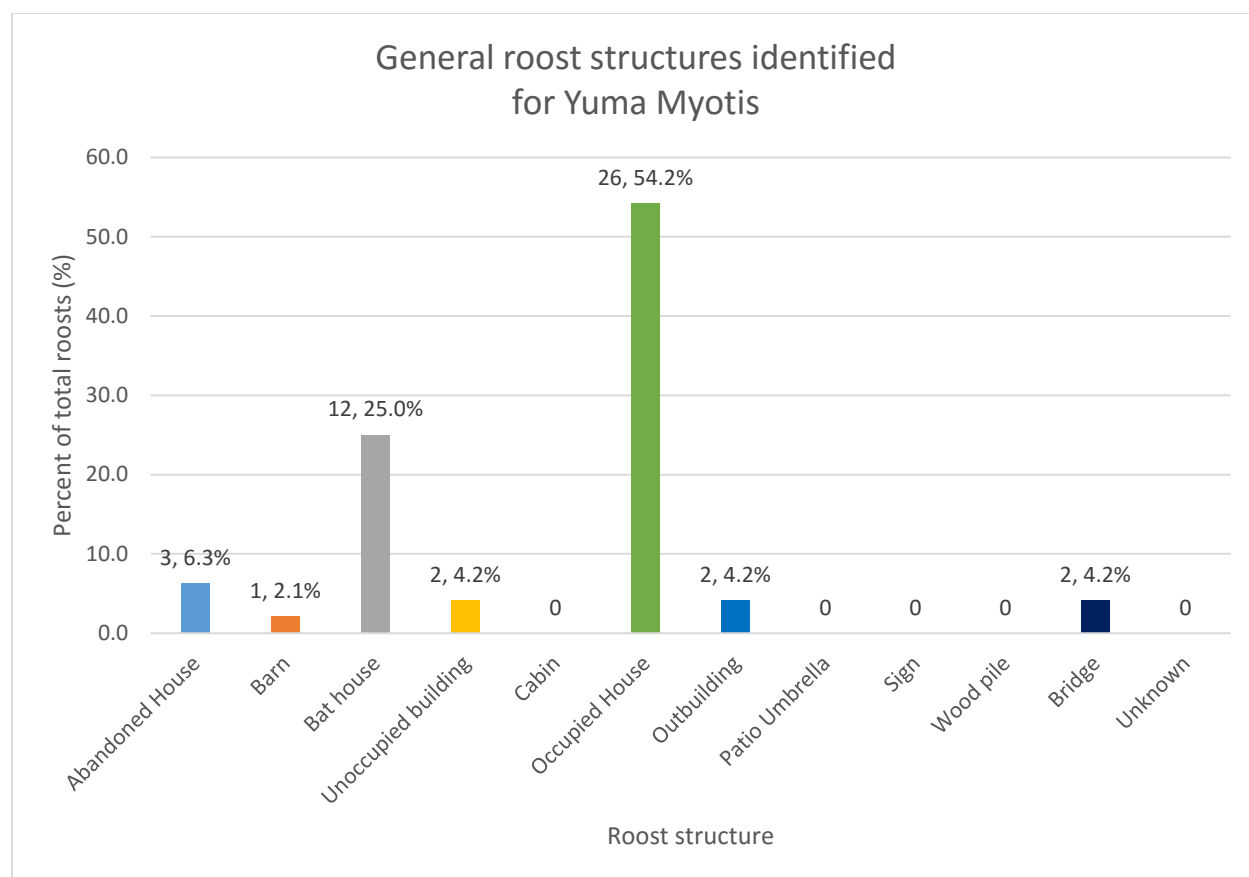


Figure 10. Summary of general bat roost structures used by Yuma Myotis (confirmed identification) identified during site visits by the KCBP. Shown is the percentage of each roost structure along with the actual number of roost structures per category.

Table 3. Summary of roost structures used by Yuma Myotis (confirmed identification) identified during site visits by the KCBP.

Roost structure	Number of roosts	Percentage of Total
Occupied House	26	54.2
Bat house	12	25.0
Abandoned House	3	6.3
Unoccupied building	2	4.2
Outbuilding	2	4.2
Bridge	2	4.2
Barn	1	2.1
Cabin	0	0.0
Patio Umbrella	0	0.0
Sign	0	0.0
Wood pile	0	0.0
Unknown	0	0.0
TOTAL	48	100%

Big Brown Bat (*Eptesicus fuscus*)

Big Brown Bat is yellow-listed in BC and has no federal listing. This species is affected by White Nose Syndrome but has not shown catastrophic population declines as has been exhibited by *Myotis* species.

Fewer Big Brown Bat roosts were detected throughout the KCBP program as compared to *Myotis* species. In total, 40 roosts were documented in 28 communities throughout the Kootenay region. More Big Brown Bat roosts were documented in the West Kootenay (n=23) vs. the East (n=17).

Big Brown Bat roosts tended to be smaller in size. The largest two Big Brown Bat roosts were estimated to contain 26 and 51 bats, respectively.

Mostly day and maternity colonies were detected for this species (n=35; 88%). Of these, most roosts occurred in occupied houses (n=25, 61%; Figure 11; Table 4) and within this structure, Big Brown bats were found roosting in roofs (n=9, 22.5%) and adjacent to chimneys (n=4, 10%). Big Brown Bats were also round roosting in barns and in bat houses but to a lesser extent.

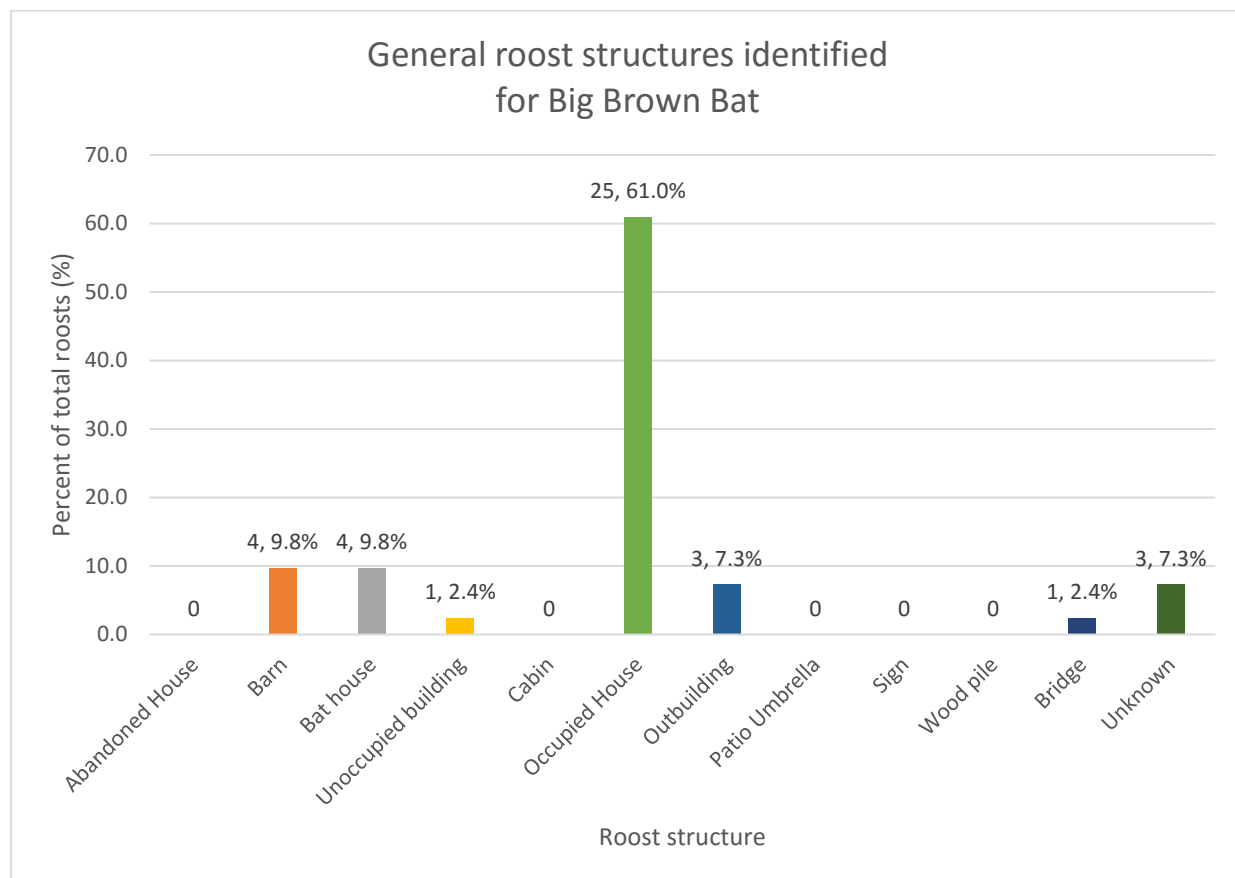


Figure 11. Summary of general bat roost structures used by Big Brown Bat (confirmed identification) identified during site visits by the KCBP. Shown is the percentage of each roost structure along with the actual number of roost structures per category.

Table 4. Summary of roost structures used by Big Brown Bats (confirmed identification) identified during site visits by the KCBP.

Roost Structure	Number of roosts	Percentage of total
Occupied House	25	61.0
Barn	4	9.8
Bat house	4	9.8
Outbuilding	3	7.3
Unknown	3	7.3
Unoccupied building	1	2.4
Bridge	1	2.4
Abandoned House	0	0.0
Cabin	0	0.0
Patio Umbrella	0	0.0
Sign	0	0.0
Wood pile	0	0.0
TOTAL	41	100%

Townsend's Big-eared Bat (*Corynorhinus townsendii*): Blue-listed

Townsend's Big-eared Bat is blue-listed in BC and has no federal listing. They have been shown to carry the *Pseudogymnoascus destructans* fungus that causes White Nose Syndrome but have not exhibited diagnostic signs of the disease. Townsend's Big-eared Bat was one of the target species of the KCBP during the initial years of the program because at that time (2004), it was the only listed species known to frequently occupy buildings.

Seventeen colonies of confirmed Townsend's Big-eared Bat were documented in 16 communities, occurring primarily in the West Kootenay; two colonies were documented in the East Kootenay. One dead Townsend's Big-eared Bat was found on the ground near a barn in the Slocan Valley and the location of its colony or associated roosting structure is unknown.

Although count data are generally lacking for this species, the largest roost site contains at least 60 bats in total and is one of the largest maternity roosts known in the Kootenays for this species. This is a maternity colony where successful reproduction has been documented.

Only day roosts or maternity colonies were detected for this species. Of these, most roosts occurred in unoccupied outbuildings, particularly in the attics as well as the upper floors of abandoned houses (Figure 12; Table 5). Here, there is typically more room for flying as well as cooler temperatures for thermoregulating.



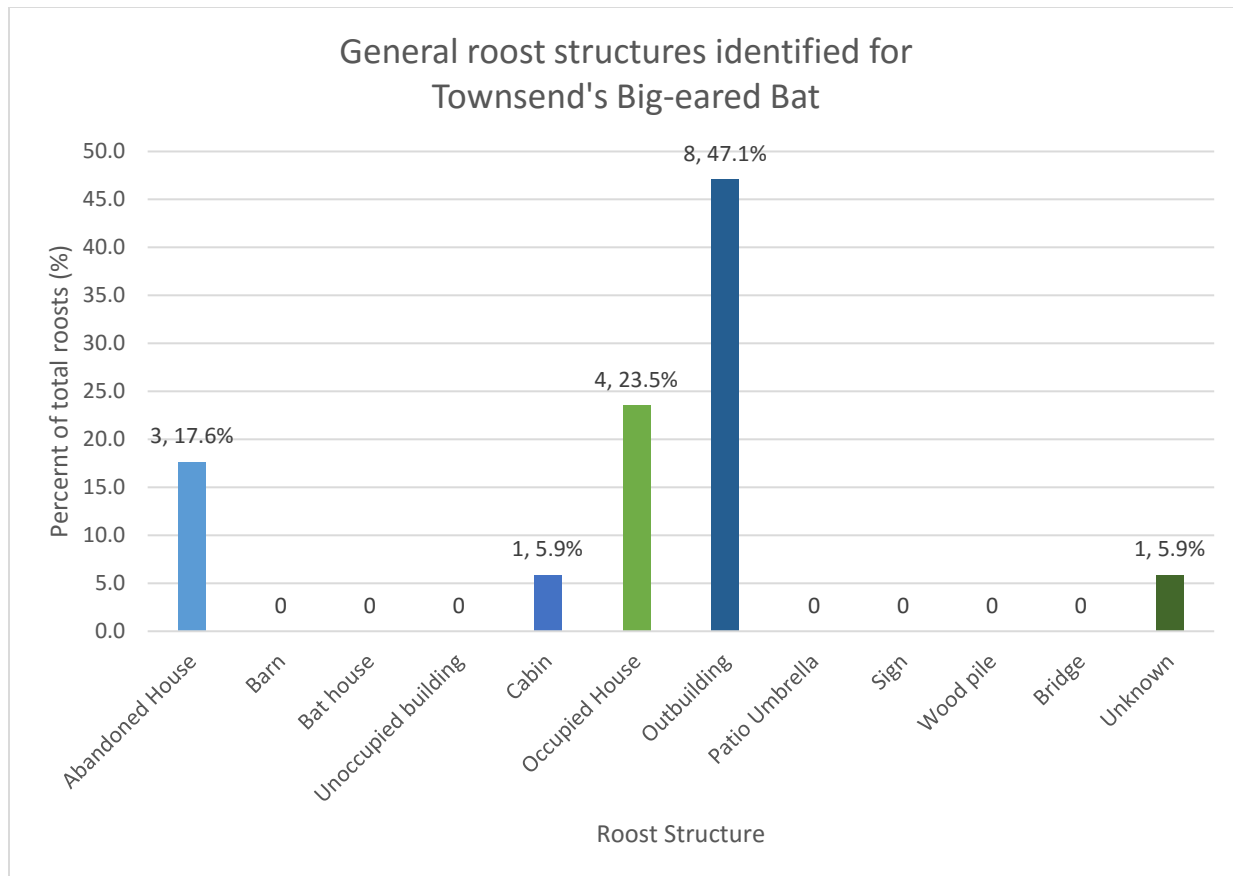


Figure 12. Summary of general bat roost structures used by Townsends Big-eared Bat (confirmed identification) identified during site visits by the KCBP. Shown is the percentage of each roost structure along with the actual number of roost structures per category.

Table 5. Summary of roost structures used by Townsend's Big-eared Bat Bats (confirmed identification) recorded during site visits by the KCBP.

Roost Structure	Number of roosts	Percentage of total
Outbuilding	8	47.1
Occupied House	4	23.5
Abandoned House	3	17.6
Cabin	1	5.9
Unknown	1	5.9
Barn	0	0.0
Bat house	0	0.0
Unoccupied building	0	0.0
Patio Umbrella	0	0.0
Sign	0	0.0
Wood pile	0	0.0
Bridge	0	0.0
TOTAL	17	100%

Long-legged Myotis (*Myotis volans*)

One day roost was identified for Long-legged Myotis (confirmed by genetic analysis) in Kingsgate. This colony is in at the top of an outbuilding on the property.

Long-eared Myotis (*Myotis evotis*)

Five Long-eared Myotis were identified during the course of the KCBP – three were reported from the Creston Valley, one from the Slocan Valley and one from the Shoreacres region near Castlegar.

In the Creston Valley, two dead bats (confirmed by carcass) were found in gardens and under raspberry bushes; one of these bats had a hole in its wing. The cause of death for these bats as well as where they were roosting is unknown. The third Long-eared Myotis in the Creston Valley was associated with a day roost located in a barn on the east shore of Kootenay Lake. It seemed that bats were becoming trapped and then squished behind a barn door but they were also roosting in the roof region of the barn as well.

In the Slocan Valley, Long-eared Myotis (as confirmed by carcass and visual) were using bat houses that were installed around the property. And finally, the Long-eared Myotis from Shoreacres was found night roosting (confirmed by visual) under a highway bridge.

Californian myotis (*Myotis californicus*)

One roost was identified for Californian Myotis in the Castlegar region. A single bat was found day roosting on the outside of a commercial building early on in the KCBP project, in 2006. Based on our inspection of roosts in the past, it is very rare to come across a Californian Myotis associated with an anthropogenic structure in summer.

Silver-haired Bat (*Lasiurus noctivagans*)

One roost was identified for Silver-haired Bat in the Castlegar region. This day roost was situated in a wood pile early on in the KCBP project, in 2005. It is rare that we come across summer colonies of this species whereas it appears that some winter bat activity is of Silver-haired Bats (pers. comm. LA Isaac).

