

Subject: RE: Request to sample
From: "OP Habitat (DFO/MPO)" <DFO.OPHabitat.MPO@dfo-mpo.gc.ca>
Date: 2023-04-03, 14:10
To: Derek Mueller <DerekMueller@CUNET.CARLETON.CA>

 [External Email]

Hello Derek,

No, I do not believe a permit/permission or letter of advice is required from DFO for your proposed sampling works.

Regards,

Lucas Coletti

Biologist | Biologiste

Fisheries and Oceans Canada | Pêches et Océans Canada

Fish and Fish Habitat Protection Program | Programme de Protection du Poisson et de Son Habitat

Email/Courriel: Lucas.Coletti@dfo-mpo.gc.ca

From: Derek Mueller <DerekMueller@CUNET.CARLETON.CA>
Sent: Sunday, April 2, 2023 1:22 PM
To: OP Habitat (DFO/MPO) <DFO.OPHabitat.MPO@dfo-mpo.gc.ca>
Subject: Re: Request to sample

Dear Triage and Planning,

I am applying for licencing under NIRB as you suggest. The Nunavut Water Board does not regulate marine environments (only freshwater as far as I understand). We do obtain a permit to use water without a licence regularly from them for camping.


Can you please inform me if I need any DFO permission to undertake the work that I outlined in my application to you?

If so, how should I proceed?

Thank you,

Derek

On 2023-03-23 16:41, OP Habitat (DFO/MPO) wrote:

 [External Email]

Hello Derek,

Thank you for your email.

The *Fisheries Act* requires that projects avoid causing any harmful alteration, disruption or destruction of fish and/or fish habitat unless authorized by the Minister of Fisheries and Oceans Canada. The Fish and Fish Habitat Protection Program of Fisheries and Oceans Canada reviews projects to ensure compliance with the *Fisheries Act* and the *Species at Risk Act*. The Fish and Fish Habitat Protection Program (FFHPP) works on reviewing physical impacts to fish habitat. From the description you provided, the work you are performing does not fall under the regulatory role of FFHP. My understanding is that scientific research

in Nunavut must be submitted through the territory.

Please consult the resources below:

[Welcome to NUNAVUT WATER BOARD | NUNAVUT WATER BOARD \(nwb-oen.ca\)](#)

[Welcome | Nunavut Impact Review Board \(nirb.ca\)](#)

Hopefully this helps!

Sincerely,

Triage and Planning

Fish and Fish Habitat Protection Program

Ontario and Prairie Region

From: Derek Mueller <DerekMueller@CUNET.CARLETON.CA>

Sent: Saturday, March 18, 2023 12:00 AM

To: OP Habitat (DFO/MPO) <DFO.OPHabitat.MPO@dfo-mpo.gc.ca>

Cc: Philippe Archambault <philippe.archambault@bio.ulaval.ca>; Jérémie Bonneau
<jeremie_bonneau@outlook.com>

Subject: Request to sample

Dear DFO,

Please see the attached cover letter and request for permission to sample for scientific research.

Many thanks

Derek

Derek Mueller (he/him)

Associate Professor

Dept. of Geography & Environmental Studies

B349 Loeb Building

Carleton University

1125 Colonel By Drive

Ottawa ON K1S 5B6 Canada

613-520-2600, ext. 1984

derek.mueller@carleton.ca

<https://wirl.carleton.ca>

This email contains links to content or websites. Always be cautious when opening external links or attachments.

Please visit <https://carleton.ca/its/help-centre/report-phishing/> for information on reporting phishing messages.

When in doubt, the ITS Service Desk can provide assistance. <https://carleton.ca/its/chat>

This email contains links to content or websites. Always be cautious when opening external links or attachments.

Please visit <https://carleton.ca/its/help-centre/report-phishing/> for information on reporting phishing messages.

When in doubt, the ITS Service Desk can provide assistance. <https://carleton.ca/its/chat>



Department of Geography & Environmental Studies
1125 Colonel By Drive
Ottawa, ON K1S 5B6
Canada

Fish and Fish Habitat Protection Program (Nunavut)
Fisheries and Oceans Canada
867 Lakeshore Rd
Burlington ON L7S 1A1
Telephone: 1-855-852-8320
Email: FisheriesProtection@dfo-mpo.gc.ca

March 17, 2023

RE: Request to sample benthic communities within the Milne Ice Shelf, Nunavut

Dear DFO;

My research group studies the remnant ice shelves along the northern coast of Ellesmere Island in Nunavut. These ice shelves and the fjords that contain them are now part of the temporary Tuvaijuittuq Marine Protected Area which will likely be made permanent before the end of 2024. Our field studies are focused on Milne Fiord (Figure 1).

