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Project Title: Muskox (Ovibos moschatus) distribution and abundance of Central Mainland, Nunavut (MX-11) Applicant: Lisa-Marie Leclerc Government of Nunavut P.O. Box 3771 leclerc@gov.nu.ca 1-867-982-7444 Number of Personnel and Visitors: The permit will need to cover 6 persons; the pilot (TBD), co-pilot (TBD), Biologist (Lisa-Marie Leclerc), Biologist (TBD), Wildlife Technician (Terry Milton), Wildlife Technician Trainee (Lena Davis), community members as observers (TBD). Project Objective: This project aims to provide new scientific information on the muskox abundance and distribution of muskox in the management zone MX-11, to be able to review the current Total Allowable Harvest. Project Location: The project will include the West and Central Portion of the Queen Maud Gulf Bird Sanctuary (QMGS). Figure 1: Map of the Muskox management unit MX-11 (black line), in relation to the Queen Maud Gulf Bird Sanctuary (light green). Project duration: From July 1, 2021 to September 15, 2021. We are looking to be 2-5 days in the QMGS. Method of transportation: This is an aerial survey with no landing in the QMGS. Summary of the activity and rationale: In 2015, new muskox management units were established in Nunavut to represent muskox population boundaries. The management unit MX-11 represents now three old harvest zones; MX-13, MX-14, MX-15, and part of MX-16 and MX-19. Current harvesting rate for the muskox management unit MX-11 is based on muskox numbers estimated in 2013 from the west part and old surveys results, which result to 7,500 adult muskoxen. Although this number is the best available information, it does not accurately represent the current muskox distribution and abundance in the western part of MX-11. To obtain these numbers, we are planning to conduct an aerial survey of MX-11 in summer 2021. The area will be flown with up to 25% coverage, with transect lines spaced 8 to 12 km apart. The transect line will be surveyed at a speed of 160 km/h and an altitude of 150 m. Observers will record the number of muskox and GPS location. This project will aim to provide new scientific information on the abundance and distribution of muskox in MX-11 to be able to review the Total Allowable Harvest. Waste disposal: N/A Potential environment impact and mitigation measure: The muskox survey will commence in mid-July, with the survey area occurring within the QMGS in early August. We will be flying at approximately 150m above the ground with an airspeed of approximately 160kms/hour. This could have a small impact on local wildlife as the aircraft flies overhead, but the wildlife will not be disturbed any further once the area has been surveyed. In the sanctuary, the survey there should be completed between 2 and 5 full days (depending on weather). The percentage of coverage will be adjusted to known muskox distribution, keeping the number of km flown low and the spacing between transect lines wider, where possible, to limit disturbance. In this case, most of the area to be surveyed in the QMGS will overlap with the dark blue strata shown in Figure 1, which is at a low coverage density of 10%. In addition, the timing of the survey has been selected to minimize overlap with the peak of the breeding bird season in June and July. Measures to avoid dangerous wildlife encounters: No planned landing will occur in the QMGS area, which will limit conflict with or major disturbance to wildlife. Community consultation and involvement: Since this is a Government of Nunavut, Department of Environment -led project, extensive consultation with the community and co-management partners occurred in the preparation of this project. Direction and community support was given at the 2017 September muskox workshop and at the 2017 and 2018 KRWB AGM that this surveyed was desired. HTOs have been involved in the review of the permit application, as well as in the survey design in 2019, 2020, 2021, as well as during a conference call in the summer of 2019 to plan the survey design. In addition, community members will be employed as observers during the survey. Future Plans: This is a short-term duration research project, until there is a need

to reassess the Muskox population MX11. Research results will be provided to co-management partners at the Kitikmeot Regional Wildlife Board Annual Meeting, as well as in part of the

