



NIRB Uuktuutinga Ihivriughikhamut #125835

Cambridge Bay Water Safety Research

Uuktuutinga Qanurittuq: New

Havaap Qanurittunia: Scientific Research

Uuktuutinga Ublua: 7/4/2023 2:13:06 PM

Period of operation: from 0001-01-01 to 0001-01-01

Piumayaat Angirutinga: from 0001-01-01 to 0001-01-01

Havauhikhaq Ikayuqtinga: Caroline Duncan
134 Adelaide St E
Toronto Ontario M5C 1K9
Canada
Hivayautit Nampanga:: 4373283009, Kayumiktukkut Nampanga::

QANURITTUT

Tukihiannaqtunik havaariyaumayumik uqauhiuyun

Qablunaatitut: Who: York University, Caroline Duncan What: This project will consist of water sampling and workshop activities as part of Caroline's PhD research looking at optimizing water safety in Cambridge Bay through participatory modelling. The central research question explored in this project is: Can access to safe drinking water in Cambridge Bay be improved using participatory system dynamics modelling? The two main goals of the project are to collect quantitative and qualitative data that will be used to build the model and to use the model to identify water management, treatment, and policy leverage points that can be used to improve access to clean and safe drinking water for Cambridge Bay residents. Key objectives: 1. Conduct an in-depth desktop review of water safety policy regulations and frameworks in Nunavut and water quality and operational records in Cambridge Bay 2. Identify technical water safety problems throughout the water system in Cambridge Bay from source to tap by assessing existing infrastructure and in-situ operational procedures and by collecting water quality samples from multiple points within the system 3. Gather qualitative data related to water access, policy, governance, and cultural considerations via participatory stakeholder engagement activities like public forums and focus groups 4. Use participatory system dynamics modelling to identify key technical, policy, and cultural leverage points, weigh the risk of different safety water hazards, and ultimately improve water treatment and water policy in Cambridge Bay. Once the stakeholders have validated the baseline model, the model will be manipulated by the researchers and the stakeholders to explore how technical and policy changes could lead to improved access to clean and safe drinking water for the residents of Cambridge Bay. Water Sampling: Caroline Duncan employed youth will take water samples from the water source, multiple points within the water treatment plant (before and after filtration; after UV disinfection; after initial chlorination; within the storage tank; and during water truck filling); distribution, and from the cisterns and taps in 10 to 12 buildings in the community. Community members will be asked if they would like to volunteer for sampling in advance. Individuals that would like to volunteer will be required to allow researchers to access their cisterns and taps for a short period that is convenient for them. Water samples will be analyzed for standard water chemistry parameters, metals, and bacterial content. Samples will be analyzed in-house at the Canadian High Arctic Research Center by the students for basic water quality analysis and sent to an accredited lab for more extensive analysis. Each month approximately 70 samples will be taken. Approximately 840 L of water will be collected within the year for sampling. A CGS employee will be available to support the students with monthly sampling and analysis. Workshops: Caroline will organize workshops in Cambridge Bay to assess water system risks and factors impacting water safety. Subsequently, she will develop a dynamic model of the water system. The workshops will also share the water quality data collected by the employed students. These students will help Caroline run the workshops. Why: water safety research in Nunavut is crucial for ensuring access to safe drinking water in the communities, the holistic approach of this project goes beyond regulations, actively involving communities in understanding their water systems and recommending improvements. This participatory approach fosters ownership and long-term sustainability. Capacity building is a key focus, employing students to receive water operator training and certification and establishing a potential succession plan for water plants. This investment in youth not only promotes personal development but also local employment and expertise. The research's impact is far-reaching. It will identify weaknesses and areas for improvement by integrating socioeconomic, cultural and political factors. Enabling Cambridge Bay to apply for funding more effectively in water infrastructure. The project aligns with the evolving field of drinking water engineering, addressing disparities between remote and urban areas. The goal is to optimize water safety, bridging health and environmental gaps in Cambridge Bay. Co-creating interventions through quantitative analysis and participatory methods is hypothesized to improve overall water safety in Cambridge Bay. This project sets a precedent for inclusive and sustainable water management in the North. Where: The water sampling activities will be held within the municipal boundaries of Cambridge Bay. Workshop activities will be held in Cambridge Bay and Iqaluit to include Government Stakeholders. When: Water sampling will occur monthly from Nov 2023-2024, while workshop activities are scheduled from Nov 2023-March 2025.

