Appendix D

Fish Collection/Observation Records

Electrofishing and Minnow Trap Surveys at Water Body Locations								
Waterbody Name	**Station**	**Date**	**Station Length (m)**	**Effort (seconds)**	**Fish Captured**	**Number of Fish Captured**	**Water Quality (Temperature, Dissolved Oxygen)**	**Comments**
Agawa Watershed								
Unnamed Water Body	9B-1	7/11/2012	at culvert	N/A	Brook Trout	4	18.73 °C, 7.85 mg/L	Minnow traps (X3)
					White Sucker	1		
					Northern Redbelly Dace	52		
					Finescale Dace	9		
Montreal River	9B-4	7/11/2012	Bay = 20mx15m	N/A	No Catch	-	23.44 °C, 8.13 mg/L	Minnow traps (X3), water levels fluctuated. Traps were deeper than originally set. MNR data indicates presence of Lake Trout.
Unnamed Water Body	9B-8	7/11/2012	N/A	N/A	No Catch	-	15.14 °C, 7.47 mg/L	Minnow traps (X2)
Montreal River	9B-9	7/11/2012	N/A	N/A	No Catch	-	26.22 °C, 7.79 mg/L	Minnow traps (X3); fluctuating water levels due to dam activities. Cyprinid schools observed. MNR data indicates presence of Lake Trout.
Unnamed Water Body	9B-10	7/12/2012	at culvert	N/A	No Catch	-	10.00 °C, 7.47 mg/L	Minnow traps (X3)
Unnamed Water Body	9B-11	7/12/2012	N/A	N/A	No Catch	-	11.97 °C, 7.39 mg/L	Minnow traps (X2)
Montreal River	10-31	7/9/2012	Lake bay	N/A	No Catch	-	23.23 °C, 8.23 mg/L	Minnow traps (X2). MNR data indicates presence of Lake Trout.
Montreal River	10-14	7/6/2012	N/A	N/A	No Catch	-	25.2 °C, 7.25 mg/L	Minnow traps (X5). MNR data indicates presence of Lake Trout.
Unnamed Water Body	10-25	7/9/2012	2 pools at 2.5x3m each	N/A	Brook Trout	3	12.20 °C, 9.79 mg/L	Minnow traps (X2)
					Mottled Sculpin	1		
Unnamed Water Body	10-8	7/6/2012	100	N/A	Northern Redbelly Dace	280	25.2 °C, 7.25 mg/L	Minnow traps (X5)
Unnamed Water Body	7-17	8/28/2012	Spot	N/A	Brook Trout	N/A	N/A	Brook Trout observed
Unnamed Water Body	7-5	7/12/2012	100	220	Central Mudminnow	3	13.36 °C, 7.41 mg/L	Many frog species observed
Unnamed Lake	1-1	7/6/2012	Lake	N/A	No Catch	-	26.33 °C, 9.03 mg/L	Minnow trap; Eastern Newt caught in trap
Unnamed Lake	1-11	7/7/2012	Lake	N/A	No Catch	-	27.60 °C, 9.43 mg/L	Minnow traps (X3); heavily influenced by old beaver dam
Goulais Watershed								
Unnamed Water Body	9C-2	8/28/2012	N/A	N/A	N/A	N/A	N/A	Creek Chub carcass on shoreline. Too shallow to place minnow traps or electrofish.
Unnamed Water Body	10-1	7/11/2012	10	N/A	No Catch	-	17.20 °C, 7.85 mg/L	Minnow traps (X3)
Unnamed Lake	1-4	7/7/2012	N/A	N/A	No Catch	-	23.89 °C, 8.18 mg/L	Minnow traps (X3)
Unnamed Water Body	1-8	8/28/2012	N/A	N/A	N/A	N/A	N/A	Three Brook Trout observed.
Unnamed Water Body	0-4	7/3/2012	N/A	N/A	N/A	N/A	N/A	Four Brook Trout observed.

Electrofishing and Minnow Trap Surveys at Water Body Locations								
Waterbody Name	**Station**	**Date**	**Station Length (m)**	**Effort (seconds)**	**Fish Captured**	**Number of Fish Captured**	**Water Quality (Temperature, Dissolved Oxygen)**	**Comments**
Negick Lake	0-10	7/14/2012	Bay of Negick	N/A	Creek Chub	1	26.66 °C, 9.11 mg/L	Minnow traps (X3). Observed schools of Creek Chub and Northern Redbelly Dace, an 18 inch Northern Pike, and 2 Northern Pike carcasses. MNR data indicates presence of Northern Pike.
Unnamed Water Body	0-11	7/14/2012	stream West of Negick Lake	N/A	Creek Chub	1	26.06 °C, 7.62 mg/L	Minnow traps. Observed schools of YOY Cyprinidae
Unnamed Lake	9F-10	8/27/2012	N/A	N/A	No Catch	-	23.74 °C, 8.51 mg/L	Minnow traps (X2)
Unnamed Water Body	9F-9	8/27/2012	Pond	N/A	Fathead Minnow	94	24.46 °C, 8.25 mg/L	Minnow traps (X2)
					Northern Redbelly Dace	88		
Unnamed Lake	9F-8	8/27/2012	N/A	N/A	Creek Chub	88	24.52 °C, 7.27 mg/L	Minnow traps (X2)
					Fathead Minnow	1		Northern Pike observed.
					White Sucker	2		
Unnamed Water Body	9F-1	7/11/2012	100	N/A	Brook Trout	4	17.23 °C, 8.91 mg/L	Minnow traps (X4); 1 Brook Trout was a YOY
					Creek Chub	16		
					Fathead Minnow	6		
					White Sucker	1		
					Northern Redbelly Dace	6		
					Blacknose Dace	47		
Unnamed	9F-7	8/27/2012	N/A	N/A	Brook Trout	2	20.39 °C, 6.91 mg/L	Minnow traps (X2)
					Northern Redbelly Dace	33		
					Creek Chub	2		
Unnamed Water Body	9F-2	7/12/2012	30	N/A	Creek Chub	2	22.2 °C, 6.90 mg/L	Minnow traps (X4)
					Northern Pearl Dace	8		
					Northern Redbelly Dace	325		
Unnamed Lake	9F-6	8/27/2012	N/A	N/A	Northern Redbelly Dace	136	23.4 °C, 8.80 mg/L	Minnow traps (X2)
					Northern Pearl Dace	1		
Unnamed Water Body	9F-3	7/12/2012	N/A	N/A	Brook Trout	N/A	N/A	Several young Brook Trout (less than 1 year old) captured by dip net.
Unnamed Water Body	9F-4	7/12/2012	N/A	N/A	N/A	N/A	N/A	Several Brook Trout observed in isolated pools.
Unnamed Pond	9F-5	8/27/2012	N/A	N/A	No Catch	-	21.68 °C, 6.62 mg/L	Minnow traps (X2); 5 Green Frog tadpoles observed

Appendix E

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.

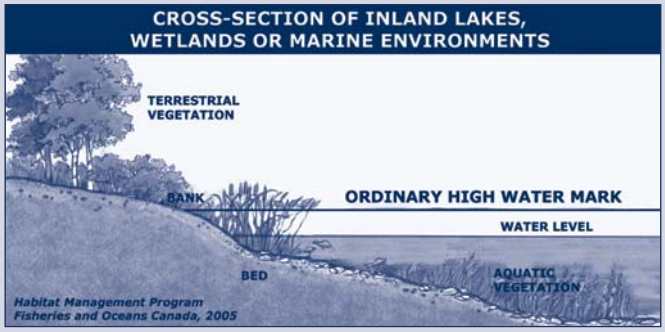
- **13.1.** Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

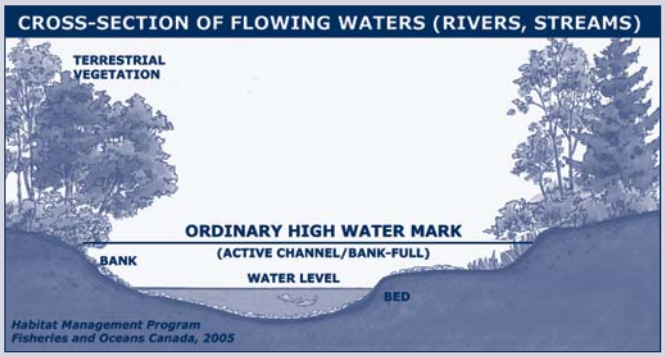
Definition:

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:

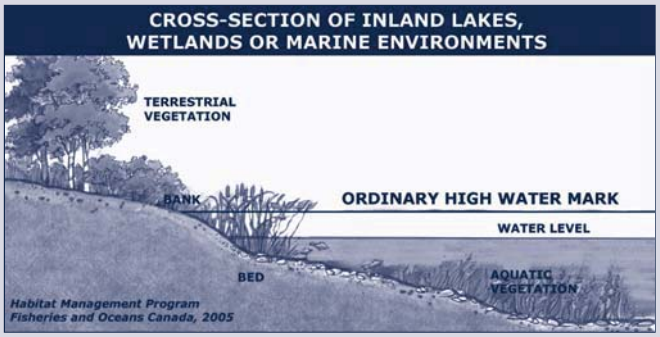
22. Stabilize the **streambed** and restore the original channel shape, bottom gradient and substrate to pre-construction condition.

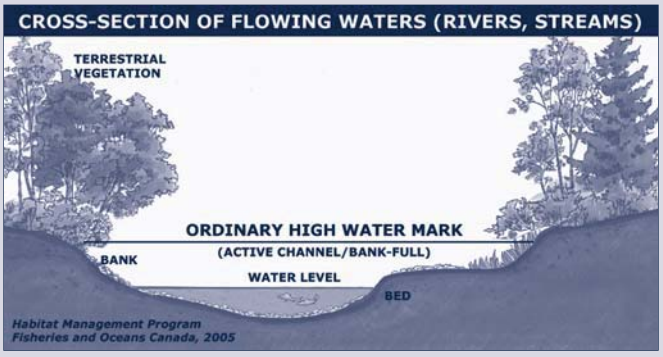
23. Ensure **banks** are stabilized, restored to original shape, adequately protected from erosion and re-vegetated, preferably with native species.

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.

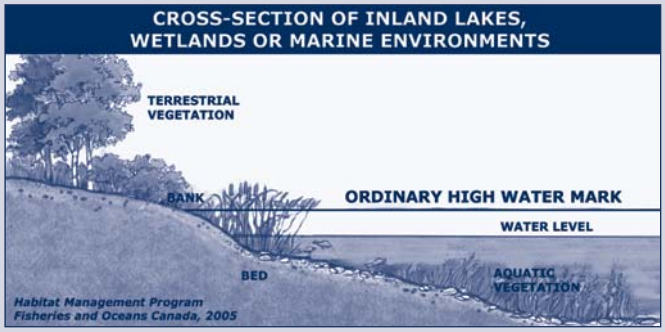
9. Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses and cover such areas with mulch to prevent erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas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

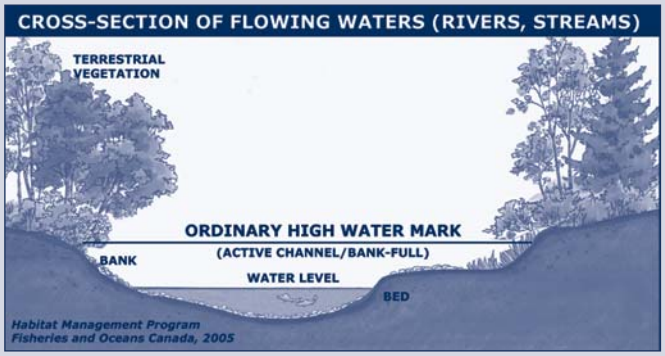
    9.1. Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

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.

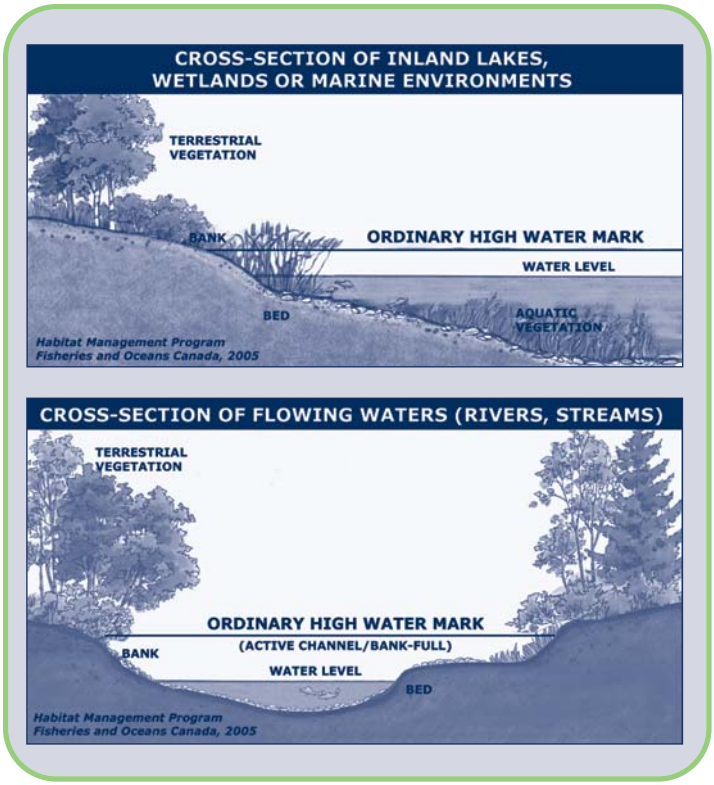
11. Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses and cover such areas with mulch to prevent erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas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

Curricula Vitae

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*

Nancy A. Harttrup B.Sc.

Fisheries Biologist / Project Manager

Nancy is a Fisheries Biologist and Project Manager with extensive experience collecting and analyzing data related to aquatic systems. Project experience includes aquatic impact assessments related to urban development, highway and pipeline construction, and aggregate extraction. Nancy has also managed environmental effects monitoring (EEM) programs for the mining and pulp and paper industries and has been involved in watershed studies, literature searches and analysis of benthic invertebrate and water quality data relative to environmental quality.

EDUCATION

B.Sc. (Honours), Co-op Biology, University of Waterloo, Waterloo, Ontario, 1986

PROJECT EXPERIENCE

Environmental Impact Assessments

Assessment of the Benthic Invertebrate Community in the Saugeen River adjacent to the Hanover Landfill Site, Town of Hanover

Assessment of Wetland Pond Health and Downstream Water Quality at Chinguacousy Landfill

Fish and Fish Habitat Surveys along Highway 66 and 624 near Larder Lake; Rehabilitation of Highway 66 and 624, Ontario (Task Manager, Fisheries Assessment Specialist)

As a part of a Detail Design study for the Rehabilitation of Highways 66 and 624 (District of Timiskaming) Nancy managed the field surveys and reporting for this project. Limited background data were available for the study area. Field data collection and reporting followed the 2006 MTO/DFO/OMNR Protocol and reporting included impact assessments for the numerous watercourses in the study area. Impact assessments were based the proposed work required at each culvert (eg. rehabilitation, replacement) which subsequently lead to the completion of appropriate forms and submissions to DFO.

Fish and Fish Habitat Survey of the Mattawishkwia River; Highway 11 Replacement of the Mattawishkwia River Bridge at Hearst, Ontario (Task Manager, Fisheries Assessment Specialist)

As a part of a Preliminary Design study for the replacement of the Mattawishkwia River bridge, Nancy managed field surveys and prepared an Impact Assessment Report for the project. The study involved the collection of background data, detailed habitat mapping and the collection of fish community data following the 2006 Protocol. Reporting included a preliminary assessment of aquatic habitat impacts based on the Preferred Plan, and mitigation measures to protect fish habitat in the river during construction.

Fish and Fish Habitat Survey of watercourses near Highway 11; Highway 11 Access Review at High Falls Road/Holiday Park Drive near Bracebridge, Ontario (Task Manager, Fisheries Assessment Specialist)

As a part of a Preliminary Design study for interchange improvements on Highway 11 at Bracebridge, Nancy is conducted field surveys and an existing conditions report for watercourses in the Study Area. The study involved the collection of background data, detailed habitat mapping and the collection of fish community data at locations potentially affected by the Preferred Plan. Data collection and reporting followed the requirements of the 2006 MTO/DFO/OMNR Fisheries Protocol Reporting included a preliminary assessment of aquatic habitat impacts, and a summary of recommended mitigation measures based on the Preferred Plan for highway access and service roads.

Fish and Fish Habitat Survey of watercourses near Highway 11; Access Review on Highway 11 from Powassan to Callander, Ontario (Task Manager, Fisheries Assessment Specialist)

As a part of a Preliminary Design study for access and interchange improvements along Highway 11 between Powassan and Callander, Nancy conducted field surveys and prepared an existing conditions report for watercourses that cross or are adjacent to the Highway 11 Study Area. The study involved the collection of background data, detailed habitat mapping and the collection of fish community data following the 2006 MTO/DFO/OMNR Fisheries Protocol. Reporting included a preliminary assessment of aquatic habitat impacts, and a summary of recommended mitigation measures based on the Preferred Plan for access improvements.

** denotes projects completed with other firms*

Nancy A. Harttrup B.Sc.

Fisheries Biologist / Project Manager

Galt Country Club - Letter of Intent for DFO Authorization, Cambridge, Ontario (Task Manager/Biologist)
The re-design of a golf course fairway at the Galt Country Club resulted in changes to fish habitat in a golf course pond located in the floodplain and connected to the Grand River. Information regarding available data on fish species in the Grand River and detailed plans regarding changes to the pond were prepared as a Letter of Intent (LOI) and submitted to DFO for authorization of the project. The LOI included details of the existing and proposed pond areas and depths, illustrating that the new pond would actually provide more potential fish habitat than before. Additional habitat enhancements were added to the plan to provide underwater structure to fish that utilized the new pond.

Fish and Fish Habitat Survey of four watercourses near Highway 11 near Allensville, Ontario - Evaluation of Highway 11 Access and Interchange Improvements, Huntsville, Ontario (Task Manager/Fisheries Assessment Specialist)
As a part of a Preliminary Design study for access and interchange improvements along Highway 11 south of Huntsville, Nancy conducted field surveys and prepared an existing conditions report for four watercourses that cross or are adjacent to the Highway 11 Study Area. The study involved the collection of background data, detailed habitat mapping and the collection of fish community data. Reporting included a preliminary assessment of aquatic habitat impacts, and a summary of recommended mitigation measures based on the Preferred Plan for access improvements.

Fish and Fish Habitat Survey of four watercourses crossing Highway 401 near Cambridge, Ontario, Evaluation of Highway 401 and 8 Access and Interchange Improvements, Kitchener and Cambridge, Ontario (Task Manager, Field Crew Leader)
As a part of a Preliminary Design study for interchange improvements along Highway 401 between the Grand River and Speed River, Nancy conducted field surveys and an existing conditions report for these watercourses and two other small watercourses that cross the Highway 401 in the Cambridge area. The final Preferred Plan only had changes proposed for the Highway 8 and 401 interchange, potentially affecting aquatic resources in the Grand River. The study involved the collection of background data, detailed habitat mapping and the collection of fish community data, however the Grand River site was not sampled as part of this project. Reporting included a preliminary assessment of aquatic habitat impacts, and a summary of recommended mitigation measures based on the Preferred Plan for highway widening.

Fish and Fish Habitat Surveys watercourses near Highway 26 at Camperdown, Camperdown, Ontario (Task Manager, Fisheries Assessment Specialist)
As a part of a Preliminary Design study for intersection improvements along Highway 26 near Camperdown, Nancy conducted field surveys and prepared an existing conditions report for three watercourses that cross Highway 26 in the vicinity of Grey Road 40 and Camperdown Road. The study involved the collection of background data, detailed habitat mapping and the collection of fish community data. Reporting included a preliminary assessment of aquatic habitat impacts, and a summary of recommended mitigation measures based on the Preferred Plan for intersection improvements.

Fish and Fish Habitat Surveys watercourses along Highway 40 near Chatham, Chatham, Ontario (Task Manager, Fisheries Assessment Specialist)
As a part of a Detail Design study for rehabilitation of Highway 40 south of Chatham, Nancy conducted field surveys and prepared an Impact Assessment Report for watercourses that cross Highway 40 between Highway 401 and the Thames River. The study involved the collection of background data, detailed habitat mapping and the collection of fish community data. Reporting included an assessment of aquatic habitat impacts, and mitigation measures to protect fish habitat in the watercourses during construction.

Summary of Habitat Survey and Bathymetry Mapping of Brant Mill Pond (Aquatic Biologist)

Wilmot Centre Trout Spawning Surveys, Hunsburger Creek near Wilmot Centre (2005 to 2008) - Wilmot Centre Well Field, Wilmot Centre, Ontario (Project Manager)

Benthic Invertebrate Community Survey in the Maitland River at Wingham, Wescast Industries Inc. (1998-present) (Project Manager)

Assessment of Impacts of Seepage from Caledon Landfill on Fisheries of the Credit River, Region of Peel (Aquatic Biologist)

** denotes projects completed with other firms*

Nancy A. Harttrup B.Sc.

Fisheries Biologist / Project Manager

Fish Community Assessment and Habitat Inventory of Strasburg Creek near Doon Village Road, Kitchener, Ontario (Project Manager)
An aquatic habitat survey was conducted in Strasburg creek, mapping physical features such as substrates, stream morphology, and instream and riparian cover. The data were required as part of the natural environment inventory for the future alignment of Doon Mills Road. Subsequent to the initial survey, fish community data were also collected in the area. During the construction phase, Nancy also participated in the fish transfer of fish from the creek to the temporary diversion channel, prior to creek realignment.

Natural Sciences & Heritage Resources
Letter of Intent for DFO Authorization, Galt Country Club, Cambridge, Ontario

Letter of Intent for DFO, Ninth Line Tributary, TACC Construction Ltd., Markham, Ontario

Long-term Monitoring and Reporting of Brown Trout Spawning Activity, Populations and Surface Water Quality in a Coldwater Stream Adjacent to an Active Gravel Pit (1993 to2003) - Dufferin Aggregates (Project Manager)

Aquatic Habitat Survey of South Wabi Creek Near Halebury, Ontario, Adjacent to Proposed Ministry of Transportation Gravel Pit (Project Manager/Aquatic Biologist)

Fish habitat study for Kempenfelt Bay, Lake Simcoe, City of Barrie (Project Manager/Aquatic Biologist)

Aquatic Resources Survey in Two Small Lakes in Georgian Bay Islands National Park (Project Manager/Aquatic Biologist)

Aquatic Habitat Mapping in Fathom Five National Marine Park (Project Manager/Aquatic Biologist)

Numerous Aquatic Habitat Impact Assessments Related to Residential Development, Pipeline Construction, Road Construction and Alterations (Aquatic Biologist)

Aquatic Ecology
Oxbow Lake Investigation at the New Hamburg Wastewater Treatment Plant, New Hamburg, Ontario (Aquatic Biologist)
Collection and review of background fisheries data for tributary of the Nith River originating in an abandoned oxbow of the Nith River. Bi-weekly collection of surface water samples along the oxbow feature to determine if the existing oxbow provides additional treatment or can be modified to augment treatment. Region of Waterloo

Mill Creek Surface Water Monitoring Program, Guelph, Ontario (Project Manager, Fisheries Biologist)
To assess potential impacts on Mill Creek (a tributary to the Grand River), a long-term Surface Water Monitoring Program (SWMP) was initiated to monitor water quality, brown trout (Salmo trutta) populations, water levels and stream temperatures over time. During the 10-years involved in this project, Nancy's duties included project management, the coordination of annual spawning surveys, population surveys as well as water quality sampling. Annual reports included the compilation of annual fisheries data and the integration of fisheries data with groundwater and surface water data into a comprehensive monitoring report.

Brant Mill Pond Fisheries Impact Assessment, Brant County, Ontario (Task Manager/Biologist)
A bridge replacement was required on a road crossing the outlet of Brand Mill Pond. The mill pond dam was structurally tied to the bridge, therefore a method was needed to reduce water pressure on the dam prior to bridge removal and replacement. Various construction scenarios were considered, including draining or partially draining the mill pond. A bathymetric survey of a mill pond was conducted to provide an indicator of the amount of available fish habitat in the pond (by depth) and the dominant substrate types in the pond. A document summarizing fish habitat conditions in the pond and possible impacts to fish habitat based on the selected construction method was submitted to GRCA for review.

Wilmot Centre Trout Spawning Surveys, Waterloo (Wilmot Centre), Ontario (Project Manager)
Annual brook trout spawning surveys have been completed in a small coldwater creek in Wilmot Centre in the vicinity of groundwater wells that provide drinking water to the supply Regional Municipality of Waterloo. The program is part of the Wilmot Centre monitoring program and looks at annual brook trout spawning activity in the creek as an indicator of the quantity and quality of suitable habitat. Brook trout depend on areas of groundwater upwelling for spawning purposes therefore the health of the fishery is related to groundwater levels in the area.

** denotes projects completed with other firms*

Nancy A. Harttrup B.Sc.

Fisheries Biologist / Project Manager

Benthic Invertebrate Community Survey in the Maitland River at Wingham, Wingham, Ontario (Project Manager)
Since 1998, Nancy has been the Project Manager for an ongoing benthic invertebrate survey in the Maitland River in Wingham, Ontario. The monitoring is an annual program that involves the collection of benthic invertebrate samples from the river as an indicator of the quality of aquatic habitat in the river adjacent to a closed landfill site. Since 1999, Nancy has been responsible for Project Management of the survey, the coordination of data collection, data analysis and reporting.

Receiver Biomonitoring in Canagagigue Creek, Elmira, Ontario (Project Manager)
Since 1998, Nancy has been the Project Manager for an ongoing Biomonitoring Program in Canagagigue Creek in Elmira, ON. The monitoring is now a biannual program that sees the collection of benthic invertebrate, sediment and fish community data in the creek. The program is a condition of the C of A for discharge of treated groundwater to the creek. Since 1999, Nancy has been responsible for Project Management of the survey, the coordination of data collection, data analysis and reporting.

Letter of Intent for DFO Authorization, Strasburg Creek at Strasburg Road Extension, Kitchener, Ontario (Task Manager/Biologist)
The extension of Strasburg Road in the City of Kitchener required a new crossing of Strasburg Creek, which provides coldwater fish habitat. Detailed mapping of the creek was prepared and areas both upstream and downstream of the proposed crossing location were surveyed, documenting any locations that were blockages to fish migration or areas of high quality habitat. Additional data collected were a fish community inventory, summer water temperatures (hourly data by instream loggers) and a fall spawning survey. All fisheries and fish habitat data were summarized and used in the Letter of Intent (LOI) submitted to DFO for authorization of the project. The LOI included mitigation and compensation measures for the loss of fish habitat that resulted from the installation of the 40m long culvert.

Letter of Intent for DFO Authorization, Tributary of Baden Creek, Baden, Ontario (Task Manager/Biologist)
A stormwater management pond outfall in a new subdivision in the town of Baden resulted in the loss of fish habitat in a small tributary of Baden Creek. Mapping of the location was prepared and a general survey of watercourse conditions was conducted for approximately 1km downstream. Together with available background data on the main channel of Baden Creek, fish habitat data were summarized and used in the Letter of Intent (LOI) submitted to DFO for authorization of the project. The LOI included mitigation and compensation measures for the loss of fish habitat that resulted from the SWM outfall.

Wastewater

Wastewater Treatment Plant Biomonitoring, Woodstock, Ontario (Senior Biologist / Project Manager)
Benthic macro-invertebrate sampling and a multi week in-situ water quality monitoring program. The program was designed to identify the potential impacts of the municipal wastewater treatment plant discharge on the biota and water quality of the Thames River.

Middle-Grand River Assimilative Capacity Assessment, Kitchener, Ontario (Aquatic Biologist)
Collection, review and summary of background data with respect to downstream users; assessment of effluent and outflow structure changes to aquatic habitat. Peer review of Grand River Surface Water Quality Monitoring Report. Region of Waterloo

Cycle 1 Environmental Effects Monitoring: project management, field studies and data analysis, Domtar Packaging, Norampac Inc., Red Rock, Ontario (Aquatic Biologist / Project Manager)

Cycle 1 Environmental Effects Monitoring: Project Management, Field Studies and Data Analysis, Domtar Packaging, Trenton, Ontario (Aquatic Biologist)

Cycle 1, 2 and 3 Environmental Effects Monitoring: Project Management, Field Studies and Data Analysis, Domtar Fine Papers, Cornwall, Ontario (Aquatic Biologist)

Cycle 2 and 3 Environmental Effects Monitoring: Project Management and Data Analysis, Provincial Papers Inc., Cascades Fine Papers Group, Thunder Bay, Ontario (Project Manager)

** denotes projects completed with other firms*

Joel L. Keene B.Sc., M.Sc. (Aqua)

Aquatic Ecologist / Benthic Taxonomist

Joel (Joe) Keene has 14 years of extensive marine and freshwater experience, including mark recapture studies and species inventory projects investigating fish population stability, species identification, measurement and marking of fish collected. He has processed over 11,000 samples from over 400 freshwater and marine projects, both in Canada and internationally. Joe has performed fecundity analysis on several fish species and marine mussels, and is experienced in the collection of soil, sediments, water, fish, crayfish, clam and benthic samples in the field using a variety of techniques and equipment. In addition, Joe is experienced with morphological and histological analysis, as well as detailed necropsies and dissection. He has been involved with a number of projects involving freshwater mussel species at risk (SAR) in Ontario and is familiar with both provincial and federal approvals processes for surveys and moves related to these organisms.

Joe's expertise includes compilation and statistical analysis of benthic data to derive various biological indices, including, but not limited to, Hilsenhoff Biodiversity Index, Percent Model Affinity, Simpson's Diversity and Evenness indices, EPT indices and BioMAP. He has researched and prepared scientific reports, studies, presentations and reviews relating to benthic studies and aquatic biology including Environmental Effects Monitoring (EEM) programs.

EDUCATION

M.Sc., University of Guelph / Aquaculture, Guelph, Ontario, 1997

B.Sc. (Specialized Honours), University of Guelph / Marine Biology, Guelph, Ontario, 1994

Certificate, Royal Ontario Museum / Fish Identification, Toronto, Ontario, 2001

Certification, Ontario Freshwater Mussel Identification Workshop, Guelph, Ontario, 2008

Class 2 Electrofishing Crew Leader, Class 2 Electrofishing Training Course, Guelph, Ontario, 2010

MEMBERSHIPS

Member, North American Benthological Society

PROJECT EXPERIENCE

Aquatic Ecology

Middle - Grand River WWTP Assimilative Capacity Study, Kitchener, Ontario (Aquatic Ecologist)

Joe assisted with the planning and implementation of a field program to map and quantitatively sample aquatic vegetation to provide estimates of macrophyte biomass, used in the GRCA's GRSM Model in support of the ACS for the Kitchener wastewater treatment plant. Joe was involved in completing routine surface water sampling on the Grand River as part of this project.

Proposed Burlington Quarry Expansion, Burlington, Ontario (Aquatic Ecologist)

Joe participated in the implementation and delivery of a multi year Natural Environment Existing Conditions program and report. The report was included as part of the application for the proposed Burlington Quarry expansion. The program involved the establishment of appropriate sampling stations for fish, benthos, water, thermal conditions and discharge.

Periodic Monitoring EEM Program, Kirkland Lake, Ontario (Benthic Taxonomist / Aquatic Ecologist)

Joe conducted the analysis, interpretation and reporting of benthic data produced for the Environmental Effects Monitoring (EEM) program in 2008 which was conducted to assess the impacts of mine effluent on the receiving waters at the KLG site. He was also involved in the interpretation and reporting of water quality, sediment and fisheries data.

Magnitude and Extent Environmental Effects Monitoring, Flin Flon and Snow Lake, Manitoba (Aquatic Ecologist / Field Crew / Benthic Taxonomist)

Joe was involved in the planning and benthic site selection for three Environmental Effects Monitoring (EEM) projects in the Flin Flon and Snow Lake areas of Manitoba for Hudson Bay Mining and Smelting. He collected benthic, sediment and water samples and processed, enumerated and identified organisms from the benthic samples. He performed the QA/QC and statistical analysis of the benthic data for each of the three EEM programs. Joe also assisted with the design and implementation of a tissue metal concentration study in amphipods (Hyalella) collected from several sites in the Flin Flon and Snow Lake areas.

** denotes projects completed with other firms*

Joel L. Keene B.Sc., M.Sc. (Aqua)

Aquatic Ecologist / Benthic Taxonomist

Georgia-Pacific Cycle 5 Environmental Effects Monitoring - Investigation of Cause, Thorold, Ontario (Aquatic Ecologist/Field Crew Leader)

As part of an Environmental Effects Monitoring (EEM) program on Beaverdams Creek and Lake Gibson in Thorold, Ontario, Joe was involved in the planning, experimental design and site selection for a caged bivalve study to determine the effects of pulp and paper mill effluent on growth, survival and reproductive success in mussels (Lasmigona compressa). He collected water samples during the collection, deployment and retrieval of the mussels to test for a variety of parameters including metals, pH, conductivity, turbidity, nutrients and chlorophyll. He also conducted an effluent plume delineation survey within Lake Gibson.

Freshwater Mussel Detection and Relocation in Medway Creek and the Grand River, London, Ontario (Aquatic Ecologist)

Involved in the identification and relocation of freshwater mussel species at risk from Medway Creek in London, Ontario and the Grand River in Kitchener-Waterloo, Ontario.

Environmental Youth Corps, University of Guelph, Guelph, Ontario* (Aquatic Ecologist)

Conducted histological analyses of Sea lamprey (Petromyzon marinus) for use in fecundity and sex determination studies.

Mark Recapture and Species Inventory Project*, North Shore of Lake Ontario (Aquatic Ecologist)

Electrofished several rivers, investigating the effects of low head barrier dams on fish distribution. Performed species identification, measuring and marking of fish, and collection of stream physical data.

American eel (*Anguilla rostrata*) downstream migration and discrimination study for New York Power Authority*, New York (Aquatic Ecologist)

Performed eel collection using hoop nets and electrofishers, morphological analysis of external characteristics, and detailed necropsies including the collection of otoliths, blood, ovary and eel muscle tissues. He also conducted histological analysis of ovary tissue, focusing on oocyte developmental stage and diameters.

Mark Recapture Study and Species Inventory Project, Mill Creek, Guelph, Ontario* (Aquatic Ecologist)

Participated in project investigating fish population stability. Performed species identification, measuring, weighing and marking of fish collected using an electrofisher.

Benthic Services

Spencer Creek Invertebrate Study, Flamborough, Ontario (Benthic Taxonomist/Field Crew Leader)

Joe has coordinated the field program of benthic sampling in Spencer Creek near Flamborough, Ontario from 2006 to 2010 which monitors effects of a housing development on the benthic communities in the area. He has been responsible for the sorting and identification of benthic macroinvertebrates from the site and has performed the analysis of the resulting data. He was responsible for quality assurance/quality control analysis and the production of reports summarizing current conditions for each year, as well as an analysis of trends or changes over time.

14 Mile Creek Invertebrate Study, Oakville, Ontario (Benthic Taxonomist/Field Crew Leader)

Joe has coordinated the field program of benthic sampling in 14 Mile Creek near Oakville, Ontario from 2006 to 2010 which monitors effects of a housing development on the benthic communities in the area. He has been responsible for the sorting and identification of benthic macroinvertebrates from the site and has performed the analysis of the resulting data. He was responsible for quality assurance/quality control analysis and the production of reports summarizing current conditions for each year, as well as an analysis of trends or changes over time.

DFO Small Bodied Fish Gut Content Analysis, Ontario (Benthic Taxonomist)

Joe conducted gut content analysis on 736 small bodied fish for Fisheries and Oceans, Canada. The study involved weights and measures of fish and gut contents as well as detailed identification and enumeration of benthic macroinvertebrates from the stomach and intestinal tract of dissected fish. Data will be used to compare resident fish diets both before and after Round Goby introduction.

Acton Quarry Expansion, Acton, Ontario (Aquatic Biologist)

As an Aquatic Biologist, Joe participated in field studies for a multi-year Natural Environment Existing Conditions program and report. The report was included as a part of the application for the proposed Acton Quarry expansion. The program involved establishing appropriate sampling stations for baseline monitoring of fish, benthos, water, thermal conditions and discharge. He was also responsible for the sorting and identification of benthic macroinvertebrates collected as part of the multi-year field surveys, as well as the subsequent analysis and reporting of benthic community data.

** denotes projects completed with other firms*

Joel L. Keene B.Sc., M.Sc. (Aqua)

Aquatic Ecologist / Benthic Taxonomist

Proposed Burlington Quarry Expansion, Burlington, Ontario (Aquatic Ecologist)

Joe participated in the implementation and delivery of a multi year Natural Environment Existing Conditions program and report. The report was included as part of the application for the proposed Burlington Quarry expansion. The program involved the establishment of appropriate sampling stations for fish, benthos, water, thermal conditions and discharge.

Mount Forest Waste Water Treatment Plant (WWTP) Study*, Mount Forest, Ontario (Benthic Taxonomist / Field Crew)

Joe was responsible for the collection and identification of benthic macroinvertebrates upstream and downstream of existing and proposed Waste Water Treatment Plant (WWTP) discharge locations to establish baseline environmental conditions on the South Saugeen River.

2006 Biomonitoring-Crompton, Elmira, Ontario (Benthic Taxonomist)

Joe participated in the field program of benthic sampling in Canagagigue Creek near Elmira, Ontario from 2006 to 2008 which monitors effects of a polluted site near the creek on the benthic communities in the area. He has been responsible for the sorting and identification of benthic macroinvertebrates from the site and has performed the analysis of the resulting data. He was responsible for quality assurance/quality control analysis and the production of reports summarizing current conditions for each year, as well as an analysis of trends or changes over time. Prior to 2006, he was responsible for the sorting and identification of the benthic samples through a different firm.

Tembec Enterprises Inc. Cycle 5 EEM, Kapuskasing, Ontario (Benthic Taxonomist)

As part of an Environmental Effects Monitoring (EEM) program on the Kapuskasing River, Ontario, Joe was involved in the planning, collection, sorting and identification of benthic samples for the purpose of characterizing the benthic communities upstream and downstream of a pulp and paper mill on the Kapuskasing River. He also collected water and sediment samples at each benthic station and assessed physical parameters such as pH, conductivity, dissolved oxygen, temperature and flows. He has performed statistical analysis of the resulting benthic data and produced reports summarizing current conditions for each year, as well as an analysis of trends or changes over time.

Proposed Quarry, Flamborough, Flamborough, Ontario (Benthic Taxonomist/Field Crew)

Joe has been involved in several aspects of the surface water monitoring of lands adjacent to the proposed quarry in an effort to provide a picture of the background ecology and hydrology. He has collected, processed, identified and analyzed benthic samples from Flamboro and Mountsberg Creeks and their tributaries over several years. He has conducted bimonthly monitoring of a number of surface water stations in the area for water depth, flow and water quality. He has also taken part in a pump test which required daily assessments of flow, depth, turbidity, pH, temperature, dissolved oxygen, conductivity, metals and bacterial samples and was responsible for coordinating daily laboratory water sample deliveries and dissemination of results to stakeholders.

Wescast Invertebrate Study, Wingham, Ontario (Benthic Taxonomist/Field Crew Leader)

Joe has coordinated the field program of benthic sampling in the Maitland River near Wingham, Ontario from 2006 to 2009 which monitors effects of a historic landfill on the benthic communities in the area. He has been responsible for the sorting and identification of benthic macroinvertebrates from the site and has performed the analysis of the resulting data. He was responsible for quality assurance/quality control analysis and the production of reports summarizing current conditions for each year, as well as an analysis of trends or changes over time. Prior to 2006, he was responsible for the sorting and identification of the benthic samples through a different firm.

