Session 3

Where We Are - Proponent Perspectives

- Blair Shoniker, GHD, Facilitator
- Melissa Mayhew, Nuclear Waste Management Organization (NWMO)
- Toby James Thorne, Toronto Zoo
- Evan Laye, Graduate Student UBC CEAR (*slides will be presented by Dr. Kevin Hanna*)

nwmo

NUCLEAR WASTE MANAGEMENT ORGANIZATION
SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES

Collectively setting the research agenda

An uncommon pathway for strengthening IA practice

Melissa Mayhew, Toby Thorne, Evan Laye,
Bridget Sparrow Scinocca, Allan Webster, Kevin Hanna, Joanne Jacyk

Impact Assessment and Project Appraisal, 29(2), June 2011, pages 159–165
DOI: 10.3152/146155111X12913679730557; http://www.ingentaconnect.com/content/beech/iapa

Professional practice

A proposal for further strengthening science in environmental impact assessment in Canada

Lorne A Greig and Peter N Duinker

We observe ongoing weaknesses in the quality of science underpinning environmental impact assessment (EIA) in Canada. This is frustrating because approaches for strong scientific practice in EIA were published decades ago. A major failing has been the lack of scientific support from outside the EIA practitioner community. We argue for a re-conception of science associated with EIA that includes a rigorous scholarship of application inside EIA and a vigorous scholarship of integration outside it. Cases of exemplary organizational structures and science applications in the Canadian forest sector are given. To turn EIA from the often bitter battleground of shallow impact debates to an enterprise of strong accumulation of effects knowledge, we urge the relevant communities of researchers and practitioners to become embedded communities of practice and reform the way science contributes to EIA.

Keywords: science, environmental impact assessment, EIA, environmental assessment, Canada

About the NWMO

- Formed in 2002 as required by *Nuclear Fuel Waste Act*
- Charged with developing and implementing national solution for used nuclear fuel
- Funded by Canada's nuclear energy corporations
- Project lifecycle cost of ~$24B (CAD) over ~150 years
- Trust Funds established, fully funded for current used fuel inventory
- Board of Directors, Independent Advisory Council

Our mission is to develop and implement collaboratively with Canadians, a management approach for the long-term care of Canada's used nuclear fuel that is socially acceptable, technically sound, environmentally responsible, and economically feasible.

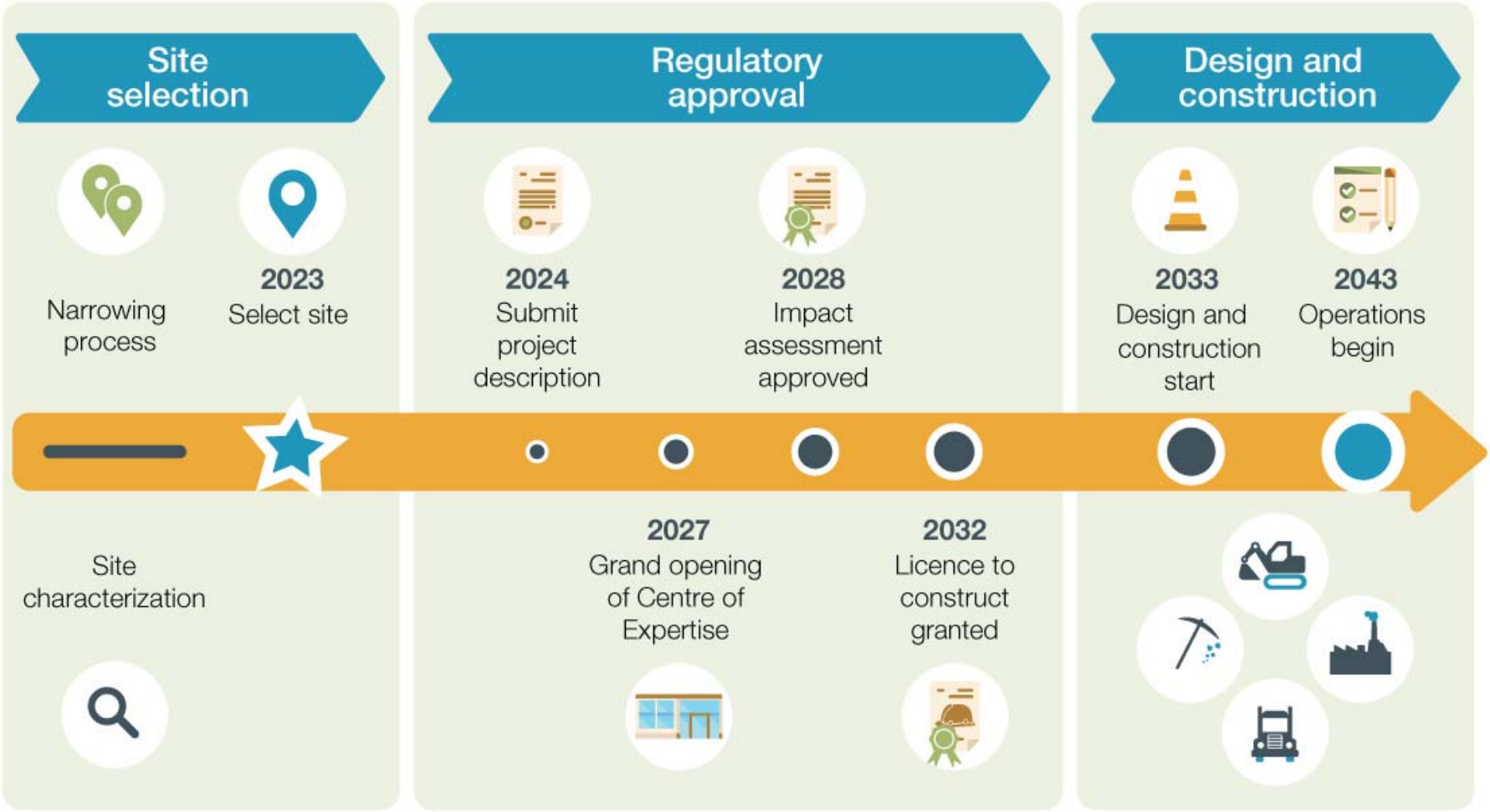
Technical method

- Centralized containment and isolation of used nuclear fuel in a deep geological repository
- Continuous monitoring
- Potential for retrievability
- *Optional* step of temporary storage (not included in current implementation plan)[1]