Uiviititut: N/A

Inuktitut: N/A

Inuinnaqtun: Kina: York Ilihaqpaalliqviat, Caroline Duncan Huna: Hapkunani havaagharnit imarmik qauyihainiaqtut ayuiqhaqtitaulutiklu hulilukaaqhutik ilauplutik taaffuma Caroline-ngum PhD-nut qauyihagtaitnut imaqmiiittaamik qayangnaiqhimayaamik Iqaluktuuttiaqmi ilaupkaiplutik. Qitqaninngaalluaqtuq apiqhuutauyuq ihivriuqtauniaqtuq hapkunani havaagharnit: Amirnaittumik imaqaqtitauyaamik Iqaluktuuttiaqmi ihuaqhivaallirniaqqa ilaupkaiplutik havauhiqaqhutik? Malruk inirimalluaqtait havaagharnit hapkunani taimaa katitirilutik amigaittunik nakuuyuniklu naunaitkutighanik atuqtauyughat hanayunit

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Iqaluktuuttiaqmiutat. Inirumalluaqtait: 1. Ihivriuttiaqlugit ikpatimiittunik imaq qayangnaiyautainut maligagghanik maliktagghanik havaagghaniklu Nunavunmi imaplu aturuminaqnia aulapkaaiyllu naunaitkutainit Iqaluktuuttiaqmi 2. Ilittuqhaqlugit ayuqnaqtut imaqmik qayangnaiyautinut ihuilutauyut immap hanguvianit Iqaluktuuttiaqmi imiqtarvianit kuvivianut qauyihaiplugit atuqtauyut ikluqpait atauttiknullu aulapkainiqmut ihivriuqhiplutik katitiquhutiklu imaqmik qimilruktaghainik amihuuyunit katitiquvignit hanguviit iluani 3. Katitiqlutik nakuuyunik naunaitkutanik imaq atuqpauhianik, maligaghainik, ataniqtuqtuiyut, ilitquhiknullu atuqpauhiinik ilaayunik katimapkaiplutik hulilukaaqtittiplutik taimaatut inungnik katimapkaiplutik ihumagilluaqtunillu katimaqatigiingnik 4. Ilaupkailutik havauhiqaqtumik maliktaghaqarlutik ilittuqhariamik inirumalluaqtait ayuqnaqtunit, maligagghanit, ilitquhirnullu ihumaalutunik, ihumagilugit aallait imaqmi qayangnautit, ihuaqhivaalliqlugit imaqmik halumaiyautait imaqmiklu maligaghaliuqhimayut Iqaluktuuttiaqmi. Taapkua ilaayut naammagigumitku naunaitkutalluanut maliktaghat, taamna maliktauyughaq ihivriuqtauniaqtuq qauyihaiyinit ilaayunillu naunaiyailutik qanuq ayuqnaqtunik maligagghaniklu aallannguqtiqhimayut ihuaqhivaalliutauniariaghait atuqtitauyaamik halumayumik amirnaittumiklu niuqaqtaghamik imaqmik nunallaarmiunit Iqaluktuuttiaqmi. Imaqmik Qauyihaiyut: Caroline Duncan havaktitauyuq inulrammik qauyihaqtauyugghanik imiqtarahuaq imiqtarvingmit, amihuulutik imiqtarvighait halummaqhivingnit quyaginnaqtumik (hivuani kinguanilu halumaiyautiliqtuqvait; UV-mit halummaqtaarumik; avuhitaarumik qakuqhitinik; talvani imautingnit; immiqhiplutiklu