Bridge Street Bridge Rehabilitation, Kitchener, Ontario (Field Crew Leader/Benthic Taxonomist)

Joe was involved in the identification, collection and relocation of freshwater mussels from the Grand River in Kitchener, Ontario. This mussel move was performed to minimize impacts of bridge reconstruction and repair on local mussel populations which included the wavyrayed lampmussel (Lampsilis fasciola); a freshwater species at risk (SAR). Joe was involved in the planning, collection, identification and relocation aspects of this mussel move.

Extensive Variety of Taxonomic Experience, 1999-2011 (Aquatic Invertebrate Taxonomist)

Joe has processed over 11,000 samples from over 400 projects in 12 years. Joe is skilled in the identification of benthic macroinvertebrates from lentic and lotic environments. His experience encompasses marine and freshwater systems across Canada and internationally.

** denotes projects completed with other firms*

Joel L. Keene B.Sc., M.Sc. (Aqua)
Aquatic Ecologist / Benthic Taxonomist

PUBLICATIONS

Sonnenberg, H., J. Keene, R. Park, K. Bernard, and S. Dickieson. Challenges overcome and lessons learned from using freshwater bivalves during two Investigation of Cause (IOC) Environmental Effects Monitoring (EEM) studies. *Presented at the 37th Annual Aquatic Toxicity Workshop, Toronto, Ontario*, 2010.

Are the costs to meet environmental effects monitoring (EEM) benthic sample precision and accuracy criteria justified?. *Proceedings of the 32nd Annual Aquatic Toxicity Workshop*, 2005.

Holloway, A.C., J. Keene, D.G. Noakes, R.D. Moccia. Effects of clove oil and MS-222 on blood hormone profiles in rainbow trout, *Oncorhynchus mykiss* (Walbaum). *Aquaculture Research, 35: 1025-1030*, 2004.

Keene, J.L., D.L.G. Noakes, R.D. Moccia, C.G. Soto. The efficacy of clove oil as an anaesthetic for rainbow trout, *Oncorhynchus mykiss* (Walbaum). *Aquaculture Research, 29: 89-101*, 1998.

Marc A. Faiella Tech. Dipl., CEPIT

Environmental Technician

Marc Faiella's experience has included industry and development sector projects. He has conducted field investigations, liaised with representatives of government agencies, regulators and worked with First Nations, synthesized data and produced reports. Marc's specific areas of expertise include Environmental Effects Monitoring (EEM), Environmental Impact Studies (EIS) and Fish Habitat Assessments. He has assessed potential impacts to aquatic habitats at a number of mining and development-related sites, such as metal mines, quarries, pulp and paper mills, subdivisions, city drainage systems and wind energy projects. Marc's technical experience has focused mainly on aquatic habitats. He has conducted fisheries inventories and Species at Risk project surveys based on provincial protocols, trout spawning surveys, collected benthic invertebrate samples, and collected water, sediment and non-lethal and lethal fish tissue samples for mercury. Marc has gained practical experience with all construction phases of DFO applied work sites. In addition, Marc has on-site experience at remote northern sites where access is gained via helicopter, ATV, boat and hiking.

EDUCATION

Tech. Dipl., Sir Sanford Fleming College / Ecosystem Management, Lindsay, Ontario, 2005

Training Certificate, Royal Ontario Museum Fish Identification Workshop, Royal Ontario Museum, Ontario, 2006

Certificate, MTO/DFO/OMNR Protocol, Toronto, Ontario, 2006

Certificate, St. John Ambulance / First Aid and CPR, Guelph, Ontario, 2010

P.A.L. and Firearms, Brampton, Ontario, 2005

Sir Sanford Fleming College / Short Wave Radio, Lindsay, Ontario, 2004

Sir Sanford Fleming College / Chainsaw Operator, Lindsay, Ontario, 2004

Certificate, Pleasure Craft Operator, Toronto, Ontario, 2005

Training Certificate, Class 1 Electrofishing Certificate, MNR, Ministry of Natural Resources, Ontario, 2012

Fisheries and Oceans Canada / Ontario Freshwater Mussel Identification Workshop, Burlington, Ontario, 2011

MEMBERSHIPS

Canadian Environmental Practitioner In Training (CEPIT), Canadian Environmental Certification Approvals Board

PROJECT EXPERIENCE

Environmental Assessments

Communal Irrigation Study, Township of Melancthon, Ontario (Crew Lead)

Obtained appropriate licences to conduct presence / absence and fish utility surveys within the Pine and Noisy River watersheds. Served as crew lead, overseeing fish surveys that were conducted in 2008 and preparations for proposed surveys in the spring / summer of 2009. Responsible for assembling report figures, maps and analysis of collected fisheries data, in tandem with Stantec's in-house GIS / graphics department.

Bruce to Milton Transmission Reinforcement Project, Multiple Sites, Ontario (Crew Lead)

Key member of the study team for the proposed hydro corridor expansion from Bruce Nuclear to a Milton, Ontario. Liaised with several Ministry of Natural Resources offices to coordinate issuance of permits and processing of historical fisheries data requests. Worked directly with the project manager to complete a work plan to safely and efficiently complete spring and summer fisheries surveys along the approximate 180 km corridor. Led a 2-person crew to conduct stream cross section surveys used to determine appropriate sizing of culverts. Coordinated production of detailed mapping and figures upon completion of the surveys, in tandem with Stantec's in-house GIS / graphics department, and was key in production of the independent Class EA report.

** denotes projects completed with other firms*

Marc A. Faiella Tech. Dipl., CEPIT

Environmental Technician

Port Alma Wind Power Project, Port Alma, Ontario (Field Crew / Data Analyst)
Exclusively responsible for conducting background topography research. Performed tree measurements for entire survey area, identified and mapped tree species locations using aerial photo base. Constructed tests for future heights (software) and produced reports detailing results. These results had significant bearing on wind turbine selection and placement.

Brampton MESP, Phase I, Springdale Environmental Site Assessment, Brampton, Ontario (Habitat Assessor)
Responsible for obtaining background information and conducted field work to assess study area. Compiled field notes and detailed data using an air photo base. Prepared final technical memorandum for submission.

Environmental Site Management

Randall Drain Branch A Restoration, Environment Inspection and Post-construction Monitoring, Waterloo, Ontario (Environmental Inspector)
Responsible for overseeing that approved plans to remediate a damaged watercourse on the City of Waterloo's airport property, as outlined by The Department of Fisheries and Oceans, Grand River Conservation Authority and Stantec Consulting Ltd., were carried out accordingly. Works included properly diverting flow downstream, efficiently dewatering the damaged area and relocating any stranded aquatic species downstream. Worked closely with the construction crew to ensure all remediation phases met Fisheries Act requirements. Prepared final report.

Mining

Vale Technology Development - Hydrology and Aquatic Assessment, Sudbury, Ontario (Aquatic Technician)
Marc was part of a two person crew that conducted a fishery presence/absence survey in a number of lakes associated with mining practices. Fish were identified, measured and tissue samples were collected for laboratory analysis.

Environmental Effects Monitoring (EEM) Program: Periodic Monitoring Phase, Hudson Bay Mining and Smelting, 2007, Flin Flon, Manitoba (Aquatic Technician)
Participated in metal mine EEM Periodic Monitoring phase, involving fisheries and benthic invertebrate surveys. Collected benthic and water samples in the field as well as fish, using various collection techniques. Completed habitat assessments, plume measurements and fish necropsies. Upon completion of field work, performed data analysis and reporting for the EEM report.

Environmental Effects Monitoring (EEM) Program: Focused Monitoring Phase, Hudson Bay Mining and Smelting, 2009, Flin Flon, Manitoba (Aquatic Technician)
Participated in metal mine EEM Focused Monitoring phase, involving fisheries and benthic invertebrate surveys. Collected benthic and water samples in the field as well as fish, using various collection techniques. Completed habitat assessments, plume measurements and fish necropsies. Upon completion of field work, performed data analysis and reporting for the final EEM report.

Environmental Effects Monitoring (EEM) Program: Periodic Monitoring Phase, Hudson Bay Mining and Smelting, 2007, Snow Lake, Manitoba (Aquatic Technician)
One of a 2-person crew stationed in Snow Lake for metal mine EEM Periodic Monitoring phase, involving fisheries and benthic invertebrate surveys. Collected benthic and water samples in the field as well as fish, using various collection techniques. Completed habitat assessments, plume measurements and fish necropsies. Upon completion of field work, performed data analysis and reporting for the EEM report.

Environmental Effects Monitoring (EEM) Program: Focused Monitoring Phase, Hudson Bay Mining and Smelting, 2009, Snow Lake, Manitoba (Aquatic Technician)
One of a 2-person crew stationed in Snow Lake for metal mine EEM Focused Monitoring phase, involving fisheries and benthic invertebrate surveys. Collected benthic and water samples in the field as well as fish, using multiple collection techniques. Completed habitat assessments, plume measurements and fish necropsies. Upon completion of field work, performed data analysis and reporting for the final EEM report.

** denotes projects completed with other firms*

Marc A. Faiella Tech. Dipl., CEPIT

Environmental Technician

Natural Sciences & Heritage Resources

Hydro One Series Capacitor Station (Project Manager)

Responsible for a fisheries sampling survey to determine the presence or absence of fish species near a proposed capacitor station. Secured a Fish Collection Licence from OMNR, compiled maps to assist in field investigations, assembled field staff, initiated survey and prepared report for internal and external circulation.

Melancthon Wind Energy Project Tree Surveys, Melancthon, Ontario (Aquatic Technician)

Measured tree heights and the species identified with use of a laser-sighted measuring device. Performed a desktop exercise, whereby heights were projected over a 20 year period. These projections were then synthesized on aerial photos, showing potential hazards to turbines, thus assisting with selection of wind turbine placement and selection of site-appropriate turbine models.

Oil & Gas

Enbridge Pipeline Crossing, Sarnia, Ontario (Aquatic Construction Monitor)

Marc was responsible for monitoring the St. Clair River for "frak-outs" that may occur during the horizontal drilling and pipe line installation under the St. Clair River. Marc was also responsible for collecting water samples for laboratory analysis and recording current river conditions using a YSI water quality meter.

Power

Biological Monitoring for the Shekak-Nagagami Generating Station, Hearst, Ontario (Field Crew Lead)

Responsible for compiling appropriate field gear to complete the Year-13 monitoring study along the Shekak and Nagagami Rivers in the vicinity of a hydroelectric dam. Participated in surveys, which included: fish inventories through electrofishing, fish tissue collection via gillnets, benthic sampling and water quality and sediment quality collection through several collection techniques. Performed data analysis and completion of the report. Worked closely with Brookfield Power, the MNR and Hearst employees to obtain necessary information and data to complete the project.

Hydro One Series Capacitor Station, Huntsville, Ontario (Project Management / Crew Leader)

Undertook a fisheries sampling survey to determine the presence or absence of fish species near a proposed capacitor station. Duties included securing fisheries permits from related agencies, compilation of maps to assist with surveys, assembly of staff, planned and implemented the field program and prepare report for internal and external circulation.

Yellow Falls Hydroelectric Project, Smooth Rock Falls, Ontario (Aquatic Technician)

Crew member responsible for extensive fish, benthic, water and habitat surveys along the Matagami River. Fish surveys included setting and retrieving gillnets, electrofishing, identification of fish species, retrieving age indicators from fish, characteristic measurements and collecting non-lethal samples for mercury analysis. Collected benthic invertebrates using various sampling techniques for later sorting and identification. Collected water samples and substrate samples using various sampling techniques and equipment for lab testing. Worked closely with a First Nations crew member for the duration of the project and, upon completion of the field surveys, performed data analysis and report writing.

Roads and Highways

Highway 11 Access Improvements. Preliminary Design. MTO Northeastern Region, Huntsville, Ontario (Fisheries Specialist)

Marc conducted an inventory of aquatic resources adjacent to the existing highway. The fish and fish habitat investigations were completed on three watercourses in the Study Area, and were conducted in accordance with the 2006 MTO/DFO/OMNR Protocol

Highway 11 Access Improvements. Preliminary Design. MTO Northeastern Region, Huntsville, Ontario (Fisheries Specialist)

Marc conducted an inventory of aquatic resources adjacent to the existing highway. The fish and fish habitat investigations were completed on three watercourses in the Study Area, and were conducted in accordance with the 2006 MTO/DFO/OMNR Protocol

** denotes projects completed with other firms*

Marc A. Faiella Tech. Dipl., CEPIT

Environmental Technician

Highway 8 and Highway 401 Interchange Improvements. Preliminary Design. MTO Southwestern Region, Kitchener, Ontario (Fisheries Specialist)
Marc conducted an inventory of aquatic resources within the study area. The fish and fish habitat investigations were completed following the 2006 MTO/DFO/OMNR Protocol. An exception to this occurred at the Grand River, where fish inventories were not conducted in order to avoid disturbances to mussel Species at Risk that are known to occur in the area

Highway 3 Rehabilitation, Renton to Jarvis. Detail Design. MTO West Region, Ontario (Fisheries Specialist)
Marc participated in detailed Natural Heritage features assessments and a Fish Habitat Existing Conditions Report in accordance with the 2006 MTO/DFO/OMNR Protocol. Three major water crossings (Nanticoke Creek and two crossings of Black Creek) were assessed in addition to other smaller crossings

Wind Power

White Pines Wind Energy, Prince Edward County, Ontario (Field Crew Lead)
Marc conducted aquatic habitat assessments and a fisheries presence/absence surveys to determine aquatic features under REA (Renewable Energy Act). He also assisted in producing a photo log and figures that assisted in the application process for construction work permits.

