Department of Geography | **Département de géographie**

McGill University
Burnside Hall
805 Sherbrooke Street West
Montreal, Quebec, Canada
H3A 0B9

Université McGill
Pavillion Burnside
805 rue Sherbrooke oust
Montréal (Québec) Canada
H3A 0B9

Tel: (514) 398-4454
Fax: (514) 398-7437
www.mcgill.ca/geography/
christopher.omelon@mail.mcgill.ca

Indigenous and Northern Affairs Canada
Land Administrator Engineer
P.O. Box 100
IQALUIT, NU XOA OHO

March 20, 2019

Re: Land Use Permit #N2016N0014
McGill Arctic Research Station
Annual reports for 2018, 2017, and 2016

2018 Annual Report

(A) Activities based out of MARS in 2018 included regular camp maintenance and hosting researchers and students to conduct local scientific studies in April-May and July-August. The camp hosted between 4-8 people at any one time, with an estimated 310 total person days. The main aims of activity based out of MARS focus on climate change: in 2018, this included: (1) monitoring landscapes and landscape variability associated with climate change; (2) evaluating the nature and extent of ground ice in permafrost and determining the amount and rate of landscape change caused by permafrost degradation; (3) the study of invertebrates; (4) characterizing groundwater–permafrost interactions; and (5) hosting undergraduate students from McGill University where they learned about the local climate and geology and were instructed in safe field practices. Water use was estimated to be 0.2-0.4 m^3/day sourced from Colour Lake, adjacent to MARS. Waste was estimated to be 0.3 m^3/day contained by sump.

(B) The coordinates for fuel cache locations and scientific activities are listed below, and shown on maps attached to the end of this document.

i. No drilling

ii. Fuel caches:

(A) Jet fuel cache adjacent to seasonal airstrip:	79˚24′59″N 90˚45′27″W
(B) Diesel fuel cache adjacent to permanent structure (UH):	79˚24′54″N 90˚44′53″W
(C) Diesel fuel cache adjacent to permanent structure (K):	79˚24′55″N 90˚44′53″W
(D) Gasoline fuel cache:	79˚24′53″N 90˚44′51″W
(E) Diesel fuel cache adjacent to permanent structure (CSA):	79˚23′22″N 91˚01′22″W

iii. Scientific activities:

(1) Climatic conditions of different landscapes:

a. Glacial/moraine	79°26′23″N 90°38′07″W
b. Wetland	79°24′58″N 90°45′23″W
c. Tundra/coastal	79°23′22″N 91°01′22″W

(2) Ground ice/permafrost degradation:

a. Polygonal terrain	79°24′59″N 90°45′37″W

(3) Invertebrate cataloging:

a. Active layer soils	79°24′59″N 90°45′37″W

(4) Groundwater-permafrost interactions:

a. Colour Lake:	79°25′05″N 90°44′55″W
b. Gypsum Hill diapir	79°24′30″N 90°43′05″W
a. Colour Peak diapir	79°22′48″N 91°16′24″W

(C) The work plan for the year 2019 includes: (1) monitoring landscapes and landscape variability associated with climate change; (2) evaluating the nature and extent of ground ice in permafrost and determining the amount and rate of landscape change caused by permafrost degradation; and (3) characterizing groundwater–permafrost interactions.

2017 Annual Report

(A) Activities based out of MARS in 2017 included regular camp maintenance and hosting researchers and students to conduct local scientific research in April-May and July. The camp hosted between 4-6 people at any one time, with an estimated 290 total person days. Activities included: (1) monitoring landscapes and landscape variability associated with climate change; (2) evaluating the nature and extent of ground ice in permafrost and determining the amount and rate of landscape change caused by permafrost degradation; and (3) characterizing groundwater–permafrost interactions. Water use was estimated to be 0.2-0.3 m^3/day sourced from Colour Lake, adjacent to MARS. Waste was estimated to be 0.25 m^3/day contained by sump.

