



<p><b>RETURN BIDS TO:</b> <b>RETOURNER LES SOUMISSIONS À:</b></p> <p><b>Bid Receiving - Environment Canada / Réception des soumissions – Environnement Canada</b></p> <p><b>Electronic Copy:</b> <a href="http://ec.soumissions-bids.ec@canada.ca">ec.soumissions-bids.ec@canada.ca</a></p> <p><b>BID SOLICITATION</b> <b>DEMANDE DE SOUMISSIONS</b></p> <p><b>PROPOSAL TO: ENVIRONMENT CANADA</b></p> <p>We offer to perform or provide to Canada the services detailed in the document including any attachments and annexes, in accordance with the terms and conditions set out or referred to in the document, at the price(s) provided.</p> <p><b>SOUSSION À:</b> <b>ENVIRONNEMENT CANADA</b></p> <p>Nous offrons d'effectuer ou de fournir au Canada, aux conditions énoncées ou incluses par référence dans le document incluant toutes pièces jointes et annexes, les services détaillés dans le document, au(x) prix indiqué(s).</p>	<p><b>Title – Titre</b> Monitoring to Address the Response of Turtles and Snakes to the Outcomes of <i>Phragmites Australis</i> Management at the Big Creek and Long Point National Wildlife Areas</p>		
	<p><b>EC Bid Solicitation No. /SAP No. – N° de la demande de soumissions EC / N° SAP</b> 5000055907</p>		
	<p><b>Date of Bid solicitation (YYYY-MM-DD) – Date de la demande de soumissions (AAAA-MM-JJ)</b> 2021-03-22</p>		
	<p><b>Bid Solicitation Closes (YEAR-MM-DD) - La demande de soumissions prend fin (AAAA-MM-JJ)</b>  at – à 3:00 P.M. on – le 2021-04-16</p>	<p><b>Time Zone – Fuseau horaire</b>  Eastern Daylight Time</p>	
	<p><b>F.O.B – F.A.B</b></p>		
	<p><b>Address Enquiries to - Adresser toutes questions à</b> Heidi Noble <a href="mailto:heidi.noble@canada.ca">heidi.noble@canada.ca</a></p>		
	<p><b>Telephone No. – N° de téléphone</b> 905-319-6982</p>	<p><b>Fax No. – N° de Fax</b></p>	
	<p><b>Delivery Required (YEAR-MM-DD) – Livraison exigée (AAAA-MM-JJ)</b> 2023-03-31</p>		
	<p><b>Destination - of Services / Destination des services</b> Ontario, Canada</p>		
	<p><b>Security / Sécurité</b> There is no security requirement associated with this requirement.</p>		
<p><b>Vendor/Firm Name and Address - Raison sociale et adresse du fournisseur/de l'entrepreneur</b></p>			
<p><b>Telephone No. – N° de téléphone</b></p>	<p><b>Fax No. – N° de Fax</b></p>		
<p><b>Name and title of person authorized to sign on behalf of Vendor/Firm: (type or print) / Nom et titre de la personne autorisée à signer au nom du fournisseur/de l'entrepreneur (taper ou écrire en caractères d'imprimerie)</b></p>			
<p><b>Signature</b></p>	<p><b>Date</b></p>		

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**PART 1 – GENERAL INFORMATION**

**1. Security Requirement**

1.1 There is no security requirement associated with this requirement.

**2. Statement of Work**

The Work to be performed is detailed under Annex A, Statement of Work of the resulting contract.

**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 of receipt of the results of the bid solicitation process. The debriefing may be in writing, by telephone or in person.

## PART 2 – BIDDER INSTRUCTIONS

### 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 PWGSC *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.

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 (2020-05-28) Standard Instructions - Goods or Services - Competitive Requirements, are incorporated by reference into and form part of the bid solicitation.

The standard instructions 2003 are modified as follows:

**Under “Text” at 02:**

**Delete:** “Procurement Business Number”

**Insert:** “Deleted”

**At Section 02 Procurement Business Number**

**Delete:** In its entirety

**Insert:** “Deleted”

**At Section 05 Submission of Bids, Subsection 05 (2d):**

**Delete:** In its entirety

**Insert:** “send its bid only to Environment Canada (EC) as specified on page 1 of the bid solicitation or to the address specified in the bid solicitation;”

**At Section 06 Late Bids:**

**Delete:** “PWGSC”

**Insert:** “Environment Canada”

**At Section 07 Delayed Bids:**

**Delete:** “PWGSC”

**Insert:** “Environment Canada”

**At Section 08 Transmission by Facsimile, Subsection 08 (1):**

**Delete:** In its entirety

**Insert:** “Bids may be submitted by facsimile if specified in the bid solicitation.”

**At Section 12 Rejection of Bid, Subsection 12 (1) a. and b.:**

**Delete:** In their entirety

**Insert:** “Deleted”

**At Section 17 Joint Venture, Subsection 17 (1) b.:**

**Delete:** “the Procurement Business Number of each member of the joint venture,”

**Insert:** “Deleted”

**At Section 20 Further Information, Subsection 20 (2):**

**Delete:** In its entirety

**Insert:** “Deleted”

**At Section 05 Submission of Bids, Subsection 05 (4)**

**Delete:** “sixty (60) days”

**Insert:** “one hundred and twenty (120) days”

### 2. Submission of Bids

- 2.1 Bids must be submitted to Environment Canada (EC) at the address and by the date, time and place indicated on page 1 of the bid solicitation.

### 3. Former Public Servant – Competitive Bid

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 FPS, 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 FPS 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.

**4. Enquiries - Bid Solicitation**

All enquiries must be submitted in writing to the Contracting Authority no later than seven (7) 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.

**5. Applicable Laws**

Any resulting contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in Ontario.

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**

### **1. Bid Preparation Instructions**

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

Section I: Technical Bid (1 electronic copy)

Section II: Financial Bid (1 electronic copy)

Section III: Certifications (1 electronic 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.

#### **Note for electronic submission of bids:**

In order to be considered, bids must be received no later than 1500h (3 p.m.) (Eastern Daylight Time) on the date and time indicated on the cover page to herein as the “Closing Date.” Bids received after the Closing Date will be considered non-responsive and will not be considered for contract award. Bids submitted by email must be submitted ONLY to the following email address:

Email Address: [ec.soumissions-bids.ec@canada.ca](mailto:ec.soumissions-bids.ec@canada.ca)

Attention: Heidi Noble

Solicitation Number: 5000055907

Bidders should ensure that their name, address, Closing Date of the solicitation and Solicitation Number are clearly indicated in the body of their email. Bids and supporting information may be submitted in either English or French.

The total size of the email, including all attachments, must be less than 15 megabytes (MB). It is each Bidder's responsibility to ensure that the total size of the email does not exceed this limit.

Bids sent by fax will not be accepted.

It is important to note that emails systems can experience systematic delays and, at times, large attachments may cause systems to hold or delay transmission of emails. It is solely the Bidder's responsibility to ensure that the Contracting Authority receives a bid on time, in the mailbox that has been identified for bid receipt purposes. Date stamps for this form of transmission are not acceptable.

#### **Section I: Technical Bid**

In their technical bid, bidders should demonstrate their understanding of the requirements contained in the bid solicitation and explain how they will carry out the Work

#### **Section II: Financial Bid**

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

##### **1.1 Price Breakdown**

In their financial bid, the bidders are requested to provide a detailed breakdown of the price for the following elements for each task of the Work, as applicable:

- (a) Professional fees (if applicable): For each individual and (or) labour category to be assigned to the Work, the bidders should indicate: i) the firm hourly rate or the firm daily rate, inclusive of overhead

and profit; and ii) the estimated number of hours or days, as applicable. The bidders should indicate the number of hours in one working day.

The professional fees must include the total estimated cost of all travel and living expenses that may need to be incurred for:

- (i) Work described in Part 6, Resulting Contract of the bid solicitation required to be performed within Ontario;
  - (ii) travel between the successful bidder's place of business and Ontario; and
  - (iii) the relocation of resources.
- (b) Equipment (if applicable): The bidders should specify each item required to complete the Work and provide the pricing basis of each one, Canadian customs duty and excise taxes included, as applicable.
- (c) Materials and Supplies (if applicable): The bidders should identify each category of materials and supplies required to complete the Work and provide the pricing basis. The Bidder should indicate, on a per category basis, whether the items are likely to be consumed during the performance of any resulting contract.
- (d) Travel and Living Expenses (if applicable): The bidders should indicate the number of trips and the number of days for each trip, the cost, destination and purpose of each journey, together with the basis of these costs without exceeding the meal, private vehicle and incidental expenses provided in Appendices B, C and D of the *National Joint Council Travel Directive* and with the other provisions of the directive referring to "travellers", rather than those referring to "employees".
- (e) Subcontracts (if applicable): The bidders should identify all of the proposed subcontractors and provide in their financial bid for each one a price breakdown.
- (f) Other Direct Charges (if applicable): The bidders should identify all of the categories of other direct charges anticipated, such as long distance communications and rentals, providing the pricing basis for each and explaining the relevance to the work described in the resultant contract in part 6 of the bid solicitation.
- (g) Applicable Taxes: The bidders should indicate the Applicable Taxes separately.

**1.2** Bidders should include the following information in their financial bid:

- (a) Their legal name; and
- (b) The name of the contact person (including this person's mailing address, phone and facsimile numbers and email address) authorized by the Bidder to enter into communications with Canada with regards to their bid; and any contract that may result from their bid.

### **Section III - Certifications**

#### **1. Certifications Required Precedent to Contract Award**

Bidders must provide the required certifications Part 5.



**PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION**

**1. Evaluation Procedures**

Bids will be assessed in accordance with the entire requirement of the bid solicitation including the technical and financial evaluation criteria.

An evaluation team composed of representatives of Canada will evaluate the bids.

**1.1 Technical Evaluation**

Except where expressly provided otherwise, the experience described in the bid must be the experience of the Bidder itself (which includes the experience of any companies that formed the Bidder by way of a merger but does not include any experience acquired through a purchase of assets or an assignment of contract). The experience of the Bidder's affiliates (i.e. parent, subsidiary or sister corporations), subcontractors, or suppliers will not be considered.

**1.1.1 Mandatory Technical Criteria – Refer to Attachment 1 to Part 4**

Mandatory criteria are assessed on a simple pass/fail basis. Bids that fail to meet any of the mandatory criteria will be considered non-responsive.

**1.1.2 Point Rated Technical Criteria – Refer to Attachment 1 to Part 4**

A proposal must obtain the required minimum score of 110 points in the technical evaluation criteria to be considered responsive.

**1.2 Financial Evaluation**

**1.2.1 Mandatory Financial Criteria**

Bids which fail to meet the Mandatory Financial Criteria will be declared non-responsive.