Fairview Wind Energy, Staynor, Ontario (Field Crew Lead)
Marc conducted aquatic habitat assessment surveys to assess their designation under the REA (Renewable Energy Act). In addition, Marc conducted electrofishing surveys to assess the presence or absence of fish species and was also part responsible for producing a photo log and figures to assist in the application process for associated construction work permits.

Port Dover Wind Energy, Port Dover, Ontario (Aquatic Technician)
Marc conducted field surveys to assess aquatic features and to determine its designation under the REA (Renewable Energy Act). Marc was also part responsible for producing reports, photo logs and figures to aid in the application process to gain associated construction work permits.

Amherst Island Wind Energy, Amherst, Ontario (Field Crew Lead)
Responsible for collecting fisheries habitat characteristics along the proposed shoreline of Lake Ontario to aid in obtaining associated construction work permits. Marc was also responsible for conducting a presence/absence survey using several capture methods such as, gill nets, boat electrofishing, Fyke nets and minnow traps.

** denotes projects completed with other firms*

Mitch Ellah Tech. Dipl., B.Sc. (Hons.)

Aquatic Ecologist

Mitch Ellah is an aquatic ecologist who serves Stantec's Environmental Services group. He has significant experience conducting field research in the Canadian Arctic and various locations in southern and northern Ontario and Quebec. Mitch has been involved in all aspects of aquatic and terrestrial projects, including the review of background data, correspondence with government agencies, site investigation and data collection, and report writing. He is knowledgeable in, and proficient at field surveys and standardized protocols involving data collection for water quality and quantity, benthic macroinvertebrates, fish, bird, herpetofauna, aquatic plants and forest communities. Mitch has performed vegetation surveys using Ecological Land Classification (ELC) and Ontario Wetland Evaluation (OWES) protocols. He has excellent fish identification skills, and is proficient at conducting aquatic habitat and fish community assessments using electrofishing equipment, gill nets, fyke nets, seine nets and minnow traps. Mitch worked progressively for three field seasons in the Canadian Arctic investigating treatment wetlands in Nunavut and NWT Inuit communities. Mitch's knowledge of ecology and biotic identification, his strong communication skills and proven abilities at multi-discipline teamwork are complemented by his research experience, providing him with valuable technical expertise to meet a variety of project needs.

EDUCATION

B.Sc. (Honours), Trent University / Environmental Resource Science, Peterborough, Ontario, 2011

Tech. Dipl., Sir Sandford Fleming College / Environmental Technologist Diploma, Lindsay, Ontario, 2009

Tech. Dipl., Sir Sandford Fleming College / Environmental Technician Diploma, Lindsay, Ontario, 2008

Certificate, Ministry of Natural Resources / Ontario Wetland Evaluation System (OWES), Lindsay, Ontario, 2009

Certificate, Royal Ontario Museum / Fish Identification Workshop, Toronto, Ontario, 2011

Certificate, Stantec Consulting Ltd. / Class 2 Electrofishing Training, Guelph, Ontario, 2012

PROJECT EXPERIENCE

Natural Sciences & Heritage Resources

Hydro One Clarington Transformer Station, Clarington, Ontario (Field Ecologist)

Conducted fisheries and aquatic habitat assessment for proposed transformer station development

Shell Oil and Gas, Montreal, Quebec (Field Ecologist)

Conducted site investigation for amphibian and reptile populations, and amphibian breeding call surveys

Natural Heritage Site Inventories and Reporting*, Various Locations (Field Ecologist)

Bat maternity roost surveys in forest settings, various wildlife surveys including amphibians, reptiles, mammals, and birds; data collection and report writing for renewable energy REA environmental assessment projects; ELC vegetation community and wildlife habitat assessments; online database research for technical report preparation, including MNR Biodiversity Index and various atlases

Proposed Melancthon Quarry, Melancthon, Ontario (Field Ecologist)

Conducted species at risk surveys targeting Whip-poor-will using standardized MNR protocol

** denotes projects completed with other firms*

Mitch Ellah Tech. Dipl., B.Sc. (Hons.)

Aquatic Ecologist

Proposed Simpson's Quarry EA, Bancroft, Ontario (Field Ecologist)
Conducted field sampling, including 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

Renewable Energy

Niagara Region Wind Corp. Wind Farm, Niagara Region, 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

Cedar Point Wind Farm, Middlesex County, Ontario (Field Ecologist)
Conducted snake cover board searches to determine presence/absence of snake population and diversity

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

Research / Laboratories

Centre for Alternative Wasewater Treatement (CAWT), Sir Sandford Fleming College*, Baker Lake, Nunavut (Arctic Field and Laboratory Research Technician)
Remote study site in Baker Lake, NU; researcher for an International Polar Year project and United Nations Environmental Program

Centre for Alternative Wastewater Treatment (CAWT), Sir Sandford Fleming College*, Various Sites, Nunavut and Northwest Territories (Arctic Field and Laboratory Research Technologist)
Remote study sites in Baker Lake, NU, Gjoa Haven, NU and Holman, NT; results used for the continuation of the International Polar Year research project

Centre for Alternative Wastewater Treatment (CAWT), Sir Sandford Fleming College*, Alert, Nunavut (Arctic Field and Laboratory Research Technician)
A partnership project with Department of National Defense and Environment Canada Wastewater Division; remote study site in Alert, NU; sole researcher to plan, research, organize equipment, work with partners and set-up laboratory; conducted bird surveys for Environment Canada

Water

Komoka Wastewater Treatment Plant, Komoka, Ontario (Field Ecologist)
Conducted benthic macroinvertebrate and water quality sampling for wastewater treatment plant discharge

Fox Meadow Subdivision EEM, Peterborough, Ontario (Field Ecologist)
Conducted benthic macroinvertebrates and water quality sampling for EEM of subdivision encroachment on PSW

Canagagigue Creek EEM, Elmira, Ontario (Field Ecologist)
Water quality and quantity measuring, benthic macroinvertebrate, and fish community assessment at chemical plant discharge site

Blue Springs EEM, Guelph, Ontario (Field Ecologist)
Routine flow measurement, monitoring and maintenance of rain gauges, Barologgers, air temperature loggers and in-stream water level loggers to assess potential effects of aggregate operations and groundwater draw down on fish habitat in a coldwater stream

Mill Creek EEM, Guelph, Ontario (Field Ecologist)
Routine flow measurement, monitoring and maintenance of rain gauges, Barologgers, air temperature loggers and in-stream water level loggers to assess potential effects of aggregate operations and groundwater draw down on fish habitat in a coldwater stream

** denotes projects completed with other firms*

Mitch Ellah Tech. Dipl., B.Sc. (Hons.)
Aquatic Ecologist

PUBLICATIONS

Chemical and Biological Changes in an Arctic Treatment Watershed to Assess the Value of Macroinvertebrate Biomonitoring. *Undergraduate Thesis, Trent University, Peterborough, Ontario*, 2011.

Michael A. Johns Technologist Diploma

Ecologist

Mike has 19 years of environmental consulting experience, specializing in aquatic ecosystem monitoring and assessment. He has worked for a variety of industry sectors including mining, aggregates, forestry, pulp & paper and development, as well as municipal, provincial and federal governments. Mike is a senior field technologist and has designed sampling programs and developed aquatic mitigation and compensation measures at sites across Canada. He is a trained and experienced project manager and has managed many multi-year, multi-disciplinary projects involving the ongoing assessment of water, sediment, fish communities and benthic invertebrate communities. Mike continues to hone his project management skills through ongoing training and development.

EDUCATION

Terrain and Water Resources Technician Diploma, Sir Sanford Fleming College / Terrain and Water Resources, Lindsay, Ontario, 1991

Terrain and Water Resources Technologist Diploma, Sir Sanford Fleming School of Natural Resources / Terrain and Water Resources Technology, Lindsay, Ontario, 1992

Training Certificate, Royal Ontario Museum Fish Identification Workshop, Royal Ontario Museum, Toronto, Ontario, 2001

Training Certificate, Ontario Stream Assessment Protocol, Ontario Ministry of Natural Resources, Dorset, Ontario, 2002

Training Certificate, Class 1 Electrofishing Certification (Crew Leader, Boat Operation), Ministry of Natural Resources, Lindsay, Ontario, 2004

Training Certificate, Fisheries Specialist – MTO/DFO/MNR Protocol for Protecting Fish Habitat on Provincial Transportation Undertakings, MTO/DFO/MNR, Toronto, Ontario, 2006

Training Certificate, MOE internal training - Sampling in the Environment, Ministry of the Environment, Toronto, Ontario, 1992

MEMBERSHIPS

Member, American Fisheries Society

Member, North American Benthological Society

PROJECT EXPERIENCE

Aggregate Services

Mill Creek*, Guelph, Ontario (Project Manager/Field Crew Leader)

Mike shared project management responsibilities for this project, overseeing the biological monitoring and surface water monitoring components and worked with a hydrogeologist on the project team to monitor potential effects of aggregate extraction on Mill Creek. He was in charge of field operations, conducting annual spawning surveys and brown trout (Salmo trutta) population estimates in Mill Creek, a coldwater stream in the Grand River watershed. Mike was also responsible for developing rating curves to estimate stream discharge based on water levels, which were monitored hourly using in-situ data loggers

Construction Monitoring

St. Clair River Line 6B Pipeline Crossing, Corunna, ON (Fisheries Specialist)

In 2011, Mike assisted the project team in securing permits and approvals for a horizontal directional drill (HDD) crossing of the St. Clair River. Permits and Approvals were required through multiple agencies including the Department of Fisheries and Oceans, Ministry of the Environment, Ministry of Natural Resources, the St. Clair Region Conservation Authority and Transport Canada. Mike designed the project water quality monitoring protocols and response triggers, and oversaw implementation of the protocols and all construction monitoring activities. Construction monitoring involved collection of weekly water samples and continuous assessment of water turbidity in-situ

** denotes projects completed with other firms*

Michael A. Johns Technologist Diploma

Ecologist

Muskoka Commerce Park, Huntsville, Ontario (Fisheries Compliance Inspector)

Mike was responsible for securing Fisheries Act approvals and designing fish habitat compensation features for the development of a commercial park at the intersection of Highways 60 and 11 near Huntsville, Ontario. The project involved three new culvert installations and the extension of an existing culvert under Highway 60. Mike oversaw all in-stream works and the construction of compensation features, which included scour pools, riffles, boulder cover and riparian plantings. During the course of this project, notification procedures were required and works had to be temporarily stopped when buried electrical services were identified at the site of a proposed overwintering pool. Mike's knowledge of the project, knowledge of fish habitat and good working relationship with Fisheries and Oceans Canada enabled him to immediately contact both the client and the DFO biologist to arrange alternative compensation options while on-site. The project was then able to proceed with minimal delay

Lake Trout Spawning Shoal, Lake Ontario, Bowmanville, Ontario (Fisheries Compliance Inspector)

Mike was responsible for post-construction monitoring for a project requiring a Fisheries Act Authorization for the infilling of a part of the shoreline on Lake Ontario. The approved compensation plan called for the creation of a Lake Trout spawning shoal in Lake Ontario. Mike worked with a dive team to deploy and retrieve emergent traps and temperature loggers to monitor the suitability of habitat, use of the shoal by Lake Trout, and hatching success of Lake Trout eggs on the newly created shoal

Shekak River, Wawa, Ontario (Fisheries Specialist)

Mike was responsible for completing the post-construction monitoring report for a project requiring a Fisheries Act Authorization for the construction of a new hydroelectric facility on the Shekak River in Northern Ontario. The post-construction monitoring program was an intensive, multi-year monitoring study with fish community, benthic community and fluvial geomorphology components

St. Clair River Directional Drill, Sombra, Ontario (Fisheries Compliance Inspector)

Mike was responsible for on-site monitoring of construction activities on a 700 metre directional drill project traversing beneath the St. Clair River. Of special concern was the potential 'frac-out' of drilling fluid into the St. Clair River. Monitoring involved the frequent collection of water samples across the river width and throughout the depth of the water column to identify increased turbidity

Mapleton Township Drain #1*, Fergus, Ontario (Fisheries Specialist)

Mike was called upon to complete this project to avoid potential charges under the Fisheries Act. Working with Grand River Conservation Authority and Fisheries and Oceans Canada, Mike assisted in the design of compensation features to improve the productive capacity of Northern Pike spawning habitat. Mike oversaw post construction monitoring activities and monitored effectiveness of the newly created spawning habitat

Dam 4, Trent-Severn Waterway, Trenton, Ontario (Fisheries Compliance Inspector)

Mike was responsible for monitoring the success of fish habitat enhancement features installed to improve the productive capacity of a smallmouth bass fishery in the Trent-Severn Waterway. Enhancement features included boulder piles, substrate placement and aquatic vegetation plantings which were required as compensation under a Fisheries Act Authorization. At the client's request, Mike successfully negotiated with Fisheries and Oceans Canada to forgo the final year of a long term monitoring plan in favour of additional enhancement works. This approach was more cost effective for the client and provided a greater net gain in the productive capacity of fish habitat

Groundwater Monitoring and Reporting

Arkell Well Field Adaptive Management Plan (AMP), Guelph, ON (Aquatic Ecologist)

Beginning in 2011 and scheduled to continue through 2014, Mike serves as task manager, responsible for implementation of an Adaptive Management Plan (AMP) designed to monitor groundwater/surface water interactions and to identify potential effects from increased water takings from municipal wells. The comprehensive AMP involves continuous monitoring of water temperatures, stream discharge and groundwater levels in the Blue Springs Creek watershed. The study also includes annual assessment of trout spawning activity (redd surveys) and fish community composition