In 2017 we discovered a benthic ecosystem (scallops, corals, sea stars, worms) living inside the Milne Ice Shelf (<https://wirl.carleton.ca/calving-2020/#life-inside-milne-ice-shelf>). We had thought that this habitat was destroyed during the calving of the Milne Ice Shelf in 2020 but now we are not certain based on our field work in 2022. In our attempts to profile through what appeared to be a rift in the ice shelf, we were prevented from lowering our instruments, ostensibly by horizontal ice ledges that protrude within channels within the ice (Figure 2).

We plan to use our newly purchased remotely operated vehicle (ROV) to explore this and other under-ice environments. This ROV has a video camera and an imaging sonar which we will use to better understand the sub-ice-shelf environment.

In this application I am requesting permission to sample some organisms *IF* we find this benthic ecosystem still exists in the fjord *AND* the organisms are abundant (we will sample only less than 5% of the population and take photos of the rest). In particular, we wish to take up to 40 scallops to analyze their shells to find their age and environmental history. Our ROV can take samples using a gripper arm.

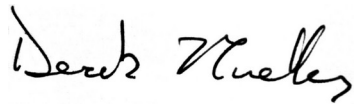
Here is a list of samples we would be interested in taking (given assumptions listed above):
≤40 adult scallops (Pectinidae), ≤10 adult brittle stars (Ophiuridae), ≤10 adult anemones (Actiniaria), ≤10 adult worms (Polychaeta), ≤10 adult sponges (Porifera), ≤10 adult sea cucumbers (Holothuroidea), ≤10 adult soft coral (Nephtheidae), ≤10 adult hydrozoa, ≤20 worms tubes.

We do not know if any of the species we have observed prior to the break-up of the Milne Fiord exist there currently. None of the species we observed are listed as endangered or rare at this location as there are very few observations of benthic communities at this latitude. Certainly the location of this particular habitat (within an ice shelf) is unique globally and therefore worthy of study.

I have applied for review to the Nunavut Planning Commission and anticipate a review from the Nunavut Impact Review Board. I will also consult with the communities of Grise Fiord and Resolute directly about this and related plans for fieldwork.

Would you kindly review this application (attached) and let us know if you have any questions or concerns.

Thank you,



Derek Mueller
Associate Professor



Figure 1: Satellite image of the Milne Fiord area showing the Milne Ice Shelf. Proposed sampling area is marked with a red dot. (2020 August MODIS Image, courtesy of NASA)



Figure 2: Joseph Shoapik and Jérémie Bonneau profile through rifts in the ice shelf to measure the temperature and salinity of the water below. Photo credit: Cameron Fitzpatrick



NOTIFICATION FORM

Code of Practice

PROPONENT INFORMATION

Name	Derek Mueller, Associate Professor				
Street Address	Dept of Geography and Env. Studies, Carleton University, 1125 Colonel By Drive				
City/Town	Ottawa	Province/Territory	ON	Postal Code	K1S 5B6
Tel. No. (Residence)	6132827955	Tel. No. (Work)	6135202600x1984		
Fax No.		Email Address	derek.mueller@carleton.ca		

CONTRACTOR INFORMATION (provide this information if a Contractor is working on behalf of the Proponent)

Name					
Street Address					
City/Town		Province/Territory		Postal Code	
Tel. No. (Residence)		Tel. No. (Work)			
Fax No.		Email Address			

PROJECT INFORMATION

Select the interim codes of practice that are being used (check all applicable boxes)

- ☐ End of Pipe Fish Screens
- ☐ Routine Maintenance Dredging

Select the type of water body or watercourse at or near your project

- ☐ River, Stream, Creek ☒ Marine (Ocean or Sea)
- ☐ Lake (8 hectares or greater) ☒ Estuary
- ☐ Pond or Wetland (pond is less than 8 hectares) ☐ Riparian