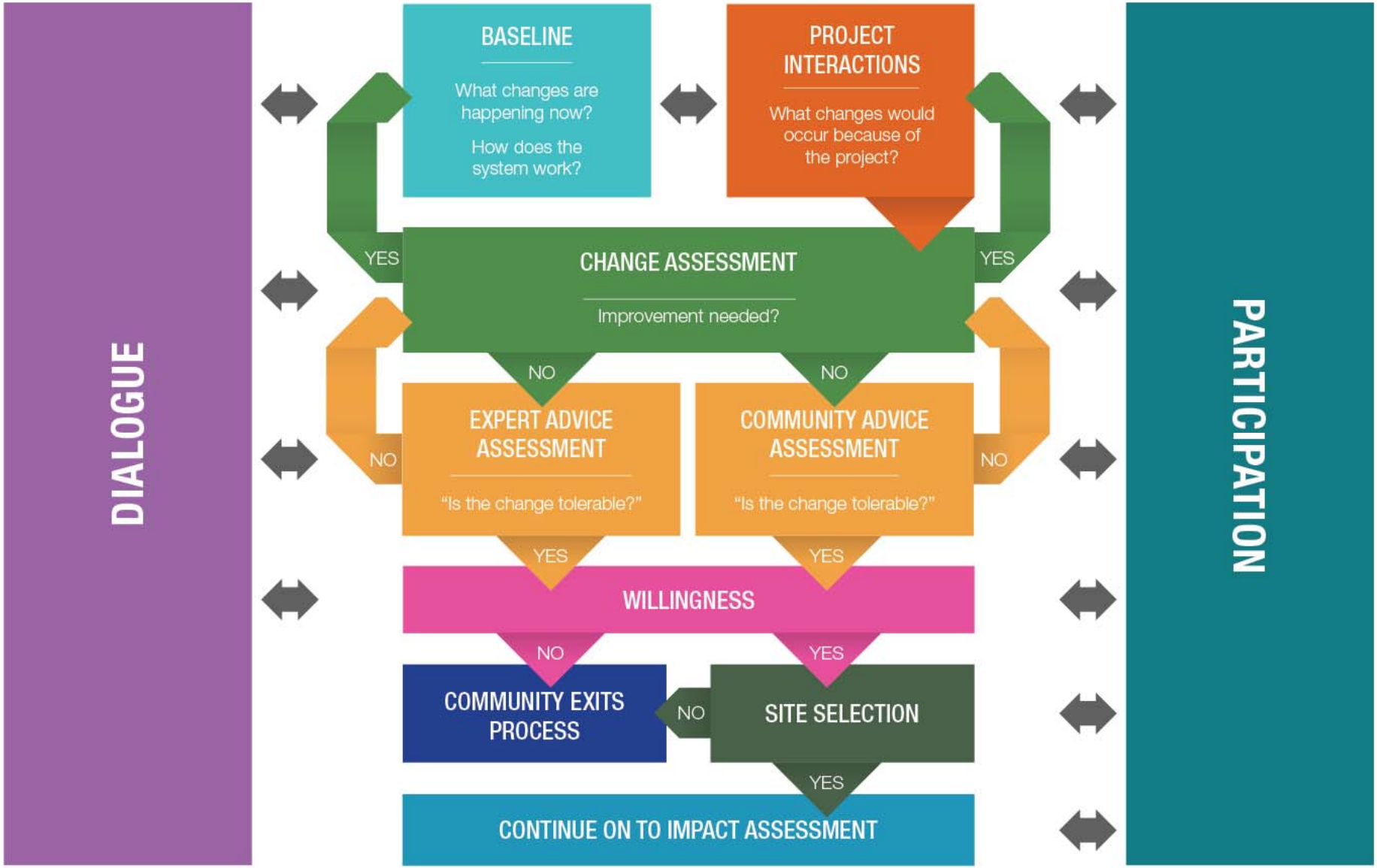
[1] We do not expect to need the optional step of temporary storage as used fuel will remain at interim storage facilities until the repository is operational.

Management system

- Flexibility in pace and manner of implementation
- Phased and adaptive decision-making
- Responsive to advances in technology, research, Indigenous Knowledge, and societal values
- Open, inclusive and fair siting process to seek an informed and willing host
- Sustained engagement of people and communities throughout implementation


Site selection
Regulatory approval
Design and construction
Narrowing process
2023
Select site
2024
Submit project description
2028
Impact assessment approved
2033
Design and construction start
2043
Operations begin
Site characterization
2027
Grand opening of Centre of Expertise
2032
Licence to construct granted

MARCH 2021


DIALOGUE
BASELINE
What changes are happening now?
How does the system work?
PROJECT INTERACTIONS
What changes would occur because of the project?
YES
CHANGE ASSESSMENT
Improvement needed?
YES
NO
NO
EXPERT ADVICE ASSESSMENT
"Is the change tolerable?"
COMMUNITY ADVICE ASSESSMENT
"Is the change tolerable?"
NO
NO
YES
YES
WILLINGNESS
NO
YES
COMMUNITY EXITS PROCESS
NO
SITE SELECTION
YES
CONTINUE ON TO IMPACT ASSESSMENT
PARTICIPATION

What People Told Us

Biodiversity Matters

- Indigenous Knowledge holders, western science experts & local people should work together
- Consider new technology and advanced monitoring techniques
- Trust issues
- Need a regional approach




All Photos by Heather Bears

Collaboration in Action

Biodiversity Assessment Goals

1) Provide inputs to a model(s) of the interacting natural systems that predict how key biodiversity values would be expected to change over the life of the APM Project with and without the APM Project, including considerations of both temporary and long-term effects;

2) Provide information that reduces uncertainty about potential APM Project effects on biodiversity values; and,

3) Provide a strong foundation for an adaptive environmental management program that seeks to achieve “no net loss” and opportunities for “net gain” in biodiversity values.

Research
Engagement
Conservation

Long-term funding offered by NWMO allows Toronto Zoo's Native Bat Conservation Program to focus on addressing core research questions that support meaningful conservation outcomes

Ontario Bats | Species

Little Brown Myotis

Provincially Endangered

Federally Endangered

Tri-colored Bat

Provincially Endangered

Federally Endangered

Northern Myotis

Provincially Endangered

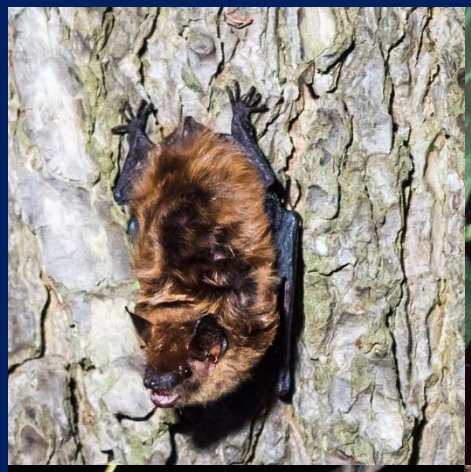
Federally Endangered

Eastern Small-footed Myotis

Provincially Endangered

Ontario Bats | Species

Big Brown Bat



Eastern Red Bat

Assessment 2022...