** denotes projects completed with other firms*

Michael A. Johns Technologist Diploma

Ecologist

Mining

Alderon Iron Ore Mine Project Baseline Study, Wabush, Labrador, Newfoundland and Labrado (Field Ecologist)

Baseline mining study that comprised sediment and water sampling, bathymetry data, flow and discharge measurements, and downloading surface and ground water loggers

Young Davidson Mine Environmental Monitoring, Matachewan, Ontario (Principal Investigator/Project Manager)

In 2010 and 2011, Mike oversaw the implementation of the Aquatic Environmental Effects Monitoring Study for Northgate Minerals Corporation as required by the mine's Certificate of Approval (CofA) for wastewater discharge. This study involved the assessment of fish communities, benthic macroinvertebrate communities, water quality, sediment quality and aquatic plant communities to monitor potential effects of mine discharge. Mike also assisted Northgate in harmonizing their provincial (CofA) and federal (EEM) monitoring requirements

Phase 3 Environmental Effects Monitoring (EEM): Periodic Monitoring, Kirkland Lake, ON (Project Manager/Field Crew Leader)

Mike was the principal investigator responsible for the Phase 3 EEM Periodic Monitoring program for Kirkland Lake Gold Inc. This EEM program began in 2010 (continuing through 2012) and involvs the collection of water, sediment, fish and benthos to assess possible environmental effects caused by the mine and followed federal Metal Mining Effluent Regulation (MMER) guidelines. Throughout the duration of the project, Mike has been responsible for all aspects of data collection, data management, project management and quality control

Vale Hydrology and Aquatic Assessment, Ontario (Project Manager/Aquatic Ecologist)

Beginning in 2010 and continuing through 2011, Mike was the project manager for a baseline study examining hydrological and aquatic features at two potential mine sites. The intent of the study was to identify preferred water taking and discharge options. Mike oversaw all aspects of the study, but played a key role in documenting existing aquatic habitat characteristics and identifying potential effects on aquatic resources. The study involved the collection of meteorological, hydrological, water quality, sediment quality, benthic invertebrate and fish community data. Mike was also responsible for overall project delivery and project management

Environmental Effects Monitoring (EEM): Initial Monitoring, Konuto Mine, Denair Beach, Manitoba (Aquatic Ecologist)

Mike was responsible for the site characterization of the receiving environment and selection of appropriate reference sampling areas for the Initial Monitoring EEM program at the Konuto Mine in Denair Beach Manitoba. Site characterization methods followed the protocols set out in the Technical Guidance Documents for Metal Mining EEM and included assessment and documentation of effluent plume mixing, geological conditions, hydrological conditions, fish habitat, limnological conditions, water quality, sediment quality, mining processes and potential confounding factors

Environmental Effects Monitoring (EEM): Initial Monitoring, Ruttan Mine, Leaf Rapids, Manitoba (Aquatic Ecologist)

Mike was responsible for the site characterization of the receiving environment and selection of appropriate reference sampling areas for the Initial Monitoring EEM program at Ruttan Mine near Leaf Rapids Manitoba. Site characterization methods followed the protocols set out in the Technical Guidance Documents for Metal Mining EEM and included assessment and documentation of effluent plume mixing, geological conditions, hydrological conditions, fish habitat, limnological conditions, water quality, sediment quality, mining processes and potential confounding factors

Environmental Effects Monitoring (EEM): Chisel Mine, Snow Lake, Manitoba (Aquatic Ecologist)

Mike was responsible for site characterization of the receiving environment and selection of appropriate reference sampling areas for the Initial Monitoring EEM program at Chisel Mine near Snow Lake Manitoba. Site characterization methods followed the protocols set out in the Technical Guidance Documents for Metal Mining EEM and included assessment and documentation of effluent plume mixing, geological conditions, hydrological conditions, fish habitat, limnological conditions, water quality, sediment quality, mining processes and potential confounding factors

** denotes projects completed with other firms*

Michael A. Johns Technologist Diploma

Ecologist

Environmental Effects Monitoring (EEM): Initial Monitoring, Snow Lake Mill, Snow Lake, Manitoba (Aquatic Ecologist)

Mike was responsible for the site characterization of the receiving environment and selection of appropriate reference sampling areas for the Initial Monitoring EEM program at Snow Lake Mine in Snow Lake Manitoba. Site characterization methods followed the protocols set out in the Technical Guidance Documents for Metal Mining EEM and included assessment and documentation of effluent plume mixing, geological conditions, hydrological conditions, fish habitat, limnological conditions, water quality, sediment quality, mining processes and potential confounding factors

Environmental Effects Monitoring (EEM): Initial Monitoring, Trout Lake Mine, Flin Flon, Manitoba (Aquatic Ecologist)

Mike was responsible for the site characterization of the receiving environment and selection of appropriate reference sampling areas for the Initial Monitoring EEM program for Trout Lake Mine in Flin Flon, Manitoba. Site characterization methods followed the protocols set out in the Technical Guidance Documents for Metal Mining EEM and included assessment and documentation of effluent plume mixing, geological conditions, hydrological conditions, fish habitat, limnological conditions, water quality, sediment quality, mining processes and potential confounding factors

Environmental Effects Monitoring (EEM): Initial Monitoring, Flin Flon Mill, Flin Flon, Manitoba (Aquatic Ecologist)

Mike was responsible for the 'site characterization' of the receiving environment and selection of appropriate reference sampling areas for the Initial Monitoring EEM program at the Hudson Bay Mining and Smelting main processing mill in Flin Flon Manitoba. Site characterization methods followed the protocols set out in the Technical Guidance Documents for Metal Mining EEM and included assessment and documentation of effluent plume mixing, geological conditions, hydrological conditions, fish habitat, limnological conditions, water quality, sediment quality, mining processes and potential confounding factors

Phase 1 Environmental Effects Monitoring (EEM): Initial Monitoring, Kirkland Lake Gold Inc.*, Kirkland Lake, Ontario (Project Manager / Field Crew Leader)

From 2004 through 2006, Mike oversaw the execution of the EEM Initial Monitoring program for Kirkland Lake Gold Inc. This project involved the collection of water, sediment, fish and benthos to assess possible environmental effects caused by the mine and followed federal Metal Mining Effluent Regulation (MMER) guidelines. Throughout the duration of the project, Mike has been responsible for all aspects of data collection, data management, project management and quality control, and is currently working with Kirkland Lake Gold on the next cycle of EEM monitoring

Environmental Monitoring, Detour Lake Mine*, Cochrane, Ontario (Field Crew Leader)

Mike was the field crew leader and logistics coordinator on this aquatic environmental effects monitoring study, which was modeled after the national EEM program. This work was completed at a closed mine site with no infrastructure. Planning and organization were paramount to the success of this remote aquatic environmental effects monitoring study. Access to the study site was by road and All Terrain Vehicle (ATV), and due to the remote location of the site, the field crew set up a base camp and stayed on-site for the duration of the two week sampling period. In addition to his involvement in the field, Mike played a key role in designing the study, analysis of data and reporting. Study design components included fish community inventory, fish tissue analysis for mercury, fish habitat assessment, benthic invertebrate community assessment, water sampling, and sediment sampling

** denotes projects completed with other firms*

Michael A. Johns Technologist Diploma

Ecologist

Environmental Effects Monitoring (EEM), Lupin Mine*, Yellowknife, Northwest Territories (Field Crew Leader)

Mike was the field crew leader and logistics coordinator on this remote Environmental Effects Monitoring (EEM) study in Nunavut. He was responsible for organizing and mobilizing all field equipment and personnel and for ensuring that the study methods followed Metal Mining Effluent Regulations (MMER). The field work involved collection of fish, benthos, water and sediment to assess potential impacts from an inactive mine site. The sentinel fish species used to assess potential effects were Brook Stickleback (Culaea inconstans) and Arctic Grayling (Thymallus arcticus). This work was completed at a closed mine site with no staff or active infrastructure and was accessible only by air. Planning and organization were paramount to the success of this remote EEM project. Mike's extensive EEM experience contributed to the success of this remote arctic EEM study

Environmental Baseline Studies*, Red Lake, Ontario (Field Crew Leader)

In 2007 and 2008, Mike conducted baseline studies at the location of two potential new mine sites in the vicinity of Red Lake. Mike was responsible for developing the monitoring program to satisfy the requirements of regulatory agencies and oversaw the aquatic baseline monitoring component of the field program. Aquatic baseline inventories included fish community inventory, fish tissue analysis for mercury, documentation of potential spawning, feeding and rearing habitat, benthic invertebrate community assessment, water quality, and sediment quality assessment

Environmental Effects Monitoring (EEM): Focused Monitoring, Snow Lake Mill, Snow Lake, Manitoba (Aquatic Ecologist)

Mike developed a Study Design for this EEM project to identify new sampling areas that were necessary to estimate the magnitude and extent of potential mining related impacts. The Study design involved the use of fish, benthos, water and sediment for assessing potential impacts. A particularly challenging component of this study was to identify appropriate fish community evaluation methods, given the relatively small size of the effluent plume and mobile nature of the sentinel species. Isolating the mine discharge as the source of variation in results was also challenging due to the presence of confounding factors. Mike's experience in designing EEM programs and knowledge of the MMER regulations helped to design an EEM program to address these potential issues

Environmental Effects Monitoring (EEM): Focused Monitoring, Flin Flon Mill, Flin Flon, Manitoba (Aquatic Ecologist)

In 2009, Mike assisted with the Study Design for this project, and conducted field investigations to identify new sampling areas that were necessary to estimate the magnitude and extent of potential mining related impacts. Mike conducted in situ monitoring of water quality to confirm the results of plume modeling and evaluated fish habitat characteristics to determine suitability as potential reference sites

Phase 2 Environmental Effects Monitoring (EEM): Periodic Monitoring, Kirkland Lake Gold Inc., Kirkland Lake, Ontario (Project Manager / Field Crew Leader)

Mike was the principal investigator responsible for the design and implementation of the EEM Periodic Monitoring program for Kirkland Lake Gold Inc. This EEM program occurred from 2007 through 2009 and involved the collection of water, sediment, fish and benthos to assess possible environmental effects caused by the mine and followed federal Metal Mining Effluent Regulation (MMER) guidelines. Throughout the duration of the project, Mike has been responsible for all aspects of data collection, data management, project management and quality control, and is currently working with Kirkland Lake Gold on their current cycle of EEM monitoring

Power

St. Lawrence River American Eel Study*, Ogdensburg, New York (Field Crew Leader)

Mike was the field crew leader on this six month field program, coordinating a large field crew at a remote field camp. Mike was responsible for the collection of American eels over a 50 km reach of the St. Lawrence River, using hoop nets and boat electrofishers as the primary collection methods. Detailed morphological features were measured on all eels and detailed necropsies were performed on a sample of the eel population

** denotes projects completed with other firms*

Michael A. Johns Technologist Diploma

Ecologist

Little Long Reservoir Lake Sturgeon Population Assessment*, Kapuskasing, Ontario (Field Crew Leader)

Mike contributed to the design of a study to estimate the population of lake sturgeon (Acipenser fulvescens) in the Little Long Reservoir (Mattagami River). Mike was the field crew leader, responsible for coordination of all field activities and personnel, at a remote sampling site. Mike established field camps in areas accessible only by boat to conduct a mark/recapture study on lake sturgeon. In addition to the population estimate, data was also collect to assess fish movement and migration patterns, fish diet and contaminant levels in muscle tissue. Mike shared project management responsibilities for this project

Roadways

Highway 144 Route Selection, Chelmsford, On (Fisheries Specialist)

In 2011, Mike conducted habitat assessments and fisheries inventories as a part of a route selection study.