Number	Criterion	Met/Not Met	Page Number
MF1	The maximum budget allocated for this project must not exceed Initial Contract Period - Contract Award to March 31, 2023 - \$190,000.00 Option Period One – April 1, 2023 – March 31, 2024 - \$95,000.00 applicable taxes extra, including all option periods, labour, associated costs and subcontractors. Bids valued in excess of this amount will be considered non-responsive. This disclosure of project funds does not commit Environment and Climate Change to pay such an amount.		

**1.3 Evaluation of Price**

The price of the bid will be evaluated in Canadian dollars including any option periods, the Applicable Taxes excluded, Canadian customs and excise taxes included.

For evaluation purposes only, the price of the bid will be determined as follows:

Proposals will be evaluated out of 30 points

The proposal with the lowest price receives the maximum 30 points, and all higher priced proposals will be pro-rated relative to the lowest price

**2. Basis of Selection**

**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;
  - (b) meet all mandatory technical criteria and mandatory financial criteria; and
  - (c) obtain the required minimum score of 110points in the technical evaluation criteria.
2. Bids not meeting (a) or (b) or (c) will be declared non-responsive.
3. The evaluation 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 70/30 ratio of technical merit and price, respectively. The total available points equals 100 and the lowest evaluated price is \$55,000.00.

Basis of Selection - Highest Combined Rating Technical Merit (70%) and Price (30%)

<u>Bidder</u>	Bidder 1	Bidder 2	Bidder 3
Overall Technical Score	90/100	70/100	80/100
Bid Evaluated Price	\$75,000.00	\$55,000.00	\$65,000.00
<u>Calculations</u>			
Technical Merit Score	$90/100 \times 70 = 63$	$70/100 \times 70 = 49$	$80/100 \times 70 = 56$
Pricing Score	$55/75 \times 30 = 22$	$55/55 \times 30 = 30$	$55/65 \times 30 = 25$
Combined Rating	85	79	81
Overall Rating	1 <sup>st</sup>	3 <sup>rd</sup>	2 <sup>nd</sup>

**ATTACHMENT 1 TO PART 4**

**MANDATORY TECHNICAL CRITERIA AND POINT RATED TECHNICAL CRITERIA**

**MANDATORY TECHNICAL CRITERIA:**

Mandatory Technical Criteria		
Evaluation Criteria	Indicate Yes/No	Cross Reference to Proposal
M1: The Bidder must demonstrate that it has led 2 projects within the past 5 years conducting Species at Risk (SAR) turtle visual encounter surveys, mark-recapture and shell-notching in southern Ontario by providing a brief description of the projects completed.		
M2: The Bidder must demonstrate that it has led 2 projects using a Before-After-Control-Impact (BACI) design, by providing a brief description of the projects completed.		
M3: The Bidder must demonstrate that it has led 2 projects within the past 5 years conducting snake visual encounter surveys in southern Ontario, by providing a brief description of the projects completed.		
M4: The Bidder must demonstrate that it has led 1 project within the past 5 years conducting radio-telemetry with turtles, including affixing radio tags to individuals, by providing a brief description of the project(s) completed.		
M5: The Bidder must propose a minimum of two resources to complete the Work outlined in Annex A.		
M6: The Bidder must demonstrate that its Proposed Resources, as a collective, has completed 2 projects within the past 5 years conducting turtle visual encounter surveys, mark-recapture and shell-notching in southern Ontario, by providing a brief description of the projects completed.		
M7: The Bidder must demonstrate that its Proposed Resources, as a collective, has completed 2 projects using a BACI design, by providing a brief description of the projects completed.		
M8: The Bidder must demonstrate that its Proposed Resources, as a collective, has completed 2 projects within the past 5 years conducting snake visual encounter surveys in southern Ontario, by providing a brief description of the projects completed.		

**POINT RATED TECHNICAL CRITERIA:**

Point Rated Technical Criteria			
Evaluation Criteria	Maximum Score	Score	Cross Reference to Proposal
<p><b>Expertise of the Bidder, with brief CV or Statement of Qualifications provided</b></p> <p>R1. Bidder's scope of corporate experience related to scientific study design and associated field work components</p> <ul style="list-style-type: none"> <li>• &gt;5 years - 5 points</li> <li>• 2-5 years - 2.5 points</li> <li>• &lt;2 years or not demonstrated - 0 point</li> </ul> <p>R2. Bidder's scope of corporate experience related to set-up and execution of visual encounter and mark-recapture surveys</p> <ul style="list-style-type: none"> <li>• &gt;5 years – 10 points</li> <li>• &gt;2-5 years – 5 points</li> <li>• 1-2 years – 2.5 points</li> <li>• &lt;1 year or not demonstrated – 0 point</li> </ul> <p>R3. Bidder's scope of corporate experience in turtle monitoring, collection of basic biometric data (e.g. weight, measurements, sexing), and shell notching.</p> <ul style="list-style-type: none"> <li>• &gt;5 years – 10 points</li> <li>• &gt;2-5 years – 5 points</li> <li>• 1-2 years – 2.5 points</li> <li>• &lt;1 year or not demonstrated – 0 point</li> </ul> <p>R4. Bidder's scope of corporate experience in conducting radio-telemetry studies with turtles, including affixing radio tags and using the equipment outlined in Section 3.7.2.2 of Annex A.</p> <ul style="list-style-type: none"> <li>• &gt;5 years – 10 points</li> <li>• &gt;2-5 years – 5 points</li> <li>• 1-2 years – 2.5 points</li> <li>• &lt;1 year or not demonstrated – 0 point</li> </ul> <p>R1. – R4. Where “year” is defined as a season of fieldwork that lasts between 2-12 months. “Years” cannot be overlapping (i.e. 2 projects co-occurring do not count as 2 years). Only experience within the past 10 years will be considered.</p> <p style="text-align: right;"><b>Sub-total:</b></p>	<p>5</p> <p>10</p> <p>10</p> <p>10</p> <p><b>/35</b></p>		
<p><b>Experience of the Proposed Resources, with brief CV provided</b></p> <p>R5. The Proposed Resources assigned to do the Work, with brief CVs provided, collectively demonstrate experience in:</p> <p>a. Performing visual search surveys for turtles and snakes</p> <ul style="list-style-type: none"> <li>• The project team has a combined &gt;200 hours of search experience - 5 points</li> <li>• the project team has a combined 100-200 hours</li> </ul>	<p>5</p>		

<p>of search experience - 3 points</p> <ul style="list-style-type: none"> <li>the project team has a combined 1-99 hours of search experience, or no experience or none provided - 0 point</li> </ul> <p>b. Performing Visual Encounter and Mark-Recapture Surveys</p> <ul style="list-style-type: none"> <li>More than one individual of the project team has experience - 5 points</li> </ul> <p>c. Collecting basic biometric data of turtles (including weight, measurements, sexing) and notching shells</p> <ul style="list-style-type: none"> <li>More than one individual of the project team has experience - 5 points</li> <li>one individual of the project team has experience - 2.5 points</li> <li>no experience or none provided 0 point</li> </ul> <p>d. Conducting radio-telemetry studies with turtles, including affixing trackers and using the equipment outlined in Section 3.7.2.2 of Annex A.</p> <ul style="list-style-type: none"> <li>More than one individual of the project team has experience - 5 points</li> <li>one individual of the project team has experience - 2.5 points</li> <li>no experience or none provided 0 point</li> </ul> <p>e. Performing quality assurance and control processes when collecting data</p> <ul style="list-style-type: none"> <li>More than one individual of the project team has experience - 5 points</li> <li>one individual of the project team has experience - 2.5 points</li> <li>no experience or none provided - 0 point</li> </ul> <p>R5 b -e Where “experience” is defined as having previously assisted in at least two projects with the outlined requirement.</p> <p style="text-align: right;"><b>Sub-total:</b></p>	<p>5</p> <p>5</p> <p>5</p> <p>5</p> <p>5</p> <p><b>/25</b></p>		
<p><b>Experience of the Bidder and Proposed Resources working with SAR</b></p> <p>R6. The Bidder and Proposed Resources collectively demonstrate experience identifying SAR within Southwestern Ontario</p> <ul style="list-style-type: none"> <li>More than two individuals on the project team has experience - 5 points</li> <li>One or two individuals of the project team has experience - 2.5 points</li> <li>No experience or none provided - 0 point</li> </ul> <p>R7. The Bidder Proposed Resources collectively demonstrate</p>	<p>5</p>		

<p>experience working with SAR turtles and snakes, including incorporating mitigation measures to prevent harm to individuals and/or residences</p> <p>a) <u>SAR turtles</u></p> <ul style="list-style-type: none"> <li>• More than one individual on the project team has experience working with SAR turtles incorporating mitigation measures to prevent harm - 5 points</li> <li>• One individual on the project team has experience working with SAR turtles incorporating mitigation measured to prevent harm - 2.5 points</li> <li>• No experience or none provided - 0 point</li> </ul> <p>b) <u>SAR snakes</u></p> <ul style="list-style-type: none"> <li>• More than one individual on the project team has experience working with SAR snakes, incorporating mitigation measures to prevent harm - 5 points</li> <li>• One individual on the project team has experience working with SAR turtles and one individual has experience working with SAR snakes, incorporating mitigation measured to prevent harm - 2.5 points</li> <li>• No experience or none provided - 0 point</li> </ul> <p>R8. The Proposed Resources collectively demonstrate experience detecting SAR turtles found in Ontario and listed as endangered or threatened on the Species at Risk Public Registry (<a href="https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html">https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html</a>).</p> <ul style="list-style-type: none"> <li>• The Proposed Resources collectively demonstrate experience detecting all SAR turtles found in Ontario and listed as endangered or threatened on the Species at Risk Public Registry - 5 points</li> <li>• The Proposed Resources collectively demonstrate experience detecting some SAR turtles listed as endangered or threatened on the Species at Risk Public Registry -3 points</li> <li>• The Proposed Resources collectively demonstrate experience detecting none of the SAR turtles listed as endangered or threatened on the Species at Risk Public Registry - 0 point</li> </ul> <p>R6. – R8. Where “experience” is defined as having previously participated in at least two projects with the outlined requirement.</p> <p style="text-align: right;"><b>Sub-total:</b></p>	<p>5</p> <p>5</p> <p>5</p> <p><b>/20</b></p>		
<p><b>Experience of the Bidder and Proposed Resources working within wetlands and/or the Long Point and Big Creek National Wildlife Areas</b></p> <p>R9. The Bidder’s Proposed Resources collectively demonstrate experience conducting Visual Encounter Surveys in wetland environments</p> <ul style="list-style-type: none"> <li>• More than one individual on the project team has experience conducting Visual Encounter Surveys in wetlands - 10 points</li> <li>• Only one individual on the project team has experience conducting Visual Encounter Surveys in wetlands - 5</li> </ul>	<p>10</p>		