PROJECT LOCATION (S) (Append multiple project locations on an additional sheet if necessary)

Name of Water Body or Watercourse	Coordinates of the Project (UTM co-ordinate or Degrees, Minutes, Seconds), if available			
Milne Fiord, Nunavut (Arctic Ocean)	Easting		Northing	
Legal Description (Plan, Block, Lot, Concession, Township, Section, Range)	Latitude	82.713 deg N	Longitude	81.302 deg W
N/A	Directions to Access the Project Site (i.e., Route or highway number, etc.)			
	N/A			
Proposed Start Date (YYYY/MM/DD)	2023/07/06	Proposed Completion Date (YYYY/MM/DD)	2026/07/31	

▲	Add New Location	Remove Location	▼
---	------------------	-----------------	---

Name of Water Body or Watercourse	Coordinates of the Project (UTM co-ordinate or Degrees, Minutes, Seconds), if available			
	Easting		Northing	
Legal Description (Plan, Block, Lot, Concession, Township, Section, Range)	Latitude		Longitude	
	Directions to Access the Project Site (i.e., Route or highway number, etc.)			
Proposed Start Date (YYYY/MM/DD)		Proposed Completion Date (YYYY/MM/DD)		

▲	Add New Location	Remove Location	▼
---	------------------	-----------------	---

Name of Water Body or Watercourse				

Legal Description (Plan, Block, Lot, Concession, Township, Section, Range)		Coordinates of the Project (UTM co-ordinate or Degrees, Minutes, Seconds), if available			
		Easting	<input type="text"/>		
		Latitude	<input type="text"/>		
		Directions to Access the Project Site (i.e., Route or highway number, etc.)			
Proposed Start Date (YYYY/MM/DD)		Proposed Completion Date (YYYY/MM/DD)			
▲	Add New Location	Remove Location	▼		

We ask that you notify DFO, preferably 10 working days before starting your work, by filling out and sending in, by mail, email or by fax, this notification form to the DFO office in your area . This information is requested in order to evaluate the effectiveness of the work carried out in relation to the code of practice.

I, Derek Mueller (print name)
certify that the information given on this form is, to the best of my knowledge, correct and complete.

 2023-03-17
Signature Date

Note: Information about the above-noted proposed work or undertaking is collected by DFO under the authority of the *Fisheries Act* for the purpose of administering the Fish and Fish Habitat Protection Provisions of the *Fisheries Act*. Personal information will be protected under the provisions of the *Privacy Act* and will be stored in the Personal Information Bank DFO-SCI-605. Under the *Privacy Act*, Individuals have a right to, and on request shall be given access to, any personal information about them contained in a personal information bank. Instructions for obtaining personal information are contained in the Government of Canada's Info Source publications available at www.infosource.gc.ca or in Government of Canada offices. Information other than "personal" information may be accessible or protected as required by the provisions of the *Access to Information Act*.

Aussi disponible en français



Request for Review

Please note that Guidance on Submitting a Request for Review is available at the end of this form. This guidance explains the requirements for a Request for Review by DFO under the fish and fish habitat protection provisions of the *Fisheries Act*. All information requested must be provided. If you attach documents to your application with additional information, you must still provide appropriate summaries in the spaces provided on the application document or your application will be considered incomplete.

A) Contact information

Name of Business/Company:

Carleton University

Name of Proponent:

Derek Mueller

Mailing address:

Department of Geography and Environmental Studies
Carleton University, B349 Loeb Building
1125 Colonel By Drive

City/Town:

Ottawa

Province/Territory:

ON

Postal Code:

K1S 5B6

Tel. No. :

613-520-2600 x1984

Fax No.:

Email:

derek.mueller@carleton.ca

Select additional contact:

Contractor/Agency/Consultant (if applicable):

Mailing address:

City/Town:

Province/Territory:

Postal Code:

Tel. No. :

Fax No.:

Email:

Is the Proponent the main/primary contact? ☒ Yes ☐ No



If no, please enter information for the primary contact or any additional contact.

This research is in partnership with benthic ecologist Philippe Archambault, Université Laval

B) Description of Project

If your project has a title, please provide it.

