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CWS WILDLIFE SURVEYS IN FAR NORTHERN ONTARIO: CARIBOU AND THEIR PREDATORS

Canadian Wildlife Service

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Environment and Climate Change Canada's 50th anniversary
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Meteorological Service of Canada's 150th anniversary
150^e anniversaire du Service météorologique du Canada



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CWS OBJECTIVES FOR WILDLIFE SURVEYS IN FAR NORTHERN ONTARIO

- Collect and share information to improve our understanding and allow for strong decision making on
 - Species at Risk (caribou, some bird, bat and bee species)
 - Migratory birds (including songbirds, shorebirds, ducks, geese etc.)
 - Peatlands
- Work collaboratively with Indigenous communities and organizations
- Explore the use of non-invasive methods (not coming into contact with animals) to minimise impacts on animals





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WILDLIFE SURVEYS IN FAR NORTHERN ONTARIO

CARIBOU



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CARIBOU IN ONTARIO'S FAR NORTH

Two types of caribou occur in Ontario's Far North: boreal caribou and eastern migratory caribou

- Distinguished based on female predator avoidance strategies during calving, and their migratory strategy

Boreal and eastern migratory caribou ranges overlap extensively, with the greatest overlap occurring in early winter.



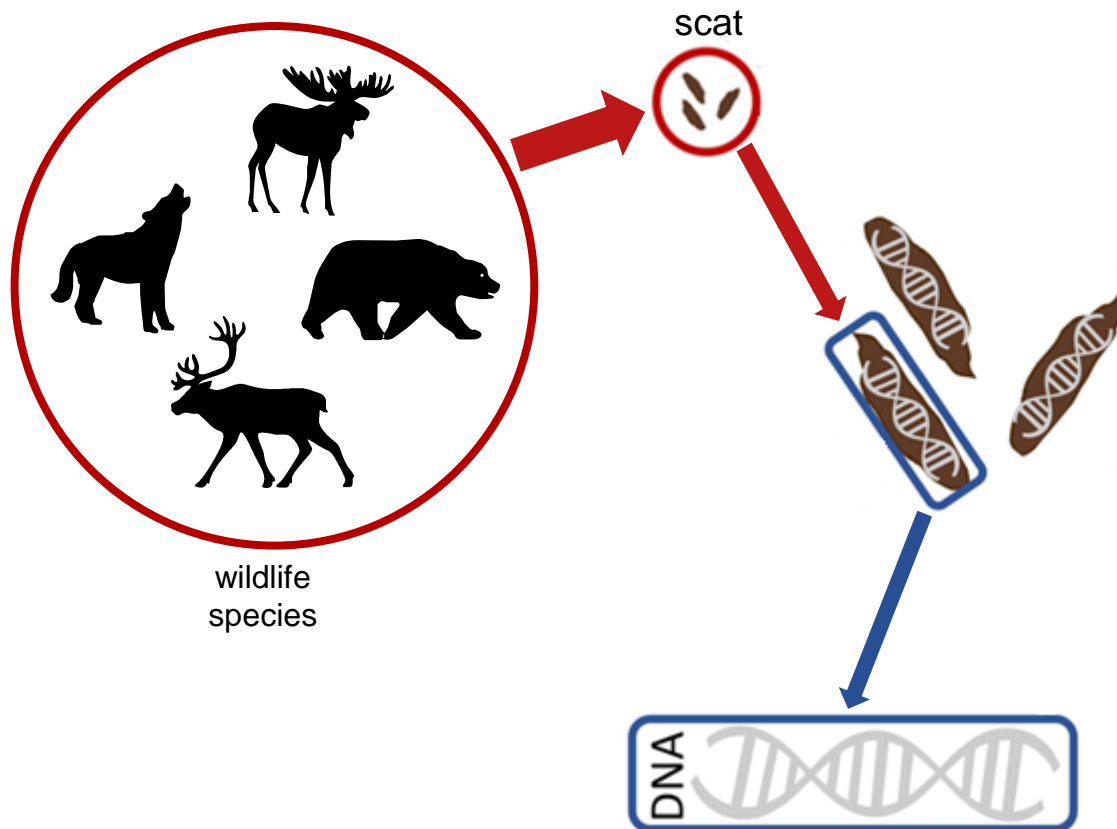
Map: Chris Brackley/Can Geo

CARIBOU MONITORING OBJECTIVES

- Monitor changes in number of animals and where they occur
- Population estimates can be difficult for animals like caribou
- Used non-invasive genetic sampling of caribou scat
 - Caribou are not present when samples are collected



NON-INVASIVE GENETIC SAMPLING



As scat moves through an animal's digestive tract, it picks up cells containing the animal's DNA.

The collected DNA can:

1. Confirm the species
2. Identify unique individuals
3. Determine the sex of the individual

Which can then tell us:

1. Sex ratio of the population (numbers of males and females)
2. Abundance estimate (total number of animals in the population)
3. Genetic structure of the population (genetic differences between individuals)
4. ...and more



POTENTIAL OUTCOMES FROM DNA



One population-level DNA survey can provide information on:

Number of animals

Number of pregnant females

Movement of individuals

Family relationships between individuals

Mapping out different populations

Telling different types of caribou apart

How related breeding individuals are

With repeated surveys, additional information can be gained on:

Population trends (rates of death, survival and young joining population)

Population density

DNA surveys cannot provide information on habitat use or movements of individuals

AERIAL CARIBOU DNA SURVEY

Phase 1



1. Follow 10-km transect lines by aircraft

2. Identify caribou cratering sites

Phase 2



3. Fly to identified craters by helicopter

4. Land at caribou cratering sites and collect fecal samples

Cratering site: where caribou dig through snow to forage for ground lichens and other vegetation

