



**PARKS CANADA AGENCY
RESEARCH AND COLLECTION PERMIT
(NOT TRANSFERABLE)**

PERMIT No.: ANP-2019-32477

START DATE: 2019-07-04

EXPIRY DATE: 2021-09-17

Project Title: ArcticNet expedition onboard the Canadian research icebreaker CCGS Amundsen

Principal Investigator Name: Louis Fortier

Address: Pavillon Alexandre-Vachon, Room 4081, 1045, avenue de la Médecine, Université Laval, Québec, QC, G1V 0A6

Telephone: 1-418-656-5646

Email: Louis.Fortier@bio.ulaval.ca

Affiliation: Scientific Director, ArcticNet Scientific Leader, Amundsen Science Professor, Université Laval

Is hereby authorized to conduct the research project entitled "ArcticNet 2019 expedition onboard the Canadian research icebreaker CCGS Amundsen.", Research and Collection Permit Application Number 38542, In Auyuittuq National Park of Canada, subject to the terms and conditions set out below and/or attached to and forming part of this Research and Collection Permit.

Members of Research Team:

- | | |
|------------------------------------|-------------------------------|
| 1. Manning, Cara | 14. Athey, Samantha |
| 2. Zheng, Zhiyin (Zarah) | 15. Bhatnagar, Srijak |
| 3. Montero-Serrano, Jean-Carlos | 16. Cramm, Margaret |
| 4. Tortell, Philippe | 17. Ellis, Madison |
| 5. Brossard, Jade | 18. Góngora Bernoske, Esteban |
| 6. Corminboeuf, Anne | 19. Hunnie, Blake |
| 7. Dalton, Abigail | 20. Weleschuk, Damien |
| 8. Garbo, Adam | 21. Normandeau, Alexandre |
| 9. Izett, Robert | 22. Broom, Laura |
| 10. Rodriguez-Cuicas, Maria-Emilia | 23. Carson, Tom |
| 11. Tremblett, Adam | 24. Anissa Merzouk |
| 12. Schreiber, Lars | 25. Camille Wilhelmy |
| 13. Altshuler, Ianina | 26. Crew of the CCGS Amundsen |



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Canada

Parcs
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Canada



- 1, 2, 4, 9: Department of Earth, Ocean and Atmospheric Sciences, University of British Columbia, Faculty of Science, 2020 – 2207 Main Mall, Vancouver, BC Canada V6T 1Z4, Tel: 604-822-2449
- 3, 5, 6, 10: Institut des Sciences de la Mer de Rimouski (ISMER), Université du Québec à Rimouski, 310, allée des Ursulines, C.P. 3300, Rimouski, QC G5L 3A1, Tel : 418 724-1650
- 7, 8: Department of Geography, Environment and Geomatics, University of Ottawa, 60 University Pvt., Room SMD043, Ottawa, ON K1N 6N5, Tel: 613-562-5800 ext. 2826
- 11: Carleton University, 1125 Colonel By Dr, Ottawa, ON K1S 5B6, Tel: 613-520-2600
- 12: National Research Council, 6100 Royalmount Ave, Montreal, QC H4P 2R2, Tel: 514-496-6283
- 13, 17: National Research Council, 6100 Royalmount Ave, Montreal, QC H4P 2R2, Tel: 514-496-6283 & Department of Natural Resources Sciences, McGill University, #21, 111 Lakseshore Road, Ste-Anne-de-Bellevue, Quebec H9X 3V9, Tel: 514-398-7889
- 14: Western University, 1151 Richmond Street, London, Ontario, N6A 3K7, Tel: 519-661-2111
- 15, 16, 20: Department of Geoscience, University of Calgary, 2500 University Dr. NW, Calgary, Alberta, T2N 1N4, Tel: 403-220-5110
- 18: Quebec Centre for Biodiversity Science, McGill University, Stewart Biology Building, Department of Biology, 1205 Dr. Penfield Avenue Montreal, H3A 1B1, Quebec, Tel: 514-398-4455
- 19: Centre for Earth Observation Science, 535 Wallace Building, University of Manitoba, Winnipeg, MB R3T 2N2, Tel: 204-272-1541
- 21-23: Geological Survey of Canada, Natural Resources Canada,
- 24-26: Amundsen Science, Université Laval, Pavillon Alexandre-Vachon, local 4081, 1045, avenue de la Médecine, Québec, QC G1V 0A6, Tel : 418-656-2356

Updated research team information will be submitted annually by the Principal Investigator.