Hoary Bat

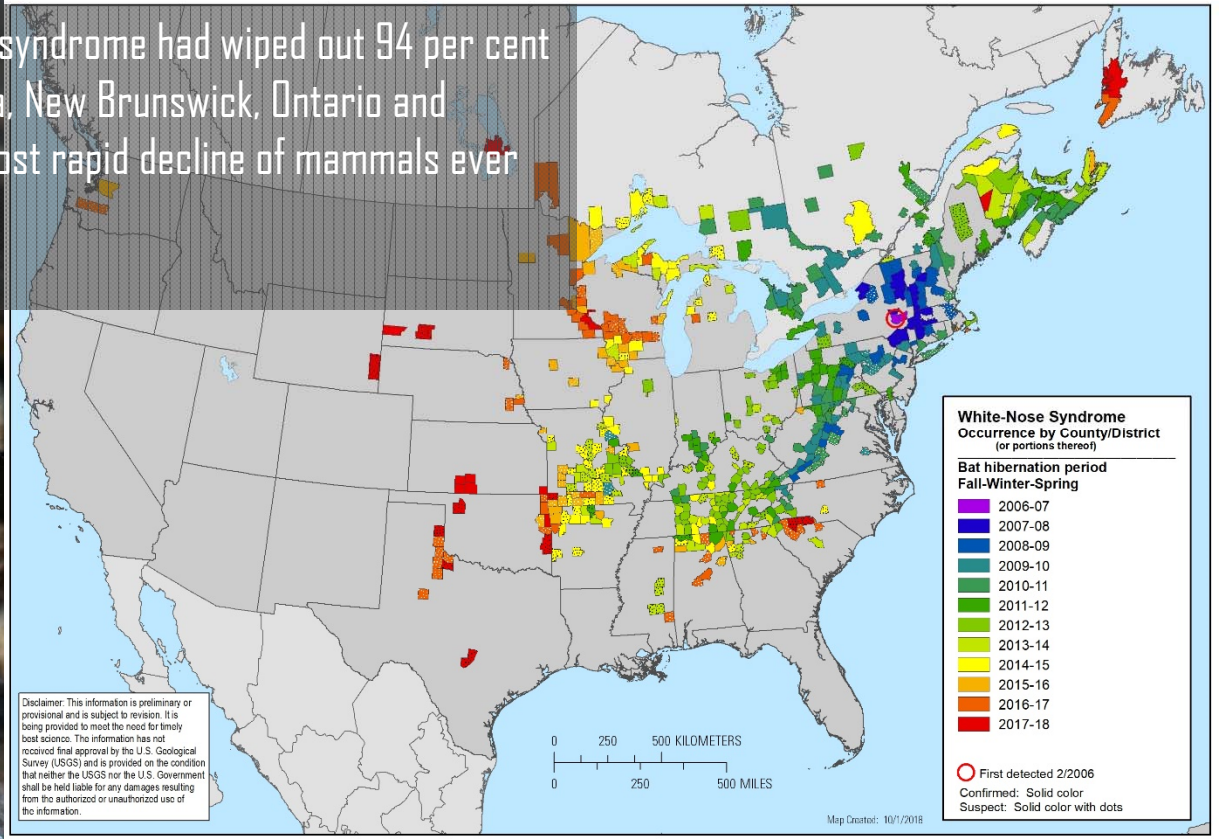
Assessment 2022...

Silver-haired Bat

Assessment 2022...

Ontario Bats | Threats | White Nose Syndrome

"Within three years of discovery, white-nose syndrome had wiped out 94 per cent of hibernating little brown bats in Nova Scotia, New Brunswick, Ontario and Quebec. Some ecologists consider this the most rapid decline of mammals ever documented"



Citation: White-nose syndrome occurrence map - by year (2018). Data Last Updated: 10/1/2018. Available at: https://www.whitenosesyndrome.org/resources/map.

World Wildlife Fund Canada. 2017. *Living Planet Report Canada: A National Look at Wildlife Loss.*

Ontario Bats | Threats | Wind Power

Friedenberg, Nicholas A., and Winifred F. Frick. 2021. "Assessing Fatality Minimization for Hoary Bats amid Continued Wind Energy Development." *Biological Conservation* 262: 109309.

Ontario Bats | Threats | Habitat Loss

Jung, Thomas S. et al. 2014. "Concluding Remarks: What Do We Need To Know About Bats in Northwestern North America?" *Northwestern Naturalist* 95(3): 318–30.

Ontario Bats | Threats | Climate Change

Sherwin, Hayley a., W. Ian Montgomery, and Mathieu G. Lundy. 2012. "The Impact and Implications of Climate Change for Bats." *Mammal Review* 43(3): 171–82.

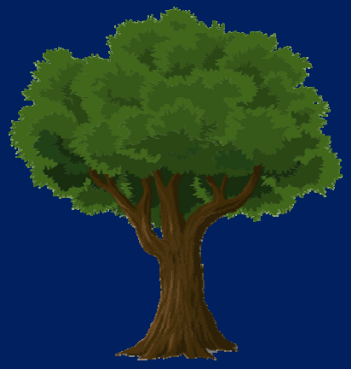
4 species given **Endangered** status in the past 10 years

3 more species to be assessed in 2022

How to Help? | Priorities

Populations → Distribution → Critical Habitat → Impacts

Who? Where? What? How?



Environment and Climate Change Canada. 2018. *Recovery Strategy for the Little Brown Myotis (Myotis lucifugus), the Northern Myotis (Myotis septentrionalis), and the Tri-Colored Bat (Perimyotis subflavus) in Canada.* Environment and Climate Change Canada.

How to Help? | Priorities

Populations → Distribution → Critical Habitat → Impacts

Research → Disseminate → Apply

Research	Disseminate	Apply
Natural History	Reports	Recovery Actions
Monitoring	Peer-review Papers	Regulatory Changes
Experimental	Science Communication	**Impact Assessments**
Traditional Knowledge	Public Outreach	

Stakeholders & Rights-holders

Ontario Species at Risk

Our Toronto Zoo - Connecting people, animals and conservation science to fight extinction.

Research, Education and Application

Species Recovery Branch – In situ actions to achieve concrete conservation outcomes for locally at-risk species

We Are:

- Taxonomic experts
- Self-directed
- Externally funded*, with in-kind support from Toronto Zoo

*mostly

We are not:

- An academic lab
- Consultants

ete conservation outcomes

ntific evidence is fundamental for guiding effective conservation action to curb biodiversity loss. Yet, rch resources in conservation are often wasted due to biased allocation of research effort, irrelevant or riority questions, flawed studies, inaccessible research outputs, and biased or poor-quality reporting."