<p>points</p> <ul style="list-style-type: none"> <li>No experience or none provided - 0 point</li> </ul> <p>R10. The Bidder's Proposed Resources collectively demonstrate experience conducting ecological surveys within the Long Point Region</p> <ul style="list-style-type: none"> <li>More than one individual on the project team has experience conducting ecological surveys within the Long Point Region - 5 points</li> <li>Only one individual on the project team has experience conducting ecological surveys within the Long Point Region - 2.5 points</li> <li>No experience or none provided - 0 point</li> </ul> <p>R.9. – R.10. Where “experience” is defined as having previously participated in at least one project with the outlined requirement.</p> <p style="text-align: right;"><b>Sub-total:</b></p>	5		
<b>Sub-total:</b>		<b>/15</b>	
<p><b>Proposed Survey Design for Big Creek Unit and Squire's Ridge – Attachment 2 to Part 4</b></p> <p>Using the Proposed Survey Design Template provided in Attachment 2 to Part 4, the Bidder should demonstrate the following:</p> <p>R11: General Approach</p> <ul style="list-style-type: none"> <li>The proposed approach (2A) is reflective of the protocol used in 2019 and outlined in Appendix 2 to Annex A, and includes: <ul style="list-style-type: none"> <li>A comprehensive BACI design - 5 points the study design includes a BACI design but is not comprehensive - 2 points the study design does not include a BACI design insufficient information provided - 0 point</li> <li>Visual Encounter Surveys and Mark-Recapture conducted over 3 or more months - 5 points Visual Encounter Surveys conducted over 2 months - 2.5 points Visual Encounter Surveys conducted over &lt;2 months insufficient information provided - 0 point</li> <li>Radio-telemetry conducted over 6 or more months - 5 points Radio-telemetry conducted over 3-5 months - 2.5 points Radio-telemetry conducted over &lt;3 months insufficient information provided - 0 point</li> <li>Treatment, control and reference sites are &gt;6 ha in size - 5 points treatment, control and/or reference sites are 3-6 ha in size - 3 points treatment, control and/or reference sites are &lt;3</li> </ul> </li> </ul>	5		

<p>ha in size - 1 point insufficient information provided - 0 point</p> <ul style="list-style-type: none"> <li>○ Surveys of 5 or more treatment, 5 or more control and 5 or more reference sites in each area - 5 points</li> <li>○ surveys of 3-4 treatment, 3-4 control and/or 3-4 reference sites in each area - 3 points</li> <li>○ surveys of less than 3 treatment, 3 control and/or 3 reference sites in each area - 1 point</li> <li>○ insufficient information provided - 0 point</li> </ul> <p>R12: Survey Effort</p> <ul style="list-style-type: none"> <li>• 3A. Visual Encounter and Mark-Recapture Surveys <ul style="list-style-type: none"> <li>○ The Bidder has proposed &gt;2 surveys per month at each site in each area - 10 points</li> <li>○ the Bidder has proposed 1-2 surveys per month at each site in each area - 5 points</li> <li>○ the Bidder has proposed &lt;1 survey per month at each site in each area - 0 point</li> </ul> </li> <li>• 3B: Radio-Telemetry <ul style="list-style-type: none"> <li>○ The Bidder has proposed to tag and track &gt;20 turtles - 10 points</li> <li>○ the Bidder has proposed to tag and track 10-20 turtles - 7 points</li> <li>○ the Bidder has proposed to tag and track 5-10 turtles - 4 points</li> <li>○ the Bidder has proposed to tag and track &lt;5 turtles - 1 point</li> <li>○ insufficient information provided - 0 point</li> <li>○ The Bidder has proposed to conduct on-site tracking &gt;3 times per month - 5 points</li> <li>○ the Bidder has proposed to conduct on-site tracking 2-3 times per month - 3 points</li> <li>○ the Bidder has proposed to conduct on-site tracking &lt;2 times per month - 1 point</li> <li>○ insufficient information provided - 0 point</li> <li>○ The Bidder has proposed to track each tagged turtle a minimum of 3 times per month - 10 points</li> <li>○ the Bidder has proposed to track each tagged turtle a minimum of 2 times per month - 6 points</li> <li>○ the Bidder has proposed to track each tagged turtle a minimum of 1 time per month - 3 points</li> <li>○ insufficient information provided - 0 point</li> </ul> </li> </ul> <p style="text-align: right;"><b>Sub-total:</b></p>	<p>5</p> <p>10</p> <p>10</p> <p>5</p> <p>10</p> <p><b>/60</b></p>		
<b>TOTAL SCORE:</b>			
		<b>/155</b>	



**ATTACHMENT 2 TO PART 4**

**PROPOSED SURVEY DESIGN TEMPLATE**

The following table will be evaluated using R11 and R12 of the evaluation criteria.

- This proposal is only for work to be conducted within the Big Creek Unit and Squire’s Ridge locations. Surveys at Brown’s Marsh and Long Pond will be conducted using the pre-established 2019 survey design outlined in Appendix 2 to Annex A.
- When completing Section 3 (Survey Effort), only outline the proposed effort for 1 year of surveys. This effort will be duplicated in 2022.
- The Contractor must perform the Work proposed in the template; after contract award, any changes to the minimum proposed work must be approved by the Technical Authority.

<b>1. Objective</b>	
<b>2. General Approach</b>	
A. Study Design	
i. Brief description of study design	
ii. Brief description of survey method	
B. Timeline	
i. Monitoring window(s)	
ii. Weather contingencies	
C. Survey Locations	
i. Description of the approach to site selection (i.e. which habitat types will be targeted)	
ii. Minimum size and number of paired treatment, control and reference sites to be surveyed at each location. All sites must be in consistent in size.	
<i>Note: specific site locations shall be delineated and submitted with the Draft Monitoring Plan, following contract award.</i>	
<b>3. Survey Effort</b>	
A. Visual Encounter and Mark-Recapture Surveys	
i. Minimum number of site visits per month	
ii. Minimum number of person hours per site visit	
B. Radio-Telemetry	
i. Minimum number of turtles to be tagged and tracked over the course of the project (include both years of work)	
ii. Minimum number of tracking events per month	
iii. Minimum number times each turtle will be tracked	

## **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.

### **1. Certifications Required Precedent to Contract Award**

#### **1.1 Integrity Provisions - Associated Information**

By submitting a bid, the Bidder certifies that the Bidder and its Affiliates are in compliance with the provisions as stated in Section 01 Integrity Provisions - Bid of Standard Instructions 2003. The associated information required within the Integrity Provisions will assist Canada in confirming that the certifications are true.

#### **1.2 Federal Contractors Program for Employment Equity - Bid Certification**

By submitting a bid, the Bidder certifies that the Bidder, and any of the Bidder's members if the Bidder is a Joint Venture, is not named on the Federal Contractors Program (FCP) for employment equity "FCP Limited Eligibility to Bid" list ([http://www.labour.gc.ca/eng/standards\\_equity/eq/emp/fcp/list/inelig.shtml](http://www.labour.gc.ca/eng/standards_equity/eq/emp/fcp/list/inelig.shtml)) available from Employment and Social Development Canada (ESDC) - Labour's website.

Canada will have the right to declare a bid non-responsive if the Bidder, or any member of the Bidder if the Bidder is a Joint Venture, appears on the "FCP Limited Eligibility to Bid" list at the time of contract award.

### **2. Additional Certifications Required 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.

#### **2.1 Status and Availability of Resources**

The Bidder certifies that, should it be awarded a contract as a result of the bid solicitation, every individual proposed in its bid will be available to perform the Work as required by Canada's representatives and at the time specified in the bid solicitation or agreed to with Canada's representatives. If for reasons beyond its control, the Bidder is unable to provide the services of an individual named in its bid, the Bidder may propose a substitute with similar qualifications and experience. The Bidder must advise the Contracting Authority of the reason for the substitution and provide the name, qualifications and experience of the proposed replacement. For the purposes of this clause, only the following reasons will be considered as beyond the control of the Bidder: death, sickness, maternity and parental leave, retirement, resignation, dismissal for cause or termination of an agreement for default.

If the Bidder has proposed any individual who is not an employee of the Bidder, the Bidder certifies that it has the permission from that individual to propose his/her services in relation to the Work to be

performed and to submit his/her résumé to Canada. The Bidder must, upon request from the Contracting Authority, provide a written confirmation, signed by the individual, of the permission given to the Bidder and of his/her availability. Failure to comply with the request may result in the bid being declared non-responsive.

**2.2 Education and Experience**

*SACC Manual* clause A3010T (2010-08-16) Education and Experience

**PART 6 - RESULTING CONTRACT** *(at contract award, delete this line)*

The following clauses and conditions apply to and form part of any contract resulting from the bid solicitation *(at contract award, delete this sentence and insert the title)*.

**Title:** *(insert title at contract award)*

**1. Security Requirement**

1.1 There is no security requirement applicable to this Contract.

**2. Statement of Work**

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

**3. Standard Clauses and Conditions**

All clauses and conditions identified in the Contract by number, date and title are set out in the PWGSC *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.

**3.1 General Conditions**

2010B (2020-05-28) General Conditions - Professional Services (Medium Complexity), as modified below, apply to and form part of the Contract.

General conditions 2010B is modified as follows:

**At Section 12 Transportation Costs**

**Delete:** In its entirety

**Insert:** "Deleted"

**At Section 13 Transportation Carriers" Liability**

**Delete:** In its entirety.

**Insert:** "Deleted"

**Insert Subsection: "36 Liability"**

"The Contractor is liable for any damage caused by the Contractor, its employees, subcontractors, or agents to Canada or any third party. Canada is liable for any damage caused by Canada, its employees or agents to the Contractor or any third party. The Parties agree that no limitation of liability or indemnity provision applies to the Contract unless it is specifically incorporated in full text in the Articles of Agreement. Damage includes any injury to persons (including injury resulting in death) or loss of or damage to property (including real property) caused as a result of or during the performance of the Contract."

**A. For professional services requirements where the deliverables are copyrightable works:**

**Contractor to own Intellectual Property (IP) rights in Copyright**

**At Section 19 Copyright**

**Delete:** In its entirety

**Insert:**

"1. In this section:

"Material" means anything that is created or developed by the Contractor as part of the Work under the Contract, and in which copyright subsists.

