



Narrative Report for IPI Project: GCXE20C327: Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake Alberta

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Foreword

This report is intended to summarize and report the progress and outcomes of the 2-year Environment Canada and Climate Change (ECCC) Indigenous Participation Initiative (IPI) project “Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta” - GCXE20C327 (the “Project”). The Project was designed to inform and support the conservation and recovery of boreal caribou in the Bistcho (or “*Mbehcho*”, in Dene Tha’ language) region, using a combination of western scientific methods and Dene Tha’ First Nation (DTFN) Traditional Knowledge, so that species-at-risk in the Bistcho Lake area, and the ecological and cultural connections that support and depend on them, may self-sustainably persist on these landscapes into the future. The funding served to launch this monitoring program and supported its first year of data collection. The intention of the monitoring program is to continue collecting data for at least five more years, or longer as funding permits.

1.0 Background and Summary of Project

The Dene Tha', or *People Common to the Territory*¹, are band members of DTFN, a self-governing Band within the definition of the Indian Act. DTFN's Traditional Territory is in Treaty 8 and 11 and overlaps what is now Alberta, British Columbia and Northwest Territories. DTFN has seven reserve parcels, including: Amber River 211; Bistcho Lake 213; Bushe River 207; Hay Lakes 209; Jackfish Point 214; Upper Hay River 212; and Zama Lake 210. DTFN has three settlements, at: Bushe River (Bushe River 207), Chateh (Hay Lakes 209), and Meander River (Upper Hay River 212). DTFN has approximately 3,000+ members, with approximately 1,000 living off-reserve.

Over the last number of years, DTFN’s ability to undertake meaningful traditional activities has been significantly eroded. With each new development that takes place, whether it be a new pipeline, oil or gas development, logging, mining/aggregates, dams, agriculture, or some other type of project, more and more lands are taken up, leaving fewer and fewer places for self-sustainable wildlife populations and intact and undisturbed wildlife habitat.

Cumulative effects of all of this development threaten not only our ability to continue to use the lands to exercise Treaty rights, but also our cultural existence as Dene Tha’ people. “The DTFN are not interested in empty Treaty rights”² [where the territorial lands, air and waters are impacted by human activities to the extent that required abundances of natural, healthy, and

¹ Dene Tha’ First Nation. 1997. Dene Tha’: Traditional Land Use and Occupancy Study. Prepared by: Arctic Institute of North America.

² F. Didzena, DTFN’s Director of Lands, personal communication with M. Munson, Nov. 1, 2021

intact species, habitat and ecosystems are increasingly diminished and not available for successful traditional activities].

Being Dene Tha', we are intimately connected to the lands, waters and resources in our Traditional Territory, and we have stewardship responsibilities to take care of them. We teach our children our cultural and harvesting practices and language, and what it means to be Dene Tha', by being out on the lands with them in our Traditional Territory. We have reciprocal responsibilities to support the conservation and protection of wildlife species, habitats, and ecosystems, as these have support us – since times before memory, for now, and into the future.

Development needs to be proactively and carefully managed to ensure that sufficient wild places and suitable areas to harvest remain to support a meaningful ability to successfully hunt, trap, fish, and gather the many species of animals, fish, birds, plants, and medicines upon which our food security, culture and traditions rely.

It is critical that DTFN meaningfully participates in design, decisions and outcomes of land use, conservation, and development proposals. These proposals come along with direct, cumulative, and residual effects that may affect our water, land, air, species, habitats, and ecosystems, that we rely upon for our food security, traditions, and Treaty rights.

Woodland caribou were listed as Threatened under the federal Species At Risk Act (SARA) in 2002 by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). It is particularly important that DTFN is involved and engaged in recovery planning for Boreal Woodland Caribou (*Rangifer tarandus caribou*) throughout DTFN's Traditional Territory.

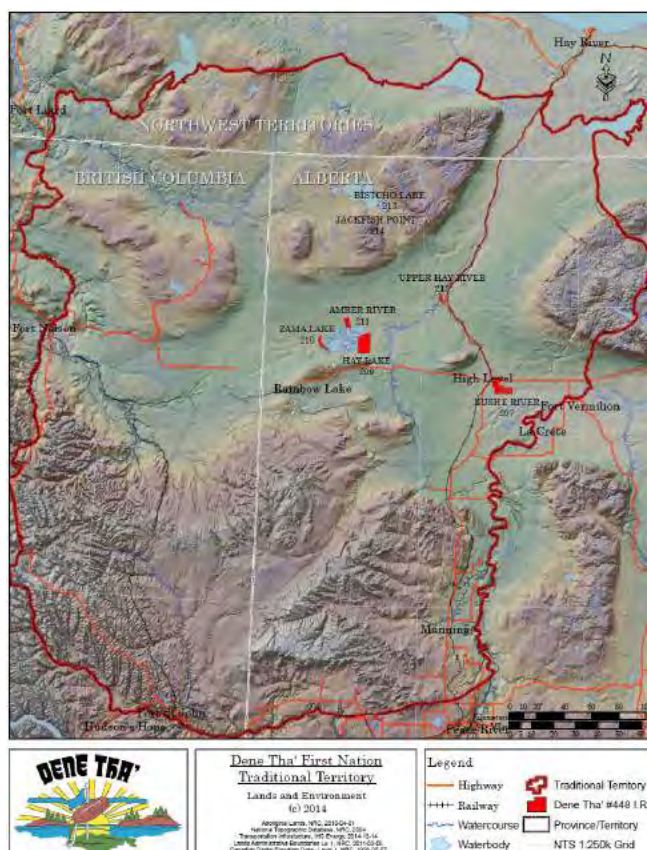


Figure 1.1. Map of Dene Tha' First Nation's Traditional Territory³

³ Dene Tha' First Nation. 2014. Dene Tha' First Nation Traditional Territory. Lands Department.

Following the Boreal Woodland Caribou recovery strategy (2020), range plans must be developed that meet habitat and population objectives. Range plans must engage and include Indigenous communities, who are best suited regionally and locally, that have strong experiential and Traditional Knowledge of caribou lifecycle, migration dynamics, and core habitats to: inform and influence effective caribou population recovery; optimize habitat restoration strategies; and identify, assess and mitigate likely uncharted effects of these recovery strategies.

Community and Guardians have identified some opportunities and concerns about potential provincial directed strategies for recovering the Bistcho range to above 65% undisturbed. Optimizing efficient disturbance restoration activities will be important - to maximize contiguous areas of un-disturbed biophysical habitat with the least amount of restoration treatments. Some DTFN are concerned about the use of very large forestry cut blocks as a primary driver of habitat restoration - intending to 'erase' legacy disturbance as these very large blocks 'sweep' across the caribou range – this strategy may leave stranded disturbances in in-operable forestry areas and increase predator and prey interactions and predation at block perimeters; and others⁴.

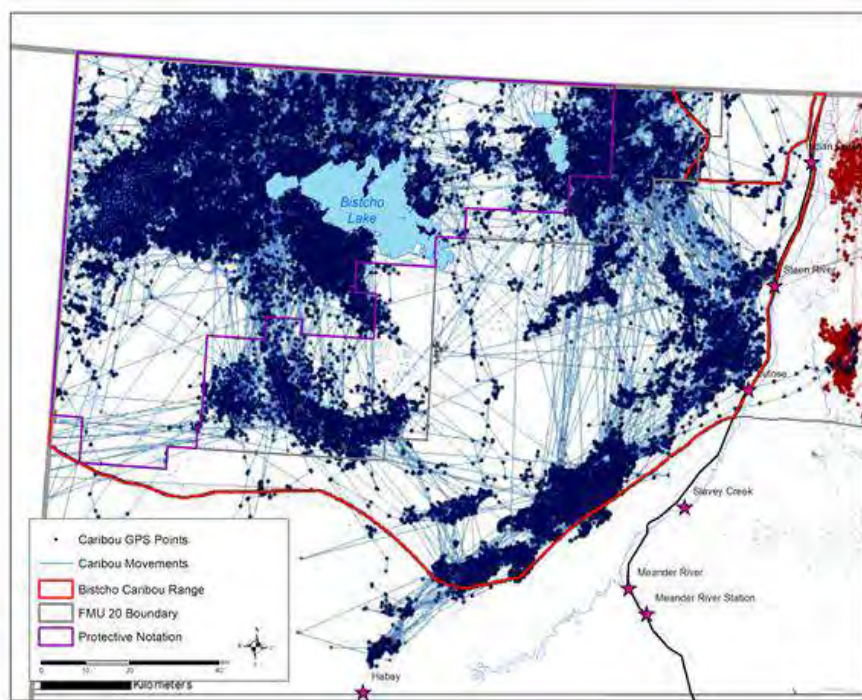


Figure 1.2. Caribou telemetry location for Bistcho woodland caribou herd, adapted from the 2017 Draft Woodland Caribou Range Plan by the Government of Alberta

DTFN has submitted many letters, comments, concerns, and recommendations to federal and provincial governments, seeking to inform into, meaningfully participate in, and collaborate with, government led species recovery and habitat conservation initiatives, including land use

⁴ Dene Tha' First Nation. (In-progress). Bistcho Indigenous Protected and Conserved Area at Bistcho Lake Project.

planning process (i.e.: Alberta Caribou sub-regional task force - Bistcho⁵) and federal / provincial caribou agreements (Section 11 Agreement for the conservation and recovery of the woodland caribou in Alberta⁶). It remains unknown to date, if or how governments will meaningfully include DTFN in the implementation of Bistcho caribou agreements, plans, and management objectives (i.e.: regional Guardians programs for adaptive management of caribou recovery strategies; Indigenous-nominated areas for designated habitat protection and restoration; cooperative management of regional plan and caribou agreement implementations).

Caribou herds in Alberta (Bistcho, Yates, Caribou Mountain, and Chinchaga), BC (Calendar, Chinchaga, Maxhamish and Snake-Sahtaneh), and Northwest Territories (NS1), are found within DTFN's Traditional Territory. The Alberta Bistcho caribou herd was deemed unlikely to be naturally self-sustaining according to a 2012 assessment by Environment and Climate Change Canada (ECCC)⁷. The Bistcho herds are known by DTFN Elders to share transboundary ranges (and inheritances) with caribou herds in Alberta (Yates and Caribou Mountains), British Columbia (Calendar, Maxhamish, and Snake-Sahtaneh), and Northwest Territories (Boreal Caribou – NS1)⁸.



Please see left a picture of respected community Elder (late) Willie Chambaud, marking up an interview map with Traditional Knowledge locations including caribou sightings, migrations, and biophysical habitats, for DTFN's Environment Canada Nature Fund "Quick Start" program.

⁵ <https://www.alberta.ca/caribou-sub-regional-task-forces.aspx>

⁶ <https://open.alberta.ca/publications/agreement-for-the-conservation-and-recovery-of-the-woodland-caribou-in-alberta>

⁷ Environment Canada. 2012. Recovery Strategy for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal population, in Canada. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa.

⁸ Dene Tha' First Nation. (In-progress). Bistcho Indigenous Protected and Conserved Area at Bistcho Lake Project.

Recent archaeological work in the area has confirmed thousands of years of continuous presence, use and occupation in our Traditional Territory within Alberta, British Columbia, and Northwest Territories, and by the types of archaeological artifacts recovered, suggest an equally long-standing relationship with the caribou.

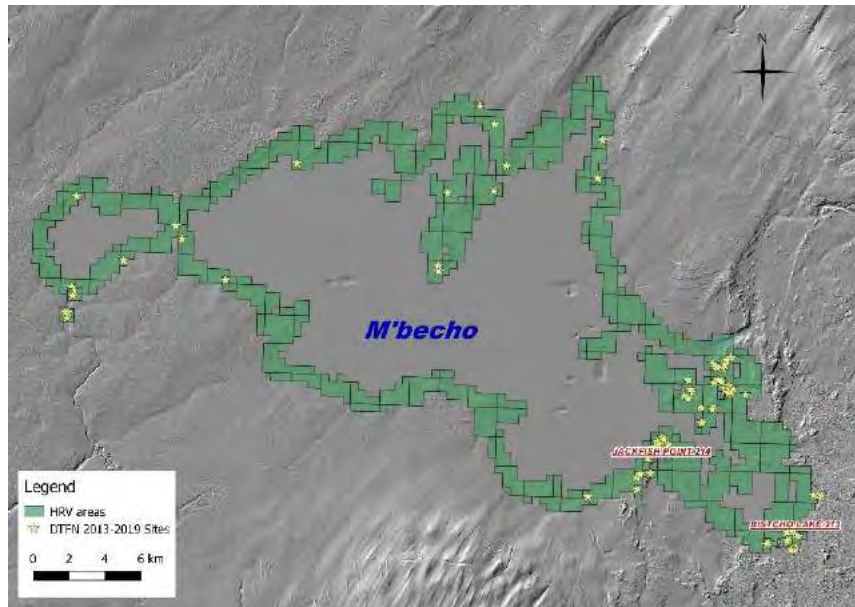


Figure 1.3. Map of Alberta Historic Resource Value (HRV) areas and DTFN archaeological sites at Bistcho Lake, AB.⁹

Fort Nelson Game Warden J.S. Clark, accompanied by his colleague, Special Game Warden B. Villeneuve undertook a 90-day dog sled patrol between January to April of 1932, within northeastern BC and northwestern Alberta¹⁰, and noted the following historic observations, including abundances of caribou relative to watercourses (Petitot River) within the Projects' camera array area:

"The country between N.W.T. line and Kotcho Lake and thence to the Alberta line is one of the very best Fur countrys in Western Canada. While I was in the Shikillie River country I never seen better fur signs and Beaver dams to be found all over the country, and Big Game such as Moose and Caribou can be found all the way up and down the Shikillie River, and the same on the Black [Petitot] River, and the Hay River."¹¹

The Bistcho caribou herd is threatened by a history of industrial disturbance in its range, especially pervasive impacts from oil and gas exploration. Legacy seismic lines, used to explore for oil potential belowground, bisect the Bistcho caribou range extensively. There are almost 62,000 km of legacy

⁹ Tiaga Heritage Consulting Ltd. 2019. Map of Alberta (HRV) areas and DTFN archaeological sites at Bistcho Lake.

¹⁰ Bouchard, R. 14 July 2009. Dene Tha' Presence in Northeastern BC. pp. (10-11).

¹¹ Patrol Report of Fort Nelson Game Warden J.S. Clark, 20 April 1932. BCA, GR 1085, Box 2, File 8, Hay Lakes Indians, 1932-1934. Extracts from this same report are found in: LAC, RG 10, Vol. 6735, File 420 – 3B.

seismic lines in the range, the most of any caribou range in Alberta. Approximately one fifth of the range overlaps with oil and gas footprint and current operations. Industrial activities alter the landscape and have driven caribou declines across the country by altering predator distributions, alternative prey distributions, fragmenting habitat, and reducing suitable caribou habitat.

Total habitat disturbance was assessed through satellite and ortho-image classification by Alberta Environment and Parks. 94% of the range's caribou habitat was determined to be disturbed by quantifying the footprint of permanent and temporary roads; municipal infrastructure; electrical lines; railways; well pads; coal, peat, and mineral mines; industrial facilities; pipelines; and forest harvest areas.¹² These cumulative disturbances reduce the Bistcho caribou herd's habitat to only 6% undisturbed. Significant (inclusive, collaborative and sustained) efforts will be required to meet Environment Canada's target of 65% undisturbed habitat for boreal woodland caribou.¹³ Thus, an effective range plan for the Bistcho caribou herd must address landscape change impacts and include management strategies that reflect how caribou, and the wildlife community, have responded to these landscape changes and monitor (in near-real time) effects and efficacy of caribou population recovery and habitat restoration measures.

SARA-listed species known to occur within DTFN's Traditional Territory include:

- | | |
|---|---------------------------------------|
| 1. Woodland caribou (boreal population) | 8. Rusty Blackbird |
| 2. Wood Bison* | 9. Yellow Rail |
| 3. Grizzly Bear (Prairie population) | 10. Bank Swallow |
| 4. Wolverine | 11. Red-necked Phalarope |
| 5. Short-eared Owl | 12. Horned Grebe (Western population) |
| 6. Common Nighthawk | 13. Gypsy Cuckoo Bumble Bee |
| 7. Olive-sided Flycatcher | |

(*) disease-free Wood Bison in Alberta, listed on Nov 12, 2021

2.0 Purpose and Expected Results

The primary purpose of this Project was to develop a Traditional Knowledge-informed remote camera array in the Bistcho Lake area in the Northwest of Alberta in DTFN Traditional Territory to support wildlife data collection, especially for; caribou population recovery, habitat protection and restoration, and to increase and enhance available caribou data. The camera array program has been in place for almost two years collecting data on the culturally and ecologically valuable species in the area, especially those of conservation concern, most prominently boreal woodland

¹² Alberta Environment and Parks. (2021). Draft Bistcho Lake Sub-regional Plan Appendix A: Woodland Caribou Habitat Recovery Analysis.

¹³ Environment Canada. 2012. Recovery Strategy for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal population, in Canada. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa.

caribou. In the long-term, these data are expected to give insight into population dynamics, spatial ecology, and overall herd health of the Bistcho caribou herd. These data are expected to meaningfully inform the cooperative management of the Bistcho caribou herd, such that these populations are self-sustaining over long periods of time, and for; “... *as long as the sun shines, the grass grows, the rivers flow and until such time as Yidah should reverse ...*”.¹⁴

Protecting caribou is critical for many reasons, including maintaining boreal species biodiversity, protecting the traditional cultural practices of the DTFN, and safeguarding a cultural icon of the Canadian wilderness. Below are preliminary results from the 2020-2021 monitoring season.

The array was developed to encompass the areas that DTFN Traditional Knowledge holders indicated were vital for caribou movement and occupation. Site selection within these important areas was further informed using a western scientific approach that used a stratified random study design that ensured habitat classes were proportionately sampled, so as to avoid biasing the data toward one habitat type. Our monitoring sites reflect a variety of habitat types and topologies across important caribou movement corridors and habitat uses (See Figure 2.1).

A field team comprised of CPAWS and DTFN technicians travelled to these remote locations via helicopter in March of 2020 and deployed 33 remote cameras surrounding Bistcho, Thurston and Beatty Lakes. Cameras were serviced a year later in March 2021. Nine cameras were replaced to address equipment failures. Cameras at all 33 sites remain in the field to continue collecting data.

