



Department of Geography

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

Département de géographie

Université McGill
Pavillon Burnside
805 rue Sherbrooke ouest
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

April 3, 2020

Re: Land Use Permit #N2016N0014
McGill Arctic Research Station
Annual report for 2019

2019 Annual Report

- (A) Activities based out of MARS in 2019 included both regular camp maintenance in July and two periods when the camp hosted researchers and students to conduct local scientific studies: one period in April-May and a second in July. The camp hosted between 4-8 people at any one time. Scientific activities based out of MARS focus primarily on climate change: in 2019, this included: (1) collecting climate data and monitoring landscapes and landscape variability associated with climate change; (2) determining the amount and rate of landscape change caused by permafrost degradation, as well as evaluating the nature and extent of ground ice in permafrost; (3) studying terrestrial invertebrates and microbiota; (4) characterizing groundwater-permafrost interactions; and (5) low frequency measurements of the radio sky. Water use was estimated to be 0.2-0.4 m³/day sourced from Colour Lake, adjacent to MARS. Waste was estimated to be 0.3 m³/day contained by sump.
- (B) The attached map shows the locations of fuel caches and activities described above. The locations of fuel caches and activities were as follows (see map images at end of 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: 79°24'54"N 90°44'53"W
 - (C) Diesel fuel cache adjacent to permanent structure: 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 temporary structures: 79°23'22"N 91°01'22"W

iii. Locations where activities were conducted:

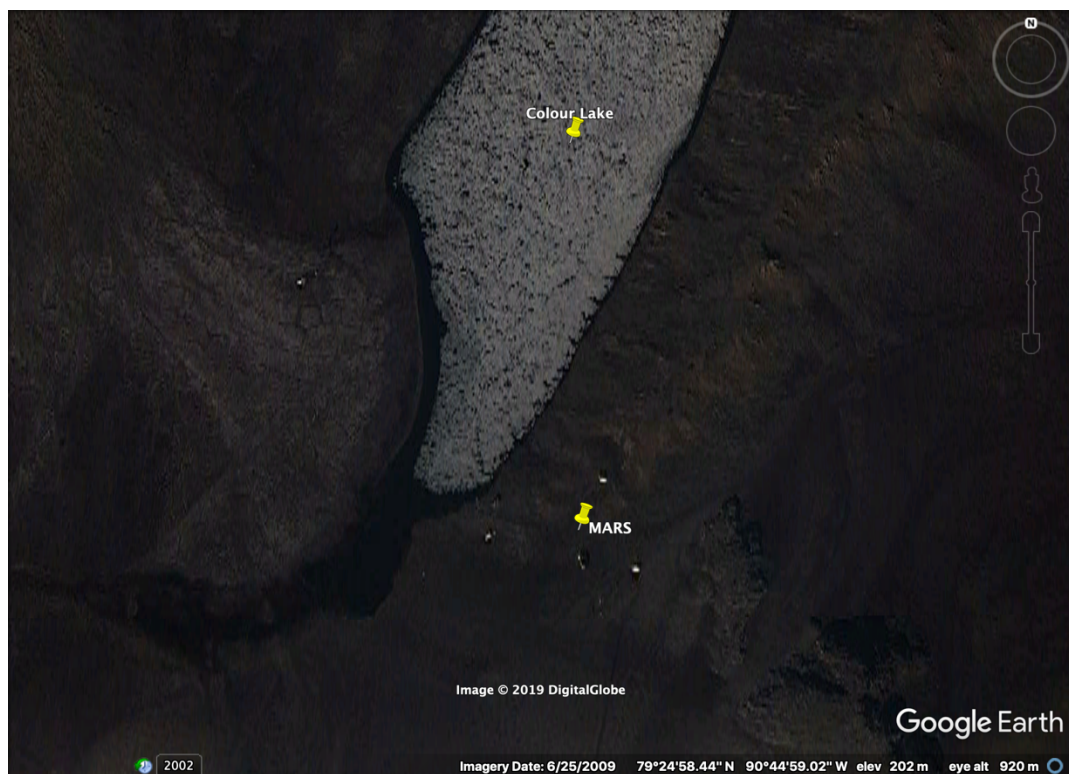
- | | |
|--|-----------------------|
| (1) Climatic conditions of different landscapes: | |
| a. Glacial/moraine | 79°26'23"N 90°38'07"W |
| b. Wetland | 79°24'58"N 90°45'23"W |
| c. Tundra/coastal | 79°23'22"N 91°01'22"W |
| (2) Permafrost degradation/ground ice: | |
| a. Polygonal terrain | 79°24'59"N 90°45'37"W |
| (3) Invertebrate and microbiota study: | |
| 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 |
| (5) Radio sky measurements | |
| a. MARS | 79°24'52"N 90°45'01"W |

- (C) The work plan for the year 2020 includes: (1) collecting climate data and monitoring landscapes and landscape variability associated with climate change; (2) determining the amount and rate of landscape change caused by permafrost degradation, as well as evaluating the nature and extent of ground ice in permafrost; (3) studying the activity of terrestrial invertebrates and microbiota; (4) documenting groundwater-permafrost interactions; and (5) taking low frequency measurements of the radio sky.

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:

