



WILDLIFE RESEARCH PERMIT APPLICATION FORM

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New Project

Ongoing Project

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SPONSOR(S): Environment and Natural Resources (ENR) - GNWT

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ADDITIONAL LICENCES REQUIRED: NWT Wildlife Care Committee Permit
Comités de protection des animaux de l'Université Laval

PROJECT TITLE: Mackenzie Bison Collaring Program 2021

RATIONALE:

Wood Bison are a Species at Risk, listed as “Threatened” under NWT legislation (Conference of Management Authorities 2017) and under Canada’s *Species at Risk Act*, and assessed as “Special Concern” by COSEWIC (COSEWIC 2013).

ENR has monitored the Mackenzie bison population since it was re-introduced to the area in 1963. Population surveys and summer classification surveys are completed to provide population trend information. However in recent years, following the 2012 anthrax outbreak and large wildfires in 2014, bison have changed habitat use patterns and have been difficult to locate during anthrax surveillance flights and classification surveys, resulting in low confidence in anthrax surveillance and age- and sex-ratios due to low sample sizes in some years (e.g., n=31 cows classified in 2017, 13 cows in 2014 and 0 in 2015).

Bison have not been collared in the Mackenzie subpopulation since 1993 following that year’s anthrax outbreak. **Renewed collaring of bison was recommended by the Mackenzie bison working group and is a Key Action in the Mackenzie Bison Management Plan, which was developed by the Mackenzie Bison Working Group and completed in 2018.** The working group was composed of members from the Community Government of Behchokò, Deh Gáh Got’îê First Nation, Fort Providence Métis Council, the



Hamlet of Fort Providence, North Slave Métis Alliance, NWT Wildlife Federation, NWT Métis Nation, Tłı̨chǫ Government, Wek'èezhì Renewable Resources Board, Yellowknives Dene First Nation and the Department of Environment and Natural Resources (ENR).

Bison location and movement information provided by collars will help address several identified knowledge gaps and help answer research questions, as detailed below:

Mackenzie bison management plan: Collaring of bison has been recommended by the Mackenzie Bison Working Group and is a Key Action in the *Mackenzie Bison Management Plan*. Knowledge gaps that would be addressed by collaring bison include: refining guidelines in the plan for setting sustainable harvest, modelling the population to increase knowledge of demography and population trends, understanding bison movements to help reduce collisions and conflicts in the community of Fort Providence, understanding habitat selection and range use to aid in managing habitat and Environmental Impact Assessment of future developments, estimating sightability on population surveys and calculating correction factors to be applied to estimates, understanding interactions with other species especially moose, wolves and caribou, improving surveillance and detection of anthrax, and providing data on frequency with which bison cross the Mackenzie River and enter the Bison Control Area and where they go when there.

Identifying Critical Habitat (CH) for wood bison is a requirement for species listed under Canada's *Species at Risk Act* but that cannot be done because information on habitat use and selection by most wood bison populations, include the Mackenzie, do not exist. The national *Recovery Strategy for Wood Bison (Bison bison athabascaae) in Canada* includes a schedule of studies to identify CH that includes collecting data such as would be obtained from collaring bison.

Locating bison for surveys: In recent years, following the 2012 anthrax outbreak and large wildfires in 2014, bison have changed habitat use patterns and have been difficult to locate during anthrax surveillance flights and classification surveys, resulting in low sample sizes for classification data (see above) or the cancellation of this survey (2019). Collared bison can be located using telemetry gear to increase survey sample sizes and confidence in anthrax surveillance.

Correction factor for population surveys: Boulanger *et al.* (2017) recommended continued use of distance sampling to estimate bison abundance but also recommended developing sightability models to correct for imperfect detection of bison on surveys, especially from fixed-wing aircraft. Collar-marked bison would enable ENR to estimate and correct for imperfect detection.

Understanding habitat use: Existing survey methods depend on visually spotting bison from an aircraft. This biases our observations to bison using open habitat types (e.g., large prairies or the shorelines of rivers and lakes). We know that wood bison also use forested habitats, but they are remarkably hard to see in this vegetation type despite their large size and dark coloring. Evaluating habitat use by collared bison will greatly enhance our understanding of how bison use open versus closed habitats and help improve survey design and anthrax surveillance. Understanding habitat use, habitat selection and range use will facilitate informed environmental impact assessments on future developments, identifying critical habitat and enable us to manage habitat to influence bison movements, e.g. to reduce collisions and community incursions.

Habitat selection compared to boreal caribou: Boreal caribou are monitored with collars within the Mackenzie bison range. Collar data from both species will allow us to compare habitat selection and



seasonal range overlap between these two species (as well as with collared wolves).

