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Sustainable Technologies
EVALUATION PROGRAM

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New Erosion and Sediment Control Guide for Urban Construction

Presented by: Lisa Rocha

TRIECA - March 20, 2019

The water component of STEP is a collaborative of:

Lake Simcoe Region conservation authority

Credit Valley Conservation inspired by nature

Toronto and Region Conservation Authority

About STEP

The Sustainable Technologies Evaluation Program (STEP) is a conservation authority led initiative developed to support broader implementation of sustainable technologies and practices within a Canadian context.

Current partners:

Lake Simcoe Region conservation authority

Credit Valley Conservation inspired by nature

Toronto and Region Conservation Authority

Program objectives:

- Carrying out research, monitoring and evaluation of clean water technologies
- Develop strategies to overcome implementation barriers
- Develop tools, guidelines and policies
- Education, advocacy, and knowledge transfer

Sustainable Technologies EVALUATION PROGRAM

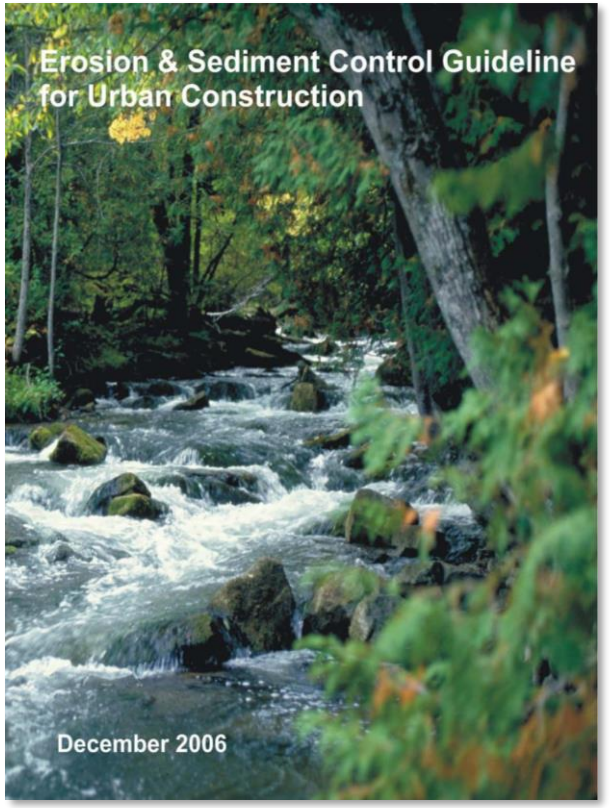
About the ESC Guideline update

Why is the update needed?

- GGHA Conservation Authorities ESC Guideline for Urban Construction published over 12 years ago
- ESC knowledge has expanded & practice has evolved

Key changes this past decade:

- Availability of professional training
- Legislative changes
- Changes to BMPs
- Expanded knowledge & understanding of ESC issues
- Turbidity monitoring requirements for SAR habitat (e.g. Silt Smart Protocol)
- New CSA ESC standards



Guide contributors

Authors

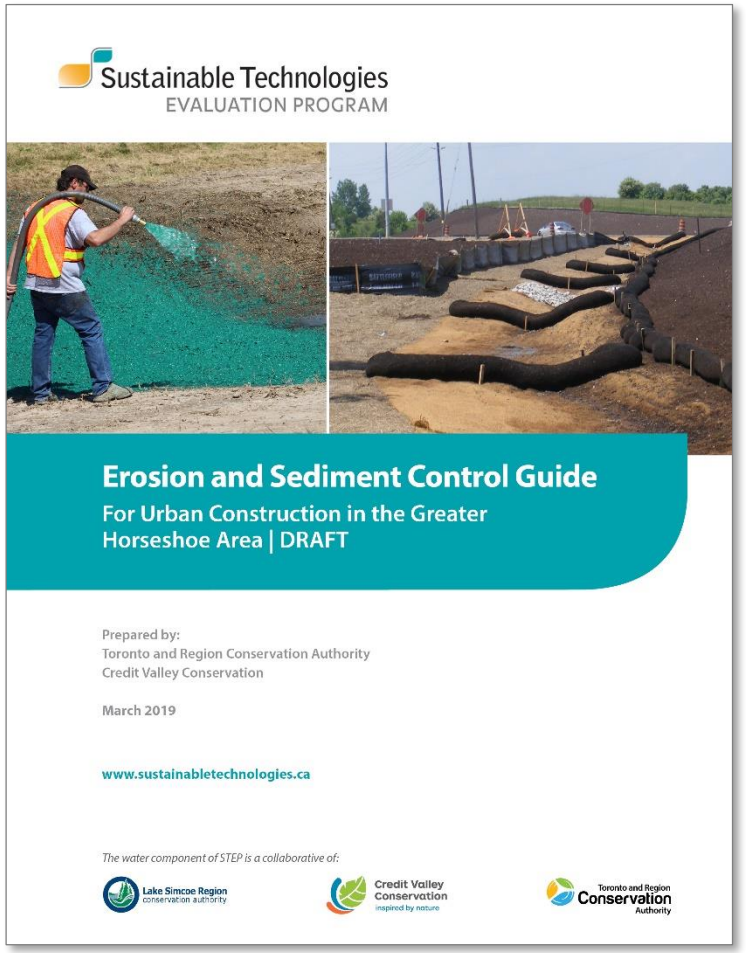
- TRCA and CVC staff in planning ecology, water resources engineering, and restoration services

