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Aerial Monitoring for Wild Pigs in the Northwest Territories

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ABSTRACT

This report describes the results of the first aerial survey attempt in the Northwest Territories conducted in November 2020 that looked for wild pigs. The survey was a proactive response to the threat of an expanding range of wild pigs in Alberta and Saskatchewan northwards, and an opportunity to judge the operational realities using a belly-mounted forward-looking infrared (FLIR) camera on a helicopter for future monitoring and management responses.

The survey was conducted between November 5 and 6 with a total of ten hours flown. The survey crew consisted of the authors, camera technician Kyle Landry and pilot Brent Robinson who flew in an A-Star B2 helicopter operated by Acasta HeliFlight Inc. In general, weather was good although low cloud and snowfall somewhat constrained the first day of flying.

Flying focused on searching the 60th parallel. Wild pigs and all large wildlife along flightpaths were searched for using the infrared system, and visually using motion-stabilized binoculars from the front seat or rear seat of the helicopter. Overall, no wild pigs were detected visually or by the FLIR camera. Several observations of big game species were recorded and every effort was made to detect and video capture every animal seen.

Future surveys could likely be completed with an appropriate low-speed and altitude capable fixed-wing aircraft. Also, future use of the FLIR camera system could be limited to situations when trying to find a specific animal in a known approximate area; especially when search times and spatial area coverage could be generally limited.

TABLE OF CONTENTS

LIST OF FIGURES

INTRODUCTION

There is one historical account of wild pigs (*Sus scrofa*) at large in the Northwest Territories (NWT) from 1996 when a small group escaped an enclosure near Fort Resolution. These individuals were quickly eradicated (Figure 1). While exact amounts are unknown, the numbers of pigs in the NWT today are very likely low and primarily exist as companion animals or raised for agricultural purposes. Even so, escapes from fenced areas are not uncommon (Figure 2).

Figure 1. The sounder of now eradicated wild pigs initially found along the highway to Fort Resolution in 1996. Photo: GNWT/Brett Elkin, ENR.

Figure 2. Agricultural pigs in 2019 that escaped their enclosure near Fort Smith and returned to their owner. Photo: GNWT/ENR.

Wild pigs, also commonly called feral hogs, feral pigs, feral swine, invasive wild pigs, or wild boar (Keiter et al. 2016), are a serious issue as these invasive animals typically wreak havoc to landscapes, ecosystems, and can be vectors for the spread of disease to native wildlife populations (Barrios-Garcia and Ballari 2012). Wild pigs throughout North America originated primarily from escaped domestic/farmed populations after the market for them crashed in the mid-1990s (Kramer 2021). After that time a series of intentional releases, further escapes, and uncontrolled breeding of free-ranging pigs sourced the viable free-ranging populations that exist today (Brook and van Beest 2014, Michel et al. 2017).

Immediately neighbouring the NWT, wild pigs in Alberta and Saskatchewan have demonstrated high reproduction rates, become established over significant areas, have high overwinter survival, and continue to exhibit range expansion (Aschim and Brook 2019).

Discussions with jurisdictional experts shared that, at least as of 2019, the nearest known recent location of wild pigs to the NWT border was approximately 300 km to the south near Highway 35 in Alberta. Considering the demonstrated capacity for wild pig range expansion and their highly adaptive nature (Aschim and Brook 2019), vigilance against this invasive species and monitoring of their movements are necessary to safeguard the NWT's

wildlife and wildlife habitat. Early detection and rapid response is critical to prevent the expansion and subsequent establishment of a wild pig population in the NWT.

METHODS

The Department of Environment and Natural Resources (ENR) chartered an AS350B2 (A-Star B2) helicopter to fly along the NWT 60th parallel for a wild pig surveillance flight. The A-Star was equipped with a belly-mounted forward-looking infrared (FLIR) U 8000 Series camera (Figure 3). This geo-stabilized infrared camera can continuously record the flight path imagery in full-colour, or "white-hot" or "contrast" infrared, resolution.

Figure 3. Naima Jutha along with the belly-mounted FLIR U 8000 Series camera on November 5, 2020. Photos: GNWT/ENR.

As this was the first attempted wild pig surveillance flight we estimated two days of flying would be required including positioning to-and-from Yellowknife. Day one would be a ferry flight to the border flying westerly, day two would be a ferry flight from Hay River to Fort Liard, then proceeding to a survey along the border flying easterly.

All wild pigs and wildlife were searched for thermally using the infrared camera, and also visually using motion-stabilized binoculars from the front seat or rear seat of the helicopter. The infrared had a live-feed to a dedicated observer watching a monitor mounted in the back seat of the helicopter, with focus and directional panning controlled by a handheld remote. All observations were recorded with the FLIR camera and a GPS waypoint taken for each observation. Garmin GPS units were used to record flight lines. A dedicated camera technician accompanied us on each helicopter flight with the pilot to lead the operation of the FLIR unit.

RESULTS

Air temperatures during the surveys were generally mild with -13˚C on November 5th and -18˚C on November 6th. Flying on November 5th was somewhat constrained by low cloud and snowfall requiring that survey to end early. Snow cover was continuous in the areas surveyed (Figure 4).

