PORT RYERSE WIND POWER PROJECT
WATER ASSESSMENT AND
WATER BODY REPORT

File No. 160960773
March 2013
Updated November 8, 2013

Prepared for:

Boralex Inc.
772 Sherbrooke St. West
Suite 200
Montreal QC H3A 1G1

In Association with:

UDI Renewables Corporation
492 South Coast Drive
Nanticoke, ON N0A 1L0

Prepared by:

Stantec Consulting Ltd.
Suite 1 - 70 Southgate Drive
Guelph ON N1G 4P5

Record of Revisions

Revision	Date	Description
0	November 2012	Submission to Municipalities and Aboriginal Communities
1	December 2012	Submission to Public
2	March 2013	Submission to the Ministry of the Environment
3	November 8, 2013	Updates to include MOE Comments

Table of Contents

Table of Contents

List of Tables

List of Appendices

List of Figures

Appendix A

1.0 Introduction

Boralex Inc. (Boralex), in association with UDI Renewables Corporation (UDI), is proposing to develop the Port Ryerse Wind Power Project (the Project) east of the hamlet Port Ryerse in Norfolk County , Ontario, in response to the Government of Ontario's initiative to promote the development of renewable electricity in the province. The Project was awarded a Feed-In-Tariff (FIT) contract with the Ontario Power Authority (OPA) on February 25, 2011. Further information on the Project can be found on the project-specific website at http://www.udi-canada.com. Boralex Inc. is a power producer whose core business is dedicated to the development and operation of renewable energy facilities. Further information on Boralex can be found at http://www.Boralex.com/en/.

The Project Study Area is centered in the Township of Woodhouse. The location of the Project Study Area is shown on **Figure 1, Appendix A**.

The Renewable Energy Approval (REA) process for the Port Ryerse Project was originally initiated by UDI, with the assistance of M.K. Ince and Associates Ltd. Boralex is considering acquisition of the Project from UDI and retained Stantec Consulting Ltd. (Stantec) to complete the REA Application, as required under Ontario Regulation 359/09 - Renewable Energy Approvals under Part V.0.1 of the Act of the Environmental Protection Act (O. Reg. 359/09). According to subsection 6(3) of O. Reg. 359/09, the Project is classified as a Class 4 Wind Facility and will follow the requirements identified in O. Reg. 359/09 for such a facility.

1.1 PROJECT OVERVIEW

Three wind turbine models were initially assessed as part of the REA process, the Siemens SWT 3.0 113, ENERCON E-92 2.35 MW and ENERCON E-82 E2 2.3MW; however one turbine model has been selected as the preferred alternative; the Siemens SWT 3.0 113.

The Project will include four Siemens SWT 3.0 113 wind turbine generators. The 3.0 MW turbine will be customized to a nameplate capacity of 2.5 MW for this Project. The total maximum installed nameplate capacity of all four turbines will not exceed 10 MW. Other basic components include step-up transformers located adjacent to the base of each turbine (step up voltage from approximately 0.69 kV to 27.6 kV), a 27.6 kV underground collector system, fibre optic data lines, a distribution substation, a permanent parking lot (if required), a meteorological tower and turbine access roads.

Temporary components during construction include laydown areas at the turbine locations and crane pads. No operations and maintenance building or transmission line is anticipated to be required for the Project. No Project components are located within municipal road Rights of Way (ROWs).

The 27.6 kV underground collector lines will transport the electricity generated from each turbine to the distribution substation located on private property east of Port Ryerse Road. Directional bore techniques will be used where the underground collector lines cross valleylands and watercourses. At the substation, a dip-pole connection will be made directly into the local distribution system.

1.2 STUDY AREA AND PROJECT LOCATION

The Project Study Area is generally bounded by i) Woolley and Gilbert Roads to the north; ii) Port Ryerse Road to the west; iii) Hay Creek to the east and iv) Avalon Lane to the south (**Figure 2, Appendix A**). The proposed Project Location includes all parts of the land in, on, or over which the Project is proposed. The Project Location, including all Project infrastructure, is sited on privately-owned lands, where landowners have entered into a lease agreement with Boralex/UDI. Permissions to access these properties have been obtained through verbal discussions with landowners, as a requirement of their signed agreements with Boralex /UDI.

The "Study Area" used for the records review component of this Water Assessment and Water Body report is shown on **Figure 1, Appendix A**.

The proposed "Project Location", as defined in O. Reg. 359/09, includes any air space and all parts of the land in, on or over which the Project is proposed. As required by the regulation, a 120 m "Zone of Investigation" has been identified around the outer limits of the Project Location; measured as 120 m from the outer limit of the Project Location, where site preparation and construction activities will occur and where infrastructure will be located. The outer limit includes the turbine blade tip where that component forms the outer limit of the Project Location. The Project Location and 120 m Zone of Investigation are shown on **Figure 2, Appendix A**.

For the purposes of this Project, the Project Location includes the footprint of the facility components, plus any temporary work and storage locations. The boundary of the Project Location is used for defining setbacks and site investigation distances according to O.Reg.359/09. The buildable area (construction area), which includes the footprint of the facility components, plus any temporary work and storage locations, would be staked on private lands. All construction and installation activities would be conducted within this designated area, including construction vehicles and personnel.

Although O. Reg. 359/09 considers the REA process in terms of the Project Location, the siting process for wind projects is an iterative process, and therefore final location of Project components is not available at Project outset. Therefore, a Project Study Area is developed to examine the general area within which the wind Project components may be sited; information gathered within this larger area feeds into the siting exercise.

This Water Assessment and Water Body Report is intended to satisfy the requirements outlined within O. Reg. 359/09 and is to be submitted as one component of the Renewable Energy Approval (REA) application for the Project. The Project boundary is not located within the Oak Ridges Moraine Conservation Plan Area, Greenbelt Plan, or Niagara Escarpment Plan.

This report identifies water bodies that are within the 120 m Zone of Investigation and assesses potential negative environmental effects that may result from construction activities. Mitigation measures are also identified to alleviate potential negative environmental effects.

Once the Project layout and locations of water bodies were confirmed, a water records review was conducted according to Section 30(1) of O. Reg. 359/09. The records review included examination of preliminary background data and field data collected by M.K. Ince and Associates (MKI, 2012a, b). Additionally, a general aquatic habitat assessment was conducted for the waterbodies within the 120 m Zone of Investigation. A combination of background data and results of Stantec's 2012 surveys were used to determine the presence or absence of water bodies and fish habitat within the 120 m Zone of Investigation. Photographs of all water features were taken during field surveys and are included in **Appendix B**.

Locations where water bodies are present within the 120 m Zone of Investigation are presented in **Figure 2, Appendix A** and summarized in **Table 3.1**. The high water mark of all water bodies within the Zone of Investigation, and identified in this report, are located farther than 30 m from any turbine blade tip. Distances from water bodies to turbine blade tip are shown on **Figure 2**, **Appendix A**. The designation of features as water bodies was agreed upon by field staff using field conditions at the time of the survey and the definition of water body provided in O. Reg. 359/09.

This Water Assessment and Water Body Report has been prepared in accordance with O. Reg. 359/09 (s. 39 and 40), the Ministry of Natural Resources' (MNR's) *Approval and Permitting Requirements Document for Renewable Energy Projects* (September 2009), and the Ontario Ministry of the Environment's (MOE's) *Technical Guide to Renewable Energy Approvals* (MOE, March 2012).

1.3 REPORT REQUIREMENTS

A Water Assessment includes a records review and site investigation to determine the presence and boundaries of water bodies, as defined in O. Reg. 359/09, within 120 m of the Project Location (assuming that no Lake Trout lakes that are at or above development capacity are identified within 300 m). If water bodies are identified within 120 m of the Project Location, a Water Body Report must be prepared.

A renewable energy project includes all activities associated with the construction, installation, use, operation, maintenance, changing or retiring of the renewable energy generation facility. Therefore, for the purposes of measuring the distance from the Project Location to a water body, a Project Location is considered to be the outer limit where site preparation and construction activities will occur and where infrastructure will be located (e.g. temporary structures, laydown areas, storage facilities, generation equipment, access roads, transmission lines less than 50 km in length, etc.).

The documentation requirements of the Water Assessment and Water Body Reports as specified under O. Reg. 359/09 is summarized in **Table 1.1.**

Table 1.1: Water Assessment Report and Water Body Report Requirements: O. Reg. 359/09

Requirements (Water Assessment)	Completed	Section Reference
A person who proposes to engage in a renewable energy project shall conduct a water assessment, consisting of the following:		
1. A records review conducted in accordance with section 30.	✓	2.2, 4.0
2. A site investigation conducted in accordance with section 31, including:		
31(4)(1). A summary of any corrections to the report.	N/A	
31(4)(2). Information relating to each water body.	✓	3, 4.1 and Table 4.2
31(4)(3). A map showing boundaries, location/type and distances.	✓	Appendix A
31(4)(4). A summary of methods used to make observations for the purposes of the site investigation.	✓	2.3
31(4)(5). The name and qualifications of any person conducting the site investigation.	✓	2.4
If an investigation was conducted by visiting the site:		
31(4)(6)(i). The dates and times of the beginning and completion of the site investigation.	✓	Table 4.1, Appendix C
31(4)(6)(ii). The duration of the site investigation.	✓	Table 4.1, Appendix C
31(4)(6)(iii).The weather conditions during the site investigation	✓	Table 4.1, Appendix C
31(4)(6)(iv). Field notes kept by the person conducting the site investigation.	✓	Appendix C
If an alternative investigation of the site was conducted:		
31(4)(7)(i). The dates of the generation of the data used in the site investigation.	✓	2.3, 3.0
31(4)(7)(ii). An explanation of why the person who conducted the alternative investigation determined that it was not reasonable to conduct the site investigation by visiting the site.	✓	2.3, 3.0
Requirements (Water Body)		
39(2)(a).Report identifies and assesses any negative environmental effects of the project on a water body and on land within 30 meters of the water body.	✓	4.2, 5.0 and Table 4.2
39(2)(b). Report identifies mitigation measures in respect of any negative environmental effects.	✓	Table 4.2 and 6.0
39(2)(c). Report describes how the environmental effects monitoring plan addresses any negative environmental effects.	✓	7.0
39(2)(d). Report describes how the construction plan report addresses any negative environmental effects.	✓	6.0, 7.1

2.0 Methods

2.1 DEFINITION OF A WATER BODY

The presence or absence of water bodies within the Project's 120 m Zone of Investigation was assessed using the definition of a water body provided in O. Reg. 359/09, which is as follows:

"…a lake, a permanent stream, an intermittent stream and a seepage area but does not include, a) grassed waterways, b) temporary channels for surface drainage, such as furrows or shallow channels that can be tilled and driven through, c) rock chutes or spillways, d) roadside ditches that do not contain a permanent or intermittent stream, e) temporarily ponded areas that are normally farmed, f) dugout ponds, or g) artificial bodies of water intended for the storage, treatment or recirculation of runoff from farm animal yards, manure storage facilities and sites and outdoor confinement areas".

2.2 RECORDS REVIEW

A water records review was conducted according to Section 30(1) of O. Reg. 359/09. Data was gathered by MKI (2012a, b) and Stantec through agency requests and/or accessing online databases as follows:

- Ontario Ministry of Natural Resources
- Land Information Ontario (LIO) mapping database
- Long Point Region Conservation Authority (LPRCA)
- Ontario Ministry of Agriculture Foods and Rural Affairs (OMAFRA)
- Rural Drainage Mapping Website

Copies of all correspondence related to the Records Review will be provided in the Record of Consultation which will be submitted as part of the complete REA application to the MOE. Information obtained as a result of the information requests/records review are presented in **Section 4.0** of this report.

Watercourses and waterbodies identified by LIO mapping (MNR, 2009) are included in **Figure 2**, **Appendix A**, where "watercourses" and "waterbodies" are water features (including lakes, rivers, streams, etc.), as mapped by the MNR. These water features may or may not meet the definition of a water body as described in **Section 2.1**.

Past reports written by the LPRCA (2007 and 2008) provided background data regarding fish communities and habitat in the Zone of Investigation.

2.3 SITE INVESTIGATIONS

Site investigations were carried out according to Section 31 of O. Reg. 359/09. The field investigations were conducted by Stantec on October 1, 2012, as summarized in **Table 4.1**. Records of field investigations are included in **Appendix C**. The conclusions in this report are based entirely upon Stantec's field investigations.

The purpose of the site investigations was to:

- Ground truth the results of the records review to identify any required corrections;
- Determine whether any additional water bodies exist, other than those identified during the records review; and
- Identify the boundaries of any water body located within the 120 m Zone of Investigation.

While on site, the field crew used visual inspections to verify the presence or absence of water bodies within the 120 m Zone of Investigation.

In some cases, marshes or portions of other on-line wetland features that were observed in the field may meet the definition of a water body if they are part of a permanent or intermittent channel or seepage area.

Once locations of water bodies were confirmed, a general aquatic habitat assessment was conducted within the 120 m Zone of Investigation. A combination of background data and results of Stantec's 2012 surveys were used to determine the presence or absence of fish habitat within the 120 m Zone of Investigation.

As a result of the collection of background data and field data, an assessment was made with respect to the presence or absence of fish habitat at each surveyed reach. The following criteria were used for the designation of fish habitat:

- **Fish Habitat** – permanently flowing watercourse with available fish community data (background and/or Stantec surveys) or intermittently flowing channel contributing indirectly (e.g., allochthonous inputs, flow) to downstream reaches supporting fish.
- **Not Fish Habitat** – not directly connected to a downstream water feature that supports fish or as per background data.

2.4 QUALIFICATIONS

The following Stantec personnel were responsible for the identification of water bodies and for determining any Project implications associated with fish and fish habitat:

- Kelly Mason B.Sc. (Env.), ERGC – Aquatic Ecologist
- Nathan Burnett, Tech. Dipl., B.Sc. – Biologist
- Mark Pomeroy, B.Sc. – Fisheries Biologist
- Kathleen Todd, M.Sc. – Senior Aquatic Ecologist

Curricula vitae are provided in **Appendix E**.

3.0 Water Bodies and Fish Habitat within the 120 m Zone of Investigation

As indicated in **Section 2.2**, the presence or absence of water bodies within the Zone of Investigation was assessed using the definition of a water body provided in O. Reg. 359/09. Based on the results of field investigations and the records review, water features within the 120 m Zone of Investigation were identified. These have been summarized in **Table 3.1** and illustrated in **Figure 2, Appendix A**. Three water bodies were identified within the 120 m Zone of Investigation. During the field investigations, there were no additional water bodies, lakes or seepage areas identified within the 120 m Zone of Investigation other than those described in **Section 4.0**. Photographs and field notes of these investigations are provided in **Appendices B** and **C** respectively.

The presence of fish habitat within the 120 m Zone of the Investigation was determined through a combination background data review and field observations. The water bodies within the Zone of Investigation were not fished. Fish habitat is illustrated in **Figure 3** (**Appendix A**).

Based on a review of the document entitled “Inland Ontario Lakes Designated for Lake Trout Management” (MNR, 2003), there are no Lake Trout lakes that are at or above development capacity identified within 300 m of the Project Location.

Table 3.1: Water Body Project Component Summary

Water Body	Station	Crossing Type*			w/in 120 m			
		Access Road**	Collector Line	Transmission Line	Turbine	Access Road**	Collector Line	Transmission Line
Tributary to Lake Erie 1	WA1		1					
Tributary to Lake Erie 2	WA2		1					
Hay Creek	WA3					√		

***Number(s) displayed in cell(s) represent the number of times a particular Project component crosses that water body**

****Includes crane pad and underground collector line**

4.0 Existing Conditions and Predicted Impacts

MNR's LIO mapping (MNR, 2009) indicates the presence of three waterbodies within the 120 m Zone of Investigation. Field investigations determined that all three features meet the definition of a water body presented in O. Reg. 359/09.

The following section provides information on available background data provided for the watershed within the 120 m Zone of Investigation and site-specific information regarding physical habitat and fish communities. Weather conditions during field investigations are presented in **Table 4.1**. The information is summarized in **Table 4.2**. Potential impacts to fish habitat and general mitigation measures are provided for each site where fish habitat is present. In some cases, Fisheries and Oceans Canada (DFO) Operational Statements (OS's) may be applicable for construction activities in or near water (e.g. crossing watercourses with overhead lines, underground cables, etc.). When an OS is used, mitigation measures provided in the OS will protect fish habitat and no further review or approvals are required.

Although specific OS's are referenced in this report, consultation with the LPRCA and/or DFO may result in site-specific construction methods and mitigation measures for some locations.

Table 4.1: Site Investigation Information

Dates	Daily Duration of Site Visit	Air Temperature (Range) °C	Precipitation in 24 hours prior to Survey	General Weather Observations
October 1, 2012	11:15-12:35	16-20	none	Sunny, 20°C, 10% cloud, no wind

4.1 DEDRICK-YOUNG CREEKS WATERSHED

The proposed Project is located in the Dedrick-Young Creeks watershed. The watershed area is approximately 263 km² spanning 19 km north to south and 26 km east to west. This watershed contains groundwater fed creeks and streams that result in several significant coldwater fisheries in the general area. The watershed is mainly located within the Norfolk Sand Plains which is characterized as a low-relief, silt sand and gravel sand plain. The Project Location is situated near the eastern boundary of the watershed, where clay becomes the primary surface material (LPRCA 2007, 2008). All of the water bodies within the Zone of Investigation drain directly into Lake Erie.

Background information indicates that the following six fish species are known to occur within the watershed:

- Fathead Minnow
- Longear Sunfish
- Pumpkinseed
- Rock Bass
- White Sucker
- Creek Chub
- Brook Trout

Habitat information at the locations identified in **Figure 2, Appendix A** is provided in **Table 4.2** along with references to general impacts, mitigation measures and predicted net effects of specific Project components.