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Titre du Projet: Distribution et abondance des boeufs musclés (*Ovibos moschatus*) du Centre du continent, Nunavut (MX-11) Applicant: Lisa-Marie Leclerc Government of Nunavut P.O. Box 3771 leclerc@gov.nu.ca 1-867-982-7444 Quantités de personnel et visiteurs: Sous ce permis, il y aura 6 personnes: le pilote, le co-pilote, la Biologiste (Lisa-Marie Leclerc), le technicien de la faune (Terry Milton), l'apprentie technicienne (Lena Davis) et les observateurs de la communauté. But du projet: Ce projet a pour but d'amasser des nouvelles données scientifiques sur la distribution et l'abondance des boeufs musclés (*Ovibos moschatus*) du Centre du continent, Nunavut (MX-11), et ainsi de déterminer les quotas de chasse en vigueur avec plus d'exactitude. Location du projet: Le projet s'effectuera dans les parties ouest ainsi que dans la zone centrale du Sanctuaire d'Oiseaux de Queen Maud Gulf. Figure 1: Carte de la zone de gestion des boeufs musclés (MX-11) (ligne noire) en relation avec le Sanctuaire d'Oiseaux du Queen Maud Gulf (en vert pâle). Durée du projet: Ce projet prendra place du 1er juillet 2021 au 15 septembre 2021. Pendant le projet, nous serons dans le Sanctuaire d'Oiseaux du Queen Maud Gulf pour une durée de 2 à 5 jours seulement. Méthode de transport: Ce projet est un survol aérien sans atterrissage dans le Sanctuaire d'Oiseaux du Queen Maud Gulf. Résumé de l'activité: En 2015, de nouvelles zones de gestion ont été établies au Nunavut afin de mieux représenter la délimitation des populations de boeufs musclés. La zone de gestion MX-11 est constituée de trois anciennes zones de chasses : MX-13, MX-14, MX-15 et d'une partie de MX-16 et MX-19. Le quota de chasse pour cette zone de gestion MX-11 a été établi à partir de l'estimée de la population en 2013 qui a fait l'inventaire de boeufs musclés seulement à l'ouest de la zone MX-11 et des vieux inventaires disponibles pour le restant de la zone totalisant 7,500 adultes boeufs musclés. Bien que ce soit la seule information disponible, ce montant ne représenterait pas bien le nombre actuel de boeufs musclés, ainsi que leur distribution dans MX-11. Pour réaliser la mise à jour, nous planifions de faire un inventaire aérien de cette zone au courant de l'été 2021. La zone d'étude va être survolée à 25% maximum et les lignes de transect vont être espacées de 8 à 12 km et survolées à une vitesse de 160 km/heure avec une altitude de 150 m. Les observateurs vont enregistrer le nombre de boeufs musclés et prendre un point GPS pour chaque groupe observé. Ce projet a pour but d'amasser des nouvelles données scientifiques sur la distribution et l'abondance des boeufs musclés (*Ovibos moschatus*) du Centre du continent, Nunavut (MX-11), et ainsi revoir les quotas de chasse en vigueur. Disposition des déchets: N/A Impacts environnementaux et mesures d'atténuation: Cet inventaire aérien de boeufs musclés commencera vers la mi-juillet, et nous estimons être dans le Sanctuaire d'Oiseaux du Queen Maud Gulf en début août. L'altitude de vol sera à environ 150 m du sol avec une vitesse d'environ 160 km/heure. Ceci peut avoir un impact très faible sur la faune quand l'avion passe par-dessus, cependant la faune ne sera dérangée qu'une seule fois pour une très courte durée lors du survol. Dans le Sanctuaire, le survol aérien sera limité à une durée de 2 à 5 jours (dépendamment des conditions météorologiques). Pour limiter les impacts sur la faune, le pourcentage de l'air survolé sera ajusté pour une distribution de boeufs musclés pré-établie afin de limiter le nombre de kilomètre parcourus et de conserver l'espace entre les lignes de transect large. Dans ce cas, la majorité de l'air d'étude dans le Sanctuaire d'Oiseaux du Queen Maud Gulf qui est définie par le strata en bleu, figure 1, va être survolé à 10%. De plus, la durée de l'inventaire a été sélectionnée hors de la saison de reproduction des oiseaux en juin et juillet. Mesures pour éviter les face-à-faces dangereux avec la faune: Parce qu'il n'y aura pas d'atterrissage dans le Sanctuaire d'Oiseaux du Queen Maud Gulf, ceci limite grandement les conflits avec la faune. Engagement et consultation de la communauté: Ceci est un projet du Gouvernement du Nunavut, du Département de