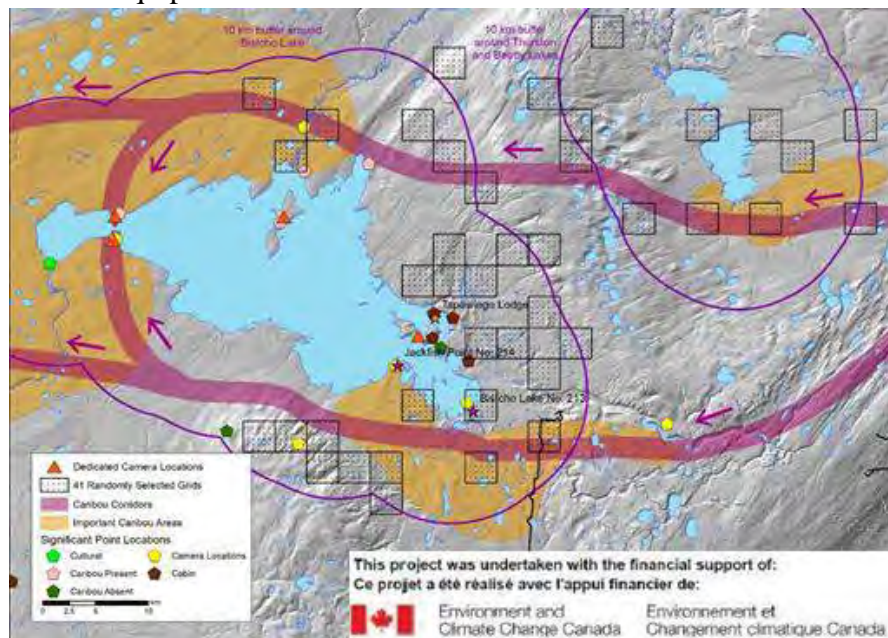


Figure 2.1. Array development map using DTFN Traditional Use Study data

¹⁴ Treaty 8 First Nation. 2021. About Us. [website: <http://www.treaty8.ca/About-Us-2/>]

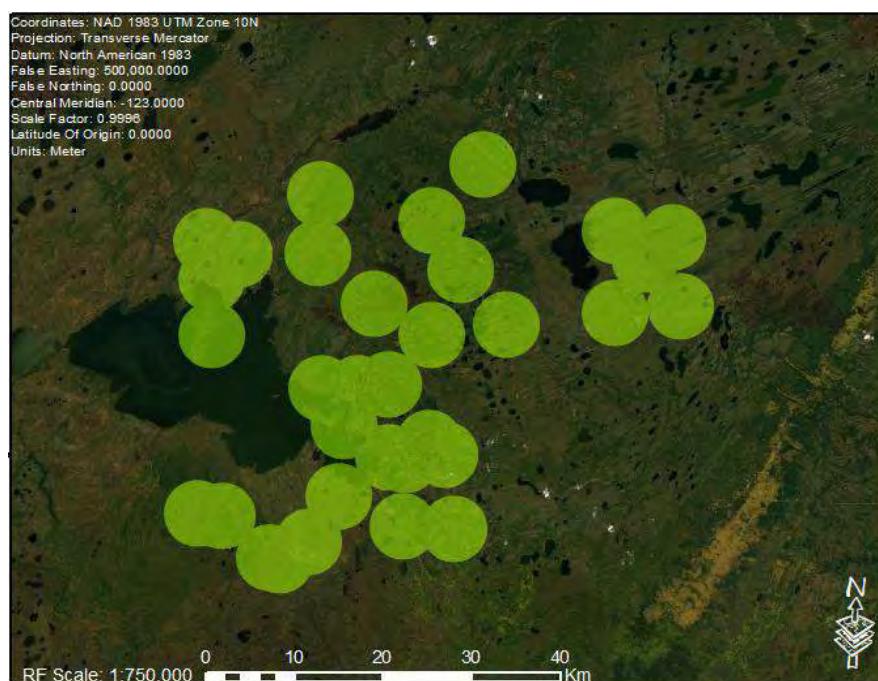


Figure 2.2. Camera trap locations in the Bistcho region (true locations appear approximated and offset)

3.0 Summary of Preliminary Results

The Project work plan activities (as detailed in Section 4 of the GCXE20C327 Contribution Agreement between DTFN and ECCC), have been successfully undertaken and completed, including:

1. Deployment of 33 remote motion-triggered cameras in and around Bistcho Lake and the Cameron Hills, (or “*Nahgah’yie*”), and successfully serviced a year later to retrieve camera data and ensure the cameras continue operating for the next year (planned as a Project extension for March 2022);
2. Development of a DTFN Traditional Knowledge -informed camera trap array, using scientific methods informed by community members (see Figure 2.1);
3. DTFN community members have received training previously *via* DTFN’s Guardians program and this Project to deploy and service remote cameras;
4. Wildlife data generated by the Project cameras have been collected and retrieved for a 1-year capture period thus far (March 2020 to March 2021) and remain deployed and active for a future planned data retrieval and camera maintenance event (March 2022);

5. Data for informing provincial Bistcho caribou range planning are available for use by government and partnerships upon request. As of the date of this report, two-thirds of the sites have been qualitatively assessed for species detection. An image processing methodology is currently being developed and formal classification of images will follow.

In summary, 20 camera sites successfully collected data for 12 consecutive months. Other sites collected data for a partial period of 2-5 months - typically during the summer - a critical time period to be collecting data on calving success and behavior of female caribou with calves at heel. Preliminary analyses indicate caribou were detected, at minimum, at 10 camera sites (50% of sites that surveyed the whole year) including solitary females, solitary males, females with calves, and large groups of caribou. Detections occurred throughout spring, summer, fall and winter, and calving seasons.

We feel this is a promising start to the monitoring program, especially given limited caribou data available for remote Bistcho and transboundary caribou ranges. Given the remoteness of the herd and the limited access options into these areas, available information strongly depends on government telemetry data and aerial surveys to monitor the herd, both of which are costly and time sensitive. Our first year of data collection demonstrates that our approach to remote camera array deployment and maintenance, can effectively fill many data gaps for these herds, to help improve understandings of Bistcho and transboundary range caribou population dynamics, distribution, and behavior.



Camera trap photo of caribou with tracking collar. We are still working to trace the origin of this caribou's collar, and look forward to working with government to cross reference our detection with collared data

One particularly valuable capture was a photo of a GPS-collared caribou at Kirkness Island (or Moose Island or “*Xahdah Du*”). It has yet to be confirmed which jurisdiction collared this individual, as all three provincial/territorial governments have caribou collared that migrate across the

provincial/territorial boundaries of Alberta, British Columbia and Northwest Territories. It is possible that this individual is a transboundary animal that crossed provincial/territorial boundaries, emphasizing the importance (and necessity - according to government recovery strategies and agreements), of inter-jurisdictional management of caribou which do not recognize geopolitical boundaries. Moreover, we emphasize that this was the only collared individual detected, out of the several dozen events (at least) captured on our cameras. This signals that our camera array is successfully collecting data on caribou that are otherwise not being monitored by telemetry.

The array additionally detected an impressive diversity of non-target species in the Bistcho area, including moose, black bear, wolf, lynx, marten, snowshoe hare, sharp-tailed grouse, northern harrier, Canada jay, gulls (*Larus* sp.) and swan (*Cygnus* sp.). This indicates the monitoring program can provide insight on many other boreal species, including analyses on species interactions (such as wolves following ungulate trails).



Camera trap photos of competing bull moose (left) and travelling wolf (right), demonstrating how multiple species are using these landscape disturbances in different ways.

The strength of a remote camera array is the ability to observe broad-scale and long-term trends. Because the array has only been operating for approximately 1.5 years, and data has only been retrieved for one year, broad generalizations about population dynamics of the Bistcho caribou herd cannot yet be made. The cameras have already collected valuable data that support and methodically validates the Traditional Knowledge shared by DTFN members for this Project (informing the design of the camera array), including identification of a vital predator refuge for mothers with calves, presence in preferred biophysical habitat, timing of seasonal migration, transboundary movements, and others. We look forward to obtaining and strengthening this information in the future.

As the cameras continue to collect data and the images are classified (for the creation of numeric data suitable for statistical and spatial analyses), we expect the value and utility of this Project for caribou range planning, habitat conservation and population recovery, to greatly increase.

We note that some cameras experienced technical difficulties operating in the extreme cold weather. Some cameras could not operate beyond a -40C temperature threshold, typically during the month of January, or during extreme high temperature above 35C in July, though they did become operational once again when the temperatures increased above -40C or decreased below 35C. These gaps in data typically lasted for only a few days during high temperatures. Despite this technical limitation, we do not feel this equipment issue significantly hampers the Project, as the data we are most interested in, early on in this multi-year program, is focusing on corroborating Traditional Knowledge information provided by DTFN towards caribou occurrence and behavior during calving season and the summer. The temperature driven technical difficulty will be reassessed and addressed in future camera array deployment plans and maintenance events.

For some site-specific maps, attributes, and photo detections, please see at the end of this document, the technical data report; “*Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 “Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta”*” (the “Project Data Report for GCXE20C327”), as Annex A.

3.1 Some Interim Project Outcomes

A documentary has been produced focused on the activities led by DTFN at Bistcho Lake, including a highlight of technicians checking the caribou monitoring cameras. The documentary titled “*Bistcho Lake: Indigenous Leadership in Conservation*”¹⁵, additional information about the camera monitoring Project, and interactions and continuations with other environmental monitoring projects led by DTFN, can be found at: [www.bistcholake.ca].

Late in September 2021, our Project work was featured by Sharon J. Riley, in *The Narwhal* newspaper, in an in-depth article titled; “*Carbon and caribou: why the Dene Tha' are forging a plan to protect a northern Alberta lake*”¹⁶. Please follow the following link to The Narwhals' website and article at: [<https://thenarwhal.ca/dene-tha-alberta-lake-carbon-caribou/>].

¹⁵ Dene Tha' First Nation. September 2020. *Bistcho Lake: Indigenous Leadership in Conservation*. Documentary Film. Prepared by Jeremy Williams, River Voices Productions.

¹⁶ The Narwhal and Riley, S.J. September 25, 2021. *Carbon and caribou: why the Dene Tha' are forging a plan to protect a northern Alberta lake*. [available: <https://thenarwhal.ca/dene-tha-alberta-lake-carbon-caribou/>].

In October, our project partner Gillian Chow-Fraser of CPAWS Northern Alberta, was interviewed in the CBC Radio program, *What On Earth*, for an episode entitled “*How protecting caribou can help climate*”¹⁷ and discussed our caribou camera array project work in the Bistcho caribou range. The podcast can be found at: [\[https://www.cbc.ca/listen/live-radio/1-429-what-on-earth/clip/15869884-how-protecting-caribou-help-climate\]](https://www.cbc.ca/listen/live-radio/1-429-what-on-earth/clip/15869884-how-protecting-caribou-help-climate)

We are working on an article to be submitted to a peer reviewed journal about DTFN community-led methods used to create the camera array and the cell phone-based data collection survey application. The paper will describe how the methodology used created conditions for the Project’s success, increased instances of caribou camera detections, and enabled the collection of accurate, methodical, and reliable data that could be used cooperatively with government for caribou recovery and habitat restoration plans and activities.

Our Project members have presented interim results in the following venues:

Table 1: List of Some Project Information Presentations

<u>[NO.]</u>	<u>EVENT:</u>	<u>TITLE:</u>	<u>DATE:</u>	<u>PRESENTERS:</u>
1.	Assembly of First Nations (AFN) Climate Gathering	<i>First Nations Leadership in Conservation: Indigenous Protected and Conserved Areas (IPCAs)</i>	March 3, 2020	Matthew Munson (DTFN), Ryan Cheng (CPAWS)
2.	Alberta Chapter of the Wildlife Society (ACTWS)	<i>Facilitating understanding between Western-based science and Indigenous Traditional Knowledge for the conservation of species at risk in northwestern Alberta, within the context of a proposed Indigenous Protected and Conserved Area (IPCA)</i>	October 15, 2020	Gillian Chow-Fraser (CPAWS), Matthew Munson (DTFN)
3.	University of Alberta (UofA) - Co-operative Management Webinar Series	<i>Bistcho Lake ‘Mbehcho’ and Indigenous-led Conservation and Protection Areas</i>	January 22, 2021	Chief James Ahnassay, Fred Didzena, Matthew Munson (DTFN)
4.	Alberta Wilderness Association (AWA) – Annual Lecture	<i>Annual Lecture Series with Chief James Ahnassay, Matt Munson and Cliff Wallis</i>	Feb 22, 2021	Chief James Ahnassay, Matthew Munson (DTFN)

¹⁷ Canadian Broadcasting Company (CBC). October 3, 2021. What On Earth. “How protecting caribou can help climate”.

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5.	University of Victoria (Uvic) – Environmental Law Centre	<i>DTFN's Bistcho Lake Indigenous Protected and Conserved Area (IPCA)</i>	March 16, 2021	Matthew Munson (DTFN)
6.	North American Caribou Workshop (NACW)	<i>Facilitating understanding between Western-based science and Indigenous Traditional Knowledge for the conservation of boreal woodland caribou in northwestern Alberta within the context of a proposed Indigenous Protected and Conserved Area (IPCA)</i>	May 6, 2021	Fred Didzena & Matthew Munson (DTFN), Gillian Chow-Fraser (CPAWS)
7.	Canadian Broadcasting Company (CBC) Radio One – What On Earth?	<i>How protecting caribou can help climate</i>	October 3, 2021	Gillian Chow-Fraser (CPAWS)
8.	University of Alberta (BIOL391) - Invited lecture	<i>"Biodiversity in Alberta: Threats and Opportunities for Conservation"</i>	October 21, 2021	Gillian Chow-Fraser (CPAWS)
9.	University of Montana Biology Department Seminar Series – Invited talk	<i>Caribou conservation in North America: successes, challenges, opportunities</i>	November 4, 2021	Gillian Chow-Fraser (CPAWS)
10.	McMaster University – BIOL341 – Invited lecture	<i>Achieving caribou conservation in Alberta</i>	November 21, 2021	Gillian Chow-Fraser (CPAWS)
11.	ArcticNet	<i>DTFN's Bistcho Lake Indigenous Protected and Conserved Area (IPCA)</i>	December 6, 2021	Gillian Chow-Fraser (CPAWS), Matthew Munson (DTFN)

4.0 Conclusion and Project Extensions

We are pleased to report on our progress and intentions to date for the Project to fill in major gaps in DTFN's ability to monitor the environment, collect useful and structured data, and use information to support local, regional, and national programs, goals and strategies. We confirm that our Project continued to qualify within the ECCC defined key specific components, including: community-driven or supported initiative; encourage action towards the protection, conservation and positive impact on the environment; inclusive of relevant knowledge, which could include, but is not limited to, Traditional Knowledge and western-science; opportunities

for training and/or youth engagement, and; data management plan to collect, manage, store and share Project data.

The following are possible extensions to the current Project that would expand on the current knowledge of the Bistcho caribou herd and inform their conservation and management. Any of the following topics noted below, would represent meaningful contributions to the body of knowledge that is key to managing threatened woodland caribou:

- Expand the remote camera array to include:
 - Additional areas in the Bistcho Region indicated by the community and Elders to assist in the design of an IPCA;
 - Heavily developed portion of the Bistcho region to compare wildlife presence with the (relatively) undeveloped regions currently represented;
 - Caribou movements around Cameron Hills to access Bistcho Lake, including an important caribou area identified by Elders as "caribou meadows" southeast of Cameron Hills; and/or,
 - Transboundary movements and habitat use in the Northwest Territories and British Columbia.
- Ensure that the monitoring program encompasses regions that are most likely to undergo future industrial development so that pre-project baselines can be recorded.
- Determine the origin of the collared caribou and explore opportunities for transboundary monitoring programs that continue to include a Traditional Knowledge foundation.
- Further analyze habitat use around Bistcho Lake and the islands on Bistcho Lake by female caribou with calves to better understand how the area potentially supports caribou calf survival and mitigates predation risks.

5.0 Recommendations

The following points are the recommendations of the Project managers and technicians for the continuation and further development of this program:

- Continue to refine and adapt field methodologies. This includes programming remote cameras to take daily timelapse photos (regardless of motion triggering), which would add new site-specific environmental data, such as first snowfall, green-up, and vegetation height, that could be used to improve habitat selection models.
- Develop a standard classification and analysis protocol for the photographic data.

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- Analyze classified data for broad trends in species occurrence and habitat use by caribou and other species of interest to the community.
- Further develop partnerships with Indigenous communities, Crown governments, and ENGO's in British Columbia and the Northwest Territories to improve Project methodology and expand the monitoring program to capture broader habitat use by this transboundary caribou herd.
- Begin annual public Project reporting for the engagement of DTFN community members and other stakeholders in this Project.
- When possible under COVID-19 guidelines, present current findings to the DTFN communities, and discuss ways the community can use this data in their traditional practices and inform community land use and wildlife management.
- Share our approaches and experiences with other Indigenous communities looking to undertake similar independent wildlife monitoring projects.
- Publish our approaches and findings in a peer-reviewed journal.
- Continue the development of our understanding of the Bistcho caribou herd and use our greater understanding to ensure that all operators and developers in the Bistcho region consider the herd's habitat, movement requirements, and anthropogenic disturbance's contribution to increased predation of this threatened species, and
- Fund dedicated staff specifically for the monitoring program to ensure project continuity and community engagement.

Work with the Government of Alberta to integrate collar data with the monitoring program by obtaining information such as:

- Data on Bistcho caribou herd population growth, including:
 - Updates on recent aerial surveys, including minimum counts;
 - Calf recruitment data, if known; and,
 - Current estimated herd size and estimated lambda (rate of population growth).
- Telemetry data (point data and movement lines) and accompanying metadata on individual caribou characteristics (sex and age).
- Details on the number of caribou collared in the Bistcho herd, and
- If completed, any analysis of range use using the telemetry data, e.g.: kernel density estimates or Resource Selection Functions.

6.0 Acknowledgements

We would like to thank DTFN's Climate Monitoring Technicians for the Traditional Knowledge informed camera array design, including; *Angus Schasees, Barry Martel, Bernard Talley, Blaine Didzena, Bobby Martel, Carmen Chambaud, Cassie Bassa, David Schasees, Delbert Salopree, Don Metchooyeah, Donny Ahkimmachie, Gabriel Ahkimmachie, Gabriel Didzena, Garrett Fournier, Harvey Denechoan, Jarek Bassa, Jayden Schasees, Joseph Chonkolay, Josephine Natannah, Kenny Martel, Levin Mercredi, Linda Semansha, Lorny Metchooyeah, Louie Didzena, Marcus Pastion, Mardie Kolay, Mark Kolay, Mataya Martel, Pam Providence, Phyllis Danais, Ricky Pastion, Ricky Seniantha, Roman Pastion, Sherman Providence, Sonny Seniantha, Stephen Ahnassay, Sylvester Seniantha, Tamara Ahnassay, Trindle Semansha, Tyler Semansha, and Verna Konda-Martel*. Mahsi cho to Climate Monitoring Technicians *Thomas Ahkimmachie* and *Felix Seniantha*, for their expert knowledge and ability in the field, who were invaluable for the safe and successful helicopter deployments of our remote caribou array cameras.

We would also like to express gratitude and appreciation for our Elder and Youth Advisory Committee members, including; Elders (late) *Willie Chambaud, Warren Denais, Elizabeth Enfield, Kathryn Enfield, Tia Enfield, Agnes and Isadore Gallant, Denell Gallant, and William Yatchotay*. We would also like to express large mahsi-cho's and much respect to; Chief *James Ahnassay*, Band Councilor *Charlie Chambaud* and all *Band Council* members, Elder *Roy Salopree*, and Director of Lands *Fred Didzena*, for Traditional Knowledge, inspiration, and direction for the many-intertwined Bistcho Indigenous Protected and Conserved Area programs.

In addition, we thank all of the DTFN community members who have intergenerationally kept Dene Tha' Traditional Knowledge alive, and each of the present day and future -holders who have and will continue to contribute their knowledge of *Mbehco, Nahgahzie*, and the Cameron Hills, crucial to the development the Project's remote camera array and future Project outcomes and extensions. Much gratitude and appreciation to all the many others that have come before to set the conditions for Project success, and to all contributing to this Project and future projects!