Milne Fiord ice-ocean interactions: Implications for the stability of ice shelves and glaciers in the Polar Regions

Is the project in response to an emergency circumstance*? ☐ Yes ☒ No

Does your project involve work in water? ☒ Yes ☐ No

If yes, is the work below the High Water Mark*? ☒ Yes ☐ No

What are you planning to do? Briefly describe all project components you are proposing in or near water.

We propose to sample sample benthic taxa for identification as well as conduct schlerochronology on scallop shells to determine their age, analyze stable isotope ratios and contaminant levels. These organisms may be found below/within the Milne Ice Shelf, Nunavut.

How are you planning to do it? Briefly describe the construction materials, methods and equipment that you plan to use.

We will sample organisms using a remotely-operated vehicle (ROV) with a gripper arm through a hole in the ice.

Include a site plan (figure/drawing) showing all project components in and near water.

Are details attached? ☒ Yes ☐ No

Identify which work categories apply to your project.

- | | |
|---|---|
| <input type="checkbox"/> Aquaculture Operations | <input type="checkbox"/> Log Handling / Dumps |
| <input type="checkbox"/> Aquatic Vegetation Removal | <input type="checkbox"/> Log Removal |
| <input type="checkbox"/> Beaches | <input type="checkbox"/> Moorings |
| <input type="checkbox"/> Berms | <input type="checkbox"/> Open Water Disposal |
| <input type="checkbox"/> Blasting / Explosives | <input type="checkbox"/> Piers |
| <input type="checkbox"/> Boat Houses | <input type="checkbox"/> Riparian Vegetation Removal |
| <input type="checkbox"/> Boat Launches / Ramps | <input type="checkbox"/> Seismic Work |
| <input type="checkbox"/> Breakwaters | <input type="checkbox"/> Shoreline Protection |
| <input type="checkbox"/> Bridges | <input type="checkbox"/> Stormwater Management Facilities |
| <input type="checkbox"/> Cable Crossings | <input type="checkbox"/> Surface Water Taking |
| <input type="checkbox"/> Causeways | <input type="checkbox"/> Tailings Impoundment Areas |
| <input type="checkbox"/> Culverts | <input type="checkbox"/> Temporary Structures |
| <input type="checkbox"/> Dams | <input type="checkbox"/> Turbines |
| <input type="checkbox"/> Dewatering / Pumping | <input type="checkbox"/> Water Control Structures |
| <input type="checkbox"/> Docks | <input type="checkbox"/> Water Intakes / Fish Screens |
| <input type="checkbox"/> Dredging / Excavation | <input type="checkbox"/> Water Outfalls |
| <input type="checkbox"/> Dykes | <input type="checkbox"/> Watercourse Realignment |



- ☐ Fishways / Ladders
☐ Flow Modification (hydro)
☐ Groundwater Extraction
☐ Groynes
☐ Habitat Restoration
☐ Ice Bridges
- ☐ Weirs
☐ Wharves
☐ Wind Power Structures
- ☒ Other Please Specify

Scientific research

Was your project submitted for review to another federal or provincial department or agency? ☒ Yes ☐ No

If yes, indicate to whom and associated file number(s).

Nunavut Planning Commission (File 149813), NIRB 08YN010 and 09YN071, Nunavut Research Institute (NRI 02 021 22R-M, to be renewed)

C) Location of the Project

Coordinates of the proposed project Latitude N Longitude W

OR UTM zone ; Easting
 Northing

Include a map clearly indicating the location of the project as well as surrounding features.

Name of Nearest Community (City, Town, Village):

Ausittuq (Grise Fiord)

Municipality, District, Township, County, Province:

Nunavut

Name of watershed (if applicable):

Milne Fiord

Name of watercourse(s) or waterbody(ies) near the proposed project:

Milne Fiord

Provide detailed directions to access the project site:

Aircraft charter only

D) Description of the Aquatic Environment

Identify the predominant type of aquatic habitat where the project will take place.

- ☒ Estuary (Estuarine)
☐ Lake (Lacustrine)
☐ On the bank/shore at the interface between land and water (Riparian)
☐ River or stream (Riverine)
☐ Salt water (Marine)
☐ Wetlands (Palustrine)



Provide a detailed description of biological and physical characteristics of the proposed project site. This description should include information on aquatic species at risk* (<https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>), their residence* and critical habitat* if found in the area. An overview of the distribution of aquatic species at risk and the presence of their critical habitat within Canadian waters can be found here <http://dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html>

See attached

Include representative photos of affected area (including upstream and downstream area) and clearly identify the location of the project.