T. et al. 2021. "Avoiding Wasted Research Resources in Conservation Science." *Conservation Science and Practice* 3(2).

tively setting the agenda?

"it would be impractical to make a valid assessment of how the APM Project could cumulatively impact these bats with current understanding"

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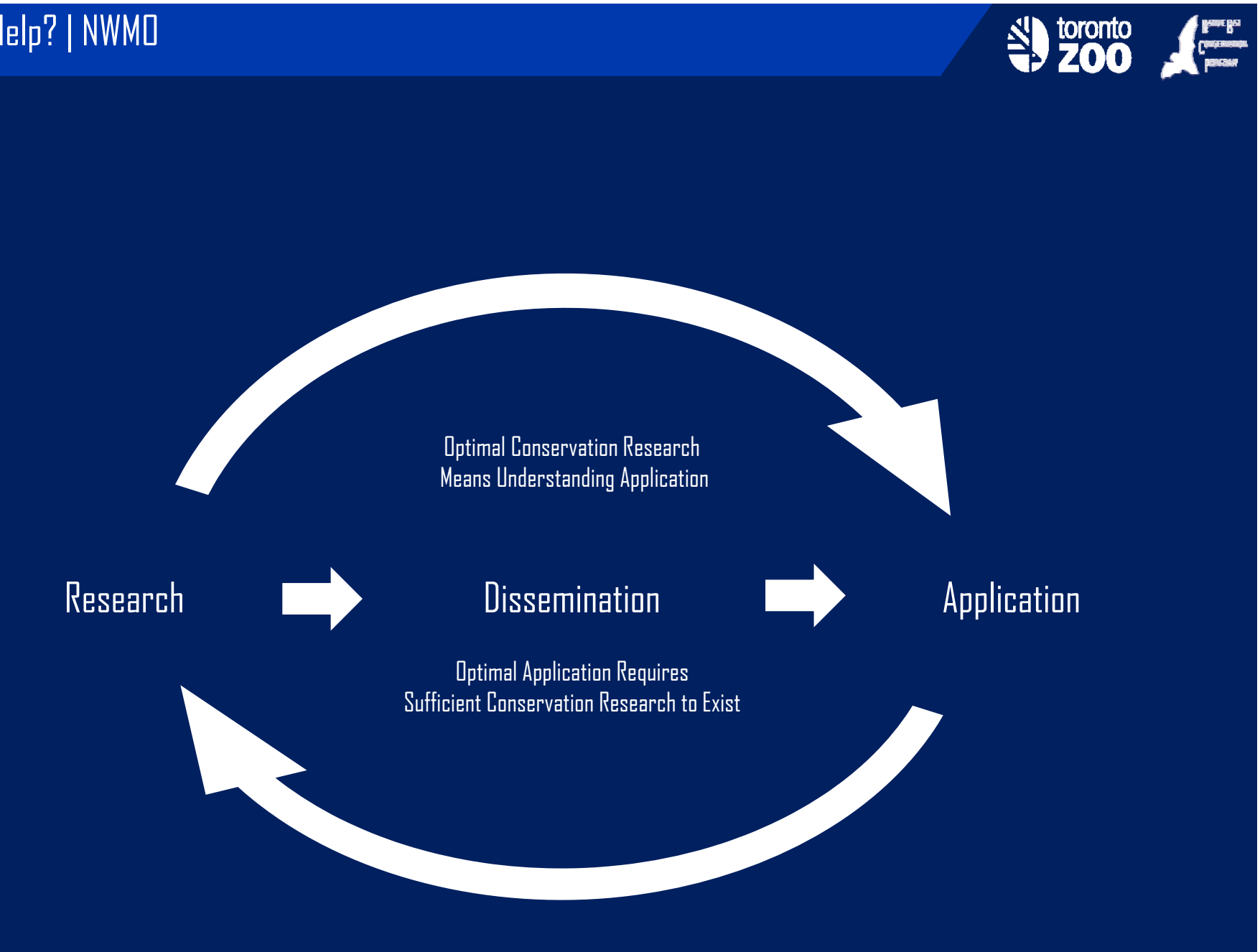
pulations	→	Distribution	→	Critical Habitat	→	Impacts
Who?)		(Where?)		(What?)		(How?)

ssa, and Jessica Perritt. 2020. "Leveraging Impact Assessment for Satisfactory Project Outcomes: Benefits of Early Planning and Participatory ing." *Impact Assessment and Project Appraisal*


Optimal Conservation Research
Means Understanding Application
Research
Dissemination
Application
Optimal Application Requires
Sufficient Conservation Research to Exist