Recommended approach to bat inventory

- ✓ Ensure there are clear definitions for day, night and maternity roosts.
- ✓ Identification of *Myotis* species must be confirmed using genetic analysis. Take multiple samples from different locations within a large roost structure to better identify mixed species, since only one pellet is analyzed at a time.
- ✓ Acoustic monitoring follow-up is recommended for colonies where species identification is important to complement genetic testing. This is especially for Little Brown and Yuma Myotis because they often form multi-species colonies that single pellet genetic sampling will not detect. However, acoustic monitoring requires a bat detector, expertise, time and software to analyse the calls, and being at the site during



emergence (or dropping off and then picking up a passive detector), all of which significantly increase the budget of site visits. Furthermore, there is excess ‘clutter’ (or sound obstructions) for bats leaving a roost making it is very difficult to obtain calls with diagnostic features to identify to species.

- ✓ Collect guano at all sites where it is accessible and prioritize analysis for those sites where bats are likely to remain (i.e. an eviction is not being planned). However, if community bat project funds allow, we recommend analysing guano samples from colonies that will be evicted, particularly sites where a bat house is being installed.
- ✓ Develop a high priority list of roost sites that includes roosts that contain the following characteristics: high priority species (e.g. Little Brown Myotis), large colonies, where no eviction is planned. For these high priority roosts, ensure species identification is confirmed, bat colony counters are in place each year and at least two replicates of pre-pup counts are completed, at minimum.

Outreach and Education

Outreach and education is an integral part of the KCBP and one of its primary goals. KCBP engages citizens in many ways including newspaper articles, targeted outreach, and the Bat Ambassador program.

Advertising

KCBP has used a number of media to advertise our program including posters (at mail box boards, gas stations, community halls), press releases (distributed to all of our local newspapers), CBC “community announcements” as well as interviews on local radio stations, and our website. During our site visits, we ask how people heard about our program and most common answers were: ‘saw a newspaper article’, ‘from a friend or neighbour’, through a program, ‘saw a poster’ or were referred by a pest control company (Table 6; Figure 13).

Table 6. How landowners heard about the KCBP. Note that this section was inconsistently filled in during site visits.

Year	News- paper	Program	Poster	Friend / Neighbour	Website	Drop in	TV*	MOE	Displa y Booth	Pest Control	Radio	CVWMA **	NCC ***	Wild- safe BC
2004	18	1	3	6		7								
2005	35	10	4	9	2	7		1		1				
2006	15	1	8	22		2	2	2		1		1		
2012	2	1	2	12	2			2				1		
2013	3	6	4	12	2	2			4			1		
2014		4	2	4	4									
2015	3	1		7	1				1	1		2		
2016	1	8		17	1					3				1
2017	1			10	1					15	1		1	
TOTAL	78	32	23	99	13	18	2	5	5	21	1	5	1	1
%	26%	11%	8%	33%	4%	6%	0.7%	1.6%	1.6%	7%	0.3%	1.6%	0.3%	0.3%

* TV feature was only done in 2006

** Creston Valley Wildlife Management Area (CVWMA) *** Nature Conservancy of Canada



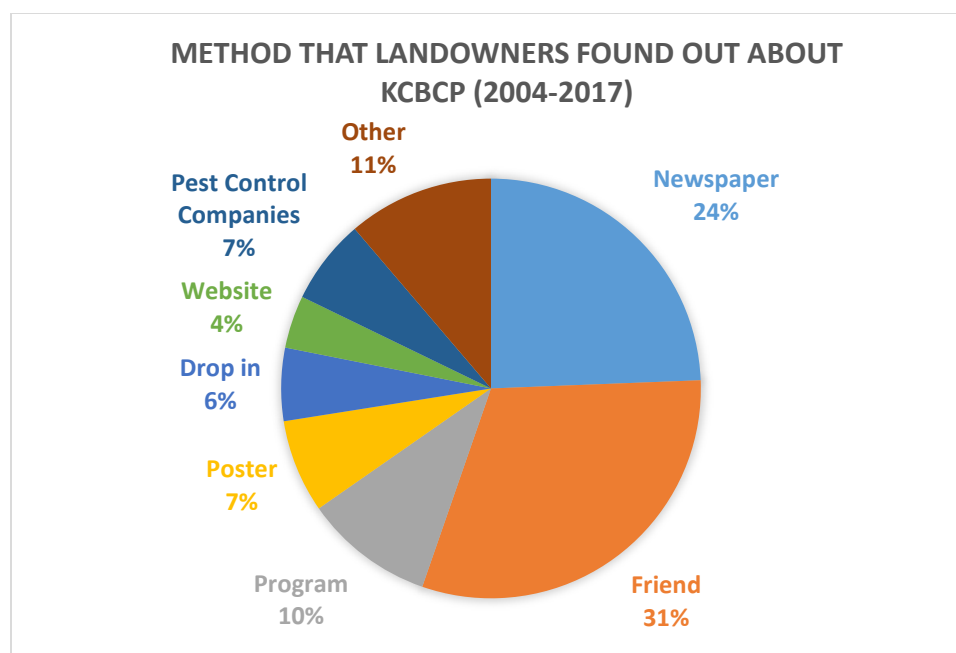


Figure 13. Method that landowners found out about KCBP based on site visit forms from 2004 to 2017.

These top answers were also reflected in the 2013 survey (of 2012 and 2013 site visits; Table 7) however this internet-based survey had more people finding out through the internet. In the 2016 survey, the majority of landowners had found out about the KCBP from the local newspaper (36%) or via an internet search (33%) and few learned of the program from posters (3.5%) or presentations (1.8%).

Table 7. Most effective advertising for landowners (i.e. how landowners first heard about KCBP) based on 2013 and 2016 surveys.

Answer Options	2013 Response Percent	2013 Response Count	2016 Response Percent	2016 Response Count
Newspaper article	54.5%	18	38.6%	22
Internet	27.2%	9	33.3%	19
Friend/Word of Mouth*	30.0%	10	15.8%	9
Display Booth (2016 only)			15.8%	9
Presentation*	24.2%	8	1.8%	1
Poster*	15.1%	5	3.5%	2
We dropped by or contacted you*	12.1%	4	3.5%	2
Pest Control Company (2016 only)			7.0%	4
Radio interview	3.0%	1	5.2%	3
Referral from Ministry of Environment	3.0%	1		
		33**		57**

* Note that these responses were not options in 2016 so they were included under “Other” but other answers were also selected.

** Note that respondents could “pick all that apply” so there are more answers than there are respondents.

Communicating with landowners is most effective via newspaper articles and this trend is consistent over time. We have come to understand the importance of newspapers in connecting with residents, particularly in more rural communities and will continue to use this media.

What is also becoming apparent is the increasing use of the internet to query information related to bats in our region and seek out assistance regarding issues related to bats. Based on our 2016 survey, the second most important form of advertising for the KCBP was the internet. This source has been increasingly important from 2004 to present with more people having access to high speed internet in the Kootenays.

Since many people are accessing information about bats using the internet and a plethora of misinformation abounds on the internet, it is important that KCBP and the broader BC Community Bat Program maintain a strong and visible presence on the internet and through social media tools, such as Facebook. In 2005, we developed a simple website and it has been improved over the years. In 2014, when the BC Community Bat Program developed a website, the intention has been to phase out the Kootenay Community Bat Project website and have it as a page on the BC Community Bat Program website in order to avoid having to update two separate websites. The KCBP website was phased out in 2017. When someone uses the internet to search for a program, they are automatically linked to the BC Community bat website (www.bcbats.ca).

It is interesting to note that the top most important form of advertising for landowner site visits was reported to be “from a friend or neighbour”. Given the stigma around bats, social acceptance of these animals is a key element of behaviour change. We encouraged social diffusion by asking landowners to talk with other people about bats and what they’ve learned. During the 2013 survey of site visits, we asked how many people landowners had shared information with and 60% of respondents reported that they had discussed bats with at least 6 other people (Table 8).

Table 8. Social diffusion of bat information after receiving a site visit from Kootenay Community Bat Project as assessed in the 2013 survey.

After our visit, with how many people (e.g. friends, family, colleagues) did you share something you learned about bats?		
Answer Options	Response Percent	Response Count
None	0.0%	0
1 or 2	8.8%	3
3 to 5	32.4%	11
6 or more	58.8%	20
<i>answered question</i>		n=34

Printed Materials

As part of community outreach and landowner visits, we developed numerous printed materials. During the first few years, we primarily used existing handouts such as bat house



plans from Bat Conservation International (Tuttle et al. 2005) and a Townsend's Big-eared Bat handout from Ministry of Environment. We also developed our own "2 pager" which was relatively inexpensive to photocopy (Appendix 1). When we did a "drop in" site visits, we attached a note to the front of the newsletter (Figure 14).



Figure 14. Note to landowners when we left a KCBP 2-pager during a drop-in visit when nobody answered.

Over time, we had accumulated many different handouts and recognized that we were frequently receiving the same questions. In 2012, we developed a "Frequently Asked Questions" booklet (48 pages) that answered common questions and included information about the BC Annual Bat Count and bat house plans. We felt that landowners were less likely to throw away a booklet than independent sheets of information. We also received feedback that some people don't read online or have limited access to internet so they appreciated a printed resource.

Some of the printed resources included:

- KCBP Handout (2 pages; Appendix 1)
- Kootenay Community Bat Project: Frequently Asked Questions (48-page booklet)
- KCBP Got Bats? poster and postcard (Figure 15)
- Bat-friendly gardening tips (Appendix 2)
- Banner for display booths

We have adapted most of these to the province through the BC Community Bat Program.



Figure 15. Poster and postcard made for Kootenay Community Bat Project.

Public Outreach

KCBP has provided hundreds of programs to raise awareness about bats including community presentations, display booths, public mist-netting nights, and school programs (Table 9). These events were designed to engage the public in bat conservation, reduce fears and dispel myths associated with bats, and increase appreciation for the ecological importance of these animals.

Table 9. Number of educational programs offered during Kootenay Community Bat Project.

Type	2004	2005	2006	2012	2013	2014	2015	2016	2017	Grand Total
Bat house Building	2	4	6		1	1	5	3	7	29
Conference Presentation		3	1							4
Mist-netting	2	1	2		1				1	7
Community Program	4	17	7	11	15	14	28	7	13	116
School Program				60	55	67	41	38	24	295
Display booth					10	14	6	13	10	53
Radio interviews		3	2	5	1	1		2	3	17
TV			1							1
Press releases	14	7	6	3	12	10		6	4	35
Grand Total	22	35	25	79	95	107	80	69	63	557

Community presentations and site visits have had very positive post-program evaluations for increasing knowledge, appreciation, and understanding of bats (Table 10). These numbers may be skewed because they were asked post-presentation and could include bias of trying to “please the presenter” with positive feedback. They are also short-term (directly post-survey). The 2013 post-landowner visit surveys (34 respondents) indicated that the vast majority of landowners found the information provided to be extremely or very useful (33/34), and that the visit significantly increased their knowledge of bats (97.05%; 29/34), and significantly

(70.5%; 24/34) or slightly (20.5%; 7/34) increased their appreciation of bats. Further long-term assessment of the efficacy of these outreach methods are recommended.

Table 10. Post-program evaluation (2004 to 2006) of whether community presentations and site visits increased participants' knowledge, appreciation and understanding of bats. Score is the average based on a scale of 1 (disagree) to 5 (agree).

Type	Increased my knowledge of bats	Increased my appreciation of bats	Increased my understanding of bats
Interpretive Program	4.47	4.46	4.6
Site Visit	4.5	4.33	4.65

Community presentations have primarily been utilized to find out about roost sites for landowner visits. During community presentations, we have a sign-up sheet for landowners to “report their bats”. Given that we were often overnight in these locations, we could do site visits with landowners the following day in that community. From the site visit forms, 11% and from the 2013 survey, 24% of landowners we visited indicated that they had heard about the KCBP through presentations. However, this number fell to only a small portion of landowners (1.6%) in the 2016 survey (Table 7). This lower value could be attributable to the overall lower level of general outreach from 2015-2017 due to the phasing out design of the KCBP.

Targeted Outreach

Very early on in the KCBP, it became apparent that it was important to engage organizations that receive phone calls about bats. During the first years of the bat project, Interior Health Authority of BC began the “Be Bat Aware” campaign which promoted people with bats in their attic to call pest control. We tried several attempts to meet with appropriate representatives of Interior Health to ask them to include our messaging about bat conservation and let them know that we included messaging about rabies and safety, but we were unsuccessful.

Our alternative approach was to install a “Got Bats?” poster wherever we found a “Be Bat Aware” poster (Figure 16). The intent of this was to encourage follow-up messaging about bats at the point where landowners would see the posters. This campaign may have led to increased calls to the KCBP - in 2006 alone, the KCBP received 300 phone call inquiries. Because of this campaign, we also recognized the importance of reaching out to pest control companies.





Figure 16. “Be Bat Aware” poster campaign by Interior Health encouraging residents to call pest control companies if they have bats in their attic.

In 2005 and 2006, we contacted local pest control companies to provide them with information on bat management. It is illegal to kill bats in BC under the *Wildlife Act*, so extermination cannot be used to address bat issues. Although one company in Cranbrook answered bat calls and provided information on safe exclusion of bats and bat houses, most companies referred any calls and questions to the KCBP. As a result, we received inquiries for information from throughout BC, including William’s Lake and Haida Gwaii, emphasizing the need for this service in the province.

One company in particular, Cranbrook Pest Control, was very interested in learning about bats and how to mitigate bat issues. We spent a day with the owner of the company and conducted site visits with him. Every year that the project was active, we contacted them to provide them with the most up-to-date information. In 2017, a more formal partnership was developed. In this particular model, Cranbrook Pest Control arranges site visits with landowners and the KCBP biologist joins the pest control professional. In recognition of the service and expertise that the KCBP could provide, a portion of the cost of each visit was donated to the KCBP. This approach is an excellent example of industry and conservation working together that could be used as a model in other areas.

In 2014, we were getting increasing calls from residents who had bats in their rooves reporting to us that roofers didn’t know how to handle the situation. Since roofers conduct the majority of their work in the summer months, they have a high potential to disrupt a bat maternity colonies. In coordination with the BC Community Bat Program, we developed outreach materials specifically for roofers and builders, pest control companies, and realtors:

- *Got Bats? Seven Steps for Managing Bats in Buildings in BC.*
- *Got Bats? Seven Steps for Managing Bats in Buildings in BC: A Guide for Pest Control Professionals.*

- *Building Homes for Bats: A Guide for Bat Houses in BC.*
- *Got Bats in a house for sale? A Bulletin for Realtors® in BC.*
- *Got Bats? A BC Guide for Homeowners with Bats in Buildings.*
- *Got Bats? A Bulletin for Roofers, Builders, and Chimney Professionals in BC.*

Since we were told by each industry that they prefer the electronic version of documents, we developed a list of all contacts in the building, roofing, chimney and pest control industries for the Kootenay region through phone books and online searches. We then contacted each company to get their email address and then disseminated these materials to the relevant audiences. Resources were sent by email to 26 roofing companies, five pest control companies, and 16 chimney installing companies. It was also sent to the Kootenay Real Estate Board and the Canadian Home Builders' Association in the Rocky Mountains.

In 2017-2018, the KCBP is following up with roofing companies, by-law officers and city officials, real estate agents and pest control companies in both the East and West Kootenay regions. Although this work is ongoing, the following main results have become apparent:

- Local pest control companies (e.g. Cranbrook Pest Control) actively engage with the KCBP and a close working relationship is currently being established;
- National franchise-based companies have not engaged with the KCBP;
- It has been difficult to connect with certain groups of professionals (e.g. chimney professionals) that are sole proprietors who lack websites, and/or work seasonally;
- Realtors may not interact with house sales and bats as much as originally anticipated; and,
- Building inspectors/city officials do not directly interact with bats.

Bat Ambassador Program

Even during the first phase of the KCBP, it became apparent that the desire for educational programs far exceeded our capacity. In 2012, KCBP offered a Bat Ambassador Training Workshop to educators from around the Columbia Basin. These skilled and talented educators were coming together for their "Know Your Watershed" program for a few days so we spent an afternoon providing bat information so that they had the potential to deliver bat educational programs. A few educators left this workshop inspired and offered dozens of bat programs afterwards. However, the majority did not pursue opportunities to deliver bat educational programs so it did not fulfill the goal of having Bat Ambassadors in a broad range of geographic areas throughout the Kootenays. We learned that "tagging on" bat training to an existing event was not an effective method of delivering the workshop.