E) Potential Effects of the Proposed Project

Have you reviewed the Pathways of Effects (PoE) diagrams (<http://www.dfo-mpo.gc.ca/pnw-ppe/pathways-sequences/index-eng.html>) that describe the type of cause-effect relationships that apply to your project?

☐ Yes ☒ No

If yes, select the PoEs that apply to your project.

- ☐ Addition or removal of aquatic vegetation
- ☐ Change in timing, duration and frequency of flow
- ☐ Cleaning or maintenance of bridges or other structures
- ☐ Dredging
- ☐ Excavation
- ☐ Fish passage issues
- ☐ Grading
- ☐ Marine seismic surveys
- ☐ Organic debris management
- ☐ Placement of marine finfish aquaculture site
- ☐ Placement of material or structures in water
- ☐ Riparian Planting
- ☐ Streamside livestock grazing
- ☐ Structure removal
- ☐ Use of explosives
- ☐ Use of industrial equipment
- ☐ Vegetation Clearing
- ☐ Wastewater management
- ☐ Water extraction

Will there be changes (i.e., alteration) in the fish habitat*? ☐ Yes ☒ No ☐ Unknown

If yes, provide a description.

Is there likely to be a harmful alteration, disruption or destruction of habitat used by fish? ☐ Yes ☒ No ☐ Unknown

Is there likely to be destruction or loss of habitat used by fish? ☐ Yes ☒ No ☐ Unknown

What is the footprint (area in square meters) of your project that will take place below the high water mark*?

2,000 to 5,000

Is your project likely to change water flows or water levels? ☐ Yes ☒ No ☐ Unknown

If your project includes withdrawing water, provide source, volume, rate and duration.

If your project includes a water control structure, provide the % of flow reduction.



If your project includes discharge of water, provide source, volume and rate.

Will your project cause death of fish? ☒ Yes ☐ No ☐ Unknown

If yes, how many fish will be killed (for multi-year project, provide average)? What species and lifestages?

<40 adult scallops (Pectinidae), <10 adult brittle stars (Ophiuridae), <10 adult anemones (Actiniaria), <10 adult worms (Polychaeta), <10 adult sponges (Porifera), <10 adult sea cucumbers (Holothuroidea), <10 adult soft coral (Nephtheidae), <10 adult hydrozoa, <20 worms tubes

What is the time frame of your project?

The construction will start on and end by

If applicable, the operation will start on 07/06/2023 and end by 07/31/2026

If applicable, provide schedule for the maintenance

We hope to conduct annual trips to the site as it may not be possible to accomplish this work in one field season.

If applicable, provide schedule for decommissioning

Are there additional effects to fish and fish habitat that will occur outside of the time periods identified above? ☐ Yes ☒ No

(If yes, provide details)

Can you follow appropriate Timing Windows (<http://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/index-eng.html>) for ☐ Yes ☒ No all your project activities below the High Water Mark*?

(If no, provide explanations.)

The benthic organisms we wish to sample live below the high water mark.

Have you considered and incorporated all options for redesigning and relocating your project to avoid negative effects to fish and fish habitat?

☒ Yes ☐ No

If yes, describe.

We have designed our project so that it does not impact fish and fish habitat except for the sampling we wish to conduct.

Have you consulted DFO's Fish and Fish Habitat Protection Measures Habitat (<https://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures-eng.html>) to determine which measures apply to your project? ☒ Yes ☐ No

Will you be incorporating applicable measures into your project? ☒ Yes ☐ No

If yes, identify which ones. If No, identify which ones and provide reasons.

We will: maintain a riparian vegetation; maintain fish passage; ensure proper sediment control; prevent entry of deleterious substances into the water.

Have you considered whether DFO standards and codes of practice apply to your project? ☐ No ☒ Yes



If Yes, include a list.

None apply: We will not be dredging or using pipes.

Have you considered other avoidance and mitigation measures?

☐ No ☒ Yes

If Yes, include a list.

We will sample only the minimum amount of organisms required for our study.

Are there any relevant measures that you are unable to incorporate?

☐ Yes ☐ No

(If yes, identify which ones.)

