BC Bat Action Team

2016 - 2020 Action Plan

In Response to the Threat of White-nose Syndrome

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Cover photo: Little brown myotis. Peace region, BC Credit: J. Hobbs

Version (last updated): 17 Dec. 2016

BCBAT

The British Columbia Bat Action Team (BCBAT) is a group of professional biologists, academic researchers, veterinarians, environmental educators, students, naturalists, wildlife rehabilitators, government biologists, and other people that are interested in bat conservation in BC.

What does BC Bat do?

BCBAT promotes the conservation of bats in British Columbia. The BC Ministry of Environment (MOE) and BC Ministry of Forest, Lands and Natural Resource Operations (FLNRO) are responsible for the management and conservation of bats in BC. BCBAT provides valuable input into development of provincial bat survey standards, best management practices for various sectors that have impacts on bats and bat habitat, conservation and recovery of bat species at risk, education and outreach, and identification of bat research and conservation priorities.

Background

British Columbia is the most bat-diverse province in Canada. Although the numbers of bat species in the province is currently in flux due to new genetic findings (Lausen et al. 2016) and new acoustic records (Ommundsen *submitted*), Nagorsen and Brigham (1993) report that 16 of the 19 Canadian bat species occur in BC; seven of these are found nowhere else in Canada. Over half of the bat species in BC are of conservation concern.

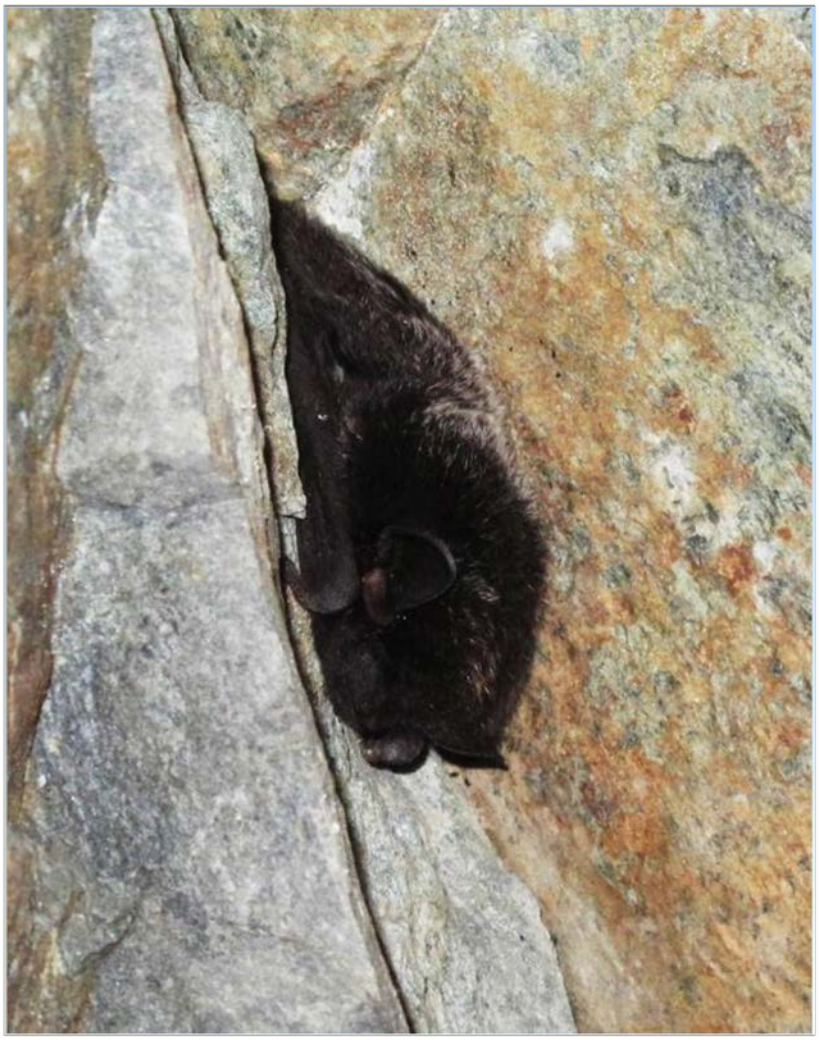
The primary threats to bats were considered to be habitat loss and degradation, and mortality arising from urban and industrial activities, until white-nose syndrome (WNS) caused by the fungus *Pseudogymnoascus destructans* (Pd) was documented in 2006 in New York. The disease has killed over 7 million bats across eastern North America and is one of the major wildlife crises of our times. The urgency for bat conservation in BC increased tremendously in spring 2016, when the US Fish and Wildlife Service announced the discovery of two bats with WNS near Seattle, Washington, approximately 150 km from the BC border. These bats were the first documented cases of WNS in western North America.