vities

s & Results

toronto ZOO

NATIVE BAT CONSERVATION PROGRAM

hes | Challenges in Monitoring Bats

are nocturnal

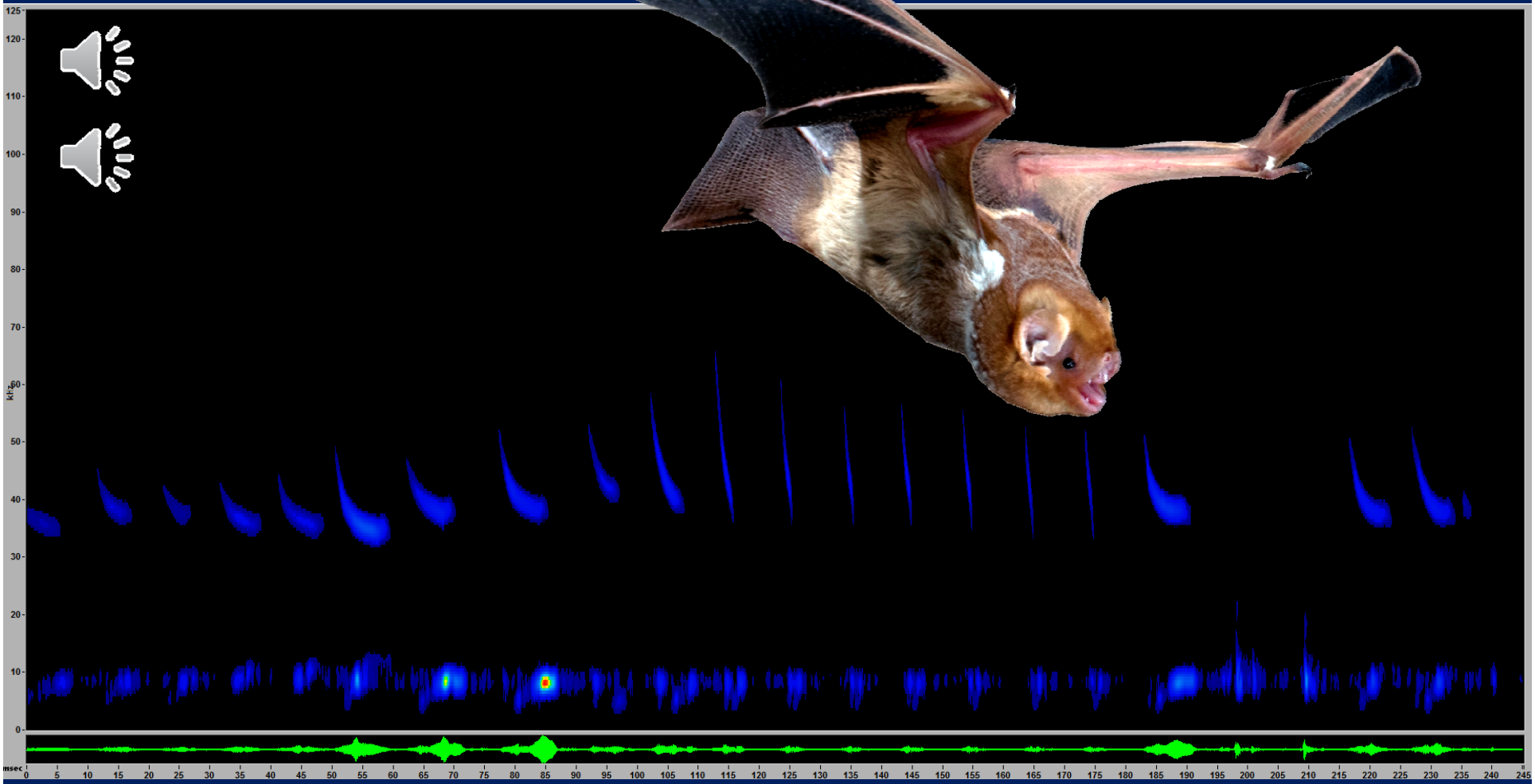
Bat behaviour varies by species

Bat activity varies seasonally

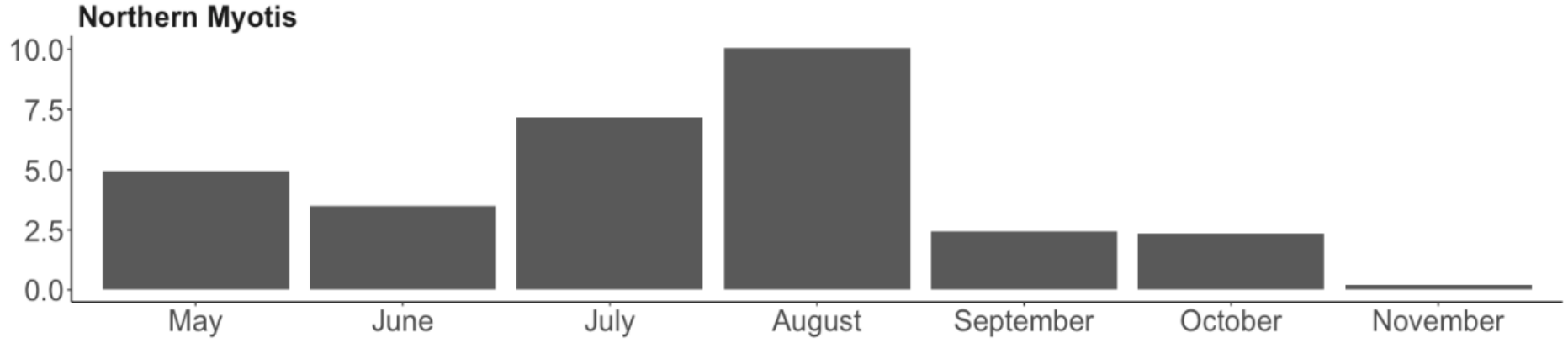
Bat roosts are difficult to locate and are ephemeral

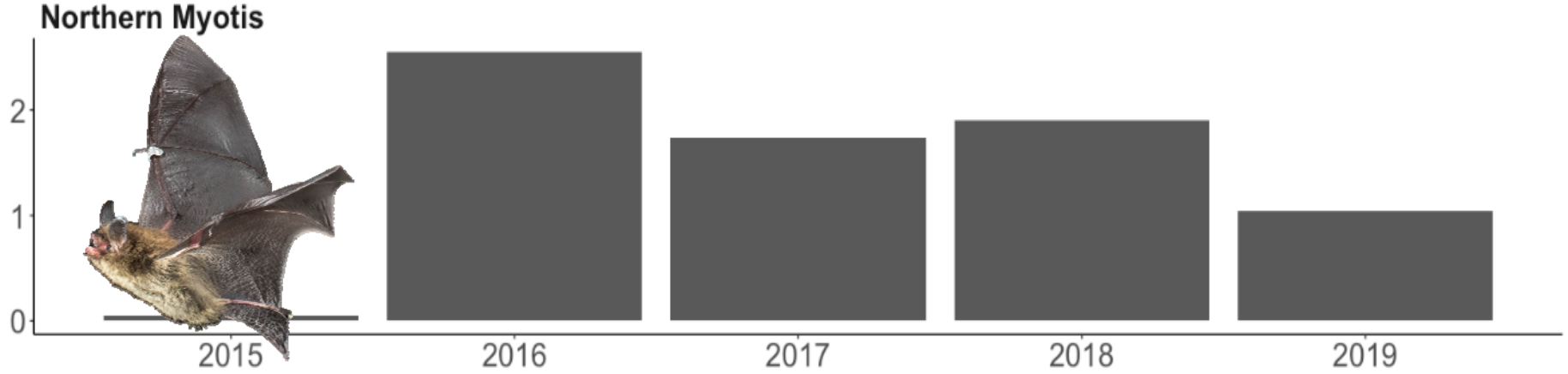
Handling and monitoring bats requires expertise