This Project, and those like it, could not be completed without collaboration between First Nations, Crown Governments, and Non-Government Organizations. Mahsi-cho, merci, and thank-you to our partners at CPAWS Northern Alberta, especially Executive Director *Kecia Kerr* and to our GCXE20C327 project funder, the Indigenous Partnerships Initiative via Environment and Climate Change Canada, including all the staff at ECCC and especially *Carmen Callihoo-Payne*, without whom this Project would not have been possible.

MAHSI-CHO / MERCI / THANK YOU

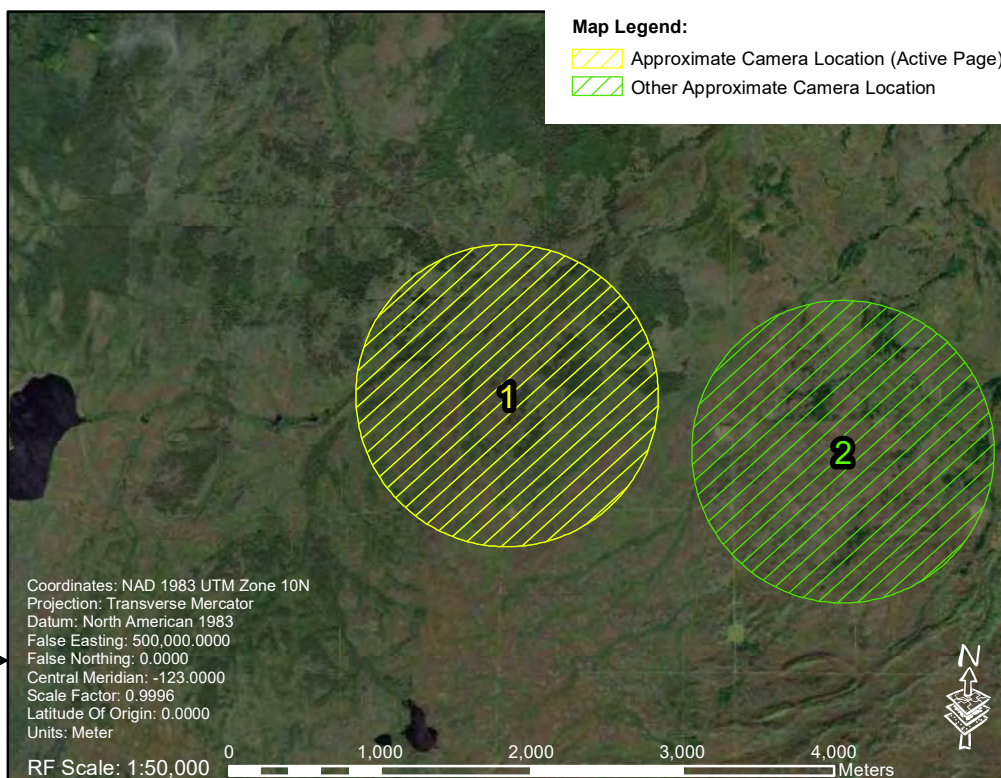
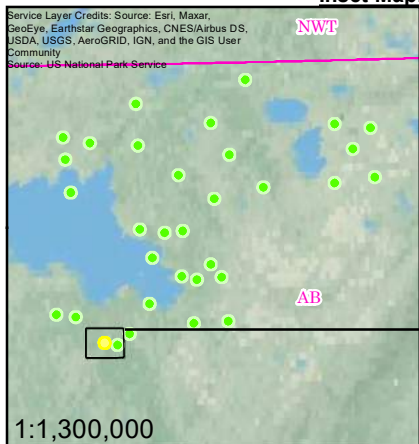
Dene Tha' First Nation - Lands Department

Annex A: Project Data Report for GCXE20C327

(next 33 pages)

Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 1

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera



Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 1

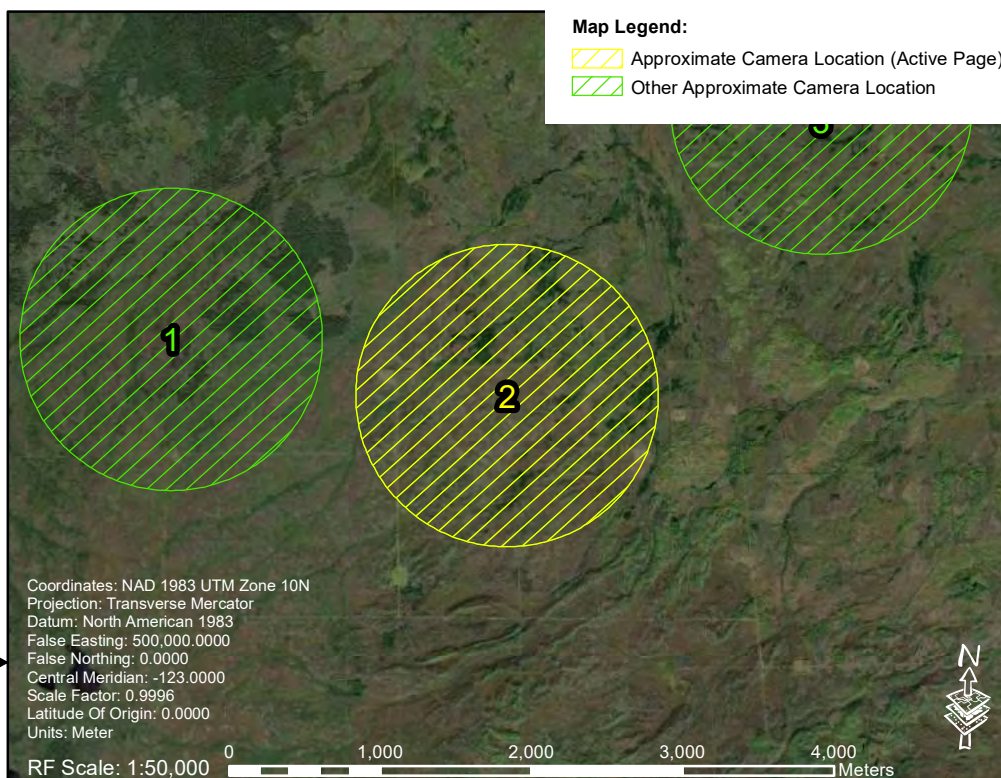
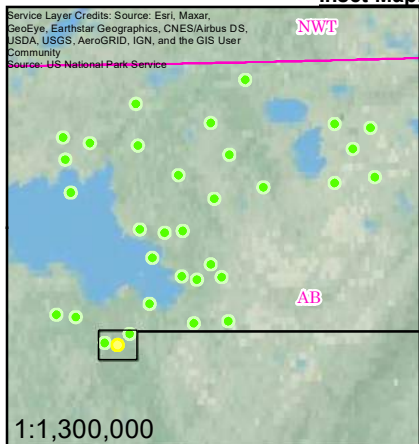
Date Deployed: 2020-03-18

Date Last Serviced: 2021-03-31

Site Description: Small mature spruce stand in middle of burn on old seismic line

Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 2

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)

Slide B: (optional)

Slide C: (optional)

Slide D: (optional)

Example Photos Obtained from Camera



Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 2

Date Deployed: 2020-03-18

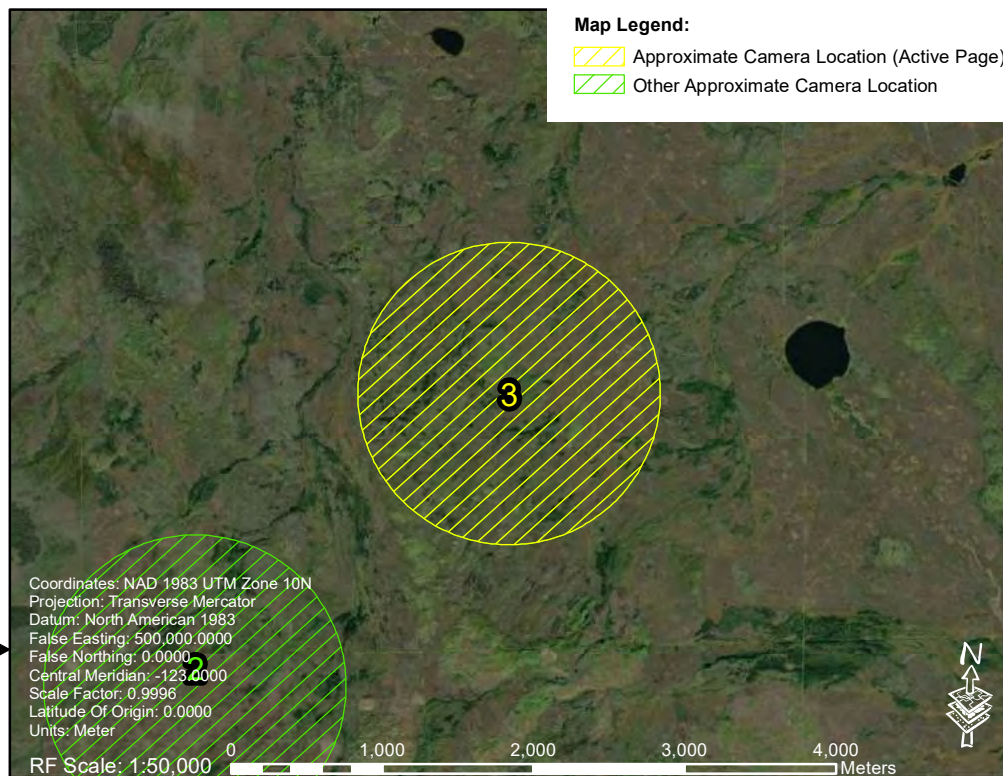
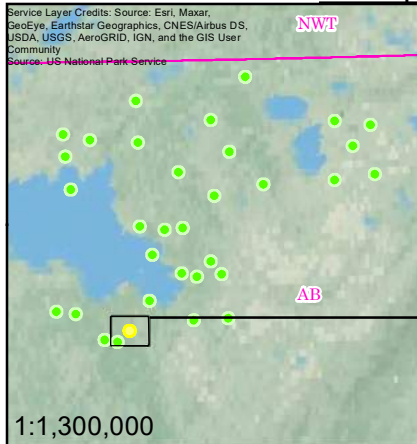
Date Last Serviced: 2021-03-31

Site Description: Burn



Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 3

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)

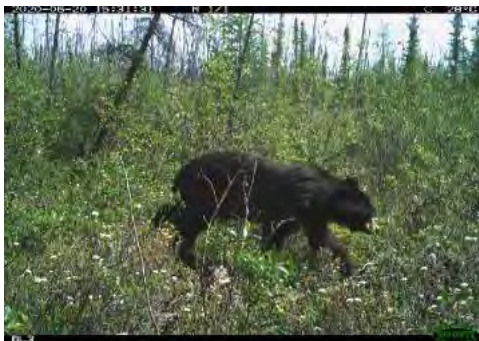


Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera



Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 3

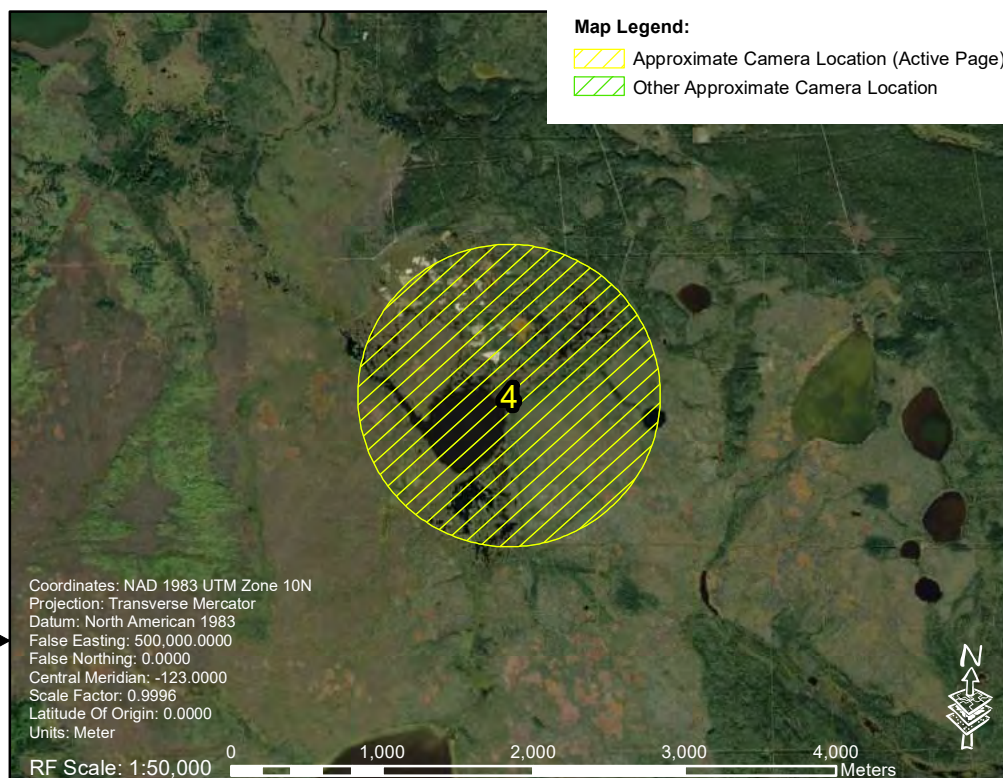
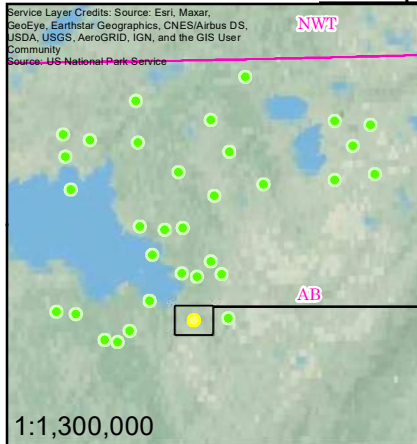
Date Deployed: 2020-03-18

Date Last Serviced: 2021-03-31

Site Description: Little bump of upland in large 10 year old burn

Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 4

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)

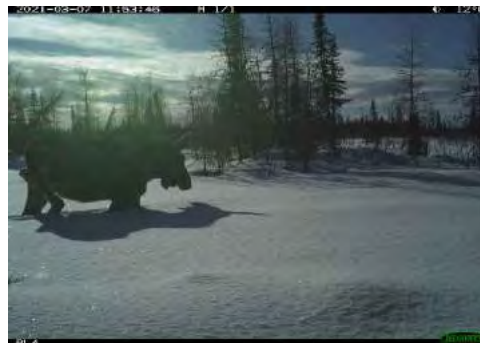


Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera



Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 4

Date Deployed: 2020-03-18

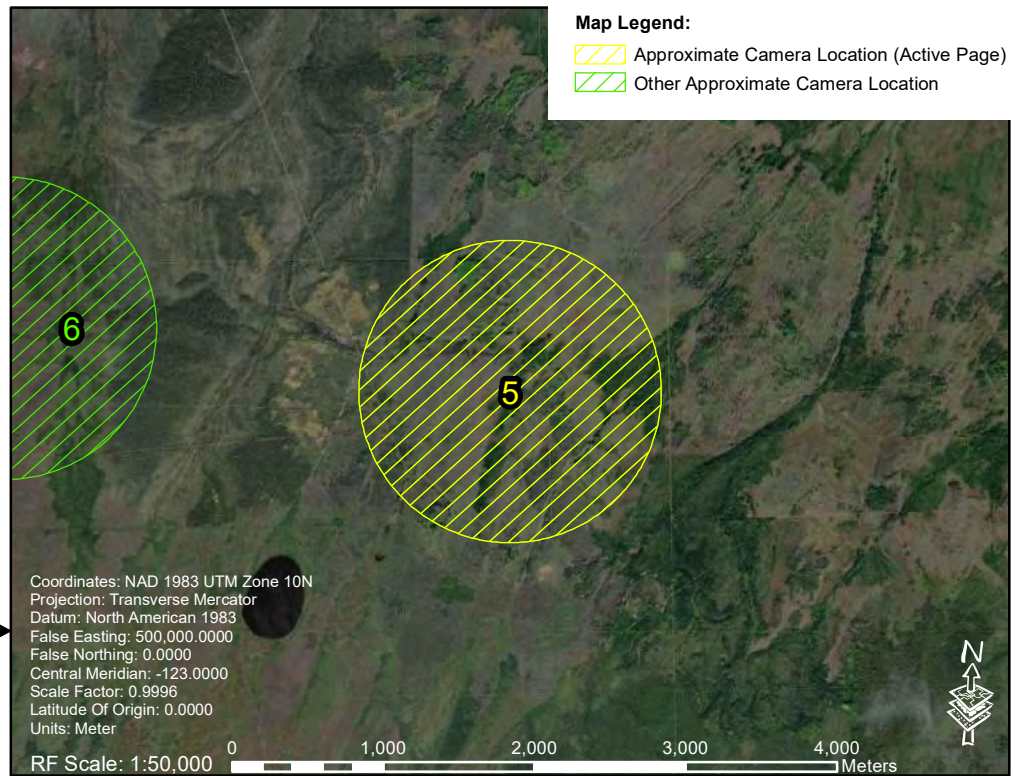
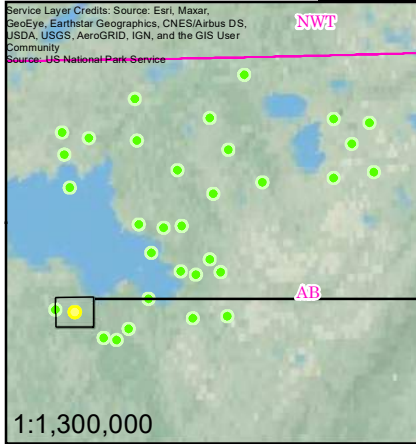
Date Last Serviced: 2021-03-31

Site Description:



Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 5

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera



Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 5

Date Deployed: 2020-03-18

Date Last Serviced: 2021-03-31

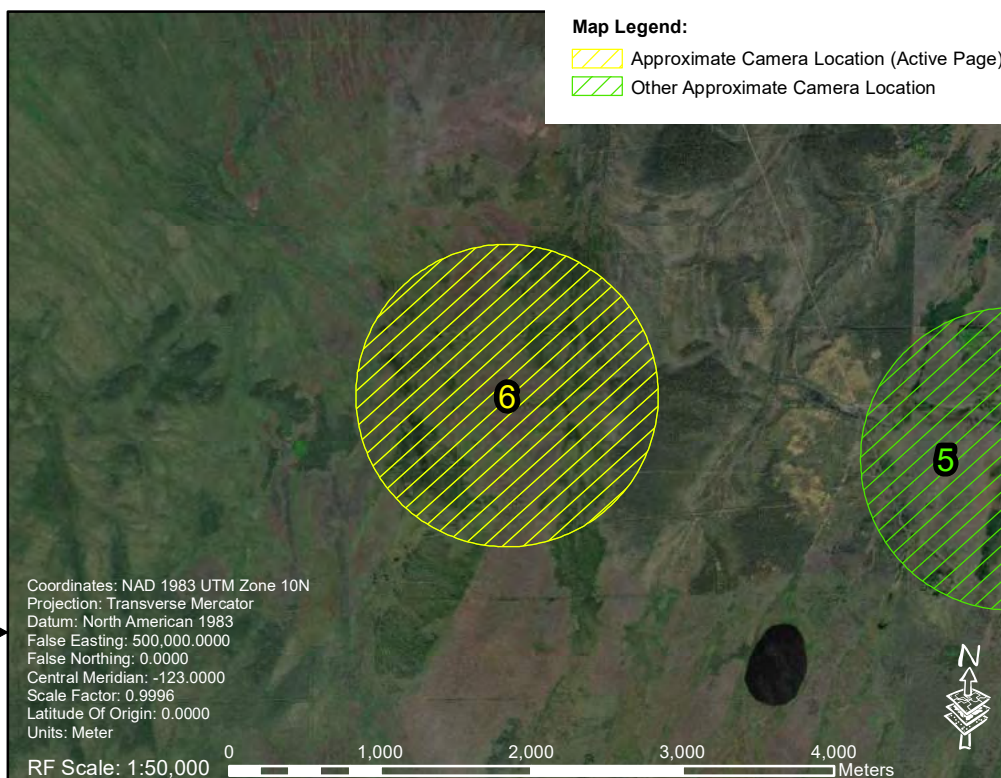
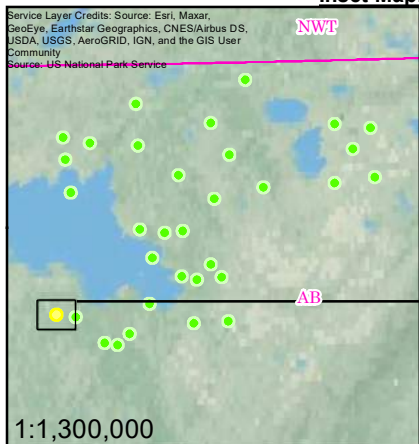
Site Description: In small clump of still standing dead trees on convergence of old cut lines