Spotted bat in Okanagan. Photo: M. Proctor.

WNS affects bats in the winter and has caused extensive mortality in some hibernating bat species. In affected colonies, mortality rates can exceed 90% (USFWS 2016). Fourteen BC bat species hibernate in the winter and are potentially at risk of WNS mortality. In response to mortality in the eastern provinces, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has listed three species as Endangered under the *Species at Risk Act* (*SARA*; COSEWIC 2014) , two of which are found in BC: Little Brown Myotis (*Myotis lucifugus*) and Northern Myotis (*M. septentrionalis*). We do not know how the other western species of bats will be affected by Pd.

Bats are often considered a "valued component" in the environmental assessment framework (Environmental Assessment Office 2013) because of their significant economic value in ecosystems services including pest control. As the primary consumers of night-time insects, bats play significant roles in many ecosystems. By providing natural pest control services, bats are important to forestry, agriculture, organic farming, gardening and mosquito-control. Boyles et al. (2011) estimated that bats provide US$3.7–$53 billion per year in pest control for agricultural crops in the United States (calculated as the cost of pesticide materials and application services).

Moths are an important component of the diet of many of British Columbia's bats, and research suggests that at least some bat species provide important pest control of forest insects during insect outbreaks (Wilson and Barclay 2006). For example, the Long-eared Myotis (*M. evotis*) eats spruce budworm caterpillars and moths, a significant forest pest (Wilson and Barclay 2006). Bats also provide control of biting and pest insects in urban environments.



If WNS causes significant bat declines in BC, as in eastern North America, then insect densities that affect these various sectors are likely to shift in unpredictable ways. Declining bat populations are likely to have far-reaching and long-lasting impacts on populations of other wildlife such as birds and fish, arising from a trophic cascade of changing insect diversity and relative abundances.

The impending potential catastrophic decline in bats necessitated a consolidated strategy to address bat conservation.

Left: Silverhaired bat hibernating in mine in West Kootenay. Photo: C. Lausen

Development of the Action Plan

In September 2016, motivated by the urgency of the high mortality rates predicted in bats during winter 2016-2017, and the limited capacity and funding invested in this issue by the provincial government, members of BCBAT came together to develop an Action Plan. The group that met in Chase, BC in September was diverse, bringing expertise from conservation and stewardship groups, academia, and biologists that work closely with industry (Appendix I).

In this facilitated meeting, the group developed a list of goals and then described actions that would be needed to achieve each goal. The actions were then prioritized based on the expert opinion of the members of the group. Each attendee was given a limited number of "points" (as a proxy for limited resources) to distribute to the actions under each goal. Actions that the group thought were the most important and urgent received the most points.

Prioritization of actions under each goal was determined based on the number of individual points they received, and 3 categories of points were delineated to establish Level I, II, and III priorities. Receiving a large number of points meant that an action was the most important (Level I). In a final consolidation, the initial list of goals (not listed here), were grouped into six main action categories (Table 2). The raw data (goals, action, points) that underpinned this prioritization exercise have been archived by BCBAT and can be accessed upon request.

One of the key goals of the WNS Action Plan is to bring awareness to BC citizens and governments of the urgency and imminence of this disease, and the cascading ecological and economic ramifications that may follow if nothing is done to address this unprecedented wildlife crisis. While motivated by the threat of WNS, there are many other threats that bats face, and there are large knowledge gaps that constrain effective conservation of most species. Given the limited opportunity to directly treat WNS infected bats, it is likely that reducing other threats to bats, enhancing habitats, and filling knowledge gaps for future recovery efforts will play a large role in this province's WNS strategy.