Additional PHA's involved

Sirmilik National Park of Canada

Quttinirpaaq National Park of Canada

Issuing Authorities and Terms and Conditions:

Permit issued pursuant to:

National Parks General Regulations: Sections 7(5), 11(1).

National Parks Wildlife Regulations: Section 15(1)(a)

Migratory Bird Sanctuary Regulations: Sections 9, 10

Project proposals within National Parks, National Marine Conservation Areas and National Historic Sites administered by Parks Canada in Nunavut are subject to the Nunavut Land Claims Agreement (NLCA) and therefore screening by the Nunavut Impact Review Board (NIRB) in accordance with Section 8.2.11. However, Schedule 12-1 of the NLCA exempts certain types of project proposals from screening by the NIRB. Under an agreement through 12-1(7), the NIRB and Parks Canada have agreed to exempt Research and Collection Permits for the National Parks from screening by the NIRB.

The Nunavut Planning Commission has conducted a conformity determination for the regional impacts of the project: it is exempt from further screening as the activities and scope have not significantly changed and have been previously screened by the NIRB (06YN071).

The conditions of the NIRB screening 06YN071 are consistent with Parks Canada conditions and should be observed with the following exceptions in Parks Canada sites:



- Condition 11: For flight activities around Bylot Island, a minimum flying height of 650 meters (2100 feet) rather than 610 m must be adhered to over Bylot Island except during landing, takeoff or as part of the approved research methods.
- Condition 14: Cultural sites found within Parks Canada sites should be reported to Parks Canada, not the Government of Nunavut.
- Condition 21: Hunting and fishing is prohibited in national parks with the exception of Nunavut Agreement Inuit employed by the research project during their leisure hours. It is not permitted to use research or Parks Canada chartered aircraft and vessels to transport any materials gathered, fished or hunted while in a park.

National General Conditions:

Failure to comply with applicable Heritage Area regulations or the conditions of the permit may constitute grounds to cancel or suspend the permit, refuse to issue future permits, and may be considered as grounds for prosecution under the applicable Act(s) or Regulation(s).

All permit holders must be in possession of a valid permit before the fieldwork commences and at other periods as stated on the permit.

Permits are not transferable and each member of the field work team must have a copy of the valid permit in their possession.

The permit is valid only for the geographic location, the time period, the activities, and under the terms and conditions described on the permit, unless amended and revalidated by the Superintendent.

Restrictions:

The Superintendent may suspend, cancel, or restrict the scope of the permit.

The permit shall cease to be valid if the fieldwork is not started within six months of the date of issue.

Other Acts and Regulations:

The Principal Investigator must abide by applicable regulations and all other federal, provincial, territorial or municipal regulations applying to the Heritage Area.

If requested by the Superintendent, an authorized Heritage Area staff member, or police constable, the Principal Investigator or any team member will identify themselves and show the permit.

Principal Investigator Responsibilities:

A site, or site component(s) that has been excavated or disturbed shall be restored or conserved by the Principal Investigator to the satisfaction of the Superintendent.

The Principal Investigator must advise the Research Coordinator of any adjustments in work location, research plan and methodology, implementation schedule, or main personnel, etc., during the course of the research.

Unless otherwise negotiated, Researchers working in a Heritage Area are required, as a condition of their permit, to submit:



- a) A report of progress sixty (60) days following the completion of the field season, unless otherwise agreed with the Research Coordinator;
- b) A final report, one (1) electronic copy and three (3) hard copies, no later than eight (8) months following the completion of the field season, unless otherwise agreed with the Research Coordinator;
- c) Submission of an online Investigator's Annual Report (IAR) within one year of signing the permit. In the case of a multi-year permits, the principal investigator will submit an IAR for each year of the research.

The reporting requirements above do not replace any reporting requirements set out in any contract between Parks Canada and the Principal Investigator.