CARIBOU DNA COLLECTION



1. Fly to caribou cratering locations

2. Collect caribou scat

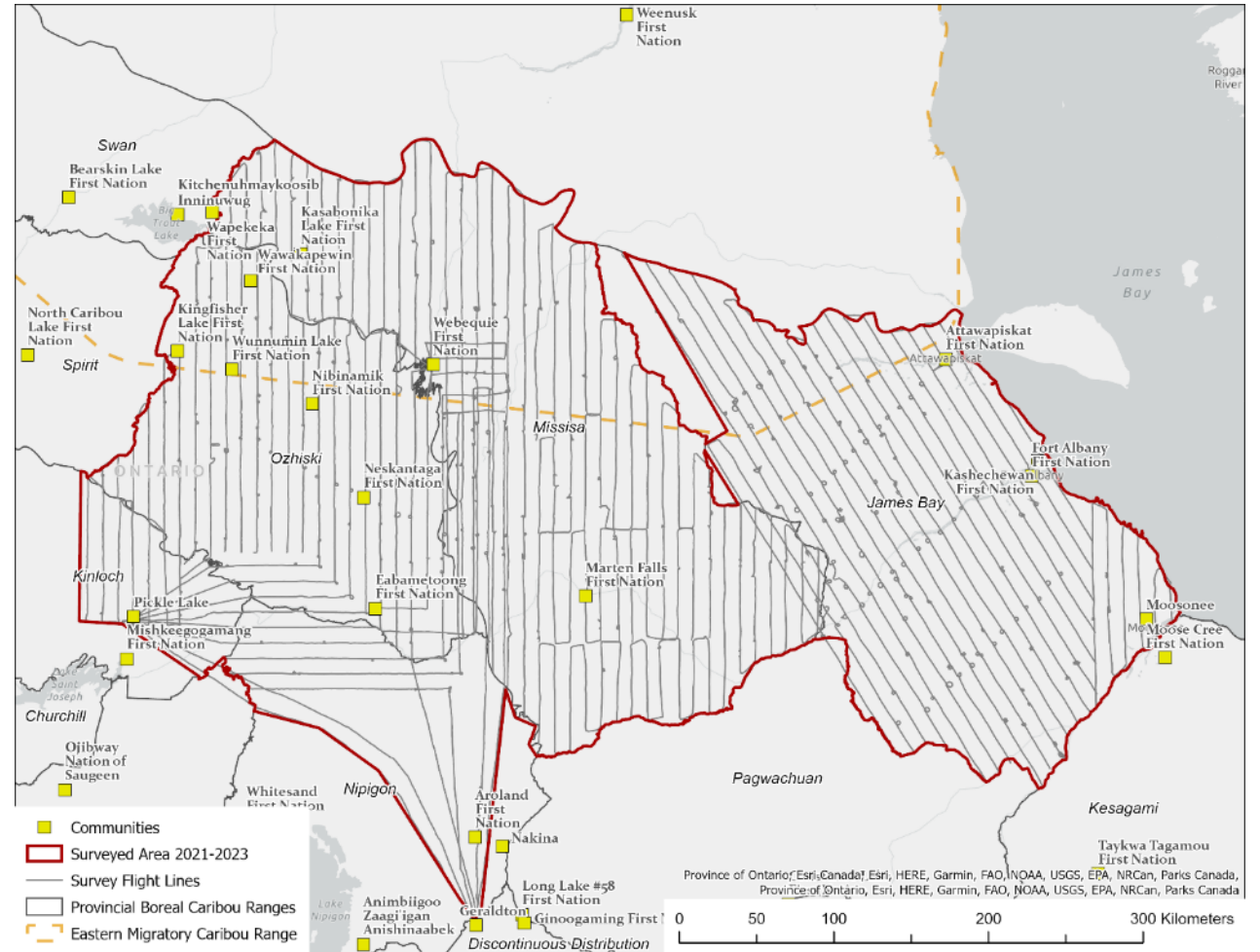
3. Label collected scat with location

4. Return frozen samples to lab to extract DNA

2021-2023 FECAL DNA SURVEYS OVERVIEW

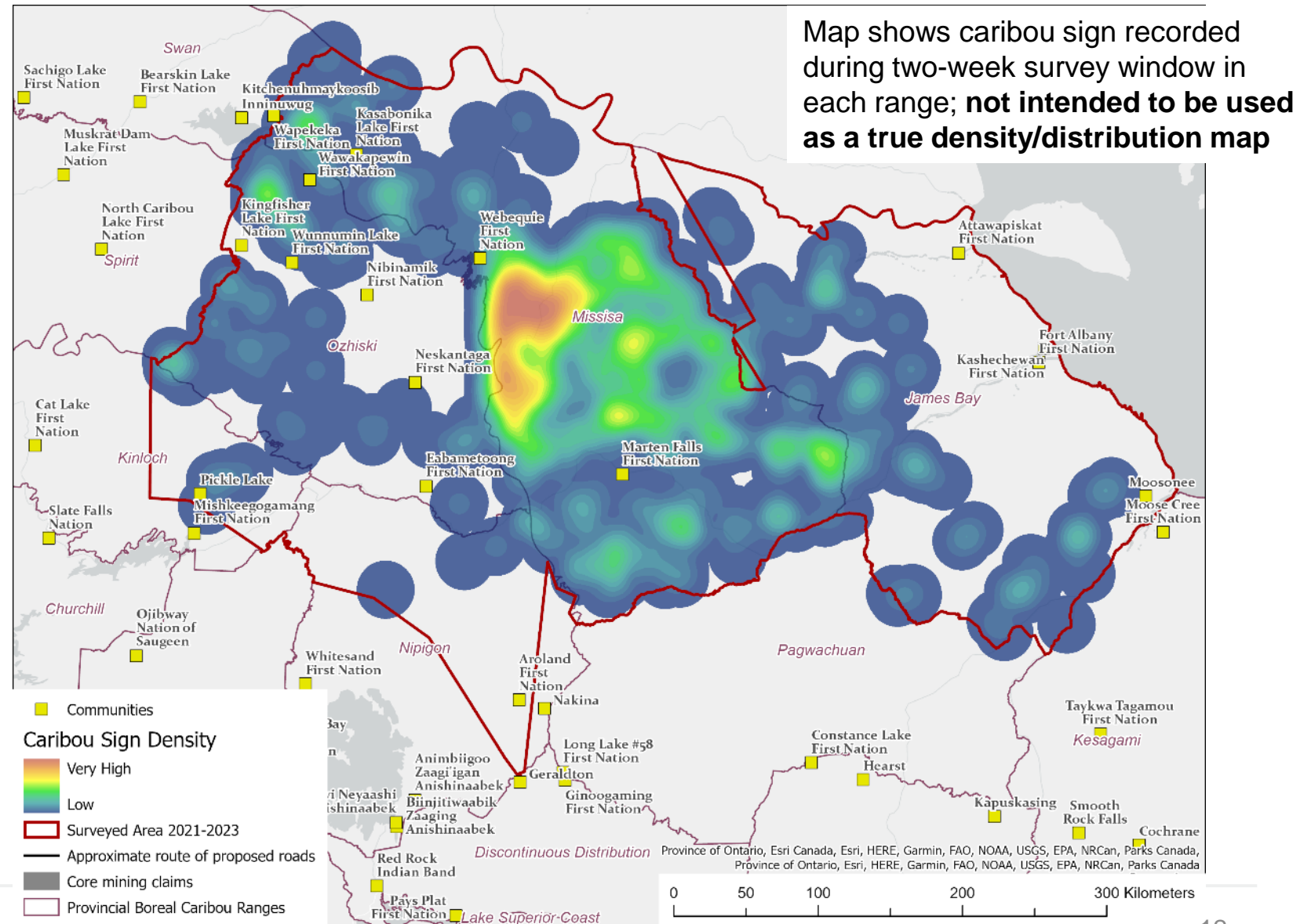
Two-stage surveys of the Missisa (2021), Ozhiski (2022) and James Bay (2023) boreal caribou ranges occurred in February and March of each year. The entirety of each range was surveyed.

- 1) The fixed-wing survey followed pre-established 10 km transect lines to record observations (~13 days per range)
- 2) Caribou scat was collected at observed feeding/cratering sites (~13 days per range)

