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Ontario
Ministry of Natural Resources and Forestry

What Goes On Upstream, Must Come Downstream…But Should It? Mitigation Measures for Protection of Aquatic Species

Kim Logan, P. Geo (Limited), P.Biol.
GEMS Senior Ecologist

Mark Heaton
MNRF Fish and Wildlife Biologist

TRIECA Conference 2017

Presentation Outline

Background

- Legislation
- Chemical and Biological considerations
- Evolution of ESC Guidelines

Triggers and Timing

- TSS and Turbidity
- In water construction timing windows

Project Examples

- Small Scale
- Large Scale

BACKGROUND
Legislation

Federal Fisheries Act

- A deleterious substance can be any substance that, if added to any water, would degrade or alter its quality such that it could be harmful to fish, fish habitat or the use of fish by people.

Ontario's Endangered Species Act

- Section 9 Prohibits kill, harm, harass
- Section 10 Prohibits damage and destruction of habitat

Ontario Water Resources Act

Lakes ands Rivers Improvement Act

Public Lands Act

BACKGROUND
Legislation

Typical conditions

- All work areas are effectively isolated from the watercourses with appropriate erosion and sediment controls in order to ensure that deleterious substances do not enter the watercourses at any time;

- No sediment, sediment-laden water or deleterious substances are discharged into the watercourses at any time;

- All erosion and sediment control measures will be inspected daily including after every rainfall, cleaned, maintained and/or adjusted accordingly to ensure sediment does not enter the watercourses at any time

BACKGROUND
Chemical and Biological Considerations

Silt is....

- Particle size less than 62 microns
- Measured in different ways (TSS, NTU)

Silt can...

- Irritate gills and impact respiration in fish
- Impact food foraging for visual feeders
- Act as a carrier for pathogens – soil bacteria
- Impact incubating eggs and larvae (smothering)
- Impact aquatic insect community (smothering)

Silt is a deleterious substance

Table 2. A standard terminology for sediment particle size (Newcombe 1996).

Sediment particle size (mm)	Sediment particle size (μm)	Size-class of sediment particle		Velocity of settling particle (mm·s^{-1})
2000–4000		Boulders	very large	
1000–2000			large	
500–1000			medium	
250–500			small	
130–250		Cobbles	large	
64–130			small	
32–64		Gravel	very coarse	
16–32			coarse	
8–16			medium	
4–8			fine	
2–4			very fine	
1–2	1000–2000	Sand	very coarse	100–200
0.5–1	500–1000		coarse	53–100
	250–500		medium	26–53
	125–250		fine	11–26
	62–125		very fine	3–11
	31–62	Silt	coarse	1–3
	16–31		medium	0.18–0.66
	8–16		fine	0.044–0.18
	4–8		very fine	0.011–0.044
	2–4	Clay	coarse	< 0.011
	1–2		medium	
	0.5–1		fine	
	0.24–0.5		very fine	

measured in the laboratory by both filterable and non-filterable residues of a water sample. Undissolved particles make up the nonfilterable residues, these varying in size from approximately 10 nm to 0.1 mm in diameter, although it is usually accepted that the suspended solids are the fraction that will not pass through a 0.45-μm pore diameter glass fibre filter (Caux et al. 1997). For the purpose of deriving water quality guidelines, the

relationship between suspended sediment concentration and turbidity is known, turbidity can be used as a surrogate to predict suspended sediment concentrations. An example of a regression developed for streams in interior Alaska (Lloyd et al. 1987) is

$$\log_{10}T = 0.045 + 0.9679 \log_{10}SSC$$

BACKGROUND
Evolution of ESC Guidelines

Technical Guidelines Erosion and Sediment Control (MNR 1989)

Canadian Water Quality Guidelines for the Protection of Aquatic Life (CCME 2002)

Erosion and Sediment Control Guideline for Urban Construction (GGHCA 2006)

SiltSmart (CVC/MNRF/DFO/MOEE 2012)

- Digital monitoring and communications

Guidance for Development Activities in Redside Dace Protected Habitat (MNRF 2016)