Table 4.2: Summary of Fish Habitat Within the 120 m Zone of Investigation

Reach ID[a]	Site Description*	Proposed Works	Potential Impacts	Mitigation	Net Effects[b]
WA1	Intermittent flowing channel; dry during field investigations. Riparian area consists of American Beech, Sugar Maple and Eastern Hemlock. In-water cover included undercut banks and woody debris. Bankfull width = 3-4 m Substrate = sand, clay, silt and gravel	Collector line to cross a water body (**Figure 2**).	Construction activities associated with installing the collector line may affect the reach outside the constructible area (e.g. Temporary increase in surface water turbidity due to runoff during construction). (see **Sections 5.1** and **5.2**).	See **Sections 6.1, 6.2**, DFO Operational Statement for High Pressure Directional Drill, Punch and Bore, and Isolated or Dry Open-cut Stream Crossing (**Appendix D**).	None expected
WA2	Intermittent flowing channel; dry during the field investigation. The culvert at the road is perched by approximately 0.5 m. Riparian area consists of Manitoba Maple, Eastern Hemlock and Jewelweed. In-water cover includes cobbles. Bankfull width = 5-6 m Substrate = Cobble, sand and gravel	Collector line to cross a water body (**Figure 2**).	Construction activities associated with installing the collector line may affect the reach outside the constructible area (e.g. Temporary increase in surface water turbidity due to runoff during construction). (see **Sections 5.1** and **5.2**).	See **Sections 6.1, 6.2**, DFO Operational Statement for High Pressure Directional Drill, Punch and Bore, and Isolated or Dry Open-cut Stream Crossing (**Appendix D**).	None expected
WA3	Permanent flow with a pool dominated channel morphology. The riparian area consists of maples, basswood, hemlock and white spruce. In-water cover includes deep pool, undercut banks and woody debris. Bankfull width = 6-8 m Wetted width = 2 m Water depth = 30 cm Substrate = clay, gravel and silt	Upgrades to access road within 120 m of a water body (**Figure 2**).	Construction activities associated with upgrading the access road may affect the reach outside the constructible area (e.g. Temporary increase in surface water turbidity due to runoff during construction. (**see Section 5.1**)	Ensure implementation of appropriate mitigation measures. See **Section 6.1**.	None expected

a see **Figure 2** (**Appendix A**)
b assumes all mitigation measures are implemented and successful
*summary of the surveyed reach

4.2 SUMMARY OF PERMITTING PROCESS

The conclusions of no net effects (**Table 4.2)** assume that negative effects associated with turbine construction and overhead/underground collector line installation can be mitigated. It may then be possible to use DFO OS's **(see Appendix D)** for the construction of these components. When an OS is used, mitigation measures provided in the Operational Statement will protect fish habitat and no further review or approvals are required. Although specific OS's are referenced in this report, consultation with the DFO may result in site-specific construction methods and mitigation measures for some locations. In such cases, additional sites may require review by the DFO, and details of construction methods, etc. should be submitted for agency review. No additional permitting under the *Fisheries Act* is anticipated.

If it is determined that Project components will be installed within areas regulated by LPRCA, additional permitting will be required under Ontario Regulation (O. Reg.) 178/06.

If necessary, permitting under O. Reg. 178/06 and the *Fisheries Act* occurs outside the REA process.

5.0 General Overview of Potential Impacts

Potential effects are summarized in Section 3.4.2 of the Construction Plan Report and are detailed below.

5.1 GENERAL CONSTRUCTION-RELATED IMPACTS

Project construction activities include land clearing, soil stripping, grubbing, grading, and fill placement. Potential impacts to watercourses located within the 120 m Zone of Investigation may include:

- Short-term increase in turbidity from runoff, sedimentation and soil erosion during construction;
- Loss of shade;
- Reduced bank stability;
- Reduced allochthonous inputs;
- Water quality and habitat disturbance effects to aquatic habitat; and,
- Fuel/lubrication fluid spills.

5.2 UNDERGROUND COLLECTOR LINES

Potential impacts to fish and fish habitat related to the installation of underground collector lines are as follows:

- Erosion and sedimentation from site disturbance and dewatering;
- Collapse of the punch or bore hold under the stream;
- Disturbing riparian vegetation can reduce shoreline cover, shade and food production areas; and,
- Machinery fording the stream can disturb bottom and bank substrates, disrupt sensitive fish life stages and introduce deleterious substances i.e. equipment is not properly maintained.

5.3 DISTRBUTION SUBSTATION

The potential for effects on watercourses exists from soil erosion resulting from unavoidable removal of stabilizing vegetative cover during construction activities. Erosion can cause sediment transport to nearby watercourses and a short-term increase in surface water turbidity, including associated impacts to fish and fish habitat. Due to the rural and agricultural land uses within the Project boundary, the watercourses are not highly sensitive to temporary disturbances. However, the magnitude and duration of potential effects to watercourses depend

on the specific characteristics of each watercourse (e.g. flow regime, water velocity, bed substrates, bank conditions, local soils and the extent and duration of exposure).

Some materials, such as fuel, lubricating oils and other fluids associated with electrical equipment operation and maintenance have the potential for release to the environment in the event of accidental spills. An appropriate spill containment system should be installed or kept on-site as necessary.

It is anticipated that no net negative effects will occur to water bodies as a result of substation installation as the facility is proposed to be located greater than 120 m away from any water body.

6.0 Standard Mitigation Measures for Working around Fish Habitat

Standard mitigation measures used for works in and around water are summarized below and in Section 3.4.2 of the Construction Plan Report. Specific details of the mitigation measures to be implemented would be determined through consultations with the local municipality, the LPRCA, and DFO. The extent of mitigation would be dependent on Project details such as technical requirements, construction methods and schedule.

6.1 GENERAL MITIGATION MEASURES

There are many mitigation measures to protect fish and fish habitat from potential effects during the construction phase of a Project. General mitigation measures for construction activities near a watercourse in the Zone of Investigation include:

- Site clearing will be kept to a minimum;
- All in-water work would be completed within MNR timing windows to protect local fish populations during their spawning and egg incubation periods. A typical construction timing window for coldwater streams in the Aylmer District is July 1 to September 30.
- All materials and equipment used for the purpose of site preparation and Project construction shall be operated and stored in a manner that prevents any deleterious substance (e.g., petroleum products, silt, etc.) from entering the water:
  - Any stockpiled materials should be stored and stabilized away from the water;
  - Refuelling and maintenance of construction equipment should occur a minimum of 30 m from a water body;
  - Spill containment kits will be kept on site;
  - As appropriate, spills should be reported to the MOE Spills Action Centre;
  - Any part of equipment entering the water should be free of fluid leaks and externally cleaned/degreased to prevent any deleterious substance from entering the water; and,
  - Only clean material, free of fine particulate matter should be placed in the water.
- Sediment and erosion control measures should be implemented prior to construction and maintained during the construction phase to prevent entry of sediment into the water:
  - Silt fencing and/or barriers should be used along all construction areas adjacent to natural areas;
  - No equipment should be permitted to enter any natural areas beyond the silt fencing during construction;

- All sediment and erosion control measures should be inspected at least weekly and during and immediately following rainfall events to ensure that they are functioning properly and are maintained and/or upgraded as required;
- Topsoil stockpiles should be sufficiently distant from watercourses to preclude sediment inputs due to erosion of stored soil materials;
- If the sediment and erosion control measures are not functioning properly, no further work should occur until the sediment and/or erosion problem is addressed;
- All disturbed areas of the construction site should be stabilized immediately and returned to pre-construction conditions as soon as possible; and,
- Sediment and erosion control measures should be left in place until all areas of the construction site have been stabilized.

6.2 MITIGATION FOR UNDERGROUND COLLECTOR LINES

High pressure directional drilling will be used to install the buried collector line. The DFO OS for this technique is included in **Appendix E**, where mitigation measures are also described.

In addition to measures identified in the OS, an Emergency Spill Kit should be available on site in the event of leaks from machinery.

High Pressure Directional Drill

All measures set out in the DFO OS (**Appendix E**) should be implemented as applicable. The following is a summary of general concepts outlined in the OS:

- Follow MNR in-water construction timing windows;
- Isolation of the exit location for the protection of water quality and control of drilling fluids;
- Restoration of any in-water work areas;
- Restoration of shoreline; and,
- Sediment control.

Refer to the High Pressure Directional Drill OS (**Appendix E**) for specific details.

7.0 Monitoring

7.1 CONSTRUCTION (AS DESCRIBED IN THE CONSTRUCTION PLAN REPORT)

Methodologies/Sampling Protocols

As appropriate, environmental monitoring will occur during installation of Project components that could potentially affect aquatic habitats to ensure compliance with specifications, site plans and permits. In particular, the Construction Contractor would ensure that pre-construction preparation is completed as per the Environmental Effects Monitoring Plan outlined in Section 7.1 of the Construction Plan Report (e.g. Erosion and Sediment Control Plans), prior to commencement of in-water work (if required). The Construction Contractor would ensure that detailed pre-construction profiles of the slopes, banks, and bed are determined prior to installation of the access roads, crane pads and collector lines. The Construction Contractor should monitor weather forecasts prior to the installation of access roads, crane paths and collector lines, particularly prior to work near aquatic habitats.

The Environmental Monitor will:

- Perform routine checks of all erosion and sediment control measures;
- Monitor flow conveyance during in-water works where culvert replacements are required;
- Visually inspect access/exit pits and directional drill line for frac-outs;
- Inspect drilling equipment and materials for spills/leaks; and,
- Ensure proper procedure is followed in the event of a spill.

Performance Objectives/Additional Actions

The Environmental Monitor should ensure that bank, bed, and floodplain conditions are restored to pre-construction conditions, where possible, following completion of the construction activities.

Environmental monitoring following spring run-off the year after construction (first year of operations) should also occur, to review the effectiveness of the bank and slope re-vegetation (if required), to check bank and slope stability, and to ensure surface drainage has been maintained. In the event that adverse effects are noted, appropriate remedial measures should be completed as necessary (i.e. site rehabilitation and re-vegetation) and additional follow-up monitoring conducted as appropriate, under the direction of an environmental advisor.

Compensation strategies and/or permits from Fisheries and Oceans Canada and/or the LPRCA, as applicable, may include conditions of approval such as construction and post-construction monitoring. All such strategies and/or permits should be obtained prior to construction, and all such conditions and requirements would be implemented as appropriate.

7.2 OPERATION

The Environmental Effects Monitoring Plan for the Project is provided in the Design and Operations Report. Operation activities that have the potential to affect aquatic habitat includes accidental spills and/or leaks. Proper storage of materials (e.g. maintenance fluids) at off-site storage containers would greatly reduce the potential for accidental spills and/or leaks.

Appropriate remedial measures may be completed as necessary and additional follow-up monitoring conducted as appropriate in the event of an accidental spill and/or leak. The level of monitoring and reporting should be based on the severity of the spill/leak and may be discussed with the MOE (Spills Action Centre) and MNR.

If *Fisheries Act* approvals are required from DFO, some monitoring may be required, and would be stated in DFO approvals. Monitoring typically includes photographic records during construction and for two years after the completion of construction to ensure survival of plantings and overall function of the installation. If significant habitat enhancement or compensation measures are required, monitoring may also include assessments of the fish community and habitat use.

8.0 Conclusions

The Port Ryerse Wind Power Project 'Water Assessment and Water Body Report' has been prepared by Stantec for Boralex/UDI in accordance with O. Reg. 359/09. This report is one component of the REA application for the Project.

Locations where water bodies are present within the 120 m Zone of Investigation are presented in **Figure 2** and summarized in **Table 4.2**. The designation of various features as water bodies was agreed upon by field staff using field conditions at the time of the survey and the definition of water body provided in O. Reg. 359/09.

Based on the current Project layout and proposed environmental mitigation measures, there will be no impacts to water bodies containing fish and fish habitat. It is expected that *Fisheries Act* approval will consist of DFO OS's, although consultation with LPRCA/DFO may result in site specific mitigation measures in addition to the mitigation measures outlined in **Section 6.0**.

This report has been prepared by Stantec for the sole benefit of Boralex/UDI, and may not be used by any third party without the express written consent of Boralex/UDI. The data presented in this report are in accordance with Stantec's understanding of the Project as it was presented at the time of reporting.

Respectfully submitted,
STANTEC CONSULTING LTD.

Kelly Clayton, B.Sc. (Env), ERGC.
Aquatic Ecologist

Mark Pomeroy, B.Sc.
Fisheries Biologist

Kathleen Todd, M.Sc.
Senior Aquatic Ecologist

w:\active\60960773\reports\03_final-submission-to-moe_march-2013\water assessment and water body report\rpt_60773_water_201303_fnl.docx

9.0 References

Long Point Region Conservation Authority (LPRCA). 2007. Technical Report on Water Quality. Available at: http://www.sourcewater.ca/swp_watersheds_longpoint/LPRCA_WQ_July07_6.pdf.

Long Point Region Conservation Authority (LPRCA). 2008. Characterization Report. Available at: http://www.sourcewater.ca/swp_watersheds_longpoint/Characterization_summary_LPR.pdf

M.K. Ince and Associates. 2012a. Water Assessment Report. Unpublished.

M.K. Ince and Associates. 2012b. Water Body Report. Unpublished.

Natural Heritage Information Centre (NHIC) database. 2012. Ontario Ministry of Natural Resources, Peterborough, Ontario. Available at: http://nhic.mnr.gov.on.ca/. Accessed January, 2012.

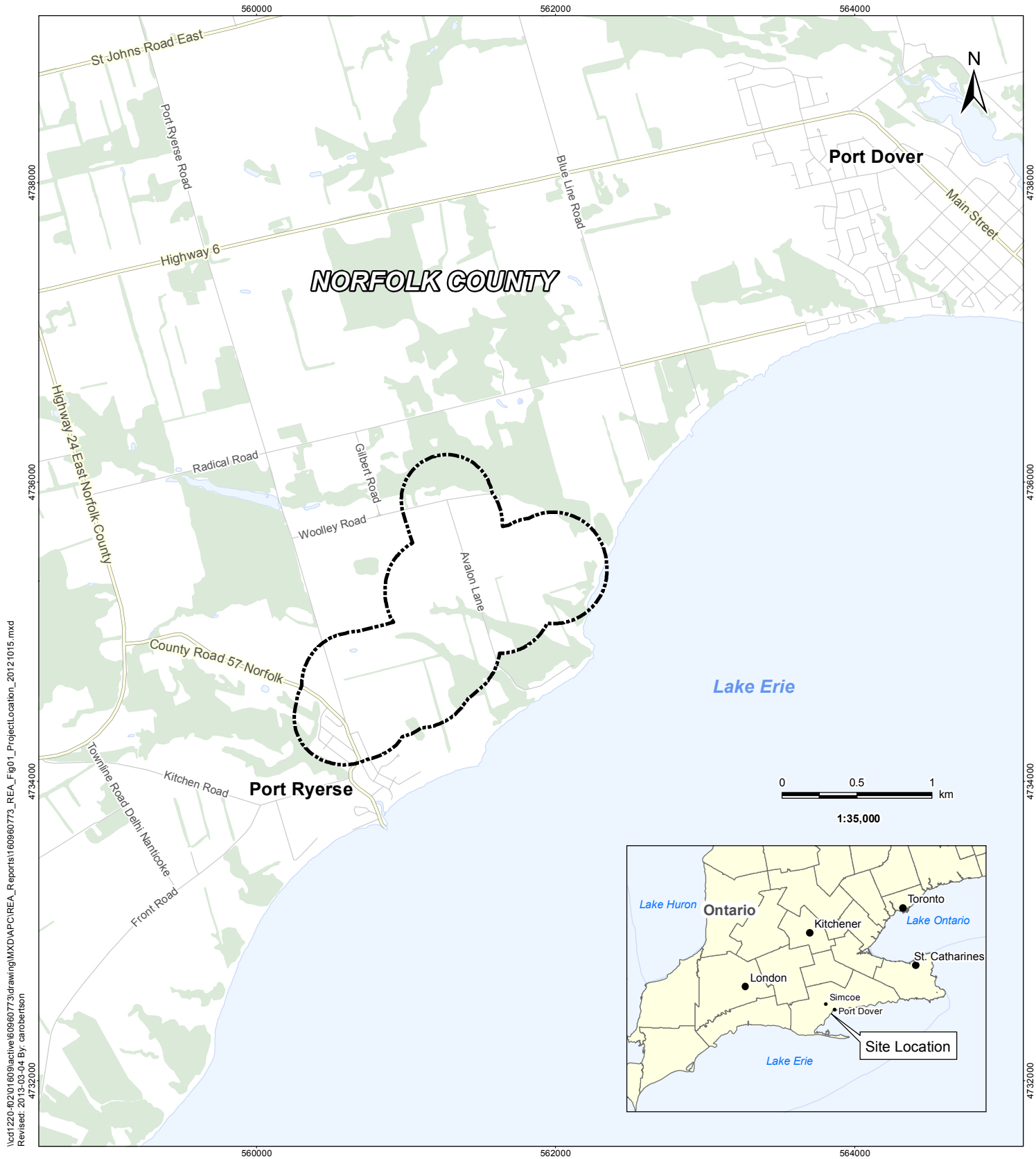
Ontario Ministry of Natural Resources (MNR). 2003. Inland Ontario Lakes Designated for Lake Trout Management.

Ontario Ministry of Natural Resources (MNR). 2009. Land Information Ontario (LIO) mapping. Available at: http://www.lio.ontario.ca/imf-ows/imf.jsp?site=aia_en#.

Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), 2012. Rural Drainage Mapping Tool. Available at: http://www.omafra.gov.on.ca/english/landuse/gis/map_drain.htm. Accessed August 2012.

Appendix A

Figures



\\cd1220-f02\01609\active\160960773\drawing\MXD\APC\REA_Reports\160960773_REA_Fig01_ProjectLocation_20121015.mxd
Revised: 2013-03-04 By: carobertson

March 2013
160960773

Stantec

Legend

- Study Area
- Major Road
- Local Road
- Wooded Area
- Waterbody

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.

Client/Project
Boralex/ UDI
Port Ryerse Wind Farm
Port Ryerse, Ontario

Figure No.
1

Title
Project Location

561000 562000

4736000 4735000 4734000

N

Gilbert Road
Woolley Road
Port Ryerse Road
Avalon Lane
County Road 57/Norfolk
Cookson Street
Ryerson Street
Ralph Street North
Ralph Street South
Young's Creek Road
King Street North
Hilltop Drive
Ford Road
Port Ryerse

T1 T2 T3 T4

46.7m
89m

Lake Erie

0 100 200 m
1:8,000

Legend

- Zone of Investigation (120 m)

Project Components

- Proposed Turbine
- MET Tower
- Bladeswept Area / Rotor Diameter (113 m)
- Proposed Access Road
- Turning Radius
- Proposed Collector Line
- Component Laydown Area and Crane Pad
- Substation/Distribution
- Proposed Permanent Site Parking Lot

Existing Features

- Major Road
- Local Road
- Watercourse
- Waterbody

Water Body Status

- REA Water Body

Setbacks

- REA Water Body Setback (30m)

Ecological Land Classification:

Vegetation Community
CUT / CUM - Cultural Thicket / Cultural Meadow
CUW - Cultural Woodland
CUW1-3* - Black Walnut Mineral Cultural Woodland
FOD4-2 - Dry-Fresh Ash Deciduous Forest
FOD5-2 - Dry-Fresh Sugar Maple - Beech, Deciduous Forest
FOD7-4 - Fresh-Moist Black Walnut Lowland Deciduous Forest
FOD9-4 - Fresh-Moist Shagbark Deciduous Forest

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
3. Orthographic Imagery Source: © First Base Solutions, 2011.
   Imagery taken in Spring 2010.