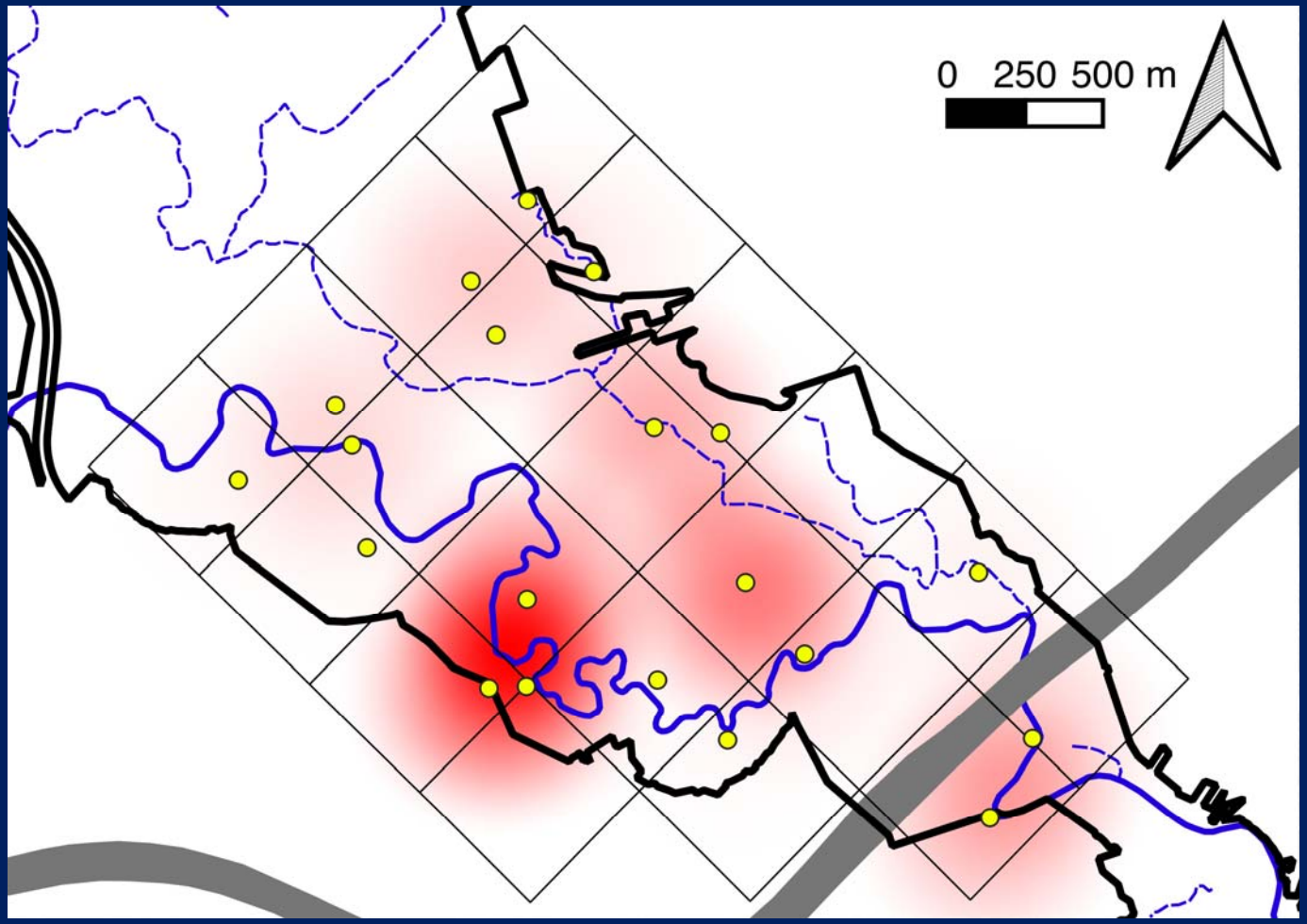
Approaches | Acoustics



Approaches | Acoustics






0 250 500 m

Approaches | Activities | Community Science Pilot Project

Who?

Focusing our efforts on people who encounter many different types of Ontario bat species on a regular basis

Where?

- Private Property
- Saugeen Valley Conservation Authority
- Maitland Valley Conservation Authority

When?

Project runs from May through October when bats are active

1) Project Design and Set Up

Provide two volunteer groups with monitoring equipment and instructional package

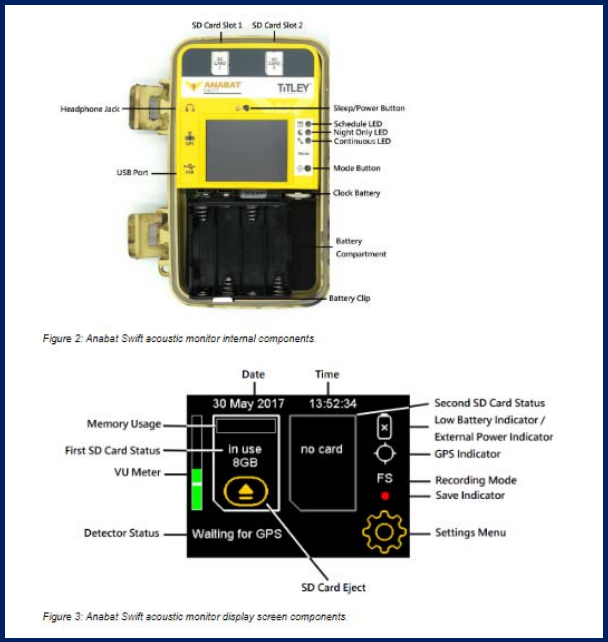


Figure 2: Anabat Swift acoustic monitor internal components.

Figure 3: Anabat Swift acoustic monitor display screen components.

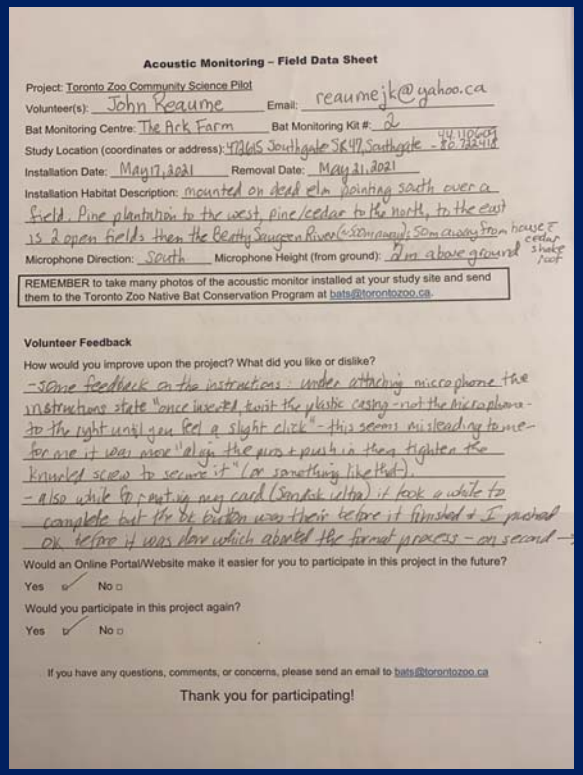
Set-up monitoring schedule where volunteers could sign up to monitor in 4-night increments.