In 2014, we offered a second Bat Ambassador training workshop (Figure 17; Appendix 3). This one was specifically organized as a weekend for educators to become knowledgeable enough about bats that they could deliver school and youth programs after the weekend. It was by invitation only and talented educators from specific geographic areas were targeted to attend. The workshop was so popular that it filled up in three days after invitations were sent out.





Figure 17. Bat Ambassadors at the 2015 Kootenay Community Bat Project’s Training Workshop.

The training workshop included an evening mist-netting event to see a variety of bat species up close, a BC Annual Bat Count to learn the methodology as well as see acoustic detectors in action, a detailed presentation on bats to address frequently answered questions, and a variety of games and activities about bat concepts. Prior to the weekend, we developed a table with BC Curriculum Prescribed Learning Outcomes and how they could relate to bats. We also gave each participant a game/activity to prepare so that all participants could try a broad range of games and activities that could be incorporated into their program. At the end of the workshop, participants received a Bat Ambassador certificate (Figure 18). We also developed “*Guidelines for Bat Ambassadors*” to describe the program and how it works (Appendix 4).

This second workshop was extremely successful at building the capacity of the KCBP to deliver educational programs. One factor in the success of this program is that there is the *Wild Voices for Kids*⁵ program, through the Columbia Basin Environmental Education Network, that provides honoraria for educators who deliver programs. What this means is that our limited KCBP operational budget could be used to support other activities because WVFK could financially support our educators. We also recognize other programs across the province that supports educators, such as ‘Scientists in the Schools’.

⁵ <http://cbeen.ca/wildvoices/>



Figure 18. Example Bat Ambassador certificate awarded to participants completing the Bat Ambassador training program.

KCBP has not evaluated the impact of youth education programs on bat conservation in general. We provide “Got Bats?” postcards to children (which are postcard copies of our posters; Figure 11) so that they can bring them home to their parents. However, we have never tracked or evaluated if school and youth programs influence bat conservation of roost sites.

We are moving the Bat Ambassador training model forward in 2018 to include more advanced training. What we have recognized is that in addition to youth education programs, we need to train and support out Bat Ambassadors so that they are prepared to speak to potential landowner issues in their various issues. The upcoming training will focus on how to perform a bat count (e.g. organization, data collection and data submission), house and building construction and terminology, how to communicate with landowners and the most current knowledge about WNS.

Recommended approach to outreach and education

- ✓ Utilize various forms of media for advertising but focus on press releases and the provincial community bat program website, posters and programs as the most effective options.
- ✓ Ensure a consistent, interesting and focused presence on the internet, including social media tools such as Facebook.
- ✓ Ensure the “How did you find out about this project?” section is consistently filled in during site visits
- ✓ Utilize social diffusion by encouraging residents that you have visited to talk to at least three other people about bats and share something they’ve learned.
- ✓ Build program capacity, reduce costs and increase social diffusion locally by training volunteers (Bat Ambassadors) to educate and advocate throughout the region. Consider

training and utilizing WildsafeBC staff as Bat Ambassadors to provide information and education about bats.

- ✓ Ensure there is at least one bat ambassador per geographic region of the project area.
- ✓ If training educators about bats, ensure that they have come to the training specifically for that purpose and not “tagged on” to another event. Provide “guidelines” for their involvement including what they can be involved in, resources available, how to get paid, etc. (Appendix 4).
- ✓ Develop partnerships with organizations and business that connect with landowners about bats in buildings in ways that can complement bat program activities (e.g. pest control and building supply companies).

Landowner Visits

Methods and approach of site visits

Roosts were identified by: 1) direct landowner reports, 2) indirect neighbour or friend reports, or 3) suspected roost site investigations by KCBP biologists. In the latter case, landowners were contacted to gain permission to search for bats. In every case, permission was granted and usually landowners became very interested in the project and assisted with the survey. During a site visit, the KCBP biologists introduced themselves and explained the purpose of the project. Residents were asked if they had any issues around bats (e.g. noise, smell, fear, health concerns) and these were addressed. All information was documented on a Site Visit Data Form (Appendix 5). Site visit methodology is written up in the BC Community Bat Program’s *Guidelines for Conducting Bat Site Visits*.

Project coordination and landowner site visits of KCBP are coordinated and executed by trained biologists with experience in bat research, education and conservation work. In addition to specific experience and training, biologists know how to safely handle bats and have the necessary rabies vaccine to protect them. Because of the specialized skill required to learn about and convey information about bats in a way that is knowledgeable, understandable and non-confrontational by landowners and the general public, not everyone is suited for this role. As such, finding a suitable biologist capable of interacting with the public, conveying accurate knowledge of bats and knowing how to create meaningful relationships with people can be challenging. Bat Ambassadors have not been engaged to conduct site visits primarily because of issues of insurance and professional training.

In the first phase of the program, roosts were generally visited by two biologists, Mike Sarell and Juliet Craig. The combination of a male-female two-person team was very effective since, in many cases, landowners responded to each biologist differently. Having two people allowed one biologist to search the roost site and record data while the other was interacting with the landowner. Trained and enthusiastic volunteers also assisted with site visits, particularly when only one biologist was available and in later phases of the program, when budget didn’t allow for two biologists. Knowledge of construction and building were extremely important during



landowner visits. Construction and building terms are used to describe where bats are roosting as well as potential strategies for eviction.

Reasons for site visits

Landowners requested site visits for a variety of reasons. In 2012 and 2013, 67.6% of landowners contacted the KCBP for advice about where to put up a bat house (Table 11). The messaging about the devastating impacts of White Nose Syndrome had led to residents wanting to do something to help. Half of landowners (50.0%) indicated that they also wanted to learn more about their bats (50.0%) and/or provide information to KCBP (55.9%). Approximately 38.2% indicated that they wanted advice for how to evict bats from a building. It is possible that the respondents to the survey were skewed to those who are more ‘bat friendly’.

Table 11. Reasons why landowners contacted the Kootenay Community Bat Project based on a survey conducted in 2013 (assessing visits completed in 2012 and 2013) and in 2016 (assessing site visits completed from 2012-2016).

Answer Options	2013 Response Percent	2013 Response Count	2016 Response Percent	2016 Response Count
Wanted information on where to put up a bat house	67.6%	23	12.28%	7
Wanted to find out what kind of bats I have and provide information to Bat Project	55.9%	19	5.26%	3
Wanted advice on how to encourage more bats on my property	50.0%	17	1.75%	1
Had bats in building and wanted advice for removing them*	38.2%	13	36.84%	21
Concern about bats related to human health and safety (2016 only)			28.07%	16
Other (please specify)	11.8%	4	15.79%	9
Not sure if I had bats but finding droppings or hearing noises	5.9%	2		
Doing a renovation and wanted to find out how to move bats to alternative location	0.0%	0		
# of landowners responding to survey		34		57

* Survey distributed to 73 landowners in 2013 (46.6% response rate).

* Survey was distributed to 169 landowners in 2016 (33.7% response rate).

* In 2016, the question was written as “Problems from having bats (noise, smell, guano, health)”

Based on the 2016 survey assessing site visits from 2012-2016, landowners contacted the KCBP primarily because of advice on evictions (36.84%) as well as bats causing human health and safety concerns (28.07%). Fewer landowners contacted the KCBP to inquire about bat houses (12.28%). NOTE: Eleven of the 57 respondents in 2016 indicated they received site visits in 2013 or earlier suggesting their input could have been double counted. What we do not know is if these same landowners who responded to the survey in 2016 were also respondents in the 2013 survey. Regardless, what is apparent from these results is that the type of landowner concerns appears to have shifted over time. This shift could be due, in part, to the phasing out



of drop-in visits and no longer encouraging landowners to contact KCBP merely to identify their species.

Overall, landowner visits appear to be a good method of changing attitudes towards bats (Table 12; Figure 19), at least in the short term. In particular, landowners that were tolerant of bats but who were concerned about noise, smell and guano had less of a concern following a site visit. Those that liked bats and wanted more bats had these positive attitudes reinforced after one-on-one time with project biologists.

Table 12. Attitude towards bats (%) before and after a KCBP site visit, based on 2016 survey.

Responses	Before (%)	After (%)
I like bats and want more	31.58	43.86
I like bats and don't mind them being there	26.32	22.81
I like bats, but will be doing modification (e.g. roofing) and concerned about bats	7.02	12.28
I like bats, but bats causing problems with noise, smell, guano	19.3	8.77
I don't mind bats but want them out of house	12.28	10.53
I don't like bats and just want them gone.	3.51	1.75

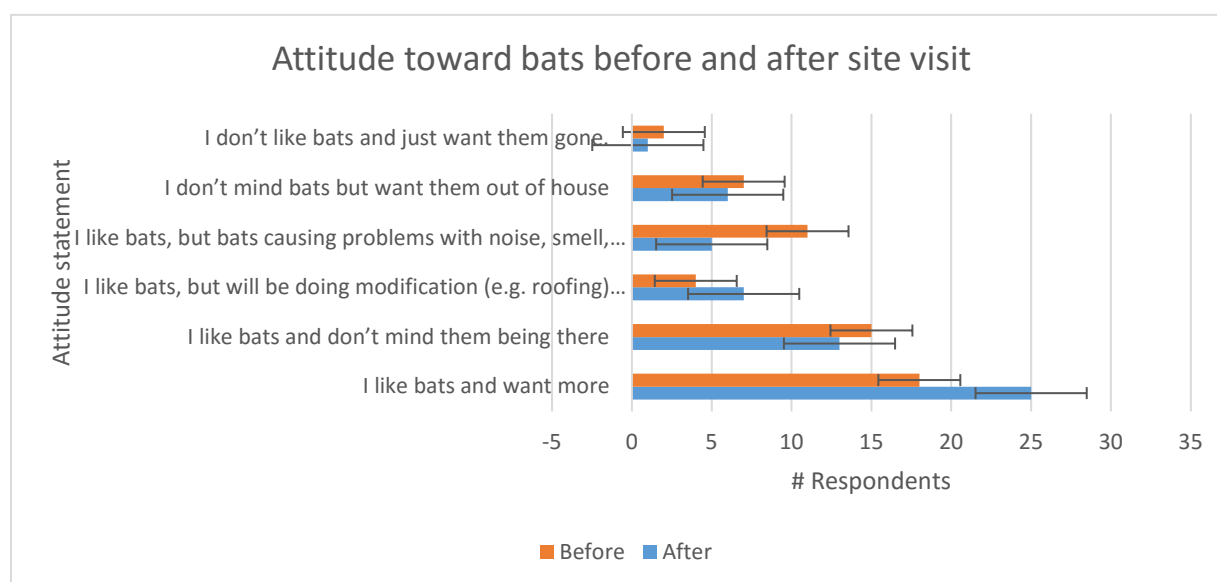


Figure 19. Attitude towards bats before and after a site visit with the Kootenay Community Bat Project (based on 2016 survey).

Bats and Health Concerns

One of the primary concerns people have about bats in their buildings is the safety (i.e. concerns of rabies or histoplasmosis) of themselves, their families, and their pets. This is concern is demonstrated in landowner respondents to the 2016, where 28.1% were concerned



about health and safety concerns related to bats. Early attempts to work with Interior Health (2005 and 2006) were not successful. However, in 2014 when the BC Community Bat Program was established, an excellent relationship was developed with the provincial wildlife vet and the provincial Public Health Veterinarian with the BC Centre for Disease Control to coordinate messaging between the bat program and health authorities.

Second to rabies (where direct interaction between a bat and human is required), histoplasmosis is a primary health concern. Some pest control companies were advising landowners that guano in BC is poisonous and it must be neutralized before removal (at a cost of several thousand dollars). Although we knew that there had not been a documented case of histoplasmosis from bat guano in BC, and the cases in Alberta were a unique set of factors, we put effort into finding out the prevalence and risk of histoplasmosis in BC so that we could provide accurate information to landowners. During 2013, we collected guano samples to test for presence of *Histoplasma capsulatum* in partnership with the BC Animal Health Centre. They analyzed a few samples but determined that the amount of effort to grow out this fungus, and the extremely low likelihood of risk in BC, deemed this initiative a low priority. We continue to recommend that landowners wear a mask when cleaning out an attic or other type of enclosed space as a precaution to dust and guano. For example, our Frequently Asked Questions booklet says:

Cleaning up large accumulations of guano should be done with appropriate respiratory protection (using a filter that will remove particles as small as two microns) used as a precaution. For further caution, guano may be sprayed down lightly with water or a 10% bleach solution in a spray bottle prior to sweeping it up to reduce the number of particles that may become airborne. There has never been a documented case of histoplasmosis from bat droppings in BC.

Roost Protection

Our philosophy with landowner visits and roost protection has been to encourage some form of stewardship of the bat colony, whether that is to leave it where it is or carry out a sensitive eviction. Landowner's attitudes towards bats are extremely varied from those that will allow us to come to their property if we promise not to harm the bats to those who have tried poisonous gases to exterminate their colonies. We gently include information about the BC *Wildlife Act* in our visits but would rather have people contact us, knowing that we will provide useful and effective information and not lay judgement rather than not contact us and attempt their own approaches.

Generally, we encourage landowners to maintain the roost site as is unless it is:

- ✓ Within their living quarters, or bats coming frequently into their living quarters in a manner that cannot be sealed;
- ✓ In an inaccessible location where smell will become an issue (e.g. within a wall, an inaccessible attic); and,
- ✓ Not acceptable to them (e.g. they are putting their house up for sale, they are not comfortable having bats, they have health concerns that we cannot alleviate)



The information that we provided during site visits has been summarized in documents⁶ including:

- ✓ *Got Bats? A BC Guide for Managing Bats in Buildings*
- ✓ *Got Bats? 7 Steps in Evicting Bats from Buildings in BC*

Landowner Action

It has been extremely challenging for the KCBP to determine how effective mitigation techniques have been. We have conducted two online surveys of landowners with whom we have done site visits. The survey in 2013 was sent to people with whom we did site visits from 2004 to 2013 (34/154 respondents). The survey in 2016 was sent to people with whom we did site visits from 2013 to 2016 (57/208 respondents).

Based on the 2013 survey, 52.9% of respondents installed a bat house to encourage bats on their property (Table 13). Of those landowners interested in excluding bats, no landowners evicted bats immediately in the summer months and of those who indicated they were going to evict the bats (17.6%), all of them waited until the fall. What we don't know from this survey is, of the 44% of respondents who will "leave bats where they are", how many were going to do that prior to our visit. In the 2016 survey, of the landowners whose primary concern before the visit was having bats, 68% (24 of 35) did not evict them.

Table 13. Landowner actions after Kootenay Community Bat Project site visit (based on survey of 2012 and 2013 site visits).

Answer Options	Response Percent	Response Count
Put up a bat house to encourage its use	52.9%	18
Left bats where they are	44.1%	15
Other (please specify)	23.5%	8
Found out I have a night roost so bats are not inside my house/building	20.6%	7
Waited until fall and then evicted bats (sealed up roost)	17.6%	6
Modified roost to accommodate bats (e.g. laid down plastic, made access easier, etc.)	2.9%	1
Evicted bats (sealed up roost) immediately	0.0%	0
Left window open as it was a stray bat that came into the house	0.0%	0
		n=34*

*Note: Respondents were asked to select all that apply so there are more answers than respondents.

In the 2016 survey, of those landowners wanting to encourage bats on their property, 88.6% installed a bat house. The following reasons were given for landowners who did not end up installing a bat house:

⁶ Documents are available at www.bcbats.ca



- Got started but didn't finish.
- Need someone to install because elderly and live alone.
- Advised not a good location.
- Renting the house.
- On my 'to do' list.
- Too old to be climbing on ladders.
- No time yet, would still like to.

Of those landowners wanting to evict bats, 68.6% did not end up evicting them. It is not known if the KCBP site visit was a factor in this decision or not. Interestingly, landowners who did not evict where guano accumulation was the main issue, ended up collecting or sweeping guano as a form of mitigation (60.0%) to this issue.

Where bats were evicted, it is very encouraging to see that 86.4% of the landowners installed a bat house.

Even if landowners would like to evict bats, it can be extremely challenging in some circumstances. Based on the 2013 survey, 3 of 5 people trying to evict bats were not successful (Table 14).

Table 14. Success of landowner evictions (based on survey of 2012 and 2013 site visits).

