

Wildlife Research Permit Background

Previous Wildlife Research Permit Number: 50323 & 500435

Title: *NWT Biodiversity Monitoring Program: 2014 Birch Lake Burn Complex*

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Background context

Northwest Territories Biodiversity Monitoring (NWTBM) program

Maintaining biodiversity is important for ecosystem health and community well-being. With ongoing impacts of climate change, human disturbance, and industry, long-term monitoring programs are required to understand the current state of and changes in wildlife populations. Monitoring programs such as these are important for informing responsible and collaboratively developed management and conservation actions. Activities proposed under this Wildlife Research Permit form part of a growing Northwest Territories Biodiversity Monitoring (NWTBM) program; a collaborative initiative aimed at enhancing structured, passive wildlife monitoring across the Northwest Territories.

Under the NWTBM, two primary types of sensors are being deployed: acoustic recording units (ARUs) and wildlife cameras (sometimes called camera traps). ARUs record the soundscape on a pre-programmed schedule, whereas cameras take photos when triggered by animal movements. Both sensor types can be left out on the land for an extended period of time or repositioned/repurposed as needed. ARUs can detect a variety of vocalizing animals, including birds, wolves, insects, and amphibians. Migratory bird data collected by ARUs helps to fulfill Environment and Climate Change Canada's (ECCC) obligations to monitor and conserve migratory bird populations (Migratory Birds Act, 1994) and protect threatened species (Species at Risk Act, 2002). Wildlife cameras can detect a variety of medium to large-sized vertebrates, including large mammals, meso-carnivores, fur-bearing species, as

well as waterfowl and other migratory and non-migratory birds. Data collected by cameras can support wildlife management and protected area planning within the Northwest Territories.

The NWTBM program's first collaborative effort was conducted in Ts'udé Niljné Tuyeta Indigenous Protected Area and has since been followed by efforts in Edézhíe Dehcho Protected Area and National Wildlife Area, Dínàgà Wek'èhodì Candidate Area, Thaidene Nēné Indigenous protected area, along the Smbaa K'e winter road, and within ~ 100 km of the communities of Norman Wells and Fort Smith. Guardians and other Indigenous partners have been actively involved in all aspects of the development and implementation of these efforts (Figure 1). As part of the most recent program's efforts in Norman Wells, Fort Smith, Gamètì, and along the Mackenzie Valley and Tłıchq winter roads, acoustic bat detectors meters and temperature sensors were also deployed alongside the ARU and wildlife cameras to collect further biodiversity data.

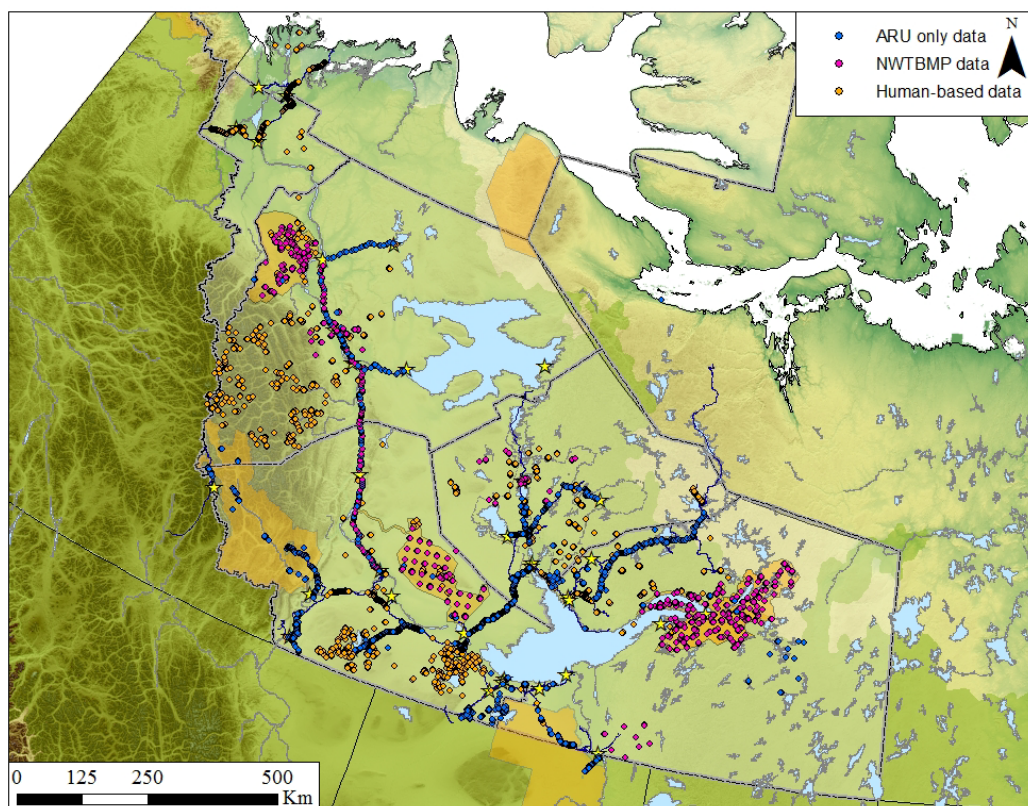


Figure 1: Study sites across NWT where the NWT Biodiversity Monitoring Program has been successfully implemented to date. In **blue** (ARU-based surveys) and **orange** (human-based point counts) are sampling locations with only avian point count data and in **purple** are sampling locations where the NWT Biodiversity Monitoring Program has been successfully implemented (missing is the recent deployment along the Tłıchq winter roads).