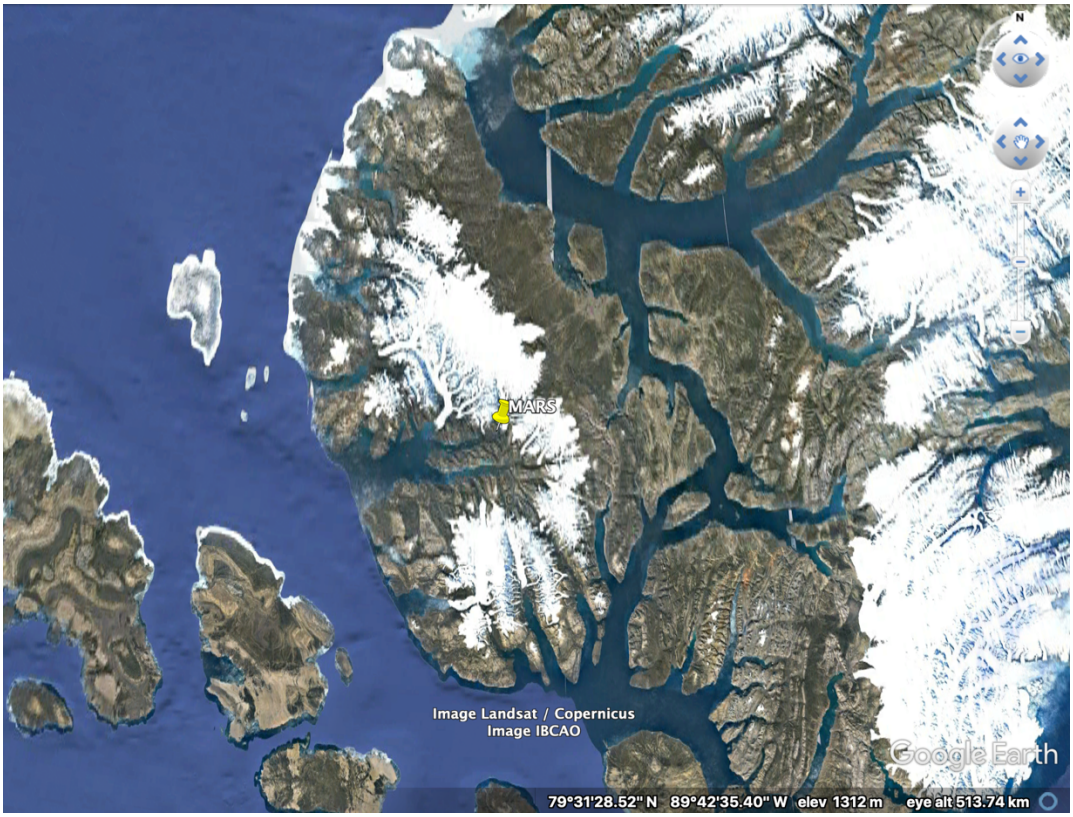
(B) Please see above for locations of fuel caches and activities.

2016 Annual Report

(A) Activities based out of MARS in 2016 included regular camp maintenance and hosting researchers and students to conduct local scientific research in April-May and July. The camp hosted between 4-6 people at any one time, with an estimated 290 total person days. Activities included: (1) monitoring landscapes and landscape variability associated with climate change; (2) evaluating the nature and extent of ground ice in permafrost and determining the amount and rate of landscape change caused by permafrost degradation; and (3) characterizing groundwater–permafrost interactions. Water use was estimated to be 0.2-0.3 m^3/day sourced from Colour Lake, adjacent to MARS. Waste was estimated to be 0.25 m^3/day contained by sump.

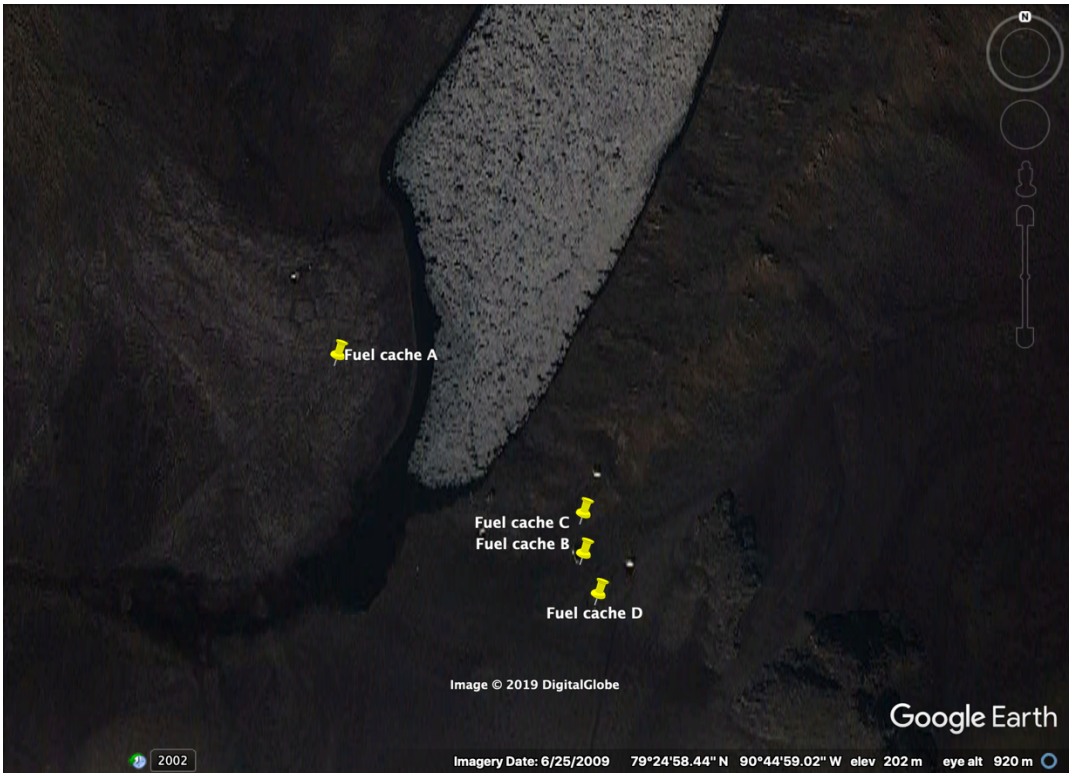
(B) Please see above for locations of fuel caches and activities.

Location of the McGill Arctic Research Station (MARS) on Axel Heiberg Island:



Location of MARS with respect to Colour Lake:

Locations of fuel caches at MARS:



Locations of scientific activities and Fuel cache E: