



Procurement Hub – Fredericton
301 Bishop Drive
Fredericton, NB E3C 2M6

July 21, 2021

30000620

ADVANCED CONTRACT AWARD NOTICE

TITLE: Cape Breton University Freshwater Mussel

ACAN:

The purpose of this Advance Contract Award Notice (ACAN) is to signal the government’s intention to award a contract for these services to Cape Breton University, Sydney, NS, B1P 6L2. Before awarding a contract, however, the government would like to provide other suppliers with the opportunity to demonstrate that they are capable of satisfying the requirements set out in this Notice, by submitting a statement of capabilities during the ACAN posting period.

If other potential suppliers submit a statement of capabilities during this ACAN posting period that meets the requirements set out in the ACAN, the government will proceed to a full tendering process on either GETS or through traditional means, in order to award the contract.

If no other supplier submits, on or before the closing date, a statement of capabilities meeting the requirements set out in the ACAN, a contract will be awarded to the pre-selected supplier.

INTRODUCTION:

Yellow Lampmussel (*Lampsilis cariosa*) and Brook Floater (*Alasmidonta varicosa*) are freshwater invertebrates listed as Species of Special Concern under the federal Species at Risk Act (SARA). Management Plans published for Yellow Lampmussel and Brook Floater identify actions or strategies for conserving these species and preventing further declines in abundance, range loss, or status due to human activities. Two strategies identified in management plans for both species are to: A. improve knowledge of the distribution and abundance of populations; B. identify and gather information on host fish species in New Brunswick and Nova Scotia.

BACKGROUND:

Part A: Environmental DNA (eDNA) techniques are sampling methods that selectively detect genetic material extracted from environmental samples (water, air, sediments). These are promising tools for monitoring at-risk aquatic populations because they are sensitive and accurate, and cost-effective for species that are challenging to monitor (e.g., rare, cryptic) using conventional methods. Fisheries and Oceans Canada (DFO) Gulf Region has developed a standardized eDNA methodology for detecting populations of the freshwater mussels Brook Floater and Eastern Pearlshell. This technique has provided reliable information on the presence/absence and relative abundance of the two species in aquatic habitats in New Brunswick.

Part B: Freshwater mussels use specific fish species to host their intermediate life-stages (glochidia), therefore, identifying important fish species is essential for the management of freshwater mussel species at risk. While fish host identification can be done in the lab, this work does not account for factors that might influence the suitability of a host, such as habitat use and attraction to mussel mantle lures. Observations of mussel glochidia attached to fish in natural habitats is therefore necessary to verify fish hosts. Species

identification of freshwater mussel glochidia based on morphological features is very difficult and sometimes impossible.

OBJECTIVES:

1. Assess the reliability of eDNA analyses in the field (Part A).

A number of environmental variables can influence the ability to detect eDNA in the environment, even in the presence of known target populations. These factors include the availability of DNA in the water column, which can be influenced by distance from the source, rate of water flow, and patterns of water movement among many other factors. In addition, eDNA may be less available seasonally due to the activity patterns of bivalves or less easily assayed due to the presence of inhibitors in the water column which can also vary seasonally. Consequently, in order to develop a robust sampling strategy, it is important to evaluate the importance of sample location, distance from source, and seasonality on the ability to detect Brook Floater using eDNA. Results from this study will inform current sampling strategy when monitoring existing populations of Brook Floater and will facilitate exploration of new habitats in the search for unknown populations of this species.

2. Establish the limits of detection and limits of quantitation using detection assays (Part A).

The ability to detect environmental DNA will always be a consequence of the amount/quality of DNA present in the environment and the sensitivity of the assay to detect that DNA. It is important to establish the sensitivity of the current system according to newly proposed standards for eDNA monitoring. Results from this analysis will enable standardized reporting of our field data, facilitate comparisons across eDNA studies of Brook Floater and other bivalves, and improve interpretation of spatial or temporal variation in results.

3. Develop a molecular identification key for the ten freshwater mussel species occurring in Atlantic Canada (including Yellow lampmussel, Brook Floater and Dwarf Wedgemussel) (Part B).

WORK REQUIREMENT:

Brook Floater and Yellow Lampmussel are listed as threatened under the Nova Scotia Endangered Species act, therefore, the contractor must be in possession of appropriate provincial permits before commencing work. A scientific license (s52) must also be obtained from DFO before undertaking any field sampling.