We cannot "prevent the death of fish" where fish "includes shellfish, crustaceans, marine animals" since these animals are what we propose to sample. We cannot carry out works, undertakings and activities on land since the organisms we wish to sample are not found there.

What harmful effects to fish and fish habitat do you foresee after taking into account the avoidance and mitigation measures described above?

None, except for the organisms we propose to sample

Do these include effects on aquatic species at risk*?

☐ Yes ☒ No

If yes, please describe, including how many individuals will be harmed, harassed, or otherwise affected by the project, and how?

No species at risk are documented in this area.

Do these include effects on areas identified as their residence or critical habitat?

☐ Yes ☒ No

If yes, please describe

Are there any aquatic invasive species in the vicinity of your project area?

☐ Yes ☒ No

(If yes, identify which ones.)

Unknown

Does your project aim to, or will it be likely to, effect any of these aquatic invasive species?

☐ Yes ☒ No

If yes, how?



F) Signature

I, Derek Mueller (print name) certify that the information given on this form is to the best of my knowledge, correct and completed.

Signature

MM/DD/YYYY 03/17/2023
Date

Information about the above-noted proposed work or undertaking is collected by DFO under the authority of the *Fisheries Act* for the purpose of administering the Fish and Fish Habitat protection provisions of the *Fisheries Act*. Personal information will be protected under the provisions of the *Privacy Act* and will be stored in the Personal Information Bank DFO-PPU-680. Under the *Privacy Act*, Individuals have a right to, and on request shall be given access to any personal information about them contained in a personal information bank. Instructions for obtaining personal information are contained in the Government of Canada's Info Source publications available at www.infosource.gc.ca or in Government of Canada offices. Information other than "personal" information may be accessible or protected as required by the provision of the *Access to Information Act*.

**All definitions are provided in Section G of the Guidance on Submitting a Request for Review*



Guidance on Submitting a Request for Review

This document explains the requirements for a Request for Review by DFO under the fish and fish habitat protection provisions of the *Fisheries Act*. To determine whether you should request a review, visit DFO's Projects Near Water webpage (<http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html>).

Incomplete Requests for Review will be returned to the applicant without review by DFO. All information requested must be provided. If you attach documents to your application with additional information, you must still provide appropriate summaries in the spaces provided on the application document or your application will be considered incomplete.

Section A: Contact Information

Provide the full legal name of the proponent and primary mailing address for the proponent. When the proponent is a company, identify the full legal registered name of the company.

If applicable, also provide the contact information of the duly authorized representative of the proponent. Please note that a copy of correspondence to Contractor/Agency/Consultant will also be sent to the Proponent.

Section B: Description of Project

This information is meant to provide background about the proposed project. All components of the proposed project in or near water, must be described.

Proponents should provide information about all appropriate phases of the project, i.e., the construction, operation, maintenance and closure phases for the proposed project.

All details about the construction methods to be used, associated infrastructure, permanent and temporary structure, structure type (e.g. corrugated steel pipe vs box culvert), structures dimension, building materials to be used, machinery and equipment to be used must also be provided. For example, the construction of **permanent structures** may require the construction of temporary structures such as temporary dikes, in conjunction with other associated activities like the withdrawal of water, land clearing, excavation, grading, infilling, blasting, dredging, installing structures, draining or removing debris from water. Similarly, the equipment and materials to be used may include hand tools, backhoes, gravel, blocks or armor stone (provide the average diameter), concrete (indicate if pre-cast or poured in-water), steel beams or wood.

When physical structures in or near water are proposed, provide the plan and specifications of those works which would require a review.

Section C: Location of the Project

The purpose for this information is to describe and illustrate the location of the proposed project, and to provide geographical and spatial context. The information should also facilitate an understanding of how the project will be situated in relation to existing structures.