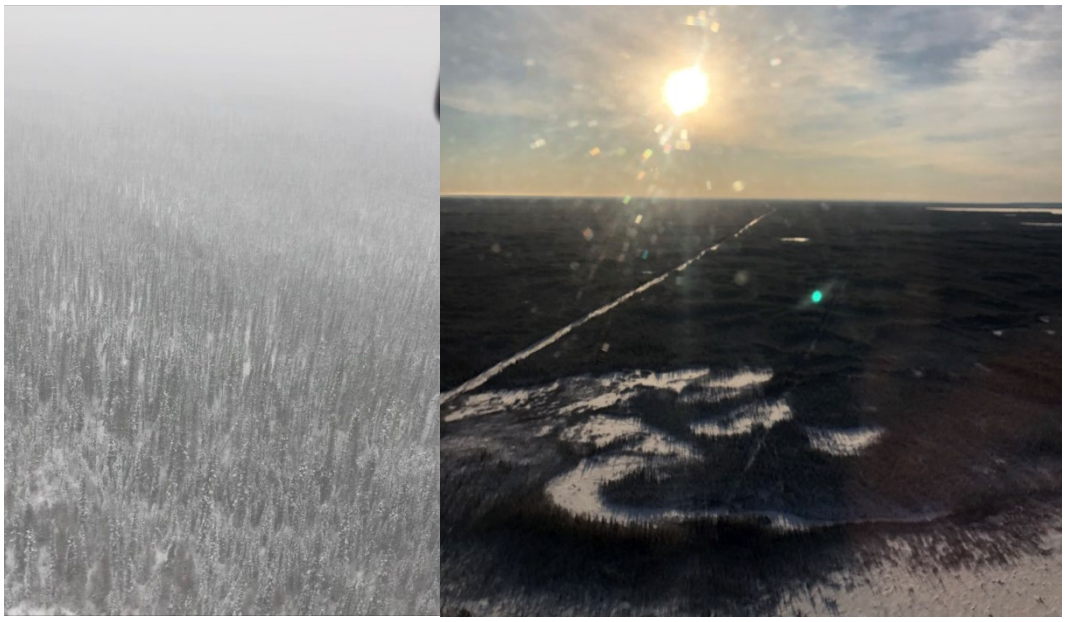

Figure 4. Field conditions on November 5 (left) before suspending the flight for the day, and November 6 (right). Photos: GNWT/ENR.

We surveyed all of the 60th parallel except for an approximate 80 km portion after weather conditions suspended activities on November 5th. Altitude was maintained at about 120 m (400 ft.) above ground level.

No wild pigs were detected visually or by the FLIR camera, however several observations of wood bison (*Bison bison athabascae*), boreal caribou (*Rangifer tarandus caribou*), moose (*Alces americanus*) and wolves (*Canis lupus*) were made (Figure 5). As this was the first experience in the NWT using FLIR imagery to potentially assist with the detection of wild pigs, every effort was made to detect and video capture every animal seen (Figure 6) as a test of method.