imiqtautinik); agyaqtaqhutik, imautinillu kuviviinillu talvani 10-nik 12-nikluuniit ikluqpangnit nunallaarmi. Nunallaarmiut apiriyauniaqtut ilaayumayaagghainik qauyihaiyunut pitinnatik. Inuit ikayurumayut qauyihaiyunut qauyihainik imiqtaqtittiyaghaat imautainit kuviviinillu naittumik hivikittumik ihuariyaigut upluqhiutikkut. Immat qauyihaqtaghat ihivriuqtauniaqtut immap avugiingniagut, haviqariaghaat, halumailruiniklu. Ihivriuqtaghat qauyihaqtauniaqtut havakvingnit talvani Kanatami Ukiuqtaqtumi Qauyihaqvianit ilihaqtunit qanurininganianik ihivriuqhilutik tuyuqtaulutiklu ilitariyaayumit ihivriuttiaqtauyaamik. Tatqiqhiutit tamaat haniani 70-nguniaqtut ihivriuqtaghat. Haniani 840 L imaqmik katitirahuat ukiuq atuqtillugu qauyihaqtauyughaq. Nunalingni Kavamatkunnilu Pivikhaqautikkut havaktiqarniat ikayuqtighaq ilihaqtunut tatqiqhiutit tamaat qauyihaqtaghanut ihivriuqtaghanullu. Ilihaqvighait: Caroline parnaiyainiaqtuq katimavighainik Iqaluktuuttiaqmi qauyihaiyaamik imautit hanguviinut qayangnautit ihuilutillu immap qayangnautainut. Kinguani, maliktaghaliurniaqtuq ihuaqtumik immap hanguvianut. Ilihaqvighainit ilittuqhitiiniaqtullu immap qanurininganianut naunaitkutanik katitiquhimayut havaktitauhimayunit ilihaqtunit. Hapkua ilihaqtut ikayuqtiunahuat Caroline-mut ilihaitilluni. Huuq: imaqmik Qayangnaiqhimayaamik qauyihaiyaamik Nunavunmi iharianaqtuq qayangnaittumik imaqtuqtitauyaamik nunallaarnit, katimaplutik havaqatigiiktumik hapkuninnga havaagharnik kinguvaalliutauvaktuq maliktagghanik, ilaupkaiplugit nunallaarmiut ilihimattiarimik imautainik ihuaqhautighanik pitquiplutiklu. Ilaupkaiplutik taimaa nanminirivaalliutauvaktuq hivituyumiklu aulapkaiaamingnik. Havaktighaqarniq ihumagilluaqpagaat, havaktittiplutik ilihaqtunik imiqtaqtighat ilihaqtauplutik ilitaritjutiniktittiplugit ahiagullu parnaiyautighaliuriamik hivunighami imiqtarvighanut. Taimaa ilaupkaiaamik inulrammirnik hivumuuqtittivaktuq inmingnut ayuiqhaqpaalliutaigut kihimi nunallaarnilu havaktiqariamik ayuitaigullu. Qauyihaiyut nakurutait ungahiqtumut-ihangayut. Ilittuqhitiuniaqtuq ayuqhautainik nanilu ihuaqhahiyariaqaqtaanik katitiquhugit inuuhiqattiarniqmut-manighiurutait, ilitquhiit maligaliuhimayullu. Taimaa Iqaluktuuttiaqmiut tughirainnariaqariamik manighautinik ihuaqtukkut imautiqariamik. Havaaghat hapkua atauttikkuuqtullu nuivalliaayunut havakvingnik imautiqarniqmut, ihuaqhaitjutigiplugit