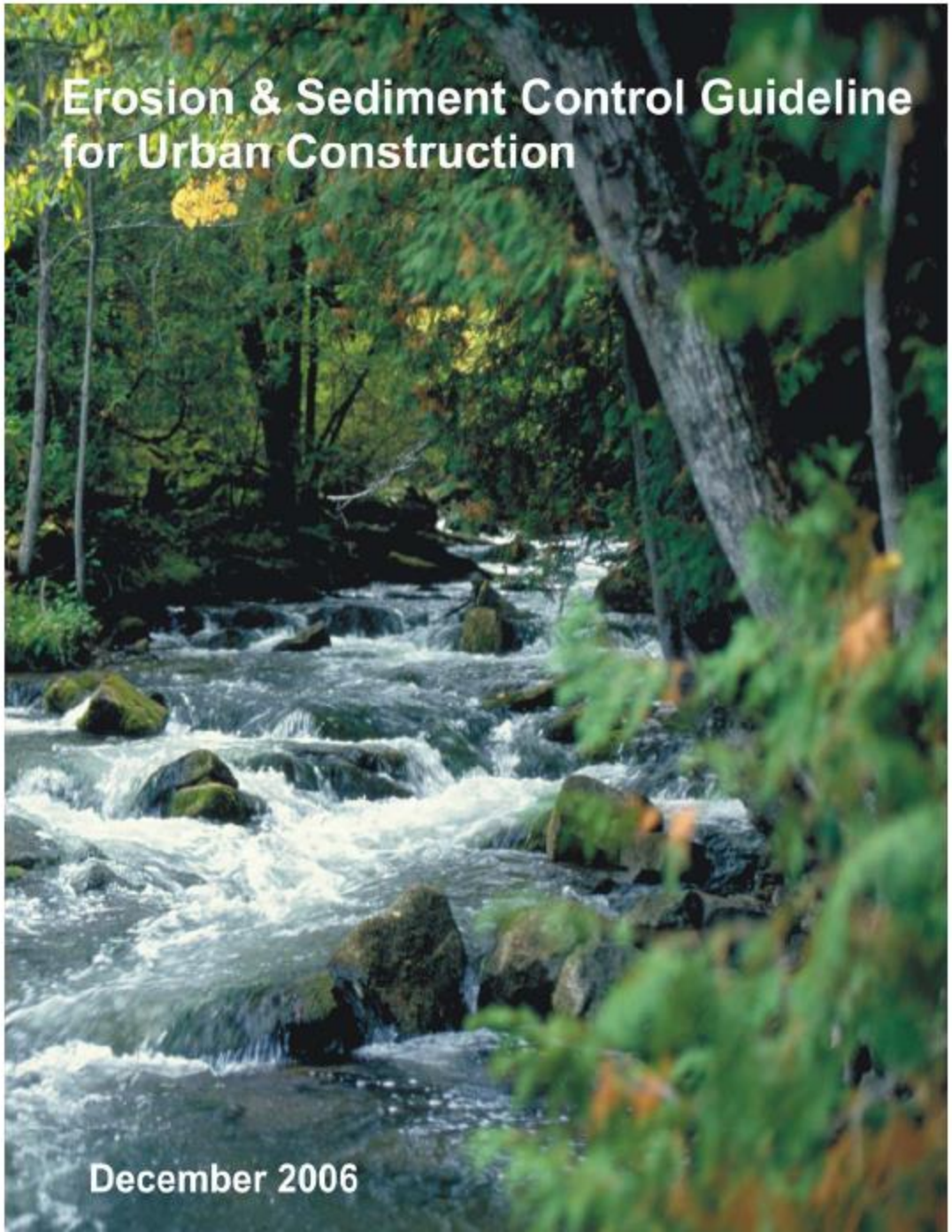
- Species specific

ONTARIO MINISTRY OF NATURAL RESOURCES

TECHNICAL GUIDELINES

EROSION AND SEDIMENT CONTROL

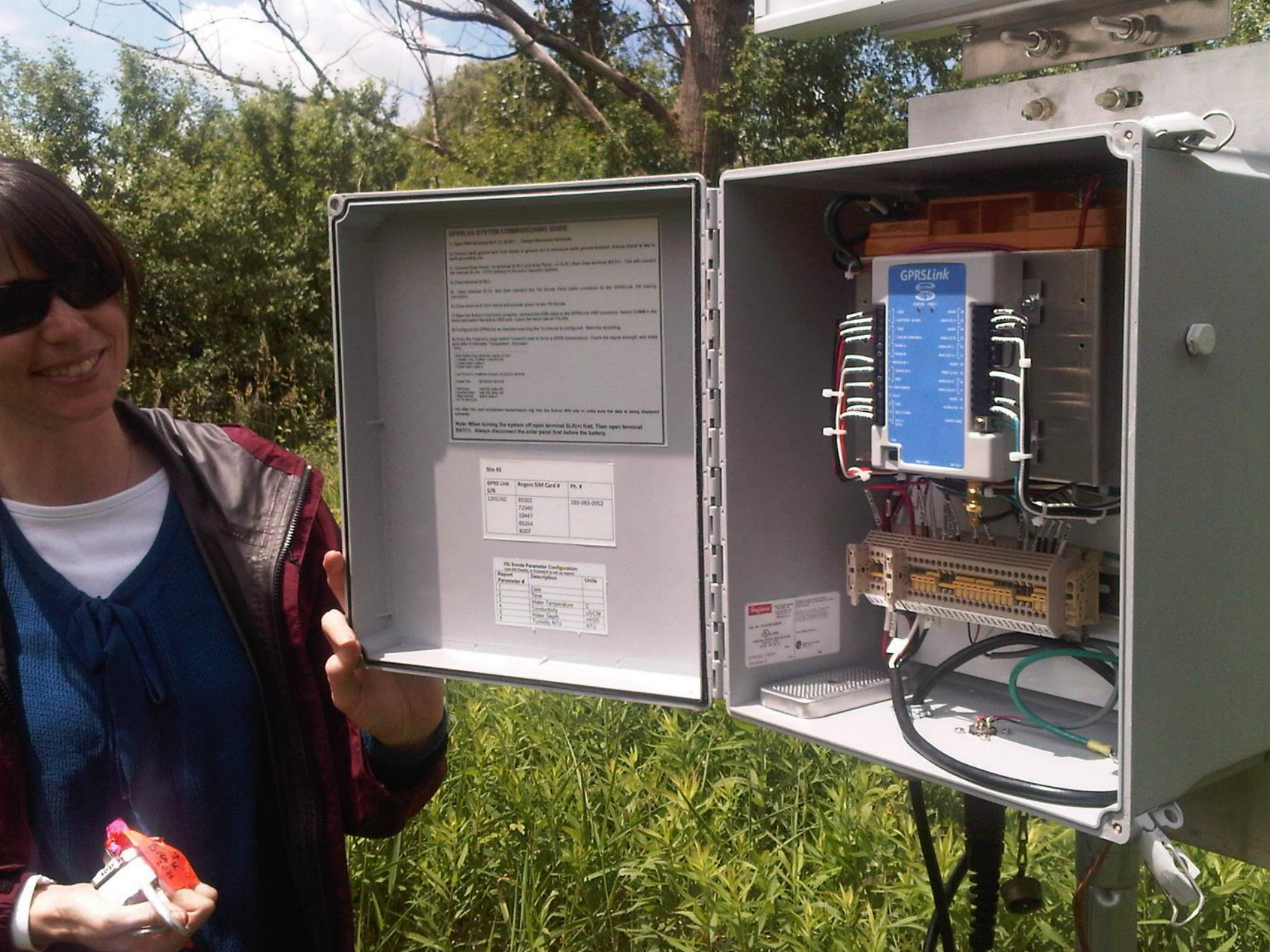
February, 1989


Erosion & Sediment Control Guideline
for Urban Construction
December 2006

Silt Smart

Erosion and Sediment Control Effectiveness Monitoring and Rapid Response Protocol for Large Urban Development Sites

Version 1.2
March 2012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Guidance for Development Activities in Redside Dace Protected Habitat

