ᓄᓇᕘᒥ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦᑎᒍᑦ ᑐᒃᓯᖅᑑᑦ ᕿᒥᕐᕈᔭᒃᓴᖅ #125492

The effect of warming on aquatic invertebrates in the Kitikmeot

ᑐᒃᓯᖅᑑᑕᐅᔪᖅ ᖃᓄᐃᑦᑑᓂᖓ:	New
ᐱᓕᕆᐊᕆᔭᐅᔪᒪᔫᑉ ᖃᓄᐃᑦᑑᓂᖓ:	Scientific Research
ᐅᓪᓗᖓ ᑐᒃᓯᖅᑑᑎᓕᐊᕕᓂᐅᑉ:	11/19/2019 3:58:55 PM
Period of operation:	from 0001-01-01 to 0001-01-01
ᑲᔪᓯᒃᑲᐃᔨᐅᓂᐊᕋᓱᒋᔭᐅᔪᑦ:	from 0001-01-01 to 0001-01-01
ᐱᓕᕆᐊᖅᑭᒪᔪᖅ:	Michelle Tseng University of British Columbia 3156 - 6270 University Boulevard Vancouver British Columbia V6T 1Z4 Canada ᐅᖄᓚᐅᑏᑦ: 778-232-7404, ᓱᑲᔪᒃᑯᑦ:

ᑐᓴᐅᒪᔭᒃᓴᑦ

ᖃᓄᐃᑦᑑᑎᓂᒃ ᐱᓕᕆᐊᖅᑲᖅᓂᐊᕆᐊᖕᒐᓐᓂᒃ

ᖃᓪᓗᓈᑎᑐᑦ: Who: Michelle Tseng, Aquatic and Insect Ecologist, University of British ColumbiaWhat: Researchers are currently studying the health of lakes, ponds, streams, and rivers in the Kitikmeot Region. This ongoing project is a collaboration between several universities, the Ministry of Environment (Government of Canada), and POLAR Knowledge Canada. I am joining this group of researchers to study in particular, whether increased water temperature in lakes and ponds is changing the health of small aquatic animals called zooplankton. In summer 2020, I propose to take 100 live zooplankton from each of 10 lakes. This amount is less than 0.01% of a typical lake zooplankton population. I will employ one local guide through the Ekaluktutiak Hunters and Trappers Association, and one local high school student. We will travel to these lakes by truck or ATV. At the Canadian High Arctic Research Station (CHARS), I (and the guide or student if they are interested), will measure the respiration rate (breathing rate) of live individual zooplankton held at different temperatures. I am testing the idea that zooplankton collected from warmer lakes will be able to maintain normal breathing rates at warmer temperatures, compared to zooplankton collected from cooler lakes. Why: Zooplankton are important components of healthy aquatic environments. They filter water and they are food for larger insects and for fish such as lake trout and Arctic char. Without zooplankton, lakes would become cloudy with algae, and fish would become malnourished or unable to survive at all. This study will give us information about how tolerant zooplankton are to warmer water temperatures, and also how quickly they may be able to adapt to changing temperatures. This study is part of a three-year study that will also investigate (a) whether zooplankton collected at different times of the year show different responses to warmer temperatures, and (b) whether differences in the ability of zooplankton to withstand warmer temperatures are due their environment, or to specific genes. Together this information will allow us to make more accurate predictions for whether important fish like trout and char will still have enough high-quality food to grow and thrive as climate change continues.Where: I propose to sample zooplankton from a subset of the lakes being currently being studied by the lake research group. All sites will be within a three-hour ATV or truck ride from CHARS. We will depart from CHARS in the morning and return by late afternoon each day.When: I plan to consult with the community from June 07 to June 13, 2020. Pending positive feedback from the community, we will sample lakes in July 2020. If the community would like me to change my proposed research, I will postpone lake sampling until the suggested changes have been integrated.