Stantec

November 2013
160960773

Client/Project
Boralex/ UDI
Port Ryerse Wind Farm
Port Ryerse, Ontario

Figure No.
2

Title
Water Body Location

W:\active\60960773\drawing\MXD\Aquatics\WaterAssessmentReport\160960773_Fig02_WaterBodyLocations_20130307.mxd
Revised: 2013-11-07 By: dharvey

561000 562000

4736000 4735000 4734000

N

Gilbert Road
Woolley Road
Port Ryerse Road
Avalon Lane
County Road 57/Norfolk
Cookson Street
Ryerson Street
Ralph Street North
Ralph Street South
Yarmouth Creek Road
King Street North
Hilltop Drive
Foord Road
Port Ryerse

T1 T2 T3 T4

Lake Erie

0 100 200 m
1:8,000

Legend

- Zone of Investigation (120 m)

Project Components

- Proposed Turbine
- MET Tower
- Bladeswept Area / Rotor Diameter (113 m)
- Proposed Access Road
- Turning Radius
- Proposed Collector Line
- Component Laydown Area and Crane Pad
- Substation
- Proposed Permanent Site Parking Lot

Existing Features

- Major Road
- Local Road
- Watercourse
- Waterbody

Water Body Status

- Fish Habitat

Ecological Land Classification:

Vegetation Community
CUT / CUM - Cultural Thicket / Cultural Meadow
CUW - Cultural Woodland
CUW1-3* - Black Walnut Mineral Cultural Woodland
FOD4-2 - Dry-Fresh Ash Deciduous Forest
FOD5-2 - Dry-Fresh Sugar Maple - Beech, Deciduous Forest
FOD7-4 - Fresh-Moist Black Walnut Lowland Deciduous Forest
FOD9-4 - Fresh-Moist Shagbark Deciduous Forest

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
3. Orthographic Imagery Source: © First Base Solutions, 2011.
   Imagery taken in Spring 2010.

Stantec

October 2012
160960773

Client/Project
Boralex/ UDI
Port Ryerse Wind Farm
Port Ryerse, Ontario

Figure No.
3

DRAFT

Title
Fish Habitat

W:\active\60960773\drawing\MXD\Aquatics\WaterAssessmentReport\160960773_Fig03_FishHabitat_20121005.mxd
Revised: 2012-10-15 By: dharvey

Appendix B

Photographic Record

Photo 1: Station Wa04 – Hay Creek (Fall 2012) - Facing upstream (northwest) north of Gilbert Road, showing channel overview.

Photo 2: Station Wa04 – Hay Creek (Fall 2012) - Facing downstream (southeast) north of Gilbert Road, showing channel and woody debris.

Photo 3: Station Wa04 – Tributary to Lake Erie (Fall 2012) – North of Gilbert Road, showing clay/silt/gravel substrate of channel.

Photo 4: Station Wa02 – Tributary to Lake Erie (Fall 2012) - Facing upstream (northwest) off of Avalon Lane, showing perched culvert and pool in channel.

Photo 5: Station Wa02 – Tributary to Lake Erie (Fall 2012) - Facing downstream (southeast) off of Avalon Lane, showing channel in forested area.

Photo 6: Station Wa02 – Tributary to Lake Erie (Fall 2012) - Off of Avalon Lane, showing cobble/gravel/sand substrate of channel.

Photo 7: Station Wa01 – Tributary to Lake Erie (Fall 2012) - Facing upstream (northwest) west of Avalon Lane, showing channel in forested area.

Photo 8: Station Wa01 – Tributary to Lake Erie (Fall 2012) - Facing downstream (southeast) west of Avalon Lane, showing channel in forested area.

Photo 9: Station Wa01 – Tributary to Lake Erie (Fall 2012) - West of Avalon Lane, showing clay/silt/sand substrate of channel.

Appendix C

Field Notes

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Station # WA01 | Project Name Port Rexpere
Watercourse Name unknown Trib | Project # 160960773
Photos 20-25 | Field Staff K. Mason, N. Burnett
Date Oct 11/12 | Time 12:35
Weather conditions in previous 24 hrs 16°C, Sunny
GPS Coordinates (Zone) 17T E 0561566 N 4734697 Datum Nad83
Descriptive Location West of Avalon Lane, SW of WA02

Water Quality
Dissolved Oxygen (mg/L) dry channel | pH | Conductivity (µS/cm)
Water Temperature (°C) | Air Temperature (°C) 20°C
Time *in situ* measurements taken

Watercourse Dimensions & Morphology
Mean Watercourse Width (m) | Maximum Pool Depth dry (cm)
Mean Bankfull Width 3-4 (m) | Mean Water Depth (cm)
% Riffle | % Pool | % Run | % Flat
Evidence of eroding banks, Comments on bank stability a little erosion on right bank

Substrate (% cover)
Bedrock | Cobble 40 | Sand 20 | Silt | Muck
Boulder 20 | Gravel 20 | Clay | Marl | Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks | Deep Pool | Watercress | Aquatic Veg | Overhanging Vegetation | Woody Debris | Boulder | Other

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
95%, trees, mature
Adjacent Land Use
cornfield, forest

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Migratory Obstructions (seasonal, permanent) dry channel
Note any fish observations

Waterbody Notes
Natural Watercourse ✓ | Trapezoidal Channel | Grassed Swale | Buried Tile
Surficial Drainage (i.e. furrows) | Dugout Pond | Dominated by Aquatic Veg | Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc. Am. Beech Maple hemlock
Moderately defined channel, fairly even, deep valley

Field Notes Authored by K. Mason | Field Notes QA/QCed by N Burnett

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Station # Wa02
Watercourse Name Unknown Creek to Lake Erie
Photos 8-10, 18, 19
Date Oct 1/12
Project Name Pat Reverse Wind farm
Project # 160960773
Field Staff K. Mason, N. Burnett
Time 11:25
Weather conditions in previous 24 hrs sunny, ~16°C
GPS Coordinates (Zone) 17T E 0561538 N 4735090 Datum Nad83
Descriptive Location off of Avalon Lane, ~700m South of Gilbert Rd.

Water Quality * Isolated pool
Dissolved Oxygen (mg/L) 5.60 pH 8.27 Conductivity (µS/cm) 922
Water Temperature (°C) 11.84 Air Temperature (°C) 20°C
Time *in situ* measurements taken 11:40

Watercourse Dimensions & Morphology
Mean Watercourse Width _____(m) Maximum Pool Depth _____(cm)
Mean Bankfull Width 5-6(m) Mean Water Depth _____(cm)
_____% Riffle _____% Pool _____% Run _____% Flat
Evidence of eroding banks, Comments on bank stability banks eroding & scouring mostly on right bank.

Substrate (% cover)
_____Bedrock 50 Cobble 30 Sand _____ Silt _____ Muck
_____Boulder 20 Gravel _____ Clay _____ Marl _____ Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris (Boulder) Other _____
Cobble

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
95% Manitoba maple, mature
Adjacent Land Use
Road, corn field

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
potential spawning for white sucker during high flows.
Migratory Obstructions (seasonal, permanent)
perched culvert / dry channel
Note any fish observations

Waterbody Notes
Natural Watercourse ✓ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc. perched culvert (by ~0.5m)
- Many maple, hemlock lowland riparian area
- dry channel, but most likely wet in other years.
- Cobble / gravel / clay bottom

Field Notes Authored by K. Mason Field Notes QA/QCed by N. Burnett

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Station # Wa03
Watercourse Name unknown trib to L. Erie
Photos 11-14, 15, 16 & 17
Date Oct 1/12

Project Name Port Revere Wind farm
Project # 160960773
Field Staff K. Macan, N Burnett
Time 11:55 am

Weather conditions in previous 24 hrs sunny, 16°C
GPS Coordinates (Zone) 17T E 0562046 N 4735176 Datum Nad83
Descriptive Location East of Avalon Lane & Wa02

Water Quality dry channel
Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) 20°C
Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology dry
Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width 2 (m) Mean Water Depth _____ (cm)
_____ % Riffle _____ % Pool _____ % Run _____ % Flat
Evidence of eroding banks, Comments on bank stability fairly stable - well vegetated

Substrate (% cover)
_____ Bedrock _____ Cobble _____ Sand 70 Silt _____ Muck
_____ Boulder 10 Gravel 20 Clay _____ Marl _____ Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Cobble Other _____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
95%, Mature trees (maple, ash, willow), mature
Adjacent Land Use
cornfield

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
—
Migratory Obstructions (seasonal, permanent)
dry channel
Note any fish observations —

Waterbody Notes
Natural Watercourse ✓ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry —

Other Habitat Notes, Incidental Wildlife Observations, etc. • looks like channel maybe dry for the majority of the year. Black Ash, maple, willow, Populus. dry channel comprised of cobble, gravel, silt near. At the end of channel there was a road which was built over top of drainage coming off field into main channel (photos 15, 16, 17)
• deep valley, fairly shallow channel

Field Notes Authored by K. Macan Field Notes QA/QCed by N. Burnett

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Station # WA04
Watercourse Name Hay Creek
Photos 1-7
Date Oct 1/12
Weather conditions in previous 24 hrs sunny, 16°C
GPS Coordinates (Zone) 17T E 0561261 N 4735993 Datum NAD83
Descriptive Location North of Gilbert Road (~100m north) & north of avalon road

Project Name Port Reverse
Project # 1609607/3
Field Staff K. Masan, N. Burnett
Time 11:16

Water Quality
Dissolved Oxygen (mg/L) 9.45 pH 8.67 Conductivity (µS/cm) 548
Water Temperature (°C) 13.45 Air Temperature (°C) 20C
Time *in situ* measurements taken 11:16

Watercourse Dimensions & Morphology
Mean Watercourse Width 2 (m) Maximum Pool Depth 75 (cm)
Mean Bankfull Width 6-8 (m) Mean Water Depth 30 (cm)
40 % Riffle 50 % Pool 10 % Run ____ % Flat
Evidence of eroding banks, Comments on bank stability some erosion occurring on right bank, exposed roots etc

Substrate (% cover)
____ Bedrock ____ Cobble ____ Sand 10 Silt ____ Muck
____ Boulder 10 Gravel 80 Clay ____ Marl ____ Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other ____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
95% - Sugar maples, mature
Adjacent Land Use
forest, road, residential

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
small bodied fish - potentially nursery/spawning due to proximity to L. Erie
Migratory Obstructions (seasonal, permanent)
in water logs - jams
Note any fish observations ____

Waterbody Notes
Natural Watercourse ✓ Trapezoidal Channel ____ Grassed Swale ____ Buried Tile ____
Surficial Drainage (i.e. furrows) ____ Dugout Pond ____ Dominated by Aquatic Veg ____ Dry ____

Other Habitat Notes, Incidental Wildlife Observations, etc. frog
highly sinuous natural channel, mostly clay substrate, some gravel. lots of in stream logs.
Riparian area comprised of maples, solomon seal, basswood, hemlock, white spruce.

Field Notes Authored by K. Masan. Field Notes QA/QCed by N. Burnett

Appendix D

DFO Operational Statements

HIGH-PRESSURE DIRECTIONAL DRILLING

Fisheries and Oceans Canada
Ontario Operational Statement

Version 3.0

For the purpose of this Operational Statement, the term High-Pressure Directional Drilling (HPDD) means trenchless methods of crossing a watercourse using pressurized mud systems. HPDD is used to install cables and pipelines for gas, telecommunications, fibre optics, power, sewer, oil and water lines underneath watercourses and roads. This method is preferable to open-cut and isolated crossings since the cable or pipeline is drilled underneath the watercourse with very little disturbance to the bed or banks. HPDD involves drilling a pilot bore hole underneath the watercourse towards a surface target, back-reaming the bore hole to the drill rig while pulling the pipe along through the hole. This process typically uses the freshwater gel mud system composed of a mixture of clean, freshwater as the base, bentonite (clay-based drilling lubricant) as the viscosifier and synthetic polymers.

The general order of preference for carrying out a cable or pipeline stream crossing in order to protect fish and fish habitat is: a) a punch or bore crossing (see *Punch & Bore Crossings* Operational Statement), b) HPDD crossing, c) dry open-cut crossing, and d) isolated open-cut crossing (see *Isolated or Dry Open-cut Stream Crossings* Operational Statement). This order must be balanced with practical considerations at the site.

One of the risks associated with HPDD is the escape of drilling mud into the environment as a result of a spill, tunnel collapse or the rupture of mud to the surface, commonly known as "frac-out". A frac-out is caused when excessive drilling pressure results in drilling mud propagating toward the surface. The risk of a frac-out can be reduced through proper geotechnical assessment practices and drill planning and execution. The extent of a frac-out can be limited by careful monitoring and having appropriate equipment and response plans ready in the event that one occurs. HPDD can also result in excessive disturbance of riparian vegetation and sedimentation and erosion due to operation of equipment on the shoreline or fording to access the opposite bank.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. By following the conditions and measures set out below you will be in compliance with subsection 35(1) of the *Fisheries Act.*

The purpose of this Operational Statement is to describe the conditions under which it is applicable to your project and the measures to incorporate into your project in order to avoid negative impacts to fish habitat. You may proceed with your high-pressure directional drill project without a DFO review when you meet the following conditions:

- the crossing technique will not damage the stream bed and thereby negatively impact fish or fish habitat,
- the crossing is not a wet open-cut crossing,
- you have an emergency frac-out response plan and a contingency crossing plan in place that outline the protocol to monitor, contain and clean-up a potential frac-out and an alternative method for carrying out the crossing, and
- you incorporate the *Measures to Protect Fish and Fish Habitat when High-Pressure Directional Drilling* listed below in this Operational Statement.

If you cannot meet all of the conditions listed above and cannot incorporate all of the measures listed below then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact your Conservation Authority, or the DFO office in your area (see Ontario DFO office list) or Parks Canada if the project is located within its jurisdiction, including the Trent-Severn Waterway and the Rideau Canal, if you wish to obtain an opinion on the possible options you should consider to avoid contravention of the *Fisheries Act*.

You are required to respect all municipal, provincial or federal legislation that applies to the work being carried out in relation to this Operational Statement. The activities undertaken in this Operational Statement must also comply with the *Species at Risk Act* (**www.sararegistry.gc.ca**). If you have questions regarding this Operational Statement, please contact one of the agencies listed above.

We ask that you notify DFO, preferably 10 working days before starting your work by filling out and sending the Ontario Operational Statement notification form (**www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terr/index_e.htm**) to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to this Operational Statement.

Measures to Protect Fish and Fish Habitat when High-Pressure Directional Drilling

1. Use existing trails, roads or cut lines wherever possible, as access routes to avoid disturbance to the riparian vegetation.

2. Design the drill path to an appropriate depth below the watercourse to minimize the risk of frac-out and to a depth

to prevent the line from becoming exposed due to natural scouring of the stream bed. The drill entry and exit points are far enough from the banks of the watercourse to have minimal impact on these areas.

3. While this Operational Statement does not cover the clearing of riparian vegetation, the removal of select plants may be necessary to access the construction site. This removal should be kept to a minimum and within the road or utility right-of-way.

4. Machinery fording the watercourse to bring equipment required for construction to the opposite side is limited to a one-time event (over and back) and should occur only if an existing crossing at another location is not available or practical to use. A *Temporary Stream Crossing* Operational Statement is also available.

- **4.1.** If minor rutting is likely to occur, stream bank and bed protection methods (e.g., swamp mats, pads) should be used provided they do not constrict flows or block fish passage.
- **4.2.** Grading of the stream banks for the approaches should not occur.
- **4.3.** If the stream bed and banks are steep and highly erodible (e.g., dominated by organic materials and silts) and erosion and degradation are likely to occur as a result of equipment fording, then a temporary crossing structure or other practice should be used to protect these areas.
- **4.4.** Time the one-time fording to prevent disruption to sensitive fish life stages by adhering to appropriate fisheries timing windows (see the *Ontario In-Water Construction Timing Windows*).
- **4.5.** Fording should occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding.

5. Operate machinery on land above the ordinary high water mark (see definition below) and in a manner that minimizes disturbance to the banks of the watercourse.

- **5.1.** Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.
- **5.2.** Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent any deleterious substance from entering the water.
- **5.3.** Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.
- **5.4.** Restore banks to original condition if any disturbance occurs.

6. Construct a dugout/settling basin at the drilling exit site to contain drilling mud to prevent sediment and other deleterious substances from entering the watercourse. If this cannot be achieved, use silt fences or other effective sediment and erosion control measures to prevent drilling mud from entering the watercourse. Inspect these measures regularly during the course of construction and make all necessary repairs if any damage occurs.

- **6.1.** Dispose of excess drilling mud, cuttings and other waste materials at an adequately sized disposal facility located away from the water to prevent it from entering the watercourse.

7. Monitor the watercourse to observe signs of surface migration (frac-out) of drilling mud during all phases of construction.

Emergency Frac-out Response and Contingency Planning

8. Keep all material and equipment needed to contain and clean up drilling mud releases on site and readily accessible in the event of a frac-out.

9. Implement the frac-out response plan that includes measures to stop work, contain the drilling mud and prevent its further migration into the watercourse and notify all applicable authorities, including the closest DFO office in the area (see Ontario DFO office list). Prioritize clean up activities relative to the risk of potential harm and dispose of the drilling mud in a manner that prevents re-entry into the watercourse.

10. Ensure clean up measures do not result in greater damage to the banks and watercourse than from leaving the drilling mud in place.

11. Implement the contingency crossing plan including measures to either re-drill at a more appropriate location or to isolate the watercourse to complete the crossing at the current location. See *Isolated or Dry Open-cut Stream Crossings* Operational Statement for carrying out an isolated trenched crossing.

12. Stabilize any waste materials removed from the work site to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with preferably native grass or shrubs.

13. Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses and cover such areas with mulch to prevent erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.