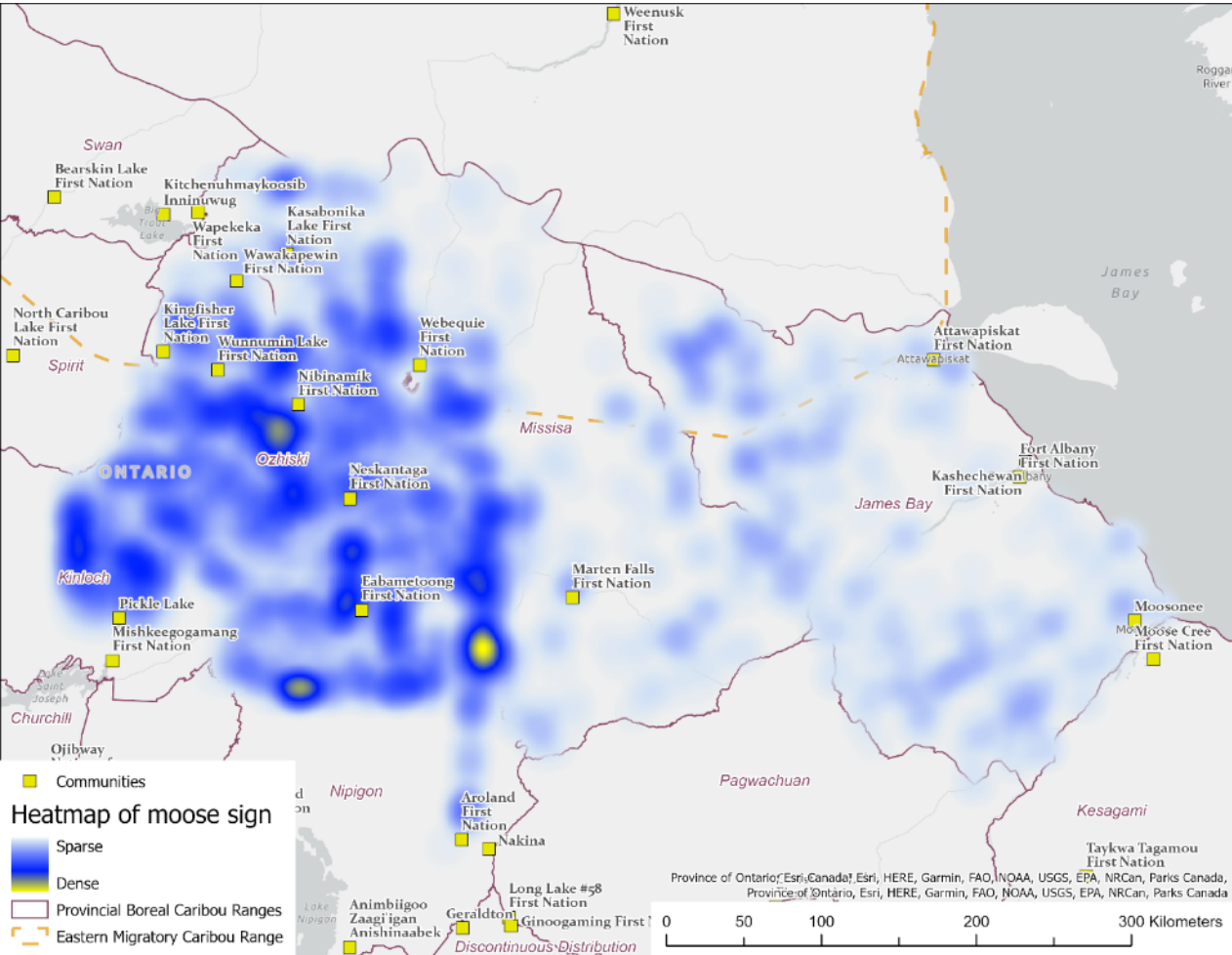


2021-2023 FECAL DNA SURVEYS RESULTS

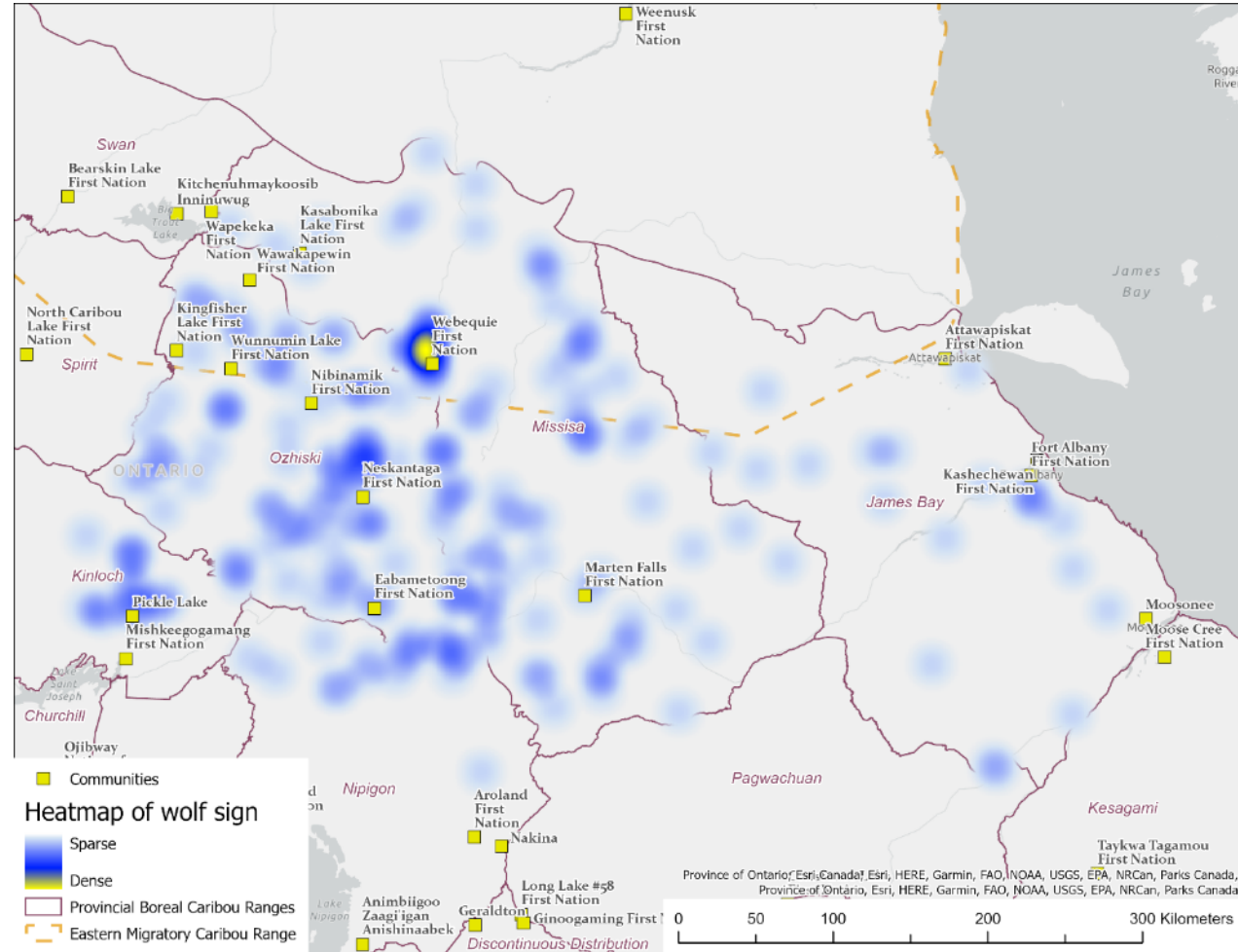
- Collected nearly 2,500 fecal samples
- Highest density of caribou sign in the Missisa range
- No caribou sign observed in central Ozhiski or near James Bay coast