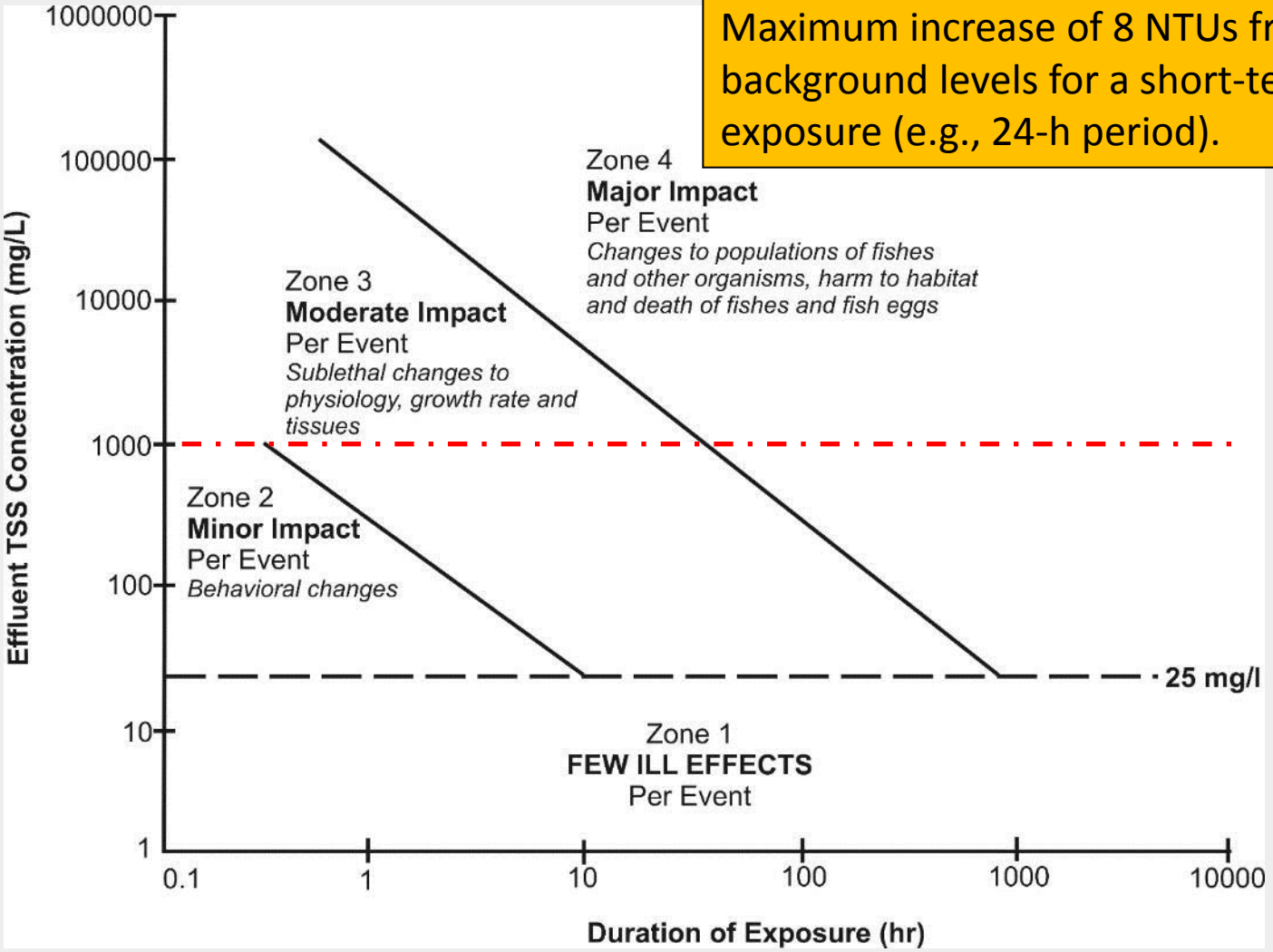
Ministry of Natural Resources and Forestry
Species at Risk Conservation Policy

