



**RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:**

Bid Receiving/Réception des soumissions

Procurement Hub | Centre d'approvisionnement
Fisheries and Oceans Canada | Pêches et Océans Canada
301 Bishop Drive | 301 promenade Bishop
Fredericton, NB E3C 2M6

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

REQUEST FOR PROPOSAL

DEMANDE DE PROPOSITION

Proposal to: Fisheries and Oceans Canada

We hereby offer to sell to Her Majesty the Queen in right of Canada, in accordance with the terms and conditions set out herein, referred to herein or attached hereto, the goods and services listed herein and on any attached sheets at the price(s) set out therefor.

Proposition aux : Pêches et Océans Canada

Nous offrons par la présente de vendre à Sa Majesté la Reine du chef du Canada, aux conditions énoncées ou incluses par référence dans la présente et aux appendices ci-jointes, les biens et les services énumérés ici sur toute feuille ci-annexée, au(x) prix indiqué(s).

Comments: - Commentaries :

Title – Sujet Fresh water mussel research (role of food)		Date 12-07-2016
Solicitation No. – N° de l'invitation F5211-160270		
Client Reference No. - No. de référence du client F2905-160021		
Solicitation Closes – L'invitation prend fin At / à : 2:00PM ADT(Atlantic Daylight Time) On / le : July 28th 2016		
F.O.B. – F.A.B Destination	GST – TPS See herein — Voir ci-inclus	Duty – Droits See herein — Voir ci-inclus
Destination of Goods and Services – Destinations des biens et services See herein — Voir ci-inclus		
Instructions See herein — Voir ci-inclus		
Address Inquiries to – Adresser toute demande de renseignements à Jean-Pierre deVink Email – courriel: DFOtenders-soumissionsMPO@dfo-mpo.gc.ca		
Delivery Required – Livraison exigée See herein — Voir ci-inclus	Delivery Offered – Livraison proposée	
Vendor Name, Address and Representative – Nom du vendeur, adresse et représentant du fournisseur/de l'entrepreneur:		
Telephone No. – No. de téléphone	Facsimile No. – No. de télécopieur	
Name and title of person authorized to sign on behalf of Vendor (type or print) – Nom et titre de la personne autorisée à signer au nom du fournisseur (taper ou écrire en caractères d'imprimerie)		
Signature	Date	



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PART 1 - GENERAL INFORMATION

1.1 Security Requirements

There is no security requirement associated with this bid solicitation

1.2 Statement of Work

The Work to be performed is detailed under Article "A" of the resulting contract clauses.

1.3 Debriefings

Bidders may request a debriefing on the results of the bid solicitation process. Bidders should make the request to the Contracting Authority within 15 working days from receipt of the results of the bid solicitation process. The debriefing may be in writing, by telephone or in person.

1.4 Procurement Ombudsman

The Office of the Procurement Ombudsman (OPO) was established by the Government of Canada to provide an independent avenue for suppliers to raise complaints regarding the award of contracts under \$25,000 for goods and under \$100,000 for services. You have the option of raising issues or concerns regarding the solicitation, or the award resulting from it, with the OPO by contacting them by telephone at 1-866-734-5169 or by e-mail at opo-boa@opo-boa.gc.ca. You can also obtain more information on the OPO services available to you at their website at www.opo-boa.gc.ca.



PART 2 - BIDDER INSTRUCTIONS

2.1 Standard Instructions, Clauses and Conditions

All instructions, clauses and conditions identified in the bid solicitation by number, date and title are set out in the [Standard Acquisition Clauses and Conditions Manual](https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual) (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>) issued by Public Works and Government Services Canada.

Revision to Departmental Name: As this solicitation is issued by Fisheries and Oceans Canada (DFO), any reference to Public Works and Government Services Canada or PWGSC or its Minister contained in any term, condition or clause of this solicitation, including any individual SACC clauses incorporated by reference, will be interpreted as reference to DFO or its Minister.