Highway 40 Rehabilitation, Chatham to Wallaceburg, ON (Fisheries Specialist)

In 2010, Mike conducted habitat assessments and fisheries inventories at 13 water crossings to assess potential impacts to the aquatic environment following MTO protocols

DFO Approvals, Compensation and Mitigation Plans for the Construction of a New Road Network and Associated New Culverts in Muskoka Commerce Park, Huntsville, Ontario (Principal Investigator & Project Manager)

Mike conducted baseline habitat assessments and fisheries inventories on Haynes Creek, the site of a proposed new commercial park. Mike reviewed detailed designs to assess potential impacts to fish and fish habitat and made recommendations to mitigate potential impacts. He prepared a Letter of Intent for the proposed works and obtained DFO authorization for the creation of three new municipal culverts, one box culvert extension under Highway 60, and one temporary crossing. As a part of the DFO approvals process, Mike designed compensation items to create winter refuge pools for small bodied fish. Mike also conducted pre-construction, construction and post-construction monitoring at this site, in accordance with the DFO authorization

DFO Approvals and Compensation for New Boat Launch and Travel Lift on the Wye River (Principal Investigator & Project Manager)

Mike conducted habitat assessments and fisheries inventories on the lower Wye River, the site of a proposed new boat launch and travel lift. Mike reviewed detailed designs to assess potential impacts to fish and fish habitat and made mitigation recommendations. He prepared a Letter of Intent for the proposed works and obtained project approvals from DFO. As a part of the DFO approvals process, Mike designed compensation items to replace like for like habitat, which provided seasonal spawning habitat for a variety of warm water fish species

Bank Stabilization to Protect Road Base, Naicatchewenin First Nation (Senior Reviewer)

Mike was the senior reviewer for this project involving the protection of an eroding road base along the La Vallée River. The area is a known walleye spawning area. Mitigation measures and compensation items focused on the protection and enhancement of walleye spawning habitat

Construction of New Ferry Terminals to Service Christian Island, Georgian Bay, Ontario (Principal Investigator & Project Manager)

Mike conducted habitat assessments in the vicinity of two proposed ferry terminal locations. Mike reviewed detailed designs to assess potential impacts to fish and fish habitat and made recommendations to mitigate potential impacts. He also prepared a Letter of Intent for the proposed works and obtained project approvals from DFO

Replacement of the Powers Bridge Over the Nottawasaga River, Simcoe County, Ontario (Principal Investigator & Project Manager)

Mike conducted habitat assessments and fisheries inventories to assess potential impacts to the aquatic environment and developed mitigation measures for the protection of fish habitat

Simcoe County Road 90 Widening (Principal Investigator & Project Manager)

Mike conducted habitat assessments and fisheries inventories to assess potential impacts to the aquatic environment and developed mitigation measures for the protection of fish habitat

** denotes projects completed with other firms*

Michael A. Johns Technologist Diploma

Ecologist

MTO Retainer Assignment #3006-E-0009 (Project Manager)

Mike served as project manager, overseeing all aspects of consulting team coordination, budget tracking, budget control, client liaison, agency liaison, fieldwork and reporting. Projects completed under this Retainer Assignment included work related to fluvial geomorphology, post construction monitoring, fisheries assessment, terrestrial assessment, impact assessments, site rehabilitation and DFO approval through submission of 'No HADD' forms

Highway 26 Rehabilitation (Natural Sciences Lead)

Mike conducted field investigations and oversaw the production of Natural Sciences Existing Conditions Reports. Mike is in the process of evaluating impacts to Fish and Fish Habitat and working with regulatory agencies to make a Harmful Alteration, Disruption or Destruction (HADD) determination for a site which required installation of a new box culvert

Highway 21 (Grand Bend) Rehabilitation (Natural Sciences Lead)

Mike was responsible for managing the natural sciences team and coordinating production of a Fish and Fish Habitat Existing Conditions Report and a Terrestrial Habitat Existing Conditions Report. Mike reviewed detailed designs to assess potential impacts to fish and fish habitat and made recommendations to mitigate potential impacts based on the Environmental Guide for Fish and Fish Habitat (December, 2008)

Highway 21 (Bluewater) Rehabilitation (Natural Sciences Lead)

Mike was responsible for managing the natural sciences team and coordinating the production of a Fish and Fish Habitat Existing Conditions Report and a Terrestrial Habitat Existing Conditions Report. Mike reviewed preliminary designs and applied the Environmental Guide for Fish and Fish Habitat (December, 2008) to determine the appropriate course of action for protecting aquatic Species At Risk in the area

Wastewater

Shelburne WWTP Impact Assessment Study*, Shelburne, Ontario (Field Ecologist/Project Manager)

Mike was responsible for the design and implementation of a biological study utilizing benthic macroinvertebrates to assess potential effects from the Shelburne Waste Water Treatment Plant. Mike used fixed area samplers to estimate benthic invertebrate population statistics and determine differences in the abundance and species composition. Habitat characteristics and water quality parameters were used in conjunction with the biological data during interpretation of results

Canacagigue Creek Monitoring, Elmira, Ontario (Field Crew Leader)

Mike was responsible for the collection of water, sediment and biological data to assess potential effects of an industrial discharge on Canacagigue Creek, a Tributary to the Grand River. Quantitative benthic samples were collected from both erosional and depositional habitats using fixed area samplers. Fish inventory was conducted by backpack electrofishing. Mike was also responsible for management of field data, calculating biotic indices and reporting. This ongoing project has been designed to monitor the long term trends and changes in water quality and fish habitat

Mount Forest WWTP*, Mount Forest, Ontario (Project Manager, Field Crew Leader)

As a part of a municipal Environmental Assessment (EA), Mike was asked to complete a pre-construction study on the Saugeen River, to establish baseline aquatic conditions prior to the construction of a new Waste Water Treatment Plant (WWTP). The study involved the collection and analysis of water quality and benthic macroinvertebrate community data. Quantitative methods were used to assess variability among sampling sites and sampling years. Mike was responsible for all aspects of data collection, data management, project management and quality control

** denotes projects completed with other firms*

Katie Easterling Hon. B.Sc., Dipl., CEPIT

Biologist

Katie Easterling is an Aquatic Ecologist with over 6 years of field experience in both the aquatic and terrestrial disciplines. Katie's experience includes fish habitat assessments, fish community sampling, fish salvages, REA water and water body assessments, trout spawning surveys, walleye spawning surveys, bass spawning surveys and baseline aquatic surveys for various pipeline, rail line, transportation, renewable energy and municipal projects. She also has experience conducting preliminary or baseline terrestrial habitat assessments and Species at Risk surveys. Katie's reporting skills include aquatic existing conditions reports, aquatic impact assessment reports, REA water assessment and water body reports, terrestrial existing conditions reports, Environmental Screening/Review Reports, Natural Heritage Evaluations (NHE) and Environmental Impact Statements (EIS). Katie has also consulted with First Nations, municipal, provincial and federal government agencies.

Katie is proficient in a variety of fish sampling techniques, including Fall Walleye Index Netting (FWIN), Near Shore Community Index Netting (NSCIN), fyke netting, seine netting, gill netting and boat and backpack electrofishing. She holds a certificate in radio telemetry and is certified in Ecological Land Classification (ELC). Her educational background focused on terrestrial, wildlife and aquatic biology, and includes a degree in Zoology and a Fish and Wildlife diploma. Prior to joining Stantec, Katie worked as an Ecological Research Assistant with Parks Canada, a Conservation Interpreter with the Long Point Region Conservation Authority and has worked as a Research Assistant and a Biologist.

EDUCATION

Hon. B.Sc., University of Toronto / Major Zoology, Minor Biology, Toronto, Ontario, 2003

Diploma, Sir Sandford Fleming College / Fish and Wildlife Technician, Lindsay, Ontario, 2007

Stantec Consulting Ltd. / Class II Electrofishing Crew Leader Certification Course, Guelph, Ontario, 2012

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

Ministry of Natural Resources / MTO/DFO/MNR Fisheries Protocol Training Session for Fisheries Specialists, Toronto, Ontario, 2011

MNR / Renewable Energy Natural Heritage Assessment Training, Toronto, Ontario, 2011

Chrisolas Management Services / Certified Traffic Control Technician, Kitchener, Ontario, 2010

Birchdale Ecological, Ltd., Bats R Us Canada Div. / Bat Acoustic Analysis Course, Calgary, Alberta, 2008

Ministry of Natural Resources / Wetland Classification Certificate, Elgin, Ontario, 2006

Ministry of Natural Resources / Ecological Land Classification Certification, Elgin, Ontario, 2006

Sir Sandford Fleming College / Radio Telemetry Certificate, Lindsay, Ontario, 2006

Sir Sandford Fleming College / Pleasure Craft Operators Course, Linsday, Ontario, 2006

CN Rail / Contractor Orientation Online Course, Kitchener, Ontario, 2012

REGISTRATIONS

Canadian Environmental Practitioner-In-Training, Canadian Environmental Certification Approvals Board

MEMBERSHIPS

Member, American Fisheries Society

** denotes projects completed with other firms*

Katie Easterling Hon. B.Sc., Dipl., CEPIT

Biologist

PROJECT EXPERIENCE

Municipal

Habitat Assessment, Regional Municipalities of Durham and York, Ontario (Terrestrial Project Biologist)
Multiple sites around the regions were assessed for wildlife usage, fisheries and ideal browse, nesting and cover habitat Recommendations for a preferred site were given based on a combination of these factors and how the potential loss of habitat through development would affect the local wildlife

Fish Sampling, Regional Municipality of Durham, Ontario (Aquatic Ecologist)
Various stations along Tooley Creek in Durham Region were electrofished to obtain composite samples of whole fish that were identified, weighed, measured and bagged for a metals analysis as part of a human health risk report for the proposed Durham-York Residual Waste Study

Baseline Aquatic Survey, Regional Municipality of York, Ontario (Aquatic Ecologist)
A baseline terrestrial and aquatic survey was conducted as a project component of an Environmental Assessment for the Fairy Lake Garden Pond Maintenance Project in the Town of Newmarket. Tasks included a visual assessment of water depth, aquatic vegetation, available cover, substrate and the presence of barriers to fish movement upstream or downstream of Garden Pond, which were used to assess the feature's function as fish habitat, both within the pond and the pond's function within the Fairy Lake/East Holland River watershed

Aquatic Habitat Surveys, Town of Ajax, Ontario (Aquatic Ecologist)
The Town of Ajax is committed to improving water quality along its Lake Ontario waterfront and in Duffins Creek and Duffins Marsh. As part of this, preliminary fieldwork was conducted to assess the existing conditions at each of the stormwater outfalls, including terrestrial and aquatic habitat. The assessment consisted of a visual assessment of water depth, aquatic and terrestrial vegetation, available cover, substrate and the presence of barriers to fish movement upstream or downstream

Trout Spawning Surveys for Municipal Road Expansion, Ontario (Aquatic Ecologist)
Conducted multiple trout spawning surveys along two coldwater creeks in the eastern region of the GTA for two municipal road expansion projects. Fieldwork involved surveying the creeks 50 m upstream and 100 m downstream to determine if Rainbow Trout were staging or spawning in the creek and within the vicinity of the bridge

Arkell Well Field Adaptive Management Plan, City of Guelph, Ontario (Aquatic Ecologist)
As part of a yearly monitoring program, fish habitat was assessed using the OSAP protocol at four monitoring stations outside the city of Guelph

Natural Sciences & Heritage Resources

Forest and Wetland Classification, Parks Canada*, Ontario (Ecological Research Assistant)
Performed rapid assessments of 400 m forest plots and 100 m wetland plots to evaluate and classify sites along the Trent-Severn Waterway from Rice Lake to Canal Lake. Classification was based on biological features such as flora and fauna present and physiological features such as soil and drainage. Data collected was used to create a mapping inventory of the Trent-Severn system for Parks Canada and the Ministry of Natural Resources

Soil Sampling Survey, Brampton Brick, Brampton, Ontario (Terrestrial Project Biologist)
Collected soil samples to assess the impact of emissions on the surrounding terrestrial environment as part of the phytotoxicology assessment of the Brampton Brick facility

Ecological Receptors of Concern Surveys, Various Clients, Ontario (Terrestrial Project Biologist)
Conducted biological surveys of flora and fauna on potentially contaminated sites to assess the current site conditions

Category B Class EA, Ontario Realty Corporation, Various Locations, Ontario (Terrestrial Project Biologist)
Conducted the background research and evaluation of existing natural heritage baseline conditions for multiple ORC properties situated across Ontario

** denotes projects completed with other firms*

Katie Easterling Hon. B.Sc., Dipl., CEPIT

Biologist

Preliminary Aquatic and Terrestrial Assessment, Canada Post, Various Locations, Ontario (Terrestrial Project Biologist)

Preliminary aquatic and terrestrial assessments of various sites in Southern Ontario were conducted to establish the existing baseline conditions. Surveys involved recording bird species observed, vegetation cover species found on the site and assessing potential impacts on nearby Valued Ecosystem Components (VECs) and any aquatic systems

Fish Community Survey*, Ontario (Fisheries Field Biologist)

FWIN, NSCIN, gill netting and Seine netting techniques were used to perform a fish surveys on a lake and rivers in the Kawartha Lakes system. Processing of the sampled fish included weighing, measuring, sexing, determining gonadal condition, removing aging structures and aging

Benthic Invertebrate and Water Quality Sampling, Fox Meadows Estates, Ontario (Aquatic Ecologist)

Benthic invertebrate sampling was conducted following the OBBN protocol and water quality samples were collected and submitted for testing. Results from the sampling effort were summarized and compared to previous years in an effort to gage and mitigate potential impacts from a residential development expansion

Box Grove, DFO Authorization for Works Affecting Fish and Fish Habitat No. BU-04-3082, Ontario (Aquatic Ecologist)

This survey was conducted to satisfy conditions included in the Department of Fisheries and Oceans (DFO) Authorization for Works Affecting Fish and Fish Habitat (DFO Authorization No. BU-04-3082). Condition 4.2 of the Authorization is to enhance fish passage through the creation of a low flow channel following the removal of a 30 m long culvert. The culvert removal and new channel construction were completed in spring 2010. This survey was conducted as part of the post construction monitoring program required by the DFO Authorization

Piles Development (Keswick) Corporation, DFO Authorization PE 07-0957, Ontario (Aquatic Ecologist)

An evaluation of fish habitat, fish passage and the fish community was conducted within the channel realignment to confirm the compensation measures and structures are functioning as designed and are providing fish habitat. Fish community sampling was conducted using a backpack electrofisher

Lake Gibson Angler Survey, Ontario Power Generation, Thorold, Ontario (Aquatic Ecologist)

Lake Gibson is a hydro-electric reservoir owned and operated by Ontario Power Generation (OPG). As detailed in the OPG Risk Management Plan, OPG is required to monitor the persistence of sediment contamination and its expression in the environment within Lake Gibson. The program was designed to identify, quantify and compare the levels of contamination over time and the impact on sediments, water, benthic invertebrates, and fish in the system. Katie was involved as a field biologist interviewing anglers at Lake Gibson to assess the effectiveness of OPG's communication with the public regarding the contamination of Lake Gibson sediment and fishes