"Background Information" means all Intellectual Property that is not Foreground Information that is incorporated into the Work or necessary for the performance of the Work and that is proprietary to or the confidential information of the Contractor, its subcontractors or any other third party;

"Foreground Information" means all Intellectual Property first conceived, developed, produced or reduced to practice as part of the Work under the Contract;

2. Material that is created or developed by the Contractor as part of the Work under the Contract belongs to the Contractor.
3. The Contractor grants to Canada a non-exclusive, perpetual, irrevocable, world-wide, fully-paid and royalty-free license to exercise all rights comprised in the Material, for any non-commercial government purposes. Canada may use independent contractors in the exercise of Canada's license pursuant to this clause.
4. At the request of the Contracting Authority, the Contractor must provide to Canada, at the completion of the Work or at such other time as the Contracting Authority may require, a written permanent waiver of moral rights as defined in the [Copyright Act](#), R.S., 1985, c. C-42, in a form acceptable to the Contracting Authority, from every author that contributed to the Work. If the Contractor is an author, the Contractor permanently waives the Contractor's moral rights.
5. The Contractor also grants to Canada a non-exclusive, perpetual, irrevocable, world-wide, fully-paid and royalty-free license to use the Background Information to the extent that this information is required by Canada to exercise its rights to use the Material.
6. Copyright in any improvement, modification or translation of the Material made by or for Canada belongs to Canada. Canada agrees to reproduce the Contractor's copyright notice, if any, on all copies of the Material, and to acknowledge the Contractor's title to the copyright in the original Work on all copies of translations of the Material effected by or for Canada.
7. No restrictions other than those set out in this section must apply to Canada's use of the Material or of translated versions of the Material."

#### 4. Term of Contract

##### 4.1 Period of the Contract

The period of the Contract is from date of Contract to March 31, 2023 inclusive.

The Contractor grants to Canada the irrevocable option to extend the term of the Contract by up to one (1) additional one (1) year period under the same conditions. The Contractor agrees that, during the extended period of the Contract, it will be paid in accordance with the applicable provisions as set out in the Basis of Payment.

Canada may exercise this option at any time by sending a written notice to the Contractor at least thirty-one (31) calendar days before the expiry date of the Contract. The option may only be exercised by the Contracting Authority, and will be evidenced for administrative purposes only, through a contract amendment.

#### 5. Authorities

##### 5.1 Contracting Authority

The Contracting Authority for the Contract is:

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Environment and Climate Change Canada  
Procurement and Contracting

Address: \_\_\_\_\_

Telephone: \_\_\_\_-\_\_\_\_-\_\_\_\_\_

Email address: \_\_\_\_\_

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.

## 5.2 Technical Authority

The Technical Authority for the Contract is:

Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Organization: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone: \_\_\_\_ - \_\_\_\_ - \_\_\_\_\_  
Email address: \_\_\_\_\_

The Technical Authority named above 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 Technical Authority, however the Technical 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.

## 5.3 Contractor's Representative

The Contractor's Representative for the Contract is:

Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Organization: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone: \_\_\_\_ - \_\_\_\_ - \_\_\_\_\_  
Email address: \_\_\_\_\_

## 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.

## 7. Payment

In consideration of the Contractor satisfactorily completing all of its obligations under the Contract, the Contractor will be paid a firm price of \$ \_\_\_\_\_ (*insert the amount at contract award*). Customs duties are \_\_\_\_\_ (*insert "included", "excluded" OR "subject to exemption"*) and Applicable Taxes are extra.

Canada will not pay the Contractor for any design changes, modifications or interpretations of the Work unless they have been approved, in writing, by the Contracting Authority before their incorporation into the Work.

### 7.2 Limitation of Expenditure

- (a) Canada's total liability to the Contractor under the Contract must not exceed \$ \_\_\_\_\_. Customs duties are (*insert "included", "excluded" or "subject to exemption"*) and Applicable Taxes are extra.

- (b) No increase in the total liability of Canada or in the price of the Work resulting from any design changes, modifications or interpretations of the Work, will be authorized or paid to the Contractor unless these design changes, modifications or interpretations have been approved, in writing, by the Contracting Authority before their incorporation into the Work. The Contractor must not perform any work or provide any service that would result in Canada's total liability being exceeded before obtaining the written approval of the Contracting Authority. The Contractor must notify the Contracting Authority in writing as to the adequacy of this sum:
- (i) when it is 75 percent committed, or
  - (ii) four (4) months before the contract expiry date, or
  - (iii) as soon as the Contractor considers that the contract funds provided are inadequate for the completion of the Work,

whichever comes first.

- (c) If the notification is for inadequate contract funds, the Contractor must provide to the Contracting Authority a written estimate for the additional funds required. Provision of such information by the Contractor does not increase Canada's liability.

**8 Invoicing Instructions**

**8.1 Milestone Payments**

- (a) Canada will make milestone payments in accordance with the Schedule of Milestones detailed below and the payment provisions of the Contract if:
- (i) an accurate and complete claim for payment and any other document required by the Contract have been submitted in accordance with the invoicing instructions provided in the Contract;
  - (ii) all such documents have been verified by Canada;
  - (iii) all work associated with the milestone and as applicable any deliverable required have been completed and accepted by Canada.

**8.2 Schedule of Milestones**

The schedule of milestones for which payments will be made in accordance with the Contract is as follows:

**Milestones:**

Item	Due Date
<b>Initial Contract Period – Contract Award – March 31, 2023</b>	
Draft 2021 Monitoring Plan – submit a draft monitoring plan for review and approval by Technical Authority	No less than 20 days prior to the commencement of work
Preliminary Fieldwork Meeting – attend a meeting to discuss the timeline and expected tasks for the study	Shortly following commencement of the Contract
Permits – ensure necessary permits (CWA, SARA, animal handling) are in place.	Prior to start of work each year
Draft Monitoring Data – submit a draft monitoring spreadsheet in Microsoft Excel and shapefile/geodatabase, to be reviewed and approved by the Technical Authority	No less than 10 days prior to the commencement of work

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Brief Monthly Update – provide a brief written summary of work (1 or 2 paragraphs) via email on a monthly basis	The 30 <sup>th</sup> day of each month, April through September, each year
Draft Annual Report – to be submitted for review and approval by the Technical Authority	November 30, 2021
2021 Annual Report	December 31, 2021
Fieldwork Meeting – attend a meeting to discuss the project timeline and approach for 2022	No later than March 1, 2022
Draft 2022 Monitoring Plan – submit a draft monitoring plan for review and approval by Technical Authority	No later than March 15, 2022
Draft Annual Report	November 30, 2022
2022 Annual Report	December 31, 2022
Final Project Report	March 31, 2023
<b>Option Period One – April 1, 2023 – March 31, 2024</b>	
Fieldwork Meeting – attend a meeting to discuss the project timeline and approach for 2023 (Option Period One)	No later than March 1, 2023
Draft 2023 Monitoring Plan – submit a draft monitoring plan for review and approval by Technical Authority (Option Period One)	No later than March 15, 2023
Draft Annual Report	November 30, 2023
2023 Annual Report	December 31, 2023
Amended Final Project Report	March 31, 2024

**9. Certifications**

**9.1 Compliance**

Compliance with the certifications provided by the Contractor in its bid is a condition of the Contract and subject to verification by Canada during the term of the Contract. If the Contractor does not comply with any certification or 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.

**10. Applicable Laws**

The Contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in Ontario.

**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) Modified 2010B General Conditions - Professional Services (Medium Complexity) (2020-05-28)
- (c) Annex A, Statement of Work;
- (d) Annex B, Basis of Payment;
- (e) the Contractor's bid dated \_\_\_\_\_, (*insert date of bid*) (*If the bid was clarified or amended, insert at the time of contract award: "as clarified on \_\_\_\_\_" or "as amended on \_\_\_\_\_" and insert date(s) of clarification(s) or amendment(s).*)

**12. Insurance Requirements**

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

#### 1.0 Background

Environment and Climate Change Canada-Canadian Wildlife Service (ECCC-CWS) is responsible for the protection of species at risk (SAR) and their Critical Habitat on federally owned lands under the *Species at Risk Act* (SARA). Under the authority of the *Canada Wildlife Act*, ECCC-CWS establishes National Wildlife Areas (NWAs) for the purposes of conservation, research, and interpretation. NWAs are managed to maintain the ecological integrity of the site for the benefit of migratory birds, SAR, and other wildlife of national importance and in accordance with the conservation objectives set out in its management plan.

Big Creek and Long Point NWAs are located within ECCC-CWS Ontario Region's Long Point Walsingham Forest (LPWF) Priority Place, where the invasive species *Phragmites australis* is highlighted as a primary threat. Implementing a program to reduce the extent of *Phragmites* by 90% is an objective of the Integrated Conservation Action Plan (ICAP) for the Priority Place, as well as the Management Plans for the NWAs. Management of *Phragmites* is necessary to sustain and improve habitat and populations of SAR, migratory birds and resident flora and fauna.

Over the course of the project, ECCC-CWS plans to manage 90% of the *Phragmites* at the Big Creek National NWA (BCNWA) and Long Point NWA (LPNWA). Management activities, including herbicide application, mowing, rolling and burning, must co-occur with wildlife monitoring to track and report on the response of species and habitats to management. In addition, monitoring enables the implementation of adaptive management, a key component of the ICAP. Approximately 10ha of *Phragmites* were managed within Brown's Marsh (BCNWA) and Long Pond and Otter Pond (LPNWA) in 2019, and approximately 150ha were managed within BCNWA and Thoroughfare Unit (LPNWA) in 2020.

#### 2.0 Purpose and Objectives

The purpose of this Contract is to evaluate the outcomes of non-native *Phragmites* management on SAR turtles and snakes. Outcomes will be evaluated by assessing variation in relative abundance and habitat use before and after management action, and compared with control and reference plots. In addition to informing the *Phragmites* management project, these surveys will provide ECCC-CWS with needed information to inform Critical Habitat and Action Plans (requirements under the *Species at Risk Act*) for Threatened and Endangered turtle and snake species at these sites.

Monitoring activities must be designed to address the following research question:

**What is the impact of non-native *Phragmites* management on turtle and snake relative abundance and habitat use?**

To address the research question, ECCC-CWS requires the collection of turtle and snake monitoring data at two NWAs. Data collection must occur in 2021 and 2022, at the locations and using the methods described in the objectives below:

1. Evaluate the relative abundance and habitat use of turtles and snakes following the management of *Phragmites* within Brown's Marsh of BCNWA and Long Pond of LPNWA, through Visual Encounter Surveys (VES);
2. Evaluate the change in relative abundance and habitat use of turtles and snakes prior to and following the management of *Phragmites* within Squire's Ridge of LPNWA, through a combination of VES and Mark-Recapture (MR); and
3. Evaluate relative abundance and habitat use of turtles and snakes following the management of *Phragmites* within the Big Creek Unit of BCNWA, through a combination of VES, MR and radio-telemetry.

For Objective 1, the Contractor must implement the established VES study design (Appendix 2 to Annex A) at Brown’s Marsh and Long Pond, and its associated control and reference sites. The Otter Pond sites monitored in 2019 will not be included.

For Objectives 2 and 3, the Contractor must adapt and implement the provided study designs (Appendices 2 and 3 to Annex A), by drawing upon its expertise to employ the appropriate scientific methods for data collection and statistical tools for data analysis. Minimum data collection requirements have been established for guidance (Section 3.5).

An annual report, submitted to the Technical Authority on December 31 in each year of the Contract, must include introduction, methods, results and analysis.. The final report, submitted in March 2023, must include introduction, methods, overall results and analysis, and recommendations for future management and monitoring.