The Principal Investigator will be responsible for all members of their party. All field assistants must observe any general or specific conditions of the permit.

The Principal Investigator shall at all times indemnify and save harmless the Crown from and against all claims, demands, loss, costs, damages, actions, suits, or other proceedings, by whosoever made, sustained, brought or prosecuted, in any manner based upon, occasioned by, or attributable to, anything done or omitted by the Principal Investigator or the project personnel in the fulfillment or purported fulfillment of any of the conditions of the Permit.

General Conditions Governing Natural Science Research:

Any natural objects collected under authority of this permit remain the property of the Crown (Canada) and are considered on loan to the permit holder. Final disposition of natural objects must be as shown in the project proposal unless amended by the Superintendent. Export of objects or specimens require approval by the Superintendent and is subject to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Cultural Property Export and Import Act and the Export and Import Permits Act. Intention to export specimens must be indicated in the project proposal.

Only the natural objects or categories of natural objects indicated on the permit may be collected.

A detailed inventory of material collected will be provided to the Heritage Area prior to its removal by the researcher.

When fossils or evidence of previous human occupation are found, they should be reported to the Superintendent and must be left undisturbed until inspected by a Parks Canada palaeontologist or archaeologist.

Special Conditions:

The following conditions apply to Research & Collection Permits issued for Auyuittuq, Sirmilik and Quttinirpaaq National Parks and are in addition to those outlined above.

 X Permit holder(s) are required to check into the respective National Park Office prior to the commencement of their field activities (Sirmilik 867-899-8092; Auyuittuq 867-473-2500 or 867-927-8834; Quttinirpaaq 867 975 4673 or 867-252-3000) at least one week prior to their arrival to schedule an orientation with each park.

 X For air access, Permit holder(s) will confirm aircraft operators have an Aircraft Access Permit authorized by the Superintendent. Landings identified for this Research and Collection Permit are authorized by the Superintendent as per Section 5 of the National Parks of Canada Aircraft Access Regulations subject to the following provisions:



- A list of all aircraft use must be provided to the Superintendent and Park Manager prior to commencement of fieldwork. This list must include: dates, location, and type of aircraft for all landings and take offs;
- Conflict with wildlife, wildlife habitat and park visitor use must be minimized;
- A minimum flying height of 650 meters (2100 feet) must be adhered to over Bylot Island except during landing, takeoff or as part of the approved research methods.
- A minimum flying height of 610 meters (2000 feet) must be adhered to in all other areas except during landing, takeoff or as part of the approved research methods.
- For areas with known concentrations of migratory birds (e.g., bird colonies, moulting areas) a lateral distance of at least 1,500 metres (4,900 feet) must be respected. If this is not possible, a minimum flight altitude of 1,100 metres (3,500 feet) must be maintained over these areas.

X A list of all fuel caches associated with research activities must be provided to the Superintendent and Park Manager prior to commencement of field work and must include: location, amount, and the type of fuel at each cache.

- All fuel caches and empty drums are to be clearly and indelibly marked with the project leader's name, year that fuel was cached, and Polar Continental Shelf Project (PCSP) number if applicable.
- All fuel drums are to be removed from the park at the end of the field season unless otherwise agreed upon.

X The use of UAVs or drones is not permitted.

X For mitigation related to motorized boat activity in the vicinity of marine mammals, refer to Attachment A.

X All garbage is to be removed from the park in accordance with the National Park Regulations.

X The project leader will ensure that all party members understand and comply with the Canada National Parks Act and Regulations.

X The project leader is responsible to ensure that all party members read available polar bear safety information.

X All polar bear observations and encounters must be reported to the Park Manager

X Nunavut Agreement Inuit employed by the research project are not permitted to use research or Parks Canada chartered aircraft and vessels to transport any materials gathered, fished or hunted during their leisure hours while in the park.

X The permittee shall not remove, disturb or displace any archaeological artifact or site.

X Should an archaeological site or specimen be encountered or disturbed by any land use activity, the permittee shall immediately contact the Parks Canada (Nunavut Field Unit) Cultural Resources Management Advisor at (867) 975-4673.

X The permittee shall immediately cease any activity that disturbs an archaeological site encountered during the course of a land use operation, until permitted to proceed with the authorization of Parks Canada.

X A field season summary report must be submitted to Parks Canada by 30th October each year that the permit is valid (email: pc.rechercheparcsnunavut-nunavutparksresearch.pc@canada.ca) and to





the following community groups: Hamlet Councils of Pond Inlet, Arctic Bay, Qikiqtarjuaq, Pangnirtung, Resolute and Grise Fiord as well as Mittimatalik HTO, Ikajurtit HTO, Nattivak HTO, Pangnirtung HTO, Resolute Bay HTO and Iviq HTO.

☒ The project leader or designate will share the research project and results to Parks Canada staff at a mutually agreed upon time.

☒ The project leader or designate must present the research project and results to the communities of Pangnirtung and/or Qikiqtarjuaq for Auyuittuq National Park and Pond Inlet and/or Arctic Bay for Sirmilik National Park and Resolute and/or Grise Fiord for Quttinirpaaq at a mutually agreed upon time.

☒ Copies of all reports, scientific papers, and posters must be provided to the Parks Canada offices in Iqaluit, Pangnirtung and Pond Inlet.

☒ Data files will be provided to Parks Canada upon request.

☒ The following are the approved collections & procedures that can be made in Auyuittuq, Sirmilik and Quttinirpaaq National Parks (For details on methodology refer to Application # 38542. Exceptions or amendments to the application methodology are identified here):

Field Dates:

Approximately July 4 – September 10, 2019. Field dates will be updated annually in letter due February 28.

Research Purposes:

Assess the changes occurring in the marine ecosystems of the Canadian Arctic in response to climate change by focussing on four main research components: 1) a mooring program; 2) meteorology, ocean & sea ice; 3) marine resources and environment; and 4) geology and bathymetry.

Objectives:

Auyuittuq National Park

1. Sample for contaminants including mercury
2. Determine the environmental factors that control their production and cycling in Arctic ecosystems
3. Study the impacts of glacial runoff and meltwater plumes on downstream productive marine ecosystems central to the health of northern communities
4. Describe all components of the marine environment (atmosphere, seawater, sediments, ice and marine organisms) and assess the status and changes occurring in this Arctic system.

Sirmilik National Park

5. Understand how river flows to the Arctic Ocean are changing due to global warming and how this could change the emissions of greenhouse gases from rivers to the atmosphere and the ocean.
6. Study the impacts of glacial runoff and meltwater plumes on downstream productive marine ecosystems central to the health of northern communities.
7. Describe all components of the marine environment (atmosphere, seawater, sediments, ice and marine organisms) and assess the status and changes occurring in this Arctic system.

Quttinirpaaq National Park

8. Study the impacts of glacial runoff and meltwater plumes on downstream productive marine ecosystems central to the health of northern communities
9. Describe all components of the marine environment (atmosphere, seawater, sediments, ice and marine organisms) and assess the status and changes occurring in this Arctic system.



Activities

Auyuittuq National Park

1. Take pictures of the sea and ice surrounding the ship with an automated 360° camera.
2. Measure water currents using an Accoustic Doppler Current Profiler.
3. Record information on meteorological, atmospheric and sea-surface properties using various sensors.
4. Map and characterize the sea floor and sediments using a multibeam echosounder and a subbottom profiler.
5. Collect water samples from the CCGS Amundsen in the fiord system at the outlet of Penny Ice Cap. Samples will be collected at selected depths for measurements of dissolved carbon and nutrients, Chlorophyll a, microbial densities and suspended sediments. They will be collected at a maximum of 4 stations in each fiord (Maktak, Coronation and North Pangnirtung Fiords). Data will also be collected on physical water properties (temperature, salinity, oxygen, etc.).
6. Collect sediment cores for geological and benthos analyses, using a piston corer (1 sample at 1 station, 9m x 0.01m², for a total of 3 cores), box corer (0.75m³ at 1 station, for a total of 3 cores), gravity corer (1 sample at 1 station, 3m x 0.01m², for a total of 3 cores) from the Amundsen. Collect shallow sediment samples (1Kg x 3 sampling stations, for a maximum of 3 Kg) from a zodiac using a shovel. The sediment analyses will include assessing the abundance, diversity and distribution of benthic organisms and levels of contaminants and carbon in the sediments as well as mineralogical and biogeochemical properties.
7. Collect data on larval and adult fish and zooplankton abundance and contaminant levels using an echosounder, fish finder and plankton nets, trawls (including Isaacs-Kidd Midwater Trawl (IKMT), benthic beam trawl and Agassiz trawl). Maximum 1 Kg (wet weight) of micro and zooplankton and 2 Kg of macrozooplankton will be collected at each station (1 station per fiord, 3 stations total for park). A maximum of 1,000 fish larvae and adults will be collected within the park.

Access

- Data collection and field work will take place in Maktak Fiord, Coronation Fiord and North Pangnirtung fiords, subject to conditions described below.
- Motorized boat access is permitted in Maktak Fiord, Coronation Fiord and North Pangnirtung fiords. The priority for 2019 within this park is North Pangnirtung Fiord. Attachment A applies to boating activities.
- Access to Maktak and Coronation Fiords (see Attachment B, map 1) is prohibited from the time the first narwhals are observed in the fiords until freeze up. Before entering Maktak or Coronation Fiord, the research team will contact the park office in Qikiqtarjuaq (867 927 8834) or in Pangnirtung (867 473 2500). Sampling will take place in an alternate location outside the park if narwhals are present in Maktak or Coronation Fiord.

Sirmilik National Park

1. Collect water samples using a battery-powered pump in 3 rivers in Sirmilik National Park (Black Cliffs River, Glacier River and Charles York River) for chemical analysis, including measurement of greenhouse gases. Measure temperature, salinity, and water flow rate using sensors.
2. Collect riverbed and riverbank sediments using a shovel (approximately 2 Kg per river, for a maximum of 6Kg) in 3 rivers (Black Cliffs River, Glacier River and Charles York River) and approximately 1Kg at 1 river (in the vicinity of Dufour Point) for geological analyses and to identify the sources of river sediments.
3. Take pictures of the sea and ice surrounding the ship with an automated 360° camera.
4. Measure water currents using an Accoustic Doppler Current Profiler.
5. Record information on meteorological, atmospheric and sea-surface properties using various sensors.
6. Map and characterize the sea floor and sediments using a multibeam echosounder and a subbottom profiler.
7. Collect water samples from the CCGS Amundsen in Oliver Sound. Samples will be collected at selected depths for measurements of dissolved carbon and nutrients, Chlorophyll a, microbial



densities and suspended sediments. They will be collected at a maximum of 4 stations in along a transect running from the base of the glacier to the open ocean. Data will also be collected on physical water properties (temperature, salinity, oxygen, etc.).

8. Collect shallow sediment samples (1Kg x 3 sampling stations, for a maximum of 3 Kg) using a shovel, from a zodiac in Oliver Sound. The sediment analyses will include assessing the abundance, diversity and distribution of benthic organisms and levels of contaminants and carbon in the sediments.

Access

- Black Cliffs River, Glacier River and Charles York River, Oliver Sound, Bylot Island subject to conditions listed below.
- Helicopter access is permitted in Sirmilik National Park to conduct activities listed in points 5 and 6 (river sampling), subject to the following conditions:
 - i. The Black Cliffs sampling site is located within a zone I area of special preservation due nesting activity of seabird colonies (see Attachment B, map 2). The following setbacks will be observed for the seabird colonies:
 - o Aerial: vertical setback of 1100m in areas where concentration of birds are present; lateral setback of 3 km when birds are present (i.e., no flying closely along the coast to access the sampling site.)
 - o Marine: 500m setback.
 - o Terrestrial: 300 m setback from concentrations of birds. If concentrations of birds are present at sampling site, the sampling location will be moved (same river) to meet the setback requirements.
 - ii. The river sampling sites at Black Cliffs River, Glacier River and Charles York River are located within a closure area due to polar bear activities (see Attachment B, map 3). A dedicated person (preferably a licenced bear monitor) to monitor for bear activity during sampling activity is required. If a bear is present at site, sampling location will be moved away from bear (i.e., no hazing is permitted).
 - iii. The river sampling site near Dufour Point is in the vicinity of a cultural site (see Attachment B, map 4). No access is allowed within the cultural site buffer zone. River sampling activity will occur on the east side of the river to avoid the cultural site.
- Motorized boat access is authorized in Oliver Sound subject to the following conditions:
 - i. Attachment A applies to boating activities.
 - ii. Oliver Sound is an Area of Special Importance to Inuit for harvesting activities (see Attachment B, map 4). The HTO of Pond Inlet shall be notified of timing for Oliver Sound work in advance of these activities taking place. Results of mapping activity shall be provided to the HTO.
 - iii. No access is allowed to the Zone I cultural site without a Park staff or Parks Canada trained guide.
- Access to the Zone I cultural site (see Attachment B, map 5) is prohibited unless accompanied by a Park staff or Parks Canada trained guide.