ᐅᐃᕖᑎᑐᑦ: In our instruction letter we were asked to provide the Non-technical Project Summary in English and Inuinnaqtun

ᐃᓄᒃᑎᑐᑦ: In our instruction letter we were asked to provide the Non-technical Project Summary in English and Inuinnaqtun

Inuinnaqtun: Nunavut Avatiligiyit Katimayiit – titikani nakataa 19YN044, NPC-kot titikani: 149242Ayongnakpalaanggituk havaagoyoghakot titigakhimayuk Kablonaatut Inuinnaqtutlo, < 5000 titikatKina: Michelle Tseng, Tahikmiotaligiyit kiktogianiklo elittoghaiyit, University of British Columbia-mitHona: Elittoghaiyit tatja naonaiyaiyot tattit kanoginmagaagita omayovalokaknigitigot, komakoniklo naonaiyaiyot tahitkani, kogaayovaloitlo, kookatlo Kitikmeot eloani. Hamna havaagohimmaktuk ahini nunani aviktokhimayonit havakatikakhotik elihakvikyoagoyoni, Kavamatokatkollo Avatiligiyiinik (Kaanatap Kavamaini), okoninggalo POLAR Knowledge Canada. Havakatigilogot elaonialiktongga elittoghaiyinik naonaiyainahoaktillogit kanogittoniklikaa havaagiyaitigot, kanoginniakmagaagita tattit hihaikpalialingmagaagita tahikkallo kinggoknakhitivalialikmagaagitalo tahikani komagovaloit honalikaa tahikmiotavaloit atikaktot zooplankton-gonigaktaoyot. Aoyakat 2020mi, pinahoakniaktongga omayonik tahikmiotanik tahikamiotaniklo hapkoningga kolinik tattinit.

Haffoma amiktilaaga mikiyonnoak naamavyanggittok 0.01%-posanganik tahikmiotavalokнginnik. Atahikmik Ekaluktutiakmiotamik havaktikakniaktongga egoaktigiyaghamnik Ekaluktutiami HTO-kogitigotI ataihikmilo anggayoghiit sikookvianit. Aolaakatakniaktogot aghalootikot foahoilakotloniit. Okonani Kaanatap Okioktaktonggani Nalvaaghioktoligiyiini (CHARS-gonigaktaoyok), ovanggalo (kaitiktiginahoaktagalo atahiklo sikooktok elaoyomakpanik), naonaigahoakniaktavot anighaaktoknanggitigot tahikmiotavaloit nalianni tattit okkooknaginni. Oktogahoktatka katighoktavot omayovaloit tahikanit tattinit hihaitkiyanit kanoktot aningnikaohiit kinggoknakniakmagaagita alanggatkiyaoniakmagaagitaloniit tattinit niklamatkiyanit. Hook: tahikmiotat omayovaloit pimmagiokmata kanoginniakmagaagitalo emangmiotavaloit. Imak halommakhimakmajot nikikaotaoplotiklo anggiyaatkiyanot komakonot ekaloknollo immakaat ehooknot ekalokpiknnollo. Tattit omayovalokanggitpata, tattit ehoghiniaktot halomailgovaloknit, ekaloit piominaigotiginiaktaat annaomalimaitotiklo. Hamna naonaiyaotiginahoaktakot elittogijotiginiaktakot honalikaa tahikmiotavaloit kanok annaomaniakmagaagita tattini hihaitkiyani, talvalo hongiotiyagikniakmagaagita Alani tattiniiligomik immat alanggokpalianinggitigot. Hamna naonaiyaotiginahoaktavot havaagihimmakniaktakot okionot pinggahonot talvalo elittoghaifaakniakmiyot tahikmiotavaloknik annaomanighaitigot tattini hihaitkiyani avatiginiaktamikni naliatigolloniit. Hapkoa katighoknahoaktavot alatkiikniga okiop atoklogo, ovaloniit, naonaiyaotigiyavot ehoaghivaaliotiniaktot hivonighami kanoginniakmagaagita annaomajohighaitigollo ehoot ekalukpiitlo nikighakatiagaiginni piyominaknighaitigollo pivaliatillogo hilap alanggokpalianinga kinggoknakhivaliaginnakmat. Homi: naonaiyagomayatki tattit ekalokaknigit omayovalokaknigillo naotiktaoktaohimmaaktnik tattinik okonanga tattinik naonaiyaiyonik. Tamaita elittoghaknahoaktavot aolaaknakniaktot ekaaknini pinggahonit CHARS-konnit oblaami aolakpaklota otikpaklotalo onnoligaikpat oblotoagaikpat. Kakogo: Nunaliit okakatigiyaktokniaktatka tohakvigilogillo June 07-mit June 13-mot, 2020-mi. Naonaijagikhiniakkook kanok tohakviginiagoptigik nunaliit, tattit naonaiyalikniaktavot July 2020-mi. nunalknit okaojaogoma naonaiyakvigiyomayatka alanggokokpatigik, nutkaktillakniaktaga naonaiyakvighatkat nunalingnit kakogo pitloikpata.