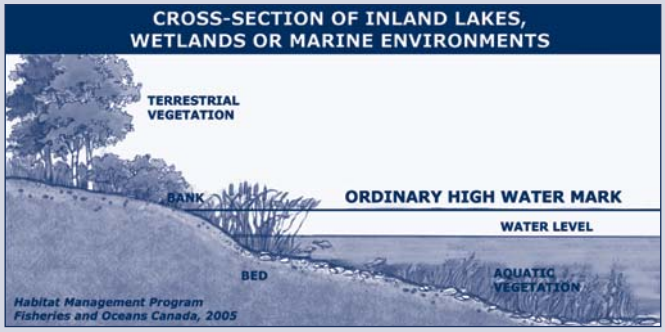
- **13.1.** Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

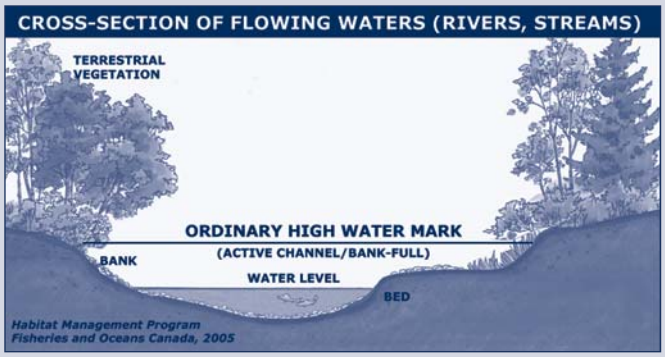
Definition:

Ordinary high water mark – The usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land. In flowing waters (rivers, streams) this refers to the “active channel/bank-full level” which is often the 1:2 year flood flow return level. In inland lakes, wetlands or marine environments it refers to those parts of the water body bed and banks that are frequently flooded by water so as to leave a mark on the land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial

vegetation (excepting water tolerant species). For reservoirs this refers to normal high operating levels (Full Supply Level).

For the Great Lakes this refers to the 80th percentile elevation above chart datum as described in DFO's *Fish Habitat and Determining the High Water Mark on Lakes*.





FISHERIES AND OCEANS CANADA OFFICES IN ONTARIO

Southern Ontario District

Burlington
Fisheries and Oceans Canada
3027 Harvester Road, Suite 304
P.O. Box 85060
Burlington, ON L7R 4K3
Telephone: (905) 639-0188
Fax: (905) 639-3549
Email: ReferralsBurlington@DFO-MPO.GC.CA

London
Fisheries and Oceans Canada
73 Meg Drive
London, ON N6E 2V2
Telephone: (519) 668-2722
Fax: (519) 668-1772
Email: ReferralsLondon@DFO-MPO.GC.CA

Eastern Ontario District

Peterborough
Fisheries and Oceans Canada
501 Towerhill Road, Unit 102
Peterborough, ON K9H 7S3
Telephone: (705) 750-0269
Fax: (705) 750-4016
Email: ReferralsPeterborough@DFO-MPO.GC.CA

Prescott
Fisheries and Oceans Canada
401 King Street West
Prescott, ON K0E 1T0
Telephone: (613) 925-2865
Fax: (613) 925-2245
Email: ReferralsPrescott@DFO-MPO.GC.CA

Northern Ontario District

Parry Sound
Fisheries and Oceans Canada
28 Waubeek Street
Parry Sound, ON P2A 1B9
Telephone: (705) 746-2196
Fax: (705) 746-4820
Email: ReferralsParrySound@DFO-MPO.GC.CA

Sudbury and Sault Ste. Marie
Fisheries and Oceans Canada
1500 Paris Street, Unit 11
Sudbury, ON P3E 3B8
Telephone: (705) 522-2816
Fax: (705) 522-6421
Email: ReferralsSudbury@DFO-MPO.GC.CA

Thunder Bay and Kenora
Fisheries and Oceans Canada
Thunder Bay Office
100 Main Street, Suite 425
Thunder Bay, ON P7B 6R9
Telephone: (807) 346-8118
Fax: (807) 346-8545
Email: ReferralsThunderBay@DFO-MPO.GC.CA

Aussi disponible en français

http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/index_f.asp

DFO/2007-1329

Fisheries and Oceans Canada | Pêches et Océans Canada

NOTIFICATION FORM

Fisheries and Oceans Canada
Ontario Operational Statement

Version 3.1

PROPONENT INFORMATION

NAME:	STREET ADDRESS:	
CITY/TOWN:	PROVINCE/TERRITORY:	POSTAL CODE:
TEL. NO. (RESIDENCE):	TEL. NO. (WORK):	
FAX NO:	EMAIL ADDRESS:	

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

NAME:	STREET ADDRESS:	
CITY/TOWN:	PROVINCE/TERRITORY:	POSTAL CODE:
TEL. NO. (RESIDENCE):	TEL. NO. (WORK):	
FAX NO:	EMAIL ADDRESS:	

PROJECT INFORMATION

Select Operational Statements that are being used (check all applicable boxes):

- ❒ Beach Creation for Residential Use
- ❒ Beaver Dam Removal
- ❒ Bridge Maintenance
- ❒ Clear-Span Bridges
- ❒ Culvert Maintenance
- ❒ Dock and Boathouse Construction
- ❒ High-Pressure Directional Drilling
- ❒ Ice Bridges and Snow Fills
- ❒ Isolated Pond Construction
- ❒ Isolated or Dry Open-cut Stream Crossings
- ❒ Maintenance of Riparian Vegetation in Existing Rights-of-Way
- ❒ Mineral Exploration Activities
- ❒ Moorings
- ❒ Overhead Line Construction
- ❒ Public Beach Maintenance
- ❒ Punch & Bore Crossings
- ❒ Routine Maintenance Dredging
- ❒ Submerged Log Salvage
- ❒ Temporary Stream Crossing
- ❒ Underwater Cables

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

- ❒ River, Stream, Creek
- ❒ Lake (8 hectares or greater)
- ❒ Marine (Ocean or Sea)
- ❒ Pond or wetland (pond is less than 8 hectares)
- ❒ Estuary

PROJECT LOCATION (S) (fill out this section if the project location is different from Proponent Information; append multiple project locations on an additional sheet if necessary)

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

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

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

Signature _____ Date _____

Note: If you cannot meet all of the conditions and cannot incorporate all of the measures in the Operational Statement then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact your Conservation Authority, or the DFO office in your area (see Ontario DFO office list), or Parks Canada if the project is located within its jurisdiction, including the Trent-Severn Waterway and the Rideau Canal, if you wish to obtain more information on the possible options you should consider to avoid contravention of the *Fisheries Act*. For activities carried out under the *Crown Forest Sustainability Act*, the requirements of the applicable Operational Statements are addressed through an existing agreement and the Ontario Ministry of Natural Resources is the first point of contact.

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

Canada

FISHERIES AND OCEANS CANADA OFFICES IN ONTARIO

Southern Ontario District

Burlington
Fisheries and Oceans Canada
3027 Harvester Road, Suite 304
P.O. Box 85060
Burlington, ON L7R 4K3
Telephone: (905) 639-0188
Fax: (905) 639-3549
Email: ReferralsBurlington@DFO-MPO.GC.CA

London
Fisheries and Oceans Canada
73 Meg Drive
London, ON N6E 2V2
Telephone: (519) 668-2722
Fax: (519) 668-1772
Email: ReferralsLondon@DFO-MPO.GC.CA

Eastern Ontario District

Peterborough
Fisheries and Oceans Canada
501 Towerhill Road, Unit 102
Peterborough, ON K9H 7S3
Telephone: (705) 750-0269
Fax: (705) 750-4016
Email: ReferralsPeterborough@DFO-MPO.GC.CA

Prescott
Fisheries and Oceans Canada
401 King Street West
Prescott, ON K0E 1T0
Telephone: (613) 925-2865
Fax: (613) 925-2245
Email: ReferralsPrescott@DFO-MPO.GC.CA

Northern Ontario District

Parry Sound
Fisheries and Oceans Canada
28 Waubeek Street
Parry Sound, ON P2A 1B9
Telephone: (705) 746-2196
Fax: (705) 746-4820
Email: ReferralsParrySound@DFO-MPO.GC.CA

Sudbury and Sault Ste. Marie
Fisheries and Oceans Canada
1500 Paris Street, Unit 11
Sudbury, ON P3E 3B8
Telephone: (705) 522-2816
Fax: (705) 522-6421
Email: ReferralsSudbury@DFO-MPO.GC.CA

Thunder Bay and Kenora
Fisheries and Oceans Canada
Thunder Bay Office
100 Main Street, Suite 425
Thunder Bay, ON P7B 6R9
Telephone: (807) 346-8118
Fax: (807) 346-8545
Email: ReferralsThunderBay@DFO-MPO.GC.CA

Aussi disponible en français

http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/index_f.asp

DFO/2007-1329

ISOLATED OR DRY OPEN-CUT STREAM CROSSINGS

Fisheries and Oceans Canada
Ontario Operational Statement

Version 1.0

For the purpose of this Operational Statement, the term "Isolated Crossing" means a temporary stream crossing technique that allows work (e.g., trenched pipeline or cable installation) to be carried out "in-the-dry" while diverting the natural flow around the site during construction. These types of open trenched crossings are isolated using flume or dam and pump techniques (see *Pipeline Associated Watercrossings*, 2005 at **http://www.capp.ca/default.asp?V_DOC_ID=763&PubID=96717**). The term "Dry Open-cut Stream Crossing" means a temporary stream crossing work (e.g., trenched pipeline or cable installation) that is carried out during a period when the entire stream width is seasonally dry or is frozen to the bottom.

The risks to fish and fish habitat associated with isolated open cut stream crossings include the potential for direct damage to substrates, release of excessive sediments, loss of riparian habitat, stranding of fish in dewatered areas, impingement/entrainment of fish at pump intakes, and disruption of essential fish movement patterns. Similarly, dry open-cut stream crossings pose a risk to fish and fish habitat due to potential harmful alteration of substrates, loss of riparian habitat, and release of excessive sediment once stream flows resume.

The order of preference for carrying out a cable or pipeline stream crossing, in order to protect fish and fish habitat, is: a) punch or bore crossing (see *Punch & Bore Crossings* Operational Statement); b) high-pressure directional drill crossing (see *High-Pressure Directional Drilling* Operational Statement); c) dry open-cut crossing; and d) isolated open-cut crossing. This order must be balanced with practical considerations at the site.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. By following the conditions and measures set out below you will be in compliance with subsection 35(1) of the *Fisheries Act*.

The purpose of this Operational Statement is to describe the conditions under which it is applicable to your project and the measures to incorporate into your project in order to avoid negative impacts to fish habitat. You may proceed with your isolated or dry open-cut stream crossing project without a DFO review when you meet the following conditions:

- if working within the Thames River, Sydenham River, Ausable River, Grand River, or Maitland River, you have contacted your Conservation Authority or local DFO Office (see Ontario DFO office list) to ensure that your project will not impact Schedule I mussel species at risk under the federal *Species at Risk Act* (SARA), before proceeding,
- for dry, open-cut crossings the watercourse is dry or frozen completely to the bottom at the site,
- for isolated crossings, the channel width of the watercourse at the crossing site is less than 5 meters from ordinary high water mark to ordinary high water mark (HWM) (see definition below),
- the isolated crossing does not involve the construction or use of an off-stream diversion channel, or the use of earthen dams,
- the isolated crossing ensures that all natural upstream flows are conveyed downstream during construction, with no change in quality or quantity,
- the site does not occur at a stream location involving known fish spawning habitat, particularly if it is dependent on groundwater upwelling,
- the use of explosives is not required to complete the crossing, and
- you incorporate the *Measures to Protect Fish and Fish Habitat when Carrying Out an Isolated or Dry Open-cut Stream Crossing* listed below.

If you cannot meet all of the conditions listed above and cannot incorporate all of the measures listed below then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact your Conservation Authority, or the DFO office in your area (see Ontario DFO office list) or Parks Canada if the project is located within its jurisdiction, including the Trent-Severn Waterway and the Rideau Canal, if you wish to obtain an opinion on the possible options you should consider to avoid contravention of the *Fisheries Act*.

You are required to respect all municipal, provincial and federal legislation that applies to the work being carried out in relation to this Operational Statement. The activities undertaken in this Operational Statement must also comply with SARA (**www.sararegistry.gc.ca**). If you have questions regarding this Operational Statement, please contact one of the agencies listed above.

We ask that you notify DFO, preferably 10 working days before starting your work, by filling out and sending the Ontario Operational Statement notification form (**www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terr/index_e.htm**) to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to this Operational Statement.

Measures to Protect Fish and Fish Habitat when Carrying Out an Isolated or Dry Open-Cut Stream Crossing

1. Use existing trails, roads or cut lines wherever possible, as access routes to avoid disturbance to the riparian vegetation.

2. Locate crossings at straight sections of the stream, perpendicular to the banks, whenever possible. Avoid crossing on meander bends, braided streams, alluvial fans, active floodplains or any other area that is inherently unstable and may result in the erosion and scouring of the stream bed.

3. Complete the crossing in a manner that minimizes the duration of instream work.

4. Construction should be avoided during unusually wet, rainy or winter thaw conditions.

5. While this Operational Statement does not cover the clearing of riparian vegetation, the removal of select plants may be necessary to access the construction site. This removal should be kept to a minimum and within the utility right-of-way.

6. Machinery fording a flowing watercourse to bring equipment required for construction to the opposite side is limited to a one-time event (over and back) and is to occur only if an existing crossing at another location is not available or practical to use. Operational Statements are also available for *Ice Bridges and Snow Fills*, *Clear-Span Bridges*, and *Temporary Stream Crossing*.

    - **6.1.** If minor rutting is likely to occur, stream bank and bed protection methods (e.g., swamp mats, pads) should be used provided they do not constrict flows or block fish passage.
    - **6.2.** Grading of the stream banks for the approaches should not occur.
    - **6.3.** If the stream bed and banks are steep and highly erodible (e.g., dominated by organic materials and silts) and erosion and degradation is likely to occur as a result of equipment fording, then a temporary crossing structure or other practice should be used to protect these areas.
    - **6.4.** Time the one-time fording to prevent disruption to sensitive fish life stages by adhering to appropriate fisheries timing windows (see the *Ontario In-Water Construction Timing Windows*).
    - **6.5.** Fording should occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding.

7. Operate machinery in a manner that minimizes disturbance to the watercourse bed and banks.

    - **7.1.** Protect entrances at machinery access points (e.g., using swamp mats) and establish single site entry and exit.
    - **7.2.** Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.
    - **7.3.** Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent deleterious substances from entering the water.
    - **7.4.** Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.

8. Install effective sediment and erosion control measures before starting work to prevent entry of sediment into the watercourse. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.

9. Stabilize any waste materials removed from the work site, above the HWM, to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with grass or shrubs.

10. Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses and cover such areas with mulch to prevent soil erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.

    - **10.1.** Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

Measures to Protect Fish and Fish Habitat when Carrying Out an Isolated Crossing

Temporary isolation is used to allow work “in-the-dry” while maintaining the natural downstream flow by installing dams up and downstream of the site and conveying all of the natural upstream flow into a flume, or pumping it around the isolated area. In addition to measures 1 to 10, the following measures should be carried out when conducting an isolated stream crossing:

11. Time isolated crossings to protect sensitive fish life stages by adhering to fisheries timing windows (see Measure 6.4).

12. Use dams made of non-earthen material, such as water-inflated portable dams, pea gravel bags, concrete blocks, steel or wood wall, clean rock, sheet pile or other appropriate designs, to separate the dewatered work site from flowing water.

    - **12.1.** If granular material is used to build dams, use clean or washed material that is adequately sized (i.e., moderately sized rock and not sand or gravel) to withstand anticipated flows during the construction. If necessary, line the outside face of dams with heavy poly-plastic to make them impermeable to water. Material to build these dams should not be taken from below the HWM of any water body.
    - **12.2.** Design dams to accommodate any expected high flows of the watercourse during the construction period.

13. Before dewatering, rescue any fish from within the isolated area and return them safely immediately downstream of the worksite.

13.1. You will require a permit from DFO to relocate any aquatic species that are listed as either endangered or threatened under SARA. Please contact your Conservation Authority or the DFO office in your area to determine if an aquatic species at risk is in the vicinity of your project and, if appropriate, use the DFO website at **www.dfo-mpo.gc.ca/species-especes /permits/sarapermits_e.asp** to apply for a permit.

14. Pump sediment laden dewatering discharge into a vegetated area or settling basin, and prevent sediment and other deleterious substances from entering any water body.

15. Remove accumulated sediment and excess spoil from the isolated area before removing dams.

16. Stabilize the **streambed** and restore the original channel shape, bottom gradient and substrate to pre-construction condition before removing dams.

17. Ensure **banks** are stabilized, restored to original shape, adequately protected from erosion and re-vegetated, preferably with native species.

18. If rock is used to stabilize banks, it should be clean, free of fine materials, and of sufficient size to resist displacement during peak flood events. The rock should be placed at the original stream bank grade to ensure there is no infilling or narrowing of the watercourse.

19. Gradually remove the downstream dam first, to equalize water levels inside and outside of the isolated area and to allow suspended sediments to settle.

20. During the final removal of dams, restore the original channel shape, bottom gradient and substrate at these locations.

21. Pumped Diversion
Pumped diversions are used to divert water around the isolated area to maintain natural downstream flows and prevent upstream ponding.

21.1. Ensure intakes are operated in a manner that prevents streambed disturbance and fish mortality. Guidelines to determine the appropriate mesh size for intake screens may be obtained from DFO (e.g., *Freshwater Intake End-of-Pipe Fish Screen Guideline* (1995), available at **www.dfo-mpo.gc.ca/Library/223669.pdf**).

21.2. Ensure the pumping system is sized to accommodate any expected high flows of the watercourse during the construction period. Pumps should be monitored at all times, and back-up pumps should be readily available on-site in case of pump failure.

21.3. Protect pump discharge area(s) to prevent erosion and the release of suspended sediments downstream, and remove this material when the works have been completed.

Measures to Protect Fish and Fish Habitat when Carrying Out a Dry Open-Cut Stream Crossing

In addition to measures 1 to 10, the following measures should be carried out when conducting a dry open-cut stream crossing:

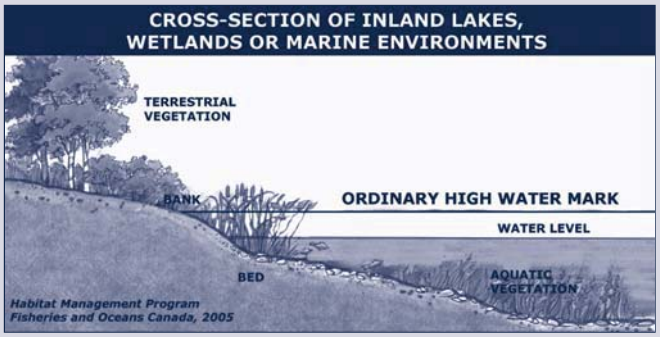
22. Stabilize the **streambed** and restore the original channel shape, bottom gradient and substrate to pre-construction condition.

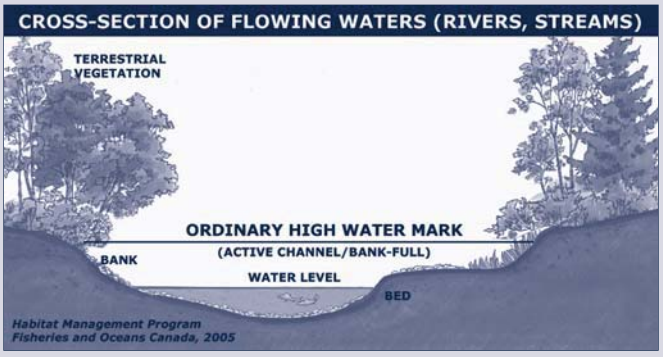
23. Ensure **banks** are stabilized, restored to original shape, adequately protected from erosion and re-vegetated, preferably with native species.

Definition:

Ordinary high water mark (HWM) - The usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land. In flowing waters (rivers, streams) this refers to the "active channel/bank-full level" which is often the 1:2 year flood flow return level. In inland lakes, wetlands or marine environments it refers to those parts of the water body bed and banks that are frequently flooded by water so as to leave a mark on the land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial vegetation (excepting water tolerant species). For reservoirs this refers to normal high operating levels (Full Supply Level).

For the Great Lakes this refers to the 80th percentile elevation above chart datum as described in DFO's Fish Habitat and Determining the High Water Mark on Lakes.





FISHERIES AND OCEANS CANADA OFFICES IN ONTARIO

Southern Ontario District

Burlington
Fisheries and Oceans Canada
3027 Harvester Road, Suite 304
P.O. Box 85060
Burlington, ON L7R 4K3
Telephone: (905) 639-0188
Fax: (905) 639-3549
Email: ReferralsBurlington@DFO-MPO.GC.CA

London
Fisheries and Oceans Canada
73 Meg Drive
London, ON N6E 2V2
Telephone: (519) 668-2722
Fax: (519) 668-1772
Email: ReferralsLondon@DFO-MPO.GC.CA

Eastern Ontario District

Peterborough
Fisheries and Oceans Canada
501 Towerhill Road, Unit 102
Peterborough, ON K9H 7S3
Telephone: (705) 750-0269
Fax: (705) 750-4016
Email: ReferralsPeterborough@DFO-MPO.GC.CA

Prescott
Fisheries and Oceans Canada
401 King Street West
Prescott, ON K0E 1T0
Telephone: (613) 925-2865
Fax: (613) 925-2245
Email: ReferralsPrescott@DFO-MPO.GC.CA

Northern Ontario District

Parry Sound
Fisheries and Oceans Canada
28 Waubeek Street
Parry Sound, ON P2A 1B9
Telephone: (705) 746-2196
Fax: (705) 746-4820
Email: ReferralsParrySound@DFO-MPO.GC.CA

Sudbury and Sault Ste. Marie
Fisheries and Oceans Canada
1500 Paris Street, Unit 11
Sudbury, ON P3E 3B8
Telephone: (705) 522-2816
Fax: (705) 522-6421
Email: ReferralsSudbury@DFO-MPO.GC.CA

Thunder Bay and Kenora
Fisheries and Oceans Canada
Thunder Bay Office
100 Main Street, Suite 425
Thunder Bay, ON P7B 6R9
Telephone: (807) 346-8118
Fax: (807) 346-8545
Email: ReferralsThunderBay@DFO-MPO.GC.CA

Aussi disponible en français

http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/index_f.asp

DFO/2007-1329

OVERHEAD LINE CONSTRUCTION

Fisheries and Oceans Canada
Ontario Operational Statement

Version 3.0

Overhead lines are constructed for electrical or telecommunication transmission across many watercourses that range in size from small streams and ponds to large rivers, lakes and reservoirs. This Operational Statement applies to selective removal of vegetation along the right-of-way to provide for installation and safe operation of overhead lines, and passage of equipment and materials across the water body.

Although fish habitat occurs throughout a water system, it is the riparian habitat that is most sensitive to overhead line construction. Riparian vegetation occurs adjacent to the watercourse and directly contributes to fish habitat by providing shade, cover, and spawning and food production areas. It is important to design and build your overhead line project to meet your needs while also protecting riparian areas. Potential impacts to fish and fish habitat include excessive loss of riparian vegetation, erosion and sedimentation resulting from bank disturbance and loss of plant root systems, rutting and compaction of stream substrate at crossing sites, and disruption of sensitive fish life stages.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. By following the conditions and measures set out below you will be in compliance with subsection 35(1) of the *Fisheries Act*.

The purpose of this Operational Statement is to describe the conditions under which it is applicable to your project and the measures to incorporate into your project in order to avoid negative impacts to fish habitat. You may proceed with your overhead line project without a DFO review when you meet the following conditions:

- it does not require the construction or placement of any temporary or permanent structures (e.g. islands, poles, crib works, etc.) below the ordinary high water mark (HWM) (see definition below), and
- you incorporate the *Measures to Protect Fish and Fish Habitat when Constructing Overhead Lines* listed below in this Operational Statement.

If you cannot meet all of the conditions listed above and cannot incorporate all of the measures listed below then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact your Conservation Authority, or the DFO office in your area (see Ontario DFO office list) or Parks Canada if the project is located within its jurisdiction, including the Trent-Severn Waterway and the Rideau Canal, if you wish to obtain an opinion on the possible options you should consider to avoid contravention of the *Fisheries Act.*

You are required to respect all municipal, provincial or federal legislation that applies to the work being carried out in relation to this Operational Statement. The activities undertaken in this Operational Statement must also comply with the *Species at Risk Act* (**www.sararegistry.gc.ca**). If you have questions regarding this Operational Statement, please contact one of the agencies listed above.

We ask that you notify DFO, preferably 10 working days before starting your work by filling out and sending the Ontario Operational Statement notification form (**www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terr/index_e.htm**) to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to this Operational Statement.

Measures to Protect Fish and Fish Habitat when Constructing Overhead Lines

1. Installing overhead lines under frozen conditions is preferable in all situations. On wet terrains (e.g., bogs), lines should be installed under frozen conditions, where possible, or using aerial methods (i.e., helicopter).

2. Design and construct approaches so that they are perpendicular to the watercourse wherever possible to minimize loss or disturbance to riparian vegetation.

3. Avoid building structures on meander bends, braided streams, alluvial fans, active floodplains or any other area that is inherently unstable and may result in erosion and scouring of the stream bed or overhead line structures.

   3.1. Wherever possible, locate all temporary or permanent structures, such as poles, sufficiently above the HWM to prevent erosion.

4. While this Operational Statement does not cover the clearing of riparian vegetation, the removal of select plants may be necessary to accommodate the overhead line. This removal

should be kept to a minimum and within the road or utility right-of-way.

5. Machinery fording the watercourse to bring equipment required for construction to the opposite side is limited to a one-time event (over and back) and should occur only if an existing crossing at another location is not available or practical to use. A *Temporary Stream Crossing* Operational Statement is also available.

    5.1. If minor rutting is likely to occur, stream bank and bed protection methods (e.g., swamp mats, pads) should be used provided they do not constrict flows or block fish passage.
    5.2. Grading of the stream banks for the approaches should not occur.
    5.3. If the stream bed and banks are steep and highly erodible (e.g., dominated by organic materials and silts) and erosion and degradation is likely to occur as a result of equipment fording, then a temporary crossing structure or other practice should be used to protect these areas.
    5.4. Time the one-time fording to prevent disruption to sensitive fish life stages by adhering to appropriate fisheries timing windows (see the *Ontario In-Water Construction Timing Windows*).
    5.5. Fording should occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding.

6. Operate machinery on land and in a manner that minimizes disturbance to the banks of the watercourse.

    6.1. Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.
    6.2. Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent any deleterious substance from entering the water.
    6.3. Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.
    6.4. Restore banks to original condition if any disturbance occurs.

7. Install effective sediment and erosion control measures before starting work to prevent entry of sediment into the watercourse. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.

    7.1. Avoid work during wet, rainy conditions or use alternative techniques such as aerial methods (i.e., helicopter) to install overhead lines.

8. Stabilize any waste materials removed from the work site to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with grass or shrubs.

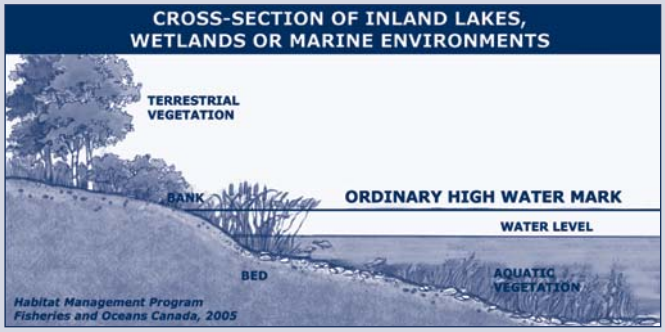
9. Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses and cover such areas with mulch to prevent erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.

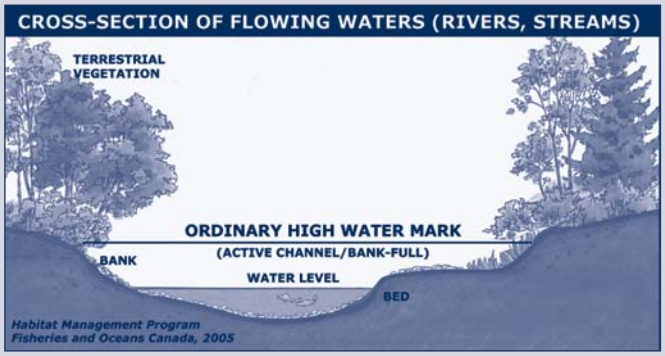
    9.1. Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

Definition:

Ordinary high water mark (HWM) – The usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land. In flowing waters (rivers, streams) this refers to the "active channel/bank-full level" which is often the 1:2 year flood flow return level. In inland lakes, wetlands or marine environments it refers to those parts of the water body bed and banks that are frequently flooded by water so as to leave a mark on the land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial vegetation (excepting water tolerant species). For reservoirs this refers to normal high operating levels (Full Supply Level).

For the Great Lakes this refers to the 80th percentile elevation above chart datum as described in DFO's *Fish Habitat and Determining the High Water Mark on Lakes*.





FISHERIES AND OCEANS CANADA OFFICES IN ONTARIO

Southern Ontario District

Burlington
Fisheries and Oceans Canada
3027 Harvester Road, Suite 304
P.O. Box 85060
Burlington, ON L7R 4K3
Telephone: (905) 639-0188
Fax: (905) 639-3549
Email: ReferralsBurlington@DFO-MPO.GC.CA

London
Fisheries and Oceans Canada
73 Meg Drive
London, ON N6E 2V2
Telephone: (519) 668-2722
Fax: (519) 668-1772
Email: ReferralsLondon@DFO-MPO.GC.CA

Eastern Ontario District

Peterborough
Fisheries and Oceans Canada
501 Towerhill Road, Unit 102
Peterborough, ON K9H 7S3
Telephone: (705) 750-0269
Fax: (705) 750-4016
Email: ReferralsPeterborough@DFO-MPO.GC.CA

Prescott
Fisheries and Oceans Canada
401 King Street West
Prescott, ON K0E 1T0
Telephone: (613) 925-2865
Fax: (613) 925-2245
Email: ReferralsPrescott@DFO-MPO.GC.CA

Northern Ontario District

Parry Sound
Fisheries and Oceans Canada
28 Waubeek Street
Parry Sound, ON P2A 1B9
Telephone: (705) 746-2196
Fax: (705) 746-4820
Email: ReferralsParrySound@DFO-MPO.GC.CA

Sudbury and Sault Ste. Marie
Fisheries and Oceans Canada
1500 Paris Street, Unit 11
Sudbury, ON P3E 3B8
Telephone: (705) 522-2816
Fax: (705) 522-6421
Email: ReferralsSudbury@DFO-MPO.GC.CA

Thunder Bay and Kenora
Fisheries and Oceans Canada
Thunder Bay Office
100 Main Street, Suite 425
Thunder Bay, ON P7B 6R9
Telephone: (807) 346-8118
Fax: (807) 346-8545
Email: ReferralsThunderBay@DFO-MPO.GC.CA

Aussi disponible en français

http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/index_f.asp

DFO/2007-1329

PUNCH & BORE CROSSINGS

Fisheries and Oceans Canada
Ontario Operational Statement

Version 3.0

For the purpose of this Operational Statement, the term punch and bore refers to a trenchless crossing method which involves the excavation of a vertical bell hole or shallow depression on either side of the watercourse. Horizontal punching or boring between the two points, at an appropriate depth below the watercourse, completes the creation of a passage-way for the crossing. Punch and bore crossings allow cables and pipelines to be installed under watercourses without imparting any disturbance to the bed and banks. Punch and bore crossings differ from high-pressure directional drilled crossings, in that no pressurized mud systems are required, thereby avoiding the risk of sediment release due to frac-out.

Punch and bore crossings can negatively impact fish and fish habitat due to erosion and sedimentation from site disturbance and dewatering of bell holes or the collapse of the punch or bore hole under the stream. Disturbing riparian vegetation can reduce important shoreline cover, shade and food production areas. Machinery fording the stream can disturb bottom and bank substrates, disrupt sensitive fish life stages, and introduce deleterious substances if equipment is not properly maintained. Impacts can be reduced if an emergency response plan and clean-up materials are in place.

The general order of preference for carrying out a cable or pipeline stream crossing in order to protect fish and fish habitat is: a) a punch or bore crossing, b) high-pressure directional drill crossing (see *High-Pressure Directional Drilling* Operational Statement), c) dry open-cut crossing, and d) isolated open-cut crossing (see *Isolated or Dry Open-cut Stream Crossings* Operational Statement). This order must be balanced with practical considerations at the site.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. By following the conditions and measures set out below you will be in compliance with subsection 35(1) of the *Fisheries Act*.

The purpose of this Operational Statement is to describe the conditions under which it is applicable to your project and the measures to be incorporated into your project in order to avoid negative impacts to fish habitat. You may proceed with your punch or bore crossing project without a DFO review when you meet the following conditions:

- the crossing is not a wet open-cut crossing,
- the crossing technique will not damage the stream bed or bank and thereby negatively impact fish or fish habitat,
- the site does not occur at a stream location involving known fish spawning habitat, particularly if it is dependent on groundwater upwelling, and
- you incorporate the *Measures to Protect Fish and Fish Habitat when Conducting Punch and Bore Crossings*, listed below.

If you cannot meet all of the conditions listed above and cannot incorporate all of the measures listed below then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact your Conservation Authority, or the DFO office in your area (see Ontario DFO office list) or Parks Canada if the project is located within its jurisdiction, including the Trent-Severn Waterway and the Rideau Canal, if you wish to obtain an opinion on the possible options you should consider to avoid contravention of the *Fisheries Act.*

You are required to respect all municipal, provincial or federal legislation that applies to the work being carried out in relation to this Operational Statement. The activities undertaken in this Operational Statement must also comply with the *Species at Risk Act* (**www.sararegistry.gc.ca**). If you have questions regarding this Operational Statement, please contact one of the agencies listed above.

We ask that you notify DFO, preferably 10 working days before starting your work by filling out and sending the Ontario Operational Statement notification form (**www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terr/index_e.htm**) to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to this Operational Statement.

Measures to Protect Fish and Fish Habitat when Conducting Punch and Bore Crossings

1. A punch or bore crossing can be conducted at any time of the year provided there is not a high risk of failure and it does not require in-water activities such as machinery fording.

2. Design the punch or bore path for an appropriate depth below the watercourse to prevent the pipeline or cable from becoming exposed due to natural scouring of the stream bed.

3. While this Operational Statement does not cover the clearing of riparian vegetation, the removal of select plants may be necessary to access the construction site and to excavate the bell holes. This removal is to be kept to a minimum and within the utility right-of-way.

4. Install effective sediment and erosion control measures before starting work to prevent entry of sediment into the water body. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.

5. Machinery fording the watercourse to bring equipment required for construction to the opposite side is limited to a one-time event (over and back) and should occur only if an existing crossing at another location is not available or practical to use. A *Temporary Stream Crossing* Operational Statement is also available.

- **5.1.** If minor rutting is likely to occur, stream bank and bed protection methods (e.g., swamp mats, pads) should be used provided they do not constrict flows or block fish passage.
- **5.2.** Grading of the stream banks for the approaches should not occur.
- **5.3.** If the stream bed and banks are steep and highly erodible (e.g., dominated by organic materials and silts) and erosion and degradation are likely to occur as a result of equipment fording, then a temporary crossing structure or other practice should be used to protect these areas.
- **5.4.** Time the one-time fording to prevent disruption to sensitive fish life stages by adhering to appropriate fisheries timing windows (see the *Ontario In-Water Construction Timing Windows*).
- **5.5.** Fording should occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding.

6. Operate machinery on land above the ordinary high water mark (HWM) (see definition below) and in a manner that minimizes disturbance to the banks of the watercourse.

- **6.1.** Machinery is to arrive on-site in a clean condition and is to be maintained free of fluid leaks.
- **6.2.** Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent any deleterious substance from entering the water.
- **6.3.** Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.

7. Excavate bell holes beyond the HWM, far enough away from any watercourse to allow containment of any sediment or deleterious substances above the HWM.

- **7.1.** When dewatering bell holes, remove suspended solids by diverting water into a vegetated area or settling basin, and prevent sediment and other deleterious substances from entering the watercourse.
- **7.2.** Stabilize any waste materials removed from the work site (including bell holes) to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with grass or shrubs.
- **7.3.** After suitably backfilling and packing the bell holes, vegetate any disturbed areas (see Measure 11).

8. Monitor the watercourse to observe signs of malfunction during all phases of the work.

9. For the duration of the work, keep on-site and readily accessible, all material and equipment needed to contain and clean-up releases of sediment-laden water and other deleterious substances.

