

The Nature Conservancy of Canada

PERMIT TO CONDUCT RESEARCH

To: Christine Bahlai Ph.D., Assistant Professor, Department of Biological Sciences, Kent State University

Permit Number: AG-ON-2019-153721

Annual/ interim report due: January 31st, 2020; January 31st, 2021

Final report due: January 31st, 2022

Based on the information contained in the attached Application to Conduct Research, permission is granted to the above-named applicant to conduct the research on the property(ies), during the term, for the purpose(s) and subject to the terms and conditions described in the Application.

Public liability insurance is not required. ***(If NCC requires liability insurance, amend accordingly and insert minimum amount of coverage required e.g. \$1M)***

Dated at 8:20 this 5 day of 04 20 19

The Nature Conservancy of Canada

Approved via electronic workflow by

Name of
NCC
approver: Mhairi McFarlane

Position: Director of Science and
Stewardship, Ontario Region

NCC PERMIT CONTACT (Usually subregional NCC staff):

Esme Batten

Coordinator, Conservation Biology – Saugeen Bruce Peninsula

519-373-4620

Esme.batten@natureconservancy.ca

THE NATURE CONSERVANCY OF CANADA

APPLICATION TO CONDUCT RESEARCH

The Nature Conservancy of Canada is a non-profit, science-based organization. We strive to encourage research on the majority of our properties, and welcome research applications from all sectors of science. Our research permit process is designed to ensure that we have a record of the work that has been conducted on our properties, are aware of who is accessing properties and can ensure that biodiversity is protected.

NCC will provide the researcher with necessary background information as appropriate, including information on other activities that may be taking place on the property (e.g. habitat management, donor tours, hunting.). We may also be able to provide you with existing property data, including species lists, maps, etc, and, in some cases, may even be able to help you with fieldwork. Please contact the relevant NCC staff person if you require any assistance. Please accept our best wishes in your research endeavours.

Instructions

1. Fill out this form with as much relevant detail as possible, including the section regarding insurance (see page 4. If you are affiliated with a university or college, your institution may be able to provide insurance);
2. Save it as a **word document** in the format: "Surname NCC Research Permit" and send the word document by email to the NCC contact person for review;
3. **If your permit is approved**, you will receive the word document back, containing an NCC signature. Please sign this document, and return it to the relevant contact person via email, fax or mail;
4. If the application is approved, the permit with this application must be carried when working on NCC property.
5. Please take note of the due date of your interim (if applicable) and final reports. Discuss the structure of your report with your NCC contact person, but at minimum, we appreciate an indication of when and how often you visit which properties, and what samples were taken (see "Conditions" on page 3). NCC would also greatly welcome a brief (paragraph) summary of your work in plain language which would be suitable for inclusion on the NCC website or similar.

Note to Applicants: The Nature Conservancy of Canada usually requires a period of three weeks for review and approval of this application.

Mail or fax your application to:

The Nature Conservancy of Canada
ATTN: Conservation Coordinator
55 Wyndham St North,
Guelph, Ontario, N1H 7T8

Fax: 519-826-9206

1. Applicant's Name:

Dr. Christie Bahlai and Katherine Manning (PhD Student)

2. Affiliation (school, college, university, government agency, company, etc.):

Department of Biological Sciences, Kent State University

3. Contact Information (mailing address, phone, fax, email):

Cunningham Hall, 1250 University Esplanade, Kent, OH, USA

Phone: 330-672-9775 (office), 517-331-0499 (mobile)

cbahlai@kent.edu, and kmanni12@kent.edu

4. Title of Research Project:

Understanding biodiversity services in urban and analogous natural systems to build better environments

5. Location (NCC property(ies) in which research will take place). Please state clearly if you would like to work in the Norfolk Forests and Long Point Wetlands Focal Area (Norfolk County), as extra NCC approvals are required:

Northern Bruce peninsula properties with alvars, adjacent thin-soil habitats

Davis Stewardship Project, Shining Rainbow Deer, Dwarf Lake Iris Reserve, Dyers Bay West, Beaton.