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Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 6

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)

Slide C: (optional)

Slide D: (optional)

Example Photos Obtained from Camera



Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 6

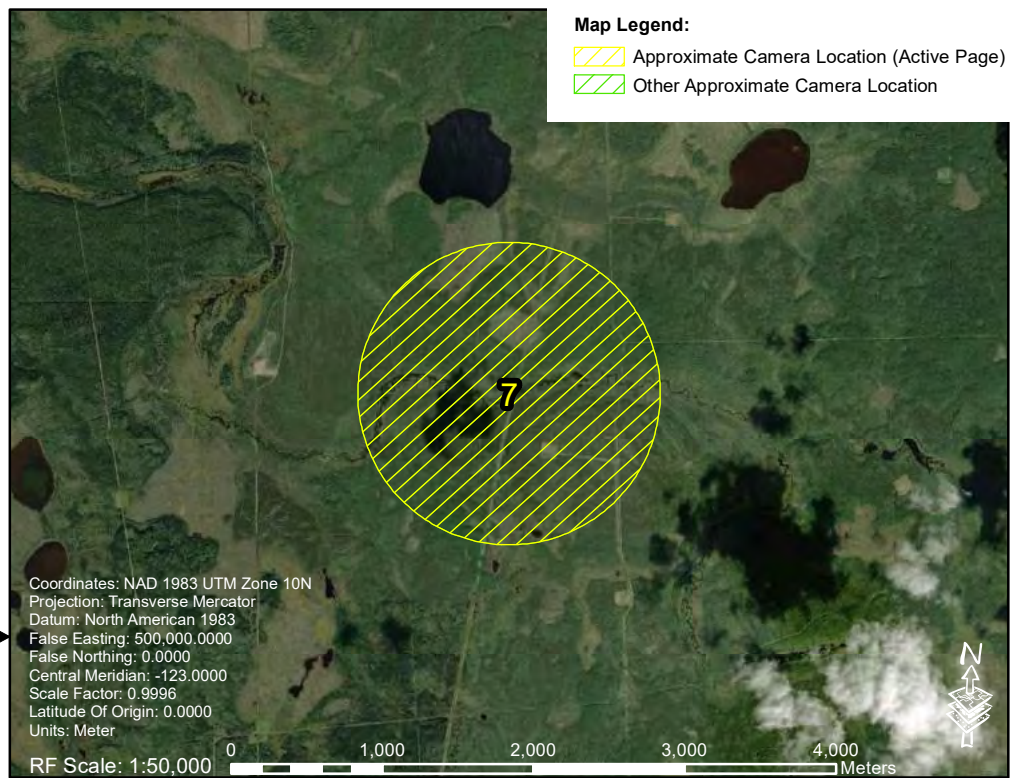
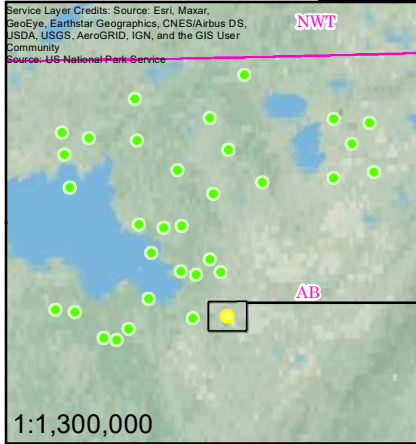
Date Deployed: 2020-03-18

Date Last Serviced: 2021-03-31

Site Description: Burn

Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 7

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



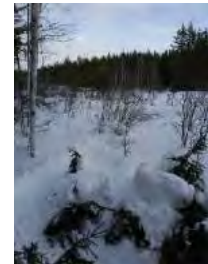
Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera



Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 7

Date Deployed: 2020-03-18

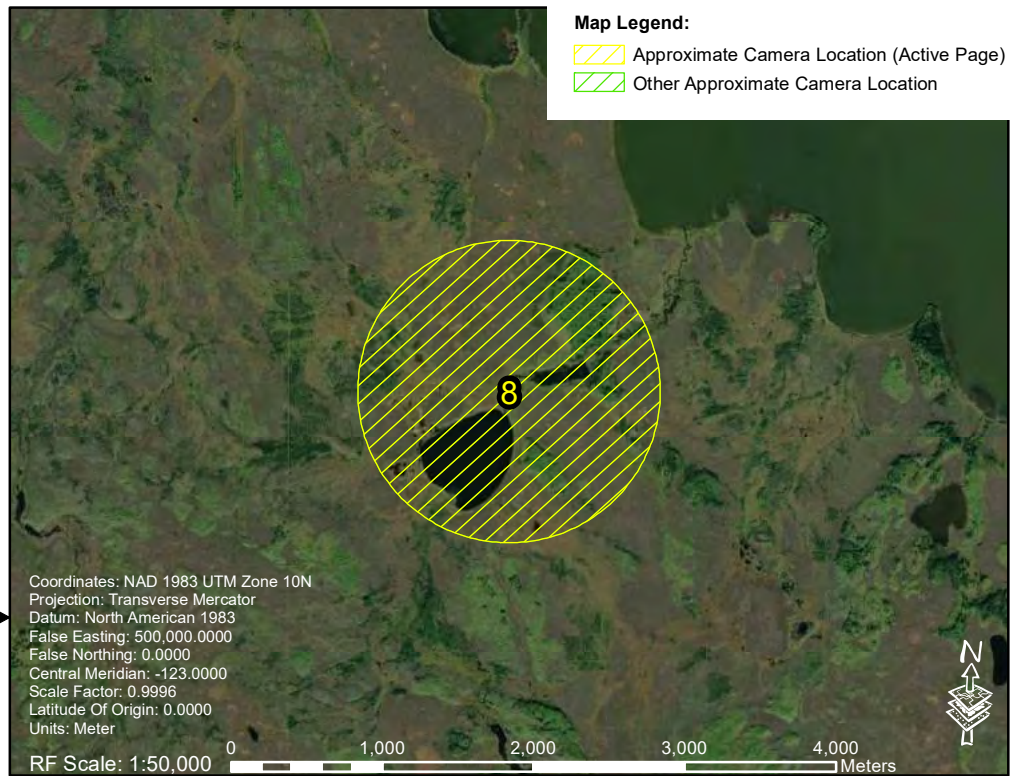
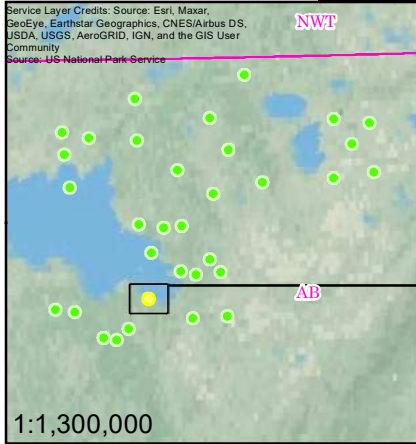
Date Last Serviced: 2021-03-31

Site Description: Pipeline



Updated: December 1st, 2021

Inset Map:



Map Legend:

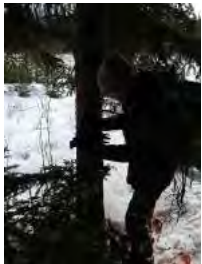
- Approximate Camera Location (Active Page)
- Other Approximate Camera Location

Site ID: 8

GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera



Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 8

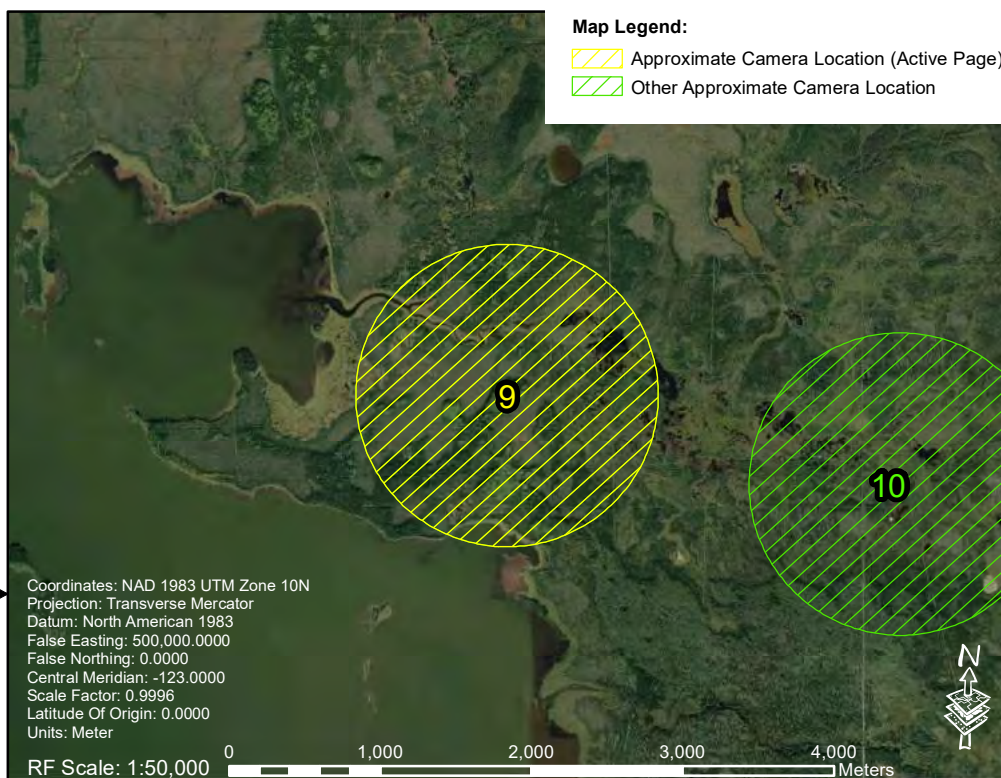
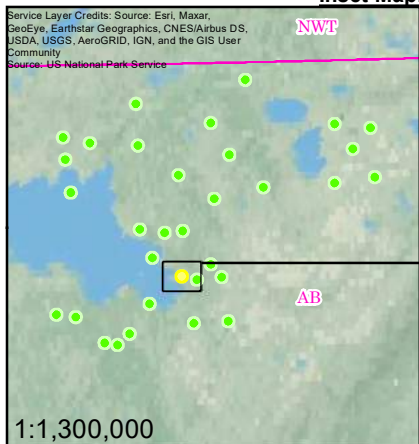
Date Deployed: 2020-03-18

Date Last Serviced: 2021-03-31

Site Description:

Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 9

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



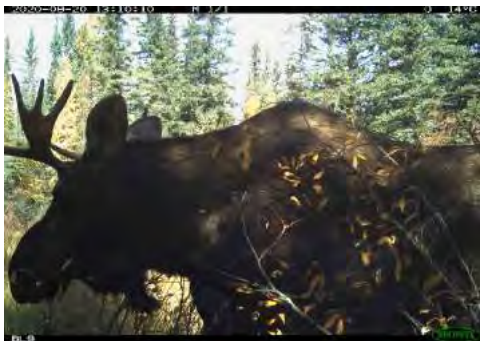
Slide B: (optional)



Slide C: (optional)

Slide D: (optional)

Example Photos Obtained from Camera



Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 9

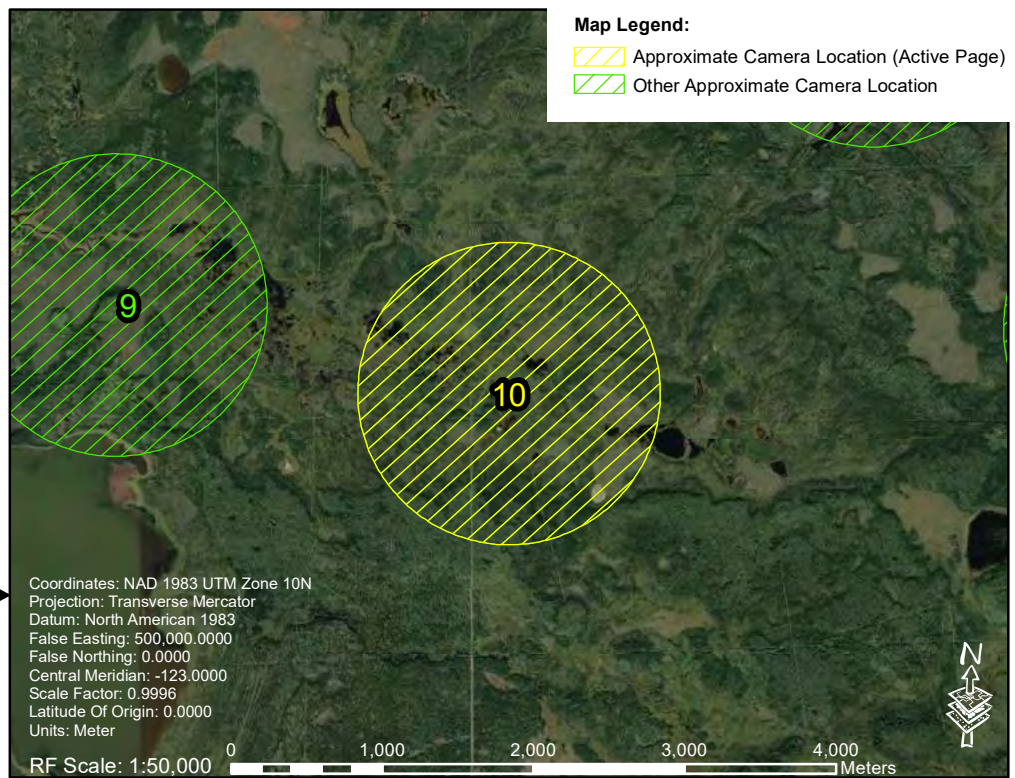
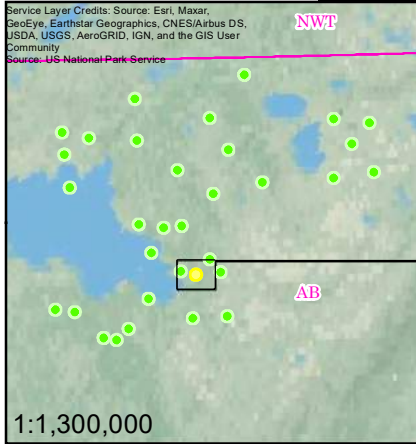
Date Deployed: 2020-03-18

Date Last Serviced: 2021-03-31

Site Description: Wetland edge

Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 10

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



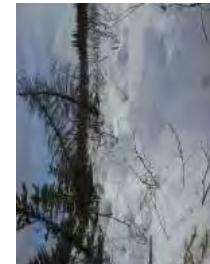
Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera



Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 10

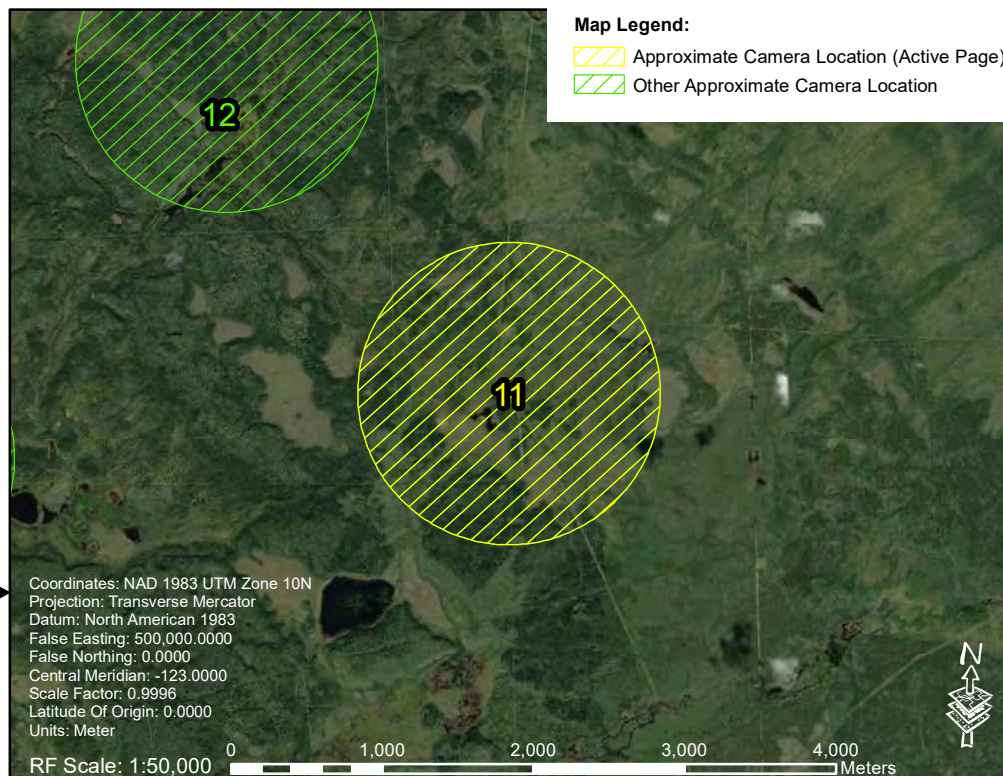
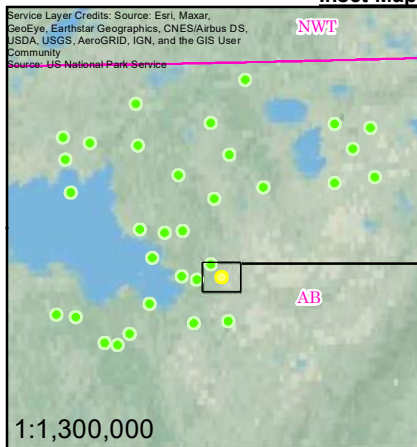
Date Deployed: 2020-03-18