10. Develop a response plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance. This plan is to include measures to: a) stop work, contain sediment-laden water and other deleterious substances and prevent their further migration into the watercourse; b) notify all applicable authorities in the area, including the closest DFO office; c) promptly clean-up and appropriately dispose of the sediment-laden water and deleterious substances; and d) ensure clean-up measures are suitably applied so as not to result in further alteration of the bed and/or banks of the watercourse.

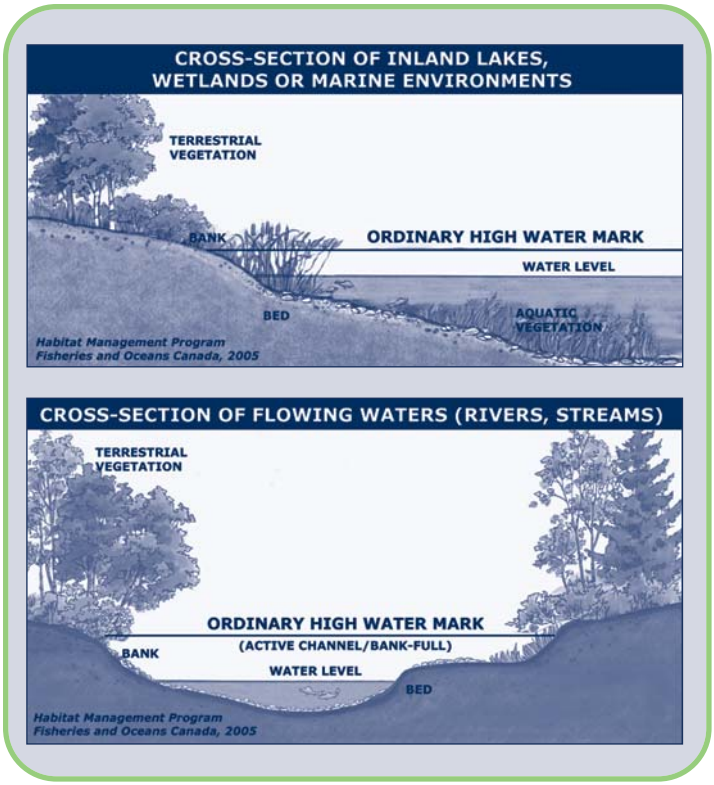
11. Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses and cover such areas with mulch to prevent erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.

- **11.1.** Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

Definition:

Ordinary high water mark (HWM) – The usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land. In flowing waters (rivers, streams) this refers to the “active channel/bank-full level” which is often the 1:2 year flood flow return level. In inland lakes, wetlands or marine environments it refers to those parts of the water body bed and banks that are frequently flooded by water so as to leave a mark on the land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial vegetation (excepting water tolerant species). For reservoirs this refers to normal high operating levels (Full Supply Level).

For the Great Lakes this refers to the 80th percentile elevation above chart datum as described in DFO’s *Fish Habitat and Determining the High Water Mark on Lakes*.



FISHERIES AND OCEANS CANADA OFFICES IN ONTARIO

Southern Ontario District

Burlington
Fisheries and Oceans Canada
3027 Harvester Road, Suite 304
P.O. Box 85060
Burlington, ON L7R 4K3
Telephone: (905) 639-0188
Fax: (905) 639-3549
Email: ReferralsBurlington@DFO-MPO.GC.CA

London
Fisheries and Oceans Canada
73 Meg Drive
London, ON N6E 2V2
Telephone: (519) 668-2722
Fax: (519) 668-1772
Email: ReferralsLondon@DFO-MPO.GC.CA

Eastern Ontario District

Peterborough
Fisheries and Oceans Canada
501 Towerhill Road, Unit 102
Peterborough, ON K9H 7S3
Telephone: (705) 750-0269
Fax: (705) 750-4016
Email: ReferralsPeterborough@DFO-MPO.GC.CA

Prescott
Fisheries and Oceans Canada
401 King Street West
Prescott, ON K0E 1T0
Telephone: (613) 925-2865
Fax: (613) 925-2245
Email: ReferralsPrescott@DFO-MPO.GC.CA

Northern Ontario District

Parry Sound
Fisheries and Oceans Canada
28 Waubeek Street
Parry Sound, ON P2A 1B9
Telephone: (705) 746-2196
Fax: (705) 746-4820
Email: ReferralsParrySound@DFO-MPO.GC.CA

Sudbury and Sault Ste. Marie
Fisheries and Oceans Canada
1500 Paris Street, Unit 11
Sudbury, ON P3E 3B8
Telephone: (705) 522-2816
Fax: (705) 522-6421
Email: ReferralsSudbury@DFO-MPO.GC.CA

Thunder Bay and Kenora
Fisheries and Oceans Canada
Thunder Bay Office
100 Main Street, Suite 425
Thunder Bay, ON P7B 6R9
Telephone: (807) 346-8118
Fax: (807) 346-8545
Email: ReferralsThunderBay@DFO-MPO.GC.CA

Aussi disponible en français

http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/index_f.asp

DFO/2007-1329

Appendix E

Curricula Vitae

Kathleen R. O. Todd M.Sc.

Aquatic Ecologist / Project Manager

Kathleen's experience is focused in aquatic biology, including stream, lake and wetland assessments, benthic macroinvertebrate identification and biomonitoring, and fisheries habitat studies. She has experience conducting environmental impact studies, environmental effects monitoring programs, baseline studies and watershed plans. Using ecosystem based approaches, typical multidisciplinary project involvement includes Class EAs and infrastructure siting/routing studies, evaluating alternative design concepts and developing mitigative solutions to minimize impacts to the natural environment.

Kathleen has acquired an understanding of federal and provincial legislation, policies and procedures for natural heritage features, particularly regarding working in and around fish habitat in Ontario. She is experienced in the Fisheries Act Authorization process, including evaluating the effects of development on aquatic habitat, designing fish habitat mitigation measures, and negotiating Fisheries Compensation Strategies. In addition, Kathleen serves as a team leader for aquatic science staff in Ontario, including professionals in the fields of fisheries biology, fluvial geomorphology, and aquatic invertebrate taxonomy.

EDUCATION

M.Sc., Watershed Ecosystems, Trent University, Peterborough, Ontario, 2003

B.Sc. (Env.), Environmental Sciences, University of Guelph, Guelph, Ontario, 1997

Certified in the Ecological Land Classification (ELC) System for Southern Ontario, Ontario Ministry of Natural Resources, Turkey Point, Ontario, 2000

Qualified Southern and Northern Ontario Wetlands Evaluator, Ontario Ministry of Natural Resources, North Bay, Ontario, 2000

Fisheries Assessment Specialist and Fisheries Contracts Specialist, MTO/DFO/OMNR Fisheries Protocol Course, Downsview, Ontario, 2006

Ontario Freshwater Mussel Identification Workshop / Fisheries and Oceans Canada, Burlington, Ontario, 2008

Qualified Electrofishing Operator (Class 2), Ontario Ministry of Natural Resources, Guelph, Ontario, 2010

MEMBERSHIPS

Member, North American Benthological Society

PROJECT EXPERIENCE

Environmental Assessments

Northwest Area Planning and Servicing Review, Welland, Ontario* (Environmental Scientist)

Conducted a review of natural heritage features and identified development-related constraints in a newly designated urban area.

Willoughby Lands Golf Course Facility, Niagara Region, Ontario* (Aquatic Ecologist)

Obtained Fisheries Act Authorization for development of a golf course facility. Supervised an underwater dive investigation to survey aquatic habitat along a series of alternative Niagara River water intake pipe alignments. The study lands also support habitat for a rare aquatic plant and an extensive program was proposed to ensure its protection. Environmental monitoring during construction was conducted.

** denotes projects completed with other firms*

Kathleen R. O. Todd M.Sc.

Aquatic Ecologist / Project Manager

Municipal Water and Wastewater EAs, Various Sites, Ontario* (Aquatic Ecologist)

Evaluated natural heritage features in terms of ecological sensitivity and watermain and/or trunk sewer construction feasibility options (tunnel vs. open cut). Aquatic habitat conditions were assessed at all potential watercourse crossings and recommendations were provided regarding Fisheries Act requirements, construction mitigation measures and timing restrictions on in-water works. Also responsible for siting a chlorine booster station, surface water treatment plants and pumping stations, and mitigating impacts from emergency overflow of chlorinated water into adjacent watercourses. Water and wastewater experience includes:

- City of Barrie, Surface Water Treatment Plant Class EA & Impact Assessment
- Region of Niagara (Point Abino), Water Supply Class EA
- Region of Peel (Brampton), West Brampton Reservoir, Pumping Station & Watermain Class EA
- Region of York (Etobicoke), Steeles Avenue West Forcemain Class EA
- Region of York (Markham), Southeast Collector Trunk Sewer Class EA

Natural Sciences & Heritage Resources

Environmental Impact Studies for Land Development, Various Sites, Ontario (Project Manager)

Assessed potential environmental impacts from land development proposals. Conducted ecological community inventories in watercourses, wetlands and woodlots. Prepared Environmental Management Plans providing net effects analyses, mitigation solutions to minimize impacts to the natural environment, buffer zone recommendations, and re-vegetation and restoration activities. Participated in consultation to address agency concerns. EIS experience includes:
- Block 34 East Landowners Group Inc., Block 34 East Natural Environment Report, Vaughan, Ontario
- Block 41-28W Development Group Inc., Block 41 Natural Environment Report, Vaughan, Ontario
- Boca East Investments Limited, Block 64 Master Environmental Servicing Plan (Natural Environment Chapter), Vaughan, Ontario
- Georgian International Land Corp., Buffalo Springs Development Environment Report, Township of Oro-Medonte
- Keirland Developments Inc., Meadows of Bear Creek Subdivision Phases 2 & 3 EIS, Barrie, Ontario
- Kleinburg Heights Holdings Inc., Kleinburg Heights Natural Environment Report, Vaughan, Ontario

Environmental Impact Studies for Land Development, Various Sites, Ontario* (Project Manager)

Assessed potential environmental impacts from land development proposals. Conducted ecological community inventories in watercourses, wetlands and woodlots. Prepared Environmental Management Plans providing net effects analyses, mitigation solutions to minimize impacts to the natural environment, buffer zone recommendations, re-vegetation and restoration activities, proposed trail routes and community stewardship programs. Participated in public open houses to address the concerns of local residents. Where required, environmental monitoring during construction was conducted. EIS experience includes:
- City of London, Dearness Home for Seniors Redevelopment EIS, London, Ontario
- Fieldgate Developments, Tresstown Subdivision EIS, Stouffville, Ontario
- Grey Gables School, Proposed Private School Site, Ecological Assessment, St. Catharines
- Lebovic-Fieldgate Developments, Functional Servicing Plan, Ecological Component, Stouffville, Ontario
- Norwest Land Corp., Kains Road East Development EIS, London, Ontario
- Quinte's Isle Campark, Scoped EIS, Prince Edward County, Ontario
- Sifton Properties Ltd., Equestrian Condominium Communities, Development Assessment Reports, Township of Middlesex Centre & Municipality of West Middlesex
- Sifton Properties Ltd., River Bend Community Phases 1&2 EIS, London, Ontario
- St. Joseph's Health Care Centre, Parkwood Hospital Scoped EIS, London, Ontario
- Westhill Redevelopment Company Limited, Aurora Golf Course Community EIS, Aurora, Ontario

River Bend Community Phases 1 & 2, Environmental Monitoring Protocol & Baseline Study*, London, Ontario (Environmental Scientist)

Established baseline aquatic, terrestrial and soils conditions in the vicinity of a golf course community. Subsequently, the Environmental Monitoring Program - Year 1 and, later, Year 3, were submitted to document any potential impacts.

** denotes projects completed with other firms*

Kathleen R. O. Todd M.Sc.

Aquatic Ecologist / Project Manager

Ecological Risk Assessment of Residual Heavy Oil in a Wetland*, Drumbo, Ontario (Environmental Scientist)
Analyzed stream and wetland data to determine potential aquatic food chain impacts of a historical heavy oil release. Analyzed invertebrate community structure and identified exposure pathways and community end-points. Considered site remediation options on the basis of these data.

Proposed Acton Quarry Extension, Dufferin Aggregates, Acton, Ontario (Aquatic Ecologist / Project Manager)
The extension of the existing Acton Quarry is proposed to meet the need for additional close-to-market aggregate resources of high quality Amabel Dolostone. The area of focus encompasses approximately 615 ha, across two Conservation Authority watersheds within the Regional Municipality of Halton Hills. Kathleen has participated in extensive ecological field work, including aquatic species surveys and habitat assessments, inventories for potential Species at Risk habitat, and aquatic rehabilitation planning. She has co-authored technical reports produced in accordance with the PPS and ARA application requirements, as well as participated in interdisciplinary consultation with agencies and agency-appointed committees.

Otonabee Landfill Site Biological Assessment Study*, Peterborough, Ontario (Wetlands Ecologist)
Prepared a 'Surface Water Quality Study' to address background water quality and aquatic habitat conditions and a 'Natural Environment Report' to identify baseline wetland and terrestrial environment conditions. The study was designed to identify potential impacts from existing landfill operations and to predict future impacts from proposed landfill site expansion.

Forest City Industrial Lands, Wetland Evaluation & Environmental Assessment*, London, Ontario (Wetlands Ecologist)
Evaluated a locally significant wetland according to the Ontario Wetland Evaluation System and revised the existing boundaries of a provincially significant wetland in cooperation with MNR.

West Nile Virus Information Package, Ballantrae, Ontario (Environmental Scientist)
Designed a pamphlet to educate residents and golfers regarding West Nile virus, the status of the virus in York Region, and the client's proactive mosquito monitoring program.

Confidential Client, Environmental Baseline and Feasibility Study for a Decommissioned Gold Mine*, Northern, Ontario (Environmental Scientist)
Conducted aquatic and terrestrial habitat inventories to determine the environmental feasibility of re-opening a gold mine. Assessed streams, wetlands and woodlots. Conducted invertebrate and fish collections, avifauna and wildlife surveys, and vegetation community inventories.

Transportation Planning

MTO Aquatic and Terrestrial Biology Retainer Services, Southwestern Ontario (Project Manager / Fisheries Specialist)
Under the terms of two 2-year Retainer Agreements (2004-2006, 2007-2009) eleven individual assignments were completed, involving: characterizing existing ecological conditions, assessing site sensitivities and impacts related to proposed bridge/culvert repairs and highway improvements, recommending environmental mitigation measures, and conducting during/post-construction monitoring. Value added components included: fluvial geomorphological services, design and implementation of bio-engineered slope stabilization solutions, Permit to Take Water applications, and site rehabilitation and Planting Plans. Extensive agency liaison was required with staff from numerous Conservation Authority, MNR and DFO offices.

Municipal Road Improvement Projects, Various Sites, Ontario (Environmental Scientist)
Collected aquatic and terrestrial habitat field data, conducted environmental impact assessments, and obtained required agency approvals related to municipal transportation projects, including:
*- City of Hamilton, Bridge & Culvert Master Plan**
*- City of London, Airport Road Widening**
- City of London, Bradley Avenue Extension
- City of London, Western Road Widening
*- Town of Markham, Woodbine Avenue By-Pass**
*- Township of Wilmot, Haysville Bridge Replacement**

Natural Sciences Reports Related to MTO Highway Improvement Works, Various Sites, Ontario (Fisheries Specialist)
Produced numerous Natural Sciences reports related to highway improvement works. Where required, Fisheries Act Authorization was obtained and Fish Habitat Compensation Plans were developed. Potential impacts to aquatic habitat, terrestrial vegetation, wetlands and wildlife were described for the following studies:

** denotes projects completed with other firms*

*- Highway 6 (Flamborough)**
- Highway 6 (Guelph)
*- Highway 6 By-Pass (Caledonia)**
*- Highway 7 (Marmora)**
*- Highway 7 (Peterborough)**
*- Highway 7A/28/115 (Peterborough)**
*- Highway 8 (Dublin)**
- Highways 11/17 (North Bay)
- Highways 11/17 (Thunder Bay)
- Highways 11/101 (Matheson)
*- Highway 17 (Stonecliffe)**
- Highway 17/Municipal Road 55 (Sudbury)
- Highway 17 Southwest By-Pass (Sudbury)
*- Highways 17/531 (North Bay)**
- Highway 21 (Bluewater)
- Highway 21 (Grand Bend)
- Highway 23 (Palmerston)
- Highway 24 Interchange Improvements (Cambridge)
- Highway 26 (Meaford)
- Highway 26 (Owen Sound)
*- Highway 63 (Bancroft)**
*- Highway 63 (North Bay)**
- Highway 401/403 (Woodstock)
*- Highway 401/County Road 41 (Napanee)**
*- Highway 518 (Orrville)**

West Nile Virus Surveillance Program, Various Sites, Central Ontario (Aquatic Ecologist)
Evaluating the potential for MTO owned/managed properties (e.g. stormwater ponds) to be mosquito breeding habitats, and recommended suitable strategies to curtail mosquito breeding success.

Bridge Widening, CN Rail Mile 119.6*, Kingston, Ontario (Aquatic Ecologist)
Procured federal Fisheries Act Authorization related to a rail line widening project over a warmwater creek. Conducted a post-construction monitoring program to confirm the viability of the habitat compensation measures.

Environmental Data Collection, CN Rail Corridor*, Toronto to Hornepayne, Ontario (Environmental Scientist)
Identified, collected and assessed secondary source natural heritage data for a study area that followed the CNR corridor from Toronto to Hornepayne. The data were then transferred to a GIS database, to be used during emergency planning.

Water Resources Management

Minnow Lake Restoration*, Sudbury, Ontario (Aquatic Ecologist)
Coordinated a lake-wide monitoring program to evaluate the degree of water pollution resulting from stormwater discharge to an urban lake. Participated in frequent public consultation to liaise with residents of the Minnow Lake Restoration Group.

Fort Creek Restoration*, Sault Ste. Marie, Ontario (Aquatic Ecologist)
In consultation with DFO, completed a restoration plan for an urban creek that outlets to Lake Huron and provides salmon spawning habitat. Habitat enhancement involved the removal of in-stream debris, channel stabilization, riparian plantings, substrate enhancement, and creation of refuge areas. Fisheries Act Authorization was obtained, and environmental monitoring during construction was conducted.

