

NIRB Uuktuutunga Ihivriughikhamut #126494
Environmental Behavior of Ammunition Constituents in Arctic Conditions

QANURITTUT

Tukihiannaqtunik havaariyaumayumik uqauhiyun

Qablunaatitut: Project Title: Small arms range risk assessment at Resolute BayLead Researcher's Name and Affiliation;Marie-Claude Lapointe, Defense Research and Development Canada (DRDC), Valcartier Research Center (VRC), Weapons Systems Section.Project ProposalCurrent understanding of small-caliber ammunition transport processes in permafrost-affected soil and the ability to quantify them is inadequate. An improved understanding of the influence of Arctic conditions such as soil characteristics and especially temperature and light, on the transformation and fate of munition constituents (MC), the long-term trends in levels of MC in different ecological compartments and a better understanding of the effects of contaminants on Arctic ecosystems to aid in the design and implementation of monitoring and potential management, if required, is needed.The scope of the project is to perform field work to aid in the assessment of the environmental fate and ecological impact of munitions constituents under the environmental conditions specific to Northern Canada. The five main objectives are: 1) to survey evidence of MC usage and measure their concentrations in soil and surface water using new sampling devices to promote efficiency; 2) to test new field sampling methods to enhance MC recovery; 3) to assess transport parameters from observed quaternary deposits and vegetation cover; 4) conduct targeted manual drilling to collect soil and potentially permafrost cores for analysis related to permafrost structure; 5) to determine the biotransformation potential of MC by local Arctic soil microbial communities and assess respective biotic transformation rates as a function of temperature; and 6) to perform aquatic and terrestrial toxicity tests of MC on ecological receptors representative of the Canadian Arctic macro- and micro-flora.From september 16th to september 25th 2026, DRDC personnel will be deployed to characterize the firing range located 3 km east of Resolute Bay, as well as other sites within Resolute Bay.Indications of the presence of MC and transformation products in surface water will be assessed using a multiparameter digital water quality meter. Surface water samples will be collected directly from the site and its surroundings for energetic material, metals, ammoniacal nitrogen (N-NH₄⁺), anions and perchlorate analysis. The presence of MC will also be assessed in the soil based on the multi-increment sampling approach. DRDC personnel will collect three 45-gallon soil barrels using manual tools. The soil will be transported to the DRDC laboratory in Quebec for subsequent analysis. In subsequent years, if feasible, soil characterization for permafrost investigations is planned to be conducted using a manual drilling rig with a diameter of 2 to 4 inches.Also, a monitoring station will be installed to help with the modeling of potential contaminant transport.A survey of the site flora will be made to better assess biotransformation potential and enhance relevancy on present laboratory ecotoxicological investigations. A strict assurance/quality control (QA/QC) program will be put in place.VRC is analyzing soil properties as part of a partner agreement study with the National Research Council Canada to make recommendations related to Canadian Armed Forces readiness and sustainable training practices in the unique ecological environment of the Arctic.All acquired data will be stored in DRDC's computers and managed only by the technical Lead/authority of this research. The management plan will reflect DNDs' directives captured from the Defense Administrative Orders and Directives, DAOD-6000-0.DRDC-VRC requested the support from a member of CRPG to JTF(N) for wildlife protection.Upon request, results will be shared to Nunavut governmental authority.

Uiviititut: Titre du projet : Évaluation des risques liés au champ de tir d'armes légères à Resolute BayNom et affiliation du chercheur principal :Marie-Claude Lapointe, Recherche et développement pour la défense Canada (RDDC), Centre de recherches de Valcartier (CRV), Section des systèmes d'armes.Proposition de projetLes connaissances actuelles sur les processus de transport des constituants des munitions de petit calibre dans les sols affectés par le pergélisol, ainsi que sur la capacité à les quantifier, sont insuffisantes. Il est nécessaire de mieux comprendre l'influence des conditions arctiques, notamment les caractéristiques du sol et, plus particulièrement, la température et la lumière, sur la transformation et le devenir des constituants des munitions (CM). Il est également nécessaire de mieux comprendre les tendances à long terme des concentrations de CM dans les différents compartiments écologiques, ainsi que les effets des contaminants sur les écosystèmes arctiques, afin de contribuer à la conception et à la mise en œuvre d'activités de surveillance et, au besoin, de mesures de gestion.La portée du projet consiste à effectuer des travaux sur le terrain afin de contribuer à l'évaluation du devenir environnemental et de l'impact

[illegible]

Inuinnaqtun: N/A

Personnel on site: 3

Days on site: 3

Total Person days: 9

Operations Phase: from 2026-09-01 to 2029-09-30

Hulilukaarutit

Inigiya	Hulilukaarut Qanurittuq	Nunannga Qanurittaakhaanik	Initurlinga qanuritpa	Initurlinga utuqqarnitat unaluuniit Ingilraaqnitat Uyarannguqtut akhuurninnga	Qanitqiyauyuq qanitqiamut nunallaat kitulluuniit ahiruqtailiyainnit nuna
Localisation of the project	Researching	Crown	N/A	N/A	N/A