6. Timeframe (Approximate date(s) during which research will take place):

June-August 2019, 2020, 2021

7. Objectives of the project, including a brief statement as to why these properties have been chosen. Attach research/thesis proposal if available:

The northern Bruce peninsula is home to thin-soil environments which host a wide variety of unique or rare plant and insect species. We seek to 1) characterize these communities from a biodiversity-function standpoint and 2) understand structural elements driving these functional patterns, to help preserve and mimic these functions in human-depleted landscapes.

In our increasingly urbanized world, green design is being increasingly used to provision ecosystem services to human-dominated landscapes. Natural ecosystems can provide 'templates' for this approach, and in turn, well-designed urban ecosystems have the potential to provision habitat to organisms extirpated from natural habitats due to development- yet methods for assessing the success of these approaches are generally lacking. In the case of globally rare habitats, such as alvars and similar thin soil environments, urban analogues could include built structures such as green roofs. Like alvars, green roof habitats are typically characterized by thin soils experiencing drought, flood, wind and intense solar radiation. Natural habitats with these characteristics are relatively rare, and yet host a multitude of rare plants and insects, however, thin soil environments occur in the Great Lakes basin are rare and under ongoing threat. Our research examines the plant and insect communities arising around these natural and built thin-soil environments, to gain insight into how these habitats contribute service and function to the greater landscape. Our objectives are:

Characterize insect and plant communities

Characterize functions of insect communities
Compare communities between and within natural and built environments

8. General outline of the research to be conducted:

In addition to Northern Bruce NCC properties, we will be conducting identical surveys in several thin soil sites in the greater Cleveland area, in partnership with Cleveland Metroparks, and similar sites near Athens, Ohio, at Crane Hollow State Nature Preserve, in partnership with the Ohio Department of Natural Resources, and in green roofs in the greater Cleveland area. Our study is designed to capture a north-south transect spanning the extremes of the Great Lakes Basin, ensuring any findings will have applicability in conservation efforts focusing on cities through the region. Within each focal region (Northern Bruce, Cleveland and Southern Ohio) we plan to sample three sites.

We will sample three functional groups of insects (pollinators, natural enemies and decomposers) in green roofs and natural areas that are similar to green roof structure, while characterizing the plants and other physical attributes of each site. Bees will be sampled using standard bee bowl arrays (three plastic dishes, painted blue, yellow and white respectively, and suspended on a plastic tray at plant canopy height, and filled with soapy water to capture insects that land in them), at a rate of five per site. Flying predators will be sampled using yellow sticky cards, glue traps which are suspended at plant canopy level, at a rate of ten per site. Decomposers and other ground dwelling insects will be sampled using ramp traps (pitfall traps designed for thin soil environments to minimize soil or substrate disturbance- these are constructed out of beverage cans, cut in half with the sides flared down so insects walking in will be intercepted, and drown in soapy liquid at the bottom of the can), at a rate of 6 per site. Traps will be placed in the field for a 48 hour exposure, once monthly during the summer season, and then collected for transport and processing. We will create species list for all sites, which we will share with NCC as soon as they become available. Once identified, we will compare communities between and within built and natural systems of various characteristics, and the functional ecology can be described. Insect samples taken will be initially held in the Bahlai Lab at Kent State University during processing and identification; upon completion, voucher specimens will be deposited at the University of Guelph Insect Collection to ensure continuous availability and curation.

We will further characterize the plant community at each site using quadrat sampling. To accomplish this, we will identify all plants in two representative 1m² quadrats at each sampled site, and estimate % cover of each species. Plant community assessments will take place once per growing season. Where possible, plants will be identified in-situ by a qualified botanist (J. Gerrath), but where this is impossible, a sample will be taken, pressed and identified in the lab. Plant samples will then be appropriately mounted and deposited in the Tom S. and Miwako K. Cooperrider Herbarium at Kent State University, where records are digitized and curated. Data collected will be shared with NCC personnel as processing is completed.