External advisory group including representatives from:

- Provincial ministries (MECP, MNRF, MTO)
- Environment and Climate Change Canada
- Municipalities
- Construction and development industry (i.e. consultants, developers, contractors)
- Conservation Ontario and ten conservation authorities in southern Ontario (TRCA, CVC, GRCA, LSRCA, CLOCA, UTCA, RVCA, HRCA, HCA, NVCA)

Highlights

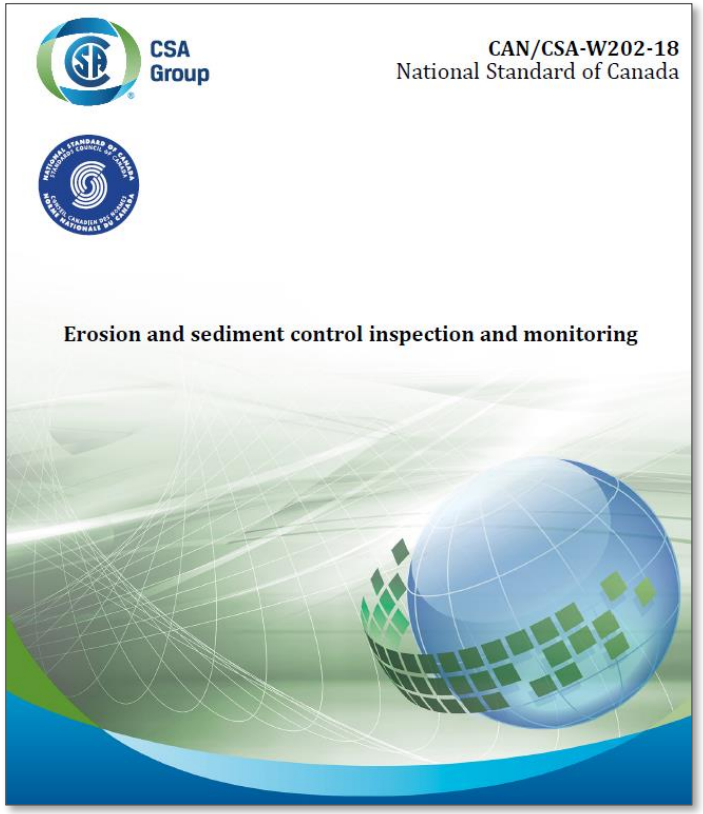
- Guidance on carrying out qualitative erosion risk assessment
- Updated information on protecting natural features during in water works
- Recommendations for protecting LID features during construction
- ***Guidance on ESC effectiveness monitoring, including turbidity monitoring protocols consistent with CSA's ESC I&M Standard (Nov. 2018)***
- Clarification of approvals process, including flowcharts
- Inclusion of new BMPs with an emphasis on erosion prevention, and elimination of reference to proprietary BMP names