Date Last Serviced: 2021-03-31

Site Description: Wetland

Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

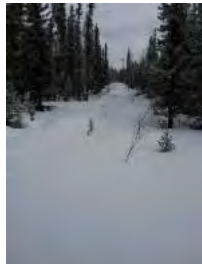
Site ID: 11

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera

Photos not yet processed
or obtained

Photos not yet processed
or obtained

Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 11

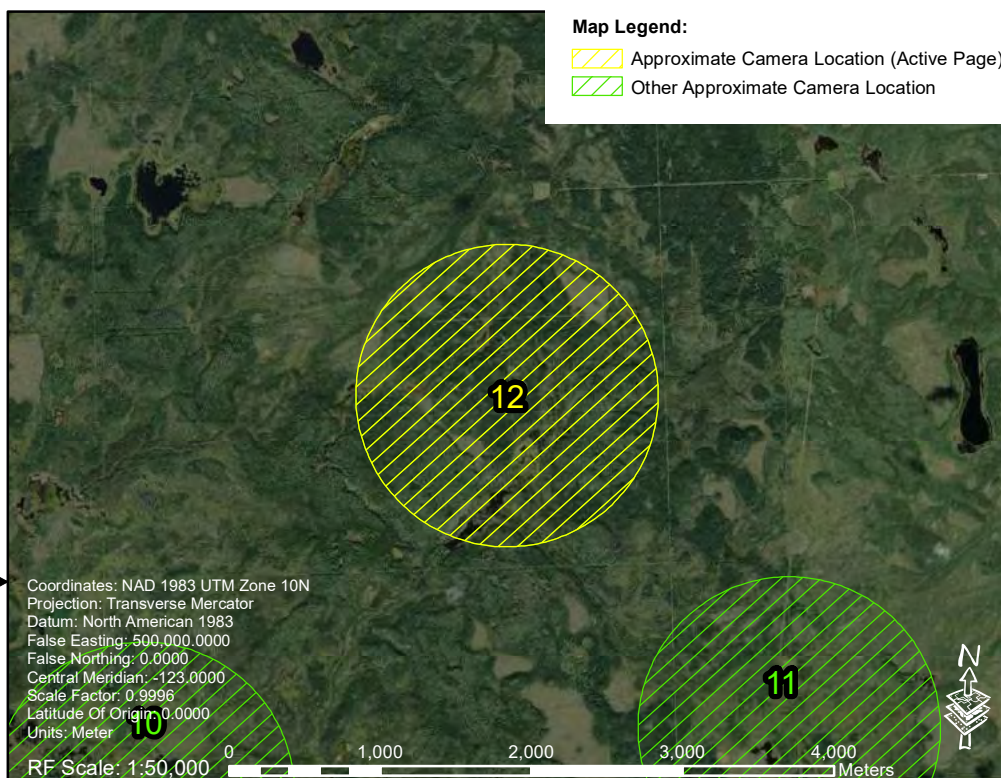
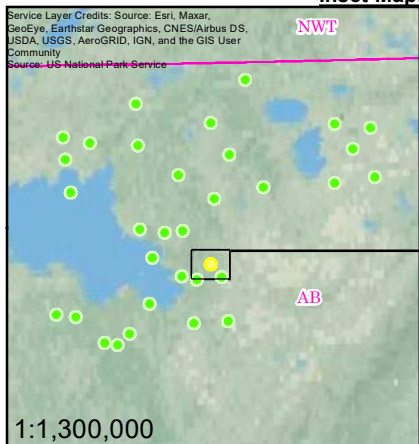
Date Deployed: 2020-03-18

Date Last Serviced: 2021-03-31

Site Description: Upland small spruce seismic

Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 12

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera

Photos not yet processed
or obtained

Photos not yet processed
or obtained

Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 12

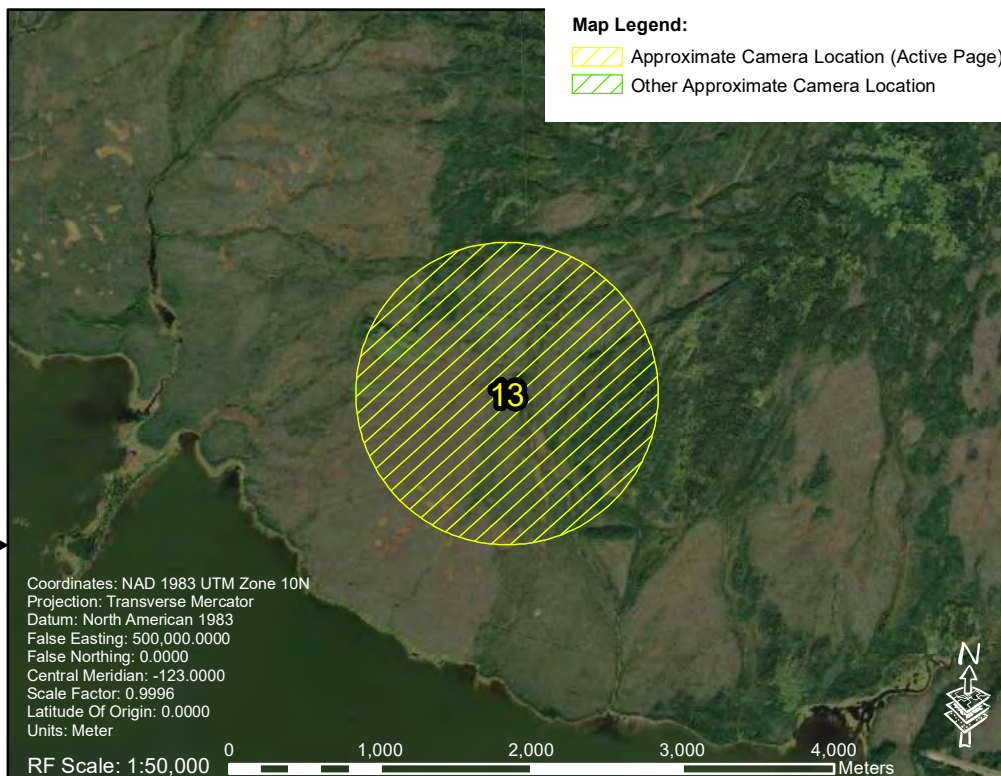
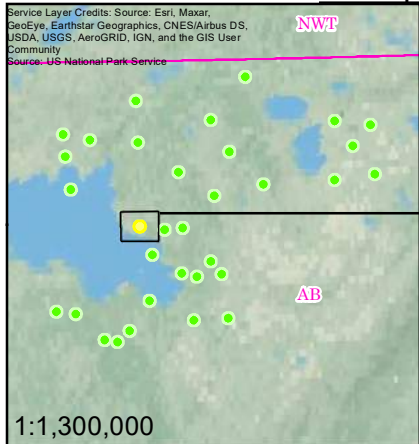
Date Deployed: 2020-03-18

Date Last Serviced: 2021-03-31

Site Description: Facing lake upland

Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 13

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera



Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 13

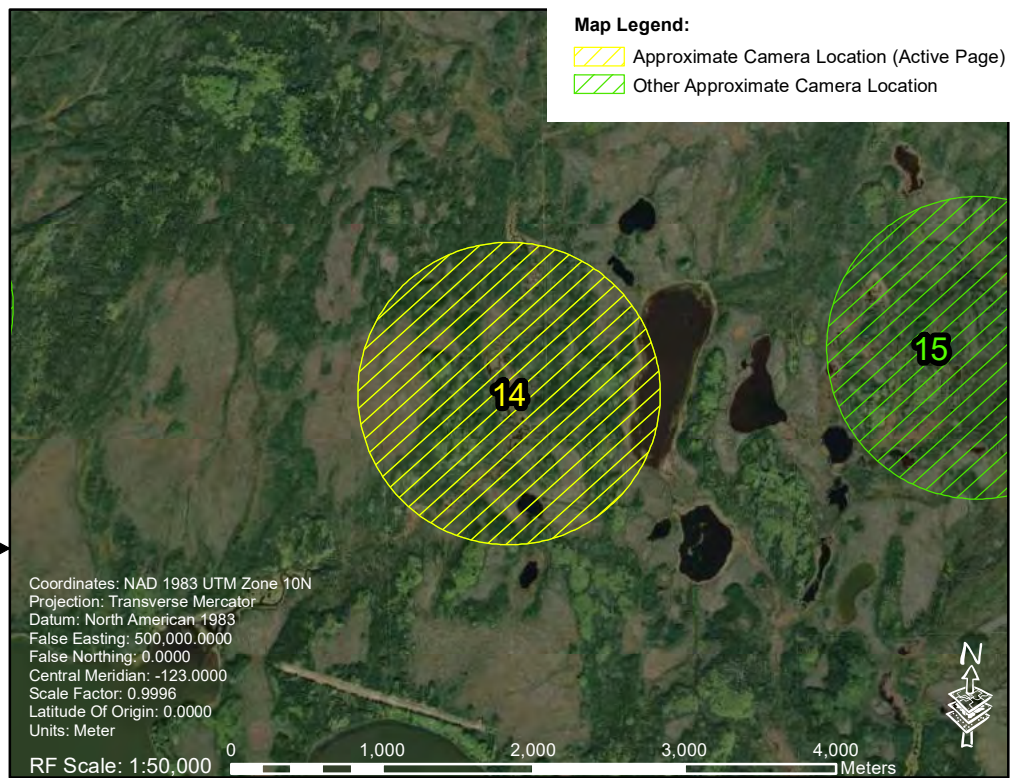
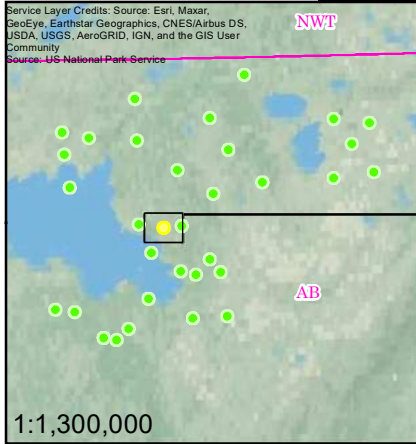
Date Deployed: 2020-03-18

Date Last Serviced: 2021-03-31

Site Description: In small black spruce stand and small clearing not on seismic line

Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 14

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera

Photos not yet processed
or obtained

Photos not yet processed
or obtained

Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 14

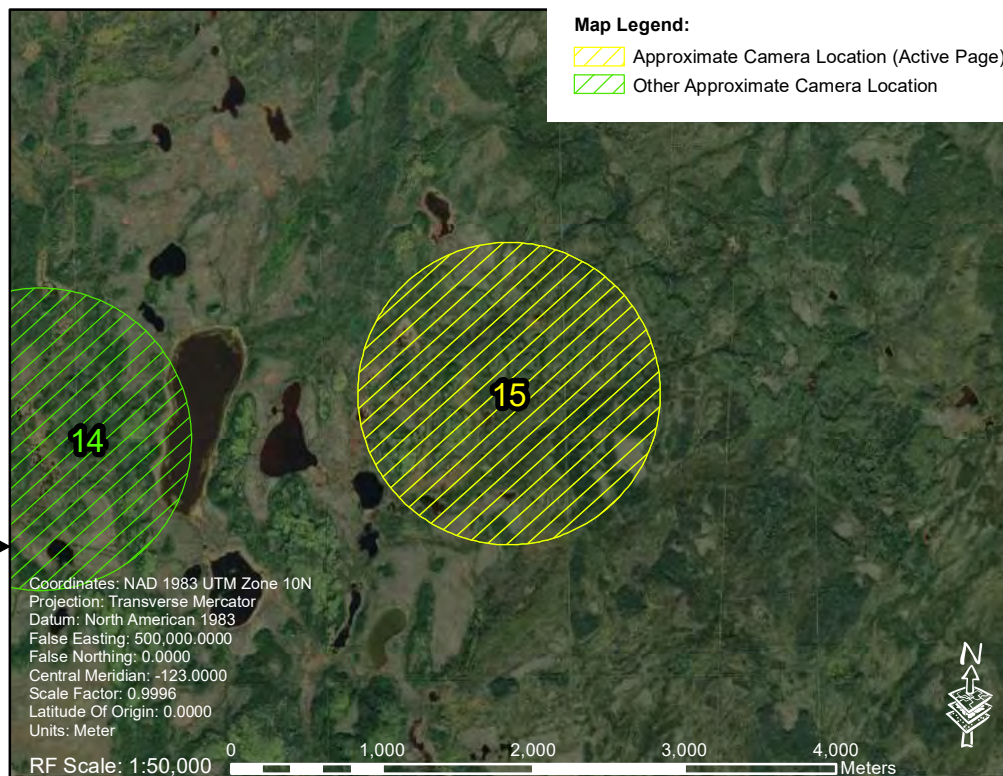
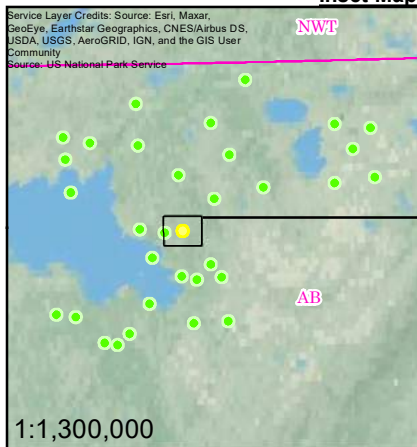
Date Deployed: 2020-03-18

Date Last Serviced: 2021-03-31

Site Description: Mature upland spruce

Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 15

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera

Photos not yet processed
or obtained

Photos not yet processed
or obtained

Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 15

Date Deployed: 2020-03-18

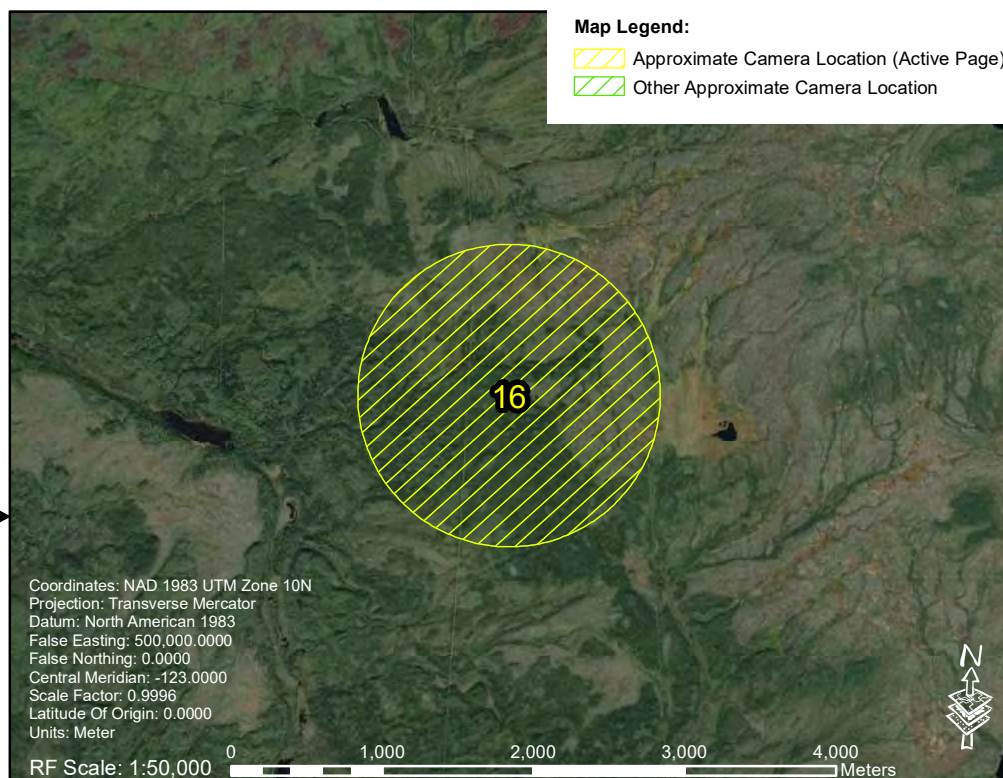
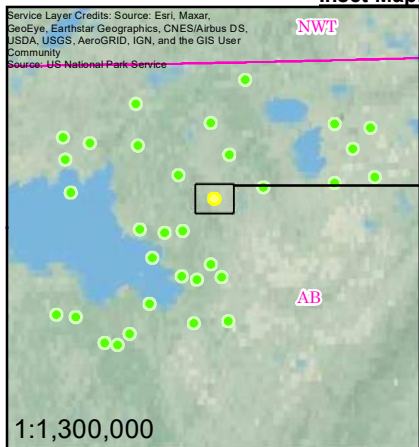
Date Last Serviced: 2021-03-31

Site Description: Edge of young black spruce stand, 20 m from seismic on a game trail line

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Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

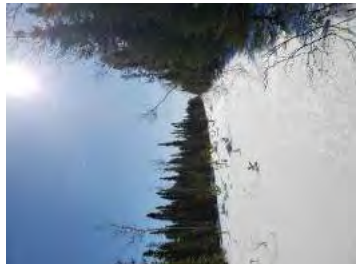
Site ID: 16

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)

Slide C: (optional)

Slide D: (optional)

Example Photos Obtained from Camera



Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 16

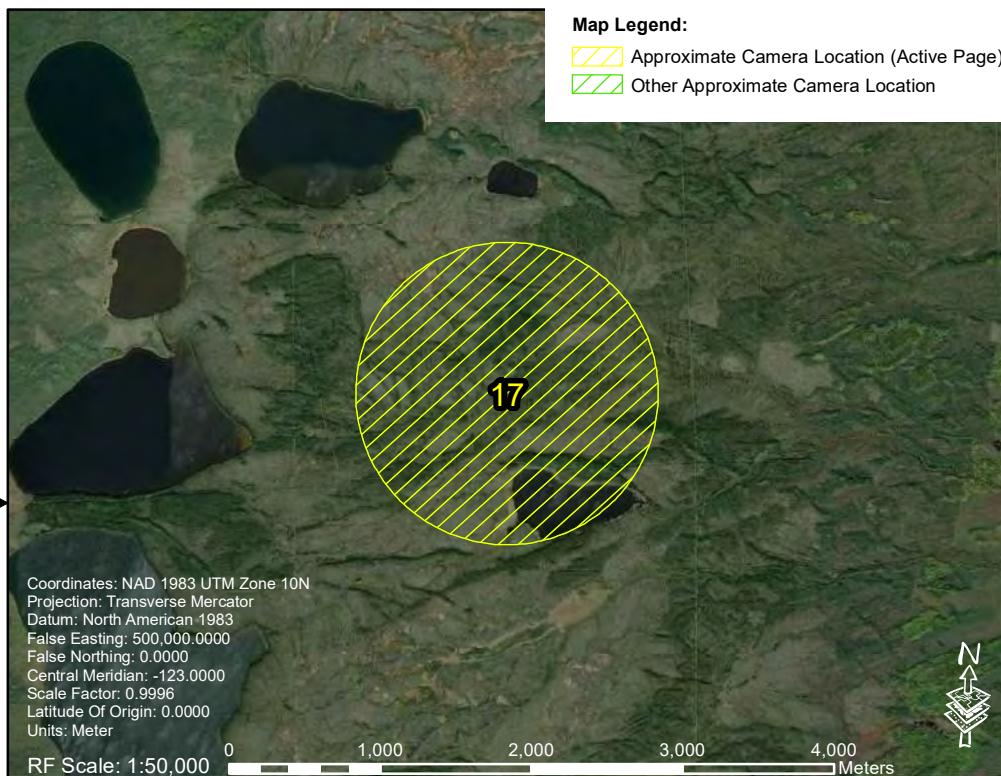
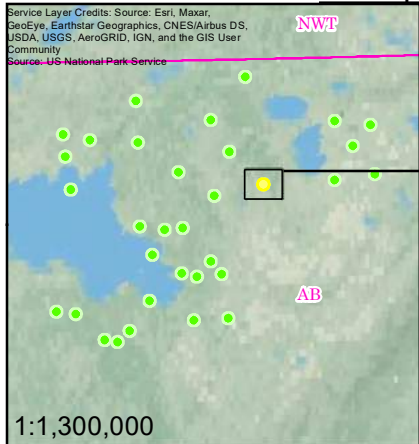
Date Deployed: 2020-03-18