July						
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
27	28	29	30	1	2	3
				Lloyd Holbrook	Lloyd Holbrook	Name:
				Private Property	Private Property	Study Location:
				4	5	Day:
4	5	6	7	8	9	10
Name:	John Reaume	John Reaume	John Reaume	John Reaume	John Reaume	Name:
Study Location:	Private Property near Holstein	Private property near Holstein	Private properth near Holstein	Private property near Holstein	Private property near Holstein	Study Location:
Day:	1	2	3	4	5	Day:
11	12	13	14	15	16	17
Name:	Lloyd Holbrook	Lloyd Holbrook	Lloyd Holbrook	Lloyd Holbrook	Lloyd Holbrook	Name:
Study Location:	Private Property	Private Property	Private Property	Private Property	Private Property	Study Location:
Day:	1	2	3	4	5	Day:
18	19	20	21	22	23	24
Jim Roberts	Jim Roberts	Jim Roberts	Jim Roberts	Jim Roberts	Jim Roberts	Jim Roberts
Private Property Blair's Grove	Private Property Blair's Grove	Private Property Blair's Grove	Private Property Blair's Grove	Private Property Blair's Grove	Public Property Ripley Botanical Garden	Public Property Ripley Botanical Garden
1	2	3	4	5	1	2
25	26	27	28	29	30	31
Jim Roberts	Jim Roberts	Jim Roberts	Name:	Name:	Name:	Name:
Public Property Ripley	Public Property Ripley	Public Property Ripley	Study Location:	Study Location:	Study Location:	Study Location:

2) Data Collection

Monitor Placement

Field Datasheet



Acoustic Monitoring – Field Data Sheet

Project: Toronto Zoo Community Science Pilot
Volunteer(s): John Keaume Email: reaumejk@yahoo.ca
Bat Monitoring Centre: The Ark Farm Bat Monitoring Kit #: 2
Study Location (coordinates or address): 9736S Southgate SR 47, Southgate - 44.110609, -80.722418
Installation Date: May 17, 2021 Removal Date: May 21, 2021
Installation Habitat Description: mounted on dead elm pointing south over a field. Pine plantation to the west, pine/cedar to the north, to the east is 2 open fields then the Beatty Saugeen River (~50m away); 50m away from house, cedar shake roof
Microphone Direction: South Microphone Height (from ground): 2m above ground

REMEMBER to take many photos of the acoustic monitor installed at your study site and send them to the Toronto Zoo Native Bat Conservation Program at bats@torontozoo.ca.

Volunteer Feedback

How would you improve upon the project? What did you like or dislike?
- some feedback on the instructions: under attaching microphone the instructions state "once inserted, twist the plastic casing - not the microphone - to the right until you feel a slight click" - this seems misleading to me - for me it was more "align the pins + push in then tighten the knurled screw to secure it" (or something like that).
- also while formatting my card (Sandisk ultra) it took a while to complete but the 32 bottom was there before it finished + I pushed OK before it was done which aborted the format process - on second

Would an Online Portal/Website make it easier for you to participate in this project in the future?
Yes ✓ No ☐

Would you participate in this project again?
Yes ✓ No ☐

If you have any questions, comments, or concerns, please send an email to bats@torontozoo.ca

Thank you for participating!

3) Data Analysis and Sharing of Results

SD cards containing acoustic data is sent to the Toronto Zoo for analysis and reports are returned to volunteers informing them of how many bat species they monitored during their sampling effort

Community Science Bat Monitoring Pilot
Preliminary Results for:
Janice Gibson Site 3 Report

Prepared by:
Toronto Zoo Native Bat Conservation Program
Auto-report V1.0

About This Document

Thank you for participating in the 2021 pilot Community Science bat monitoring project by the Toronto Zoo! This report is intended to provide fast feedback about the bats detected on your property. This document was automatically generated from available data on 2021-09-02, and is intended to provide a preliminary summary. Full verification of species identifications, and further analysis of the results have not yet taken place and will be communicated at a later date. Please use caution while interpreting these results, and consult with the Toronto Zoo's Native Bat Conservaiton Staff with any questions.

1 Data Collection and Analysis

One ultrasonic recorder was deployed over a period of 2 nights between 2021-08-07 and 2021-08-09. Specific location dadta is included in Table 1 below.

Table 1. Location names and coordinates for ultrasonic recorders included in these data.

Location	Latitude	Longitude	Nights Monitored
Janice Gibson Site 3	44.10633	-81.72144	0

Data were processed by Toronto Zoo Native Bat Conservation Program staff. After initial organisation and labelling the files were scrubbed to remove 'noise' files without any potential bat signals. The remaining files were then assigned species identifications using an automated classifier. This classifier is effective, but not infallible, and manual verification is required before these results are considered final.

2 Results

A total of 813 acoustic observations observations of 5 species were detected at this location. The total number of observations for each species at each monitoring location are given in Table 2.

Table 2. Total species observations at each monitoring location.

Species	Janice Gibson Site 3
Big Brown Bat	158
Eastern Red Bat	24
Hoary Bat	594
Silver-haired Bat	8
Eastern Small-footed Myotis	0
Little Brown Myotis	29
Northern Myotis	0
Tri-colored Bat	0

Bat activity varied between nights. Nightly activity of each species at each site throughout the monitoring period is presented in Figure 1 below. Please note that the number of observations cannot be directly compared between species: this is because some bats are more easily observed than others (for example loud, low-frequency bats are easier to detect than quiet, high-frequnecy bats).

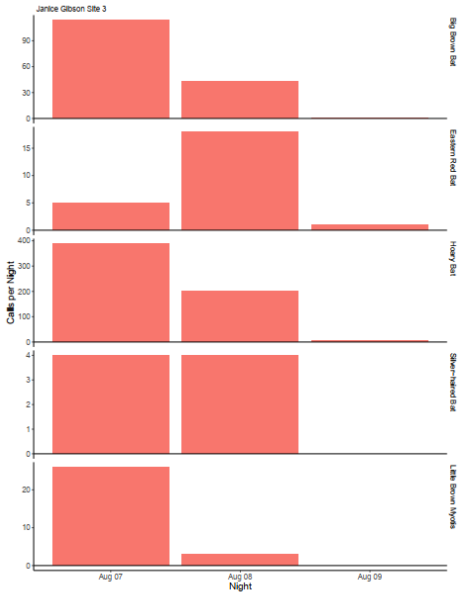


Figure 1. Nightly bat observations (coloured bars) by species and monitoring location.