Personnel

Personnel on site: 3

Days on site: 7

Total Person days: 21

Operations Phase: from 2020-06-03 to 2022-10-24

ᐱᓕᕆᐊᕆᔭᐅᓂᐊᖅᑐᑦ

ᓇᒥ	ᖃᓄᐃᑦᑑᒥᑦ ᐱᓕᕆᐊᖃᕐᓂᐊᖅᐸ	ᑭᒃᑯᑦ ᓄᓇᖁᑖᓂ	ᑐᓴᐅᒪᔭᒃᓴᑦ ᓄᓇᐅᑉ ᖃᓄᖅ ᐊᑐᕋᐅᓚᐅᖅᓯᒪᔭᕆᐊᖓᓐᓂᒃ	ᐃᑦᓴᕐᓂᑕᖃᕐᕕᐅᑫᓚᐅᖅᐸ ᐃᓄᒃᓄᑦ ᓇᔪᖅᑕᐅᖃᑦᑕᕐᓂᒫᑫᓗ ᑕᐃᑦᓯᒪᓂᑐᖃᐅᓕᖅᑐᖅ	ᖃᓂᓐᓂᖅᐹᖅ ᓄᓇᓕᒥᔭᐅᔪᖅ ᐊᒻᒪᓗ ᓴᐳᒥᒃᓰᕕᐅᑫᓗ ᓱᓇᓄᑦ
Tseng-UBC-Invertebrate-Health-Kitikmeot	Sampling sites	Municipal	These lakes and ponds are part of a larger set of water bodies being studied by Polar Knowledge Canada, Canadian University Partners, and community partners.	n/a	These lakes and ponds are all within a 3 hr. ATV ride from Cambridge Bay

ᓄᓇᓕᐅᑉ ᐃᓚᐅᖃᑕᐅᓂᖓ ᓄᓇᓖᓐᓗ ᐊᕕᒃᑐᖅᓯᒪᐅᕐᓂᖓᓄᑦ ᐃᑲᔪᑕᐅᔪᓐᓇᖅᑐᑦ

ᓄᓇᓕᒥᔭᖅ	ᐊᑏᑦ	ᑲᑐᔾᔨᐊᖃᑎᒌᒥᔭᖅ	ᖃᖓᓗ ᑐᓴᖅᑎᑕᐅᓚᐅᕆᐊᖏᓐᓂᒃ
ᐃᖃᓗᒃᑑᑦᓯᐊᖅ	Beverly Makasagak	Ekaluktutiak Hunters and Trappers Association	2019-08-20

ᓚᐃᓴᓐᓰᑦ ᐱᒧᓐᓇᐅᑏ ᐊᖏᖅᑕᐅᓯᒪᔪᑦ

ᓇᒦᒥᐊᖏᓐᓂᒃ ᐱᓕᕆᐊᕆᕝᕕᐅᓂᐊᖅᑐᑦ ᑎᑎᕋᕐᔪᒥᑦ:

Kitikmeot

ᓚᐃᓴᓐᓰᑦ ᐱᒧᓐᓇᐅᑏ ᐊᖏᖅᑕᐅᓯᒪᔪᑦ

ᒐᕙᒪᒥᔭᐅᔩᑉ ᐊᕕᒃᑐᖅᓯᒪᐅᕐᓂᖕᒐᓐᓂ ᒪᓕᒐᕐᓅᖕᒐᔪᓂᒃ ᐱᕐᑯᔭᕐᓅᖕᒐᔪᓂᒡᓗ ᑲᒪᔩᑦ ᐱᔪᓐᓇᐅᑎᑖᕈᑎᓂᒃ ᓚᐃᓴᓐᓯᓄᓪᓗ ᑲᔪᓯᒃᑲᐃᔩᑦ	ᖃᓄᐃᑦᑐᓪᓚᓇᐅᕙ ᓚᐃᓴᓐᓯᑖᕈᑕᐅᔪᖅ ᐱᔪᓐᓇᐅᑎᑖᕈᑕᐅᔪᖅ ᐊᖏᖅᑕᐅᔪᕐᓘᓐᓃᑦ	ᒫᓐᓇ ᖃᓄᐃᓕᖕᒐᕙ	ᐅᓪᓗᒥ ᑐᓂᔭᖅ/ ᑐᒃᓯᖅᑑᑕᐅᓚᐅᖅᓯᒪᔪᖅ	ᑭᒡᓕᖅᑲᕐᕕᖕᒐ
ᓄᓇᕗᒥ ᖃᐅᔨᓴᖅᑐᓕᕆᔨᒃᑯᑦ	We will apply for a research license from the Nunavut Research Institute	Not Yet Applied		