Environmental Effects Monitoring Programs for Mining Sector Clients, Various Sites, Canada (Benthic Ecologist)
Contributed benthic ecology chapter to numerous EEM reports for Canadian metal mines. Analyzed and reported on invertebrate data to determine whether the respective mine effluent was resonsible for an aquatic community level effect. EEM experience includes:
- Hudson Bay Mining & Smelting Co. Ltd., Chisel North Mine, Snow Lake, Manitoba
- Hudson Bay Mining & Smelting Co. Ltd., Snow Lake Mill / Anderson Tailings, Snow Lake, Manitoba
- Hudson Bay Mining & Smelting Co. Ltd., Flin Flon Tailings Impoundment System and Trout Lake Mine, Flin Flon, Manitoba
- Hudson Bay Mining & Smelting Co. Ltd., Ruttan Mine, Leaf Rapids, Manitoba
- Hudson Bay Mining & Smelting Co. Ltd., Konuto Lake Mine, Denare Beach, Saskatchewan
- SMC (Canada) Ltd., McAlpine Mill, Cobalt, Ontario

Environmental Effects Monitoring Programs for Pulp and Paper Sector Clients, Various Sites, Canada (Benthic Ecologist)
Contributed the benthic ecology chapter to numerous EEM reports for Canadian pulp and paper mills. Statistically analyzed and reported on invertebrate data, according to Environment Canada biological monitoring protocols, to determine whether the respective mill effluent was responsible for an aquatic community level effect. EEM project experience includes:
- Cascades Fine Papers Group Thunder Bay Inc., Lake Superior, Thunder Bay, Ontario

** denotes projects completed with other firms*

Kathleen R. O. Todd M.Sc.

Aquatic Ecologist / Project Manager

- Georgia-Pacific Canada Inc., Lake Gibson, Thorold, Ontario
- Kimberly-Clark Incorporated, Lake Superior, Terrace Bay, Ontario
- Marathon Pulp Inc., Lake Superior, Marathon, Ontario
- Nexfor Fraser Papers, Saint John River, Edmunston, New Brunswick
- Norampac Inc., Lake Superior, Red Rock, Ontario
- Spruce Falls Inc., Kapuskasing River, Kapuskasing, Ontario
- Stora Enso Port Hawkesbury Limited, Strait of Canso, Port Hawkesbury, Nova Scotia
- Tembec Industries Inc., Mattagami River, Smooth Rock Falls, Ontario

Watershed Based Biomonitoring Program for Urban Development, Oakville, Ontario (Benthic Ecologist)
Sampled and analyzed the Fourteen Mile Creek invertebrate community to establish baseline conditions, prior to the development of a housing subdivision. Six subsequent years of during-construction monitoring were conducted.

North and South Meade Creeks Subwatershed Plan*, Peterborough, Ontario (Aquatic Ecologist)
Conducted fish collections and population analyses, invertebrate sampling and identification, and collected and analyzed water chemistry samples. The information was used to predict the ecological sensitivity of Meade Creek and to provide recommendations regarding the extent and type of future development permitted in the watershed.

Pike River Aquatic Impact Assessment*, Field, Ontario (Benthic Ecologist)
Sampled fish, invertebrates and benthic sediments within the vicinity of a chlorinated discharge zone to determine the extent of chlorine related effects to the aquatic environment.

Biological Impact Assessment of a Closed Landfill on the Maitland River, Wingham, Ontario (Benthic Ecologist)
Analyzed Maitland River invertebrate community data within the vicinity of a closed landfill to determine the potential impact of landfill leachate.

Receiver Biomonitoring Program, Elmira, Ontario (Benthic Ecologist)
Analyzed invertebrate community data to determine the viability of an industrial contaminated groundwater collection and treatment system which discharges treated water to Canagagigue Creek.

Shekak River Post Impoundment Environmental Monitoring for the Shekak-Nagagami Hydroelectric Development, Hearst, Ontario (Aquatic Ecologist)
Addressed agency concerns regarding environmental monitoring in the headpond area of a river impoundment. Evaluated shoreline erosion and the viability of fish habitat compensation measures, including a walleye spawning shoal and aquatic invertebrate enhancement works.

Environmental Effects Monitoring Program for the Antamina Mine & Port Facility, Peru (Benthic Ecologist)
Analyzed biological (metal concentrations in fish and shellfish tissues, fish health, benthic invertebrate community structure) and physical (water and sediment chemistry) data collected in the vicinity of both an inland mine (freshwater environment) and a coastal mining port facility (marine environment) to determine if the local ecosystems were being adversely affected by mining/shipping operations.

Benthic Invertebrate Monitoring Program*, Caledonia, Ontario (Benthic Ecologist)
Assessed the Fox Creek invertebrate community to determine if the stream habitat was being adversely affected by adjacent mining effluent discharge.

** denotes projects completed with other firms*

Kathleen R. O. Todd M.Sc.
Aquatic Ecologist / Project Manager

PUBLICATIONS

Todd, K.R.O., M.G. Fox and D.C. Lasenby. Presented at the 52nd Annual Meeting of the North American Benthological Society. Seasonal influence of riparian vegetation on stream macroinvertebrate community structure. *North American Benthological Society, Vancouver, B.C. (June 6-10)*, 2004.

Todd, K.R.O. The Influence of Deciduous and Coniferous Riparian Vegetation on Aquatic Macroinvertebrate Community Structure in Low Order Streams of South Central Ontario. *M.Sc. Thesis, Trent University*, 2003.

Mark C. Pomeroy B.Sc.

Fisheries Biologist / Project Manager

Mark has 14 years of experience designing, coordinating, and implementing small and large scale aquatic habitat and impact assessments, encompassing numerous habitat types including lakes, ponds, large rivers, warmwater and coldwater streams. Mark has also developed and implemented many monitoring, mitigation, compensation and inventory processes. Past employment with Fisheries and Oceans Canada (DFO), and both the Grand River and St. Clair Region Conservation Authorities contributes to Mark's extensive working experience with regulatory and approvals processes related to the *Fisheries Act*, the *Conservation Authorities Act* and the *Drainage Act*. Mark's familiarity with *Fisheries Act* mitigation and compensation includes an understanding of the Habitat Alteration Assessment Tool (HAAT). He has extensive experience involving permitting and issues resolution related to the federal *Species at Risk Act* and the provincial *Endangered Species Act*. His experience also includes several transportation-related Environmental Assessments.

EDUCATION

Honours B.Sc. (Agriculture), University of Guelph / Natural Resources Management, Guelph, Ontario, 2000

Royal Ontario Museum / Freshwater Fish Identification Course, Toronto, Ontario, 2011

Class 1 Electrofishing Certificate / Ministry of Natural Resources, Waterloo, Ontario, 2010

Ontario Freshwater Mussel Identification Workshop / Fisheries and Oceans Canada - Canada Centre for Inland Waters, Burlington, Ontario, 2007

Fisheries Assessment Specialist and Fisheries Contracts Specialist, MTO/DFO/OMNR Fisheries Protocol Course, Downsview, Ontario, 2006

PROJECT EXPERIENCE

Environmental Assessments

Locks 24 and 25 – VLH Turbine Installation, Canadian Projects Limited, Lakefield, Ontario (Aquatic Biologist)
Conducted aquatic assessments including walleye and bass spawning and habitat surveys in support of an Environmental Assessment (EA) for the installation of Very Low Head (VLH) turbines at Dams 24 and 25 on the Otonabee River. As part of the EA, will provide an analysis of impacts to walleye and bass spawning habitat and habitat use by small-bodied fish. The impact assessment will also be used as during the assessment of the project using the Fisheries & Oceans Canada (DFO) Risk Management Framework.

Pier 27 Dockwall and Dredging, Hamilton Port Authority, Hamilton, Ontario (Aquatic Biologist)
Coordinated and conducted aquatic assessments in support of the installation of a new dockwall and dredging to facilitate shipping traffic. Coordinated with DFO regarding need for Fisheries Act approval.

Pier 22 Environmental Assessment, Hamilton Port Authority, Hamilton, Ontario (Aquatic Biologist)
Coordinated and conducted aquatic assessments in support of site improvements. Negotiated compensation measures and drafted letter of intent in pursuit of Fisheries Act Authorization.

Bruce to Milton Transmission Line, Various, Ontario (Fisheries Biologist)
Planned, coordinated and assisted with execution of large-scale fisheries field program to assess potential impacts of proposed hydroelectric corridor reinforcement project and provided relevant input to the provincial environmental assessment process as well as the Fisheries Act and Conservation Authorities Act permitting processes. Managed data entry, analysis and completed reporting of aquatic resources sections. Coordination of multi-disciplinary team and regulatory agencies for acquisition of appropriate permits and approvals.

Yellow Falls Hydroelectric Project, Smooth Rock Falls, Ontario (Aquatic Biologist)
Planned, coordinated and assisted with execution of fisheries field program to assess potential impacts of proposed hydroelectric dam project. Facilitated acquisition of permits and approvals from relevant agencies. Assisted with fish, benthos, habitat, water and sediment sampling. Authored significant portions of the technical appendix related to aquatic study results.

** denotes projects completed with other firms*

Mark C. Pomeroy B.Sc.

Fisheries Biologist / Project Manager

Environmental Impact Assessments

Georgia Pacific Thorold Cycle 4 EEM, Thorold, Ontario (Aquatic Ecologist)

Assisted in field sampling of fish, benthos, water and sediment for federally regulated pulp and paper environmental effects monitoring.

Spruce Falls Cycle 4 EEM, Kapuskasing, Ontario (Aquatic Ecologist)

Assisted in field sampling of fish, benthos, water and sediment for federally regulated pulp and paper environmental effects monitoring.

Smooth Rock Falls Cycle 4 EEM, Smooth Rock Falls, Ontario (Aquatic Ecologist)

Assisted in field sampling of fish, benthos, water and sediment for federally regulated pulp and paper environmental effects monitoring.

Highway and Transportation

King Street and Fountain Street Improvements Class Environmental Assessment Study, Cambridge, Ontario (Fisheries Biologist)

Planned, coordinated and conducted field investigations to assess aquatic habitat at watercourse crossings within the project study area. Data collected during field investigations was used to assess potential impacts of preferred option. Drafted text for relevant sections of Class EA document.

Franklin Boulevard Widening Class Environmental Assessment Study, Cambridge, Ontario (Fisheries Biologist)

Planned, coordinated and conducted field investigations to assess aquatic habitat at watercourse crossings within the project study area. Data collected during field investigations was used to assess potential impacts of preferred option. Drafted text for relevant sections of Class EA document.

Highway 69 - Patrol Yards between Parry Sound and Sudbury, Ontario (Fisheries Biologist)

Planned, coordinated and conducted field investigations to assess aquatic habitat at watercourses within the project study area. Data collected during field investigations was used to assess potential impacts of proposed maintenance patrol yards located adjacent to Highway 69. Drafted text for inclusion in Fisheries and Aquatic Ecosystems Report. All work was conducted in accordance with the MTO/DFO/MNR Protocol (2006).

Highway 11 - High Falls Road Access Improvements Class Environmental Assessment, Bracebridge, Ontario (Fisheries Biologist)

Planned and conducted field investigations to assess aquatic habitat at watercourse crossings within the project study area. All work was conducted in accordance with the MTO/DFO/MNR Protocol (2006).

Highway 11 - Intersection Improvements, Powassan, Ontario (Fisheries Biologist)

Planned, coordinated and conducted field investigations to assess aquatic habitat at watercourse crossings within the project study area. Data collected during field investigations was used to assess potential impacts of preferred option, including potential impacts to Brook Trout. Drafted text for inclusion in Fisheries and Aquatic Ecosystems Report. All work was conducted in accordance with the MTO/DFO/MNR Protocol (2006).

Highway 3 - Rehabilitation between Jarvis and Renton, Ontario (Fisheries Biologist)

Planned, coordinated and conducted field investigations to assess aquatic habitat at watercourse crossings within the project study area. Data collected during field investigations was used to assess potential impacts of preferred option, including potential impacts to Brook Trout. Drafted Fisheries and Aquatic Ecosystems Report. All work was conducted in accordance with the MTO/DFO/MNR Protocol (2006), and included preparation and submission of "no HADD forms" to satisfy Fisheries Act requirements.

Highway 69 - Key River Bridge Replacement, Britt, Ontario (Fisheries Biologist)

Planned, coordinated and conducted field investigations to assess aquatic habitat in Key River at proposed location of bridge replacement. Data collected during field investigations was used to assess potential impacts of bridge replacement activities. Drafted Fisheries and Aquatic Ecosystems Report. All work was conducted in accordance with the MTO/DFO/MNR Protocol (2006), and included preparation and submission of "no HADD forms" to satisfy Fisheries Act requirements.

Replacement of Coutts Line Bridge over Baptiste Creek, Tilbury, Ontario (Fisheries Biologist)

Facilitated acquisition of provincial Endangered Species Act (ESA) approval (letter of advice) through provision of advice regarding construction techniques. Planned, coordinated and conducted field investigations to assess freshwater mussel community and habitat at bridge site.

** denotes projects completed with other firms*

Mark C. Pomeroy B.Sc.

Fisheries Biologist / Project Manager

Replacement of Dawn Mills Bridge over Sydenham River Creek, Dresden, Ontario (Fisheries Biologist)
Dawn Mills Bridge is located over a reach of the Sydenham River known to contain one of the largest number of taxa of federally regulated Species at Risk fish and mussels in Canada. Facilitated acquisition of federal approvals (Fisheries Act and Species at Risk Act, letter of advice) through provision of advice regarding construction techniques. Planned, coordinated and conducted field investigations to assess freshwater mussel habitat at bridge site.

Chinguacousy Road Widening, Brampton, Ontario (Fisheries Biologist)
Conducted fish community assessment to determine presence of Redside Dace (a provincially Endangered species). Drafted applications for Fisheries Act Authorization, Conservation Authorities Act approval, and Endangered Species Act approval. Provided input to engineering design for compensation measures related to Redside Dace habitat.

Detroit Windsor Truck Ferry Improvements (Design) (GWP 3071-06-00), Windsor, Ontario (Fisheries Biologist)
Provided aquatic community and habitat assessment services as well
as input regarding project design, construction staging and silt and sediment control planning. Acquired approvals under Fisheries Act and Conservation Authorities Act related to fish habitat. Negotiated compensation measures with Conservation Authority prior to project design change, resulting in no HADD.

Highway 24 - Intersection Improvements, Cambridge, Ontario (Fisheries Biologist)
Provided fish rescue services. Performed environmental inspection duties related to implementation of the Fisheries Act compensation plan and resolution of onsite issues related to construction.

Detroit Windsor Truck Ferry Improvements (Contract Administration) (WP 3071-06-00), Windsor, Ontario (Fisheries Biologist)
Construction monitoring services related to Fisheries Act implications (fish removals, species at risk identification training for contract staff , staging and implementation design review), provision of advice regarding alternative staging/construction operations to prevent impacts to aquatic habitat/organisms.

Fanshawe Park Road Widening, London, Ontario (Fisheries Biologist)
Facilitated acquisition of approvals from DFO for the realignment of Heard Drain/Snake creek during the expansion of Fanshawe Park Road. Performed construction inspection services, resolved onsite implementation issues related to the Fisheries Act.

Natural Resource Services

Municipal Drain Classification Program*, Various, Ontario (Drain Assessment Technician)
Planned and implemented large scale sampling protocol designed by DFO to assess the sensitivity of various municipal drains to disturbance. Sampling program encompassed all drains within the Grand River watershed and consisted of habitat, thermal and fish community characterization based on extensive field sampling. Analyzed substantial quantities of field data, summarized results and produced interim and final reports.

Fish Habitat Study*, Strathroy, Ontario (Biological Technician)
Planned and implemented field program to sample fish community in reservoirs managed by the St. Clair Region Conservation Authority. Responsible for writing final report concerning existing fish habitat status and providing recommendations based on field data. Participated in water quality and benthic community field sampling programs.

Various Environmental Assessments*, Sarnia, Ontario (Fish Habitat Biologist)
Assessed project proposals for impacts to fish habitat as defined in the Fisheries Act. Issued Letters of Advice and Authorization under the Fisheries Act. Carried out screening level environmental assessments of proposed projects under the Canadian Environmental Assessment Act. Participated in outreach programs and inter-agency work groups regarding Species at Risk recovery. Acquired familiarity with the Habitat Alteration Assessment Tool (HAAT).

Renewable Energy

St. Columban Wind Project, Huron County, Ontario (Fisheries Biologist)
Planned, coordinated and conducted field investigations to assess potential aquatic impacts resulting from proposed wind project consisting of fifteen turbines. Drafted Water Assessment and Water Body Report as mandated under Ontario Reg. 359/09.

** denotes projects completed with other firms*

Mark C. Pomeroy B.Sc.

Fisheries Biologist / Project Manager

Plateau Wind Project, Grey County, Ontario (Fisheries Biologist)
Planned, coordinated and conducted field investigations to update previous field work to assess potential aquatic impacts resulting from proposed wind project consisting of eighteen turbines. Drafted relevant sections of the Environmental Screening Report (ESR) as mandated under Ontario Reg. 116/01. Provided advice concerning provincial species at risk concerns.

Grand Renewable Energy Park, Haldimand County, Ontario (Fisheries Biologist)
Planned, coordinated and conducted field investigations to assess potential aquatic impacts resulting from proposed wind and solar project consisting of sixty-seven turbines and 425,000 solar panels. Drafted Water Assessment and Water Body Report as mandated under Ontario Reg. 359/09.

Springwood Wind Project, Belwood, Ontario (Fisheries Biologist)
Conducted field investigations to assess potential aquatic impacts resulting from proposed wind project consisting of and assisted with draft Water Assessment and Water Body Report under Ontario Reg. 359/09.

Whittington Wind Project, Dufferin County, Ontario (Fisheries Biologist)
Planned and coordinated field investigations to assess potential aquatic impacts resulting from proposed wind project consisting of three turbines. Drafted Water Assessment and Water Body Report as mandated under Ontario Reg. 359/09.

Fairview Wind Project, Stayner, Ontario (Fisheries Biologist)
Planned and coordinated field investigations to assess potential aquatic impacts resulting from proposed wind project consisting of eight turbines. Drafted Water Assessment and Water Body Report as mandated under Ontario Reg. 359/09.

White Pines Wind Project, Prince Edward County, Ontario (Fisheries Biologist)
Planned, coordinated and conducted field investigations to assess potential aquatic impacts resulting from proposed wind project consisting of twenty-nine turbines. Drafted Water Assessment and Water Body Report as mandated under Ontario Reg. 359/09 (in progress).