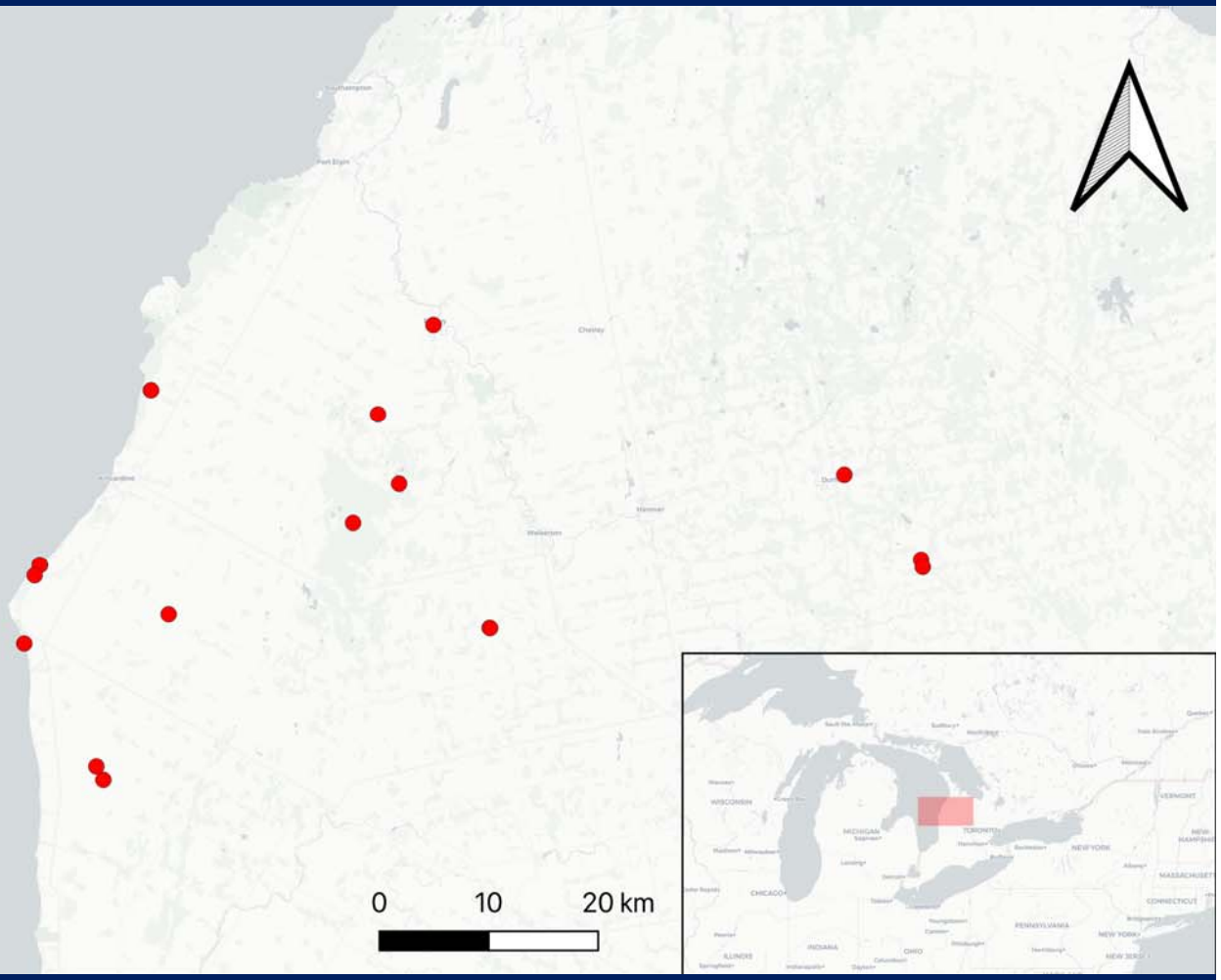
4) Preliminary Results

15 Volunteers Engaged

18 Sites Sampled

116 Nights Monitored

7 Species Identified



re Next?

tion & Design

Purpose: fill knowledge gaps to support better decision making and define effective conservation approaches

Likely* Focal Directions:

1) Doing better acoustics
2) miniMOTUS foraging tracking

!

Targeted Research Questions

Results Published,
Findings Applied

*subject to change

tively setting the agenda

NATIVE BAT CONSERVATION PROGRAM

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Conservation is a **team sport.**

Evan Laye
Graduate Student, MSc
University of British Columbia – Okanagan Campus
UBC Advisor: Dr. Kevin Hanna

OCTOBER 2021

UESTIONS AND AREAS OF INTEREST GUIDING THESIS EVELOPMENT

Can small spaces be significant?

- Can project-level mitigation and/or monitoring influence positive effects at the larger local or regional scale?
- What are the impacts of projects with small geographic footprints at an ecosystem-level; how do we measure this?

mpact assessment as a tool for advancing regulatory objectives.

- Can Project analysis/mitigation/monitoring be designed to achieve targets identified within species at risk recovery strategies?

ntersection between biodiversity/conservation policy and best practices with Indigenous knowledge and land management practices.

WHY DID THIS GRADUATE STUDY OPPORTUNITY APPEAL TO ME?

The NWMO approach to the *Impact Assessment Act* submission process is unique, thorough, and possessing a willingness to explore beyond the conventional idea of what impact assessment is/is not.

Opportunity to:

- Contribute to positive change in Canadian impact assessment processes on a significant project.

- Expand knowledge and understanding of impact assessment, build professional capacity, and acquire new technical skills.

- Collaborate with passionate individuals and organizations.

WHAT DO WE HOPE TO ACCOMPLISH?

- Meaningful contribution to the NWMO submission for the Impact Assessment Agency of Canada related to biodiversity protection/promotion.

- Highlight potential efficiencies for proponents through collaboration with academic institutions on their impact assessment act submissions.

- Explore a narrative that views academic engagement as an important step in the assessment process.

WHY ARE COLLABORATIONS BETWEEN ACADEMICS AND PROPONENTS IMPORTANT FOR IMPACT ASSESSMENT?

Impact assessment in Canada is undergoing regulatory and methodological changes

- E.g. *Impact Assessment Act,* increased visibility/inclusion of Indigenous and community knowledge.

Collaboration between academic and industry/proponents is critical to navigating the evolving impact assessment landscape.

Academics can be an important resource for both proponents and governments in understanding and addressing potential adverse impacts at a project, local and regional scale.

- E.g. development of site (or industry) specific mitigation through research initiatives, evaluating existing environmental conditions of a region, informing environmental policy and legislation.

Reflections

Support & Participate in Research Partnerships

Reduce Uncertainty & Build Confidence

Focused Assessment & Targeted Follow-up