Bidders who submit a bid agree to be bound by the instructions, clauses and conditions of the bid solicitation and accept the clauses and conditions of the resulting contract.

The [2003](#) (2015-07-03) Standard Instructions - Goods or Services - Competitive Requirements, are incorporated by reference into and form part of the bid solicitation.

Section 01 – Integrity Provisions – Bid of 2003 referenced above is amended as follows:

Delete section 01 in its entirety.

Section 02 – Procurement Business Number – of 2003 referenced above is amended as follows:

Delete section 02 in its entirety.

2.2 Submission of Bids

Bids must be submitted only to Fisheries and Oceans Canada (DFO) Bid Receiving Unit by the date, time and place indicated on page 1 of the bid solicitation.

Due to the nature of the bid solicitation, bids transmitted by facsimile to DFO will not be accepted.

2.3 Former Public Servant

Contracts awarded to former public servants (FPS) in receipt of a pension or of a lump sum payment must bear the closest public scrutiny, and reflect fairness in the spending of public funds. In order to comply with Treasury Board policies and directives on contracts awarded to FPSs, bidders must provide the information required below before contract award. If the answer to the questions and, as applicable the information required have not been received by the time the evaluation of bids is completed, Canada will inform the Bidder of a time frame within which to provide the information. Failure to comply with Canada's request and meet the requirement within the prescribed time frame will render the bid non-responsive.

Definitions

For the purposes of this clause, "former public servant" is any former member of a department as defined in the [Financial Administration Act](#), R.S., 1985, c. F-11, a former member of the Canadian Armed Forces or a former member of the Royal Canadian Mounted Police. A former public servant may be:

- a. an individual;



- b. an individual who has incorporated;
- c. a partnership made of former public servants; or
- d. a sole proprietorship or entity where the affected individual has a controlling or major interest in the entity.

"lump sum payment period" means the period measured in weeks of salary, for which payment has been made to facilitate the transition to retirement or to other employment as a result of the implementation of various programs to reduce the size of the Public Service. The lump sum payment period does not include the period of severance pay, which is measured in a like manner.

"pension" means a pension or annual allowance paid under the [Public Service Superannuation Act](#) (PSSA), R.S., 1985, c. P-36, and any increases paid pursuant to the [Supplementary Retirement Benefits Act](#), R.S., 1985, c. S-24 as it affects the PSSA. It does not include pensions payable pursuant to the [Canadian Forces Superannuation Act](#), R.S., 1985, c. C-17, the [Defence Services Pension Continuation Act](#), 1970, c. D-3, the [Royal Canadian Mounted Police Pension Continuation Act](#), 1970, c. R-10, and the [Royal Canadian Mounted Police Superannuation Act](#), R.S., 1985, c. R-11, the [Members of Parliament Retiring Allowances Act](#), R.S. 1985, c. M-5, and that portion of pension payable to the [Canada Pension Plan Act](#), R.S., 1985, c. C-8.

Former Public Servant in Receipt of a Pension

As per the above definitions, is the Bidder a FPS in receipt of a pension? **Yes** () **No** ()

If so, the Bidder must provide the following information, for all FPSs in receipt of a pension, as applicable:

- a. name of former public servant;
- b. date of termination of employment or retirement from the Public Service.

By providing this information, Bidders agree that the successful Bidder's status, with respect to being a former public servant in receipt of a pension, will be reported on departmental websites as part of the published proactive disclosure reports in accordance with [Contracting Policy Notice: 2012-2](#) and the [Guidelines on the Proactive Disclosure of Contracts](#).

Work Force Adjustment Directive

Is the Bidder a FPS who received a lump sum payment pursuant to the terms of the Work Force Adjustment Directive? **Yes** () **No** ()

If so, the Bidder must provide the following information:

- a. name of former public servant;
- b. conditions of the lump sum payment incentive;
- c. date of termination of employment;
- d. amount of lump sum payment;
- e. rate of pay on which lump sum payment is based;
- f. period of lump sum payment including start date, end date and number of weeks;



- g. number and amount (professional fees) of other contracts subject to the restrictions of a work force adjustment program.