2021-2023 FECAL DNA SURVEYS INCIDENTAL OBSERVATIONS



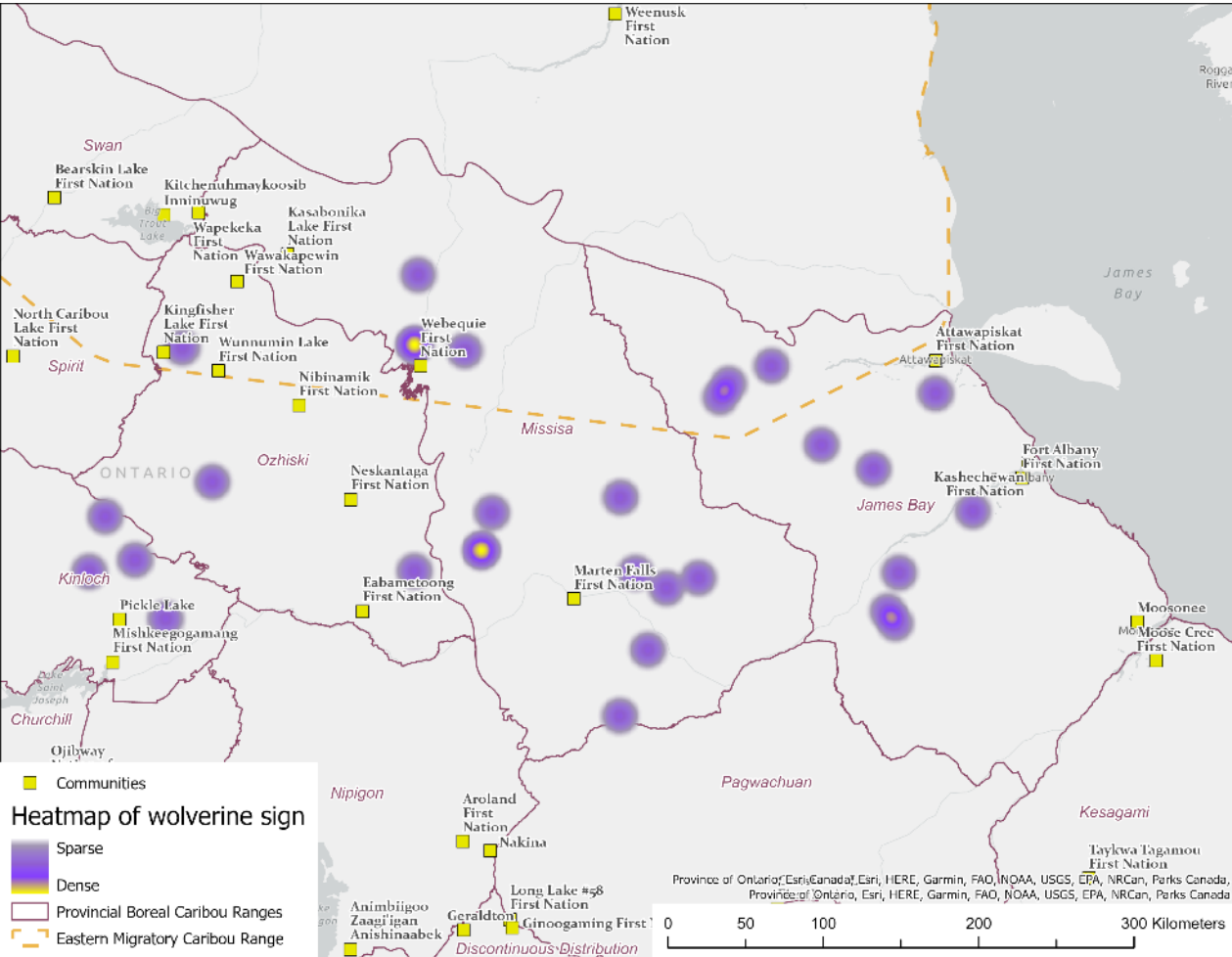
Moose



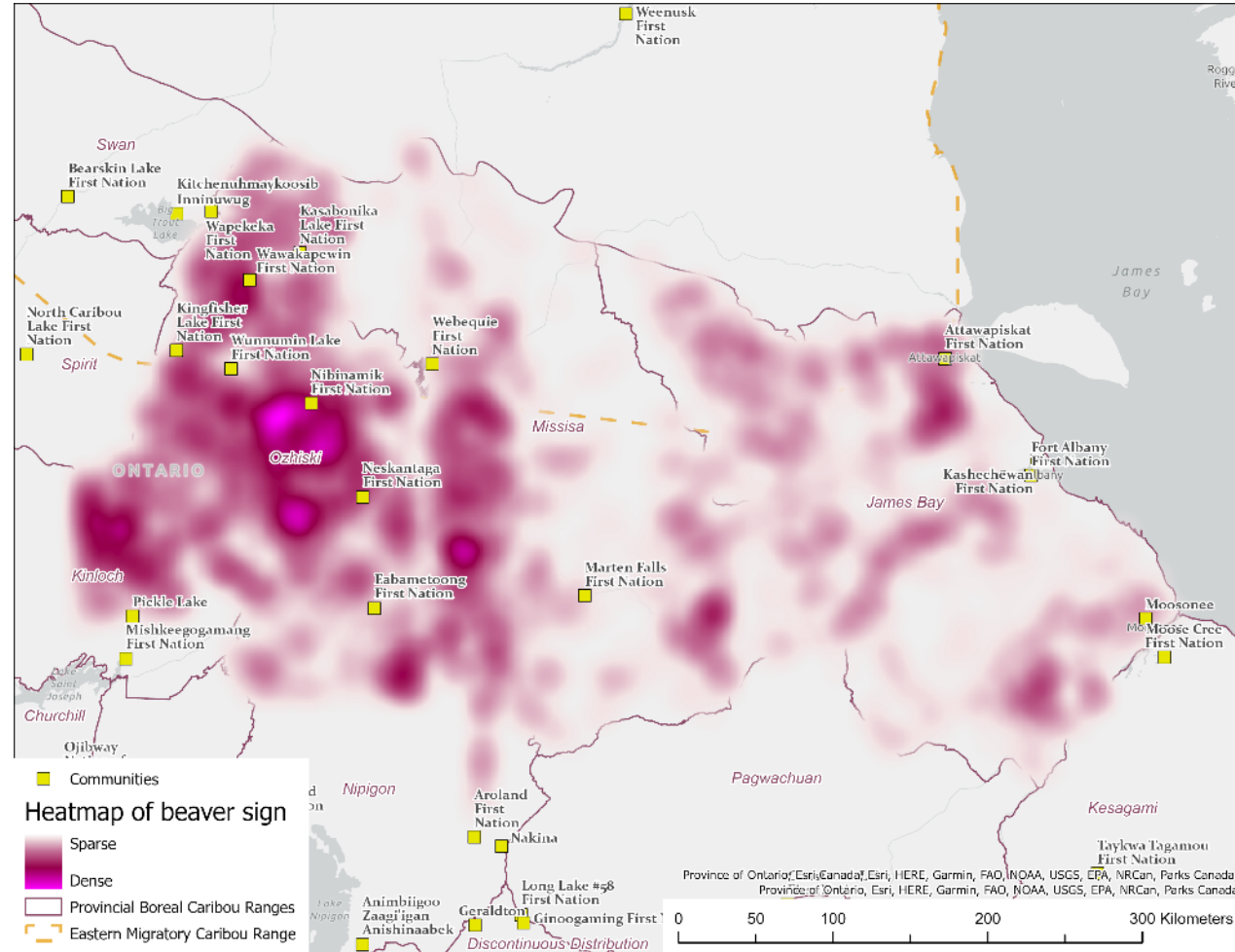
Wolf

2021-2023 FECAL DNA SURVEYS

INCIDENTAL OBSERVATIONS



Wolverine



Beaver

FECAL DNA LAB ANALYSIS

- All caribou scat samples collected from surveys were delivered to Trent University after each survey took place
- Lab and data analysis are being completed through funding agreements between the Science and Technology Division of ECCC and Trent University
 - The project has received NSERC Alliance funding to complete additional research activities
- Taking longer than expected to refine methods for telling boreal caribou and eastern migratory caribou apart



FECAL HORMONE ANALYSIS

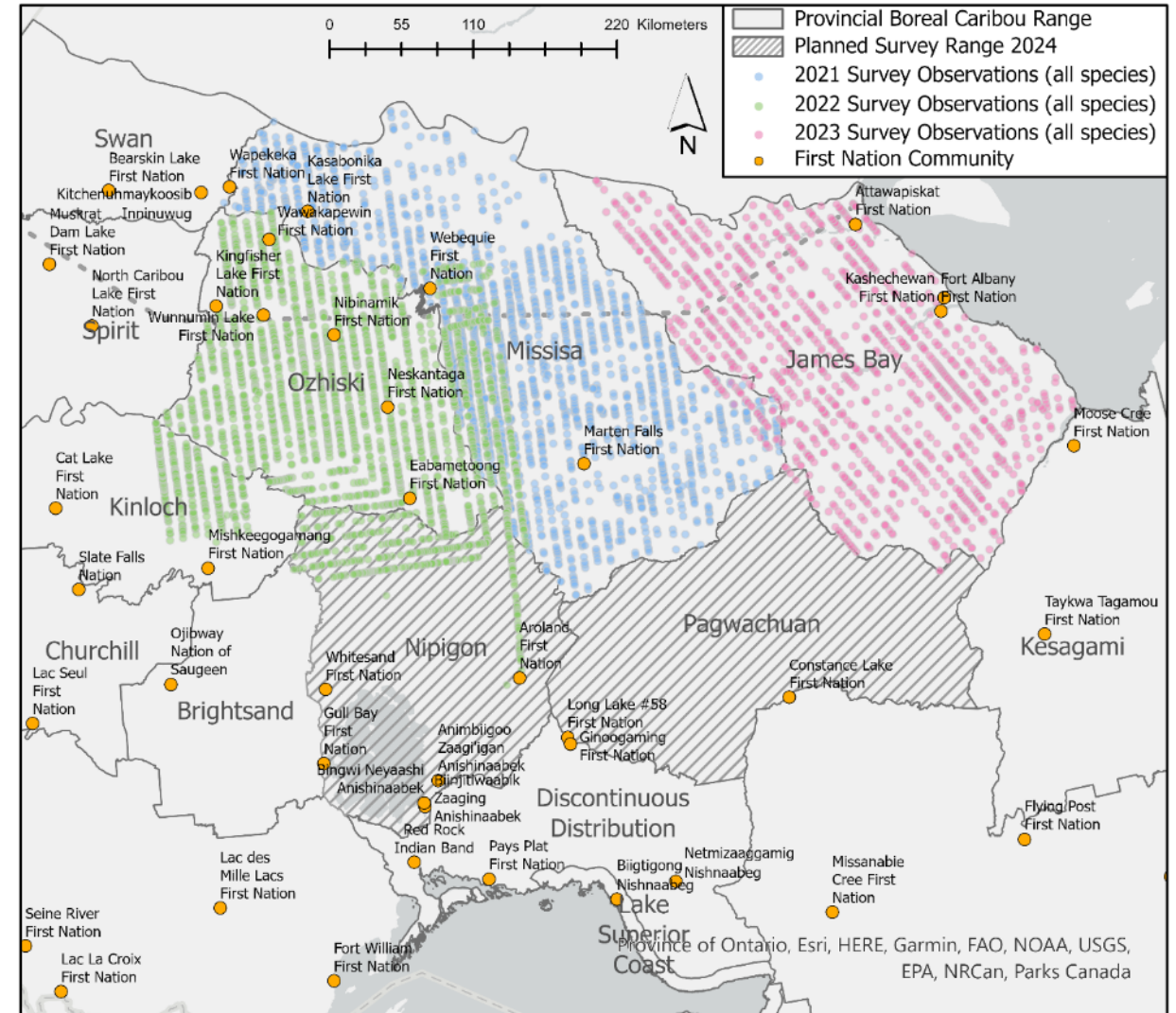
- Extracting hormones from collected fecal samples to assess:
 - Pregnancy status of female caribou
 - Stress levels of male and female caribou
- Results will provide important information on pregnancy rates and stress levels of caribou residing in Ontario's Far North



2024 FECAL DNA PLANNED SURVEY

Fecal DNA survey planned for early 2024:

- Nipigon and Pagwachuan provincial boreal caribou ranges (shaded)
- Expand the area over which we can add to understanding of caribou populations and genetics
- Same method as the 2021-2023 surveys – two stage survey following pre-established 10 km transect lines



NEXT STEPS - CARIBOU

- 2024 surveys of the Nipigon and Pagwachuan caribou ranges
- Genetic analysis of data from 2021, 2022 and 2023 caribou DNA surveys
- Looking for opportunities for further collaboration/engagement with Indigenous communities
 - Questions or regions of interest to local communities
 - Community led projects including those that are ITK related
 - Discussion of potential for funding opportunities
- All observational data are available for sharing with Indigenous communities and organizations

What do you see as key questions of interest about caribou in the Far North?

Do you have general comments or questions on the aerial survey approach?