Project transportation types

Transportation Type	ᓱᓇᒍᑦ ᐊᑐᒐᐅᓂᐊᖅᐸ	Length of Use
Water	We will sample lakes and ponds using either a) an inflatable zodiac powered by a 2.5 h.p. outboard motor, or b) a manually-powered inflatable kayak	
Land	We will travel by truck or ATV	

Project accomodation types

ᓄᓇᓕᒥᔭᖅ

ᐊᑐᒐᐅᓂᐊᖅᑐᖅ

ᐱᖁᑦ ᐊᖏᔪᖅ ᐊᑐᖅᑕᐅᓂᐅᓴᔪᖅ ᐃᓚᖃᓯᐅᑎᓗᒋᑦ ᐃᑰᑕᐃᑦ, ᒥᓪᓗᐊᕿᑏᑦ, ᖃᖓᑕᓲᖅ, ᓄᓇᓯᐅᑦ ᐊᓯᖏᓪᓗ

ᐊᖏᔪᖅ ᐱᖁᑦ ᐊᑐᒐᐅᓂᐊᖅᑐᖅ ᖃᓄᐃᑦᑑᓂᖓ	ᖃᑦᓯᐅᔪᑦ	ᐊᖏᓂᖏᑦ - ᐳᖅᑐᓂᖏᑦ	ᓱᓇᒧᑦ ᐊᑐᒐᐅᓂᐊᖅᐸ
ATV or Truck	2	regular	To travel to lakes within a 3 hour drive of Cambridge Bay
Zodiac or inflatable kayak	1	6 ft	To sample zooplankton from lakes
Plankton tow net	1	30cm x 100xm	To collect zooplankton from lakes

ᑎᑎᕋᐅᓯᕆᓗᒍ ᐅᖅᓱᒃᓴᐃᑦ ᐊᑦᑕᓇᖅᑐᖅᑕᓖᓪᓗ ᐊᑐᖅᑕᐅᓂᐊᕐᓂᖏᑦ

ᓱᓇᒧᑦ ᐅᖅᓱᒃᓴᒡᒥᐊᖅ ᐊᑐᒐᐅᓂᐊᖅᐸ	ᖃᓄᐃᑦᑐᓪᓚᕆᐅᑉ ᐅᖅᓱᒃᓴᒡᒥᐊᖅ	ᖃᑦᓯᐅᔪᑦ ᐅᖅᓱᒃᓴᖃᐅᑏᑦ	ᐴᒃᓴᐅᒃ ᐃᒪᖃᖅᑎᒋᔪᓐᓇᕐᓂᖓ	ᑲᑎᓪᓗᒍ	ᐴᒃᓴᐃᑦ ᐊᒥᓲᓂᖏᑦ	ᓱᓇᒧᑦ ᐊᑐᒐᐅᓂᐊᖅᐸ
Gasoline	fuel	2	20	40	Liters	For the ATV and 2.5 hp outboard motor (if not provided by CHARS)

ᐃᒪᖅ ᐊᑐᖅᑕᐅᔪᒫᖅᑐᖅ

ᐅᓪᓗ ᑕᒫᖅ ᐊᑐᖅᑕᐅᓂᐊᖅᑐᖅ	ᖃᓄᖅ ᐃᒥᖅᑕᖃᑦᑕᕐᓂᐊᖅᐸᑦ	ᓇᑭᑦ ᐃᒥᖅᑕᖃᑦᑕᕐᓂᐊᖅᐸᑦ
70	Water will be obtained from CHARS taps	Water will be obtained from CHARS taps