For all contracts awarded during the lump sum payment period, the total amount of fees that may be paid to a FPS who received a lump sum payment is \$5,000, including Applicable Taxes.

The following certification signed by the contractor or an authorized officer:

"I certify that I have examined the information provided above and that it is correct and complete"

Signature

Print Name of Signatory

2.4 Enquiries - Bid Solicitation

All enquiries must be submitted in writing to the Contracting Authority no later than 9 calendar days before the bid closing date. Enquiries received after that time may not be answered.

Bidders should reference as accurately as possible the numbered item of the bid solicitation to which the enquiry relates. Care should be taken by bidders to explain each question in sufficient detail in order to enable Canada to provide an accurate answer. Technical enquiries that are of a proprietary nature must be clearly marked "proprietary" at each relevant item. Items identified as "proprietary" will be treated as such except where Canada determines that the enquiry is not of a proprietary nature. Canada may edit the question(s) or may request that the Bidder do so, so that the proprietary nature of the question(s) is eliminated, and the enquiry can be answered to all bidders. Enquiries not submitted in a form that can be distributed to all bidders may not be answered by Canada.

2.5 Applicable Laws

Any resulting contract must be interpreted and governed, and the relations between the parties determined, by the laws in force **in the province or territory where the goods and/or services are to be rendered.**

Bidders may, at their discretion, substitute the applicable laws of a Canadian province or territory of their choice without affecting the validity of their bid, by deleting the name of the Canadian province or territory specified and inserting the name of the Canadian province or territory of their choice. If no change is made, it acknowledges that the applicable laws specified are acceptable to the bidders.



PART 3 - BID PREPARATION INSTRUCTIONS

3.1 Bid Preparation Instructions

Canada requests that bidders provide their bid in separately bound/saved sections as follows:

Section I: Technical Bid (one hard copies **OR** one soft copy in PDF format)

Section II: Financial Bid (one hard copies **OR** one soft copy in PDF format))

Section III: Certifications (one hard copies **OR** one soft copy in PDF format))

Please note that DFO prefers receipt of proposals in soft copy to the email address identified on page one of the solicitation. Emails must not exceed 8 MB (if over the limit Bidders are asked to send additional numbered emails)

If there is a discrepancy between the wording of the soft copy and the hard copy, the wording of the hard copy will have priority over the wording of the soft copy.

Prices must appear in the financial bid only. No prices must be indicated in any other section of the bid.

Canada requests that bidders follow the format instructions described below in the preparation of their bid:

- a) use 8.5 x 11 inch (216 mm x 279 mm) paper;
- b) use a numbering system that corresponds to the bid solicitation.

In April 2006, Canada issued a policy directing federal departments and agencies to take the necessary steps to incorporate environmental considerations into the procurement process [Policy on Green Procurement](http://www.tpsgc-pwgsc.gc.ca/ecologisation-greening/achats-procurement/politique-policy-eng.html) (<http://www.tpsgc-pwgsc.gc.ca/ecologisation-greening/achats-procurement/politique-policy-eng.html>). To assist Canada in reaching its objectives, bidders should:

1. use 8.5 x 11 inch (216 mm x 279 mm) paper containing fibre certified as originating from a sustainably-managed forest and containing minimum 30% recycled content; and
2. use an environmentally-preferable format including black and white printing instead of colour printing, printing double sided/duplex, using staples or clips instead of cerlox, duotangs or binders.

Section I: Technical Bid

In their technical bid, bidders should explain and demonstrate how they propose to meet the requirements and how they will carry out the Work.

Section II: Financial Bid

Bidders must submit their financial bid in accordance with the Basis of Payment. The total amount of Applicable Taxes must be shown separately.