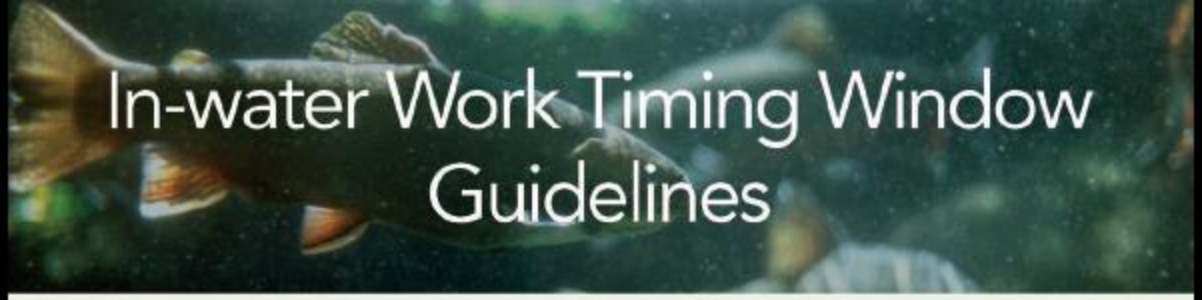
March 2016

Version 1.2

TRIGGERS – TSS and Turbidity

Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-h period).





In-water Work Timing Window Guidelines

Ontario Ministry of Natural Resources

March 11, 2013

The Ministry of Natural Resources (MNR) has established timing window guidelines to restrict in-water work related to an activity during certain periods in order to protect fish from impacts of works or undertakings in and around water during spawning migrations and other critical life stages.

Follow the steps below to determine which timing windows apply to your project:

1. Determine the fish species that are present in the waterbody in which the activity will occur. If you are uncertain, please contact your local MNR office.
   NOTE: If species listed under the *Endangered Species Act, 2007* are present, you may be required to obtain approval under the *Endangered Species Act, 2007* prior to commencing any in-water work related to an activity.

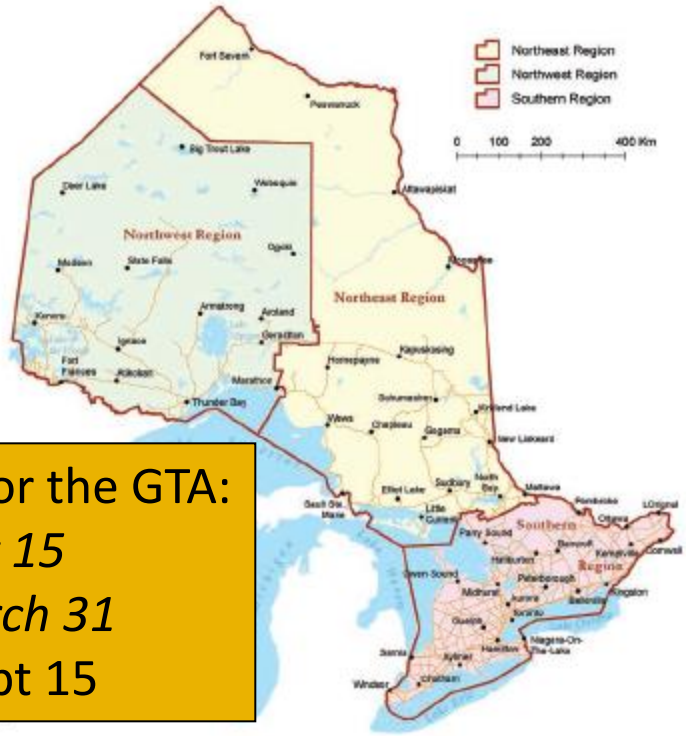
2. Use the following map on page 2 (Figure 1. MNR Regions) to determine the MNR Region in which the activity will occur. If you are uncertain of the MNR Region in which the activity will occur, please contact your local MNR office.

3. Use Table 1 (on page 2) to determine the dates during which in-water work related to an activity is restricted based on the region and species present. If more than one species is present, then the timing windows should be combined for all species present (e.g., if a waterbody in the Northwest Region contains both Northern Pike (April 1 to June 15) and Smallmouth Bass (May 15 to July 15), then the combined timing window would be April 1 to July 15).

4. If you are required to conduct in-water work related to an activity during a restricted timing window period as outlined in Table 1, please contact your local Ministry of Natural Resources Office.