**3.0 Scope of Work**

**3.1 Locations**

The wetlands to be surveyed are within the BCNWA and LPNWA, in Norfolk County, Ontario. All surveys must occur on Federal land, and are accessible by pre-established access points. Monitoring efforts are focused within two of the areas managed in 2019 (Brown’s Marsh and Long Pond; Figure 1, Appendix 1 to Annex A) (hereon referred to as the Pilot Areas), and the areas undergoing management in 2020/21 and 2021/22 (Big Creek Unit of BCNWA (excluding Brown’s Marsh), and Squire’s Ridge of the LPNWA; Figure 2, Appendix 1 to Annex A) (hereon referred to as the New Areas). The longitude and latitude of each unit’s centroid has been detailed in Table 1. For the New Areas, it is the responsibility of the Contractor to establish, through a monitoring plan, the location of each survey site within the prescribed units. The delineated survey sites and Draft Monitoring Plan must be submitted to the Technical Authority for review no less than 20 days prior to the commencement of the Work. For the Pilot Areas, the same locations within Brown’s Marsh and Long Pond outlined in Appendix 2 to Annex A are to be resurveyed.

**Table 1.** The *Phragmites* treatment areas to be surveyed at Big Creek and Long Point NWAs. In the Pilot Areas, the control and reference sites are located within 3km of the treatment areas (see Appendix 2 to Annex A). The longitude and latitude of each wetland’s centroid have been expressed in decimal degrees.

Wetland Area	Longitude	Latitude	Monitoring Method
Brown’s Marsh	-80.457716	42.603031	VES
Long Pond	-80.080233	42.546239	VES
Big Creek Unit (excludes the area of Brown’s Marsh)	-80.457760	42.586103	VES + Mark-Recapture + Telemetry
Squire’s Ridge	-80.238138	42.559501	VES + Mark-Recapture

**3.2 Timing**

Surveys must occur between April 2021 and December 2022, and potentially will continue for an additional year in 2023. A third year of monitoring will be contingent upon receipt of permits, availability of funding, and management efficacy. Therefore, this Contract will include an option period, enabling an extension if deemed appropriate.

**3.3 Visual Encounter Surveys (VES) and Mark-Recapture (MR)**

VES and MR using a Before-After Control-Impact (BACI) design is to be conducted in the spring of 2021 and 2022. The study includes surveys of management sites, comparable control sites (where *Phragmites* does occur but was not managed), and reference sites (where *Phragmites* is not the dominant vegetation type, e.g. cattail and shallow aquatic marsh).

**3.3.1 Pilot Areas:** In 2021 and 2022, Post-*Phragmites*-management surveys are required in Brown’s Marsh and Long Pond (Pilot Areas). Monitoring within the Pilot Areas occurs only for turtles, and using the pre-established study design (Appendix 2 to Annex A), which includes approximately 86 VES surveys over 47 habitat patches, totalling approximately 15 days of spring surveys and 150 person hours.

**3.3.2 New Areas:** In 2021 and 2022, Pre- (2021) and post- (2022) *Phragmites* management surveys are required in Squire's Ridge, and post-*Phragmites*-management surveys are required over both years in the Big Creek Unit. A study design reflecting the VES and MR protocols outlined in Appendices 2 and 3 to Annex A must be developed for the New Areas and proposed within the Draft Monitoring Plan, ensuring scientific rigor and feasibility. Considerations for feasibility include budget, weather, and the remote nature of the Work. VES occurs for all turtle and snake species, whereas MR only occurs for two species of endangered turtles (to be specified to the Contractor upon obtaining a Sensitive Data Use License from the Natural Heritage Information Centre). The Contractor should refer to and abide by species-specific survey protocols developed by the Ontario Ministry of Natural Resources (OMNRF) wherever possible (for example, [Blanding's Turtle](#)).

### 3.4 Telemetry

In 2021 and 2022, a post-*Phragmites*-management radio-telemetry study is required within the Big Creek Unit (BCNWA), for two species of endangered turtles (to be specified to the Contractor upon obtaining a Sensitive Data Use License from the Natural Heritage Information Centre). All new individuals encountered while conducting VES and MR in 2021 must be captured by hand or net and tagged, unless physical conditions deem otherwise (for ex. individual appears sick or injured, too young, etc.), up to a maximum number of individuals, as mutually agreed upon by the Contractor and Technical Authority. A study design for this Work must be included in the Draft Monitoring Plan, which reflects the protocols outlined in Appendix 3 to Annex A. In its Draft Monitoring Plan, the Contractor must also propose an approach to finding additional individuals if an insufficient number is caught while conducting VES. Radio transmitters, provided by ECCC-CWS, will be affixed to the individuals using a protocol that meets Animal Care approved animal handling guidelines. Turtles must be tracked at a minimum of: once per month, for one day, from April to August of each year.

### 3.5 Minimum Study Design Requirements

When establishing the study design (for both 3.3.2 and 3.4), the number and distribution of survey sites within the New Areas must be determined by the Contractor, ensuring sufficient statistical power and sampling of all relevant habitat types, while remaining within the prescribed budget. Each site must be consistent in size (to be determined by the Contractor, based on budgeting) to ensure consistency in effort. Each site must be surveyed a minimum of 3 times per year; timing of surveys is strongly influenced by climatic factors, but should be reasonably spread over the months of April, May and June, 2021 and 2022. Each survey of each site must last a minimum of 30 minutes of active searching time, include a search effort of 3 person-hours per hectare, and include individual(s) slowly walking transects, making note of the following:

- Daily environmental characteristics
  - air temperature (°C)
  - water temperature (°C)
  - cloud cover (approximate %)
  - wind speed (km/h)
  - last precipitation event
- Habitat characteristics:
  - Water depth (cm)
  - Average vegetation density; must be categorized into very low, low, medium or high.
    - Very low = surface fully open to sun
    - Low = sun able to penetrate to surface in many areas
    - Medium = sun able to penetrate to surface in some areas
    - High = surface completely shaded from sun
  - Dominant emergent and submerged vegetative species
- Boundary of survey site: a shapefile or geodatabase (using a projection of UTM Zone 17N, NAD83) contracting the polygon boundary of the site
- Precise location for each turtle and snake encountered: location data is to be collected using a GPS data with a minimum accuracy of 5m, and provided to ECCC-CWS as shapefiles or a geodatabase using a projection of UTM Zone 17N, NAD83.
- Biometric data for all turtles captured by hand, including weight, measurements, life stage, sex, behaviour and health status

- Notch code, radio tag and frequency (if applicable)
- Information on any other SAR observed, including precise location, species name, an actual or estimate count where more than one individual is present, a photo and a general habitat description.

All new turtle individuals of interest (endangered, to be specified following contract award) captured by hand within Squire's Ridge must be notched (pending permit approval) using notch codes provided by ECCC-CWS. All new turtle individuals of interest captured within the Big Creek Unit must be notched and tagged (pending approval) using the radio tags provided by ECCC-CWS. Tagged turtles must be tracked a minimum of one day, once per month from April to August of each year.

Additional biological, physical or chemical data may be collected by the Contractor should it deem them to be pertinent to the study and commensurate with the overall budget.

To generate meaningful results from the collected data, at a minimum, a generalized linear mixed-effects model must be used to compare turtle abundance between treatment, control and reference sites. This model must include number of turtles (abundance) as the response variable, patch type (treatment, control or reference) as fixed effects, and day of year (to account for detection variability) and unique patch ID (if patches are sampled repeatedly) as random effects. Additional/alternative analyses can be proposed within the Draft Monitoring Plan and/or developed over the course of the Contract in consultation with the Technical Authority.

### **3.6 Expectations of the Contractor**

The Contractor must:

1. Develop and submit a Draft Monitoring Plan no less than 20 days prior to the commencement of Work, which includes activities outlined in numbers 4, 5 and 6 listed below.
2. Hold, or be listed under, a *Species at Risk Act* permit, which enables execution of the Work described in this Contract. Hold an Ontario Animal Handling permit. The Contractor is to provide copies of the required permits to the Technical Authority prior to initiation of the Work.
  - a) If timeline is of concern, ECCC-CWS will work with the Contractor to develop the Animal Handling permit applications to ensure permits are in place prior to commencement of the Work
3. Hold a Sensitive Data Use License, issued by the NHIC.
4. Meet with the Technical Authority to discuss the timeline and approach. To be scheduled shortly after issuance of the Contract.
5. Conduct ongoing VES for SAR turtles at the Pilot Areas (Brown's Marsh and Long Pond), using the pre-established study design.
6. Conduct VES for all turtles and snakes, and MR for two species of turtles, within the New Areas (Big Creek Unit of the BCNWA and Squire's Ridge of the LPNWA).
7. Conduct radio-telemetry for two endangered turtle species within the Big Creek Unit.
8. Only access the proposed area from the access points established by ECCC-CWS and contact staff identified by ECCC-CWS to coordinate on-site work in advance.
9. Provide ECCC-CWS with monthly progress reports on work completed to date.
10. Format and provide the survey and spatial data to ECCC-CWS, as outlined in Section 3.7.2 of Annex A.
11. Analyze data to summarize major trends; identify the relationship between turtle and snake relative abundance and vegetation type (treated, control and reference) to infer habitat use.
12. Prepare a final report (introduction, methodology, results, discussion) on the Work completed, which must include recommendations for harm mitigation during any future *Phragmites* management at Big Creek and Long Point NWAs, and submit to ECCC-CWS.

### **3.7 Additional Technical Information**

#### **3.7.1 Equipment**

ECCC-CWS will provide some of the necessary equipment to conduct radio-telemetry, as outlined in Section of 3.7.2.2 of Annex A. No other equipment will be provided by ECCC-CWS. The Contractor must have access to and experience working with equipment for conducting VES and MR, including but not limited to handheld GPS units, canoes, files for notching. The Contractor

must have experience affixing radio tags to turtles of various life stages and operating radio-telemetry equipment. The Contractor must be flexible in the timing of its work and prepare for delays, as transport can be impacted by unforeseen circumstances (e.g. weather).

**3.7.2 ECCC-CWS Will Provide the Contractor**

**3.7.2.1 Reference Materials**

- Shapefiles to delineate the extent of the study areas
- Relevant ECCC-CWS data and monitoring protocols, as required
- Notch codes

**3.7.2.2 Equipment**

- ECCC-CWS will provide some of the technical equipment required to conduct radio-telemetry, including:
  - Radio Tags – Holohil, RI-2B
  - Biotracker VHF Reciever
  - 3 Element Folding Yagi Antenna
  - Pesola Spring Scales (4x500g, 4x1000g and 4x2500g)
- This equipment must be returned to ECCC-CWS upon completion of the Work. All equipment must be returned in working order; any damage to the equipment must be reported to the Technical Authority as soon as possible. It is the responsibility of the Contractor to repair any damage incurred due to misuse of the equipment.