Section III: Certifications

Bidders must submit the certifications required under Part 5.



PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION

4.1 Evaluation Procedures

- (a) Bids will be assessed in accordance with the entire requirement of the bid solicitation including the technical and financial evaluation criteria.
- (b) An evaluation team composed of representatives of Canada will evaluate the bids.

4.1.1 Technical Evaluation

4.1.1.1 Mandatory Technical Criteria

Bidders must meet all the mandatory requirements described below. This will be evaluated as either “Yes” or “No”. Proposals not receiving “Yes” for any mandatory requirement will not be considered further.

Mandatory Requirement	YES	NO	Proposal Page #
• Minimum of 10 years experience working with freshwater bivalves			
• Minimum of 5 years experience working with species at risk			
• Minimum of 2 years experience assessing feeding behavior of freshwater mussels			
• Laboratory facility capable of holding and maintaining live freshwater mussels			

In order to assess the **Mandatory Requirements**, all bids must be accompanied by:

- A resume and summary of relevant work experience by the principal investigator
- Description of laboratory facility to be used during the project

4.1.1.2 Point Rated Technical Criteria

Point Rated Requirements

A proposal with a score less than 70% as a whole will be considered non responsive.

Maximum available – 30 points: Pass Mark = 70%

Attention Bidders: Write beside each of the criteria the relevant page number(s) from your proposal which addresses the requirement identified in the criteria.

Laboratory facilities (30 points total, Pass = 21 points)	MAX POINTS (30)	EVALUATION GRID	PAGE #
<ul style="list-style-type: none"> • Long term holding conditions(including housing and feeding regime) <ul style="list-style-type: none"> - Flow through system - Ability to control temperature - A plan for feeding algae or shellfish diet 	15	(5) points for each of the identified holding conditions	



<ul style="list-style-type: none"> • Experimental apparatus - Experimental raceway or tanks - Flowcam - Method of keeping food in suspension 	15	(5) points for each of the identified experimental apparatus	
TOTAL POINTS: /30		PASSING SCORE ≥ 21	

4.1.2 Financial Evaluation

SACC Manual Clause [A0220T](#) (2014-06-26), Evaluation of Price

4.2 Basis of Selection

4.2.1 Basis of Selection - Highest Combined Rating of Technical Merit and Price

1. To be declared responsive, a bid must:
 - a. comply with all the requirements of the bid solicitation; and
 - b. meet all mandatory criteria; and
 - c. obtain the required minimum of 21 points overall for the technical evaluation criteria which are subject to point rating.
The rating is performed on a scale of 30 points.
2. Bids not meeting (choose "(a) or (b) or (c)") will be declared non-responsive.
3. The selection will be based on the highest responsive combined rating of technical merit and price. The ratio will be 70 % for the technical merit and 30 % for the price.
4. To establish the technical merit score, the overall technical score for each responsive bid will be determined as follows: total number of points obtained / maximum number of points available multiplied by the ratio of 70 %.
5. To establish the pricing score, each responsive bid will be prorated against the lowest evaluated price and the ratio of 30 %.
6. For each responsive bid, the technical merit score and the pricing score will be added to determine its combined rating.
7. Neither the responsive bid obtaining the highest technical score nor the one with the lowest evaluated price will necessarily be accepted. The responsive bid with the highest combined rating of technical merit and price will be recommended for award of a contract.



The table below illustrates an example where all three bids are responsive and the selection of the contractor is determined by a 60/40 ratio of technical merit and price, respectively. The total available points equals 135 and the lowest evaluated price is \$45,000 (45).