Northern Pike (Esox lucius), Hawk Lake, Kenora Ontario

Figure 1. MNR Regions



Three general timing windows for the GTA:
Coldwater *Open June 15 to Sept 15*
Warmwater *Open July 1 to March 31*
Redside Dace Open July 1 to Sept 15

Table 1. Timing windows when in-water work is restricted – based on species presence and MNR Region

	Fish Species	Northwest Region	Northeast Region	Southern Region
Spring	Walleye	April 1 to June 20	April 1 to June 20	Mar. 15 to May 31
	Northern Pike	April 1 to June 15	April 1 to June 15	Mar. 15 to May 31
	Lake Sturgeon	May 1 to June 30	May 1 to July 15	May 1 to June 30
	Muskellunge	May 1 to July 15	May 15 to July 15	Mar. 15 to May 31
	Large/Smallmouth Bass	May 15 to July 15	May 15 to July 15	May 1 to July 15
	Rainbow Trout	April 1 to June 15	April 1 to June 15	Mar. 15 to June 15
	Other/Unknown Spring Spawning Species	April 1 to June 15	April 1 to June 15	Mar. 15 to July 15
Fall	Lake Trout	Sept. 1 to May 31	Sept. 1 to May 31	Oct. 1 to May 31
	Brook Trout	Sept. 1 to June 15	Sept. 1 to June 15	Oct. 1 to May 31
	Pacific Salmon	Sept. 1 to June 15	Sept. 1 to June 15	Sept. 15 to May 31
	Lake Whitefish	Sept. 15 to May 31	Sept. 15 to May 15	Oct. 15 to May 31
	Lake Herring	Oct. 1 to May 31	Oct. 1 to May 31	Oct. 15 to May 31
	Other/Unknown Fall Spawning Species	Sept. 1 to June 15	Sept. 1 to June 15	Oct. 1 to May 31

TIMING – In-water Construction Windows

FLEXIBILITY……considerations

Sensitivity of the fish community

- Know the risk to life stages, mitigate impact if possible

Type of Activity

- Underground HDD or tunnel
- Offline with controlled dewatering

Duration of construction

- Short duration, low risk of silt escapement

Erosion and Sediment Control Monitoring

- Enhanced ESC measures – go that extra mile
- Performance during construction – hand-held digital monitoring

THERE ARE SITUATIONS WHERE IN-WATER WORK CAN OCCUR BEYOND THE USUAL GUIDELINES IT WILL DEPEND ON POTENTIAL RISK TO FISH, RISK MITIGATION AND ESC MONITORING

Project Success – Where do you start?

1. **Productive Collaboration**
   - Building cooperative relations between landowners, consultants and public agencies
   - Building trust in relationships
   - Effective meetings, scoping, start up plans, good tenders etc.
2. **Flexibilities**
   - Know the rules
   - Know the flexibility in the rules and managing risk
   - Practical construction timing windows
3. **Common end goals, good budgeting**
4. **Communication and reporting**