Do you have questions or comments about fecal DNA genetic sampling approach? Or would you like more information about this approach?

Questions?

Is there information you would like to share on caribou in the region, such as changes in behaviour over time, areas where different types of caribou are seen, timing of caribou movement?

Are there particular areas within the Nipigon and Pagwachuan ranges that CWS should focus on during upcoming surveys?

...or that are of particular interest with respect to questions about caribou?



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WILDLIFE SURVEYS IN FAR NORTHERN ONTARIO

Caribou predators



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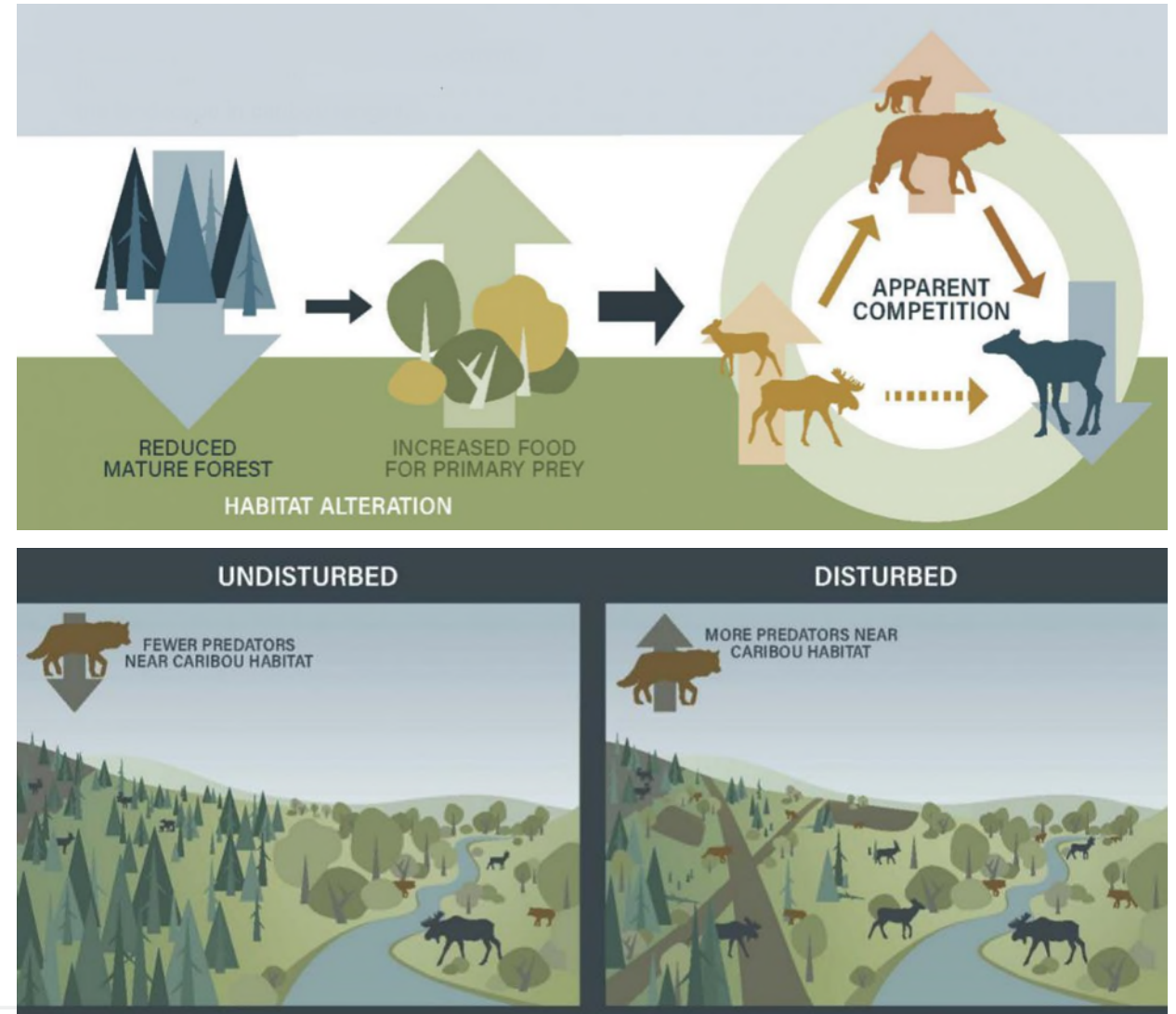
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CARIBOU, MOOSE, WOLVES AND BEARS

- Caribou are potential prey for multiple species, including wolves, bears, and to a lesser extent, wolverines
- Caribou are sensitive to predation by wolves, who also prey on moose
- Alteration of the landscape by humans can increase rates of wolf predation on caribou by:
- Caribou calves are also sensitive to predation by black bears



WOLF MONITORING OBJECTIVES

- Provide data on where wolves are found on the landscape and estimates of numbers of wolves and wolf packs
- Provide valuable data on predation risk to caribou by wolves



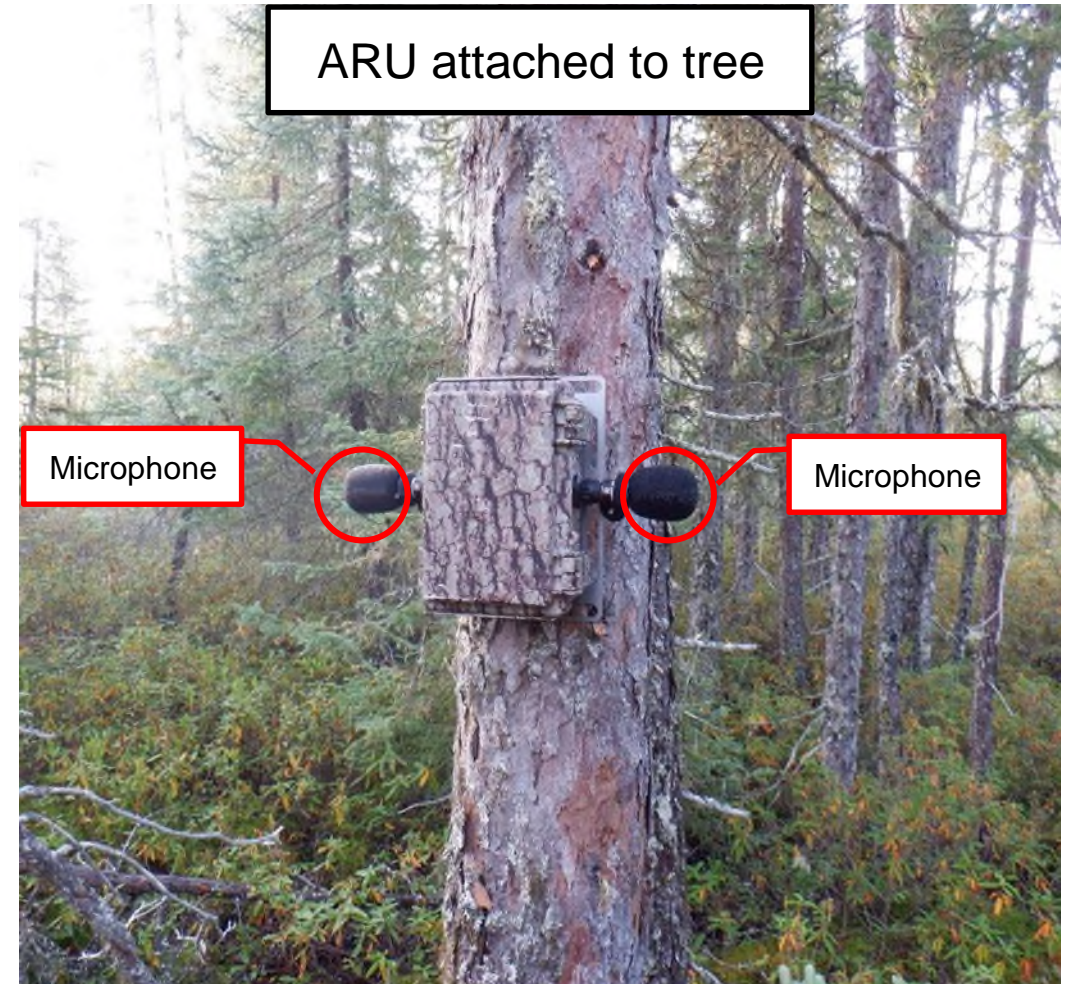
REMOTE CAMERA TRAPS

- Non-invasive method
- Multi-species monitoring
- Can survey continuously for multiple years
- Surveys to assess numbers of caribou, wolves and other mammals, and provide some information on where and when they occur