Date Last Serviced: 2021-03-30

Site Description: Seismic line in mature black spruce

Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 17

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)

Slide C: (optional)

Slide D: (optional)

Example Photos Obtained from Camera

Photos not yet processed
or obtained

Photos not yet processed
or obtained

Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 17

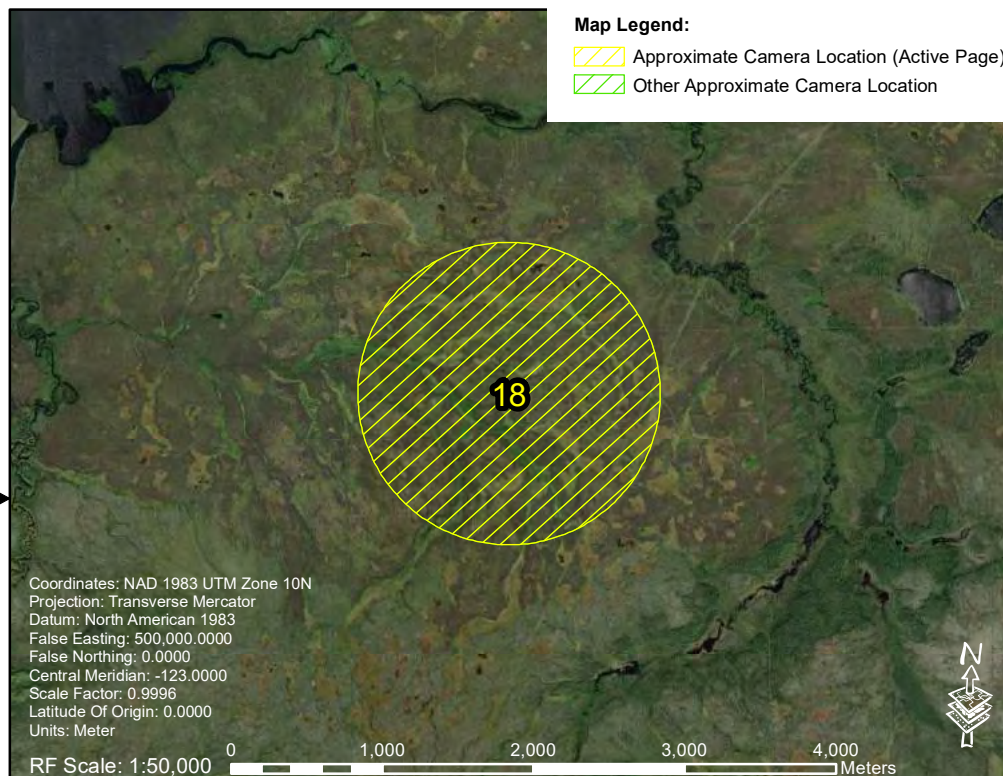
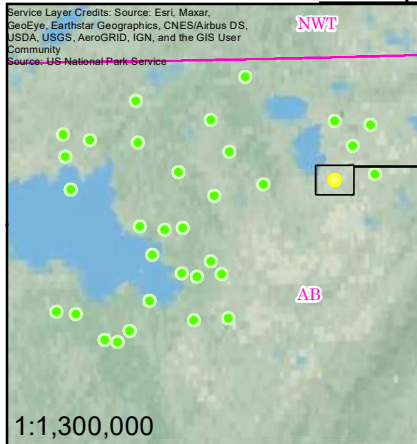
Date Deployed: 2020-03-18

Date Last Serviced: 2021-03-30

Site Description: Mature spruce stand, near old seismic line with growth on it

Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

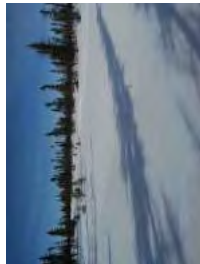
Site ID: 18

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

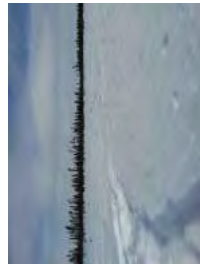
Site Photos



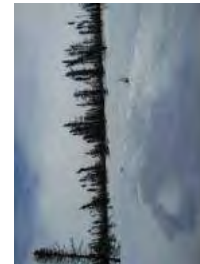
Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera



Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 18

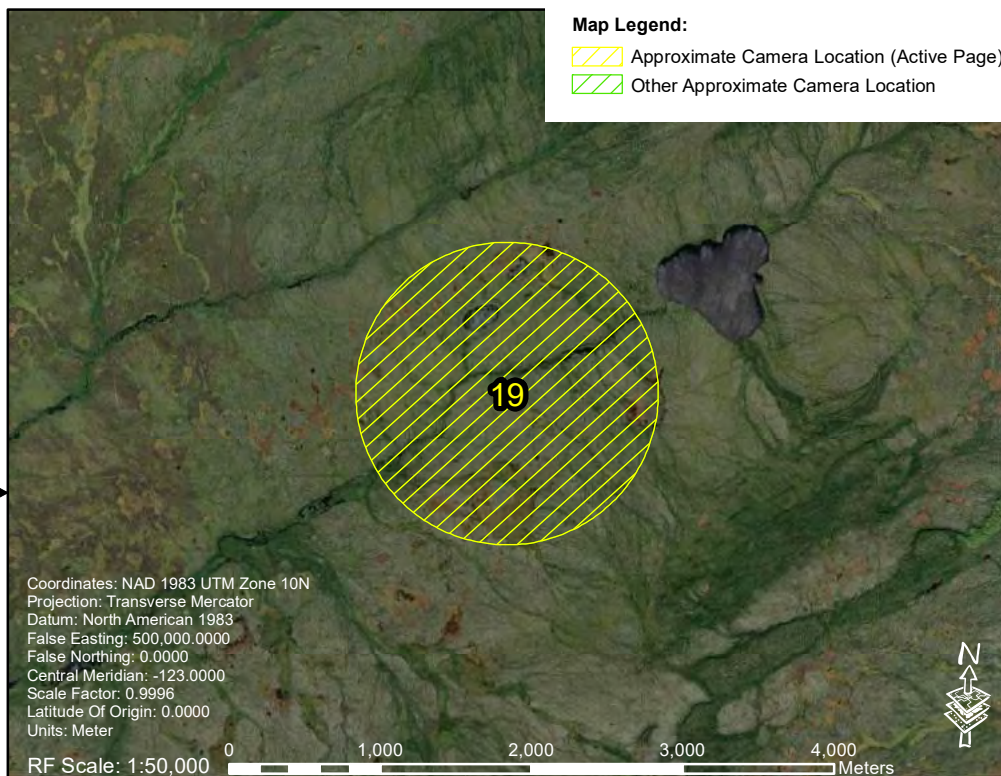
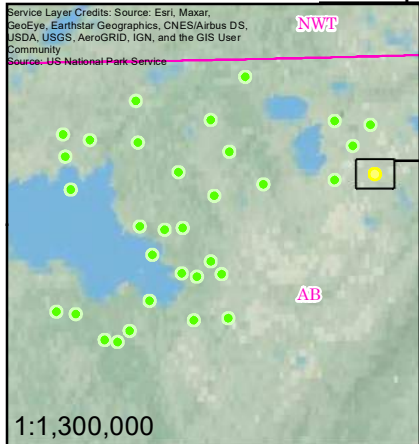
Date Deployed: 2020-03-18

Date Last Serviced: 2021-03-30

Site Description:

Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 19

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



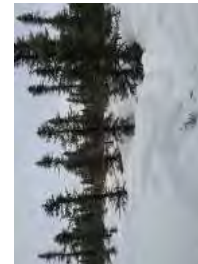
Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera



Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 19

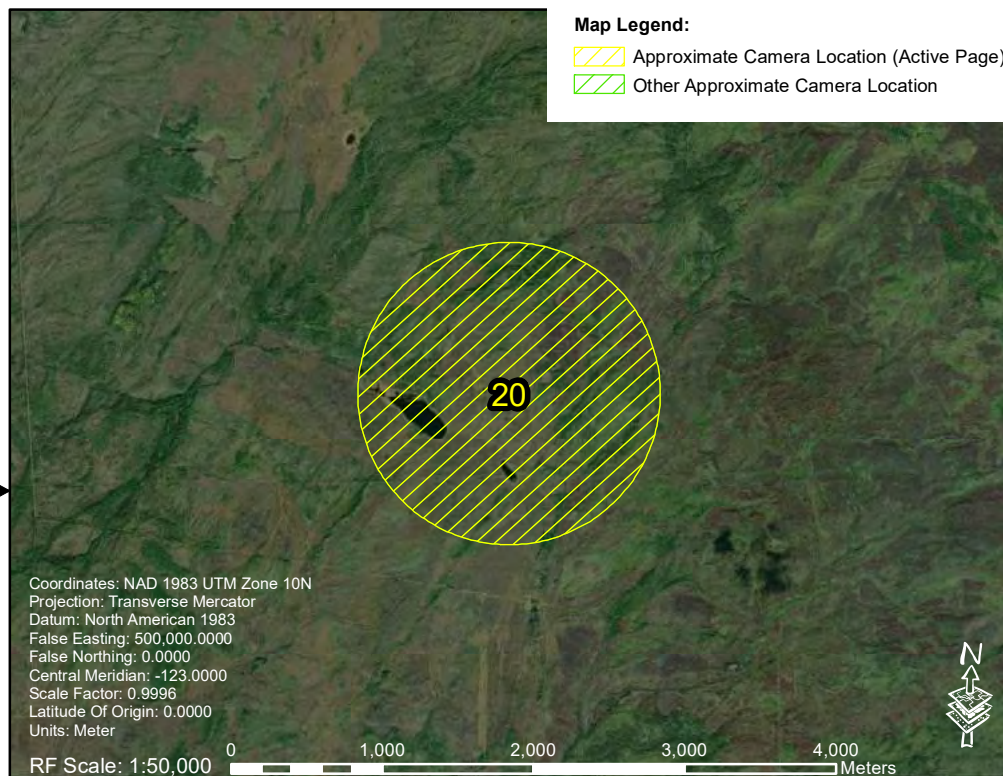
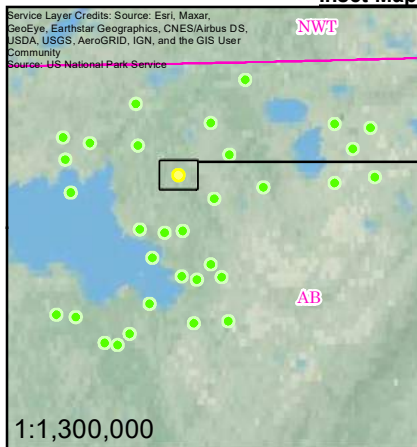
Date Deployed: 2020-03-17

Date Last Serviced: 2021-03-30

Site Description: Bog (Note: Camera was accidentally installed upside-down at site)

Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 20

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

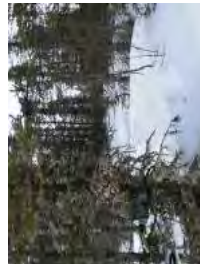
Site Photos



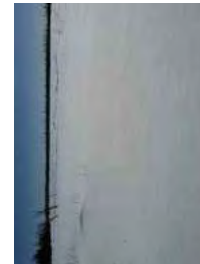
Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera



Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 20

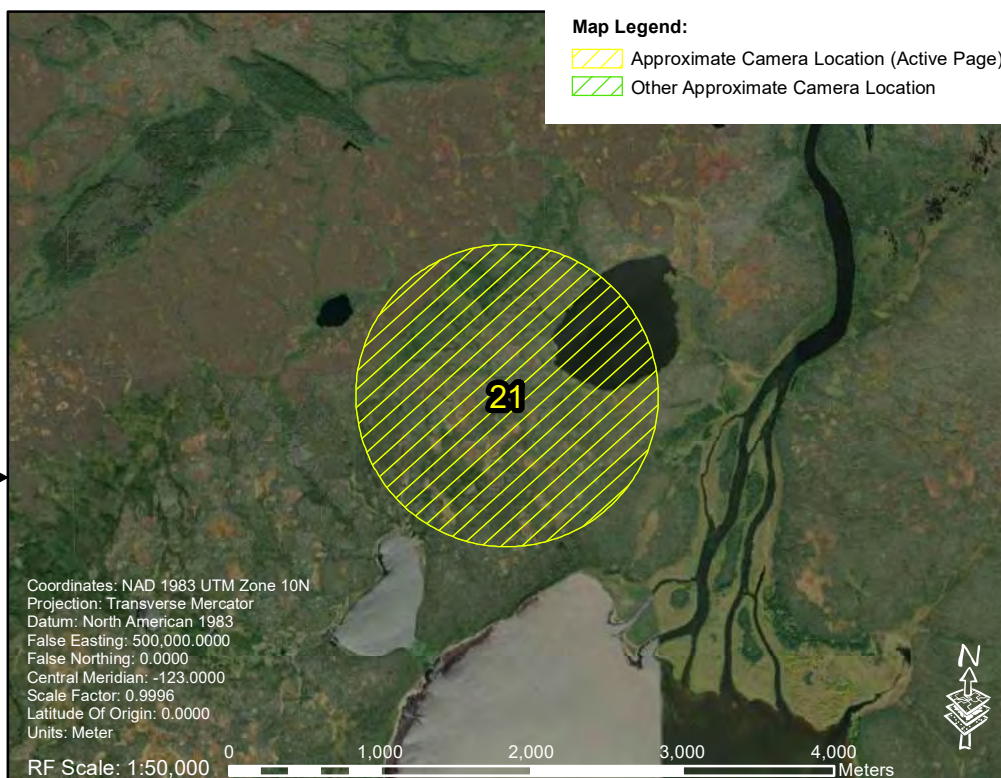
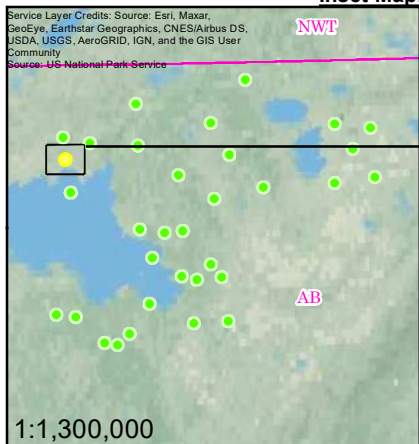
Date Deployed: 2020-03-17

Date Last Serviced: 2021-03-30

Site Description: Spruce stand

Updated: December 1st, 2021

Inset Map:

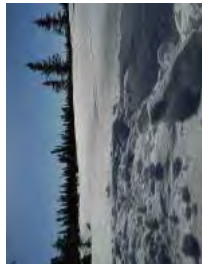


GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 21

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera



Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 21

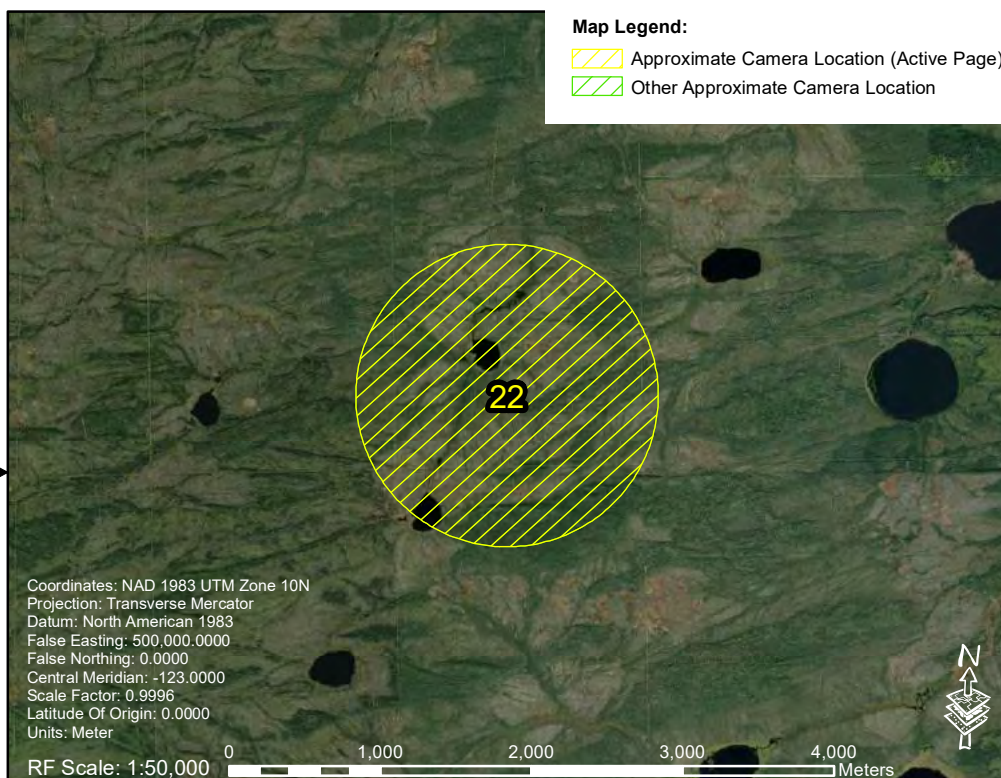
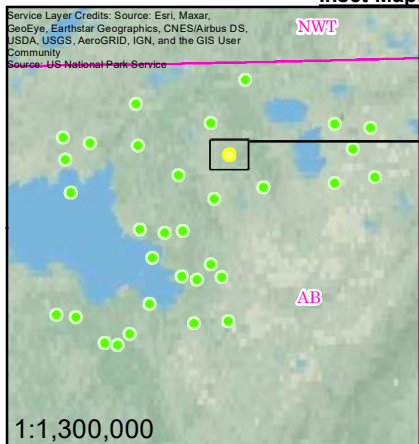
Date Deployed: 2020-03-17