Basis of Selection - Highest Combined Rating Technical Merit (70%) and Price (30%)				
		Bidder 1	Bidder 2	Bidder 3
Overall Technical Score		115/135	89/135	92/135
Bid Evaluated Price		\$55,000.00	\$50,000.00	\$45,000.00
Calculations	Technical Merit Score	$115/135 \times 70 = 59.62$	$89/135 \times 70 = 46.15$	$92/135 \times 70 = 47.7$
	Pricing Score	$45/55 \times 30 = 25.55$	$45/50 \times 30 = 27$	$45/45 \times 30 = 30$
Combined Rating		85.17	73.15	77.7
Overall Rating		1st	3rd	2nd



PART 5 - CERTIFICATIONS

Bidders must provide the required certifications and associated information to be awarded a contract.

The certifications provided by bidders to Canada are subject to verification by Canada at all times. Canada will declare a bid non-responsive, or will declare a contractor in default in carrying out any of its obligations under the Contract, if any certification made by the Bidder is found to be untrue whether made knowingly or unknowingly, during the bid evaluation period or during the contract period.

The Contracting Authority will have the right to ask for additional information to verify the Bidder's certifications. Failure to comply and to cooperate with any request or requirement imposed by the Contracting Authority may render the bid non-responsive or constitute a default under the Contract.

5.1 Certifications Precedent to Contract Award

The certifications listed below should be completed and submitted with the bid, but may be submitted afterwards. If any of these required certifications is not completed and submitted as requested, the Contracting Authority will inform the Bidder of a time frame within which to provide the information. Failure to comply with the request of the Contracting Authority and to provide the certifications within the time frame provided will render the bid non-responsive.

5.1.2 Education and Experience

SACC Manual clause [A3010T](#) (2010-08-16) Education and Experience

5.2 Contractor's Representative

The Contractor's Representative for the Contract is:

Name: _____
 Title: _____
 Address: _____
 Telephone: _____
 Facsimile: _____
 E-mail: _____

5.2.1 Supplementary Contractor Information

Pursuant to paragraph 221 (1)(d) of the Income Tax Act, payments made by departments and agencies under applicable services contracts (including contracts involving a mix of goods and services) must be reported on a T4-A supplementary slip.

To enable the Department of Fisheries and Oceans to comply with this requirement, the Contractor hereby agrees to provide the following information which it certifies to be correct, complete, and fully discloses the identification of this Contractor:

- a)** The legal name of the entity or individual, as applicable (the name associated with the Social Insurance Number (SIN) or Business Number (BN), as well as the address and the postal code:

- b)** The status of the contractor (individual, unincorporated business, corporation or partnership:



c) For individuals and unincorporated businesses, the contractor's SIN and, if applicable, the BN, or if applicable, the Goods and Services Tax (GST)/Harmonized Sales Tax (HST) number:

d) For corporations, the BN, or if this is not available, the GST/HST number. If there is no BN or GST/HST number, the T2 Corporation Tax number must be shown:

Signature

Date



PART 6 - RESULTING CONTRACT CLAUSES

The following clauses and conditions apply to and form part of any contract resulting from the bid solicitation.

6.1 Security Requirements

There is no security requirement applicable to this Contract.

6.2 Statement of Work

The Contractor must perform the Work in accordance with the Statement of Work at Annex "A".

6.3 Standard Clauses and Conditions

All clauses and conditions identified in the Contract by number, date and title are set out in the [Standard Acquisition Clauses and Conditions Manual](https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual) (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>) issued by Public Works and Government Services Canada.

Revision to Departmental Name: As this contract is issued by Fisheries and Oceans Canada (DFO), any reference to Public Works and Government Services Canada or PWGSC or its Minister contained in any term, condition or clause of this contract, including any individual SACC clauses incorporated by reference, will be interpreted as reference to DFO or its Minister.

6.3.1 General Conditions

2010B (2015-09-03), General Conditions - Services (Medium Complexity) apply to and form part of the Contract.

Section 27 – Integrity Provisions – Contract of F5211-160270 referenced above is amended as follows:

Delete section 27 in its entirety.

6.4 Term of Contract

6.4.1 Period of the Contract

The Work is to be performed from the point of contract award to march 31st 2017.