Townsend's Big-eared Bat Photo: C. Lausen

Prioritized Actions

The following six Action Categories were created with actions grouped by topic in each category:

WNS Response

- Funding
- Monitoring
- Research
- Outreach
- Communication

Threats (other than WNS)

- Quantifying Threats

Knowledge Gaps (Data and Research)

- Baseline data
- Monitoring
- Data access
- Mitigation effectiveness

Outreach and Stewardship

- Public outreach

Policy and Tools

- Standard Operating Prodedures (SOPs) / Best Management Practices (BMPs) / Protocols
- Legal Protection
- Conservation Status and Assessment

Capacity Building

- Communication
- Training/education
- Data access
- Funding

Actions are listed as Level I, II, and III (with Level I being the highest priority) according to the weightings provided by members during the Chase meeting. Actions within each level are generally listed in no particular order, and are grouped according to topic.

In total there are 84 actions listed in this Action Plan, 39 of which have been identified as high (Level I) priority. The main category with the largest number of actions (34) is “Capacity Building” which includes actions for promoting bat conservation.

Table 1. Defining priority levels and abbreviations.

Action items are listed by priority in Table 2 below. Action items were prioritized as follows:

Level I	Highest priority; these actions are critically important for bat conservation in BC and should be addressed immediately; funding and capacity development is considered essential for these tasks.
Level II	Ranked as important; these actions should be pursued in the near future.
Level III	These actions ranked lower given the urgency of higher priority items; if time, funding and someone to champion these actions arises, these actions should be done.

ABAT	Alberta Bat Action Team
ABCF	Association of BC Forest Professionals
BCBAT	British Columbia Bat Action Team
BCCF	British Columbia Conservation Foundation
BCIA	British Columbia institute of Agrologists
BMP	Best Management Practices
CAB	College of Applied Biology (registered professional biologists)
CI-WHF	Commission-Identified Wildlife Habitat Feature (Oil and Gas Commission)
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CWHC	Canadian Wildlife Health Cooperative
EA	Environmental Assessment
ECCC	Environment and Climate Change Canada
FORREX	Forum for Research and Extension in Natural Resources (*under revision*)
FLRNO	BC Ministry of Forest Lands and Natural Resource Operations
FRPA	Forest and Range Practices Act
FSC	Forest Stewardship Council
MEM	Ministry of Energy and Mines
MLA	Member of Legislative Assembly
MOE	BC Ministry of Environment
MOTI	Ministry of Transportation and Infrastructure
MP	Member of Parliament

NABat	North American Bat Monitoring Program (Loeb et al. 2015)
NSERC	Natural Sciences and Engineering Research Council
OGAA	Oil and Gas Activities Act
P.I.T.	passive integrated transponder
PARF	Protected Areas Research Forum
Pd	*Pseudogymnoascus destructans* [the fungus that causes WNS]
QA/QC	Quality Assurance/Quality Control
QEP	Qualified Environmental Professional
RBCM	Royal British Columbia Museum
RISC	Resources Information Standards Committee
SARA	Species at Risk Act
SOP	Standard Operating Practices
UBCM	Union of BC Municipalities
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WBWG	Western Bat Working Group
WCSC	Wildlife Conservation Society Canada
WHA	Wildlife Habitat Area
WHF	Wildlife Habitat Feature
WNS	white-nose syndrome

Table 2. Prioritized Actions.