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25%ngujumik takuvikhanik, piqarluni nalrujunik tingmivikhanik ungahilaarutiqaqtunik 8nik 12nun kilaamatanik (km) ungahiknirnik. Taapkuat nalrujut tingmidjutikhat qaujihaqtauniaqtun kajumiktilaakkut 160 km/h qulvahiktilaaqarlunilu imaatun 150 m (miitanik). Qunngiaqtut titiraqniaqtait kaffiuaakhainnik umingmait iliuraqlugillu GPS-kut humiinningit. Una havaakhaq piniaqhimaajuq tuniluni nutaanik nalunaq tumik kangiqhidjutinik amigaitilaanginnik humittaakhainniklu umingmainni uvani MX-11mi ihiviuriami Tamatkiutiinni Pijaaqtuni Angujauttaaqtuni.Iqqakut humungaqtukhat:PingittuqPiniaqnahuginikkut avatimi hulaqutinik imaalu ingattaqtihimainnikkut qanuriliurutikhat:Umingmainni qaujihaqniq aullaqtirniaqtuq qitkani-Julyumi, qaujihaqnikkut iningani piniaqtuq iluani Queen Maud Tariungani Tingmianun/Qupanuanun Hapummiviani atulihaaliqqat August. Tingminiaqtugu imaakiaq 150m qulaani nunaup kajumiktilaaqaqluni imaakiaq 160kms/ikaaqnirmi. Una pidjutittaarungnarhijuq mikijumik hulaqutimik tahamaniittunun huradjanun taimaatun tingmiti qulautirutaanin, kihimi huradjaq pilaqutiffaarutiqaqalimaittun ininga iniqtaukpat qaujiharnirmin. Talvani hapummivingmi, qaujiharniq iniqtauniarungnarhijuq uvani 2nik 5niklu naahimajuni ubluni (pidjutiqaqluni qanurinningani hilaup). Avvakua takuvikhanik ihuaqhaqtauniaqtuq ilihimajaujuni umingmait humiininginnun, pipkainikkut amigaitilaanginnik kilaamitanik (km) tingmidjutinik ikiklihimaninginnun ukuallu ungahiktilaanginnik akunnainni nalrujuni hilikhijuummiqninginni, humilu pijaaqqat, kikliqaqtittijumanikkut hulaqutinik. Taimaittuq uvani, tamatqiuvsjanganiaqtun iniit qaujihaqtaujukhat uvani Queen Maud Tariungani Tingmianun/Qupanuanun Hapummiviani qaliriigutiginiaqtun uumani tunguktingajumi qaliriikhimajuni nunami tautungnaqtuq Naunaitkutimi 1mi, taamna ikittunik tautukvikhanik amigaitilaanginni imaatun 10%mik. Taimaatullu, ublukhait qaujiharnirvingmi pihimajun mikhilaqtittumanikkut qaliriigutininik piqialirutaani ivajuni tingmiani/qupanuani pidjutainni June-mi July-milu.Qanuriliurutikhat pingittaami qajangnaqtuni huradjaq akkuqtuutainnik:Piniaqhimaangittut mittaamiknik uvani Queen Maud Tariungani Tingmianun/Qupanuanun Hapummiviani, taimaatun kiklikaqtipkainiaqtuq ihuangidjutinik taapkununga imaaluunniit angijunik hulaqutinik huradjanun.Nunallaani miiturutinik ilaupkainirniklu:Taimainman una Nunavut Kavamangani, Avatilqijikkut Havagvianin-hivuliqtaungman havaakhaq, amigaittun miitirutit nunallaani ukunanilu atuni-aulapkainikkut paannarijani pivaktun hivunikhaliuqnikkut uumani havaakhami. Hivunikhaliurutit nunallaaminllu ikajurutit tunijauvaktun uvani 2017mi Septembermi umingmakkut katimadjutimi uvanilu 2017mi 2018milu KRWB Katimarjuarutimi una qaujiharniq pijumajauninganik. Anguhiqijiit katimajiit (HTOs) ilauvaktun ihivriuhinirmi laisighamik uukturutimi, uvanilu qaujiharnikkut qanuridjutikhaanun May 2019, 2020,2021mi, imaalu hivajautikkut miiturutimik aujami 2019mi hivunikhaliuqnikkut qaujiharnikkut qanuridjutikhaanun. Taimaalu, nunallaamiutat havaktitauniaqtut qunngiaqtiulutik qaujiharutimi.Hivunikhami Hivunikhaliurutit:Una ikittunik-ublunik hivituniquaqtuq naunaijarnikkut havaguti, pijukhaudjutiqaqilqqat naunaijaffaaqtaujukhanguqqat una Umingmainni amigaitilaanginni uvani MX11mi. Qaujiharnikkut pidjutit tunijauhugujun ukununga atuni-aulapkainikkut paannarijani uvani Kitikmeot Aviktuqhimanirnian Uumajulirinikkut Katimajiinnun Ukiuq tamaat Miitqviani, taimaalu ilaupluni miitqatigiiknikkut havagutini Anguhiqijiit Katimaviinnun Inungnullu.