6.5 Authorities

6.5.1 Contracting Authority

The Contracting Authority for the Contract is:

Name: Jean-Pierre deVink
Title: Procurement officer
Department: Fisheries and Oceans Canada
Directorate: Material and procurement services
Address: 301 Bishop drive
Fredericton, NB, E3C 2M6
Telephone: 506-452-3619
Facsimile: 506-452-3676



E-mail address: DFOtenders.XNAT@dfo-mpo.gc.ca

The Contracting Authority is responsible for the management of the Contract and any changes to the Contract must be authorized in writing by the Contracting Authority. The Contractor must not perform work in excess of or outside the scope of the Contract based on verbal or written requests or instructions from anybody other than the Contracting Authority.

6.5.2 Project Authority

The Project Authority for the Contract is: **(to be entered at contract award)**

Name: _____
 Title: _____
 Organization: _____
 Address: _____

Telephone : _____
 Facsimile: _____
 E-mail address: _____

The Project Authority is the representative of the department or agency for whom the Work is being carried out under the Contract and is responsible for all matters concerning the technical content of the Work under the Contract. Technical matters may be discussed with the Project Authority, however the Project Authority has no authority to authorize changes to the scope of the Work. Changes to the scope of the Work can only be made through a contract amendment issued by the Contracting Authority.

6.6 Proactive Disclosure of Contracts with Former Public Servants

By providing information on its status, with respect to being a former public servant in receipt of a [Public Service Superannuation Act](#) (PSSA) pension, the Contractor has agreed that this information will be reported on departmental websites as part of the published proactive disclosure reports, in accordance with [Contracting Policy Notice: 2012-2](#) of the Treasury Board Secretariat of Canada.

6.7 Payment

6.7.1 Basis of Payment

Canada will pay the Contractor upon completion and delivery of the Work in accordance with the payment provisions of the Contract if:

- a. an accurate and complete invoice and any other documents required by the Contract have been submitted in accordance with the invoicing instructions provided in the Contract;
- b. all such documents have been verified by Canada;
- c. the Work delivered has been accepted by Canada.

6.7.1.1 All prices and amounts of money in the Contract are exclusive of the Goods and Services Tax (GST) or Harmonized Sales Tax (HST), whichever is applicable, unless otherwise indicated. GST or HST, to the extent applicable, will be incorporated into all invoices and progress claims for goods supplied or work performed and will be paid by Her Majesty. The Contractor agrees to remit to Canada Revenue Agency any GST or HST paid or due.



6.7.1.2 Any payment by Her Majesty under this contract is subject to there being an appropriation for the fiscal year in which the payment is to be made.

6.7.2 Limitation of Price

SACC Manual clause [C6000C](#) (2011-05-16) Limitation of Price

6.8 Invoicing Instructions

6.8.1 Payments will be made provided that:

6.8.1.1 The invoice(s) must be emailed to DFO Accounts Payable, at the email address indicated below:

Email: DFOinvoicing-MPOfacturation@DFO-MPO.GC.CA

The Contractor must submit invoices in accordance with the section entitled "Invoice Submission" of the general conditions. Invoices cannot be submitted until all work identified in the invoice is completed.

6.9 Certifications

6.9.1 Compliance

The continuous compliance with the certifications provided by the Contractor in its bid and the ongoing cooperation in providing associated information are conditions of the Contract. Certifications are subject to verification by Canada during the entire period of the Contract. If the Contractor does not comply with any certification, fails to provide the associated information, or if it is determined that any certification made by the Contractor in its bid is untrue, whether made knowingly or unknowingly, Canada has the right, pursuant to the default provision of the Contract, to terminate the Contract for default.

6.10 Applicable Laws

The Contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in **the province or territory where the goods and/or services are to be rendered.**

6.11 Priority of Documents

If there is a discrepancy between the wording of any documents that appear on the list, the wording of the document that first appears on the list has priority over the wording of any document that subsequently appears on the list.