The details to be provided must include:

- Coordinates of the project (e.g., Latitude and Longitude or Universal Transverse Mercator Grid coordinates);
- A map(s), site plan, or diagrams indicating the high water mark and the location, size and nature of proposed and existing structures (e.g., floating or fixed), landmarks and proposed activities. In a marine setting, it may be helpful to depict the approximate location of the proposed development on a nautical chart or showing the relation of the site to sea marks or other navigational aids. These plans, maps or diagrams should be at an appropriate scale to help determine the relative size of the proposed structures and activities, the proximity to the watercourse or waterbody and the distance from existing structures;
- The community nearest to the location of the proposal as means to provide a general reference point. When possible, proponents should use geographical names recognized by the Geographical Names Board of Canada (<http://www.nrcan.gc.ca/earth-sciences/geography-boundary/geographical-name/11680>).
- If available, provide aerial photographs or satellite imagery of the water source(s) and waterbody(ies);
- Names of the watershed(s), water source(s) and/or waterbody(ies) likely to be affected by the proposal; and
- Brief directions to access the proposed project site.



Section D: Description of the Aquatic Environment

Proponents must describe the environmental context and aquatic resources present at the proposed site. The information must identify the current state of the fish and fish habitat prior to the carrying on of the project.

It is important to include information about the fish species present, the biological, chemical, physical features present (habitat characteristics), and the fish life-cycle functions (fish characteristics).

The spatial scope for assessing fish and fish habitat should encompass the direct physical footprint of the project, and the upstream and downstream areas affected.

As an example, the following is a non-exhaustive and non-prescriptive list of some common attributes which may characterize the aquatic environment:

- Type of water source or watercourse (groundwater, river, lake, marine, estuary, etc.);
- Characteristics of the water source or waterbody could include:
 - Substrate characterization - describe the types of substrate (e.g., bedrock, boulder, cobble, gravel etc.), identify the predominant substrate type (e.g., 80% cobble, 20% gravel etc.) and provide maps of the substrate;
 - Aquatic and riparian vegetation characterization - identify the prevalent types of vegetation (e.g. rooted, submerged, emergent, etc.), identify the relative abundance of the vegetation (e.g., 10% cattails, 80% grass, 10% sedge) , indicate the predominant vegetation (e.g., by species or types) and identify the vegetation densities (e.g., type of vegetation/ area);
 - Flow characterization - specify if the flow is controlled or if it is natural, identify if the flow is permanent or intermittent, identify the current and tide (marine environment) etc.;
 - Physical waterbody characterization - identify the average depth of water for water bodies, identify bathymetry of water bodies, provide bathymetric maps where available, channel width (determine the width of the channel from the high water mark), slope ;
 - Water quality characterization - (e.g., annual or average pH, salinity, alkalinity, total dissolved solids, turbidity, temperature etc.);
 - Biological water quality characterization - (e.g., benthic macro-invertebrates, zooplankton, phytoplankton, etc.)
- Fish species characterization - identify the fish species (including molluscs, crustaceans, etc.) known or suspected to be in the area, predator prey relationships etc. Identify what source of information was used to determine the presence of fish in that area; and
- Estimate the fish abundance - estimate the number of fish present, estimate the year class for each species etc.

There are many different methods and attributes available to characterize fish and fish habitat. Proponents must describe all sources of information used, all fish and environment sampling techniques used, all modelling techniques used and all other approaches used to define the fish and fish habitat. Proponents are encouraged to use recognized fisheries inventory methods such as those approved by DFO or provinces and territories, and/or scientifically defensible methodologies and techniques whenever possible.

Whenever possible, proponents should support descriptions of the aquatic environment with the use of detailed drawings, such as plans or maps and photographs of the habitat features. In an offshore marine setting, photos may not be useful to depict the proposed development site. Instead describe and/or sketch the specific features of the sea floor which may include the presence of submarine features such as canyons, cliffs, caverns, etc.

Section E: Potential Effects of the Proposed Project

The objective of this section is to identify all anticipated effects on fish and fish habitat likely to be caused by the project. Proponents should consider all mitigation or avoidance techniques.

The description must include qualitative and/or quantitative information about the predicted/potential effects to fish species and fish habitat. Some examples of likely effects may include mortality to fish, area of habitat loss, change to flow, changes to habitat function, reduction in prey availability etc.



The spatial scope of the aquatic effects assessment would include the direct physical "footprint" of the proposed project, and any areas indirectly affected, such as downstream or upstream areas. The footprint of each component of the project below the higher water mark should be provided individually. This may also include areas in or on the water, on the shoreline, coast or bank(s) (i.e., in the riparian zone).