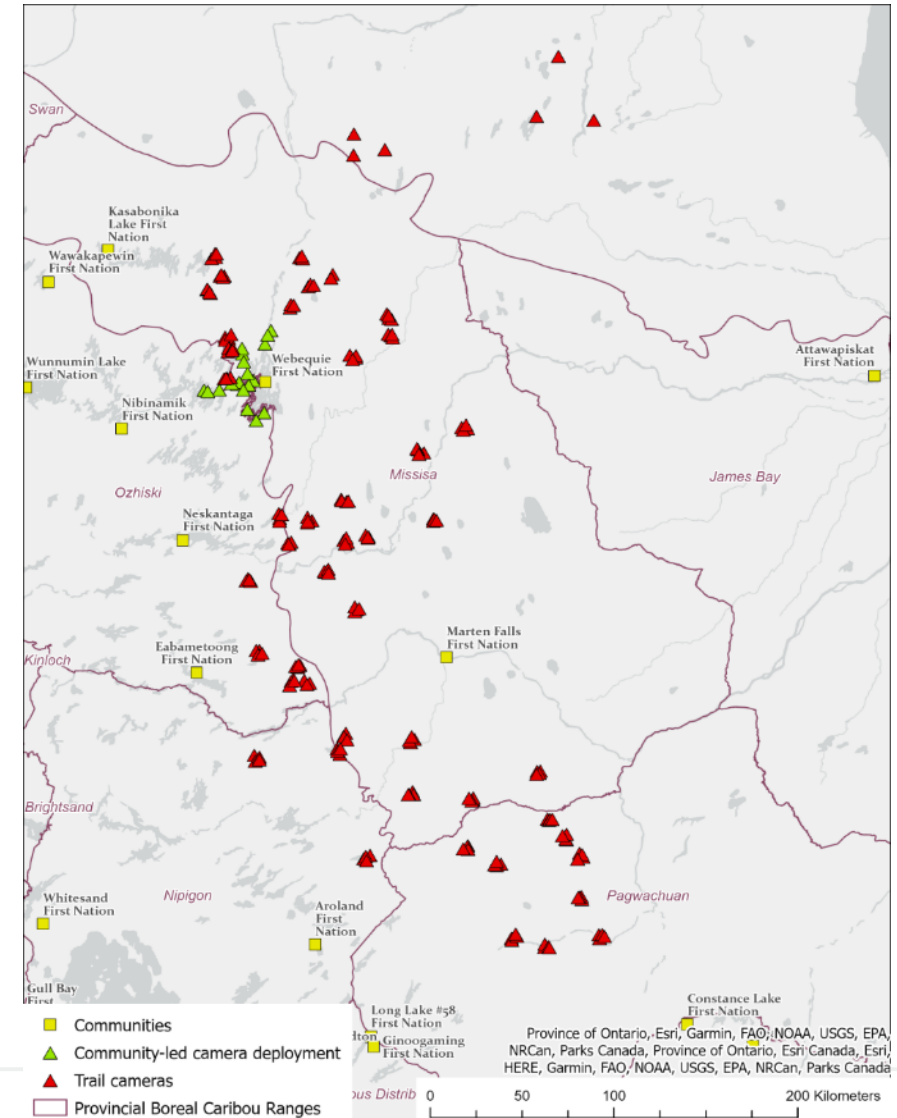
AUTONOMOUS RECORDING UNITS (ARU)

- Records 'noisy' animals such as birds, frogs, wolves and bats
- Can survey continuously for many years
- Can provide counts of individual animals, the number of different animals using a site, and information on the habitats that they use
- Wolf howls can be heard by neighbouring wolves and humans at a distance up to 10 km
 - Can be detected up to 4.6 km on recorders
- Can distinguish number of callers in a pack, call and response between packs, minimum counts



2022 TRAIL CAMERA DEPLOYMENTS

- Multiple challenges exist creating a wolf monitoring project in Ontario's Far North
 - No wolf baseline data publicly available in this region
 - Existing studies done in other parts of Canada may not represent wolf dynamics in the Far North
- We have deployed approximately 300 cameras as part of several projects
 - Looking to gather information on several parameters, such as pack size, number of wolves in area, home range size of packs, and physical differences (i.e. coat colour, size)



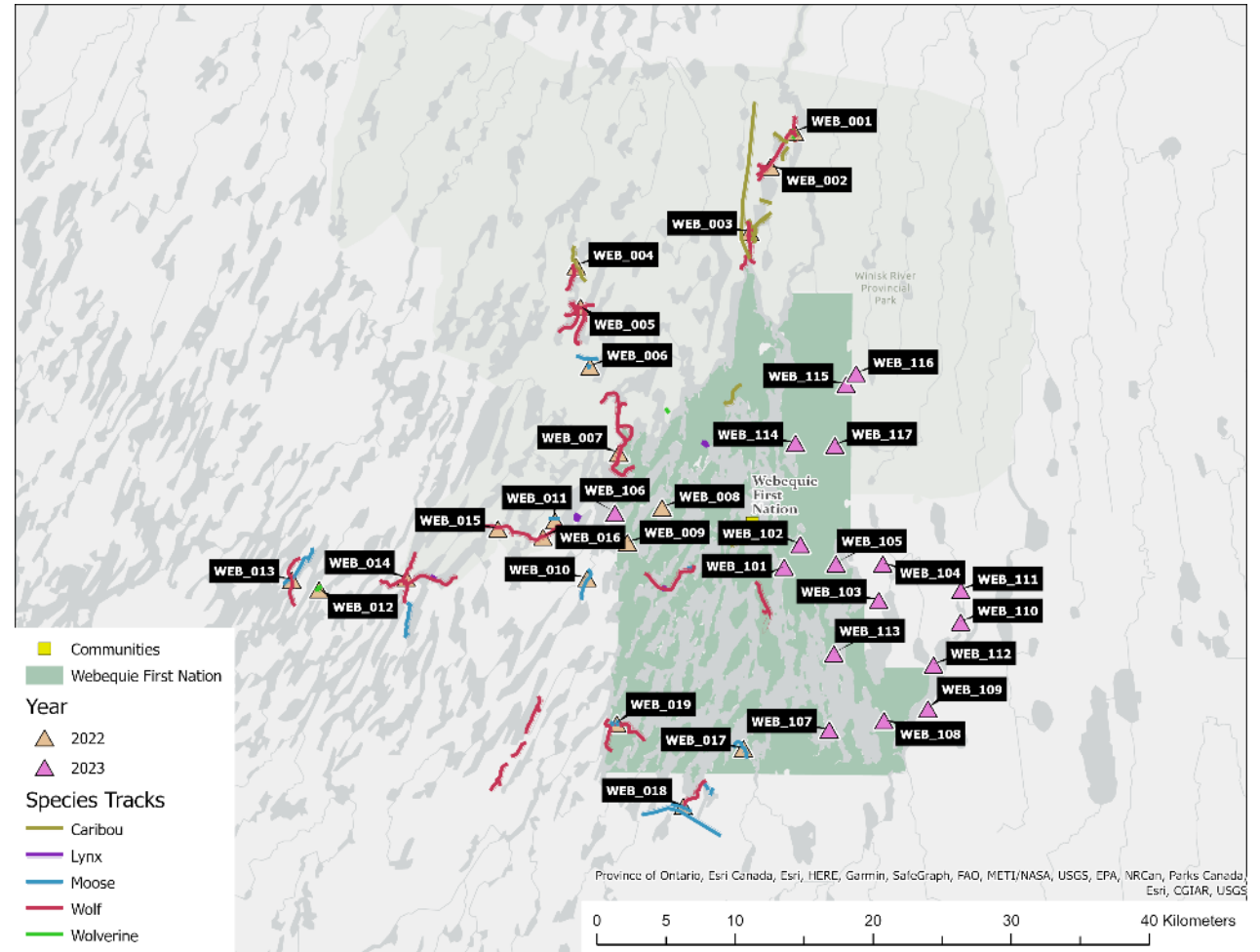
2022-2023 COMMUNITY-LED TRAIL CAMERA DEPLOYMENT

We partnered with Four Rivers to undertake a pilot study with the following objectives:

- Assess the feasibility of a small-scale camera deployment by snowmobile
- Assess results of targeted camera placement for wolf activity informed by Indigenous Knowledge (IK)

Snowmobile deployment by Four Rivers and Webequie First Nation in March 2022 and March 2023