- (a) the Articles of Agreement;
- (b) the general conditions [2010B](#) (2015-09-03);
- (c) Annex A, Statement of Work;
- (d) Annex B, Terms of payment;
- (e) Annex C, Security SRCL;
- (f) Contractors bid dated:_____.

6.12 Procurement Ombudsman

6.12.1 The Contractor confirms that it has read the Code of Conduct for Procurement and agrees to be bound by its terms.



6.12.2 The office of the Procurement Ombudsman (OPO) was established by the Government of Canada to provide an independent avenue for suppliers to raise complaints regarding the award of contracts under \$25,000.00 for Goods and under \$100,000.00 for Services. You have the option of raising issues or concerns regarding the solicitation, or the award resulting from it, with the OPO by contacting them by telephone at 1-866-734-5169 or by e-mail at opo-boa@opo-boa.gc.ca. You can also obtain more information on OPO services available to you on their website at www.opo-boa.gc.ca.

6.12.3 For further information, the Contractor may refer to the following PWGSC site:

<http://www.tpsgc-pwgsc.gc.ca/app-acq/cndt-cndct/contexte-context-eng.html>

6.13 Insurance G1005C (2008-05-12)

The Contractor is responsible for deciding if insurance coverage is necessary to fulfill its obligation under the Contract and to ensure compliance with any applicable law. Any insurance acquired or maintained by the Contractor is at its own expense and for its own benefit and protection. It does not release the Contractor from or reduce its liability under the Contract.



ANNEX "A" STATEMENT OF WORK

1.1 Title

Investigating the role of food as a component of freshwater mussel species at risk habitat.

1.2 Background:

DFO is the responsible jurisdiction for management of aquatic Species at Risk (SAR) under Canada's *Species at Risk Act* (SARA). DFO's Great Lakes Laboratory for Fisheries and Aquatic Sciences has the lead on addressing important scientific gaps that have been identified in a Recovery Strategy for these species. Recovery strategies for freshwater mussels must identify critical habitat for SARA-listed species. The Ontario Freshwater Mussel Recovery Team has identified food resources as a potential limiting component of mussel habitat allowing co-existence of multiple species in diverse mussel beds.

Objectives of the Requirement

1.3 Objectives:

- 1.3.1 To evaluate the specific algal components of naturally occurring freshwater systems of southern Ontario.
- 1.3.2 To assess clearance rates of freshwater mussel species at risk under conditions of:
 - 1.3.2.1 Differing algal flux and,
 - 1.3.2.2 Differing algal community composition.

2.0 Requirements

2.1 Background, Assumptions and Specific Scope of the Requirement

An understanding of the dietary components of unionid mussels is needed to facilitate and recover their habitats. Examining the clearance rates (*CR*; amount of material removed from the water) as well as the potential for selective feeding rates of unionid mussels on specific algal taxa under natural conditions (i.e., flowing river water) would increase our knowledge of their habitat requirements. This is especially true for turbid rivers where the sources of phytoplankton are difficult to identify due to the high concentration of suspended solids. The manual identification and enumeration of water samples before and after suspension feeding is time consuming and expensive especially when using natural seston, which is composed of many species and abundances as well as detrital particles. This is why we are developing flow cytometry techniques along with associated analyses (i.e., morphometric [size, shape] and fluorescence interrogation and filing of 'known elements' in libraries; e.g., FlowCam;) as a method to measure the abundance and identity of algal species from water samples.