	Action Category	Priority	Topic	Action	Description
	1. WNS response	Level I	WNS Funding	1.01	Lobby government to provide funds for WNS surveillance and response. Write to Ministers (MOE, FLNRO, Ministry of Agriculture, Min. of Energy and Mines, MOTI, premier, ECCC) to raise awareness.
		Level I	WNS Monitoring	1.02	Conduct hibernacula and spring Pd surveillance (e.g. emergence netting, acoustic surveys, collection of dead bats, guano, substrate, acoustic) prioritized by region ([sentinel]site identification and prioritization , coordinate surveillance site selection with adjacent jurisdictions)
		Level I	WNS Outreach	1.03	Encourage the public and others (e.g., Wildlife Rehabilitator's Network of BC) to submit dead bats to track WNS spread.
		Level I	WNS Outreach	1.04	Continue BatCaver program to identify hibernacula, characterize winter habitat for bats, reduce risk of human-mediated accidental spread of WNS, and potentially apply mitigation methods.
		Level I	WNS Monitoring	1.05	Conduct annual bat counts at roost and hibernacula to monitor declines, effectiveness of mitigation if applied, and recovery of populations.
		Level I	WNS Research	1.06	Implement and support/develop current research on methods of WNS disease management (e.g., anti-fungal treatments, safe hibernacula).
		Level I	WNS Research	1.07	Model for prediction of WNS spread; model post WNS recovery, survivorship (differential species vulnerability), and resilience; model landscape requirements, connectivity and support for rebuilding of populations; collect microclimate data for use in models re: Pd growth rates.

	Action Category	Priority	Topic	Action	Description
		Level II	WNS Communication, SOPs/BMPs/Protocols	1.08	Continue aggressive promotion of Pd decontamination protocols; revise protocols as new information is available
		Level III	WNS Communication	1.09	Engage USGS and Canadian WNS Coordinator [CWHC].
		Level III	WNS Communication	1.10	Lean heavily on US models and programs for WNS coordination to ensure a coordinated international response.
		Level III	WNS Outreach	1.11	Conduct outreach to audiences that may spread WNS (e.g. shipping, transportation, recreational vehicles [RVs], BC Parks, etc.)
	2. Threats (other than WNS) - identify, prioritize and mitigate	Level I	Quantify threats	2.01	Describe and attempt to quantify impacts of forest practices (e.g., clear-cut logging, salvage logging, rotation logging) on bats.
		Level I	Quantify threats	2.02	Determine effects of wind farm siting on all bat species.
		Level III	Quantify threats	2.03	Determine effects of pesticide use (e.g. neonicotinoids) on bat prey populations and bat populations.
		Level III	Quantify threats	2.04	Determine impact of habitat disturbance (e.g. fire, beetle, catastrophic events, development) on bat populations.
		Level III	Quantify threats	2.05	Quantify other sources of bat mortality such as mining, roads, predation of bats by cats, eviction-related mortality (e.g., pest control), etc.
		Level III	Quantify threats	2.06	Identify potential impacts of climate change on roosting habits and habitats, diversity, drinking and foraging habitats, hibernation, Pd virulence, prey availability and potential timing mis-matches, etc.
	3. Knowledge gaps - Identify, prioritize	Level I	Baseline data	3.01	Identify locations and physical characteristics of hibernacula (via radiotracking, acoustics, etc.). Priorities being species at risk, other

	Action Category	Priority	Topic	Action	Description
	and address				species suspected to be highly susceptible to WNS, or species for which risk/vulnerability is completely unknown.
		Level I	Baseline data	3.02	Develop integrated long-term bat monitoring program for BC (e.g. merging data from NABat, annual bat counts, Community Bat Program and BatCaver.org). Develop species-specific, situation-specific or site-specific monitoring as appropriate.
		Level I	Monitoring	3.03	Work with statisticians in advance to ensure adequate power and scale to detect changes of interest in all monitoring efforts for baseline and trend analysis.
		Level I	Monitoring	3.04	Determine criteria and then select sentinel sites for long-term monitoring using pit tags, bands, etc. Define "important roosts". Incorporate long-term tagging methods at sentinel sites (e.g., for age class/sex/population numbers through capture, banding and/or P.I.T.-tagging).
		Level I	Baseline data	3.05	Fill knowledge gaps regarding bats and insects. i. Quantify and publicize ecological services provided by bats in BC (e.g., pest control services, agriculture) - apply a $ value. Ii. Document pre-WNS insect abundance.
		Level I	Baseline data	3.06	Examine genetics and movement to determine connectivity of bat populations across landscape and to better understand disease spread patterns.
		Level I	Data access	3.07	Develop process to access private data and analysis (i.e. through EA commitments).
		Level I	Monitoring	3.08	Continue, expand and strengthen NABat and more intensive monitoring at local and regional scale within BC.
		Level I	Monitoring	3.09	Determine migratory characteristics of short and long distance migrating bat species, and determine route, stopover locations, and destinations