TASKS AND DELIVERABLES:

Tasks:

1. Evaluate the reliability of eDNA analyses to detect freshwater mussels (Part A):

Undertake field validations to assess the consistency of eDNA results for Brook Floater at two sites where individuals of this species have been positively identified in the past year.

- a. At each site, samples will be collected at three locations at defined distances downstream from known Brook Floater populations.
 - b. The same two sites will be sampled across three different dates to assess the effect of seasonality on our ability to detect eDNA.
 - c. Environmental variables will be recorded at the time of collection.
2. Establish limits of detection and limits of quantitation for Brook Floater and Yellow Lampmussel (Part A)
 3. Develop molecular identification key and test it on glochidia of Brook Floater (Part B)

Deliverables:

1. A report on the robustness of eDNA detection for Brook Floater in the field, based on sample location, distance from known source populations, and seasonality. Based on these results, an evaluation of sampling strategy for future monitoring of Brook Floater populations.

2. An assessment of the potential for environmental inhibitors to confound eDNA detection in the field. If inhibitors are apparent, a solution should be proposed for minimizing their influence on eDNA assays.
3. A report on the LOD and LOQ for our qPCR assay of Brook Floater, and a comparison of the sensitivity of this assay to other published assays for freshwater bivalves. Proposals for the improvement of assay sensitivity should be provided if required.
4. A comprehensive NAD1 sequence library of freshwater mussel species occurring in Atlantic Canada that could be available to other researchers through eg. Genbank (<https://www.ncbi.nlm.nih.gov/genbank/>).
5. A molecular identification key for freshwater mussels of Atlantic Canada that enables reliable and cost-effective species identification of adult and larval (glochidia) freshwater mussels.
6. A report documenting the methods for key construction and verification. Instructions for using the key must also be included.

RESOURCES AND LEVEL OF EFFORT:

- November 30, 2021: completion of field work and written informal report outlining progress toward objectives.
- December 15, 2021: written informal report outlining progress toward objectives.
- March 18, 2022: draft report describing activities and completion of objectives.

MANDATORY CRITERIA:

The contractor must show evidence of the following specifications:

- A minimum of two years' experience in the sampling and handling of freshwater mussels in Nova Scotia rivers and the collection of tissue samples for genetic analysis.
- A minimum of one year experience in extracting and typing of genetic tissues.
- The Contractor must submit evidence of having conducted a minimum of one project that required using restriction enzymes to identify freshwater mussels.

ESTIMATED VALUE

The total value of any contract emanating from this RFP shall not exceed \$20,000, including travel and living expenses and excluding all applicable taxes.

TRADE AGREEMENTS APPLICABILITY OR OTHER OBLIGATIONS:

No Trade Agreements apply.

GOVERNMENT CONTRACTS REGULATIONS EXCEPTION AND LIMITED TENDERING REASONS:

The following policy requirements are applicable to this ACAN process:

Applicable Exceptions to Soliciting Bids under the Government Contracting Regulations (GCRs) (Section 6):

Section 10.2.1 Section 6 (d) only one person or firm is capable of performing the work applies to this ACAN for the following reasons:

-There are no known alternative sources of supply. It is feasible and affordable to compete the requirement.

INTELLECTUAL PROPERTY:

No new Intellectual Property will be created in this contract.

CONTRACT PERIOD:

The period of the contract is from contract award to March 31, 2022 inclusive.

- Firm period: contract Award to March 31, 2022
- All deliverables are required by March 18, 2022

SUPPLIER'S RIGHT TO SUBMIT A STATEMENT OF CAPABILITIES:

Suppliers who consider themselves fully qualified and available to provide the services described herein, **must submit a Statement of Capabilities in writing to the Contracting Officer identified in this Notice on or before closing date. The Statement of Capabilities must clearly demonstrate how the supplier meets the advertised requirements.**

CLOSING DATE FOR SUBMITTING STATEMENT OF CAPABILITIES:

August 5, 2021 at 2:00 p.m. (ADT)

Inquiries and statements of capabilities are to be directed to:

Lauren Vandendorre

Contracting Officer

Procurement Hub – Fredericton

Telephone: (506) 470-6349

Email: DFOtenders-soumissionsMPO@dfo-mpo.gc.ca