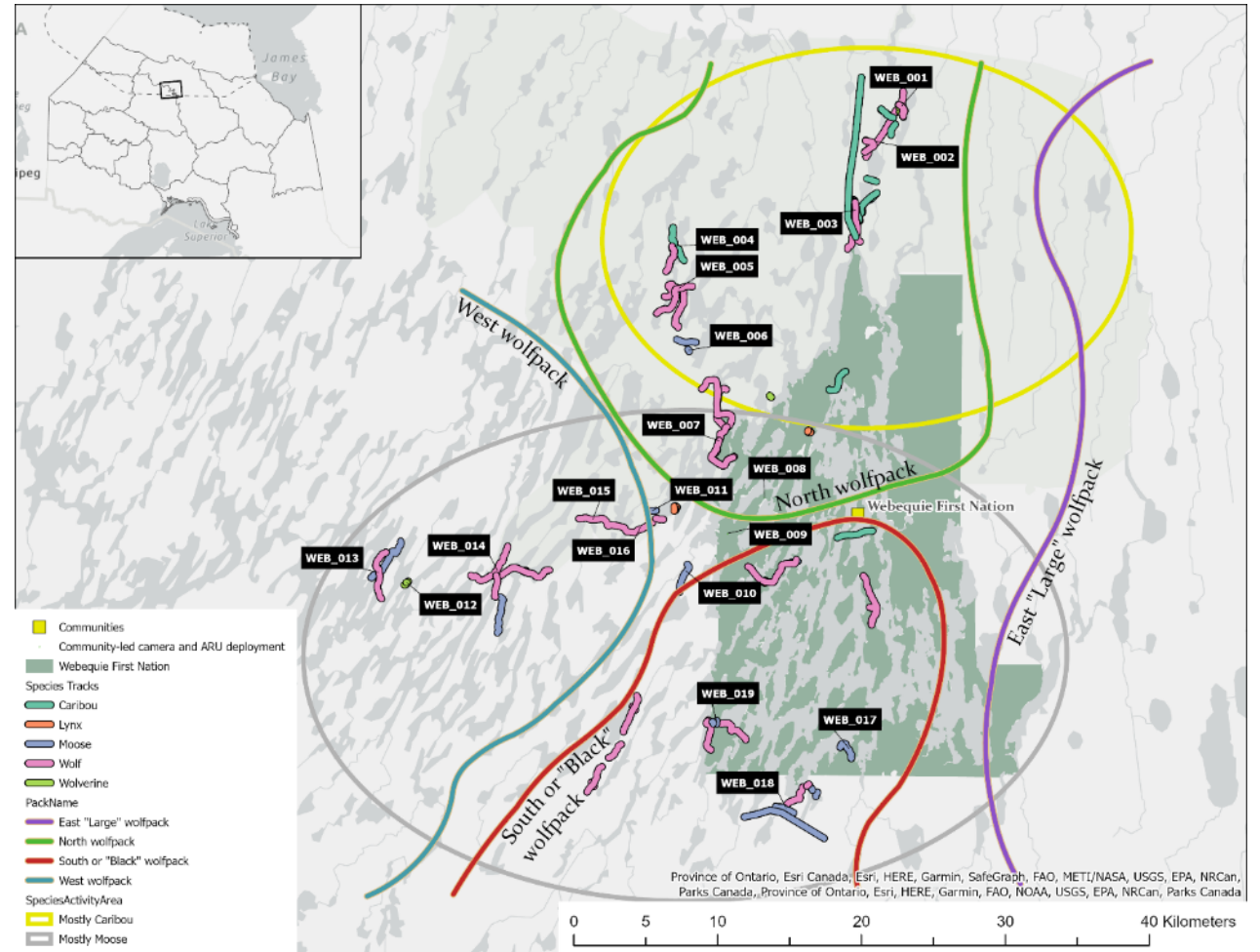
- 36 sites with paired trail cameras and ARUs were selected using IK
- Observations of wolf, caribou and moose tracks were also recorded



2022-2023 COMMUNITY-LED TRAIL CAMERA DEPLOYMENT

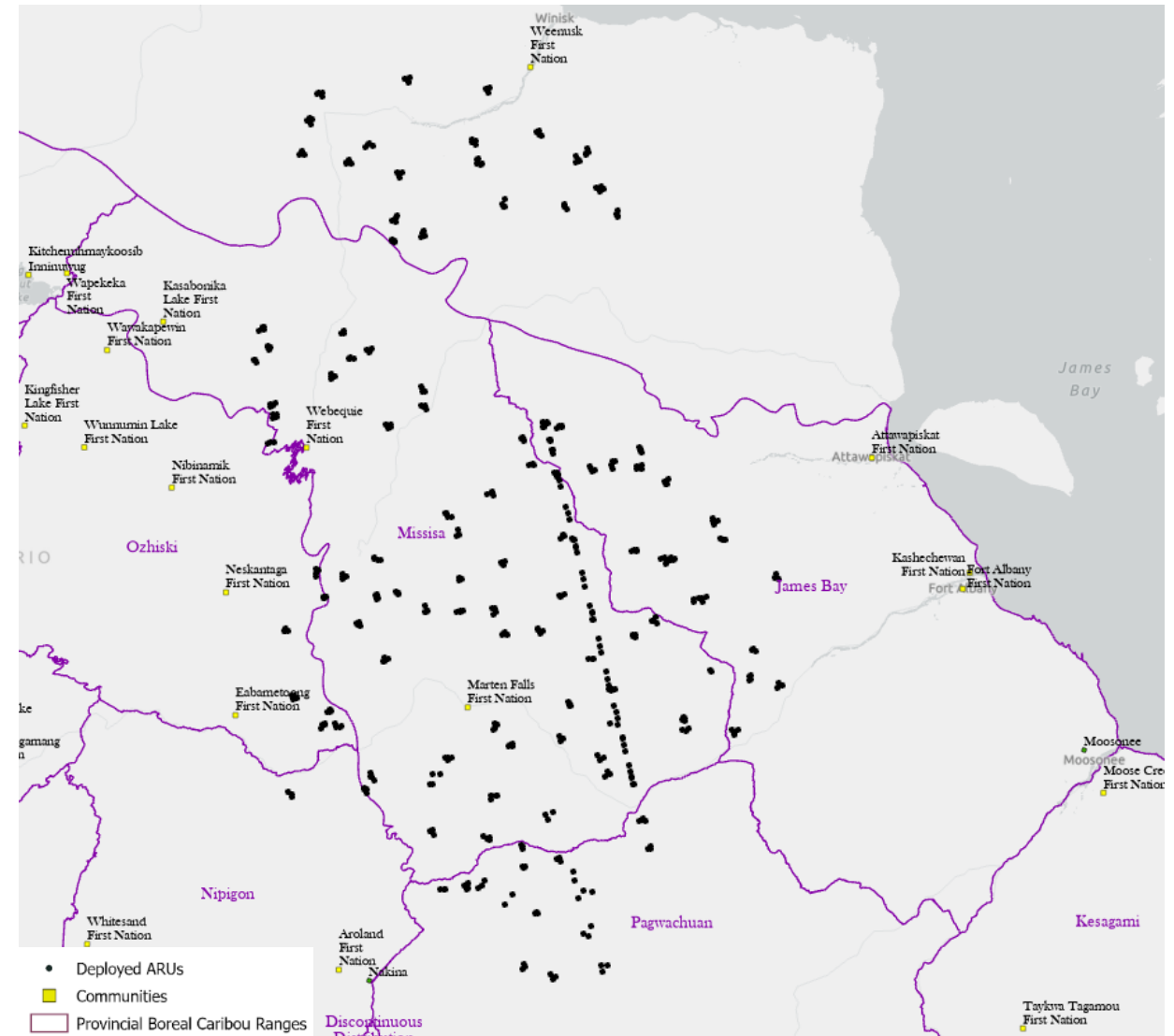
A map of technical observations was created from the observations made in 2022 in the field and technical knowledge shared by a local Knowledge Holder

- Indigenous Knowledge gathered by Four Rivers and Webeque FN during this project indicated differences between the distinctive wolf packs around WFN
- Pictures taken by camera traps may further document the visual differences between wolf packs as well as primary prey abundance north and south of the community