Nunaliin Ilauyun, Aviktuqhimayuniitunullu Ikayuuhiarunguyun

Nunauyuq	Atia	Timiuyuq	Upluani Uqaqatigiyaungmata
Qausuittuq	-	1st Canadian Rangers Patrol.	2026-09-01

Angiuttauvaktunik

Naunaiqlugu nunanga talvani havauhikhaq ittuq:

North Baffin

Angiuttauvaktunik

Munariniqmut Ayuittiaqtuq	Angirutinga Qanurittuq	Tadja Qanurittaakhaanik	Ublua Tuniyauyuq/Uuktuqtuq	Umikvikhaa Ublua
Nunavut Kavamanga, Avatiliriyikkut	Wildlife Research permit	Active	2026-08-14	2029-09-30
Nunavut Kavamanga, Nunavunmi Ihivriuqniqmut Timiqutigiyanga	Scientific Research Licence	Applied, Decision Pending		
Nunavut Imaligiyyit Katimayit	8WLC-SAR	Applied, Decision Pending		
Nunavut Kavamanga, Nunalingni Kavamatkunnilu Pivikhaqautikkut	0	Applied, Decision Pending		
Nunavut Planning Commission	Project_Proposal NPC_151295This project amends to NPC_150306	Active		

Project transportation types

Transportation Type	Qanuq Atuqtauniarmangaa	Length of Use
Land	Quads (two 4x4s)	

Project accomodation types

Nunauyuq

Ihuaqutivaluin Atuqtauyukhan

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

Hanalrutit Qanurittuq	Qaffiuyut	Aktikkulaanga – Qanurittullu	Qanuq Atuqtauniarmangaa
XRF	1	(LxWxH): 27 cm x 9 cm x 30 cm	A portable X-ray fluorescence (XRF) spectrometer for non destructive direct soil analysis, elemental analysis of mineral and alloy material identification
YSI	1	8.3 cm width x 21.6 cm length x 5.6 cm depth	The YSI (digital sampling system) is a portable water quality multiparameter instrument for the measurement of several critical parameters - dissolved oxygen, total algae, turbidity, pH, ORP, conductivity, specific conductance, salinity, TDS, resistivity, TSS, ammonium, ammonia, chloride, nitrate, depth, temperature and GPS coordinates.
UV AB light meter	1	7.32 x 27 x 26.67 cm	Direct measurement of UVA and UVB light
ARA405 Drone, EN EVO Drone and Mavic 2 Pro Zoom Drone.	1	See document TAB	Equipment used in this project will consist mostly of two quads that will allow for the transportation of personnel on site. Overall, the main objective of this project is to collect small soil/water samples throughout the specified work area. Therefore, equipment will be limited to a few manual tools, bottles, and plastic bags. There is also a possibility that an aerial survey may be conducted in the area covered by this survey. For this reason, the technical manual for the equipment associate
Vehicle	1	4x4	For movements

Qanurittuq Urhuqyuaq unalu Qayangnaqtut Hunavaluit Aturningga

Qanurittuq urhuqyuaq hunavaluit aturningga:	Urhuqyuaq Qanurittuq	Qaffiuyut qattaryut	Qattaryuk Aktikkulaanga	Atauttimut Qaffiuyut	Ilanga	Qanuq Atuqtauniarmangaa
Gasoline	fuel	2	25	50	Liters	Container Capacity Gas use for this project will be limited to the gas requirement to allow for the good

						functioning of the two quads. Work should be ongoing for not more than a week. Therefore, two 25-liter plastic containers should be sufficient
Alconox	hazardous	1	1	1	Kg	Concentrated, anionic detergent for manual cleaning of instruments.

Imaqmik Aturninnga

Ubluq qanuraaluk (m3)	Aturumayain imavaluin utiqittagaani qanuq	Atulirumayain imavaluin utiqittagani humi
0	Surface water collection for research purposes: approximately 0.01 m ³ per day.	Mecham river, Resolute Bay Small Lake, Resolute Bay

Iqqakuq

Ikkakunik Munakgiyauyunik

Havauhikhaq Hulilukaarut	Qanurittuq Iqqakut	Ihumagiyauyuq Qanuraaluktut Atuqtait	Qanuq Iqqakuurniarmangaa	Halummaqtirarnirutikhan piyutin
Researching	Other, kimwipes,nitrile gloves,Used water for cleaning the equipments	0,004 to be deposited in cubic metres per day	Keep used kimwipes in garbage bagKeep used gloves in garbage bagsStore used water in bottles and disposed appropriately	N/A

Avatiliriniqmut Ayurhaulingit:

No production of waste nor detrimental impact on the environment is anticipated regarding this proposal. As previously mentioned, the main objective of this project is to collect small soil/water samples throughout the specified work area. So, no waste will be left in place. The sample collected will be recovered and flown out to the Defense Research and Development Canada research centers in Valcartier (DRDC) infrastructure.