2014 Birch Lake Fire Complex

Prior to the establishment of the NWTBM program, the CWS conducted intensive ARU monitoring efforts following the 2014 Birch Lake Fire Complex. These wildfires occurred in 2014 during a record fire year, where 3,400,000 ha of the Northwest Territories burned representing 500% of the annual area burned over the previous 40 years (Figure 2). At this time, a total of ~ 600 sampling stations were surveyed across 33 study sites (5 x 5 grids with each unit spaced 500m apart; or equivalent 4 x 4 grids). In 2015 and 2016, ARUs were deployed for ~ 1 week before being redeployed to another study for the same duration. Deployments in 2017 and 2018 were from early May to mid-July. Data from the 2015 and 2016 fieldwork has been used as part of Michelle Knaggs' MSc thesis (University of Alberta) entitled: "*Effects of burn severity and time since fire on songbird communities in the northern boreal forest*" (<https://era.library.ualberta.ca/items/b15b79e2-06c7-4175-92c3-0faabe2622fe>) and subsequent publication in a peer reviewed scientific journal (<https://www.mdpi.com/1999-4907/11/12/1330>; Figure 3). Building on these initial monitoring efforts, the goal of this work is to continue to broaden the scope of the NWTBM program by revisiting the 2014 Birch Lake Burn Complex to deploy not only ARU units, but also wildlife cameras, acoustic bat detectors, and temperature loggers.

Proposed monitoring activities in the 2014 Birch Lake Burn Complex

In March 2024, the plan would be to deploy ~ 100 autonomous recording units (ARUs) and wildlife cameras at four study sites (1 control, 1 high severity, 1 medium, 1 low severity burn sites), and temperature loggers and bat meters (max of 8 units) at a subset of sampling locations in early May and these units would be deployed for an entire year. For the remaining study sites (18 sites; ~ 500 sampling locations), ARUs only would be deployed using the same ~ 1 week deployment/redeployment schedule throughout the month of June.