	Action Category	Priority	Topic	Action	Description
					(e.g. tie into Motus Wildlife Tracking.)
		Level I	Mitigation Effectiveness	3.10	Research whether bat houses of different designs affect reproductive success, disease transmission, and population recovery
		Level I	Mitigation Effectiveness	3.11	Ensure that municipal, provincial and federal EAs include bats in all aspects of the EA process.
		Level II	Baseline data	3.12	Research bat roosting ecology (seasonally) (trees, human structures, caves, etc.). Characterize key habitat parameters for each environment (e.g., anthropogenic, forest, mine, cliff, rock, house, bridge, barns, etc.).
		Level III	Baseline data	3.13	Examine urban bat ecology.
		Level III	Monitoring	3.14	Determine relationship between acoustic recordings vs counts at hibernacula and roosts -- to identify population trends, if any.
		Level III	Monitoring	3.15	Archive bat specimens and DNA tissue at RBCM and others.
	4. Outreach and Stewardship - improve and expand	Level I	Public Outreach	4.01	Continue, expand and strengthen outreach programs in BC: BC Community Bat program, BatCaver
		Level I	Public Outreach	4.02	Continue "Bats and Buildings" outreach to pest control companies, builders (send link with building permits), roofers, realtors, tree removal companies, including permitting for removal.
		Level I	Public Outreach	4.03	Engage citizen scientists, volunteers, bat ambassadors; encourage public reporting (e.g. batwatch.ca) and interact with engaged citizens (eg. report back information). This includes involving local naturalist groups (e.g. BC Nature), and First Nations.

	Action Category	Priority	Topic	Action	Description
		Level I	Public Outreach	4.04	Engage with First Nations. E.g., traditional knowledge of roost locations, capacity-building to implement monitoring, etc.
		Level I	Stewardship	4.05	Identify groups and do outreach to audiences who may destroy roost sites (forestry, agriculture, mining, private land owners, urban municipalities, builders, architects, pest control companies, painters, movers, MOTI).
		Level II	Stewardship	4.06	Encourage local municipalities, regions and neighbourhoods to strive for Bat-Friendly designations; develop criteria for Bat-Friendly Community designations.
		Level II	Public Outreach and Communication	4.07	Initiate a media campaign (e.g. marketing, community-based social marketing) with branding, etc. to raise awareness and funds. (e.g., develop a Wiki page for BC bats, commercials, social media, marketing, t-shirts, brand, logo). Use social and traditional media (hard hitting press releases) to communicate what is being done and needs to be done.
		Level III	Public Outreach	4.08	Create curriculum of bat material for schools targeting Learning Outcomes for specific grades.
	5. Policy and Tools -develop and implement conservation tools	Level I	SOPs/BMPs/Protocols	5.01	Engage QEPs to assess BMPs for effectiveness of mitigation and compensation actions by threat to determine which are most useful/effective; identify highest priority items (given that they can't do it all); follow up with outreach to QEPs through professional associations (e.g., FORREX).
		Level I	Legal protection	5.02	Encourage bat conservation to Council of Forest Industries, Coastal Forest Products Association and Forest Practices Board. Promote consideration of bats into forest certification standards (e.g. FSC) as a way to improve forest management for bats (get someone from BCBAT on the council for