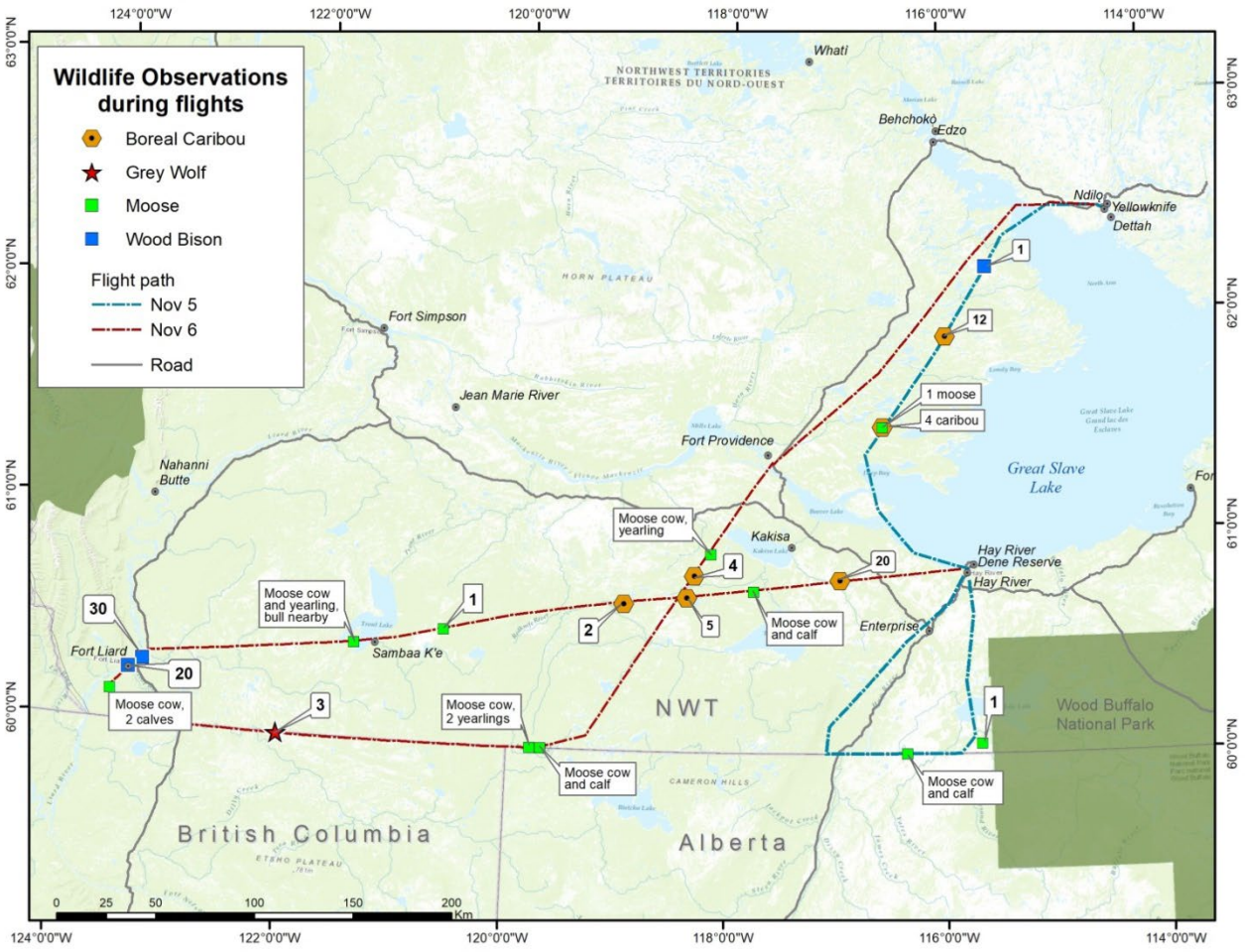

Figure 5. Flight path and observations with numbers of recorded individuals found on November 5 and 6, 2020.

Figure 6. Select images of animals observed using the FLIR camera. Clockwise from upper left: wood bison in the full-colour setting, with the remaining infrared images of two boreal caribou, a running wolf, and a cow moose with yearling calf. Photos: GNWT/ENR.

DISCUSSION

Our November 2020 wild pig survey was a proactive response to the threat of the expanding range of wild pigs in Alberta and Saskatchewan northwards. Not only was it an opportunity to judge the operational realities of an aerial surveillance flight to look for wild pigs, the survey enabled us to test and judge the feasibility of the FLIR system for future monitoring and management responses carried out by ENR staff.

In normal camera mode (see the wood bison image in Figure 6) the camera on the FLIR automatically controls the focus and contrast adjustments. However, when toggling to infrared the device requires continual manual adjustments for focus and contrast. This can be operationally challenging even at a constant altitude as variability in sun coverage, terrain differences, forest cover, and other factors require the user to almost continuously adjust the image. Our survey benefitted from a dedicated camera technician on board.

The time of year was optimal for the survey with foliage off the trees and 100% snow-cover, yet not too cold. Future surveys could be completed with an appropriate fixed-wing aircraft capable of slow flight speed and low altitude, like an Aviat Husky, as ground visibility along the 60th parallel is not restricted by thick forest canopy for a significant portion of the flight line. Future use of the FLIR camera system could be limited to situations when trying to find a specific animal in a known approximate area, when search times and spatial area coverage could be generally limited. Our assessment is that the system appears to be best suited to circumstances demanding high specificity surveillance concentrated to a limited geographical area, when investigators have a high degree of confidence that there is some targeted animal or group of animals to be observed within that range. It does not appear beneficial when the surveillance objective is to confirm absence, which demands tools catered to surveillance objectives requiring higher sensitivity.

Alternatively passive in-place monitoring like remote deployed cameras with sound recorders could provide baseline data. These units deployed in a series along the 60th parallel would also help with important biodiversity monitoring and species inventories or expansions from the south by white-tailed deer (*Odocoileus virginianus*), elk (*Cervus canadensis*), or cougar (*Puma concolor*), and likely others, along with monitoring for movement from wild pigs.

As of July 2019 any pig found outside of a fenced enclosure is now declared a “pest” under the *Wildlife Act.* Any NWT resident may kill or capture, or attempt to kill or capture, what is considered a wild pig in these instances without a licence or any restrictions. All kills must be reported to ENR within 72 hours.

Even though hunters are our first line of defence should wild pigs ever enter the NWT, ENR accepts that a coordinated jurisdictional response for wild pig eradication would also be warranted. To that end an *ENR Wild Pig Surveillance and Response Plan* is in preparation with external academic partners and wildlife managers drawing from expertise in Saskatchewan and Alberta. This plan outlines a thorough risk assessment specific to the sociocultural, ecological, and biological realities of the NWT and its wildlife. Additionally, it provides an in-depth overview of ongoing and potential future surveillance options, including both active ENR-driven activities and citizen science platforms, based upon changing potential risk of wild pigs entering the NWT. Importantly, this document provides guidance strategies in the event of wild pigs being reported in our jurisdiction, for on-the-ground response, public communications, and subsequent adaptive monitoring and management.

ACKNOWLEDGEMENTS

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