Date Last Serviced: 2021-03-30

Site Description: Next to lake

Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

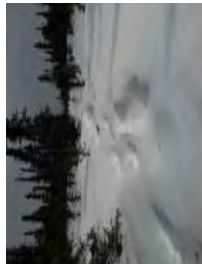
Site ID: 22

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

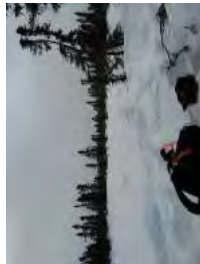
Site Photos



Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera

Photos not yet processed
or obtained

Photos not yet processed
or obtained

Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 22

Date Deployed: 2020-03-17

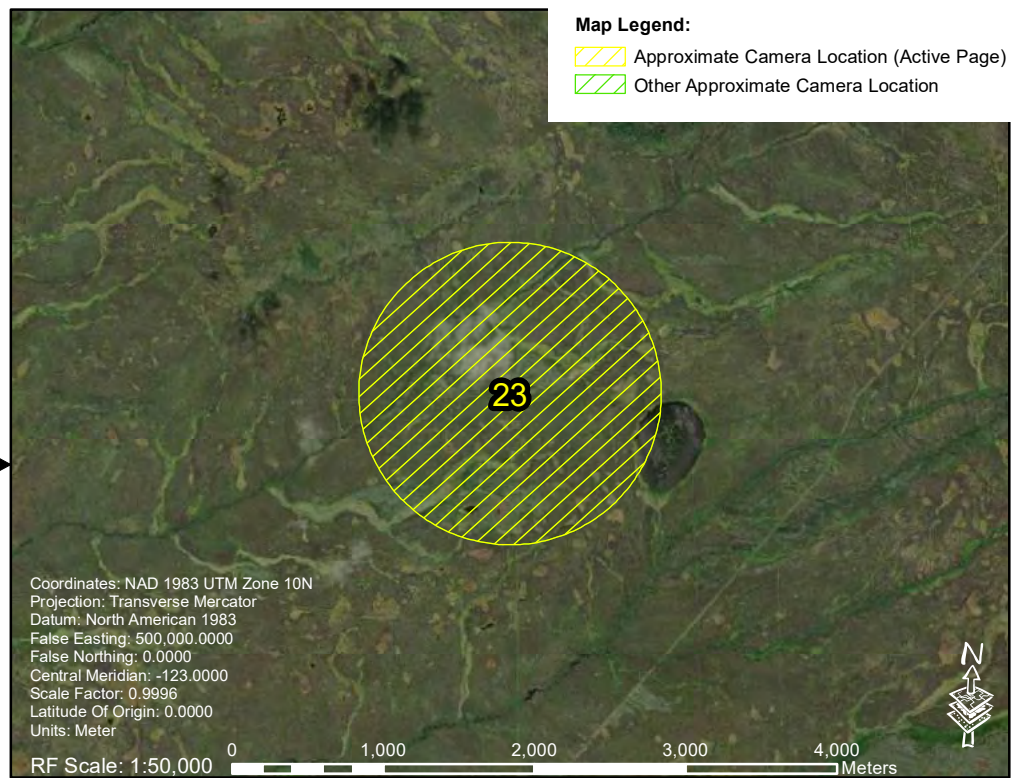
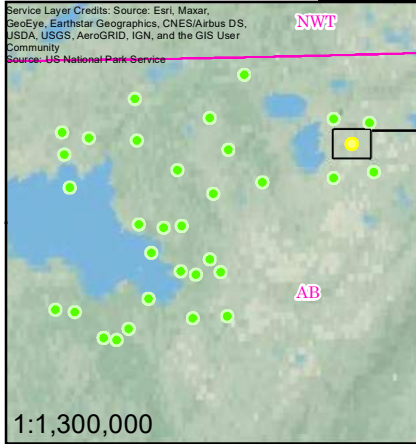
Date Last Serviced: 2021-03-30

Site Description: Upland



Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 23

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera



Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 23

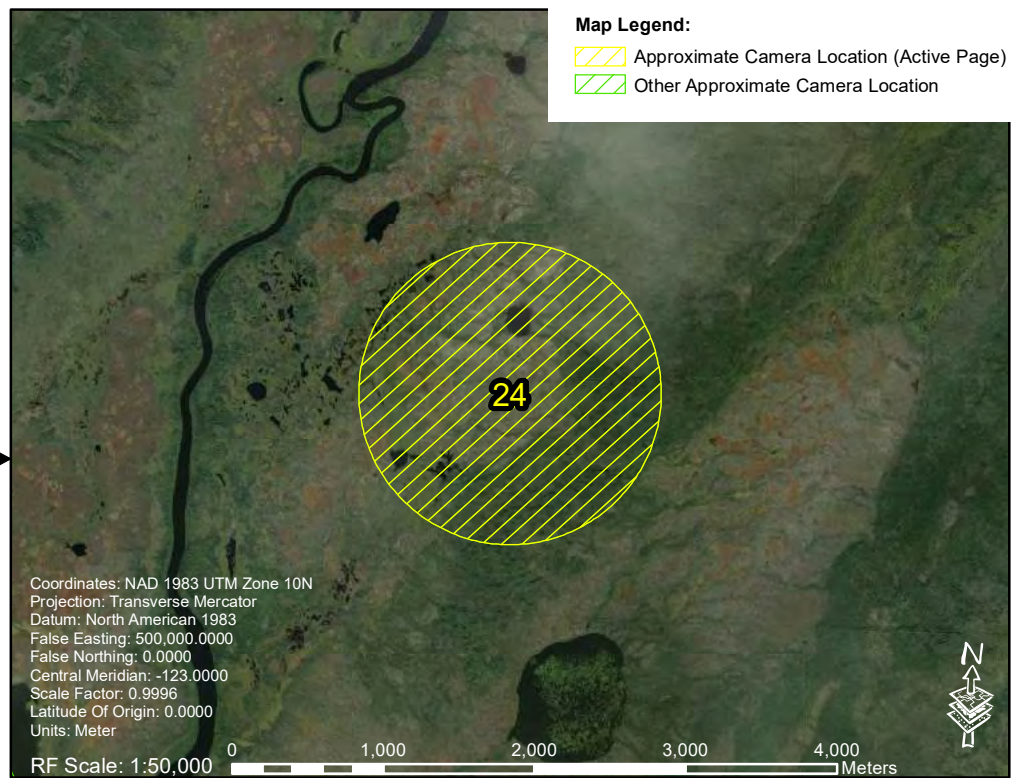
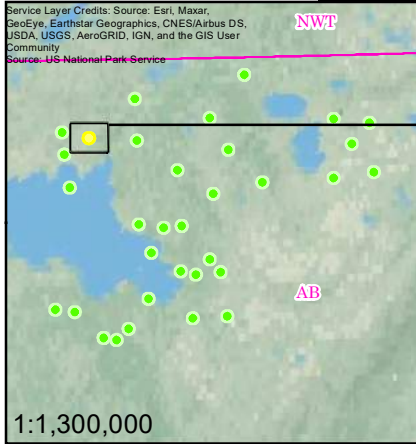
Date Deployed: 2020-03-17

Date Last Serviced: 2021-03-30

Site Description: Bog black spruce adjacent to creek

Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

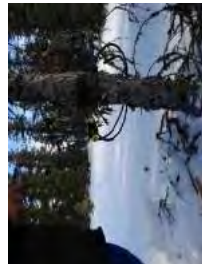
Site ID: 24

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

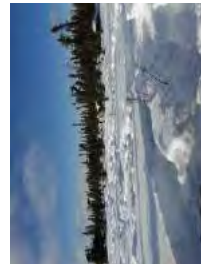
Site Photos



Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera



Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 24

Date Deployed: 2020-03-17

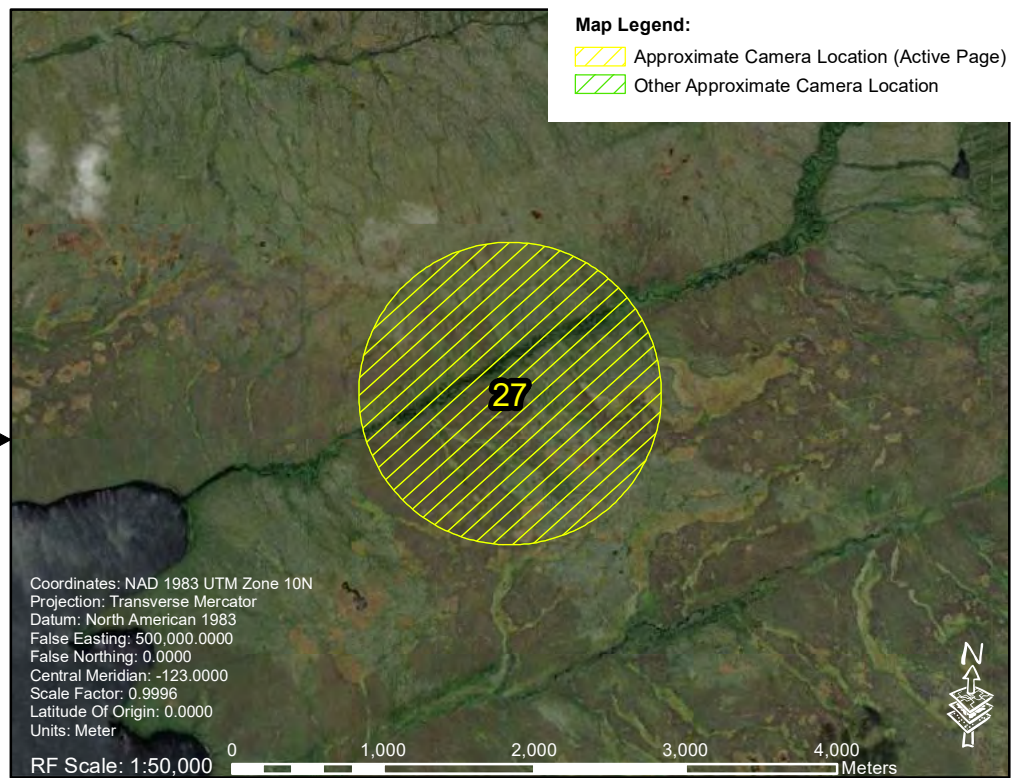
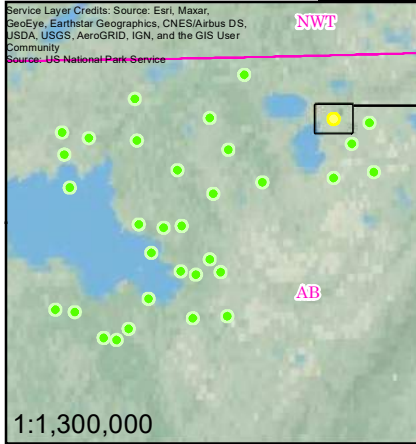
Date Last Serviced: 2021-03-30

Site Description: Bog



Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

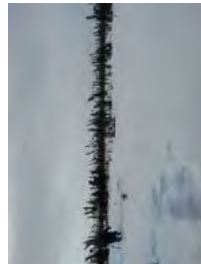
Site ID: 27

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera



Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 27

Date Deployed: 2020-03-17

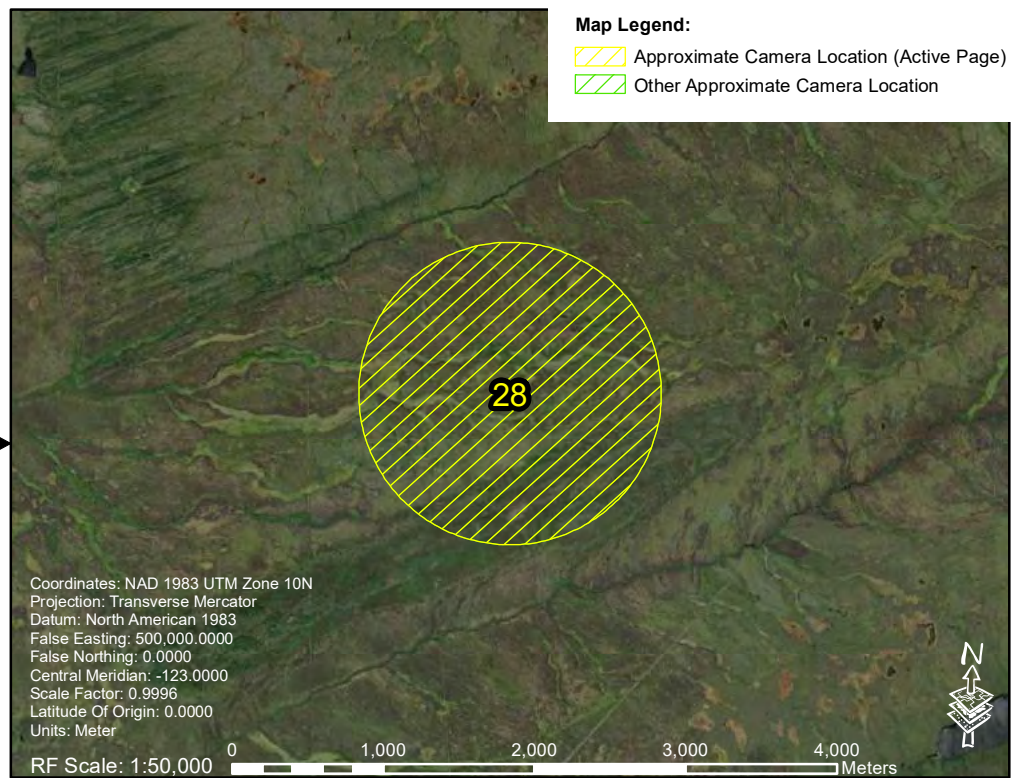
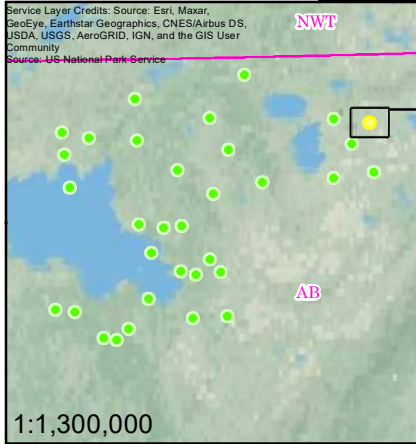
Date Last Serviced: 2021-03-30

Site Description: Bog burn



Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

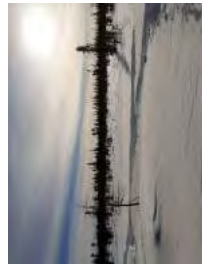
Site ID: 28

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera



Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 28

Date Deployed: 2020-03-17

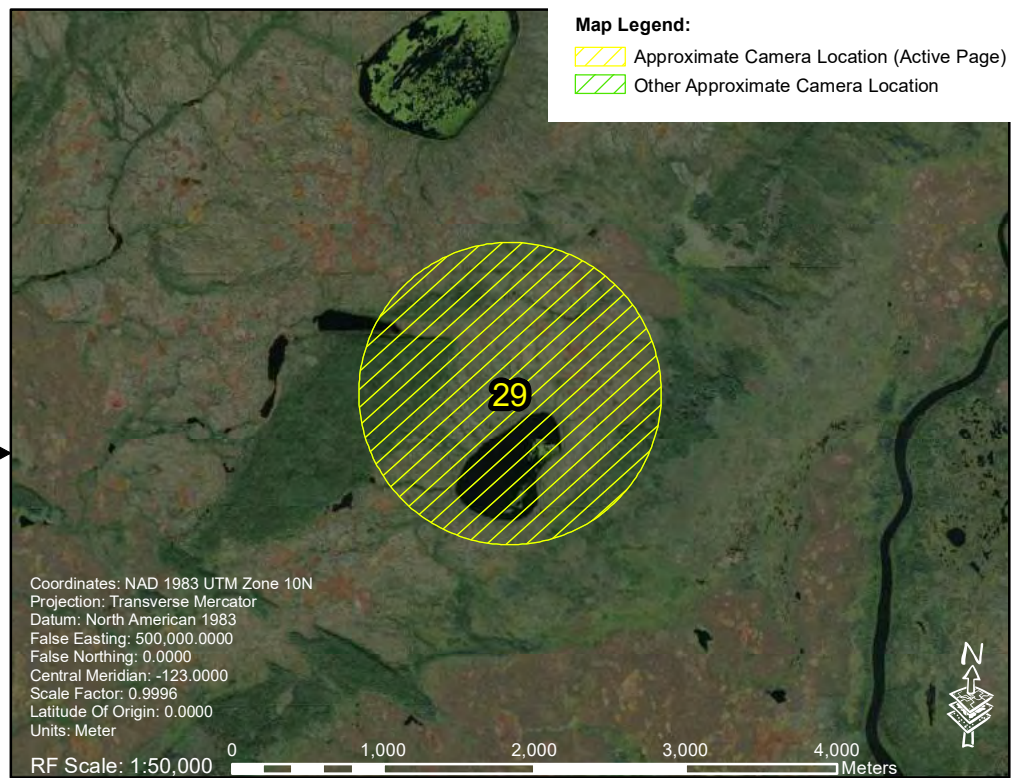
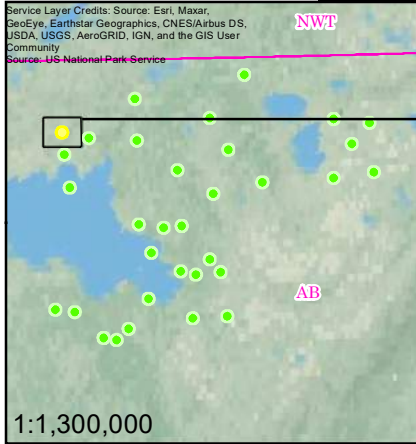
Date Last Serviced: 2021-03-30

Site Description:



Updated: December 1st, 2021

Inset Map:

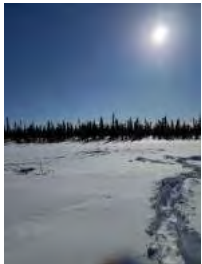


GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 29

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera

Photos not yet processed
or obtained

Photos not yet processed
or obtained

Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 29

Date Deployed: 2020-03-17

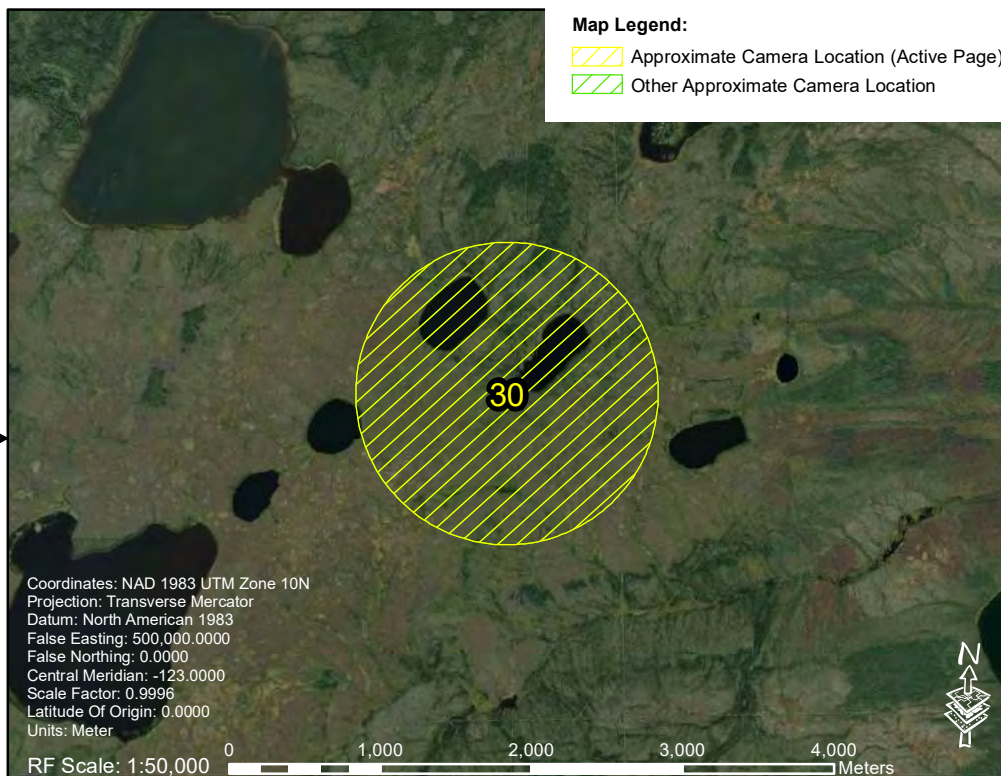
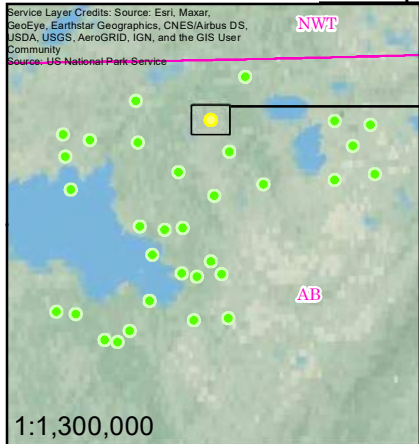
Date Last Serviced: 2021-03-30