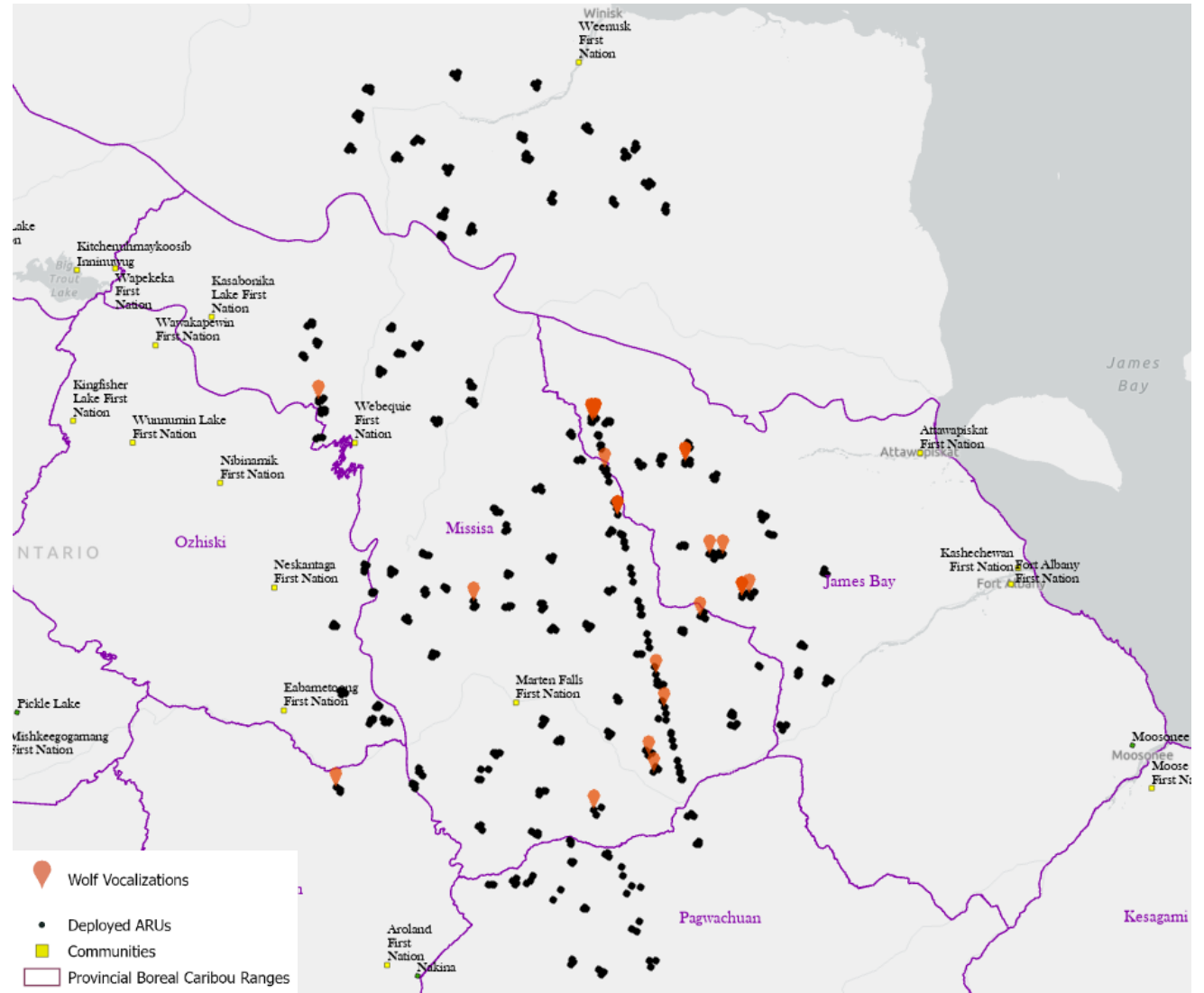
WOLF RECORDINGS ANALYSIS

- 560 ARUs were put out between 2019 - 2022 in the James Bay Lowlands
 - designed for bird studies, but analyzing same data sources for wolves
- Dusk and dawn recordings were analyzed for bird community species,
- Nocturnal recording analysis for wolves or nocturnal birds such as owls will begin this winter.
- Preliminary results indicate this is a useful method for detecting wolf howls on remote recording units



WOLF RECORDINGS ANALYSIS

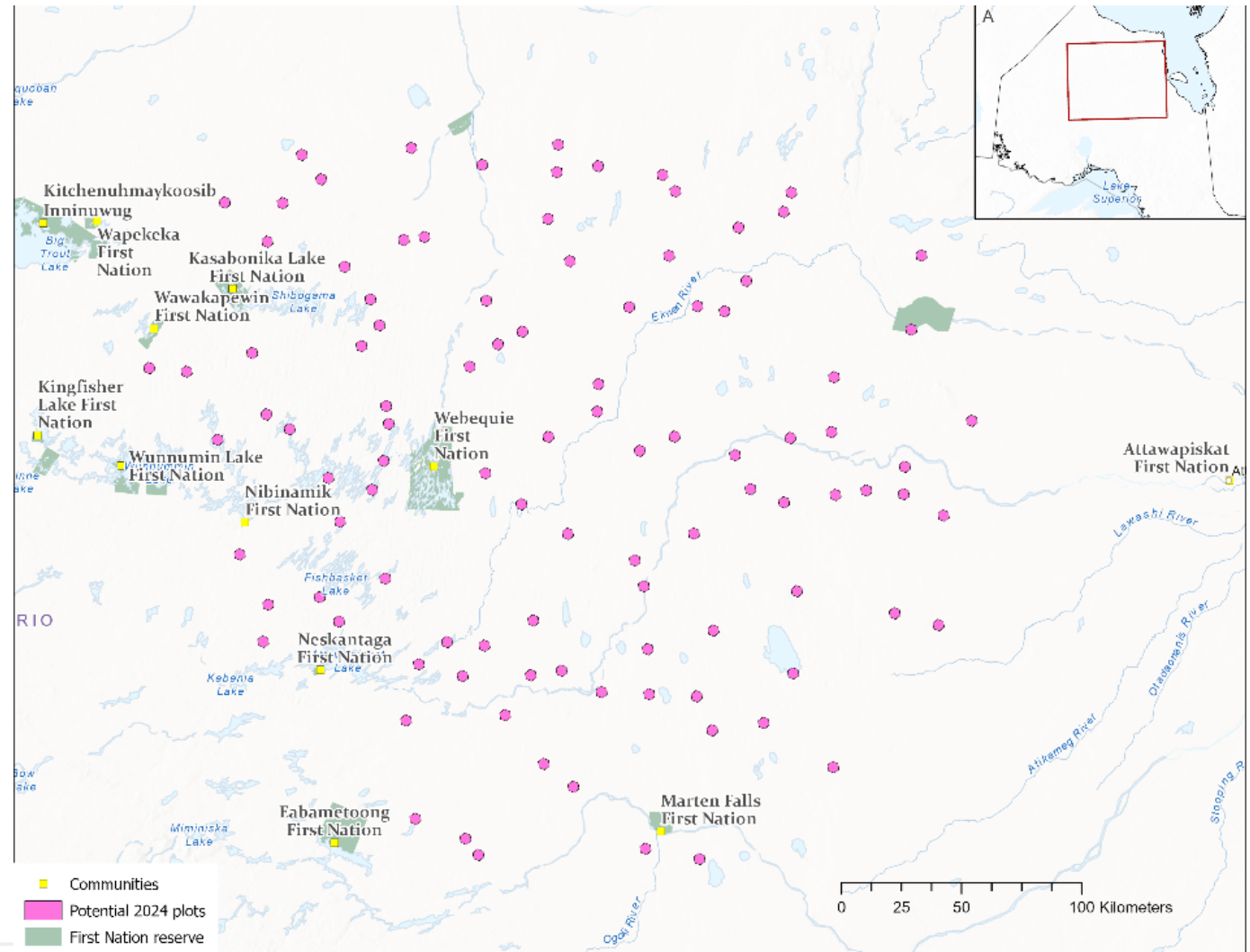
- Project is still ongoing, but so far 33 wolf calls have been detected from 444 partially interpreted ARU sites
- Data currently being analyzed is mostly from the James Bay Lowlands, some from Ontario Shield
 - Expect there is a lower density of wolves in the lowlands than in the more upland Ontario Shield ecozone
- Data from previously deployed ARUs will be analyzed soon
 - Shield deployed ARUs are expected to yield more wolf howl detections because this region supports a higher density of wolves



2024 TRAIL CAMERA & ARU DEPLOYMENT

Trail camera and ARU deployment planned for early 2024:

- Trail cameras, bird ARUs, and bat ARUs
- Units will be in place for up to 3 years



NEXT STEPS - PREDATORS

- Winter 2024 deployment of trail cameras and ARUs
- Input/comments from today's presentation
- Analysis of data
 - Preliminary results of ARU recordings available soon
 - Camera data analysis just getting underway
- Looking for opportunities for further collaboration
 - Questions or regions of interest to local communities
 - Partnerships for deployment of recorders
 - Discussion of potential for funding opportunities
- ARU data is publically available

What do you see as key questions of interest about predators in northern Ontario?

Do you have general comments or questions on the predator monitoring approaches?

Questions?

Do you know of any subregions of Far Northern Ontario ranges where there is a particular need for more information about predators?

...or that are of particular interest with respect to questions about wolves?

FUNDING

- Examples of agreements to date: biodiversity data collection and capacity building for surveys; collection and compilation of ITK; documenting of community biodiversity values; and mapping of peatlands.

Contact victoria.leck@ec.gc.ca for more information



THANK YOU FOR PARTICIPATING

If you have any further questions regarding this presentation, feel free to contact myself, Samantha McFarlane, at:

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