	Action Category	Priority	Topic	Action	Description
					certification and review of biodiversity indicators).
		Level I	Legal protection	5.03	Lobby government to implement WHF legislation (under FRPA) so that bat roosts are able to be identified and protected. This also applies to OGAA and CI-WHF's.
		Level I	Legal protection	5.04	Improve FRPA/OGAA protection (to have parity with SARA). E.g., recognize critical habitat, buffer forest cutting around rock roost features used by bats, etc.
		Level I	Conservation status assessment	5.05	Develop research task team to prioritize species- specific knowledge gaps. Run bat species through IUCN Threat calculator to identify main threats and gaps to fill, examine, and manage.
		Level I	SOPs/BMPs/Protocols	5.06	Complete BMPs; update RISC standards, using other protocols/practices (e.g., decontamination protocol, BMPs) as guidance.
		Level I	SOPs/BMPs/Protocols	5.07	Lobby responsible agencies and industry to adopt and implement existing conservation tools (i.e., BMPs for Mining, Wind Energy, Caving, and more as they are developed).
		Level I	Legal protection	5.08	Protect hibernacula, roosts, swarming sites etc. to aid recovery (i.e., WHAs, WHFs). Support a Cave and Karst Protection Act for BC (proposed).
		Level II	Conservation status assessment	5.09	Assess bat species federally (COSEWIC) and provincially as necessary.
		Level III	Legal protection	5.10	Look for synergies with existing protective legislation (e.g., migratory bird nest protection).

	Action Category	Priority	Topic	Action	Description
	6. Capacity - build capacity for actions promoting bat conservation	Level I	Communication	6.01	Create a single website as a go-to location for bat info in BC. (BCBAT →bcbat.ca, WNS info, and public health info-links, tie in with batwatch.ca) include resources like current research, outreach materials, document library.
		Level I	Communication	6.02	Identify and solicit MLAs and MPs and council members to be bat champions; BCBAT, WCSC, BC Community Bat Program to write to Ministers/premier. Individuals, regional programs, landowners to write to MLAs.
		Level I	Communication	6.03	Continue communication within BCBAT, including quarterly conference calls, bi-annual call with Alberta Bat, and invite national, international, and first nations representatives. Host an in-person meeting every one to two years.
		Level I	Training/Education	6.04	Publish new Bats of BC book (ie. updated Nagorsen, Brigham, Lausen, Hobbs).
		Level I	Training/Education	6.05	Promote technical training workshops for professionals (e.g. acoustic analysis, mist-netting, modelling, WNS detection, BioBlitz, updated RISC, etc.).
		Level I	Training/Education	6.06	Increase involvement of universities in bat research. Create a Chair position for BC (long-term). Identify currently available supervisors in BC (e.g., create a Bat Lab for BC) to train graduate students; recruit more grad students doing bat research.
		Level II	Communication	6.07	Engage industry, creating the bottom-up support from stakeholders.
		Level II	Communication	6.08	Attend key meetings (UBCM, PARF, WBWG biannual, WNS USFWS), and present when possible about the plight of bats.

	Action Category	Priority	Topic	Action	Description
		Level II	Communication	6.09	Work with health authorities to ensure accurate and consistent messaging regarding rabies and histoplasmosis.
		Level II	Communication	6.10	Identify and support representatives within BCBAT who will lead communication and articulate goals from the team, sitting in on applicable committees and calls with BC Community Bat Program, NABat, WBWG, universities, national WNS committee, ABAT, governments, etc.
		Level II	Data access	6.11	Identify funding, means, and location for long-term archiving of bat acoustic data (permissions, access).
		Level II	Data access	6.12	Create one data portal for submission of all BC bat data (where data are held). Make user-friendly data portals for sharing and storing data; develop protocols for how to use and submit data.
		Level II	Funding	6.13	Create a conservation grant fund (guided by BCBAT and administered by a charitable organization such as BCCF) and recruit donations to the fund from industry and private sources.
		Level II	Funding	6.14	Coordinate funding and applications. Identify, list and make available to the BCBAT group all of the existing funding sources for bat conservation, including federal, provincial, regional, local, private, philanthropy, crown source, industry, forestry, cattleman's, hydro, academic sources (e.g., NSERC).
		Level II	Training/Education	6.15	Find capacity/funding for dedicated provincial bat biologist (in provincial government).
		Level II	Training/Education	6.17	Make resources available to professional associations (eg. BCIA, CAB, ABCFP, etc.), including information, training (e.g., FORREX outreach).
		Level III	Communication	6.18	Identify reliable reps for all key organizations (e.g., to sit on committees, conference calls, etc.); connect with the adjacent jurisdictions. Work with