Answer Options	Response Percent	Response Count
Yes, I completely sealed the roost successfully.	7.1%	2
No, I tried but the bats are still entering.	10.7%	3
I have not yet tried.	3.6%	1
I don't know - I will find out if they re-enter next spring	21.4%	6
Not relevant - I wasn't trying to evict bats.	57.1%	16
Other (please specify)		3
		28

Observations on Exclusions

It is interesting to note that in two cases where landowners successfully evicted bats and installed a bat house, the bat species in the bat house does not appear to be the same as in the original roost site⁷. For roost site KCBP591, the bats species was suspected as MYLU in the original colony in the house (genetic results were UNK6 MYLU) but later confirmed as MYYU in the bat house after exclusion. In the case of KCBP 025, MYYU was confirmed in the house but MYLU was the species confirmed in the bat house. These results may indicate that it was originally a mixed species colony in the roost site and only one species was detected, or that the eviction excluded one species of bat and the bat house provided a roost structure for an alternative colony, not the one being evicted. This is only a preliminary observation based on

⁷ KCBP data records KCBP025 and KCBP591.



two sites. It would be useful to collect more data pre- and post- exclusion on species identification to better understand the success of bat houses as an alternative roost site for the original colony being excluded.

Reporting rates over time

It has appeared, at some points during the KCBP, that we have reached a “saturation point” in some areas where we are receiving fewer calls about roost sites (Figure 20) and, those that we do receive, are often sites that we have visited previously. It is possible that we have detected the majority of roost sites in these regions, particularly the West Kootenay. It is difficult to be certain because there are a number of confounding factors including where we have been active (Slocan Valley only in 2004; West Kootenay only in 2005 and 2012), how much effort we have put into having people report their bats, and whether or not we were doing drop-in visits.

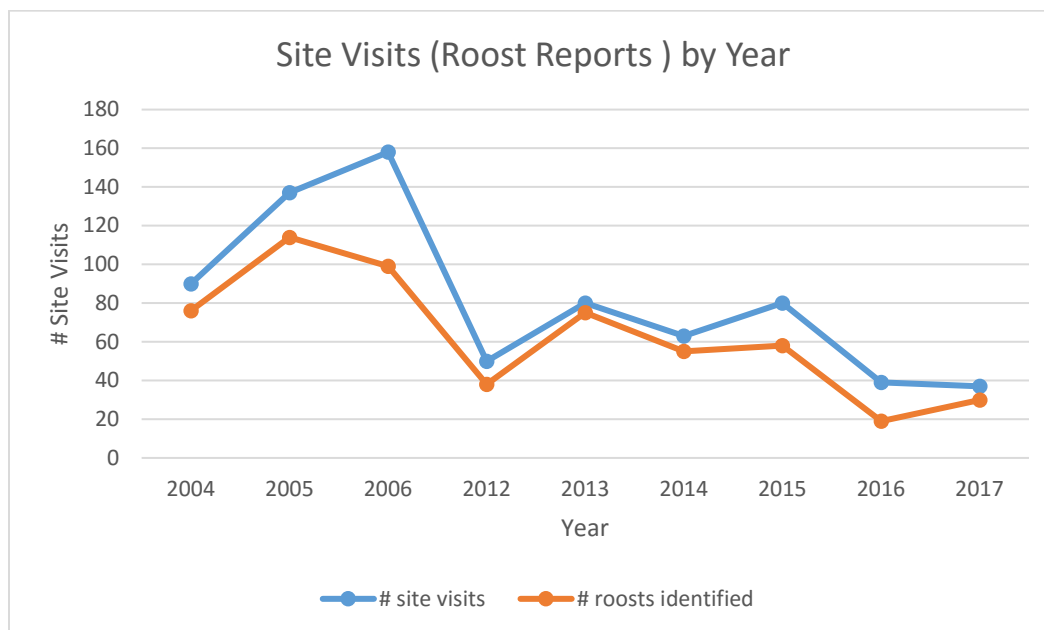


Figure 20. Number of site visit and roosts identified by the Kootenay Community Bat Project throughout the Kootenays from 2004 to 2017.

To assist with determining a saturation point, we tallied the number of site visits to unique properties (i.e. repeat visits to the same properties are not included) for the Slocan Valley and Nakusp areas since the KCBP has been active that region every year. These data indicate that the number of roost reports/site visits goes down annually and saturation can be achieved in three to four years (Figure 21). Given this information, we would suggest that if there is a high effort of advertising in a small geographic region, the majority of roost sites would be reported by willing landowners within three to four years. However, periodic media releases may identify new sites or previously detected roost sites that have new owners.



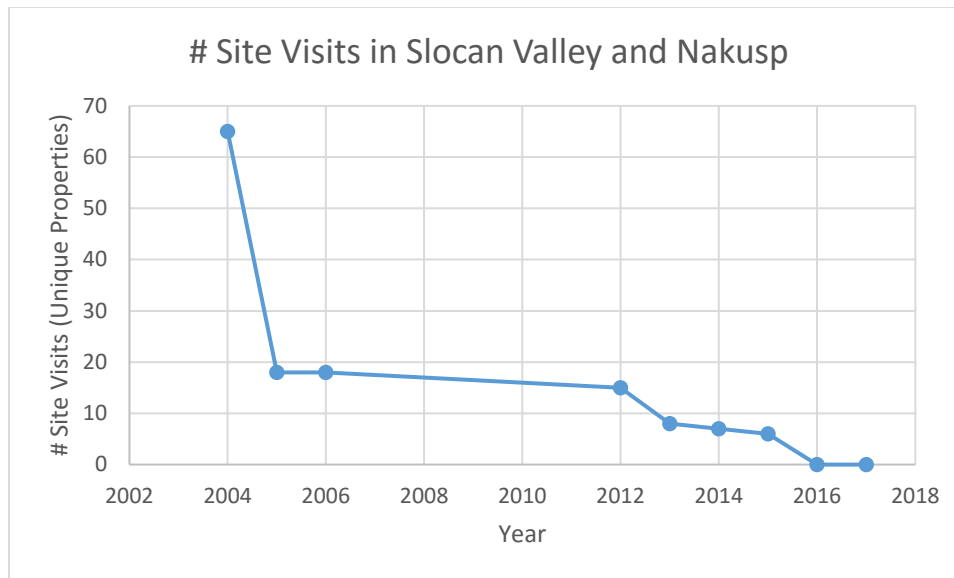


Figure 21. Number of site visit and roosts identified by the Kootenay Community Bat Project in the Slocan Valley and Nakusp areas from 2004 to 2017.

Recommended approach to landowner visits

- ✓ When a site visit is conducted, ensure you glean as much information during that exchange as possible (e.g. how did you hear about us, what misunderstandings are there about bats, etc.). Have standard data fields and boxes on the site visit form in order to compare and learn from results.
- ✓ See “*Guidelines for Conducting Bat Site Visits*” document housed with the BC Community Bat Program.
- ✓ Ensure adequate training of bat ambassadors / bat program leaders, particularly for those individuals conducting site visits and providing advice to landowners. Even trained bat biologists may not have the appropriate skills for addressing landowner issues. We recommend at least three field days with an experienced Community Bat Program biologist for learning how to conduct site visits and a 2-day training session for Bat Ambassadors to learn skills for education and awareness activities.
- ✓ Continue to update, utilize and share “*Guidelines for BC Community Bat Program Coordinators*”, “*Guidelines for Site Visits*”, or “*Guidelines for Bat Ambassadors*”. These documents should be updated annually by the BC Community Bat Program Coordinator.
- ✓ Ensure a foundation of Bat Ambassadors have been established in a region.
- ✓ Ensure that people conducting site visits have training and knowledge of building construction (e.g. parts of a house like soffits, flashing, roof vents) as well as techniques for mitigation.
- ✓ When possible, landowner visits should be conducted by two knowledgeable people, preferably one male and one female.



- ✓ To document the majority of roosts sites within buildings in an area, a high effort of advertising should be placed in a small geographic region for a period of at least three years, then maintain the connection with key landowners who have large roost sites.
- ✓ Ensure to record as much information as possible during each site visit (e.g. how landowner learned about KCBP, attitude before and after visit, gauging how many people they will talk to, etc. – use a standard form to make answers comparable).
- ✓ Collect guano and, when possible, acoustic samples to confirm identification of species being evicted at a site where a bat house will be installed. If the bat house is successful, follow-up to identify the species occupying the bat house.
- ✓ At the end of each year, follow-up with landowners with whom you have conducted site visits to evaluate effectiveness over time and report results.

Bat Houses

Bat houses are human made structures that provide an alternative roost site for bats. Over the years, bat houses have been promoted in three different ways by the KCBP including bat house building workshops, pre-made bat houses to donate, and a cost-reimbursement program (“Building Homes for Bats”). All of these programs have made use of the *Public Conservation Assistance Fund*⁸ which pays for the cost of materials (but not labour). KCBP also contributed greatly to the document “*Building Homes for Bats: A Guide for Bat Houses in BC*” to document our knowledge about bat houses.

Evolution of Approach

Bat house Building Workshops

When the KCBP began in 2004, we offered public bat house building workshops. We partnered with a program that could take the registrations (e.g. Recreation Centre, Wildsight, and College Continuing Education) and offered the bat house building workshop in conjunction with a presentation. We did the presentation in the overlap between one group arriving and the other leaving in order to reach as many people as possible. These events were extremely popular with participation at over 100 people in some small rural communities. Given the amount of work in preparing materials, the time taken for a workshop and the skill of participants, single-chambered bat houses⁹ were built during the program. The cost in materials is approximately \$25/ single chambered bat house. Where possible, we would enlist volunteers to cut and prepare materials. Because we recognize that we can only ask volunteers to do so much, we approached Home Depot for bat house program support. Home Depot has provided discounts on wood and workshop supplies and donated the cutting of materials; in exchange, we have publicly acknowledged their contribution. This is a partnership the KCBP will continue to develop.

⁸ <http://www.hctf.ca/apply-for-funding/pcaf-grants>

⁹ Bat house designs refer to those in “The Bat House Builders Handbook” by Tuttle et al. (2005).



In 2012, when we re-started KCBP after a 5-year break, we evaluated the approach of bat house building workshops. Although these events were extremely successful in engaging the public and raising awareness about bats, we were beginning to question the value in terms of enhancing bat habitat. Reflecting on Community Based Social Marketing (CBSM)¹⁰ principles, we wanted to quantify the behaviour change related to installing the bat house and the end result of supporting bat colonies.

The 2012 survey was a telephone survey to 123 attendees of the 12 bat house building workshops we had hosted from 2004 to 2006 in the communities of Argenta, Crawford Bay, Creston, Golden, Nelson, New Denver, Kimberley, Revelstoke, and Winlaw. Of the 61 respondents (response rate 49.5%), 37.7% (23) had not put up their bat house (Figure 22). Some of the reasons for not installing it included not getting around to it and not knowing where to put it. Guidelines for installation were provided at the workshops but some residents did not have a suitable location that met the criteria provided. For those who had installed it, 71.0% (27) had put it on an unheated building, post or tree, none of which are ideal locations for a single-chambered bat house. When asked if they had bats in the bat house, 21.0% (8) indicated “yes”, 57.8% (22) indicated “no”, and 21.0% (8) weren’t sure.

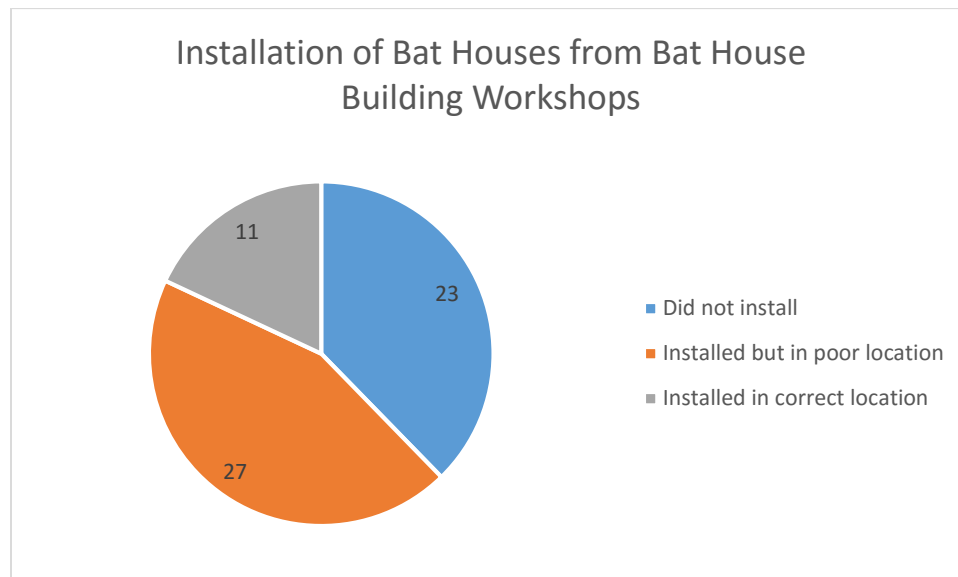


Figure 22. Number of single-chambered bat houses installed in correct location (heated building) as reported through 2012 Bat House Survey.

Bat house building workshops are extremely time intensive for organizing, pre-cutting materials (even for single-chambered bat houses) and delivering. From this information (that over 1/3 of people never put up their bat house and more than 2/3 of those that do put it in an unsuitable location), we re-evaluated this approach.

¹⁰ <http://www.cbsm.com/public/world.lasso>

Also, at this time reports of dead pups at bat houses were being received by KCBP¹¹. During hot spells, residents with bat houses were reporting numerous dead pups below the bat houses. For example, at one site (KCBP 605), the landowner found 28 dead pups in 2012, 7 dead pups in 2016, and 1 dead pup in 2017 during hot spells. Multi-chambered bat houses provide more micro-climate options which is especially important during extreme weather events so KCBP phased away from approaches involving single-chambered bat houses. If a single-chambered bat house is installed, we recommend putting it in a shady location (and it will more likely serve as a day roost rather than a maternity roost).

Occasionally KCBP continues to offer bat house building workshops. When these are for the public, the primary goal is education and outreach. Participants are asked to sign their name on a form that says they will either install their bat house or return it to the KCBP within one year. To date, two bat houses have been returned. The other purpose for a public bat house building workshop is to build multi-chambered bat houses for the bat project. The public do not take the bat houses home but rather donate them to KCBP. The disadvantage of this approach is that multi-chambered bat houses are time consuming to build so it is a 3-hour workshop rather than 1 ½ hours. Also, the quality of construction is not as good as having skilled woodworkers build them which is a preferred approach.

Pre-made bat houses to donate

In order to have a well-designed bat houses to provide to landowners who are planning an eviction, KCBP has partnered with many individuals and programs to make multi-chambered bat houses to donate. These organizations have included:

- Disabled woodworker business
- High school woodworking programs
- Keen community volunteers with woodworking shops
- Rod and gun clubs

KCBP provides the organization with the four-chambered nursery house plan (Tuttle et al. 2005) and the organization builds the bat houses. The cost in materials is approximately \$50/ four chambered bat house.

This approach has been very effective in allowing us to strategically provide bat houses to those landowners who are planning an eviction and can benefit from an alternative roost site. Also, because we hand deliver the bat houses to them, we can discuss an appropriate location for installation (or not provide a bat house if there isn't one). Note that we have not surveyed recipients of donated bat houses to determine if they have installed their bat house. The challenge with this approach is volunteer burn-out may occur since it requires high volunteer hours.

¹¹ Roost sites KCBP458 and KCBP605.



Cost reimbursement for private landowners to build bat houses

The third method that we have used since 2012 for promoting bat house installation is the “Building Homes for Bats” (BHFB) program of reimbursing the cost of materials to build and install a bat house. To receive reimbursement for bat house materials, the landowner must i) provide copies of the receipts used to purchase material, ii) provide photos to demonstrate that bat houses have been installed; and, iii) sign a commitment to monitor the bat houses for at least three years. Also, the landowner must compare two things (e.g. same design at two aspects, same design with two stain colours, different designs in the same location; Appendix 6). The impetus for this approach was to better understand bat house effectiveness (stain, design, colour, aspect) and reduce mortality of pups during hot spells.

The benefits of this method are that bat houses are always installed because photo evidence is required, at least two bat houses are installed so that differences in design or location can be compared, and recommended designs are used (e.g. four-chambered nursery houses, rocket boxes). However, this approach requires that a landowner has the skills, tools and motivation to build and install their own bat houses. The cost in materials is approximately \$100/bat house because posts and other installation materials are also included.

This program has been offered twice (based on two separate *Public Conservation Assistance Fund* grants). The first time (2012-14), the uptake was relatively high with 9 private landowners participating (Figure 23) suggesting that cost of materials was previously a barrier to building bat houses. However, in the second phase of the program (2015-17), only three private landowners participated in the program and the rest of the funds supported organizations to build bat houses for the KCBP or their own purposes (such as restoration sites) or to provide to private landowners. Organizations, particularly school carpentry programs, built far more bat houses through this funding program than private landowners (Figure 24).