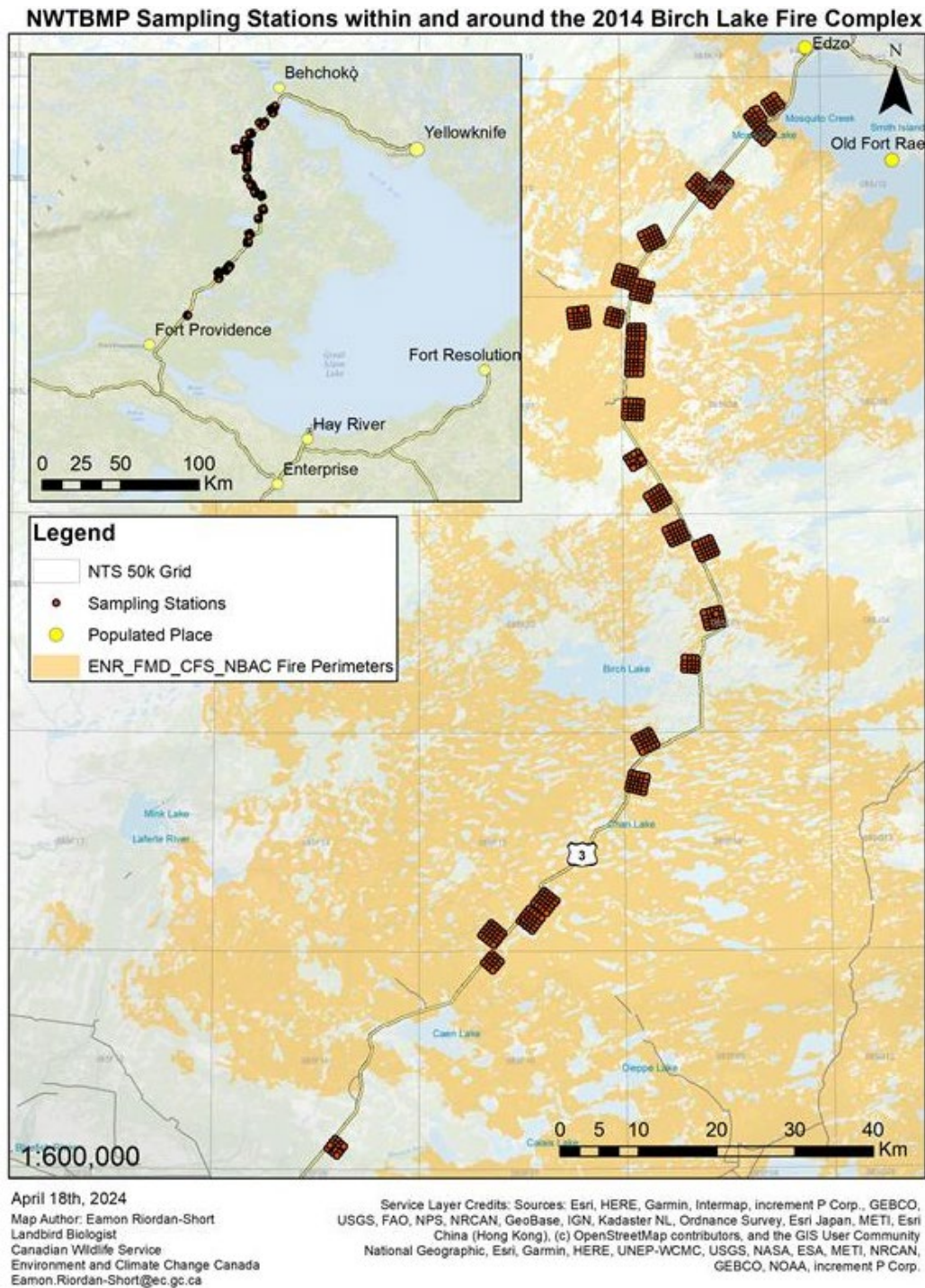


Figure 2: Location of the 28 study sites in and around the 2014 Birch Lake Burn Complex surveyed in 2015 and 2015 that are intended to be revisited in June 2024 to monitor the effects on fire on the landbird community using ARUs and start monitoring a larger number of species and ecological processes by deploying wildlife cameras, bat meters, and temperature loggers at a subset of sites.

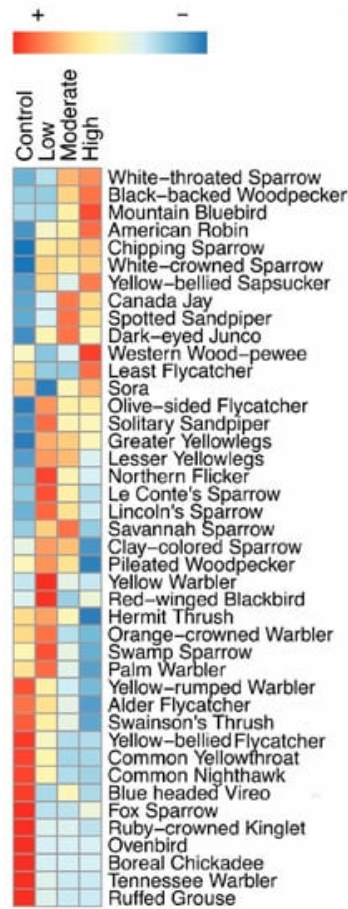


Figure 3: Heatmap of standardized species' counts in each burn severity category. Colors from blue (never present) to red (most frequently present) represent the relative frequency each species was detected in each severity category. These results are for 42 of the 59 landbird species detected that could be included in our analyses.

Appendix 1. *Proposed recording schedule for each year-long ARU deployment as part of the 2024 Birch Lake Burn Complex deployments.*

April 1st – April 30th

- 1 hour before sunset: 10 mins
- @ sunset: 10mins
- 3 hours after sunset: 10mins
- 1 hour before sunrise: 10mins
- @ sunrise: 10mins

May 1st - June 30th

- 1 hour before sunset to 4 hours after sunrise: 10 minutes/hour

July 1st – August 15th

- 1 hour before sunset: 10mins
- @ sunset: 10m
- 2 hours after sunset: 10mins
- 1 hour before sunrise: 10mins
- @ sunrise: 10m

August 15th –September 30th

- 1 hour before sunset: 10mins
- @ sunset: 10mins
- @Midnight: 10mins
- 1 hour before sunrise: 10mins
- @ sunrise: 10mins

Appendix 2. *Proposed recording schedule for each bat ARU to be deployed as part of the 2024 Birch Lake Burn Complex deployments.*

May 1st - October 31st

- 30 minutes before sunset to 30 minutes after sunset

Appendix 3. *Proposed recording schedule for each camera and temperature logger to be deployed as part of the 2024 Birch Lake Burn Complex deployments.*

<u>Sensor Type</u>	<u>Schedule</u>
Camera	Continuous for motion triggers and timelapse photo daily at noon
Temperature logger	Records temperature every 2 hours