The assessment must include the following attributes:

- Identification of all fish species affected by the proposed project as well as their life stages (e.g., juvenile, yearling, adult, etc.);
- Identification of the type of fish habitat affected (e.g., spawning habitat - gravel and cobble, feeding and rearing areas - side channel slough, small tributaries, etc.), estimate of the affected area (e.g., square meters or hectares);
- Description of the effect (e.g., mortality to fish from entrapment, delayed migration of spawning adults, reduction in prey availability, etc.);
- Probability of the effect - this is the likelihood of the effect occurring (e.g., probability of fish strike from turbines for specific fish sizes, probability of sediment plume within a distance from source, etc., or qualitative assessment: low, medium, high)
- Magnitude of the effect - this is the intensity or severity of the effect (e.g., total number of fish affected, or qualitatively assessment: low, medium, high).
- Geographic extent of the effect - this is the spatial range of the effect (e.g., localized to 100m from the work, channel reach or lake region, entire watershed etc.); and
- Duration of the effect - this is the temporal period for which the effect will persist (e.g., duration of delay to fish migration in hours, days, months or years).

The information to be provided must also describe the methods and techniques used to conduct the assessment. As much as possible, methods and techniques used should be scientifically defensible.

The schedule should, at minimum, identify the proposed start and end dates for carrying out each proposed activity, and where applicable, identify the respective phase of the proposal; i.e., the construction, operation, maintenance and closure phases. In some cases, in order to provide additional context, it may be relevant to identify other information such as the expected life span of permanent and temporary structures.

Proponents must provide comprehensive information about all available measures that are proposed to avoid or mitigate potential harmful alteration, disruption or destruction of fish habitat, or death of fish (e.g., in standards or codes of practice).

Residual harmful impacts that remain after the application of such measures.

It is important to clearly describe and quantify harmful impacts because DFO will use this information as part of its decision making on whether harmful alteration, disruption or destruction of fish habitat or death of fish is likely and an authorization is required under subsection 35(2)(b) or 34.4(2)(b) of the *Fisheries Act*.

Section F: Submission and Signature

The proponent must sign their application. A signed original of the Request for Review must be provided to the regional DFO office (<http://www.dfo-mpo.gc.ca/pnw-ppe/contact-eng.html>), even if an electronic copy was sent by email. Should the review of your project indicate that harmful alteration, disruption or destruction of fish habitat or death of fish is likely, the information provided in the Request for Review document can be referred to in the subsequent application for an authorization under Paragraphs 35(2)(b) or 34.4 of the *Fisheries Act*.

Section G: Definitions

Aquatic Species at Risk: an extirpated, endangered, threatened species, or a species of special concern. A non-exhaustive list of aquatic species at risk found in Canadian waters can be found here (<http://www.dfo-mpo.gc.ca/species-especes/sara-lep/identify-eng.html>).

Aquatic Species at Risk Critical Habitat

the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species critical habitat in the recovery strategy or in an action plan for the species.



Aquatic Species at Risk Residence: the specific dwelling place, such as a den, nest or other similar area or a place that is occupied or habitually occupied by one or more individuals during all or part of their life cycles, including breeding, rearing, staging, wintering, feeding, or hibernating.

Aquatic invasive species: are fish, invertebrate or plant species that have been introduced into a new aquatic environment, outside of their natural range. Once introduced, aquatic invasive species populations can grow quickly because they don't have natural predators in their new environment. As a result, they can outcompete and harm native species. They can even alter habitats to make them inhospitable for the native species. A non-exhaustive list of aquatic invasive species can be found here (<http://www.dfo-mpo.gc.ca/species-especes/ais-eae/identify-eng.html>).

Emergency circumstance: If your project must be conducted in response to an emergency, you may apply for an Emergency Authorization. The emergency situations are:

- The project is required as a matter of national security
- The project is being conducted in response to a national emergency where special temporary measures are being taken under the federal *Emergencies Act*
- The project is required to address an emergency that poses a risk to public health or safety or to the environment or property.

Fish habitat: means habitat that can directly or indirectly support life processes. This includes but is not limited to: spawning grounds, nursery, rearing, food supply and migration areas.

Harmful alteration, disruption or destruction means any temporary or permanent change to fish habitat that directly or indirectly impairs the habitat's capacity to support one or more life processes of fish.

High Water Mark: The usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to leave a mark on the land.