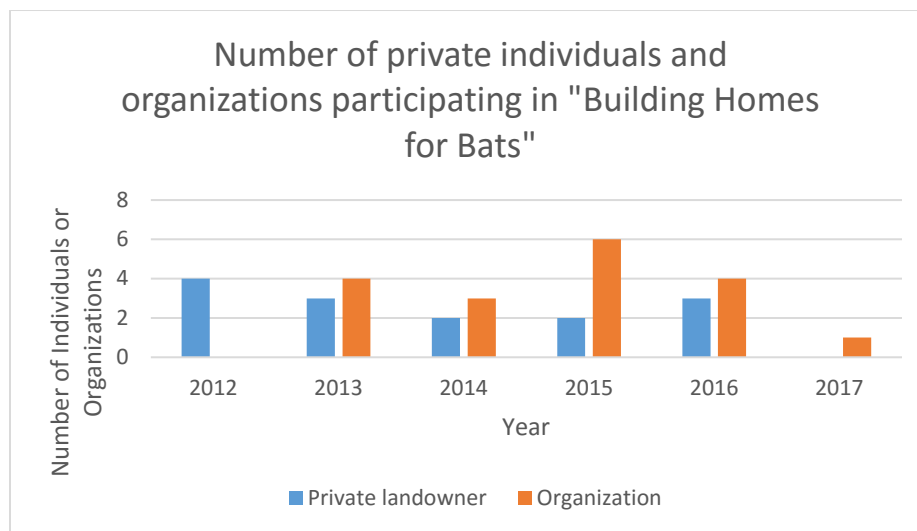


Figure 23. Number of private landowners and organizations who have accessed funds through the “Building Homes for Bats” cost reimbursement program from 2012 to 2017.



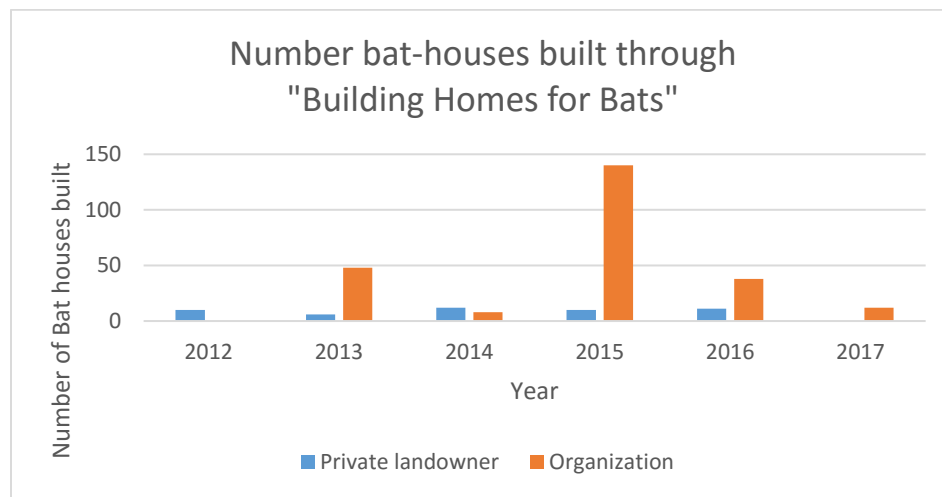


Figure 24. Number of bat houses built through the “Building Homes for Bats” cost reimbursement program by private landowners vs. organizations from 2012 to 2017.

Summary of Pros and Cons to Bat House Approaches

In summary, there are many pros and cons to be considered when adopting an approach for bat house construction (Table 15).

Table 15. Pros and cons of approaches used by Kootenay Community Bat Project for promoting bat houses.

Activity	Pros	Cons
Bat house Building Workshops (single chamber)	• Low cost (\$25/bat house) • High participation • Excellent outreach opportunity	• May be poorly constructed • Provides poor roosting habitat • Many bat houses never get installed • High workload to pre-cut materials and organize event • Limited options for installation (i.e. it has to be on a building)
Pre-made Bat Houses to donate (multi-chambered)	• Best possible design • Well-constructed • Overall less time • Low cost • More meaningful participation by woodworkers (besides solely materials preparation) • Can donate to specific properties where there is a good location for installation and paired with an eviction	• Higher cost per bat house • Low public participation • Low outreach opportunity/participation • High workload for participants (e.g. students) • Relies on KCBP for distribution • Landowners may still install incorrectly

Activity	Pros	Cons
Cost-Reimbursement Program	• All built bat houses are installed (photos) • Low cost and relatively easily accessible funding (PCAF) • Contribution to BC Annual Bat Count • Signed commitment by landowners to monitor	• Onus is on landowner to complete • Landowner needs tools and skills to participate • Lost outreach opportunity • Administration time (to review and reimburse receipts)

Bat House Monitoring

In 2016, we recognized the need for more intensive bat house monitoring to determine what factors make an effective bat house. We incorporated bat house monitoring into a sub-regional grant focused on the Kootenay Lake area. The additional objectives were to install temperature loggers in occupied bat houses and have landowners record observations (such as dead pups) to determine temperature thresholds that causes mortality. This project was taken over in the West Kootenay by Wildlife Conservation Society Canada.

All bat houses used in this study (n=10) are four-chambered nursery boxes recommended by Bat Conservation International (Tuttle et al. 2005). Of these, nine bat houses are being monitored in the West Kootenay and one in the East Kootenay. Large bat colonies (i.e. >50) that have consistent occupancy over time were used. All of these bat houses are installed on an either an occupied building, unoccupied building, or post.

During the course of this project, no maternity colonies were found using single-chambered bat houses. Also, with the exception of a tree debranched to resemble a post, no bat colonies were found in bat houses installed on trees. Occupied bat houses have been observed when oriented towards the east, south and west aspects.

Based on pilot work in 2017, initial results indicate bat house temperatures often exceed 40°C, peaking at 42°C¹². These results, however, were very roost dependent; some bat houses never exceeded 40°C throughout the summer (i.e. roosts that received less direct sunlight or were painted lighter colours). Occupancy data also collected during this time are insufficient to indicate whether bats were exhibiting roost-switching behaviours in the roosts that exceeded 40°C, or simply resting/moving over the counting strips. Preparations are currently underway to redeploy detectors in up to 30 bat houses in 2018 in bat houses of varying designs and environmental conditions to more accurately assess which bat house designs are most likely to warm bats in the spring without overheating in the summer.

We have not documented this information (e.g. bat house design, aspect, installation structure, etc.) well in the past and recommend that basic characteristics of bat houses be recorded and

¹² Preliminary research being conducted by Jason Rae and Dr. Cori Lausen, Wildlife Conservation Society Canada.



entered into the database for analysis in future years. Few multi-chambered rocket boxes have been installed in the Kootenays to our knowledge, however this is largely unknown.

There are three sites where several bat houses of different designs have been installed: Fauquier NCC Property (KCBP740; one unstained rocket box, one stained rocket box, two 4-chambered nursery boxes back-to-back with one box stained and one not)¹³, Frog Bear NCC Property (Figure 25), and JimSmith Lake Provincial Park (KCBP741; 1 stained rocket box, 2 stained nursery boxes back-to-back). At the Fauquier NCC Property, guano has been observed under the nursery boxes (MYLU) and a rocket box (unconfirmed ID). At JimSmith Lake, guano has been observed under the four-chambered nursery boxes (MYLU). We have never observed enough guano at the Frog Bear NCC Property to determine roost use or species.



Figure 25. Four bat house designs installed at Nature Conservancy of Canada’s Frog Bear Property in Creston, BC including (from left to right) two 4-chambered nursery boxes installed back-to-back, one 2-chambered rocket box, one wedge rocket box, and one bat can. Photo: Cori Lausen.

There have also been several sites through the “Building Homes for Bats” program where two bat houses have been installed to compare a difference between them. One of the priorities for KCBP’s work plan is to follow-up with landowners to determine which, if any, of the bat houses they installed are being used.

¹³ There was an error in how these bat houses were stained – the nursery boxes are back to back on a post and one set was supposed to be stained and one not. Unfortunately, one of each pair was stained instead. In one pair, the stained box is facing south and in the other it is facing north.

Recommended approach to bat houses

- ✓ Partner with an organization who can build bat houses that the community bat project can deliver (and ideally install) at high priority roost sites where an eviction is planned, and in particular those sites with landowners willing to do annual bat counts and/or that are centrally located for roost counts and guano collections
- ✓ If bat house building workshops are conducted, maintain a contact list of all participants so that follow-up surveys can be conducted to determine efficacy of the approach and support effective installation and monitoring.
- ✓ If a cost reimbursement program is used for building bat houses, promote it to local organizations who have the capacity to build bat houses for donation to landowners at key locations.
- ✓ Promote multi-chambered bat houses including four-chambered nursery boxes and two-chambered rocket boxes. Do not promote single-chambered bat houses unless more research is done on their effectiveness and suitability, particularly in hot climates.
- ✓ Utilize a signed commitment to either install and/or monitor the bat houses. Signed commitments increase effectiveness compared to no commitment or a verbal commitment.
- ✓ Continue monitoring temperature data from bat houses to determine maximum tolerable temperature for bats and situations that create high temperatures.
- ✓ For site visits, record basic characteristics of successful and unsuccessful bat houses on the site visit form (e.g. aspect, design, colour, installation structure) into community bat program databases for better analysis in future years. For bat house donations, keep a list of all contacts who receive or install a house, so this information can be collected.
- ✓ Keep a list of all contacts who receive or build or install a house, and collect standard info on bat house characteristics and installation details, to aid in determining bat preferences.
- ✓ Promote the BC Annual Bat Count at all bat houses, recording which houses are not used as well as which houses are used, and recording data on house type, colour, aspect, etc.

BC Annual Bat Count

In 2005, the “Annual Backyard Bat Count” was initiated by KCBP as an attempt to document bat populations over time. Residents were encouraged to conduct an emergence count of their colony in late-June or early-July. The count was modeled after the concept of annual bird counts and residents were asked to spend one evening counting bats as they emerged from a colony. It was not done with any specific methodology or reporting forms.

In 2012, the need for long-term bat population monitoring was heightened with the detection and advance of White Nose Syndrome from eastern North America. We contacted a variety of



sources and eventually found a protocol for bat counting from Vermont. In collaboration with Ministry of Environment, that methodology was adapted for BC as the BC Annual Bat Count. A number of bat roosts have been monitored for close to five years in the Kootenay region (Figure 26).

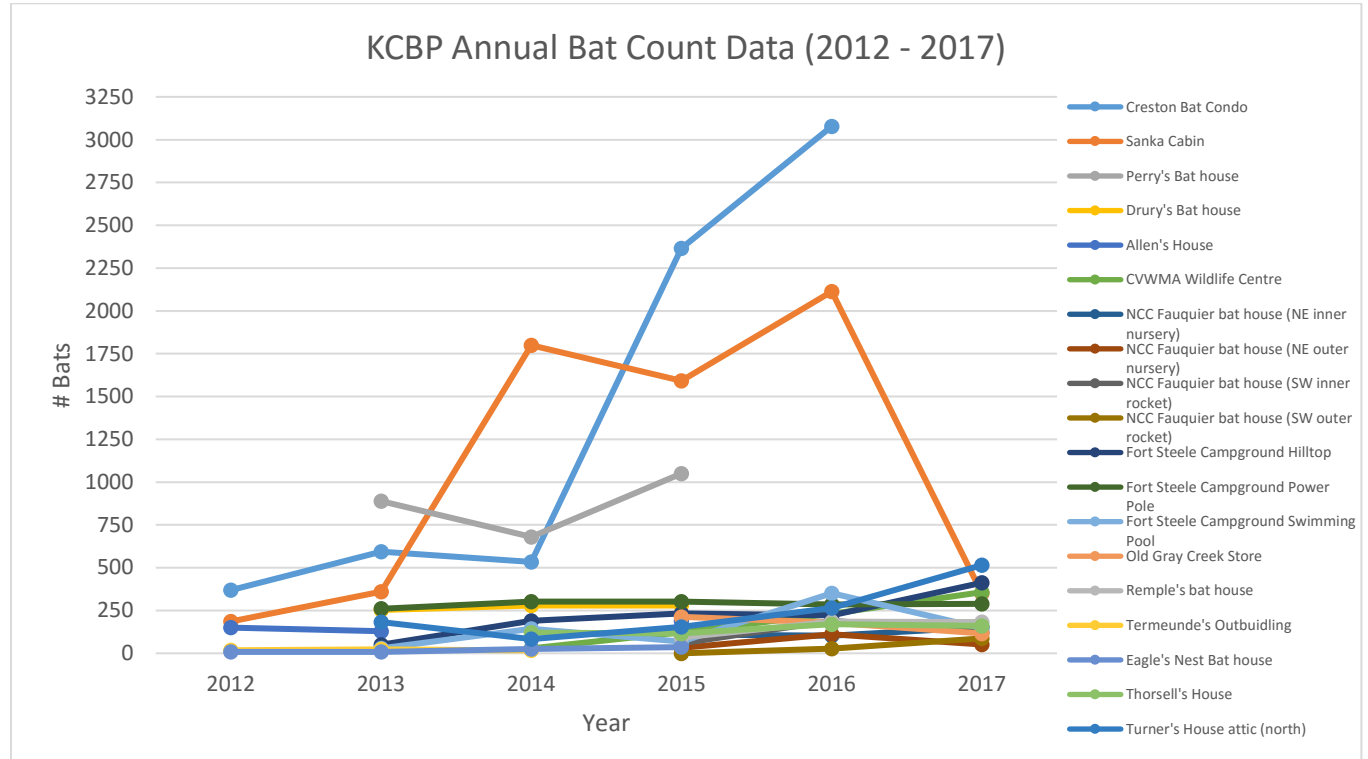


Figure 26. BC Annual Bat Count data from 19 sites from 2012 to 2017. NOTE: Maximum bat counts per year are being shown.

The BC Annual Bat Count requires a strong relationship with the “citizen scientists”, annual reminders by email or phone call, and dedicated volunteers. Higher counts occur in years when there has been effort put into contacting the citizen scientists to remind them about the count and follow up with them to see if they have done it and report data. It is also important to ensure priority sites are counted annually, with two pre-pup replicates, to detect statistically strong trends.

Recommended approach for the BC Annual Bat Count

- ✓ Contact citizen scientists by email a few weeks prior and by phone one week prior to the counting dates to encourage their participation.
- ✓ Encourage four bat counts per year be completed under ideal conditions.
- ✓ Ensure at least two replicates of the pre-pup counts are completed at priority roosts and encourage four bat counts per year (the latter two replicates occurring post-pup volancy) to be completed under ideal conditions.

- ✓ Focus efforts on roosts that are high priority (i.e. >100 bats) as identified by the regional community bat program in communication with the BC Community Bat Program.
- ✓ Pair up interested volunteers with landowners where bat colonies occur (assuming permissions are in place).
- ✓ Contact citizen scientists following the counting period to ensure complete data forms (including signatures giving permission to share data) are submitted.
- ✓ Report DNA and acoustic identification and count trends back to landowners and volunteers to maintain engagement.

Data Management

Data concerns

The KCBP has not uploaded landowner roost site information to the BC Government's Wildlife Species Inventory (WSI) database¹⁴ at this time. The primary concern about data uploading is that landowner permission has not been explicitly provided to share their roost site information with the provincial government. Many residents in the Kootenays are skeptical of the government and are unwilling to share their information (Juliet Craig, pers. obs.). Also, in many cases, landowners are consulting the KCBP for advice on evictions or because bats are causing a problem for them and when dealing with somewhat reluctant or angry residents, it has not felt appropriate to ask landowners for permission to upload their data into a provincial government database. However, we also recognize the need for long-term data storage and better representation of bat roost sites in BC.

There are now more safeguards in the WSI database to ensure that data can not be accessed without the data owner's permission, if requested to be tagged as "sensitive data" and will not be publicly displayed in the system. For example, all bat maternity roosts are considered sensitive data and data can also be deemed "Proprietary" where specific permission would need to be sought from the KCBP¹⁵. We recommend finding a solution to allow the uploading of KCBP data without breaching the trust of landowners we have worked with.

We determined that the most important data to share with the provincial government, in order to ensure long-term storage and management, were the BC Annual Bat Count data. Initially (2006 and 2012), these data were submitted directly to the KCBP. In 2012, a question was asked on the form whether the landowners were: a) willing to share the data with the government, b) willing to share if the actual site location information was not revealed, or c) data must stay within the bat project. Of the 8 bat count forms submitted, four did not answer the question, one was willing to share data, one was willing to share data without the location, and two did not want the data to go to the government (Figure 27). Although the number of responses is

¹⁴ <http://www.env.gov.bc.ca/wildlife/wsi/siwe.htm>

¹⁵ <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/ecosystems/secure-data-and-information>



extremely low, it likely represents the proportion of answers to these questions in the West Kootenay.