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

This project is the project proposal NPC_151295 and this application amends NPC_150306

Qanurittuq Ittunik Avatinga: Inuuhimayunut Avatinga

Qanurittuq Ittunik Avatinga: Inungit-maniliurutingit Avatinga

Miscellaneous Project Information

Naunaiyainiq ukuninnga Ayurhautingit unalu Piumayaat Ikikliyuumiutinahuarutit

Tamatkiumayunik Ihuikgutivaktunik

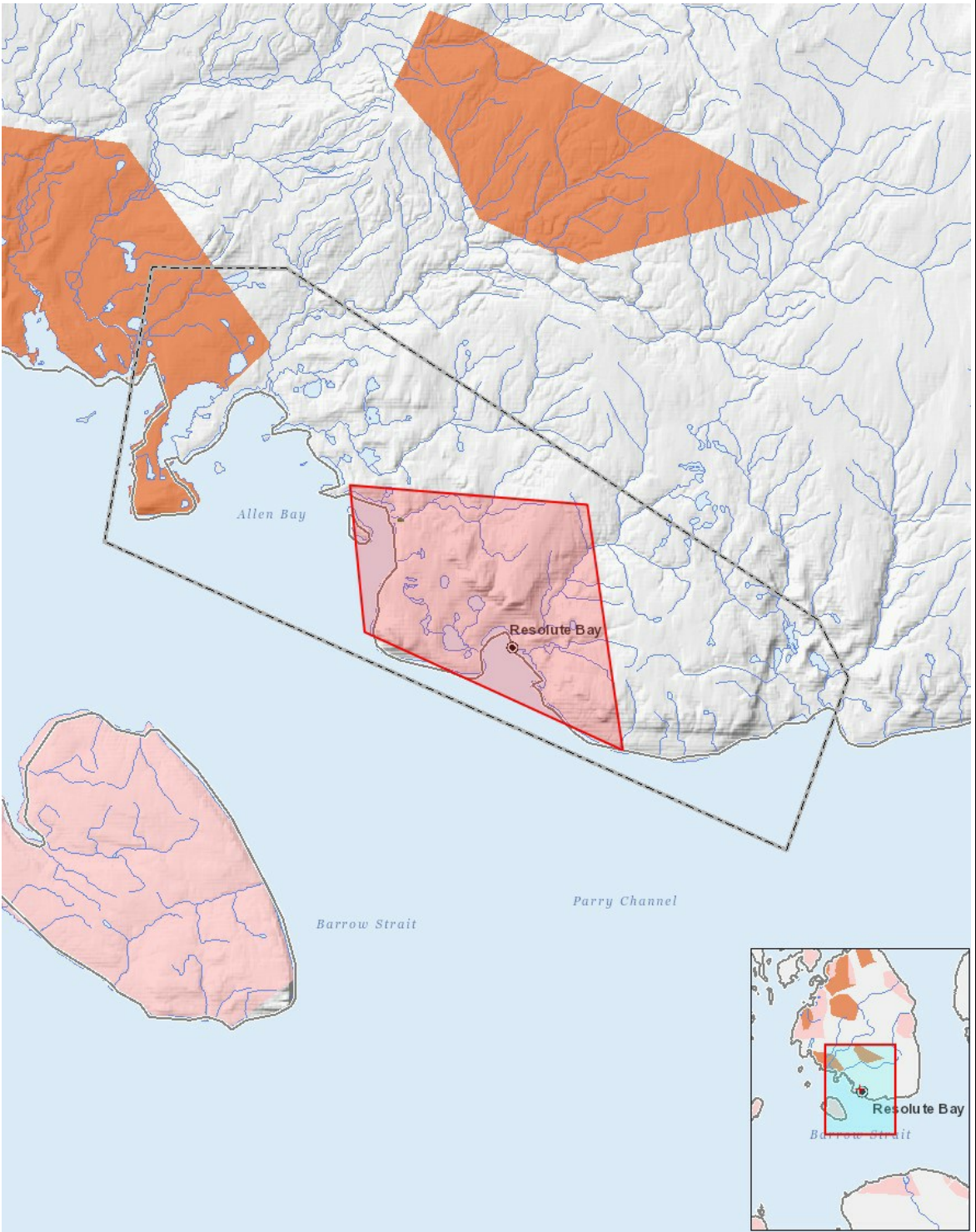
Impacts

Ilitariyauniq Avatiliriniqmut Ayurhautingit

															PHYSICAL															SOCIO-ECONOMIC														
															Designated environmental areas															Archaeological and cultural historic sites														
															Ground stability															Employment														
															Permafrost															Community wellness														
															Hydrology / Limnology															Community infrastructure														
															Water quality															Human health														
															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																													

(P = Nakuuyuq, N = Nakuungittut unalu mikhilimaittuq, M = Nakuungittut unalu mikhittaaqtuq, U = Naluyauyuq)

Havaariyauyukhamut Nayugaa



List of Project Geometries

1	polygon	Localisation of the project
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