Phase 3 Environmental Effects Monitoring (EEM): Periodic Monitoring, Kirkland Lake, Ontario (Aquatic Ecologist)

The EEM program began in 2010 (continuing through 2012) and involved the collection of water, sediment, fish and benthos to assess possible environmental effects caused by the mine and followed federal Metal Mining Effluent Regulation (MMER) guidelines. Fyke nets and a boat electrofisher were used to capture target small-bodied species. Fish dissection, gender determination, weighing of livers and gonads, and collection of eggs were performed

Oil and Gas Pipelines

Nesting Bird Surveys, TransCanada Pipelines Limited*, Ontario (Terrestrial Project Biologist)

Nesting bird surveys were performed at various remote locations throughout Northern Ontario, which included finding and identifying any active and inactive nests within and surrounding the proposed work area along a pipeline right-of-way

** denotes projects completed with other firms*

Katie Easterling Hon. B.Sc., Dipl., CEPIT

Biologist

Terrestrial Assessment, Enbridge Pipelines Inc., Ontario (Terrestrial Project Biologist)
Preliminary aquatic and terrestrial assessments of various dig sites along a pipeline in Southern Ontario were conducted to establish the existing baseline conditions. Surveys involved recording bird species observed, vegetation cover species found at the dig site and assessing any aquatic habitat found on-site

Herptile Rescue, Enbridge Pipelines Inc., Ontario (Terrestrial Project Biologist)
As part of a large pipeline maintenance project situated within a beaver pond located near the Ganaoque River, a herptile rescue was performed to remove any snakes, turtles and frogs from the trench-box once in-filling was started. All species found within or immediately adjacent to the trench-box were removed and relocated within the beaver pond but outside of the work zone

Species at Risk Survey, TransCanada Pipelines Limited, Ontario (Terrestrial Project Biologist)
Species at Risk surveys were conducted at four work areas along a pipeline right-of-way between Belleville and Brockville, Ontario. Surveys included looking for and assessing possible habitat conditions for Butternut, Henslow's Sparrow, Grey Fox, Blanding's Turtle, Eastern Milksnake and Eastern Ratsnake

Ecological Land Classification, TransCanada Pipelines Limited, Ontario (Terrestrial Project Biologist)
Ecological Land Classification (ELC) surveys were conducted along the proposed pipeline expansion route, which documented the vegetation communities present

Baseline Aquatic Habitat Survey, TransCanada Pipelines Limited, Ontario (Aquatic Ecologist)
As part of an Environmental Assessment for the proposed Thorold Sales Meter Station to connect the TransCanada Mainline to the Enbridge Gas Distribution pipeline, baseline aquatic conditions were assessed as part of the report

Fish Salvage and Construction Monitoring, Enbridge Pipelines, Ontario (Aquatic Ecologist)
In-water construction work was monitored and fish salvages were conducted at various watercourses across Ontario as part of a pipeline maintenance or repair project. The fish collected were identified, measured and released downstream of the in-water work area

Baseline Aquatic Survey, Enbridge Gas Distribution Inc., Ontario (Aquatic Ecologist)
As part of the Pipeline to Serve York Energy Centre LP Environmental Assessment, aquatic baseline conditions at all watercourse crossings were summarized as part of the preliminary assessment of reasonable routing opportunities for the proposed pipeline

Detailed Fish Habitat Assessment and Reporting, TransCanada Pipelines Limited, Ontario (Aquatic Ecologist)
As part of a pipeline expansion project, a detailed fish habitat survey was conducted following MTO protocols at ten watercourse crossings. Methodology included detailed habitat mapping 50 m upstream and 100 m downstream. Fish habitat conditions were summarized and watercourse sensitivity determined according to the DFO matrix in the Fish and Fish Habitat Assessment Report as part of a CEAA Environmental Assessment

Detailed Fish Habitat Assessment and Reporting, NOVA Chemicals (Canada) Ltd., Ontario (Aquatic Ecologist)
Fish habitat was assessed at nine proposed crossings for a pipeline route and existing conditions were summarized as part of an EA

Railroads

Nesting Bird Surveys, Canadian National Railway, Ontario (Terrestrial Project Biologist)
Nesting bird surveys were performed along various stretches of the client's right-of-way to find and identify any active or inactive nests within the proposed work area

Fish Habitat Surveys and Reporting, Canadian Pacific Railway, Ontario (Aquatic Ecologist)
As part of a CEAA Environmental Screening Report, a fish habitat and aquatic baseline survey was conducted along a proposed rail siding within a wetland. The assessment consisted of a visual assessment of water depth, aquatic vegetation, available cover, substrate and the presence of barriers to fish movement within the area of the proposed siding

** denotes projects completed with other firms*

Katie Easterling Hon. B.Sc., Dipl., CEPIT

Biologist

Detailed Fish Community and Habitat Surveys and Reporting, Canadian National Railway, Ontario (Aquatic Ecologist)
As part of a railway expansion project, detailed fish community and habitat surveys were conducted following MTO protocols at over 20 watercourse crossings. Methodology included detailed habitat mapping 50 m upstream and 100 m downstream, electrofishing to determine fish community present in the stream and water chemistry sampling. Fish community and habitat conditions were summarized and watercourse sensitivity determined according to the DFO matrix in the Fish and Fish Habitat Assessment Report as part of a CEAA Environmental Screening

Fish Salvage and Construction Monitoring, Canadian National Railway, Ontario (Aquatic Ecologist)
As part of a railway expansion project, in-water construction work was monitored and multiple fish salvages were performed at various bridge and culvert construction locations

Post-Construction Fish Community and Fish Habitat Assessment, Canadian National Railway, Ontario (Aquatic Ecologist)
As part of a railway expansion project, detailed post-construction fish community and habitat surveys were conducted following MTO protocols at approximately 20 watercourse crossings. Methodology included detailed habitat mapping 50 m upstream and 100 m downstream, electrofishing to determine fish community present in the stream and water chemistry sampling. The sites were assessed to confirm that potentially adverse effects on fish and fish habitat were effectively managed through mitigation measured proposed in the Environmental Screening Reports and approved in the Letters of Advice issued by DFO

Renewable Energy

Winter Bird Surveys, Ontario (Terrestrial Project Biologist)
As a requirement of O.Reg.116, avian monitoring surveys were conducted to characterize the bird community of two sites in Southern Ontario during the over-wintering period

Post-Construction Bird and Bat Mortality Monitoring, Ontario (Terrestrial Project Biologist)
Conducted post-construction bird and bat mortality monitoring, scavenger impact trials and searcher efficiency trials at the Ripley and Enbridge Ontario Wind Farms near Kincardine, Ontario as a requirement under O.Reg. 116

Pre-Construction Bat Monitoring Surveys, Ontario (Terrestrial Project Biologist)
Under O.Reg. 116 AnaBat detectors were installed on MET towers and design/constructed/installed multiple ground AnaBat detector units at various wind farms in Southern Ontario. Monitored pre-construction bat activity and identified species using spectrogram analysis to report on the activity level surrounding the proposed wind farms

Fish Habitat Assessment, Ontario (Aquatic Ecologist)
As part of a wind farm Environmental Assessment under O.Reg. 116, a fish habitat assessment was conducted to determine the baseline conditions and watercourse sensitivity according to the DFO matrix at each of the proposed watercourse crossings

Amherst Island REA Water Body Assessment, Ontario (Aquatic Ecologist)
Conducted the REA water assessment and prepared the water body report for a renewable energy project on Amherst Island, which involved identifying and delineating water bodies and conducting fish community and fish habitat assessment at 39 locations across the Island

Napier Wind Project REA Water Body Assessment, Ontario (Aquatic Ecologist)
Conducted the REA water assessment and prepared the water body report for a renewable energy project, which involved fish habitat assessments at three locations across the Study Area

Adelaide REA Water Body Assessment, Ontario (Aquatic Ecologist)
Conducted the REA water assessment and prepared the water body report for a renewable energy project near Strathroy, which involved identifying and delineating water bodies and conducting fish community and fish habitat assessment at 41 locations

** denotes projects completed with other firms*

Katie Easterling Hon. B.Sc., Dipl., CEPIT

Biologist

Cedar Point REA Water Body Assessment, Ontario (Aquatic Ecologist)
Conducted the REA water assessment and prepared the water body report for a renewable energy project near Forest, which involved identifying and delineating water bodies and conducting fish community and fish habitat assessment at over 100 locations

Hydroelectric Facilities, Lock 24 and 25 Dams on the Trent-Severn Waterway, Ontario (Aquatic Ecologist)
Conducted Walleye spawning surveys, benthic invertebrate sampling, small-bodied fish community sampling and Centrarchid spawning surveys at Locks 24 and 25 to establish baseline conditions within the proposed work area

Niagara Region Wind Corporation, Ontario (Aquatic Ecologist)
Conducted the REA water assessment for a renewable energy project near Welland, Ontario, which involved identifying and delineating water bodies at over 30 locations

Bow Lake Wind Project, Ontario (Aquatic Ecologist)
Conducted the REA water assessment for a renewable energy project near Sault Ste. Marie, Ontario, which involved identifying and delineating water bodies at over 20 locations

Roads and Highways

Hwy 6 Fish Salvage, MTO Southwest Region, Ontario (Aquatic Ecologist)
Conducted a fish salvage as part of an MTO highway widening project located along Hwy 6 near Varney, Ontario. Fish collected were identified, measured and released downstream of the in-water work area

Detail Design, Highway 3, 6 and 24 Fish Community and Fish Habitat Assessment at Various Locations, MTO Southwest Region, Ontario (Aquatic Ecologist)
Conducted a detailed spring, summer and fall fish community and fish habitat assessment of 20 watercourse crossings for the rehabilitation/resurfacing of Highways 3, 6 and 24 surrounding the communities of Simcoe, Delhi and Port Dover (namely, GWP 3115-09-00, GWP 3048-03-00 and GWP 362 98 00). Reporting tasks included the Aquatic Existing Conditions Report and Impact Assessment Report for each highway

Route Planning, Hwy 17 Sudbury to Markstay (GWP 5031-09-00), MTO Northeast Region, Ontario (Aquatic Ecologist)
Prepared the Aquatic Existing Conditions Report as part of the preliminary route planning study for Highway 17 between Sudbury and Markstay

Route Planning, Highway 144 Bypass around Chelmsford (GWP 5023-03-00), MTO Northeast Region, Ontario (Aquatic Ecologist)
Conducted fish habitat and fish community assessments at 63 locations in the area surrounding Hwy 144 near Chelmsford, Ontario. This involved using a backpack electrofisher or minnow traps (where applicable) to determine fish species and habitat present in order to assess the community structure and supplement watercourse sensitivity information provided by the MNR. Reporting tasks included the Aquatic Existing Conditions Report

Detail Design, Highway 7 Structural Culvert Replacement/Rehabilitation at Various Locations, MTO Eastern Region, Ontario (Aquatic Ecologist)
Conducted fish habitat and fish community assessments at 2 locations in the area surrounding Hwy 7 outside Lindsay Ontario (namely, WP 4007-08-01/02 Mariposa Creek Structural Culvert Rehabilitation, Site 32-124BC and Mariposa Brook Structural Culvert Replacement, Site 32-161C). This involved using a backpack electrofisher or minnow traps (where applicable) to determine fish species and habitat present in order to assess the community structure and supplement watercourse sensitivity information provided by the MNR. Reporting tasks included the Aquatic Existing Conditions Report

Detail Design, Highway 35 Structural Culvert Replacement/Rehabilitation at Various Sites, MTO Eastern Region, Ontario (Aquatic Ecologist)
Conducted fish habitat and fish community assessments at 3 locations in the area surrounding Hwy 35 outside Lindsay, Ontario (namely, WP 4166-09-01 Corben Creek Structural Culvert Replacement, Site 32-165C, WP 4165-09-01 Martin Creek Structural Culvert Rehabilitation, Site 32-063BC and WP 4075-09-01 South McLaren Creek Structural Culvert Rehabilitation, Site 32-072BC). This involved using a backpack electrofisher or minnow traps (where applicable) to determine fish species and habitat present in order to assess the community structure and supplement watercourse sensitivity information provided by the MNR. Reporting tasks included the Aquatic Existing Conditions Report

** denotes projects completed with other firms*

Katie Easterling Hon. B.Sc., Dipl., CEPIT

Biologist

Detail Design, Highway 35, WP 102-99-01 Trent Canal Bridge Rehabilitation, Site 32-065 (Rosedale), MTO Eastern Region, Ontario (Aquatic Ecologist)

Prepared the Aquatic Existing Conditions Report as part of the Detailed Design process for the Highway 35 site at the Trent Severn Waterway Bridge Rehabilitation

Detail Design, Highway 6 & 10, GWP 3098-09-00 Rehabilitation, MTO Southwest Region, Ontario (Aquatic Ecologist)

Conducted fish habitat and fish community assessments at 11 locations in the along Highway 6/10 between Chatsworth and Owen Sound, Ontario. This involved using a backpack electrofisher or minnow traps (where applicable) to determine fish species and habitat present in order to assess the community structure and supplement watercourse sensitivity information provided by the MNR. Reporting tasks included the Aquatic Existing Conditions Report

** denotes projects completed with other firms*

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

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

** denotes projects completed with other firms*

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

Aquatic Ecologist

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

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

** denotes projects completed with other firms*

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

Aquatic Ecologist

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*