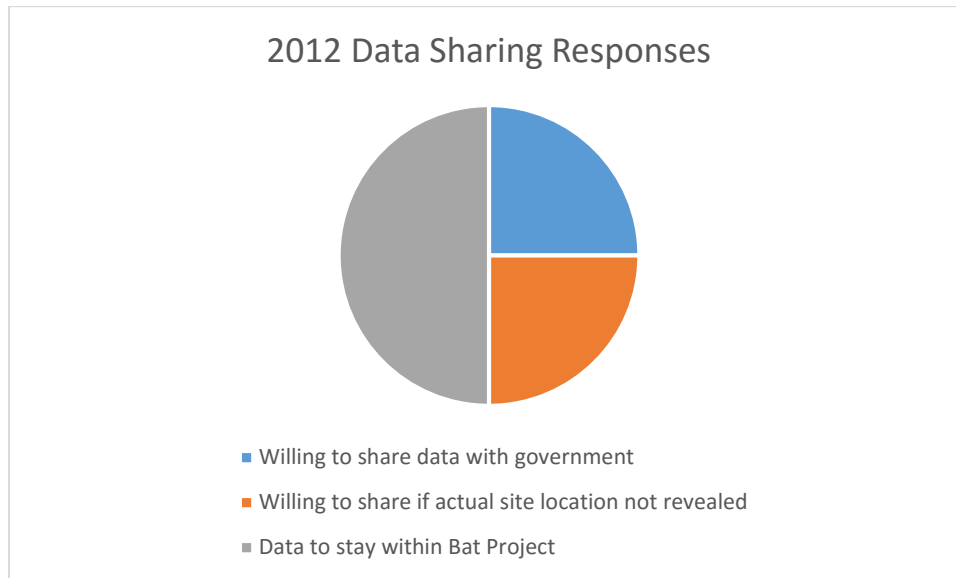


Figure 27. Responses to data sharing question on 2012 Annual Bat Count form (n=4).

We have already seen the accidental ‘leak’ of roost sites into public mapping with the Kootenay Lake Shorelines Guidance Document. On this public mapping platform, a maternity colony within a land owner’s house was identified. They have recognized and corrected the map but that information was essentially public for over a year before it was brought to the attention of the KCBP.

In 2014, KCBP biologists attempted to have landowners sign a permission form to release their data to the federal government in order to satisfy Habitat Stewardship Program (HSP) requirements. We found it extremely awkward to ask them to sign this form during a site visit and then sufficiently and adequately explain the implications of them signing it. With the federal listing of Little Brown Myotis as a federally endangered species under the federal *Species At Risk Act* (SARA), and maternity colonies listed as Critical Habitat, it is unclear what the specific implications for landowners would be if their attic were to be declared Critical Habitat. Since that time, Canadian Wildlife Service has developed a handout to answer specific questions on this topic (Henderson 2016). This document, and the links it refers to indicate that there is not enough information about Little Brown Myotis maternity roost sites (so that information would be valuable to help protect the species), SARA applies only to private land, and anthropogenic structures can be listed as Critical Habitat.

It is possible that after the introduction and spread of WNS in BC, there may be few Little Brown Myotis maternity colonies left. These remaining maternity roost sites, which largely include attics, would then receive more attention for conservation even if they are not on federal land. We have the concern, although recognize that it is speculative at this time, that

those landowners who have entrusted us with a site visit could then be perceived as being ‘penalized’ for that activity if they wish to modify their attic. KCBP has not come to a conclusion about if and how to share data with the Federal government at this time.

Current approach to data sharing

BC Annual Bat Count Data

To address the issue of providing permission to share annual bat count data with the government, from 2013 onwards the bat count data forms were submitted directly to the provincial government. The address on the form and on the website for submission was the Ministry of Environment office in Nelson. Starting in 2013, we also included a section asking for a landowner signature rather than an option of whether they are willing to share their data. By signing the data form, this gave their permission for bat counts to occur on their property and for data to be submitted to MOE for long-term data management. We indicate that data will be considered sensitive and no personal information will be stored. Specifically, the 2013 form included the following statement, to be signed by both the citizen scientist and landowner:

NOTE: In order to ensure long-term data management, this information will be stored with the Ministry of Environment. Data will be considered sensitive and not be publically accessible.

In 2017, submission through MoE became cumbersome because of the increasing number of landowner’s reports. Provincial government data management specialists worked with the coordinator to develop a new set of questions that addressed landowner concerns and allowed an option for data sharing with the province, and allowed data to be submitted directly to the CBP and then potentially to the government.

The revised section is:

Bat data in BC - bat winter hibernacula and maternity roost site location data are secured and managed per the Province’s [Species and Ecosystems Secure Data and Information Policy and Procedures](http://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/ecosystems/secure-data-and-information)¹⁶. This means secured data is not open access and will only be released by the Province if a legitimate Need-to-Know exists and the requestor agrees to the terms and conditions of a Confidentiality and Non-reproduction Agreement.

I, _____, (check all that apply)

_____ agree to allow bat counts to take place on my property by a BC Community Bat Program representative

_____ agree to allow the data to be submitted by the BC Community Bat Program to the BC Ministry of Environment for long-term data management.

_____ understand that no personal information will be submitted to the Province by the BC Community Bat Program.

Landowner(s) sign here: _____ Date: _____

¹⁶ Species and Ecosystems Secure Data and Information Policy and Procedures
<http://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/ecosystems/secure-data-and-information>



Roost data from Landowner Site Visits

Because of the concerns listed above (Data Concerns section), site visit data are not currently uploaded into the provincial wildlife inventory (SPI) database. However, to ensure long-term storage of roost site information (e.g. roosts recorded from landowner site visits), these data are uploaded annually to the *Columbia River Basin Biodiversity Atlas*¹⁷, a Kootenay-based mapping platform housed within Selkirk College. Private landowner information (name, address, phone number, issues) is removed from the dataset so only the species and location are evident. The data set has also been shared with local Kootenay researchers who can make use of the information, such as Dr. Cori Lausen with Wildlife Conservation Society Canada.

KCBP's philosophy has been that it is ultimately not going to be provincial government biologists, local government planners, or any other person with access to the provincial government database who will be responsible for the conservation of these roost sites but the private landowners themselves. The landowner has the sole ability to enhance, maintain, or destroy the roost site based on their education, attitudes and behaviour. Therefore, it is critical for KCBP biologists to maintain the highest amount of trust and integrity with these landowners to promote stewardship actions.

Recommended approach to data sharing and management

- ✓ Ensure that BC Annual Bat Count data forms are signed by the landowner giving permission for the bat counts and for the data to be shared with the provincial government.
- ✓ Ensure that landowners have provided signed data sharing consent forms for site visits before using federal funds (e.g. Habitat Stewardship Program) for conducting landowner visits because data sharing is required as part of the funding agreement. If data sharing is a concern, use these funds for other aspects of the program such as outreach or annual bat counts.
- ✓ Work with the provincial government to determine how to upload roost data from site visits without breaching landowner trust with KCBP.

Lessons Learned

The initiation and ongoing delivery of the KCBP has been a learning experience. The following items represent key lessons that we have learned through the infancy and development of this project.

- ✓ **Community bat projects are a valuable resource for bats in buildings in BC:** One of the greatest lessons we have learned is the need for this type of project. The number of phone calls, emails and inquiries far exceeded our expectations, even during the first year. At the time we started, both landowners and pest control companies lacked a resource to find out more about bats in buildings including promoting, maintaining and

¹⁷ <http://biodiversityatlas.org/>



evicting bats. Landowners told us that they had been dealing with bats for years and had run in circles calling government ministries, pest control companies, and wildlife societies without results.

- ✓ **A funded Coordinator is required:** In our attempt to leave the KCBP in the “hands of citizens”, we quickly realized that a coordinator is needed for this type of program. The volume of inquiries is so great that a significant amount of financial resources are required to maintain this type of position.
- ✓ **Site visits are extremely valuable:** It is difficult to measure the impact of a one-on-one site visit with landowners. The majority continue to express how valuable the information is, how much they’ve learned, and how they have a different perspective on bats after the visit. Also, landowners appreciate personalized recommendations specific to their situation and requirements.
- ✓ **Credibility is critical.** Visiting a landowner or having telephone and email correspondence requires a breadth of skills including interpersonal skills, the ability to listen non-judgmentally, knowledge of bats, and knowledge of building and construction. The reputation of the program depends on maintaining this credibility.
- ✓ **Roost stewardship is the ultimate responsibility of landowners.** It is not going to be provincial government biologists, local government planners, or any other person with access to the provincial government database who will be responsible for the conservation of these roost sites but the private landowners themselves.
- ✓ **Bat house building workshops serve as an outreach tool but are not the most effective way to encourage construction of bat roosting habitat.** Pre-built bat houses for donations at key sites where an exclusion is planned is a more effective use of resources for bat houses.
- ✓ **Bat houses may not be the best approach to increasing bat habitat.** KCBP has received reports of dead bats under bat houses during hot spells. Until the full scope of this situation has been assessed, KCBP has started only promoting bat houses if they are multi-chambered and done in coordination with an exclusion rather than a general method of improving bat habitat.
- ✓ **BC Annual Bat Count usually requires personal contact to ensure consistency.** It is during the years that we contact citizen scientists directly via an email a few weeks before and a phone call a week prior to the counting time that we have the most consistency with results.



Summary of Recommendations

Following the summary of the KCBP activities and a critical review of our successes and challenges, we make the following recommendations for other community bat projects:

Effort and Resources

- 1) Work to ensure funding sources are diversified. This diversification is a model that is currently being expected by funding agencies. This diversity also prevents a community bat program from being dependant on one funding source and collapsing if that source becomes unavailable.
- 2) Prioritize landowner site visits even if resources are slim since these one-on-one face-to-face visits allow the most effective guidance and engagement.

Project Area

- 3) Select a geographic area of focus that is relatively small so that landowner visits are more feasible and travel expenses are limited. Create more than one interconnected, area-based program (e.g. East and West Kootenay) or teams in large areas.
- 4) Use multiple regional programs (e.g. coordinator for both East and West Kootenay) to reduce time and travel costs.
- 5) Utilize Bat Ambassadors for education and awareness activities to regionalize these programs and reduce time and travel expenses.

Bat Inventory

- 6) Ensure there are clear definitions for day, night and maternity roosts.
- 7) Identification of *Myotis* species must be confirmed using genetic analysis. Take multiple samples from different locations within a large roost structure to better identify mixed species, since only one pellet is analyzed at a time.
- 8) Acoustic monitoring follow-up is recommended for colonies where species identification is important to complement genetic testing, especially for Little Brown and Yuma *Myotis* because they often form multi-species colonies that single pellet genetic sampling will not detect. However, acoustic monitoring requires a bat detector, expertise, time and software to analyse the calls, and being at the site during emergence (or dropping off and then picking up a passive detector), all of which significantly increase the budget of site visits. Furthermore, there is excess 'clutter' (or sound obstructions) for bats leaving a roost making it is very difficult to obtain calls with diagnostic features to identify to species.
- 9) Collect guano at all sites where it is accessible and prioritize analysis for those sites where bats are likely to remain (i.e. an eviction is not being planned). However, if community bat project funds allow, we recommend analysing guano samples from colonies that will be evicted, particularly sites where a bat house is being installed.



- 10) Develop a high priority list of roost sites that includes roosts that contain the following characteristics: high priority species (e.g. Little Brown Myotis), large colonies, where no eviction is planned. For these high priority roosts, ensure species identification is confirmed, bat colony counters are in place each year and at least two replicates of pre-pup counts are completed, at minimum.

Outreach and Education

- 11) Utilize various forms of media for advertising but focus on press releases and the provincial community bat program website, posters and programs as the most effective options.
- 12) Ensure a consistent, interesting and focused presence on the internet, including social media tools such as Facebook.
- 13) Ensure the “How did you find out about this project?” section is consistently filled in during site visits.
- 14) Utilize social diffusion by encouraging residents that you have visited to talk to at least three other people about bats and share something they’ve learned.
- 15) Build program capacity, reduce costs and increase social diffusion locally by training volunteers (Bat Ambassadors) to educate and advocate throughout the region. Consider training and utilizing WildsafeBC staff as Bat Ambassadors to provide information and education about bats.
- 16) Ensure there is at least one bat ambassador per geographic region of the project area.
- 17) If training educators about bats, ensure that they have come to the training specifically for that purpose and not “tagged on” to another event. Provide “guidelines” for their involvement including what they can be involved in, resources available, how to get paid, etc. (Appendix 4).
- 18) Develop partnerships with organizations and business that connect with landowners about bats in buildings in ways that can complement bat program activities (e.g. pest control and building supply companies).

Landowner Visits

- 19) When a site visit is conducted, ensure you glean as much information during that exchange as possible (e.g. how did you hear about us, what misunderstandings are there about bats, etc.). Have standard data fields and boxes on the site visit form in order to compare and learn from results.
- 20) See “Guidelines for Conducting Bat Site Visits” document housed with the BC Community Bat Program.
- 21) Ensure adequate training of bat ambassadors / bat program leaders, particularly for those individuals conducting site visits and providing advice to landowners. Even trained bat biologists may not have the appropriate skills for addressing landowner issues. We recommend at least three field days with an experienced Community Bat Program



biologist for learning how to conduct site visits and a 2-day training session for Bat Ambassadors to learn skills for education and awareness activities.

- 22) Continue to update, utilize and share “*Guidelines for BC Community Bat Program Coordinators*”, “*Guidelines for Site Visits*”, or “*Guidelines for Bat Ambassadors*”. These documents should be updated annually by the BC Community Bat Program Coordinator.
- 23) Ensure a foundation of Bat Ambassadors have been established in a region.
- 24) Ensure that people conducting site visits have training and knowledge of building construction (e.g. parts of a house like soffits, flashing, roof vents) as well as techniques for mitigation.
- 25) When possible, landowner visits should be conducted by two knowledgeable people, preferably one male and one female.
- 26) To document the majority of roosts sites within buildings in an area, a high effort of advertising should be placed in a small geographic region for a period of at least three years, then maintain the connection with key landowners who have large roost sites.
- 27) Ensure to gather as much information as possible during each site visit (e.g. how landowner learned about KCBP, attitude before and after visit, gauging how many people they will talk to, etc. – use a standard form to make answers comparable).
- 28) Collect guano and, when possible, acoustic samples to confirm identification of species being evicted at a site where a bat house will be installed. If the bat house is successful, follow-up to identify the species occupying the bat house.
- 29) At the end of each year, follow-up with landowners with whom you have conducted site visits to evaluate effectiveness over time and report results.

Bat Houses

- 30) Partner with an organization who can build bat houses that the community bat project can deliver (and ideally install) at high priority roost sites where an eviction is planned, and in particular those sites with landowners willing to do annual bat counts and/or that are centrally located for roost counts and guano collections.
- 31) If bat house building workshops are conducted, maintain a contact list of all participants so that follow-up surveys can be conducted to determine efficacy of the approach and support effective installation and monitoring.
- 32) If a cost reimbursement program is used for building bat houses, promote it to local organizations who have the capacity to build bat houses for donation to landowners at key locations.
- 33) Promote multi-chambered bat houses including four-chambered nursery boxes and two-chambered rocket boxes. Do not promote single-chambered bat houses unless more research is done on their effectiveness and suitability, particularly in hot climates.



- 34) Utilize a signed commitment to either install and/or monitor the bat houses. Signed commitments increase effectiveness compared to no commitment or a verbal commitment.
- 35) Continue monitoring temperature data from bat houses to determine maximum tolerable temperature for bats and situations that create high temperatures.
- 36) For site visits, record basic characteristics of successful and unsuccessful bat houses on the site visit form (e.g. aspect, design, colour, installation structure) into community bat program databases for better analysis in future years. For bat house donations, keep a list of all contacts who receive or install a house, so this information can be collected.
- 37) Keep a list of all contacts who receive or build or install a house, and collect standard info on bat house characteristics and installation details, to aid in determining bat preferences.
- 38) Promote the BC Annual Bat Count at all bat houses, recording which houses are not used as well as which houses are used, and recording data on house type, colour, aspect, etc.