	Action Category	Priority	Topic	Action	Description
					WBWG to promote awareness of WBWG (e.g., WildLinks Conference).
		Level III	Communication	6.19	Coordinate with ABAT, and whitenose.org for sharing documents and information.
		Level III	Communication	6.20	Create an organizational chart of groups and clarify mandate of key bat groups (e.g. WBWG).
		Level III	Communication	6.21	Develop annotated bat bibliography of all existing research papers and make accessible to group.
		Level III	Data access	6.22	Develop a reliability index (specifically acoustic ID and spatial metadata), including QA/QC requirements and standardized data collection protocols. This can accompany acoustic records in provincial database.
		Level III	Funding	6.23	Increase provincial funding for bat conservation through various methods including treasury board submission.
		Level III	Funding	6.24	Recruit new funders to support bat conservation (e.g., by giving presentations to potential funders, creating a funders page on the BCBAT website, and leveraging ecosystem services as a way to engage industry.
		Level III	Funding	6.26	Send BCBAT Action Plan (summary high level) to funding organizations and government as guidance for their funding decisions.
		Level III	Funding	6.27	Identify opportunities to collaborate with other taxonomic groups / projects to gain access to additional funding sources.
		Level III	Funding	6.28	Develop bursaries or funding or volunteers to assist landowners with roost mitigation.
		Level III	Funding	6.29	Build a bat equipment inventory (detectors, nets etc.) within government that can be shared across province to provide in-kind support for

	Action Category	Priority	Topic	Action	Description
					monitoring and research projects.
		Level III	Training/Education	6.30	Lobby Health Authorities to provide free (or discounted) rabies shots as they do with other fields (e.g., for field of veterinary medicine).
		Level III	Training/Education	6.31	Provide training workshops/materials for citizen scientists, including naturalist groups so they may better participate in monitoring.
		Level III	Training/Education	6.32	Support bat educator workshops to increase public outreach, e.g. camp counsellors, park interpreters, conservation officers.
		Level III	Training/Education	6.33	Define skill sets of BCBAT.
		Level III	Training/Education	6.34	Train wildlife rehabbers to take bats and submit to CWHC.
		Level III	Training/Education	6.35	Provide media training for bat professionals.

Further Detail and Future Iterations

This Action Plan will remain a living document and will be revisited by BCBAT in subsequent years. Priorities and details of actions will undoubtedly evolve to respond to changing threats, in particular the spread of WNS, to changes in funding sources, policies, and more. In particular, further details for Table 2, especially Level I actions, will be further developed to include the following information:

Piecing Together the Details: Implementation

The immediate goal following the posting of this Action Plan is to populate details for accomplishing Level I activities, and to address lower priority actions over the coming months and years, as organizations/agencies and funding sources are identified to champion each task. Such detailed planning will enable coordination among BCBAT members and others engaged in carrying out action items identified in this plan.

This document and details relating to the action items will be posted and updated on BCBAT's website: www.bcbat.ca, under the Publications Section. This Action Plan and the progress made on this plan will be reviewed annually by BCBAT until 2020 when a new plan may need to be written.

Literature Cited

Boyles, J.G., Cryan, P.M., McCracken, G.F., Kunz, T.H. 2011. Economic importance of bats in agriculture. Science 332, 41–42.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2014. Assessment and status report on the little brown myotis, *Myotis lucifugus,* northern myotis, *Myotis septentrionalis,* tri-colored bat, *Perimyotis subflavus,* in Canada. Species at Risk Public Registry. Available at: http://www.sararegistry.gc.ca/document/default_e.cfm?documentID=1323. Accessed: 14 September 2016.

Environmental Assessment Office. 2013. Guideline for the selection of valued components and assessment of potential effects. Available: http://www.eao.gov.bc.ca/pdf/EAO_Valued_Components_Guideline_2013_09_09.pdf

Lausen, C.L., Burles, D., Blejwas, K., Nagorsen, D., Govindarajulu, P. and Friis, L. 2016. Long-eared bat taxonomy: Nuclear genetic evidence eliminates the species status of Keen's Myotis (*Myotis keenii*). Joint Meeting of Society for Northwest Vertebrate Biology and Washington and Idaho Chapters of The Wildlife Society, Coeur d'Alene, Idaho, 23-24 Feb. 2016.