Recent results from our laboratory indicate such responses in 4 common unionid mussels using single algal species (e.g., *Chlorella* added to test chambers). The ability to measure the *CR* and feeding selection of unionid species at risk (SAR) mussels under natural flowing conditions using natural seston has provided us with an unprecedented opportunity to ascertain their "food" and learn more about their critical habitats. We have previously found that the *CR* of 3 SAR species increased with algal flux using natural seston, although the *CR* are not as great as was observed using water spiked with algae. Moreover, we have found that the algal biovolume in the Thames River is dominated by 2 phytoplankton taxa (9 in total) at Innerkip and 4 phytoplankton taxa (16 in total) at Plover Mills just 60 km away. Also, *CR* differ with seston flux and among phytoplankton species; *CR* increased with flux in the case of *Stephanodiscus* (a centric diatom), but declined for *Chloromonas* (a green alga). These results are intriguing and suggest a number of possibilities: (1) there may be important habitat differences in river systems that are defined by the



phytoplankton available; (2) if phytoplankton species indicative of eutrophic conditions are avoided yet dominate the biovolume, this may suggest possible mechanisms for species recovery (e.g., oligotrophication via nutrient reduction); (3) it may help to explain how diverse populations of unionids can inhabit extremely turbid rivers such as the Sydenham River in Southwestern Ontario, where suspended solids concentration can be high; and (4) it provides some interesting mechanisms to explain the co-existence of multispecies mussel beds through feeding-based niche separation.

2.2 Tasks/Activities:

- 2.2.1 Field investigations to determine the algal components of naturally occurring freshwaters in Southern Ontario.
- 2.2.2 Laboratory experiments on adult and/or juvenile freshwater mussels (including common and species at risk) to assess feeding rates under conditions of varying flux and species composition.

2.3 Deliverables:

The deliverables include electronic reports in MS Word Document format. Figures may be provided in an alternate, more appropriate format. All relevant raw data will also be submitted to the Project Authority, in an electronic format deemed appropriate by the Contractor and Project Authority.

- 2.3.1 Final report on the algal composition of naturally occurring freshwaters in southern Ontario.
- 2.3.2 Final report on the feeding rates of common and species at risk freshwater mussels under varying flux conditions and algal compositions.

2.4 Ownership of Intellectual Property

The Department of Fisheries and Oceans has determined that any intellectual property arising from the performance of the Work under the contract will belong to the contractor.

3.0 Other Terms and Conditions of the SOW

3.1 Location of Work:

All work will be completed at the contractor's facility.

3.2 Security Requirements

Access to government facilities and equipment will not be required.

3.3 Insurance Requirements

The Contractor must maintain adequate insurance coverage for the duration of any and all contract work. Compliance with Insurance requirements does not release the Contractor from or reduce its liability under the standing offer nor any related contracts.

The Contractor is responsible for deciding if additional insurance coverage is necessary to fulfill its obligation and to ensure compliance with any applicable law. Any additional insurance coverage is at the Contractor's discretion and expense, and for its own benefit and protection.



3.4 Technical, Operational and Organizational Environment

There are no technical, operational or organizational issues as all work will be completed at the contractor's facility.

3.5 Method and Source of Acceptance

The Project Authority will review the raw data and final report to ensure that it is deemed acceptable.

3.6 Project Management Control Procedures

Progress meetings may occur at the request of the Project Authority or the Contractor. Payment shall be made once the raw data and final report have been provided to the Project Authority and are deemed of acceptable quality by the Project Authority.

3.7 Change Management Procedures

If necessary, change of management procedures will occur through discussions between the Project Authority and the Contractor. However, such changes are not expected considering the breadth of the contract.

DFO Obligations

There are no additional DFO obligations as all work will occur offsite at the contractor's facility. The Contractor will not need access to DFO facilities or departmental assets.

Contractor's Obligations

There are no additional contractor obligations as there are no additional items of equipment or furnishings are required to complete this contract.

3.8 Language of Work

All work will be conducted in English.

4.1 Schedule and Estimated Level of Effort

Results of both field collections and laboratory experiments shall be provided in a final report. Raw data and final report are due to the Project Authority by March 31, 2017 marking the completion of the contract.



ANNEX "B" BASIS OF PAYMENT

BASIS OF PAYMENT:	
Fixed price for the work described in Annex "A" Statement of work:	_____ \$
Applicable taxes :	_____ \$
Total cost :	_____ \$