ᐊᑲᑕᑯᑦ

ᐊᑲᑕᑯᓪᓗᓂᐊᖅᓂᖅ

ᐱᓪᓗᐊᓗᖅᑐᐅᔾᓚᔾᔪᑦ ᐱᓪᓗᐊᓗᖅᑐᐅᓂᐊᖅᑐᖅ	ᖃᖅᓄᐃᑦᑐᖅ ᐊᑲᑕᑯᖅ	ᖃᖅᓄᑎᒋ ᐊᑲᑕᑯᑦ ᓴᖅᑭᐊᓂᐊᖅᑐᓗᓗᐅᑦ	ᖃᖅᓄᖅ ᐊᑲᑕᖅᑕᐅᓂᐊᖅᓱ	ᓴᓪᒪᖅᓴᐅᑎᑲᓴᖅᓵᓂᐅᓂᐊᖅᑐᑦ
Researching	ᐊᑲᑕᑯᑦ ᐃᑯᐊᓪᑕᑕᐅᔾᔨᓐᓇᖅᑐᑦ	1 grocery bag of waste per person	We anticipate very little or no waste associated with sampling zooplankton.Our materials and containers are all re-useable. The waste we generate from grocery shopping or from personal hygeine will be deposited at CHARS.	n/a
Researching	ᐃᒪᐃᑦ ᐊᑐᖅᑕᐅᔾᔭᕆᓇᖅᓯᒪᔾᔨᑦ	25L/day	Canadian High Arctic Research Station showers	n/a
Researching	ᖃᐅᖅᑕᓪᓗᓂᐊᖅ	1L/day	Canadian High Arctic Research Station toilets	n/a

ᐊᓵᑎᒥᐅᑕᓂᔪᑦ ᐊᑲᑐᖅᑕᐅᓯᒪᔾᔨᑦ

We anticipate that the collection of 100 zooplankton per lake will not result in any damage (temporary or permanent) to any of the sites. We will attempt to collect zooplankton from the shore. When that is not possible, our first option will be to use our inflatable kayak. If it is too windy for the inflatable kayak we will use the zodiac and 2.5 hp outboard motor. We will rinse any water device we use with clean water.