Loeb, Susan C.; Rodhouse, T.J.; Ellison, L.E.; Lausen, C.L.; Reichard, J.D.; Irvine, K.M.; Ingersoll, T.E.; Coleman, J.T.H.; Thogmartin, W.E.; Sauer, J.R.; Francis, C.M.; Bayless, M.L.; Stanley, T.R.; Johnson, D.H. 2015. A plan for the North American Bat Monitoring Program (NABat). Gen. Tech. Rep. SRS-208. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. Available: http://www.treesearch.fs.fed.us/pubs/48442.

Nagorsen, D.W. and Brigham, R.M. 1993. Bats of British Columbia. Royal BC Museum Handbook. Victoria, BC.

Ommundsen, P., Lausen, C., and Matthias, L. *Submitted*. First acoustic record of the Brazilian free-tailed bat (*Tadarida brasiliensis*) in British Columbia. Northwestern Naturalist.

US Fish and Wildlife Service (US FWS). 2016. White-nose syndrome: a devastating disease of North American bats. Available at: http://www.fws.gov/WhiteNoseSyndrome/. Accessed: 12 November 2016.

Wilson, J.M., Barclay, R.M.R. 2006. Consumption of Caterpillars by Bats During an Outbreak of Western Spruce Budworm. The American Midland Naturalist 155(1):244-249.

APPENDIX I. Chase meeting attendees.

Group Photo: Members of BCBAT present at the Action Planning meeting in Chase, BC on 16-17 Sept. 2016.

Back row left to right: Jared Hobbs, Purnima Govindarajulu, Mandy Kellner, Doug Burles, Karen Hodges, Jason Rae, Christian Engelstoft, Tanya Luszcz, Fawn Ross, Michelle Evelyn, Chris Currie, Lorraine Andrusiak. Front row left to right: Felix Martinez, Cori Lausen, Aimee Mitchell, Juliet Craig, Susan Holroyd, Susan Dulc, Patrick Burke. Laying at front: Leigh Anne Isaac.

APPENDIX II. Acknowledgements.

A. Individuals who developed this Action Plan; **B**. Sponsors of the Chase meeting and other acknowledgements.

Name	Affiliation
Lorraine Andrusiak	SNC-Lavalin
Carita Bergmann	Parks Canada, Gwaii Haanas
Patrick Burke	South Coast Bat Conservation Society
Doug Burles	Coordinator Thompson Region Community Bat Program, independent researcher
Juliet Craig	Silverwing Ecological Consulting, BC Community Bat Program and Kootenay Community Bat Project
Chris Currie	South Coast Bat Conservation Society
Susan Dulc	Aurora Consulting
Christian Engelstoft	Habitat Acquisition Trust
Michelle Evelyn	Sunshine Coast Wildlife Project
Purnima Govindarajulu	BC Min. of Environment
Ingebjorg Jean Hansen	Independent Biologist
Jared Hobbs	Hemmera Consulting
Karen Hodges	University of British Columbia - Okanagan
Susan Holroyd	Alberta Community Bat Program, Calgary, AB
Leigh Anne Isaac	VAST Resource Solutions
Mandy Kellner	BC Community Bat Program
Cori Lausen	Wildlife Conservation Society Canada
Tanya Luszcz	Partners in Flight
Felix Martinez	South Coast Bat Conservation Society
Laura Matthias	Salt Spring Island Conservancy
Aimee Mitchell	Athene Consulting
Peter Ommundsen	Salt Spring Island Conservancy
Brian Paterson	Independent Biologist
Jason Rae	Wildlife Conservation Society Canada
Fawn Ross	Associated Environmental Consultants Inc.
Mike Sarell	Ophiuchus Consulting
Elizabeth Thunstrom	Wildlife Rescue Association BC (emeritus)

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