Urban Land

Berczy Dam Removal, Markham, Ontario (Fisheries Biologist)
Provided fish rescue services, including resolution of issues related to Species at Risk.

Medway Sanitary Trunk Sewer Extension, London, Ontario (Fisheries Biologist)
Drafted Fisheries Act application and Endangered Species Act application for pipeline crossing of Medway Creek. Coordinated and completed aquatic habitat assessment and relocation of freshwater mussels. Negotiated compensation measures prior to project design change, resulting in no HADD.

Fox Hollow Subdivision, London, Ontario (Fisheries Biologist)
Facilitated acquisition of approvals from DFO for the realignment of the Heard Drain/Snake Creek and the installation of a stormwater management pond in relation to construction of the Fox Hollow Subdivision. Performed construction inspection services, resolved onsite implementation issues related to the Fisheries Act.

** denotes projects completed with other firms*

Kelly Clayton B.Sc. (Env.)

Ecologist

Kelly Clayton is a member of the Environmental Management Group at Stantec Consulting with four years of industry experience. She has a Graduate Certificate in Ecosystem Restoration and a Bachelor of Environmental Science, majoring in environmental geography and area of emphasis in biotic systems. Kelly has gained valuable experience through her formal employment and her extensive participation in volunteer projects in Ontario, as well as the United States of America. Her experience at teaching college-level environmental monitoring has imbued Kelly with a practical ability to apply Ecological Monitoring and Assessment Network (EMAN) and Ontario Stream Assessment Protocol (OSAP) protocols.

Kelly has conducted a wide array of environmental monitoring that includes bird migration surveys, salmon spawning counts, butterfly and odonate surveys, as well as fish assessment and vegetation surveys. She is familiar with the use of all manner of such survey equipment as GPS and radio telemetry equipment, seine nets, hoop nets, gill nets, fyke nets, minnow traps, basking traps and spring haul traps. Kelly is experienced at the identification of flora and fauna, and is capable of handling wildlife. Certified in ELC (Ecological Land Classification), Class II Electrofishing, and Ontario Benthic Biomonitoring Network, Kelly has the ideal background to support a wide variety of both Terrestrial and Aquatic natural heritage studies. Her laboratory experience has honed Kelly's skills in data processing and analysis, and she has a demonstrated ability to interpret and report findings accurately.

EDUCATION

B.Sc. (Env.), University of Guelph / Environmental Science, Guelph, Ontario, 2007

Graduate Certificate, Niagara College / Ecosystem Restoration, Niagara-on-the-Lake, Ontario, 2009

Class II Electrofishing Certificate, Niagara College / Ecosystem Restoration, St. Catharines, Ontario, 2008

Ontario Benthic Biomonitoring Network Certificate, Niagara College / Ecosystem Restoration, St. Catharines, Ontario, 2009

Certificate, Ecological Land Classification (ELC), Lindsay, Ontario, 2010

Certificate, Tallgrass Ontario / Seed Collector, Burlington, Ontario, 2010

Certificate, Ontario Wildlife Rehabilitation Network (OWREN), London, Ontario, 2010

Certificate, St. Johns Ambulance / CPR and First Aid, Burlington, Ontario, 2010

Workplace Hazardous Materials Information System (WHMIS), Burlington, Ontario, 2010

Licence, Boat Smart / Pleasure Craft Operators, Orangeville, Ontario, 2008

Certificate, ROM / Ontario Fish Identification Workshop, Toronto, Ontario, 2011

PROJECT EXPERIENCE

Education

Niagara College Environmental Monitoring Program*, Niagara-on-the-Lake, Ontario (Part-time Teacher)

Taught two sections of students at a second-year, college level. Demonstrated and explained Ontario Stream Assessment Protocol (OSAP) and Ontario Benthic Biomonitoring (OBBN) protocols. Discussed proper field and lab sampling/analysis techniques for water, sediment, and benthos. Prepared assignments, lectures, and exams (both written and practical). Evaluated students based on performance.

Linear Infrastructure

Thunder Bay Generating Station Pipeline Project, Thunder Bay, Ontario (Aquatic Ecologist)

Researched and summarized data for existing conditions report as part of the EA process.

** denotes projects completed with other firms*

Kelly Clayton B.Sc. (Env.)

Ecologist

Union Gas Pipeline Construction, Nanticoke, Ontario (Aquatic Ecologist)
Researched and summarized data for existing conditions report as part of the EA process.

Mining

Environmental Effects Monitoring (EEM) Program: Vale Inco, Sudbury, Ontario (Aquatic Ecologist)
Collected fish and water samples for toxicity testing.

Environmental Effects Monitoring (EEM) Program: Hudson Bay Mining and Smelting, Flin Flon, Manitoba (Aquatic Ecologist)
Collected Hyalella, water samples and sediment samples for toxicity testing.

Natural Sciences & Heritage Resources

Proposed Melancthon Quarry, Melancthon, Ontario (Aquatic Ecologist)
Conducted fish community surveys (electrofishing).

New Hamburg Oxbow, New Hamburg, Ontario (Aquatic Ecologist)
Collected water samples and water quality data twice monthly.

Blue Springs Creek Ground and Surface Water Monitoring, Arkell, Ontario (Aquatic Ecologist)
Downloaded weekly temperature and water level data and performed stream discharge measurements.

Ontario Power Generation - Lake Gibson Project, Thorold, Ontario (Aquatic Ecologist)
Collected benthic invertebrate and water samples. Safety boat operator.

Mill Creek Surface Water Monitoring Program, Milton, Ontario (Aquatic Ecologist)
Performed monthly stream discharge measurements and downloaded water level and temperature logger data. Graphed hydrological data.

Greenhouse Effluent Filtration Design Team, Niagara College*, Niagara-on-the-Lake, Ontario (Biologist)
Conducted environmental impact assessment on receiving stream and suggested several filtration design methods.

Bird Studies Canada Marsh Monitoring Program*, Hamilton, Ontario (Volunteer)
Conducted amphibian surveys on Royal Botanical Gardens property. Aided in the development of the BSC database.

Species at Risk Inventory at Legends on the Niagara Golf Course*, Chippewa, Ontario (Student Consultant)
Designed and conducted survey methods. Produced research and consultant proposals. Made recommendations for further restoration efforts.

St. Clair River Horizontal Directional Drill, Sarnia, Ontario (Aquatic Ecologist)
Performed analysis and presentation of in-situ and laboratory water quality data. Reported on results of water quality monitoring program.

Island Lake Conservation Area, Credit Valley Conservation*, Orangeville, Ontario (Conservation Technician)
Served as a client services representative, which entailed conservation awareness education. Maintained conservation area grounds.

Royal Botanical Gardens*, Hamilton, Ontario (Restoration Ecologist)
Coordinated summer students and assisted in the planning and implementation of restoration activities. Participated in habitat rehabilitation strategies (cattail and waterlily plantings). Maintained floodplain connections.
Assisted the Species at Risk Biologist in the creation of snake hibernacula. Assisted in turtle monitoring using radio telemetry, basking traps and hoop nets. Assisted Terrestrial Ecologist with Prairie grassland rehabilitation techniques (Prescribed burns and Prairie plantings). Conducted environmental monitoring (salmon spawning count, waterfowl migration count, aquatic vegetation surveys, butterfly and odonate counts).
Performed wildlife population management (carp (Cyprinus carpio) seining in Cootes Paradise Marsh and RBG ponds, electrofishing for carp), and beaver dam maintenance.
Operated Cootes Paradise Fishway carp barrier (to separate non-native species from native) and ran educational presentations at Cootes Paradise Fishway.
Collected water quality measurements and performed data entry, data quality control and analysis, in addition to report writing. Assisted in development of educational materials (pamphlets and signage).

** denotes projects completed with other firms*

Kelly Clayton B.Sc. (Env.)

Ecologist

Various Environmental Effects Monitoring (EEM) Studies, Ontario (Aquatic Ecologist)
Conducted fish population monitoring, benthic invertebrate identification and report writing/data management in support of various EEM studies for both Mining and Pulp and Paper industry projects.

Renewable Energy

White Pines Wind Farm, Picton, Ontario (Aquatic Ecologist)
Performed water-body assessments on mapped watercourses.

Fairview Wind Farm, Stayner, Ontario (Aquatic Ecologist)
Performed water-body assessments on mapped watercourses.

Pristine Power Wind Power, St. Columban, Ontario (Aquatic Ecologist)
Conducted fish community surveys (electrofishing).

Algonquin Power Wind Project, Amherst Island, Ontario (Aquatic Ecologist)
Conducted shoreline habitat mapping and fish community surveys.

Solar Power Plan Design Team, University of Guelph, City of Guelph*, Guelph, Ontario (Student)
Designed a solar power plan for the City of Guelph to coordinate with Community Energy Plan. Conducted public surveys on solar power interest. Coordinated with key stakeholders. Conducted cost/benefit analysis, baseline research regarding solar power use, prepared proposal, and presented plan to key stakeholders.

Port Dover Wind Farm, Port Dover, Ontario (Assistant Aquatic Ecologist)
Fish population monitoring (electrofishing).

Melancthon Wind Power Project, Melancthon and Amaranth Townships, Ontario (Biologist)
Conducted bat and bird mortality monitoring studies and raptor monitoring (winter raptor counts) as well as habitat assessments and data analysis.

Transportation Planning

MTO Highway 3, 6 and 24, Simcoe, Ontario (Aquatic Ecologist)
Conducted fish community surveys (electrofishing).

** denotes projects completed with other firms*

Kelly Clayton B.Sc. (Env.)
Ecologist

PUBLICATIONS

Fuller, M.M., K. Clayton, N. Ward. Project Paradise Season Summary Report 2009. *Royal Botanical Gardens. Hamilton, Ontario. RBG Report No. 2010-01*, 2010.

Clayton, K. Carroll's Bay Recovery and Management Strategy. *Royal Botanical Gardens. Hamilton, Ontario*, 2010.

Clayton, K. Recovery and Management Strategy for Carroll's Bay Marsh. *Presentation at the Project Paradise Workshop*, 2010.

Nathan Burnett Tech. Dipl., B.Sc. (Hons.)

Aquatic Ecologist

Nathan Burnett serves with Stantec's Environmental Services group as an aquatic ecologist with experience on projects that include renewable energy and other industries, and specialized Environmental Effects Monitoring (EEM) and Investigation of Cause (IOC) studies for the mining and pulp and paper industries. He has extensive field experience in Ontario and elsewhere with projects ranging from urban to remote environments during all seasons, where he has been involved in a variety of field programs, including the collection of fish, benthic invertebrate, sediment, amphibian and bird data. He is familiar with protocols for fish sampling, and has an excellent working knowledge of benthic invertebrate identification. Nathan excels in the identification of fish, amphibians, birds, insects, and mammal species, aquatic and terrestrial plants, trees and shrubs, including species at risk and their habitats. He is also experienced in wetland evaluation, FEC and ELC protocols. Nathan's field skills are complemented by his laboratory and research experience, for which he has collected, analyzed and managed data for the purposes of developing plant and wildlife management guidelines. Nathan has been a contributing author on a number of technical reports prepared in compliance with federal and provincial legislation, policies and guidelines.

EDUCATION

B.Sc. (Hons.), Trent University / Honours Bachelor of Science in Biology, Peterborough, Ontario, 2009

Tech. Dipl., Sir Sandford Fleming College / Fish and Wildlife Technology Diploma, Lindsay, Ontario, 2007

Tech. Dipl., Sir Sandford Fleming College / Fish and Wildlife Technician Diploma, Lindsay, Ontario, 2006

PROJECT EXPERIENCE

Mining

Alderon Iron Ore Mine Project Baseline Study, Wabush, Labrador, Newfoundland and Labrador (Field Ecologist)
Baseline mining study that comprised sediment and water sampling, bathymetry data, flow and discharge measurements, and downloading surface and ground water loggers

Williams Mine EA/Baseline Aquatic Study*, Marathon, Ontario (Crew Leader)
Aquatic assessment included habitat characterizations and field sampling of water sediment, benthic invertebrates and fish for metal analysis. Organized field program for three crews and logistics for accessing remote areas by helicopter

Red Lake Gold Mines, Chukuni River System Sediment Characterization* (Aquatic Biologist)
Performed sediment sampling and coring in reference and exposure areas, and effluent plume delineation. Assisted with data management and report preparation

Xstrata Zinc, Heath Steele Mine Biological Monitoring Program, Brunswick Mine Cycle 2 EEM Fish Survey, Pabineau River Watershed Biological Assessment* (Aquatic Biologist)
Conducted electrofishing for three projects, including closed station quatitiative sampling as well as qualitative sampling. Conducted the benthic and water sampling and habitat characterization components of the projects. Assisted with data management and report preparation

Xstrata Copper, Kidd Metalurgical Site, Investigation of Cause* (Aquatic Biologist)
Participated in extensive sampling program deploying passive sampling devices for sediment and pore water collection. Conducted sediment coring, benthic sampling, and several fishing methods. Assisted with data management and report preparation

Agrium Phosphate Mine*, Kapuskasing, Ontario (Aquatic Biologist)
Participated in a fish population and spawning survey on Lake Pitama at the Agrium Phosphate Operation

** denotes projects completed with other firms*

Nathan Burnett Tech. Dipl., B.Sc. (Hons.)

Aquatic Ecologist

Red Lake Magnitude and Extent Study and Cochenour-Wilanour Mine Biological Assessment* (Aquatic Biologist)
Participated in field study program involving sediment coring and collection of sediment pore water, benthic macroinvertebrates, and a lethal small-bodied fish survey

Goldcorp Canada Ltd., Musselwhite Mine Fall Program* (Aquatic Biologist)
Participated in field study to assess chemical condition and toxicity in priority fish tissues and the health of sentinel sport fish species in northern Ontario

Xstrata Copper, Kidd Mine, Metal Mining Cycle 3 EEM* (Aquatic Biologist)
Crew member of EEM study that comprised of benthic and water sampling, habitat characterization, and a hybrid lethal fish survey using minnow traps and seine nets. Assisted with data management and report preparation

Cameco Corporation, Rabbit Lake Operation, Effects of Metals and Radionuclides on Breeding Birds* (Biologist)
Served as field crew leader for two tree swallow breeding and growth studies. Collected eggs for toxicity analysis, compiled chick growth data at regular intervals and determined nesting success and productivity. Benthic sampling for metal and toxicity analysis. Wild and domestic duck harvesting to determine contaminant uptake in tissue. Reported all bird sightings at reference and exposure areas. Aided in data management and report preparation

Natural Sciences & Heritage Resources

Proposed Simpson's Quarry EA, Coloured Aggregates, Bancroft, Ontario (Field Ecologist)
Conducted field sampling that included breeding bird, waterfowl breeding, and amphibian surveys, aquatic assessments, habitat characterizations, as well as species at risk surveys that included Blanding's Turtle and Whip-poor-will

Various Volunteer Programs* (Volunteer Ecologist)
Participated in various initiatives for organizations that included Trent University (Environmental Educator - meeting coordination and facilitation pertaining to animal tracking, physiology, bird identification, wilderness survival, flora/fauna identification and biology, edible and medicinal wild plants); OFAH & CVC (Atlantic salmon fry stocking of Credit River, conducted demonstrations of terrestrial and and stream ecology); Loon and Sturgeon Lakes Fish and Wildlife Projects (analysis of water chemistry to assess health, productivity and biomass employing various sampling techniques, conducted inventories and assessments of lentic communities, Forest Ecosystem and Ecological Land Classification systems, prescribed sustainable harvest limits for moose and deer); Ringwood Fish Hatchery Chinook Salmon Spawning Initiative (conducted electrofishing fo collect scales and otoliths for aging analysis, and extracted milt and eggs for rearing at hatchery); FrogWatch (amphibian species identification through sight and sound, data collection and reporting)

Stream Survey of Clearview, Levi and Mullet Creeks*, Mississauga, Ontario (Aquatic Biologist)
Served as crew leader for a stream survey involving benthic sampling (qualitative and quantitative), and habitat characterizations as part of the Biological Monitoring and Assessment Program protocols. Assisted with data management and report preparation

Sawmill Creek Aquatic Assessment* (Aquatic Biologist)
Participated in aquatic habitat assessment of Sawmill Creek to characterize habitat. Water quality and field measures including channel width and depth, substrate, channel morphology, flow, presence of vegetation and occurrence of erosion were collected

McCabe Lake Fish and Fish Habitat Survey*, Elliot Lake, Ontario (Aquatic Biologist)
Participated in study on limitations of fish productivity in McCabe Lake to determine probable cause of reduced fish abundance. Sampling included a mark-recapture spawning survey, identification of active white sucker spawning areas in lake, and associated inlets/outlet. Habitat characterization survey was completed to determine spawning enhancement opportunities

** denotes projects completed with other firms*

Nathan Burnett Tech. Dipl., B.Sc. (Hons.)

Aquatic Ecologist

Various Clients*, Ontario (Aquatic Biologist)
Mining and pulp and paper mill project fieldwork preparation, planning and organization, including necessary equipment. Applied for permits and authored summary reports. Performed sample tracking, submission of samples collected during monitoring programs, screening and QA/QC for various sample types. Managed data, presentation of tables, figures, reports, station location mapping and habitat characterization for Environmental Effects Monitoring (EEM) and Investigation of Cause (IOC) studies

Renewable Energy

Capital Power (K2) Wind Farm, Goderich, Ontario (Field Ecologist)
Conducted aquatic assessments using REA water body designations, fish community presence/absence study and habitat characterization related to proposed wind farm

Cedar Point Wind Farm, Middlesex County, Ontario (Field Ecologist)
Conducted aquatic assessments using REA water body designations, fish community presence/absence study and habitat characterization related to proposed wind farm

Bow Lake Wind Farm, Montreal River Harbour, Ontario (Field Ecologist)
Conducted fieldwork related to natural heritage terrestrial assessment that included locating bat maternity roosts, amphibian surveys, and habitat delineation. Aquatic fieldwork included habitat characterization and water body determination congruent with the Renewable Energy Act (REA) and fish community assessments

Research / Laboratories

John Matthews Ph.D. Dragonfly Research* (Field Researcher)
Conducted field research component of study tracking Green-darner Dragonfly (Anax junius) emergence dates and their relationship to water and air temperature, as well as water depth. Used water monitoring devices to infer relationship between water temperature and juvenile emergence. Used water chemistry instruments and developed wetland identification skills

** denotes projects completed with other firms*