iharianaqniinut inuilrumi ungahiaqtunilu. Inirumayait taapkua ihuaqhivallialugu imaq amirnaiyaqlugu, ihuaqhautigiplugu aanniaqtailiniqmut avatinullu ayuqhautainik lqaluktuuttiaqmi. Havaqatigiiktumik nutqautighaliuqhutik taimaa amigaittunik qauyihaiplutik ilaupkaiplutiklu katitiqhimayut ihuaqhautighat tamatkiumayumik immap qayangnaiyautainik lqaluktuuttiaqmi. Hapkua havaaghat hivulliuplutik ilaupkainiqmut aulapkainiqmullu imaqmik Ukiuqtaqtumi. Humi: Imaqmik qauyihaiyut havaaghait hanaqiyauniaqtut nunallaam kikliinit lqaluktuuttiaqmi. Ilihaqvighait havaaghait lqaluktuuttiaqmi katimatjutauniaqtut lqalungnilu ilaupkailugit Kavamatkut Munaqtiit. Qakugu: Imaqmik qauyihaivangniat tatqiqhiutit tamaat Hikutirvia 2023-2024-mut, katimapkainiaqhimaplutik Hikutirvia 2023-mit Qiqailruq 2025-mut.

Personnel

Personnel on site: 3

Days on site: 30

Total Person days: 90

Operations Phase: from 2023-11-01 to 2025-08-31

Hulilukaarutit

Inigiya	Hulilukaarut Qanurittuq	Nunannga Qanurittaakhaanik	Initurlinga qanuritpa	Initurlinga utuqqarnitat unaluuniit Ingilraaqnitat Uyarannguqtut akhuurninnga	Qanitqiyauyuq qanitqiamut nunallaat kitulluuniit ahiruqtaliyainnit nuna
Location for various water sampling points	Sampling sites	Municipal	N/A	N/A	Cambridge Bay

Nunaliin Ilauyun, Aviktuqhimayuniitunullu Ikayuuhiarunguyun

Nunauyuq	Atia	Timiuyuq	Upluani Uqaqatigiyaungmata
Ikaluktuttiak	Jim McEachern	Municipality of Cambridge Bay	2023-04-05

Angiuttauvaktunik

Naunaiqlugu nunanga talvani havauhikhaq ittuq:

Kitikmeot

Angiuttauvaktunik

Munariniqmut Ayuittiaqtuq	Angirutinga Qanurittuq	Tadja Qanurittaakhaanik	Ublua Tuniyauyuq/Uuktuqtuq	Umikvikhaa Ublua
Nunavunmi Ihivriuqniqmut Timiqutigiyanga	License to perform research activities in Nunavut	Not Yet Applied		
Alaanut	Ethics Board for ethical approval from York University	Not Yet Applied		
Nunavut Imaligiyyit Katimayit	Water license for research purposes	Applied, Decision Pending		

Project transportation types

Transportation Type	Qanuq Atuqtauniarmangaa	Length of Use
Land		

Project accomodation types

Nunauyuq

Ihuaqutivaluin Atuqtauyukhan

Hanalrutit atuqtaunahuat (ukuallu ikuutat, pampiutainnik, tingmitinik, akhaluutinik, hunaluuniit)

Hanalrutit Qanurittuq	Qaffiuyut	Aktikkulaanga – Qanurittullu	Qanuq Atuqtauniarmangaa
Sample Bottles	3000	1L	Samples bottles for water collection will be of various size, between 250 ml and 1 L. It is not anticipated that this research will exceed 5 m3 water use.

Qanurittuq Urhuqyuaq unalu Qayangnaqtut Hunavaluit Aturninnga

Qanurittuq urhuqyuaq hunavaluit aturninnga:	Urhuqyuaq Qanurittuq	Qaffiuyut qattaryut	Qattaryuk Aktikkulaanga	Atauttimut Qaffiuyut	Ilanga	Qanuq Atuqtauniarmangaa
Information is not available						

Imaqmik Aturninnga

Ubluq qanuraaluk (m3)	Aturumayain imavaluin utiqtittagaani qanuq	Atulirumayain imavaluin utiqtittagani humi
0		

Iqqakuq

Ikkakunik Munakgiyauyunik

Havauhikhaq Hulilukaarut	Qanurittuq Iqqakut	Ihumagiyauyuq Qanuraaluktut Atuqtait	Qanuq Iqqakuurniarmangaa	Halummaqtirarnirutikhan piyutin
Information is not available				

Avatiliriniqmut Ayurhautingit:

Water sampling events will provide a big picture of the water quality from source to tap in Cambridge Bay. Youth will be hired to take water samples, which will positively impact employment. Additionally, by taking water samples from various locations within the drinking water system, we will be able to identify areas to recommend improvements to drinking water infrastructure and indirectly have a positive impact on human health.