BC Annual Bat Count

- 39) Contact citizen scientists by email a few weeks prior and by phone one week prior to the counting dates to encourage their participation.
- 40) Encourage four bat counts per year be completed under ideal conditions.
- 41) Ensure at least two replicates of the pre-pup counts are completed at priority roosts and encourage four bat counts per year (the latter two replicates occurring post-pup volancy) to be completed under ideal conditions.
- 42) Focus efforts on roosts that are high priority (i.e. >100 bats) as identified by the regional community bat program in communication with the BC Community Bat Program.
- 43) Pair up interested volunteers with landowners where bat colonies occur (assuming permissions are in place).
- 44) Contact citizen scientists following the counting period to ensure complete data forms (including signatures giving permission to share data) are submitted.
- 45) Report DNA and acoustic identification and count trends back to landowners and volunteers to maintain engagement.

Data Management

- 46) Ensure that BC Annual Bat Count data forms are signed by the landowner giving permission for the bat counts and for the data to be shared with the provincial government.
- 47) Ensure that landowners have provided signed data sharing consent forms for site visits before using federal funds (e.g. Habitat Stewardship Program) for conducting landowner visits because data sharing is required as part of the funding agreement. If data sharing



is a concern, use these funds for other aspects of the program such as outreach or annual bat counts.

- 48) Work with the provincial government to determine how to upload roost data from site visits without breaching landowner trust with KCBP.

General

- 49) To ensure program longevity and consistency, program coordinators should consider suitable candidates and provide mentorship and training.
- 50) To ensure program effectiveness and adaptability, program coordinators should be constantly looking for ways to measure the impact of various activities and programs.
- 51) Consider community-based social marketing approaches to instil and reinforce behaviour change with landowners to foster a culture of bat conservation and stewardship.



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Appendix 1 - Example 2-pager handout



Report your bats!

Did you know that half of the sixteen species of bats in BC are considered vulnerable or threatened? In the Central Kootenay area, rare bat species include the Townsend's big-eared bat, fringed bat, and northern long-eared bat.

The Kootenay Community Bat Project was initiated in 2004 to raise awareness about bats and enhance and conserve bat roosting habitat. The project includes outreach programs, inventory of bats in buildings, and support for landowners dealing with bat issues. Project biologists can visit your property to identify your bats, assist you with developing a strategy for removing or keeping them, or helping identify a good site to install a bat-house.



Should you remove your bats?

There are several reasons why you may decide to maintain your colony of bats rather than try to get rid of them:

- The roost site may be providing critical habitat for the bats and the chance of losing the colony will be reduced if they can stay where they are.
- Many bat species are endangered. Supporting bat colonies in buildings may be an important part of their conservation.

- Bats are fascinating and provide a learning environment, especially for children. Some landowners have even installed a viewing chamber to watch the bats without disturbing them.
- Bats are long-lived (more than 30 years) unlike rodents and usually only have a single pup, making them more vulnerable to population decline.
- Bats rarely carry rabies and will sicken and die if they contract it, unlike some other animals that are unaffected carriers.
- Most colonies in houses are maternity colonies, used year-after-year.
- Bats consume noxious pests (mosquitoes), agricultural pests and forest pests.
- Bat guano is an excellent fertilizer.

Modifications for bats

To decide if you need to get rid of the bats from your house, first identify the problems they are creating. Most peoples' problems are often a bi-product of bats (e.g. noise, smell) rather than the bats themselves. Some of these issues can be addressed by the following:

- Remove accumulated guano (collect all bat mummies for data).
- Install a plastic barrier on floor and caulk joints in floor to prevent odour movement to human living quarters.
- Replace stained insulation.
- Install a pre-sealed plywood floor along human access routes and under roost(s) to catch guano and facilitate annual removal.
- Special modifications and maintenance will be required with hard-to-access roosts.



Removing bats

If you would like to get the bats out of your house, here are some sensitive methods to try:

- Install bat-houses in ideal areas nearby before you evict your bats
- Wait until the fall or spring, after bats have hibernated or migrated, before disturbing the colony.
- When the roost site is empty, seal up all of the cracks to the roost site or set up a one-way door. Bats can get into spaces as small as 0.5cm so this may be a difficult task!
- See www.bcbats.ca for many booklets and resources for managing bats in buildings

Bats and Rabies...

Although the risk is extremely low, bats can transmit rabies. Since 1970, five people have died from rabies in Canada. Bats should not be feared, but caution should be taken.

- Never touch a bat (biologists with this project have preventative rabies vaccinations)
- Be cautious of bats behaving strangely, such as flying during the day
- **If you are bitten or scratched by a bat, seek immediate medical attention**

Help our Bats!

- Participate in **Annual Bat Count**
- **Register your bat-house** to help us learn more about the best bat-house designs and placements
- **Enhance bat habitat** in your backyard
- Book a **presentation**

Find out more at:

www.kootenaybats.com or
1-855-9BC-BATS ext. 14

General facts about bats

From horror movies to health warnings, societal attitudes about bats are typically extremely negative. Many people view bats as being ugly, scary, nasty little creatures that are harmful blood-sucking pests.

Both this type of public attitude, and limited available habitat that is under threat in BC, have contributed to the general decline of bat populations around the world. Subsequently many of our bat species are listed as vulnerable or threatened (Red- and Blue-listed).

As people continue to exterminate bats from their houses, actively kill bats when they come across them (which is illegal without a permit), or inadvertently destroy bat roost sites, bats as a whole remain threatened. Here are some of the real facts about bats:

- There are thought to be 11 species of bats in the West Kootenay including:
 - Big brown bat
 - Hoary bat
 - Silver-haired bat
 - Yuma bat
 - California bat
 - Little brown myotis
 - Northern myotis
 - Long-legged bat
 - Townsend's big-eared bat
 - Long-eared bat
 - Fringed bat
- Bats are not rodents, but rather belong to their own group ("Order") of mammals called *Chiroptera* which means "hand-wing". In fact, bats are far more closely related to primates (such as monkeys and humans) than they are to mice.
- White-Nose Syndrome (WNS) is a devastating disease that is decimating bat populations in eastern North America. It is estimated that WNS has killed approximately 6 million bats since it was discovered in 2006. **It was recently confirmed in Washington State.**
- Different groups of bats eat different things. There are groups of bats that eat fruit, nectar, insects, mammals, fish, and blood. Only three species of bats in the world eat blood and these are the vampire bats of Central and South America. All bats in Canada eat nothing but insects and in most cases, only flying insects.
- Bats are not blind. They have eyes and can see, likely better than we can under dimly lit conditions.
- Bats in Canada navigate and find prey mostly using echolocation. Bats emit regular calls (at the intensity of screams) and then listen to the echo of their voice. It is such an amazing system that the US Navy studies bats to improve human-developed sonar systems.
- Bats in Canada either hibernate or migrate in winter. Little is known about bat hibernation sites, especially in western Canada. Bats are extremely sensitive to disturbance when they are hibernating, and should be left alone.
- When bats appear to be diving for your hair, they are trying to eat the insects flying above your head!
- Bats expend a huge amount of energy to fly. As a result, they try to save energy when they can. They regularly use a system called "torpor" where they lower their heart rate, metabolism and body temperature and go into a deep sleep-like condition.
- The saliva of vampire bats contains an anti-coagulant that allows the blood to keep flowing after a bite so that the bat can lap up the blood. This chemical is being used as a treatment for strokes because it can help dissolve blood clots in the brain.
- Bats are found on every continent except Antarctica and there are over 1000 species of bats in the world.
- There are 16 species of bats in BC (17 if you count the one record of a Big Free-tailed Bat that washed up in 1938 in New Westminster).

Where to get a bat house

If you would like to build a bat house, contact us and we will email you bat house plans. You can also buy bat-houses locally from:

- Bill Penner (250) 269-7246 (Edgewood) ***KCBP Recommended Designs**
- Marlene Hebert (Slocan Valley) marlinhebert@yahoo.ca ***KCBP Recommended Designs**
- Bob Walker (Invermere) (250) 342-3010 ***KCBP Recommended Designs**
- Country Dawg (250) 399-0026 CountryDawg@shaw.ca (Glade) Single-chamber box

Kootenay Community Bat Project proudly supported by:



Appendix 2 – Bat Friendly Gardening Tips Example handout



You can help bats in the Kootenays by planting species in your garden that attract moths, a primary food for some bat species. This handout was prepared by volunteers with expertise in gardening. It will continue to evolve with your input. Please contact the Kootenay Community Bat Project with comments or suggestions. You can also support bats by installing a bat-house on your property – see www.kootenaybats.com for more information.

Here are a few facts about bats, moths and gardens:

- There are many more species of moths (10,000) than there are butterflies (800)
- Moths are a major food source for some bat species
- Moths are attracted to fragrant, light coloured, tubular flowers; they use sensory receptors to locate the flowers in the dark (by fragrance and the white/light colour in the dark)
- Some flowers are nocturnal only, some are open day and night, the night bloomers often look a little faded in the daytime, they might even look withered or dead, only to reopen at night
- Night bloomers often have little fragrance during the day, but emit a strong fragrance at dusk onwards
- Brightly coloured hybrids without fragrance or pollen are not beneficial. Simple flowers are best.
- This list is a guide only, there are many more flowers that would attract moths and other night insects
- One site for fragrant flowers: www.fragrantpathseeds.com - there are more. Two good sites for native plants: E-Flora BC <http://www.geog.ubc.ca/biodiversity/eflora/> and www.Nativeplantnetwork.org
- To learn about invasive plants of our region to avoid, see the Central Kootenay Invasive Plant Committee website at www.kootenayweeds.com
- Excellent resource for pollinators of all types: The Xerces Society www.xerces.org
- ** = North American Native / Z = Zone

ANNUALS

Blazing Star**	<i>Mentzelia nuda</i>	Z6 biennial
Cleome 'White Queen'	<i>Cleome hasslerana</i>	
Cosmos: 'Purity', 'Sonata White', 'Picotee'	<i>Cosmos bipinnatus</i>	
Evening Snow Phlox	<i>Linanthus dichotomus</i>	
Granite Prickly Phlox**	<i>Linanthus pungens</i>	Z4; BC native
Foxglove 'Alba'	<i>Digitalis purpurea</i>	
Gaura	<i>Gaura parviflora</i>	biennial
Glory Bower Vine	<i>Clerodendrum trichotomum</i>	
Honesty	<i>Lunaria annua albiflora</i>	
Mallow	<i>Lavatera trimestris 'Mont blanc'</i>	
Moonflower	<i>Ipomoea alba</i>	
Nicotiana	<i>Nicotiana glauca</i> <i>N. affinis</i> <i>N. noctiflora</i>	
Night phlox	<i>Zaluzianskya capensis</i>	
Night Scented Stock	<i>Matthiola longipetala ssp bicornis</i>	
Petunia species	<i>Petunia axillaris</i>	
Sunflower 'Italian White'	<i>Helianthus annuus</i>	

NOT HARDY: Plants that need special treatment

i.e., dig up in fall and store over winter /might be a house plant in the winter and be outside in the summer

Brugmansias

Calla lily *Zantedeschia aethiopica*

Cape Jasmine *Gardenia jasminoides*

Daturas

Desert Lily *Hesperocallis undulate* Z9

Plume plant *Justica carnea* 'Alba'

Hesperantha Iris Z7 *Hesperantha baurii*
H. falcate

Spider Lily** *Crinum americanum* Z7

PERENNIALS

Bee Balm** *Monarda*

Chocolate vine *Akebia quinata*

Cohosh/ Snake root** *Cimicifuga racemosa*
(syn: *Actaea racemosa*) Z4

Culver's Root:** *Veronicastrum virginicum* Z3

Daylilies: *Hemerocallis* 'Island Music', 'Shades of Darkness', 'May May', 'Guidrid', 'Lady Sundance'
Hemerocallis altissima
Hemerocallis citrina (syn: *H. Vespertina*)
H. flava

There are MANY fragrant nocturnal daylilies. Resource:
www.dbtinkersgardens.com

Evening primrose** *Oenothera argillicola* Night or day/night blooming
O. brachycarpa
O. caespitose
O. missouriensis
O. odorata
O. pallida
O. speciosa

Evening Star (Ten Petal Evening Star)** *Mentzelia decapetala* Z4

False Solomon's Seal** *Smilacena racemosa*

False Yucca (Red Yucca)** *Hesperaloe parviflora* Z6
H. nocturna Z7

Garden pinks *Dianthus* species
D. petraeus squarrosus
D. barbatus (Sweet William)

Gaura *Gaura lindheimeri*** Z5
Gaura coccinea

Gayfeather** *Liatris spicata* Alba Z4

Goldenrod** *Solidago* species

Honeysuckles:		some new hybrids are non-fragrant and some are invasive
Fragrant honeysuckle	<i>Lonicera fragrantissima</i>	
Belgium Honeysuckle	<i>L. periclymenum</i> var. <i>belgica</i>	
Italian Woodbine	<i>L. caprifolium</i>	
Hosta, August lily	<i>Hosta plantaginea</i>	
Iris, Vesper	<i>Iris dichotoma</i> (Vesper Iris)	Z4
Iris, Siberian	<i>Iris siberica</i> 'White Swirl'	Z5
Iris, Japanese	<i>Iris ensata</i> 'Moonlight Waves', 'Frosted Fountain'	Z4
Joe Pye Weed**, Spotted Boneset	<i>Eupatorium maculatum</i>	
	<i>E. perfoliatum</i>	
Hemp Agrimony	<i>E. cannabinum</i>	
Lilies (many)	<i>Lilium formosum</i>	
	<i>L. candidum</i> (Madonna lily)	
	<i>L. regale</i>	
Lily of the Nile	<i>Agapanthus</i>	Z7
Lily of the Valley	<i>Convallaria majalis</i>	
Meadowsweet**	<i>Filipendula ulmaria</i>	Z3
Milky Bellflower	<i>Campanula lactiflora</i> 'Alba'	Z4/5
Pincushion Flower	<i>Scabiosa caucasica</i> (white)	Z4
Phlox		
Wood phlox	<i>Phlox divaricata</i>	
	<i>P. pilosa</i>	
Garden phlox	<i>P. paniculata</i>	
Red Valerian, Jupiter's Beard	<i>Centranthus ruber</i> 'Snow Cloud', 'White Cloud'	
Soapwort	<i>Saponaria officinalis</i> alba	
Spreading dogbane**	<i>Apocynum androsaemifolium</i>	BC native
Twinflower**	<i>Linnaea borealis</i>	BC native
Turtlehead**	<i>Chelone glabra</i>	Z5
Verbena, Sand	<i>Abronia fragrans</i>	Z5
Water lilies	<i>Nymphaea lotus</i>	
	<i>Nymphaea caerulea</i>	
	<i>Nymphaea</i> : 'Juno', 'Sir Galahad', 'Missouri', 'Trudy Slocum'	
Yucca**	<i>Y. filamentosa</i>	open day and night, but at night the blooms open upwards (Z5)
	<i>Y. glauca</i>	
	<i>Y. baccata</i>	
HERBS		
Herbs that are nectar rich: (Annual, Perennial and Biennial)	Hyssop, Thyme, Nepeta, Sage, Rosemary, Lavender, Oregano, Dill, Angelica, Fennel, Coriander, Basil and others	

TREES AND SHRUBS

Cherry Elaeagnus	<i>E. multiflora</i> **	
Chokecherry**	<i>Prunus virginiana</i> <i>Prunus padus</i>	Z3
Clematis	<i>Clematis montana</i>	And other Clematis species
Currant**	<i>Ribes odoratum</i>	Z5
Daphne		
February daphne	<i>Daphne mezereum</i>	
Winter daphne	<i>D. odorata</i>	
Rose daphne	<i>D. cneorum</i> <i>D. tangutica</i>	
Dogwood**	<i>Cornus spp.</i>	
Hibiscus	<i>Hibiscus syriacus 'Diana'</i>	
Hydrangea, Oak-leaved	<i>Hydrangea quercifolia</i>	
Hydrangea, Climbing	<i>H. anomala ssp petiolaris</i>	
Lilac species		
Magnolia	<i>M. stellata</i> <i>M. sieboldii</i>	Z6
Sweet bay	<i>M. virginiana</i> <i>M. fraseri</i> **	Z5 Z6
Mock orange**	<i>Philadelphus x virginalis</i> <i>P. coronaries</i>	
Mountain ash**	<i>Sorbus americanus</i>	
Peony		
Tree peony	<i>Paeonia suffruticosa</i>	
Garden peony	<i>Peonia lactiflora</i>	
Roses (fragrant)	<i>Rosa spp.</i>	Many species, probably simpler flowers are best
Rhododendron	<i>Rhododendron arborescens</i> ** <i>R. serratum</i> <i>R. viscosum</i>	
Saskatoon berry**	<i>Amelanchier canadensis</i>	
Viburnums	<i>V. trilobum</i> Z2 <i>V. plicatum</i> Z5 <i>V. burkwoodii</i>	Z2 Z5
Wisteria	<i>Wisteria sinensis</i> <i>W. floribunda</i>	

Appendix 3 - 2014 Bat Ambassador Training Workshop Agenda



Agenda

Friday, April 11	Optional Evening	
7 pm to 10 pm PST (drop by)	Mist-netting at Bat Condo with Dr. Cori Lausen	Creston Valley Wildlife Management Area condo. Drop-in for as long as you like
Stay at Valley View Motel	Go to motel when ready	The motel will have your room number
Saturday, April 12	Workshop Begins	College of the Rockies
10 am PST	Introduction	
10:30 am	"All About Bats"	
12:15 pm	LUNCH (provided)	
1:00 pm	Participant-led activities	15 minutes each
3:00 pm	COFFEE BREAK	
3:15 pm	Participant-led activities	
4:15 pm	Q & A with Cori	Meet Lily the bat (live hoary bat)
5 pm	Dinner	
6 pm	Sanca Cabin - Scavenger Hunt - Annual Bat Count - Bat detector demo	Meet at Valley View Motel (Emergence around 7:45 pm)
9 pm	Return to Creston	
Sunday, April 13		
9 am	Review using "bat toss"	
9:15 am	Resources	
9:30 am	Mystery item prop talk	
10:15 am	COFFEE BREAK	
10:30 am	Create your program	
11:45 am	Wrap-up	
12 pm	Adjourn	

We are extremely grateful to Columbia Basin Trust for supporting this project!