Collaborative research project: ENR is collaborating with Dr. Daniel Fortin at Laval University on a project titled “Interdisciplinary research to understand changing food-web dynamics and threats to food security in the northern boreal forest.” This project will use data from collared animals of different species (e.g. ENR already has collar data from boreal caribou and wolves) to ask questions about how species interact with and influence each other, and how that changes depending on which species are present in an area. Collar location data will be used to identify fine-scale movement rules of individual species, and we will then use these rules to make larger-scale predictions about the distribution dynamics of interacting large mammals. The research will also provide basic information on habitat selection, and identify areas prone to human-wildlife conflicts (e.g., collisions).

TIME PERIOD:

- Collar deployments in February or March 2021 (most collars will be programmed to collect data for 6 years, up to 6 camera collars will collect data for 9 months)
- Mortality investigations, monitoring of location data from GPS collars and other activities occur throughout the year.

LOCATION AND NEAREST COMMUNITY: The Mackenzie bison population is located west of Great Slave Lake, north of the Mackenzie River (Figure 1). The closest communities are Fort Providence and Behchokò.

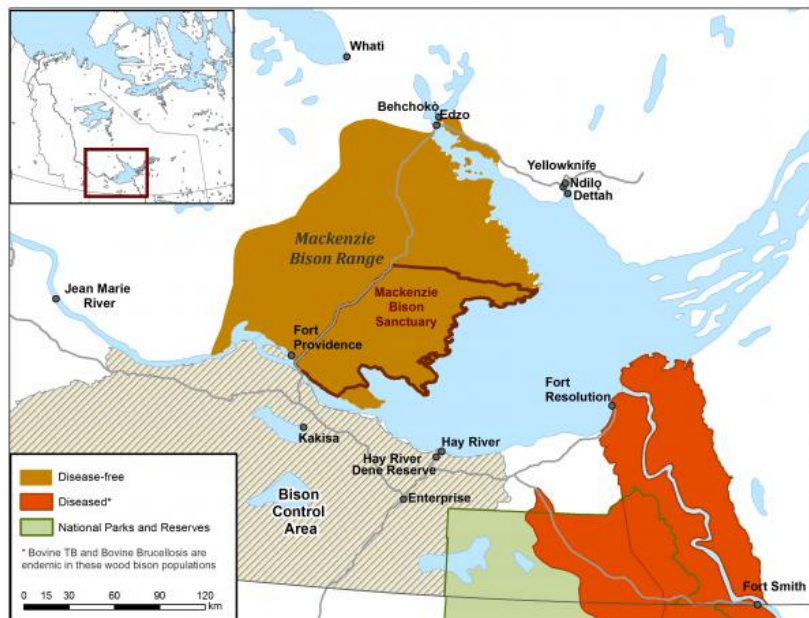


Figure 1: Mackenzie Bison Range

SPECIES STUDIED: Bison



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PROJECT PERSONNEL:

Terry Armstrong, Bison Ecologist, ENR Fort Smith, NT.
Liam Case, Wildlife Technician II, ENR Fort Smith, NT.
Naima Jutha, Wildlife Veterinarian, ENR Yellowknife, NT.
Brett Elkin, Director of Wildlife, ENR Yellowknife, NT.
Daniel Fortin, Professor, Laval University, Co-Principal Investigator of Sentinel North project
M.Sc. and PhD students co-supervised by D. Fortin
James Hodson, Manager, Environmental Assessment and Habitat, Yellowknife, NT.
Renewable Resources Officers –Fort Providence and Behchokò
Community Representatives
ENR Personnel as needed

OBJECTIVES:

Note that these objectives address specific objectives in the *Mackenzie Bison Management Plan* and the *Recovery Strategy for Wood Bison (Bison bison athabascae) in Canada*. A program to study Mackenzie bison using telemetry has long been supported and encouraged by the Mackenzie Bison Working Group and the comment that this work is still needed was made again in the March 2020 Working Group meeting. The *Review of Bison Monitoring Program for the Northwest Territories* (Boulanger *et al.* 2017) also recommended using integrated or multiple-data source models to further model bison demography and trends. These models would use data obtained from this collaring program, especially survival and recruitment rates. Other objectives include:

- Assess annual and seasonal habitat use and movements by adult female bison
- Document seasonal range use, annual home ranges and fidelity to calving areas
- Investigate habitat use and selection in relation to natural and human caused disturbance (e.g. wildfire, development) and landscape features (e.g. habitat type)
- Investigate movements in relation to highway 3 and the community of Fort Providence
- Compare habitat use and selection to that of boreal caribou and wolves, using collar data from the same geographic area
- Locate bison to increase sample sizes of summer classification surveys and anthrax surveillance
- Provide a correction factor for bison detection rates on population surveys and of dead bison in the event of an anthrax outbreak
- Monitor adult female survival and calf classification to track population trends (not implemented until year 2 or year 3)

METHODS:

Bison observations and traditional knowledge of historic and recent range use from land users will be used to determine the location of bison prior to collaring. Distribution of collars will be planned to target a random sample distributed across the range of the Mackenzie population. For remote areas, a fixed-wing aircraft may be used to locate groups of bison in advance of the capture helicopter.