Example 1: “On-line” Pond Private Landowner

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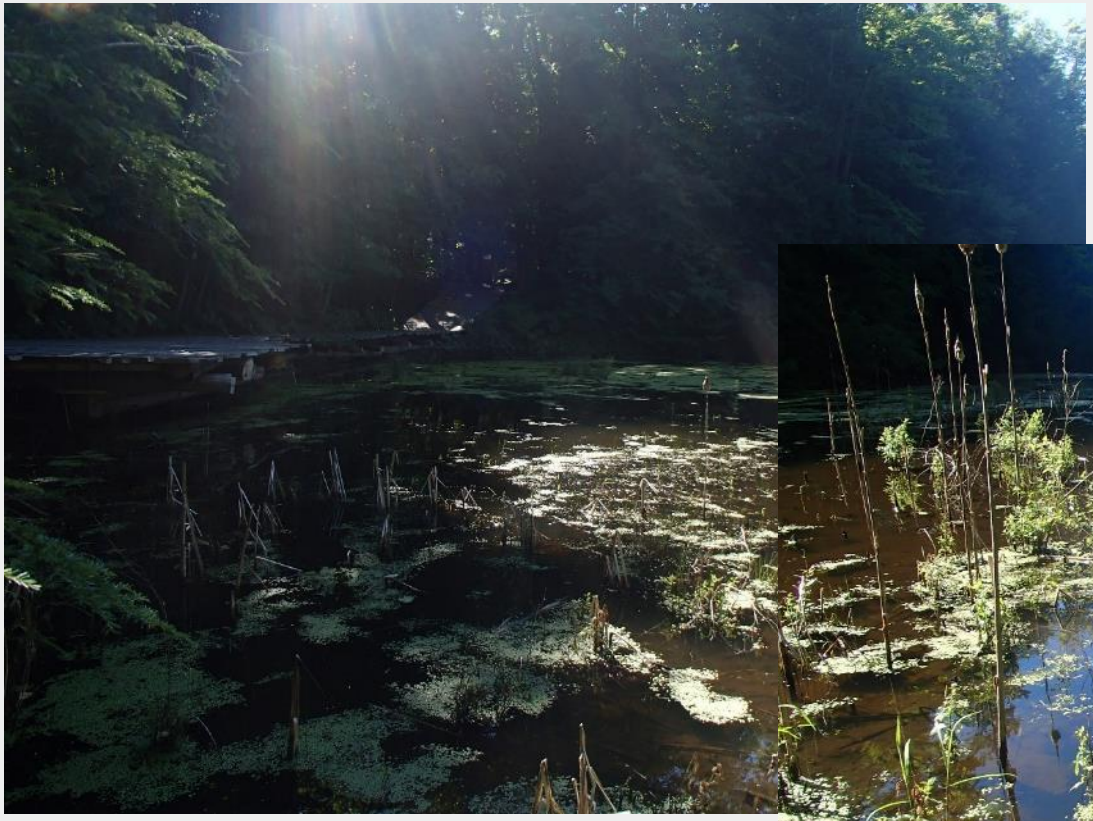
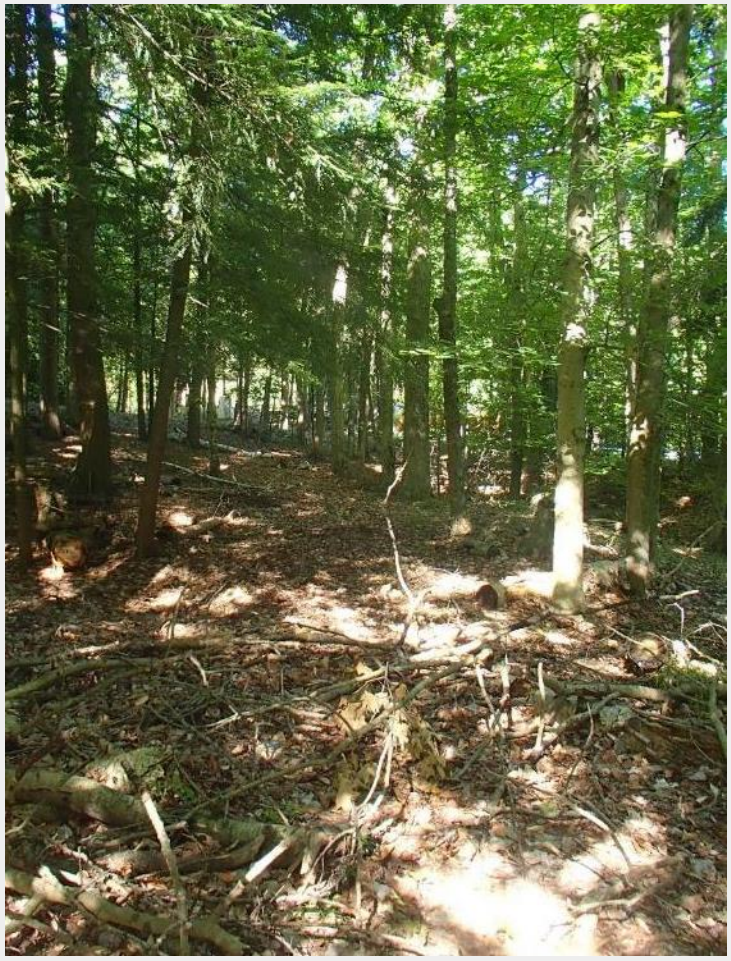


Example 1: “On-line” Pond
Private Landowner



Example 1: “On-line” Pond Private Landowner

Example 2: Block Development, SWM Ponds

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Take Away

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Questions?

Kim Logan
kim@gemservicesinc.com
Ph: 905-907-3077 ext 304
M: 416-717-2447

Mark Heaton
mark.heaton@ontario.ca
Ph: 905-713-7406