Appendix 4 – Example Guidelines for Bat Ambassadors





GUIDELINES FOR KOOTENAY COMMUNITY BAT PROJECT “BAT AMBASSADORS”

Last updated: 20 April 2015

Written by: Juliet Craig and Leigh Anne Isaac

Thank you so much for your interest in being a Bat Ambassador for the Kootenay Community Bat Project (KCBP). Your energy and enthusiasm is much appreciated, both by us and by the bats! The purpose of this document is to assist you with your activities for 2015.

WHAT IS THE KOOTENAY COMMUNITY BAT PROJECT?

Over half of the 17 bat species in BC are listed as threatened or vulnerable and, with the advance of White Nose Syndrome, a disease that is decimating bat populations in eastern North America, even common species like little brown myotis are becoming threatened. Many bat species of concern have adapted to use buildings, given the loss of critical roost structures such as old trees and undisturbed caves. Because of this habitat loss, some landowners are in the position of having a species of concern not only on their property but in their home. Given that buildings in the Columbia Basin are housing hundreds of maternity colonies of bats, community engagement is critical to the conservation of these bat populations.

The Kootenay Community Bat Project (KCBP) was established in 2004 to:

- Raise awareness about bats and their conservation
- Identify bat species in building structures
- Work with landowners who have bats in buildings (site visits to landowners)
- Increase bat roosting habitat (through bat-houses)
- Monitor bat populations (through the Annual Bat Count)

The KCBP has been extremely successful in these activities, having engaged thousands of residents over the years.

WHAT IS A KCBP BAT AMBASSADOR?

The KCBP is a community-based initiative that relies on the engagement and participation of residents in the Columbia Basin. Bat Ambassadors are keen residents (who may be educators, biologists, or simply interested in bats!). To become a Bat Ambassador, you must:

- ✓ Participate in a KCBP Educator Workshop and receive a certificate
- ✓ Have a criminal record check done (this is a requirement from Columbia Basin Trust, our funder. If you are already a Wild Voices for Kids Educator or a certified teacher, then we can take that as acceptance that you have had a criminal record check).

WHAT ARE ACTIVITIES I COULD BE INVOLVED IN?

Activities that raise awareness about bats, promote bat-houses, or engage people in the Annual Bat Count are encouraged. These may include:

- ✓ Providing youth or community presentations on bats (note that school programs are under Wild Voices for Kids)
- ✓ Conducting a “bat event” such as a “Go Batty” night, an art competition, or a film contest
- ✓ Hosting a bat-house building workshop
- ✓ Working with woodworking shops to produce bat-houses for donation
- ✓ Hosting a “Bat Watch Workshop” (Annual Bat Count training) at a roost site
- ✓ Hosting the KCBP display booth at a community event

HOW DO I GET STARTED?

- ✓ Contact Patty to discuss your idea (wolfson1@shaw.ca or 250 427-2608)
- ✓ Partner with a hosting organization (e.g. Wild Sight, Creston Valley Wildlife Management Area, school, etc.) for the advertising and logistics of your event.
- ✓ Figure out what you need in terms of props, items, or budget.
- ✓ Follow the steps of “Hosting an Event” section

STEPS TO ORGANIZING AN EVENT

- Plan your event including:
 - The steps from start to finish
 - Timeline for advertising and delivering the event
 - Checking-in with Patty about the event and budget (wolfson1@shaw.ca or 250 427-2608)
- Brush up on your bat knowledge. Read websites and documents on www.kootenaybats.com and www.bcbats.ca
- Partner with a local group. Since the KCBP is not a non-profit society, we don’t have liability insurance or coverage for events. Ideally, events will take place under an umbrella organization. You can talk to us about possibilities.
- Advertise the event (if appropriate). Provide us with information so we can add the event to:
 - KCBP website (www.kootenaybats.com)
 - BC Bats calendar of events (www.bcbats.ca)
 - KCBP Facebook page (<https://www.facebook.com/kootenaybats>)
 - Press release (if appropriate)
 - Posters (if appropriate)
- Make sure that all advertising includes acknowledgement of Columbia Basin Trust (our funder) and that you acknowledge them at your event as well.
- Host your event.
 - Take lots of photos
 - Have fun!
 - Record number of participants, date and place of event
- Send “Request for Honorarium” form to Juliet

KCBP RESOURCES AVAILABLE

- The KCBP has a number of resources available for use by Bat Ambassadors. These include:
 - o Display banner (for display booth)
 - o Canopy for outdoor display booth, table cloth, bat stuffies (for display booth)
 - o Bat-house
 - o Tub of supplies for bat-house building (caulking guns, staple guns, paintbrushes, etc.)
 - o Props such as dead and model bats, bat detector, books
- We need advance notice if you need any of these resources so we can ensure we have enough time to get them to you.

HOW DO I GET PAID?

- Honoraria are provided for Bat Ambassadors. Honoraria are meant to cover time and mileage. Generally, honoraria will be:
 - o \$100 per presentation. Note that school presentations are not eligible for honoraria since they can be covered under Wild Voices for Kids. See: <http://www.cbeen.org/wvfk>
 - o \$200 to \$300 per event (e.g. display booth, Bat Count workshop, art competition)
 - o \$300 to \$400 per bat-house building workshop
- There are also funds available to cover other costs such as materials and supplies, “prizes” for competitions, and educator resources. Mileage could also be considered an additional cost, depending on the event and activity.
- If Bat Ambassadors do an event together, they would share the honoraria.
- The honoraria are guidelines only. If you are going to be taking on something larger, have a long distance to travel, or require more funds, then please let us know.
- You **must** provide a cost estimate to Patty prior to organizing and delivering your event so we can ensure the funds are available.
- These honoraria are available until December 1, 2015. Please submit all expense claims before this time.

Contact Information:

Patty Kolesnichenko

Wolfsong1@shaw.ca

250 427-2608

Appendix 5 - Example Site Visit Form



KOOTENAY COMMUNITY BAT PROJECT DATA FORM

Summer, 2016



[Office use: email added to gmail list? _____ Data entered? _____]

Name: _____ Phone: _____ Email: _____

Address: _____ UTM: Zone 11 E: _____ N: _____ Elev: _____

Landowner's name and contact info (if different from above): _____

Date of visit: _____ In-Kind time: _____

Found out by: drop-in visit ☐ program ☐ poster ☐ newspaper ☐ website ☐ friend ☐ other: _____

_____. Surveyors: _____

Roost site data:

Attic: ☐ Wall: ☐ Under roofing: ☐ Shed/outbuilding: ☐ Bat-house: ☐ Porch: ☐

Other: _____

Night roost: ☐ Day roost: ☐ Description of

roost: _____

Aspect: _____ Height above ground: _____ Height within: _____ Interest in bat count here? _____ Suitable site? _____

Evidence of previous or future disturbances to roost? _____

What are the Issues with bats, if any?: _____

Year bats first seen: _____ Year owner moved in _____

Month bats return: _____ Month bats leave _____ Any sign of bat activity in winter? _____

Comments: _____

Bat species present:

MYLU/MYYU: ☐ EPFU: ☐ COTO: ☐ Other: _____ # Bats _____ Comments: _____

Guano only: ☐ If only guano seen: Light ☐ Medium: ☐ Heavy: ☐ Carcass(es) collected? ☐

Data Sharing?

Asked about data sharing with government? Yes ☐ No ☐ Willing to share? Yes ☐ No ☐

Samples taken:

Guano for DNA ☐ : KCBP-DNA-YEAR-MO-DY-### (Also note UTMS) _____

Priority for DNA testing: ☐ High ☐ Medium ☐ Low

Recommendations:

- | | |
|---|---|
| ☐ Leave bats where they are | ☐ Seal up roost in winter and put up bathhouse |
| ☐ Modify roost to accommodate bats | ☐ Put up a one-way trap door for immediate exclusion |
| ☐ Other: | ☐ Put up bat-house |

Information given to landowner:

Newsletter about KCBP ☐

FAQ Booklet ☐

Bats in Buildings Booklet ☐ :

Bat-house Booklet ☐

Building Homes for Bats only ☐

Annual Bat Count form` ☐

7 Steps Booklet ☐

Follow-up required?:**Landowner Perspectives (pre and post visit):**

- | | | |
|--|-----|------|
| • Likes bats and wants more | pre | post |
| • Likes bats, doesn't mind them being there | pre | post |
| • Likes bats, but will be doing modification (e.g. roofing) and concerned about bats | pre | post |
| • Likes bats, but bats causing problems with noise, smell, guano | pre | post |
| • Doesn't mind bats but wants them out of house | pre | post |
| • Dislike of bats. Just wants them gone. | pre | post |

Bat Handling Data:

Species	# AM	# AF	Repr od	# AU	# J	Total #	Fore-arm (mm)	Ear (mm)	Keel	Wt (g)	Comments

Comments:

Appendix 6 - Building Homes for Bats Claim Form





Building Homes for Bats:

Free bat-house materials!

Have you wanted to build a bat-house for your property to help move a colony out of your attic, or to attract bats to eat mosquitoes? Take advantage of this opportunity to get the materials paid for!

The Kootenay Community Bat Project is encouraging the installation of bat-houses by paying for the cost of materials. In return, the participant builds, installs and monitors the bat-houses. The goal of this project is to provide more roosting habitat for bats, learn about the best bat-house designs and placements in the Kootenays, and encourage the monitoring of bat populations.

WHO IS ELIGIBLE? Residents or stewardship groups in the Columbia Basin and Boundary are eligible for this program. Funding for people in other areas of BC may also be available – please contact us.

WHERE SHOULD I PUT MY BAT-HOUSE? Bat-houses should be placed as high as possible (at least 12'), in an open area that gets plenty of sun, south or south-east facing, and without clutter of trees, buildings, or other objects nearby (more than 6 m away is ideal). They can be mounted on the sides of buildings such as houses, barns, sheds, or garages, or on a metal pole or wooden post.

WHAT IF I DON'T HAVE A BUILDING TO ATTACH THEM TO? Bat-houses are very successful when they are mounted on poles or posts in an open area. Posts should be at least 20' long (so with 4' buried in the ground, that would be 16' high). Metal poles can be used or wooden posts with the bottoms treated and/or in cement. Once bat-houses are installed on a post, they are very heavy so installation can be challenging. A work party or small machinery may be required.

WHAT COSTS ARE COVERED? The Kootenay Community Bat Project, with funding from the Public Conservation Assistance Fund, will pay for bat-house materials and posts, including plywood, strapping, screws, caulking, screen, wooden or metal poles, and brackets. We also have limited funds available for the cost of equipment rental such as fence-post auger but these costs need to be approved in advance. *The funds will not cover the cost of labour for building or installation.*

WHAT TYPES OF BAT-HOUSES CAN I BUILD? The Kootenay Community Bat Project promotes bat-houses designs that have been tested for decades as well as new innovative approaches. Bat-house designs may include a nursery box, a two-chambered rocket box, a wedge rocket box, or an "Uncle George" design. All bat-house designs can be found at www.kootenaybats.com. **Since the goal of the project is to test bat-house designs and placements, you must build and install at least two bat-houses to be eligible.**

Examples of options for building and installing two bat-houses:

Options	Bat-house #1	Bat-house #2	Comments
If you have a large, high, south or east facing wall large enough for two bat-houses (e.g. barn, house, shed)	Nursery bat box stained black	Nursery bat box stained brown or unstained	Testing bat-house colour
If you have two large, high, south or east facing walls	Nursery bat box facing south	Nursery bat box facing south-east or east	Testing aspect
If you have a large, high, south or east facing wall large enough for one bat house and the ability to install and post/pole	Nursery bat box on wall	Rocket box on post	Testing bat house design
If you have an open area and the ability to install posts/poles	Two chambered rocket box	Wedge rocket box	Testing rocket box design
If you have an open area and the ability to install posts/poles	Nursery bat box on post	Two-chambered rocket box on post	Testing bat house design
If you have an open area and the ability to install posts/poles	Two-chambered black rocket box on post	Two-chambered unstained rocket box on post	Testing bat house colour
If you have an open area and the ability to install posts/poles	Two chambered rocket box	Uncle George design (need to modify plans)	Testing bat-house design

Note that community groups are eligible to build more than two bat-houses.

Examples of bat-house designs:



Left: Nursery box laying down - would actually be installed upright. Center: Two-chambered rocket box. Right: Wedge rocket box (inside showing – would actually have outer wall all around it). Photo from Larry Leonard.

HOW DO I SIGN UP? The funds are available on a first-come, first serve basis. Funds will be reserved for people who indicate they would like to join this program. Take the following steps:

1. Look around your property to see what would be the most suitable locations for a bat-house. Generally, bat-house sites need to be south-facing, in the open (uncluttered), and as high as possible. They should not be placed in dense forests or on trees (unless there are no branches below or directly above the bat house). Feel free to send photos of your site and contact the Kootenay Community Bat Project for advice.
2. Consider your ability to install posts. These are very heavy once bat-houses are on top of them and may require a large work party or small machinery to install. *The Kootenay Community Bat Project is not able to assist with installation.*
3. Price out the cost of your materials.
4. Contact the Kootenay Community Bat Project to express your interest and include the types of bat-houses you will build, the estimated cost, and the location.
5. Wait for approval before you buy materials so we can ensure there are funds for you.

HOW DO I RECEIVE MY MONEY BACK? In order to have the costs of materials reimbursed, you must provide the Kootenay Community Bat Project with the following:

- Original receipts for all building materials mailed to 915 Vernon St., Nelson, BC, V1L 4G7
- A completed "Expense Claim" form (attached)
- Photos of two installed bat-houses (digital preferred) to kootenaybats@gmail.com
- A commitment to monitoring the bat-houses the following summer

Once these items are received, you will be sent a cheque to cover your expenses.

For more information:

Kootenay Community Bat Project
915 Vernon Street, Nelson, BC, V1L 4G7
1-855-9BC-BATS
www.kootenaybats.com
kootenaybats@gmail.com

Special thanks to the Public Conservation Assistance Fund:



Expense Claim for Building Homes for Bats – please submit this page only

Name (who cheque should be made out to): _____

Mailing address: _____

Phone number: _____ Email address: _____

Expenses: (Please attach copies of receipts to this expense form).

Date of purchase	Place of purchase (e.g. name of store)	Total amount:	Items on that receipt
	TOTAL (sum of all receipts):		

How many volunteer hours were spent on this project? (e.g. 2 people at 8 hours to build and install bat houses = 16 volunteer hours): _____ volunteer hours. How many bat-houses were built? _____

Commitment to Monitoring

I, _____ (name), hereby commit to monitoring my bat-houses for four evenings during next summer as part of the Annual Bat Count and submitting the information to the Kootenay Community Bat Project.

(signature) _____ (date)

Please select one option for submitting photos

() I am attaching print photos of my installed bat-houses

() I have emailed digital photos of my installed bat-houses

Thank you so much for participating in this project. It is wonderful that you have been part of building homes for bats!

Mail to: Kootenay Community Bat Project, 915 Vernon Street, Nelson, BC, V1L 4G7

kootenaybats@gmail.com

1-855-9BC-BATS