**3.7.2.3 On-site transportation and accomodations, if required**

- ECCC-CWS may provide transport via boat to sites that may be inaccessible by vehicle or foot, at the discretion of the on-site CWS field technicians.
- ECCC-CWS may provide accommodations at the Squire’s Ridge cabin if available and required by the Contractor. Capacity is limited.
- *Please note: use of on-site transportation and accommodations is subject to change due to COVID-19 and evolving fieldwork restrictions. ECCC-CWS will ensure that the Contractor is kept up to date, and will work with the Contractor to secure outside accommodations if needed.*

**3.7.2.4 Permitting**

- ECCC-CWS will support The Contractor in the application process to obtain a CWA permit that includes the execution of VES, MR and radio-telemetry.

**3.7.3 Data Requirements**

The habitat components of each visit are to be captured in a Microsoft Excel spreadsheet with a clear linkage (e.g., Site ID) to the survey location or contained within a shapefile or geodatabase. All biometric and species data must be compiled into a shapefile or geodatabase. A draft of the structure of each must be shared with ECCC-CWS prior to commencement of the fieldwork, to ensure that all desired data will be collected and easily understood by ECCC-CWS staff. The completed spreadsheet(s) and shapefile/geodatabase will be shared with ECCC-CWS upon submission of the draft annual reports and any required changes are to be completed and included with the final reports.

**4.0 Milestones**

Item	Due Date
<b>Initial Contract Period – Contract Award – March 31, 2023</b>	
Draft 2021 Monitoring Plan – submit a draft monitoring plan for review and approval by Technical Authority	No less than 20 days prior to the commencement of work
Preliminary Fieldwork Meeting – attend a meeting to discuss the timeline and expected tasks for the study	Shortly following commencement of the Contract
Permits – ensure necessary permits (CWA, SARA, animal handling) are in place.	Prior to start of work each year

**Solicitation/ Demande de soumissions : 5000055907**

Draft Monitoring Data – submit a draft monitoring spreadsheet in Microsoft Excel and shapefile/geodatabase, to be reviewed and approved by the Technical Authority	No less than 10 days prior to the commencement of work
Brief Monthly Update – provide a brief written summary of work (1 or 2 paragraphs) via email on a monthly basis	The 30 <sup>th</sup> day of each month, April through September, each year
Draft Annual Report – to be submitted for review and approval by the Technical Authority	November 30, 2021
2021 Annual Report	December 31, 2021
Fieldwork Meeting – attend a meeting to discuss the project timeline and approach for 2022	No later than March 1, 2022
Draft 2022 Monitoring Plan – submit a draft monitoring plan for review and approval by Technical Authority	No later than March 15, 2022
Draft Annual Report	November 30, 2022
2022 Annual Report	December 31, 2022
Final Project Report	March 31, 2023
<b>Option Period One – April 1, 2023 – March 31, 2024</b>	
Fieldwork Meeting – attend a meeting to discuss the project timeline and approach for 2023 (Option Period One)	No later than March 1, 2023
Draft 2023 Monitoring Plan – submit a draft monitoring plan for review and approval by Technical Authority (Option Period One)	No later than March 15, 2023
Draft Annual Report	November 30, 2023
2023 Annual Report	December 31, 2023
Amended Final Project Report	March 31, 2024

**5.0 Deliverables**

<b>Item</b>	<b>Date</b>
Annual report, data and shapefiles	December 31, 2021
Annual report, data and shapefiles	December 31, 2022
Final report, data and shapefiles	March 31, 2023
Amended final report, data and shapefiles (Option Period One)	March 31, 2024

APPENDIX 1 TO ANNEX A

MONITORING LOCATIONS

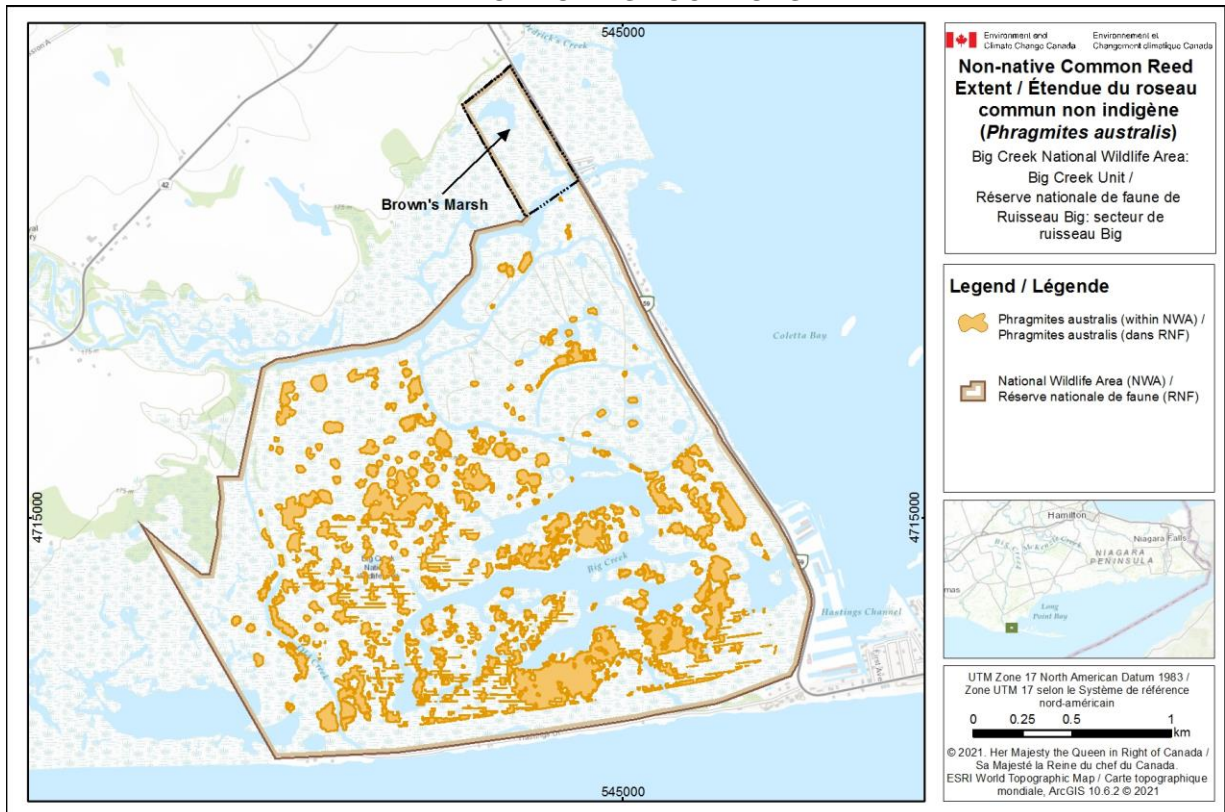


Figure 1. The Big Creek Unit, Big Creek NWA. Surveys must occur within Brown's Marsh using the pre-established protocol (see Appendix 2 to Annex A). New sites will be established within the remainder of the Unit. Updated mapping delineating the treated areas will be provided upon contract award, to assist in site selection.



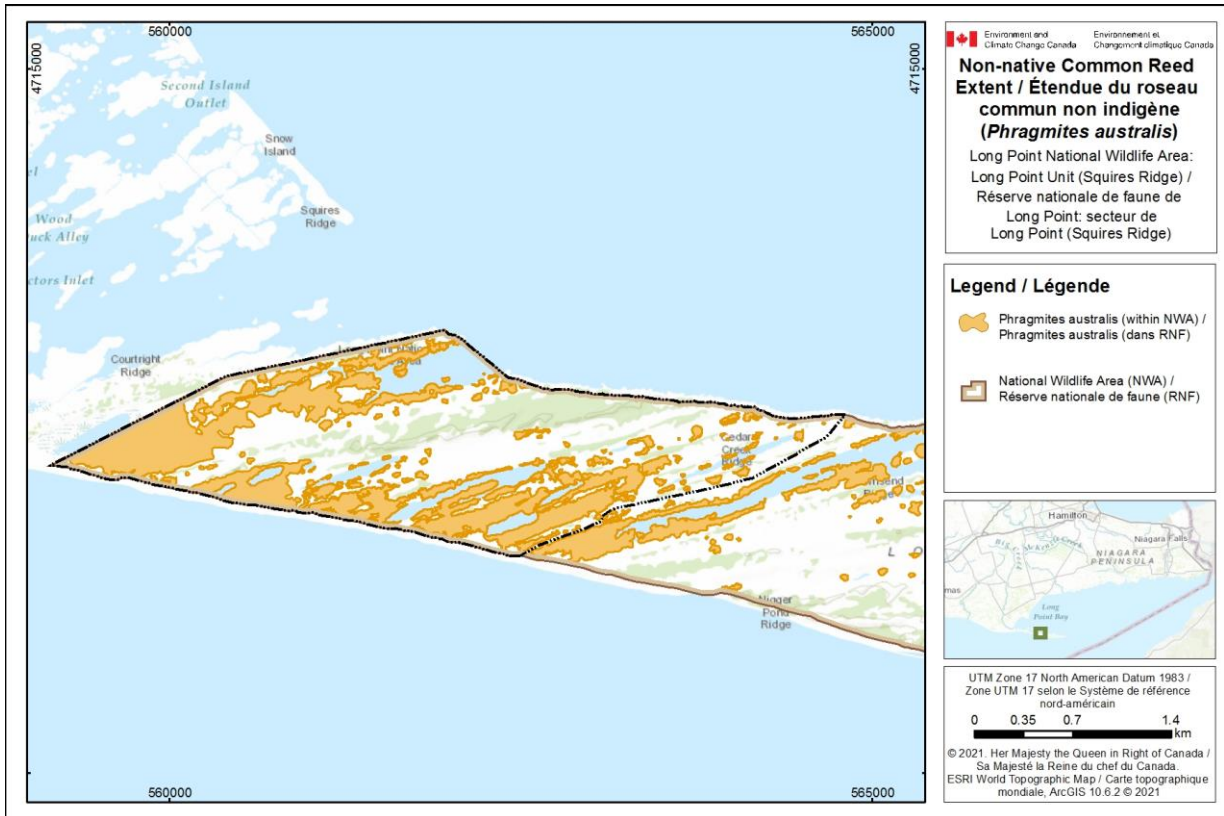


Figure 2. Squire's Ridge, Long Point NWA. New pre-treatment survey sites will be established within this area, where Phragmites management is planned in 2021.