Personnel

Personnel on site: 0

Days on site: 20

Total Person days: 0

Operations Phase: from 2021-07-01 to 2021-09-15

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Δᑦᕈᑦᕈᑦᕈᑦ	Beverly Maksagak	Hunters and Trappers Organization	2021-01-12
ᑭᓇᕈᑦᕈᑦ	Amanda Dumond	Hunters and Trappers Organization	2021-01-12
ᕈᑦᕈᑦᕈᑦ	Enuk Pauloosie	Hunters and Trapper Organization	2021-04-13

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Transboundary

Kitikmeot

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Project transportation types

Transportation Type	Transportation Mode	Length of Use
Air	fixed-wing	

Project accomodation types

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Aviation fuel	fuel	0	0	0	Gallons	Fueling of the aircraft will be done mainly in Kugluktuk and Cambridge Bay. Pending in-kind support, landing and refueling might take place at TMAC and Sabina. No fuel cache will be done for this project.
n/a	hazardous	0	0	0	Gallons	n/a

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Aerial surveys	ᐃᑲᑕᑦᑭᑦ ᐃᑲᑕᑦᑭᑦ ᐃᑲᑕᑦᑭᑦ	zero liter	none applicable	none applicable

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The muskox survey will commence in mid-July, with the survey area occurring within the QMGS in early August. We will be flying at approximately 150m above the ground with an airspeed of approximately 160kms/hour. This could have a small impact on local wildlife as the aircraft flies overhead, but the wildlife will not be disturbed any further once the area has been surveyed. In the sanctuary, the survey there should be completed between 2 and 5 full days (depending on weather). The percentage of coverage will be adjusted to known muskox distribution, keeping the number of km flown low and the spacing between transect lines wider, where possible, to limit disturbance. In this case, most of the area to be survey in the QMGS will overlap with the dark blue strata shown in Figure 1, which is at a low coverage density of 10%. In addition, the timing of the survey has been selected to minimize overlap with the peak of the breeding bird season in June and July.

Additional Information

SECTION A1: Project Info

SECTION A2: Allweather Road

SECTION A3: Winter Road

SECTION B1: Project Info

SECTION B2: Exploration Activity

SECTION B3: Geosciences

SECTION B4: Drilling

SECTION B5: Stripping

SECTION B6: Underground Activity

SECTION B7: Waste Rock

SECTION B8: Stockpiles

SECTION B9: Mine Development

SECTION B10: Geology

SECTION B11: Mine

SECTION B12: Mill

SECTION C1: Pits

SECTION D1: Facility

SECTION D2: Facility Construction

SECTION D3: Facility Operation

SECTION D4: Vessel Use

SECTION E1: Offshore Survey

SECTION E2: Nearshore Survey

SECTION E3: Vessel Use

SECTION F1: Site Cleanup

SECTION G1: Well Authorization

SECTION G2: Onland Exploration

SECTION G3: Offshore Exploration

SECTION G4: Rig

SECTION H1: Vessel Use

SECTION H2: Disposal At Sea

SECTION 11: Municipal Development

$\dot{L}^{\infty}_x \nabla \varphi \cap D' \subset B_{\rho_0} \Delta C^{\infty}_{\bar{x}} \subset L^{\infty}_x D'$: $m \geq 1$, $B_{\rho_0} \Delta C^{\infty}_{\bar{x}}$

N/A

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N/A

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N/A

Miscellaneous Project Information

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The muskox survey will commence in mid-July, with the survey area occurring within the QMGS in early August. We will be flying at approximately 150m above the ground with an airspeed of approximately 160kms/hour. This could have a small impact on local wildlife as the aircraft flies overhead, but the wildlife will not be disturbed any further once the area has been surveyed. In the sanctuary, the survey there should be completed between 2 and 5 full days (depending on weather). The percentage of coverage will be adjusted to known muskox distribution, keeping the number of km flown low and the spacing between transect lines wider, where possible, to limit disturbance. In this case, most of the area to be survey in the QMGS will overlap with the dark blue strata shown in Figure 1, which is at a low coverage density of 10%. In addition, the timing of the survey has been selected to minimize overlap with the peak of the breeding bird season in June and July.

Cumulative Effects

Impacts

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$$(P = \langle b \rangle \dot{\cup} P \cap \langle a \rangle^c)^c, N = \langle b \rangle \dot{\cup} \Gamma \setminus \langle D \rangle \langle a \rangle^c \setminus \langle \Gamma \rangle \langle a \rangle^c, M = \langle b \rangle \dot{\cup} \Gamma \setminus \langle D \rangle \langle a \rangle^c \setminus \langle \Gamma \rangle^c, U = \langle b \rangle \dot{\cup} \Gamma \setminus \langle D \rangle \langle a \rangle^c \setminus \langle \Gamma \rangle^c \setminus \langle \Gamma \rangle^c, U = \langle b \rangle \dot{\cup} \Gamma \setminus \langle D \rangle \langle a \rangle^c \setminus \langle \Gamma \rangle^c \setminus \langle \Gamma \rangle^c)$$

1	polygon	Study area MX-11
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