Site Description: Bog/clear wet area

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Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 30

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)

Slide C: (optional)

Slide D: (optional)

Example Photos Obtained from Camera

Photos not yet processed
or obtained

Photos not yet processed
or obtained

Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 30

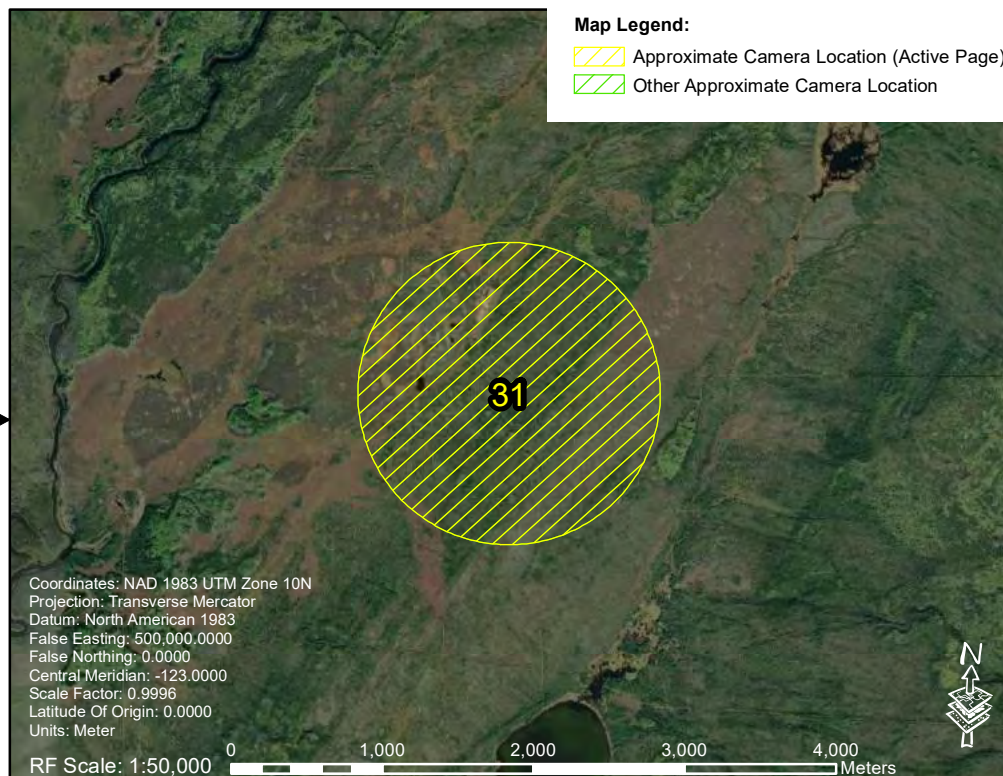
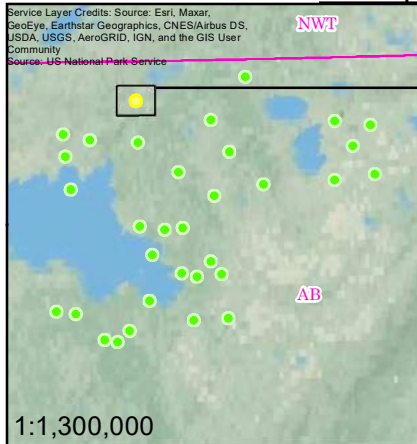
Date Deployed: 2020-03-17

Date Last Serviced: 2021-03-30

Site Description: Old seismic line

Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 31

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)



Slide C: (optional)

Slide D: (optional)

Example Photos Obtained from Camera

Photos not yet processed
or obtained

Photos not yet processed
or obtained

Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 31

Date Deployed: 2020-03-17

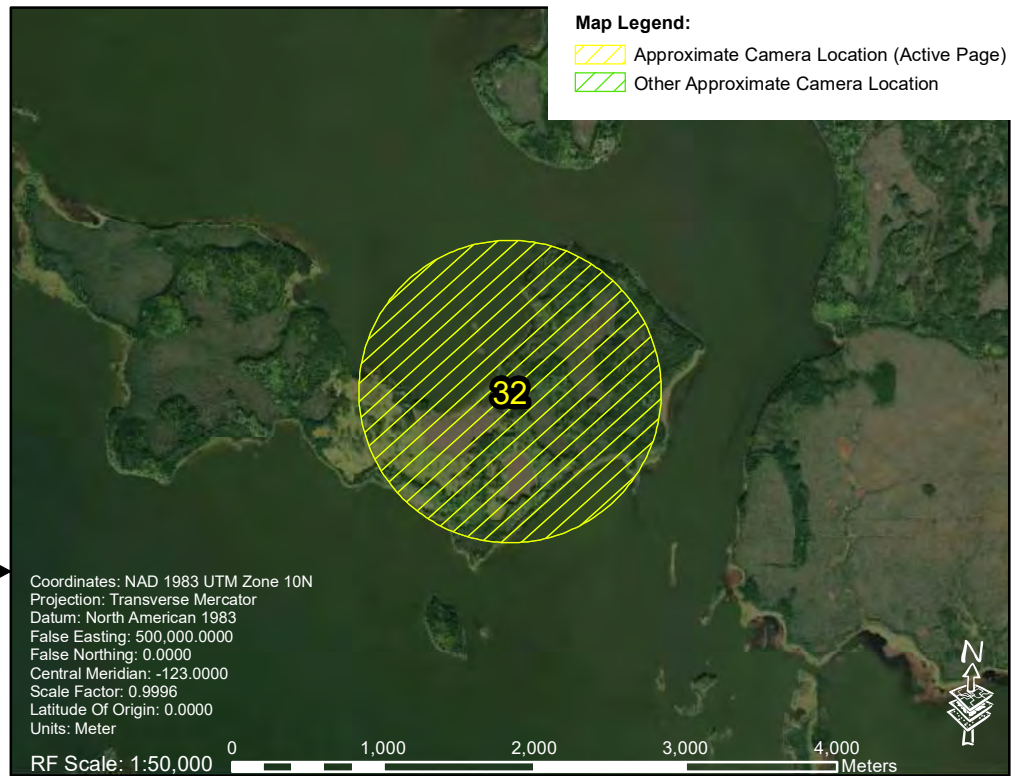
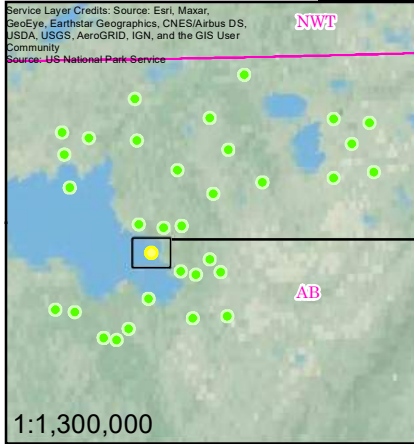
Date Last Serviced: 2021-03-30

Site Description: On seismic in mature spruce



Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 32

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)

Slide C: (optional)

Slide D: (optional)

Example Photos Obtained from Camera

Photos not yet processed
or obtained

Photos not yet processed
or obtained

Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 32

Date Deployed: 2020-03-17

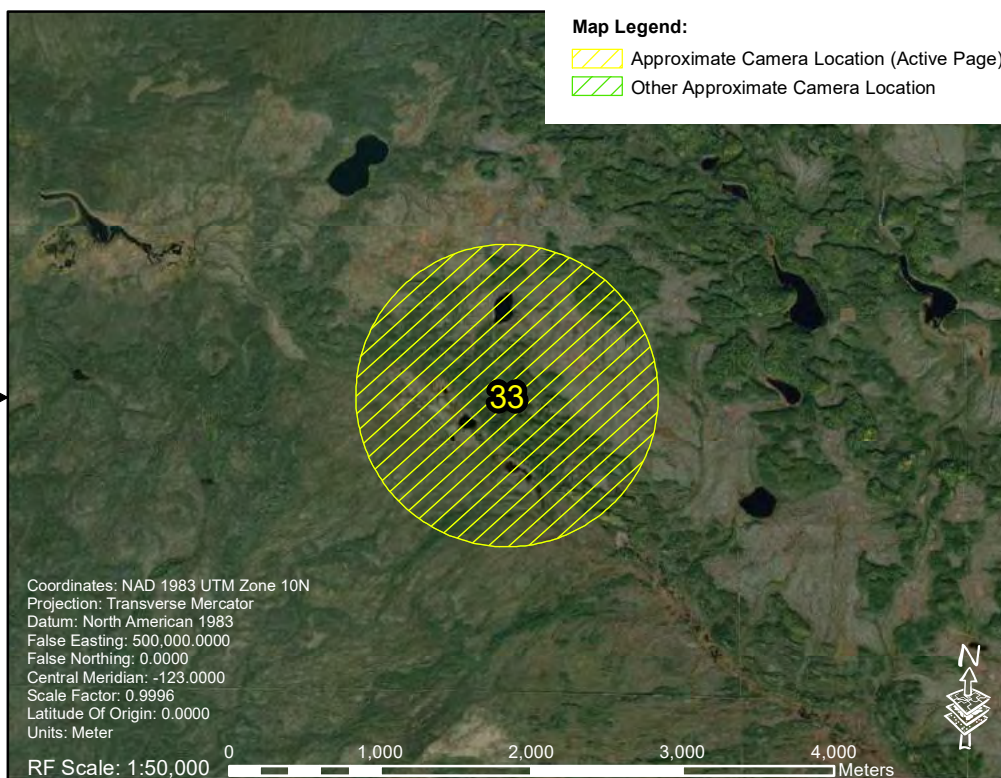
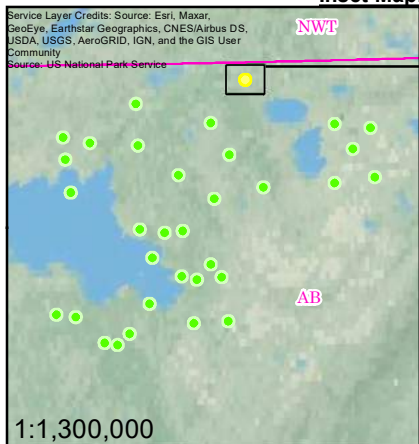
Date Last Serviced: 2021-03-30

Site Description: Upland island



Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

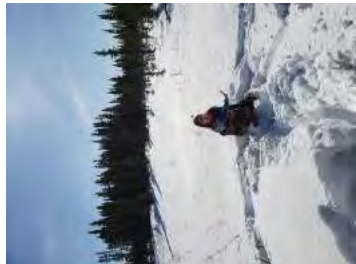
Site ID: 33

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera

Photos not yet processed
or obtained

Photos not yet processed
or obtained

Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 33

Date Deployed: 2020-03-17

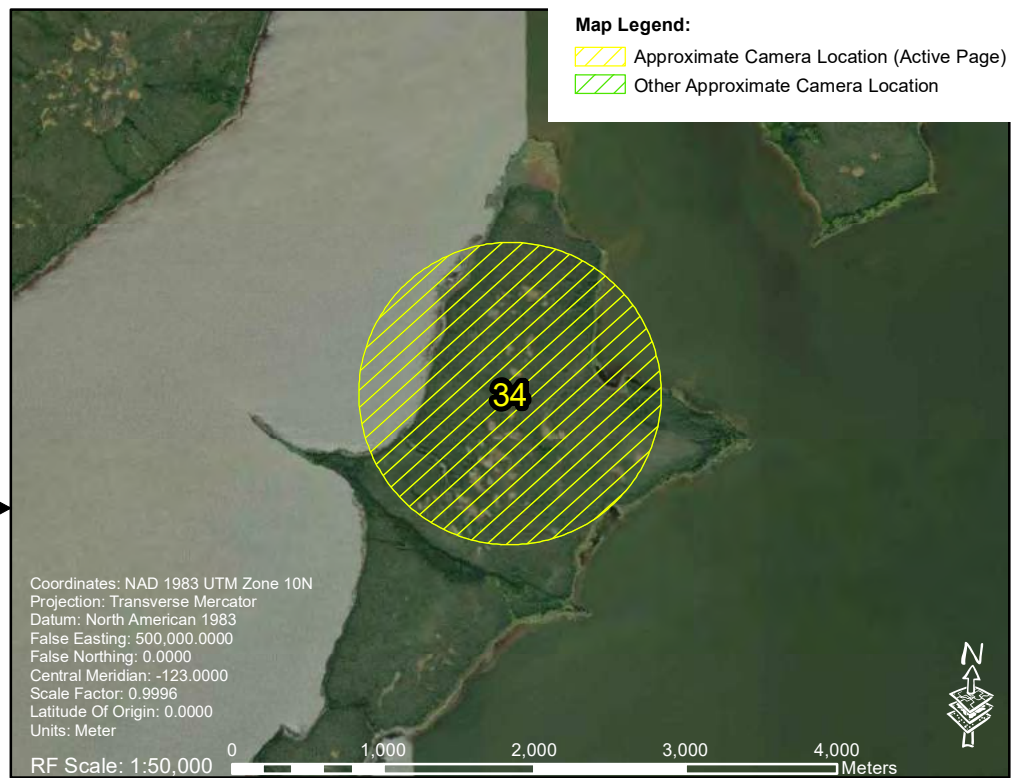
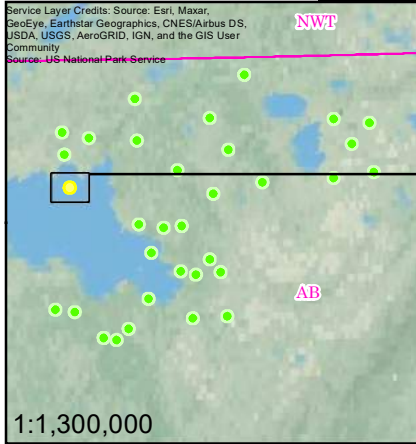
Date Last Serviced: 2021-03-30

Site Description: spruce bog off seismic line. 100 m from upland stand.

Intellectual Property and Confidentiality Notes: These Maps and any TUS Field Survey Data (the "Data") are the Intellectual Property of Dene Tha' First Nation. DTFN reserves all rights to Own, Control, Access, and Possess (OCAP) these Data consistently with Free, Prior and Informed Consent (FPIC), and protected by Canadian Law and UNDRIIP. This map and TUS data are not to be copied, shared or relied on by any Third Parties.

Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 34

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

Site Photos



Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera



Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 34

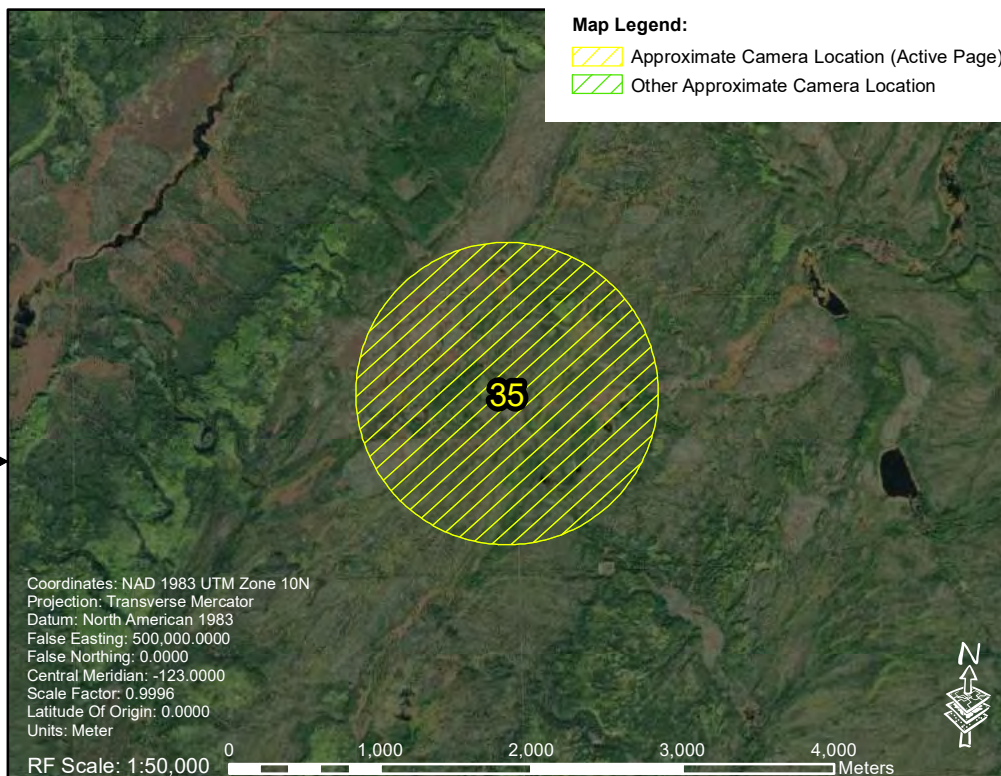
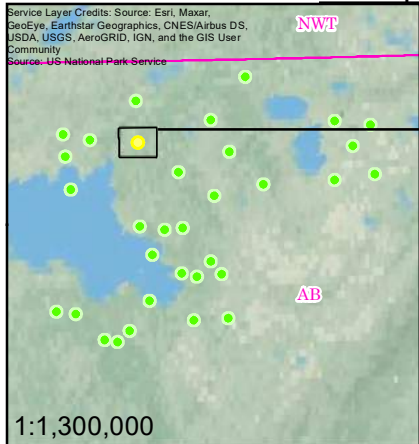
Date Deployed: 2020-03-17

Date Last Serviced: 2021-03-30

Site Description: inlet/bog on the island

Updated: December 1st, 2021

Inset Map:



GIS and Report Authors: Matthew Munson, Eamon Riordan-Short, Ryan Cheng

Site ID: 35

Map Book of Dene Tha' First Nation (DTFN) and Canadian Parks and Wilderness Society (CPAWS) Camera Trap Data for GCXE20C327 "Using Indigenous Knowledge to Protect and Recover Boreal Caribou, Grizzly Bear, and Wolverine in Bistcho Lake, Alberta"

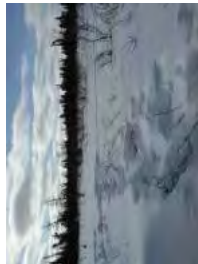
Site Photos



Slide A: (required)



Slide B: (optional)



Slide C: (optional)



Slide D: (optional)

Example Photos Obtained from Camera

Photos not yet processed
or obtained

Photos not yet processed
or obtained

Note: positional errors and omissions may exist between maps, attributes and photos, in the event of discrepancy, the watermark automated data embedded in the photo slides will prevail.

Some Survey Attributes:

Survey No.: 35

Date Deployed: 2020-03-17

Date Last Serviced: 2021-03-30

Site Description: Upland