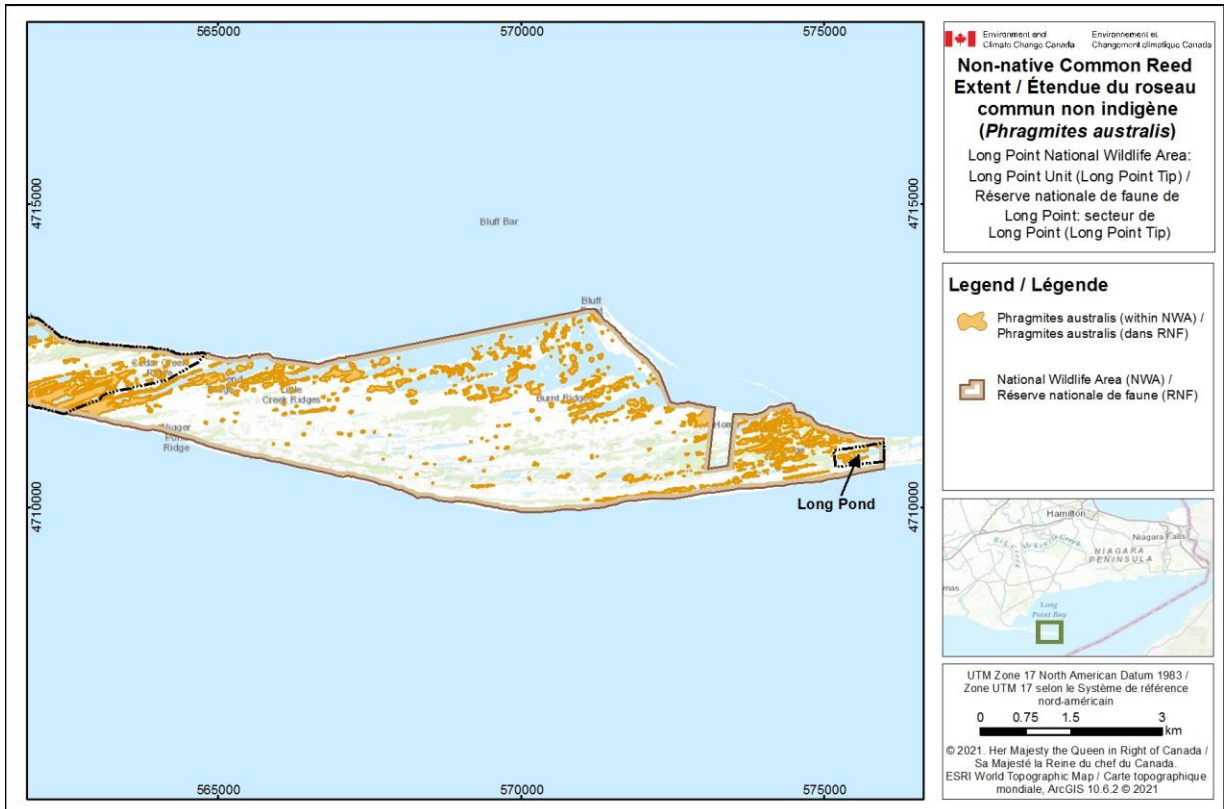


Figure 3. Long Pond, Long Point NWA. Surveys must occur here using the pre-established protocol (see Appendix 2 to Annex A).

## APPENDIX 2 TO ANNEX A

## 2019 MONITORING PROTOCOL FOR BROWN'S MARSH AND LONG POND, TO BE REPLICATED IN 2021, 2022

**Effect of *Phragmites australis* management on turtle abundance:  
Turtle visual encounter surveys at Big Creek and Long Point National Wildlife Areas before  
*Phragmites australis* treatment [Excerpt; Introduction and Methods only]**

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**Introduction**

European common reed, also known as *Phragmites australis* (herein referred to as *Phragmites*), is a non-native perennial grass that has dramatically increased in distribution and abundance across Canada (Catling and Mitrow, 2011). *Phragmites* first establishes in shallow wetland habitat or recently disturbed habitat and grows clonally from underground rhizomes to invade low marsh habitats (Amsberry et al. 2000). As *Phragmites* establishes, it becomes tall and dense (Rooth et al., 2003), replacing plant communities across a range of water depths (Tulbure et al., 2007; Yuckin and Rooney, 2019). Dense, homogenous patches of *Phragmites* results in altered habitat structure (Rice et al., 2000) and reduced plant diversity (Silliman and Bertness, 2004), and has affected many wetland-dependent species including birds, amphibians, and reptiles (Meyerson et al., 2000). While more robust species such as the marsh wren (*Cistothorus palustris*) and red-winged blackbird (*Agelaius phoeniceus*) have been able to use *Phragmites* as habitat (Gagnon Lupien et al., 2015), ecologically sensitive marsh-nesting species do not (Robichaud and Rooney, 2017). Where herpetofauna are concerned, *Phragmites*-dominated sites supported significantly fewer species of reptiles and amphibians compared to sites with little to no *Phragmites* (Mifsud, 2014).

In ecologically important and diverse marshes along the North coast of Lake Erie, herpetofauna have been negatively impacted by well-established and spreading non-native *Phragmites*. For example, in Long Point, long-term declines of the Fowler's toad (*Anaxyrus fowleri*) have been linked to the loss of shallow aquatic habitat to *Phragmites* (Greenberg and Green, 2013). In the same region, shading from tall stands of *Phragmites* altered nest microenvironment and reduced hatching success of freshwater turtles (Bolton and Brooks 2010). Not only does *Phragmites* reduce the amount of effective habitat for at-risk turtles in wetlands, it also effects their spatial ecology (Markle and Chow-Fraser, 2018). Within their home ranges, Blanding's turtles (*Emydoidea blandingii*) avoided *Phragmites* patches except during nesting migrations. During nesting migrations, female Blanding's turtles crossed patches of *Phragmites* to access nesting habitat, placing themselves at increased risk of being stranded within dense patches. Taken together, dense monospecific patches of *Phragmites* is particularly detrimental to sensitive species and species at risk with specific wetland habitat requirements (Catling 2005, Gilbert et al. 2014).

Management of non-native *Phragmites* has been identify as a priority threat to species at risk and their habitats in the Big Creek and Long Point National Wildlife Areas (NWAs). The federally-owned and managed NWAs are part of the Long Point Peninsula, the largest freshwater sandspit-marsh complex of the Great Lakes, extending 40 km into Lake Erie (ECCC, 2017a). Big Creek and Long Point NWAs support an incredible diversity of species and numerous species at risk (ECCC, 2017a; ECCC, 2017b). However, substantial increases in *Phragmites* cover, ranging from +14-37% annually, began in the mid-1990s (Jung et al., 2017). In an effort to improve habitat for species at risk, *Phragmites* management activities are proposed for the fall of 2019 and winter of 2020. Management activities will be monitored to evaluate effects on surrounding habitat and species including impacts to at-risk turtles. Since treatment and management of *Phragmites* is a multi-year process (Quirion et al., 2018), the overarching objective is to establish whether habitat use by species-at-risk turtles is altered by *Phragmites* management. As a step towards achieving this goal, turtle visual encounter surveys were completed in April and May 2019 before

*Phragmites* management was scheduled to occur in fall 2019. These baseline data represent the 'before' treatment period and can be used in a Before-After Control-Impact study to assess the effect of *Phragmites* treatment on turtle abundance.

## Methods

A Before-After Control-Impact (BACI) study has been designed to investigate the effects of *Phragmites* management on abundance of species-at-risk turtles in habitat patches before management (spring 2019) and after management (spring 2020 and onwards). Monitoring habitat use multiple years after initial management activities occur is important because as vegetation re-growth begins, microhabitat and patch structure change through time. By applying a BACI study design, natural temporal variation in habitat use and detection probabilities can be accounted for to more accurately elucidate the effect of *Phragmites* treatment. Most importantly, BACI designs have been found to be 2.9–4.1 times more accurate than before-after designs and 3.8–5.6 times more accurate than control-impact designs underscoring the importance of investing resources into robust study designs (Christie et al., 2019).

### Survey Patches

Since only one year of spring 'before' data will be collected prior to proposed activities, it is critical that resources and survey effort are focused at a study site where data collection will be most successful. Therefore, survey efforts in April 2019 focused primarily at Big Creek NWA (Big Creek Unit). Since access to Long Point NWA (Long Point Unit) was challenging, surveys at Long Pond, Otter Pond, and associated control sites were limited to a few days in May 2019. Patches of *Phragmites* proposed for management in Brown's Marsh, Otter Pond, and Long Pond were ground truthed. In total, five patches of *Phragmites* were confirmed in Brown's Marsh (Figure 4). In Long Pond, we surveyed seven patches of *Phragmites* which ranged from low to high density stands (Figure 5). A set of five, three, and seven (Big Creek, Otter Pond, and Long Pond, respectively) comparable patches (similar patch size and shape) were selected in *Phragmites* patches that will not receive management to serve as the control sites. Spring 2019 surveys can serve as treatment and control data for the 'before' period of a Before-After Control- Impact study design.

In Big Creek NWA only, two other common habitat types (cattail and shallow aquatic marsh) were surveyed in addition to the treatment and control *Phragmites* patches to provide important site-specific context regarding turtle abundance and species diversity in adjacent suitable habitat patches (reference data; Figure 4). Survey data from reference habitats will provide important contextual information when interpreting survey data from *Phragmites* patches. For example, turtle observations may be limited in *Phragmites* patches in 2019 and in the years following treatment. This may be interpreted as *Phragmites* treatment having no effect on turtle habitat use; however, if turtle observations are also limited in other habitats in Brown's Marsh and not in other parts of Big Creek NWA, the results may be more indicative of generally low turtle abundances in Brown's Marsh.

### Visual Detection Surveys

Each of the 20 habitat patches in Big Creek NWA (five cattail, five shallow aquatic, five *Phragmites* treatment, five *Phragmites* control) were surveyed three times on different days for a total of 60 surveys. We surveyed Otter Pond habitat patches (three *Phragmites* treatment, three *Phragmites* control) twice and Long Pond habitat patches (seven *Phragmites* treatment, seven *Phragmites* control) once for a total of 26 surveys in Long Point NWA.

Each survey was timed to ensure patches were surveyed with a standard effort of three person hours per hectare (Ontario Ministry of Natural Resources, 2015) to allow direct comparisons among different sized patches. The minimum survey time was set at 30 person minutes for smaller patches where the three-person hour/ha calculation would have resulted in short, ineffective surveys. In teams of 1-6 people, we slowly walked through each survey patch, walking back and forth along general transects (Ontario Ministry of Natural Resources, 2015). We recorded any turtles observed or captured by hand. During each survey, we recorded air temperature (°C), water temperature (°C), average water depth (cm), cloud cover (%), wind speed (km/h), last precipitation event, and average vegetation density (very low, low, medium, high). Vegetation density was classified as very low when the surface was fully open to the sun, low when there were many open areas between vegetation for sun to reach the surface, medium when there were only a

few scattered spots for sun to reach the surface, and high when the surface was completely shaded from the sun. When a turtle was encountered, we recorded percent cover of vegetation, behaviour, and a GPS location. For turtles that were captured by hand, we also collected basic biometric data (weight, measurements, photo, health assessment, etc.) and new individuals were notched. Scott Gillingwater (Upper Thames River Conservation Authority) provided available notch codes so all collected data will contribute to long-term population surveys in the area.