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 I1: Municipal Development

ᒫᓐᓇ ᐊᑭᑎᐅᑉ ᖃᓄᐃᑦᑐᓪᓚᕆᐅᓂᖓ: ᓄᓇᐅᑉ ᖃᓄᐃᑦᑑᓂᖓ

ᒫᓐᓇ ᐊᑭᑎᐅᑉ ᖃᓄᐃᑦᑐᓪᓚᕆᐅᓂᖓ: ᐆᒪᔪᖅᑕᖃᕐᓂᖓ

ᒫᓐᓇ ᐊᑭᑎᐅᑉ ᖃᓄᐃᑦᑐᓪᓚᕆᐅᓂᖓ: ᐃᓄᓕᕆᓂᕐᒨᖓᔪᑦ-ᐱᕋᓪᓕᐊᔪᓕᕆᓂᕐᒨᖓᔪᑦ

Miscellaneous Project Information

ᓇᓗᓇᐃᖅᑕᐅᓂᖏᑦ ᐊᒃᑐᖅᑕᐅᓯᒪᔪᑦ ᖃᓄᐃᑦᑑᓂᖏᑦ ᐸᓚᐅᒥᕝᔪᓯᖅᑕᐅᓂᐊᕐᓂᖏᓪᓗ

Cumulative Effects

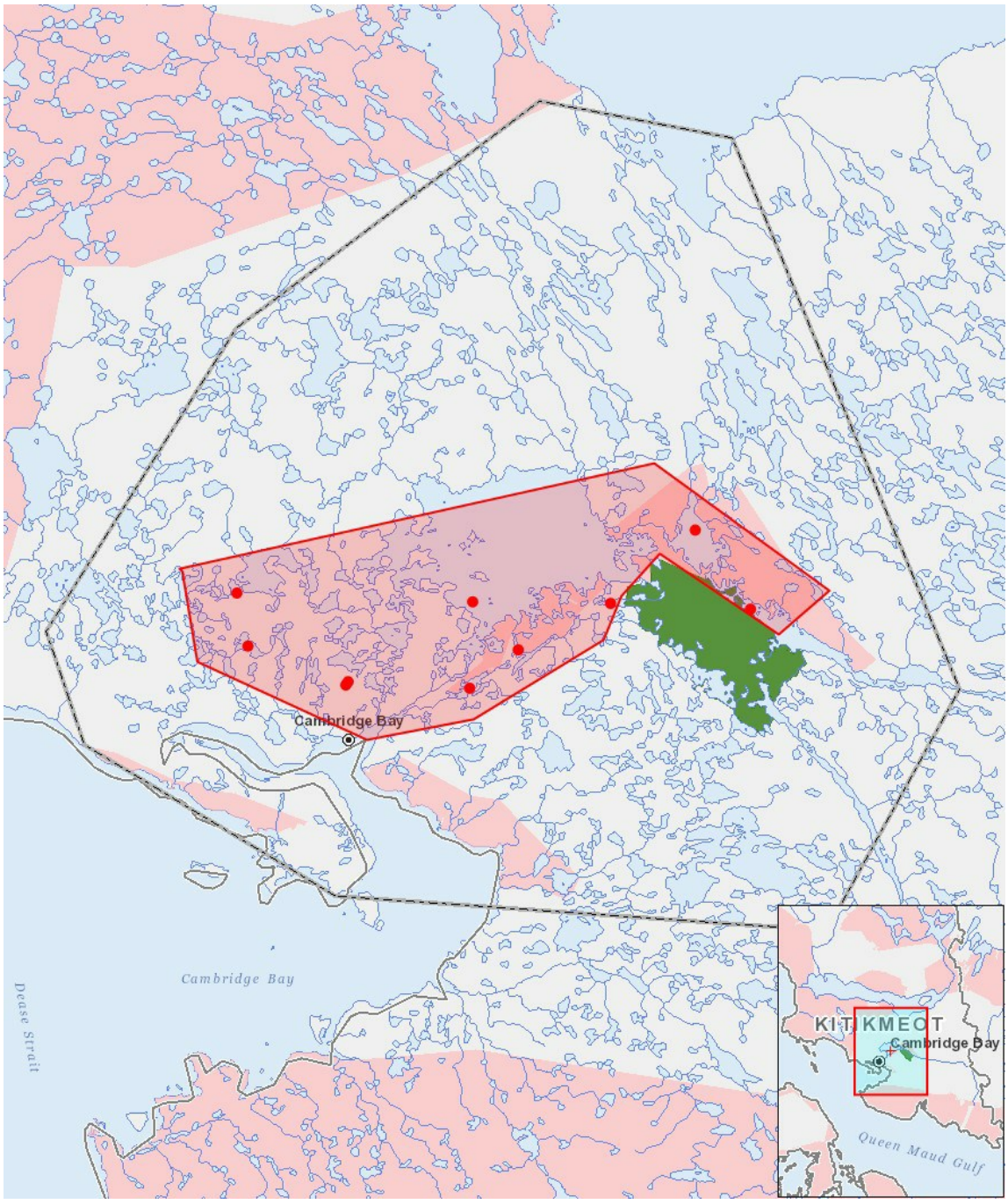
Impacts

ᓄᓇᓄᐃᖅᑕᐅᓂᖅᑎᑦ ᐊᐢᑎᑎᒥᐅᑕᓱᑦᑐᑦ ᐊᑲᑐᖅᑕᐅᓯᒪᔪᑦ

	PHYSICAL	Designated environmental areas	Ground stability	Permafrost	Hydrology / Limnology	Water quality	Climate conditions	Eskers and other unique or fragile landscapes	Surface and bedrock geology	Sediment and soil quality	Tidal processes and bathymetry	Air quality	Noise levels	BIOLOGICAL	Vegetation	Wildlife, including habitat and migration patterns	Birds, including habitat and migration patterns	Aquatic species, incl. habitat and migration/spawning	Wildlife protected areas	SOCIO-ECONOMIC	Archaeological and cultural historic sites	Employment	Community wellness	Community infrastructure	Human health
ʕᓄᓂᖅ																									
-		-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-
ᐅᔾʕᑲᒃᑕᖅ																									
-		-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-
ᐃᑐᑦᑎᓄᖅ																									
-		-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-

(P = ᐊᑲᐅᓴᕈᑎᔨᓐᓄᖅᑐᑦ, N = ᐊᑲᐅᖅᑭᑦᔨᕆᐅᔨᓐᓄᖅᑐᑦ ᕿᓚᐅᒥᔨᔪᓂᖅᑐᑕᐅᔨᓐᓄᖅᑐᑦ ᓚ, M = ᐊᑲᐅᖅᑭᑦᔨᕆᐅᔨᓐᓄᖅᑐᑦ ᕿᓚᐅᒥᔨᔪᓂᖅᑐᑕᐅᔨᓐᓄᖅᑐᑦ ᓚ, U = ᖁᑲᐅᕈᒪᓐᓄᖅᑭᑐᖅ)

ᓇᒋᒪᖏᕐᓂᖅ ᐱᓕᓇᐊᓇᖅᑐᐃᔪᖅ



List of Project Geometries

1	polygon	Tseng-UBC-Invertebrate-Health-Kitikmeot
2	point	Greiner Lake
3	point	First Lake
4	point	Second Lake
5	point	Pelly-Road1
6	point	Pelly-Road2
7	point	Pelly-Road3
8	point	WaterLake-Road1
9	point	WaterLake-Road2
10	point	West-Road1
11	point	West-Road2