GPS collars will be deployed on up to 26 adult female bison (2x Telonics Iridium TGW-4780-3 and 18x



TGW-4770-4, and up to 6 camera collars provided by Laval University) to monitor the movements, habitat use, and survival of these bison. Telonics Iridium collars will be programmed to collect data over 6 years. After 6 years, any bison that is still alive will be recaptured to remove its collar. Recaptures are planned instead of using release mechanisms that allow the collar to drop to the ground at a pre-determined time because experience in the NWT's Liard/Nahanni population and from bison collaring projects in other jurisdictions has shown that drop-off mechanisms are a weak point where collars break when used on bison. In the Liard/Nahanni population, 5 of 8 collars on bison cows broke at the site of the release mechanism within 1-11 months of deployment (mean 6.6 months). It is preferable to ensure that after an animal is captured, data is able to be collected over a long period of time.

Up to 6 camera collars provided by Laval University may also be deployed on adult female bison. These collars can provide information on calf births, predation events (even those that do not result in the bison's death), foraging behaviour in various habitats, and activity budgets. This information will contribute to the collaborative study with Laval University examining questions about habitat use and about how species interact with and influence each other. These collars will have release mechanisms programmed to release the collar after 9 months (due to battery life), and will be recovered by helicopter.

During February or March 2021, bison will be captured by net-gun from a helicopter. Capture and collar deployment will be done by an experienced crew consisting of a capture pilot, net-gunner and animal handler(s).

Pursuit of individual bison will be kept short (≤ 1 min of active running during the helicopter chase), and will be terminated if the target animal show signs of fatigue (stumbling, open mouth breathing). Once a target animal has been identified, a net will be fired from a hand-held net-gun. Once a bison is netted, the helicopter will land and the animal-handler(s) will hold the animal down, hobble and blindfold it for safe handling. The head and neck will be positioned so that the animal can breathe normally.

The animal will be visually and manually assessed to check for any capture-related injuries at the beginning of the handling, and monitored for vital signs until released (temperature, pulse, respiration).

The animal will be processed as quickly and safely as possible, with noise at the site kept to a minimum. Age and sex of the animal will be recorded, and the incisor bar will be examined to estimate age and photographed for future reference. Samples to be collected include blood (2 red tops and 2 EDTA tubes), feces (handful from rectum), and hair samples (coin envelope full, plucked from shoulder area). The collar will be fastened securely around the animal's neck, allowing for an open-palmed hand to move freely between the neck and the collar material. Pictures of the animal's head with collar ID visible are taken.

Once collaring and sampling is complete blindfold and hobbles will be removed to release the bison. Pursuit and handling times will be recorded.

In the event of an injury or other health issues during capture and handling, the animal will be assessed by the capture team and if euthanasia is required, the bison will be shot (rifle or shotgun) in the head or heart in accordance with guidelines on field euthanasia using firearms. If there is a mortality, the crew will contact the ENR veterinarian or other designate before continuing work. The ENR designate will make an assessment and a decision on whether not to proceed and confirm instructions regarding collection of biological samples and disposition of the carcass. The animal will be dressed in the field and transported to the nearest community so the meat can be used.



Starting immediately, animals will be monitored by GPS satellite locations. If a bison dies during or within 30 days of capture, a full necropsy will be undertaken whenever possible. Documentation will include a detailed history and digital images of the field necropsy to assist the veterinary pathologist diagnosing of the cause of death.

CURRENT CONSULTATION:

The *Mackenzie Bison Management Plan* was developed by the Mackenzie Bison Working Group, which was composed mainly of community members. The working group recommended that ENR develop a collaring program for Mackenzie bison and reiterated that in the March 2020 working group meeting. Ongoing consultation will continue with communities (Deh Gáh Got'îê First Nation, Fort Providence Métis Council, Tłı̄chq̄ Government, Wek'èezhì Renewable Resources Board, North Slave Métis Alliance and Yellowknives Dene First Nation) through the application for a wildlife research permit. Community observers will continue to participate in fixed-wing aerial surveys to estimate bison abundance and other surveys as opportunity permits. Information is also shared at the biennial regional wildlife workshop.

FUTURE COMMUNITY CONSULTATION PLAN:

A meeting will be held or report provided each year to each community or their representatives to provide information on bison monitoring and to receive feedback and input from communities. Monitoring results are also presented at the biannual regional wildlife workshop.

OPPORTUNITIES FOR LOCAL PARTICIPATION:

Community observers will continue to participate in fixed-wing aerial surveys and other surveys as opportunity permits. There are not opportunities for local participation during bison captures.