9. Measures that will be taken to minimize potential impacts to biodiversity:

To minimize trampling and other impacts, we will walk the same transects for each sampling, employ low impact sampling methods (minimizing the size and number of the traps as well as the sampling frequency and limited 48 h sampling period, placement of traps for sampling and then removal of traps between each sampling period, not sampling too often to prevent local depletion of populations), use small stakes for traps to secure traps without disturbing soil.

Generalist passive insect sampling techniques are generally not thought to deplete local insect populations: rare species are better sampled using targeted sampling methods, and are unlikely to be trapped frequently by our methods. There's a possibility that some rare or endangered

species may be captured: for example if Northern Barrens tiger beetles occur at any of the sites, there is a possibility of capturing in pitfalls, though their closest known population in sandy barrens at Pinery Provincial Park. Similarly, there is a possibility of several rare bumblebees at the site.

We expect by-catch of non-arthropods in these traps to be rare. The pitfall traps will contain soapy water which is very low toxicity and contained within the trap, but there is the possibility of a snake or other herp crawling up the ramp to the trap, falling in and drowning. We expect this would be unlikely occur at a lower frequency than the more typical in-ground pitfalls. Birds have been known to rarely collide with sticky card traps and become entangled. To minimize the risk of this, we will use "corn rootworm" traps (a widely used and widely available trap originally designed for use monitoring corn rootworm in agricultural fields) which are coated in a thicker, but less viscous glue than many commercially available traps, which enables birds to escape without entanglement.

When traveling between sites, all project personnel will rinse their footwear in a bleach water solution to minimize the risk of transferring biological material between sites.

10. Support or consultant assistance required from NCC staff:

None, but field visits are welcome!

11. Name, date and number of any licenses or permits (other than this NCC permit) required for the research:

We have contacted the USDA-APHIS regarding importation permits to bring the samples across the US-Canada Border so they can be identified in the Bahlai Lab facilities at Kent State University, and have obtained necessary exemptions.

12. Names and associations and contact information of persons involved with the project who will be assisting on NCC property:

Julia Perrone, Kent State Biological Science, (269) 806-1467
Tim Niepokny, Kent State Biological Science, (440) 897-8964
John Gerrath, Kent State Biological Science, (517) 331-4830

13. Anticipated submission dates for the interim /annual and final report:

We will provide an annual report of findings, plus interim data/species lists, by no later than Dec 31 of each project year.

Conditions which will form part of the Permit if approved:

1. Researchers are responsible for obtaining the appropriate provincial or federal permits for the conduct of their research (e.g. regulated species, fisheries).
2. Researchers are responsible for removing all markers, etc. when the research is completed.
3. Researchers will file an annual (due in yearly increments based on the date of the permit) and final report. Such reports will include: days on the NCC property and a summary of results of the project.

4. Any publications resulting from research conducted on an NCC property must acknowledge the use of the NCC property and reference the research permit number. A copy of all publications must be provided to NCC.
5. Researchers must provide NCC with locations of rare species observed on the property.
6. Researchers assume all risks of property damage, injury or death that may at any time result from any and all of the researcher's activities on NCC properties.
7. NCC reserves the right to cancel the Research Permit at any time in its sole discretion.

If approved, I the applicant, agree to abide by the terms and conditions specified in this Application. I shall at all times indemnify and save harmless, NCC, its directors officers, employees, agents and volunteers from and against all actions, damages, claims, demands and loss, including legal expenses incurred as a result of any claim, demand or action, by whomsoever made, brought or instituted, arising out of or in any way related to this Application to Conduct Research, the resulting Permit or the research itself or any act or omission negligent or otherwise of myself, my agents, employees, representatives, sub-researchers and volunteers.

_____ I agree to obtain and keep in force during the currency of the Permit, a general public liability insurance policy in an amount acceptable to NCC and showing NCC as an additional insured.

 X I am not able to provide public liability insurance coverage for NCC.

Applicant Signature: _____ 

Date: _____ 15/03/2019 _____

Print Name: _____ Christie Bahlai _____

Adapted from NCC Stewardship Manual (based on OMNR's Application to Conduct Research in Provincial Parks). Last updated: April 2015.