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

Qanurittuq Ittunik Avatinga: Avatingalluanga

Qanurittuq Ittunik Avatinga: Inuuhimayunut Avatinga

Qanurittuq Ittunik Avatinga: Inungit-maniliurutingit Avatinga

Miscellaneous Project Information

Naunaiyainiq ukuninnga Ayurhautingit unalu Piumayaat Ikikliyuumiutinahuarutit

Tamatkiumayunik Ihuikgutivaktunik

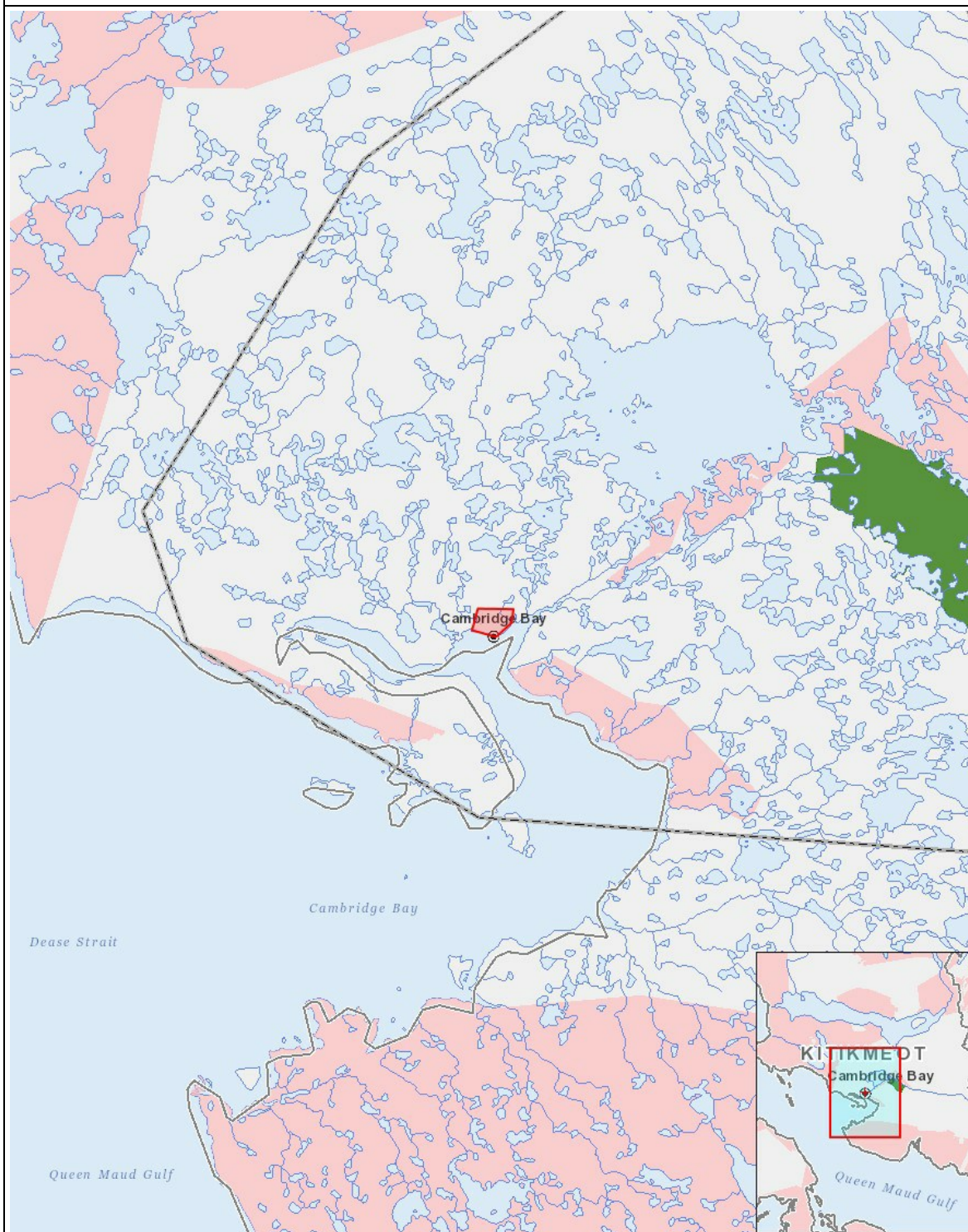
Impacts

Ilitariyauniq Avatiliriniqmut Ayurhautingit

		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
Havakvinga																										
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Aulapkaininnga																										
Sampling sites		-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	P	-	P	P
Piiqtauniq																										
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(P = Nakuuyuq, N = Nakuungittut unalu mikhilimaittuq, M = Nakuungittut unalu mikhittaaqtuq, U = Naluyauyuq)

Havaariyauyukhamut Nayugaa



List of Project Geometries

1	polygon	Location for various water sampling points
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