### Statistics

In JMP 14 (SAS Institute Inc., Cary, NC, USA), we used a linear regression to examine the relationship between day of year each survey occurred and the difference between air temperature and water temperature during each survey. To compare turtle abundance in *Phragmites* treatment and *Phragmites* control patches in both NWAs, we used a generalized linear mixed-effects model. We fit our model with the glmmTMB package (Brooks et al., 2017) in R 3.5.1 using number of turtles (abundance) as the response variable, patch type (*Phragmites* treatment or *Phragmites* control) as fixed effects, and day of year (to account for detection variability) and unique patch ID (since patches were sampled repeatedly) as random effects. Turtle abundance data were zero-inflated and overdispersed, so we used a zero-inflated negative binomial hurdle model. In a BACI study, we would predict that turtle abundance in control and treatment *Phragmites* patches do not differ in the 'before' period (Figure 6). Then, in the 'after' period, we would expect turtle abundance to remain unchanged in the control patches between the 'before' and 'after' periods but turtle abundance to increase in *Phragmites* treatment patches if *Phragmites* management successfully restores habitat for turtles (Figure 6).

In Big Creek NWA only, we used a generalized linear mixed-effects model to compare turtle abundance in shallow aquatic, cattail, *Phragmites* treatment, and *Phragmites* control patches. Similar to our previous model, we used number of turtles as the response variable, patch type as fixed effects, and day of year and unique patch ID as random effects. Once again, we used a zero-inflated negative binomial hurdle model because turtle abundance data were zero-inflated and overdispersed. We included other habitat patches known to support turtles (i.e., shallow aquatic, cattail) to provide context to the abundance data collected in *Phragmites* patches, and would expect *Phragmites* treatment and control patches in the 'before' period to have fewer turtles (Figure 6).



Figure 4. Map of survey patches within Big Creek National Wildlife Area. Patches in green are Phragmites proposed for treatment, blue are control patches of Phragmites, red are cattail patches and purple are shallow aquatic patches.



Figure 5. Map of Long Pond survey patches in Long Point National Wildlife Area. Patches in green are Phragmites proposed for treatment and blue are control patches of Phragmites.

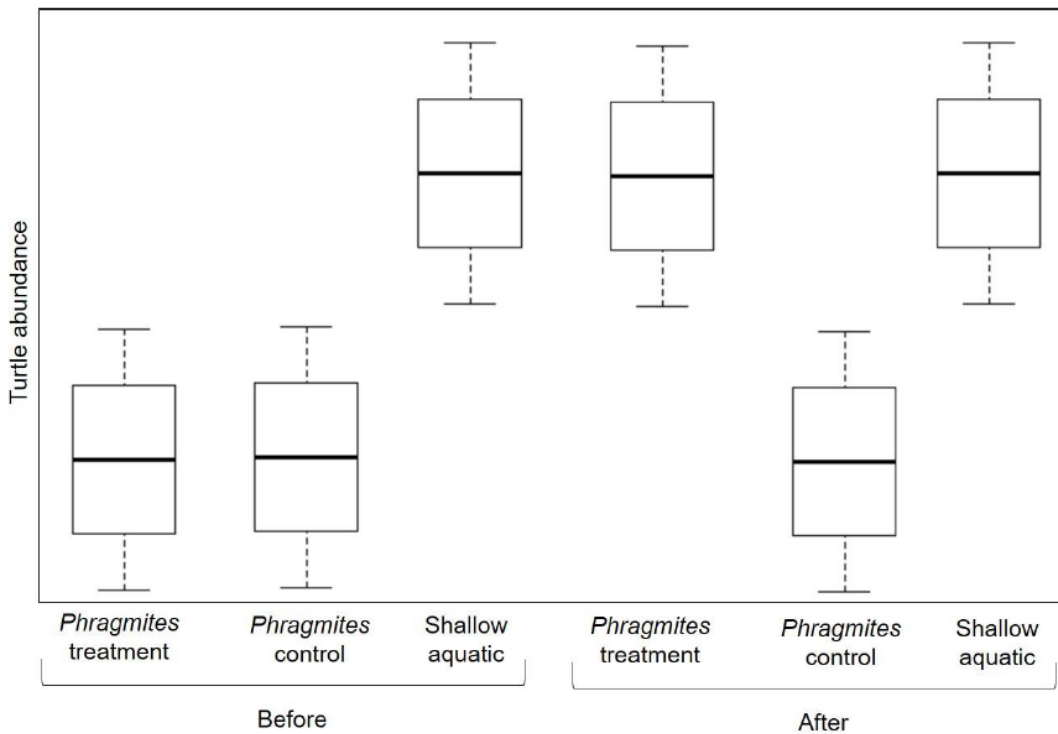


Figure 6. Conceptual Before-After Control-Impact illustration. Conceptual graph illustrating a predicted outcome of a Before-After Control-Impact study which analyses the effect of Phragmites management on turtle abundance. If Phragmites management is successful in restoring habitat for turtles, we would expect turtle abundance to increase in habitat patches after treatment while abundance in control Phragmites patches and shallow aquatic remain unchanged. Furthermore, the degree of management success could be evaluated by comparing turtle abundance in treated patches to other habitats known to support turtles.

## APPENDIX 3 TO ANNEX A

### MARK-RECAPTURE AND TELEMETRY METHODS

Protocols outlined in this document must be used as a guide to developing a proposed survey design for the New Areas (Big Creek Unit, BCNWA and Squire's Ridge, LPNWA).

#### Survey Locations

Monitoring of the 2020 and 2021 *Phragmites* management sites will be conducted as follows:

- Pre-management (2021) and post-management (2022) VES and mark-recapture at Squire's Ridge, Long Point NWA
- Post-management VES, mark-recapture and radio-telemetry in the Big Creek Unit of the Big Creek NWA

In each location, monitoring is to be conducted within treatment, control and reference sites, where control sites represent areas of no *Phragmites* treatment, reference sites represent areas not dominated by *Phragmites* and inhabited by common vegetation types (i.e. cattail and shallow aquatic marsh), and treatment sites represent areas where *Phragmites* has been or will be treated. Site selection must reflect the approach used in 2019 (Appendix 2 to Annex A); the survey sites should be similar in size, number, distribution, and habitat to those delineated within the 2019 sites. Sites are to be selected by the Contractor and included within the Draft Monitoring Plan, submitted no less than 20 days before the commencement of the Work.

#### Visual Encounter Surveys

See Appendix 2 to Annex A for methodology.

#### Mark-Recapture Surveys

Mark-recapture surveys are to be conducted in Big Creek Unit, BCNWA and Squire's Ridge, LPNWA for two species of endangered turtles. The Contractor must select study sites based on historical records, recent sightings and scouting for new sites. Searches are to be conducted on foot by moving through wetland habitats in search of basking, buried or swimming individuals. Captures are to be made by hand or with a dip net. When any snake or turtle species are encountered, UTM coordinates must be recorded using a handheld GPS.

Marking of turtles are to be done with a triangular (for small juveniles) or round (for large juveniles and adults) file to notch individual codes into marginal scutes. Notch codes will be provided by ECCC-CWS prior to the commencement of the Work.

The following data must be recorded when conducting mark-recapture surveys (see Annex A, Section 3.5 for full list):

- Date and time of capture
- Field staff
- UTM coordinates and Datum
- Environmental conditions: air temperature (in shade), weather, water temperature (if found in or near water), water depth, habitat and vegetation types
- Biometric data: sex (male, female, undetermined), age group (neonate, YOY, juvenile, adult), measurements (mm) (SCL, MCL, SPL, MPL, CH, CW, PW and height), weight (grams), behaviour of specimen (before capture), parasites/disease/injuries/abnormalities (if applicable)
- Recapture (yes or no), notch code, radio tag code and frequency (if applicable)
- Any other comments

#### Radio-Telemetry Study

Radio-telemetry surveys must be conducted in the Big Creek Unit, BCNWA. All new Blanding's and Spotted turtle individuals detected and captured must be tagged, unless physical condition deems otherwise (for ex. individual appears sick or injured, too young).

Transmitters are to be attached to the posterior portion of the carapace using PC-7 epoxy. TRX-1000S radio receiver and a Yagi 3-element folding directional antenna are to be used for tracking.

Turtles are to be tracked approximately every seven to ten days from April to September.

The following data must be recorded when conducting radio-telemetry:

- Date and time of capture
- Field staff
- UTM coordinates and Datum
- Environmental conditions: air temperature (in shade), weather, water temperature (if found in or near water), water depth, habitat and vegetation types
- Plant species within a 2m<sup>2</sup> area around the turtle must also be identified
- Biometric data: sex (male, female, undetermined), age group (neonate, YOY, juvenile, adult), measurements (mm) (SCL, MCL, SPL, MPL, CH, CW, PW and height), weight (grams), behaviour of specimen (before capture), parasites/disease/injuries/abnormalities (if applicable)
- Recapture (yes or no), notch code, radio tag code and frequency (if applicable)
- Any other comments



## ANNEX B

## BASIS OF PAYMENT

The Contractor will be paid as follows:

Item	Percentage of Price
<b>Initial Contract Period – Contract Award to March 31, 2023</b>	
Draft 2021 Monitoring Plan – submit a draft monitoring plan for review and approval by Technical Authority	
Preliminary Fieldwork Meeting – attend a meeting to discuss the timeline and expected tasks for the study	
Permits – ensure necessary permits (CWA, SARA, animal handling) are in place.	
Draft Monitoring Data – submit a draft monitoring spreadsheet in Microsoft Excel and shapefile/geodatabase, to be reviewed and approved by the Technical Authority	
Brief Monthly Update – provide a brief written summary of work (1 or 2 paragraphs) via email on a monthly basis	
Draft Annual Report – to be submitted for review and approval by the Technical Authority	
2021 Annual Report	50%
Fieldwork Meeting – attend a meeting to discuss the project timeline and approach for 2022	
Draft 2022 Monitoring Plan – submit a draft monitoring plan for review and approval by Technical Authority	
Draft Annual Report	
2022 Annual Report	
Final Project Report	50%

Item	Percentage of Price
<b>Option Period One – April 1, 2023 – March 31, 2024</b>	
Fieldwork Meeting – attend a meeting to discuss the project timeline and approach for 2023 (Option Period One)	
Draft 2023 Monitoring Plan – submit a draft monitoring plan for review and approval by Technical Authority (Option Period One)	
Draft Annual Report	
2023 Annual Report	
Amended Final Project Report	100%

<b>Bid Price</b>	\$ _____
<b>Applicable Taxes</b>	\$ _____
<b>Total Price (Including Applicable Taxes)</b>	\$ _____