Quttinirpaaq National Park

1. Take pictures of the sea and ice surrounding the ship with an automated 360° camera.
2. Measure water currents using an Accoustic Doppler Current Profiler.
3. Record information on meteorological, atmospheric and sea-surface properties using various sensors.
4. Map and characterize the sea floor and sediments using a multibeam echosounder and a subbottom profiler.
5. Collect water samples from the CCGS Amundsen in Lady Franklin Bay area of the park (Conybeare Fiord, Discovery Bay). Samples will be collected at selected depths for measurements of dissolved carbon and nutrients, Chlorophyll a, microbial densities and suspended sediments. They will be collected at a maximum of 4 stations in along a transect running from the base of glaciers to the open ocean. Data will also be collected on physical water properties (temperature, salinity, oxygen, etc.).



6. Collect sediment cores for benthos analyses, using a box corer ($1 \times 0.75\text{m}^3$ at 1 station). The sediment analyses will include assessing the abundance, diversity and distribution of benthic organisms and levels of contaminants and carbon in the sediments.
7. Collect data on larval and adult fish and zooplankton abundance and contaminant levels using an echosounder, fish finder and plankton nets, trawls (including Isaacs-Kidd Midwater Trawl (IKMT), benthic beam trawl and Agassiz trawl). Maximum 1 Kg (wet weight) of micro and zooplankton and 2 Kg of macrozooplankton will be collected at each station (maximum of 1 station in park). A maximum of 1,000 fish larvae and adults will be collected within the park.

Access

- Motorized boat access is authorized in Lady Franklin Bay area of the park (Conybeare Fiord, Discovery Bay). Attachment A applies to boating activities.
- Access to Fort Conger is prohibited unless accompanied by Parks Canada, Nunavut Field Unit staff (see Attachment B, map 6)
- River sampling is not authorized in 2019. The February 28, 2020 annual update will identify whether this activity is being proposed for 2020 or 2021.

Other conditions that apply to all 3 parks:

- Samples from parks will be removed for analysis.
- If firearms are transported on board the CCGS Amundsen, a zodiac or the helicopter that will support the research, they will not be loaded and they will either be transported in a case or be wrapped and tied securely in such a manner that no part of the firearms are exposed. Firearms will not be removed from the ship/helicopter within Auyuittuq or Sirmilik National Park or Quttinirpaaq National Park without a Parks Canada Firearm Permit.
- No research activities will take place within the Wrecks of HMS Erebus and HMS Terror National Historic Site of Canada or Qausuittuq National Park.
- No equipment will be left on the ground or in the water year-round.



Principal Investigator Signature

I, Louis Fortier, the Project Principal Investigator, accept all the stated Research and Collection Permit terms and conditions.

Signature

2019/06/13

Date (yyyy/mm/dd)

Approval:

Permit issued/approved by:

Andrew Maher

Superintendent Name (Please Print)
Nunavut Field Unit

Superintendent Signature

Lisa Pirie-Dominix

Canadian Wildlife Service Name
(Please Print)

Canadian Wildlife Service Signature

2019/06/13

Date (yyyy/mm/dd)

2019/06/13

Date (yyyy/mm/dd)

Parks Canada Contact

Maryse Mahy
Nunavut Field Unit
Inuksugait Plaza, 1104B
PO Box 278
Iqaluit, Nunavut, X0A 0H0
(867) 975-4763
maryse.mahy@pc.gc.ca



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