Evaluating ESC Effectiveness through Turbidity Monitoring

About the CSA Inspection and Monitoring Standard

- Canada-wide standard released in Nov. 2018
- Input from ESC experts & stakeholders across Canada
- Specifies receiving watercourse target TSS and turbidity as well as a construction effluent TSS target based on *Canadian Water Quality Guidelines for the Protection of Aquatic Life* (CCME, 2002)
- Does not define ***how*** turbidity monitoring should be undertaken
- Regulatory agencies must determine how to apply the standard with respect to assessing compliance with TSS/turbidity targets



CSA Standard adoption

- Local regulatory agencies involved in the development of the standard:
  - TRCA, CVC, MNRF, MTO, DFO, Environment Canada
  - Municipalities – Brampton, York Region
- Private sector involved in development of the standard:
  - Industry associations
  - ESC product and service suppliers
  - Contractors
  - Consultants

Inspections and Monitoring in the new ESC Guide

- Complements, and is consistent with, the CSA *ESC Inspection and Monitoring Standard*
- Defines how proponents should evaluate their site's compliance with turbidity targets
- Extent of turbidity monitoring based on erosion risk & presence of species at risk
- Outlines a turbidity monitoring protocol
- Details recommended response and reporting protocol

Understanding the proposed turbidity monitoring requirements

1. What are the targets?
   - *Wet vs. dry weather*
2. What are background levels and how are they determined?
3. Why use turbidity as the metric?
   - *Importance of instantaneous measurement*
   - *How duration of exposure factors in*
4. What monitoring will be required for my site?
   - *Based on erosion risk and presence of Species at Risk or coldwater fisheries.*
5. How do I respond to and report exceedance of targets?

What are the targets?

Dry weather targets for receiving water systems downstream of construction sites

- Dry weather targets should be applied when it has been ≥ 3 days since the end of a rainfall event ≥ 5 mm.

Duration of exposure	Dry weather background (DWB) concentration	Maximum TSS concentration	Maximum turbidity
< 24 hrs	any	DWB + 25 mg/L	DWB + 8 NTU
> 24 hrs		DWB + 5 mg/L	DWB + 2 NTU

Wet weather targets for receiving water systems downstream of construction sites

- Wet weather targets are applied at any time when the dry weather criteria don't apply

Duration of exposure	Wet weather background (WWB) concentration	Maximum TSS concentration	Maximum turbidity
any	25 – 250 mg/L or 8 – 80 NTU	WWB + 25 mg/L	WWB + 8 NTU
	> 250 mg/L or > 80 NTU	WWB + 10%	WWB + 10%

Defining ‘Background’ Turbidity

- Background is being defined here as the in-stream levels before construction begins
- Guide lays out methods for determining dry weather background (DWB) and wet weather background (WWB) levels based on pre-construction turbidity monitoring
- ***Accurate background values = meaningful targets***

Effluent target

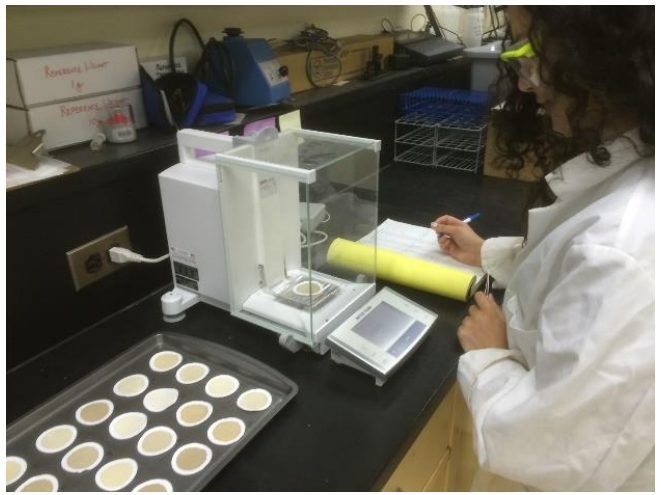
- CSA Standard defines ***effluent target as 25 mg/L***
- Applicable for use on sites where only effluent is being monitored – low erosion risk sites and/or those not draining to natural features
- Also useful for pinpointing problem areas on the site

- Guide specifies 25 mg/L as equivalent to 25 NTU based on typical turbidity TSS rating curves for construction effluent.

Why turbidity and not TSS?

- Turbidity can be measured instantaneously and on-site, with no lab submission required
- As a result, it can be measured continuously in-water
- Allows for assessment of how long turbidity has been elevated
- Duration is a key factor in assessing impacts to aquatic organisms

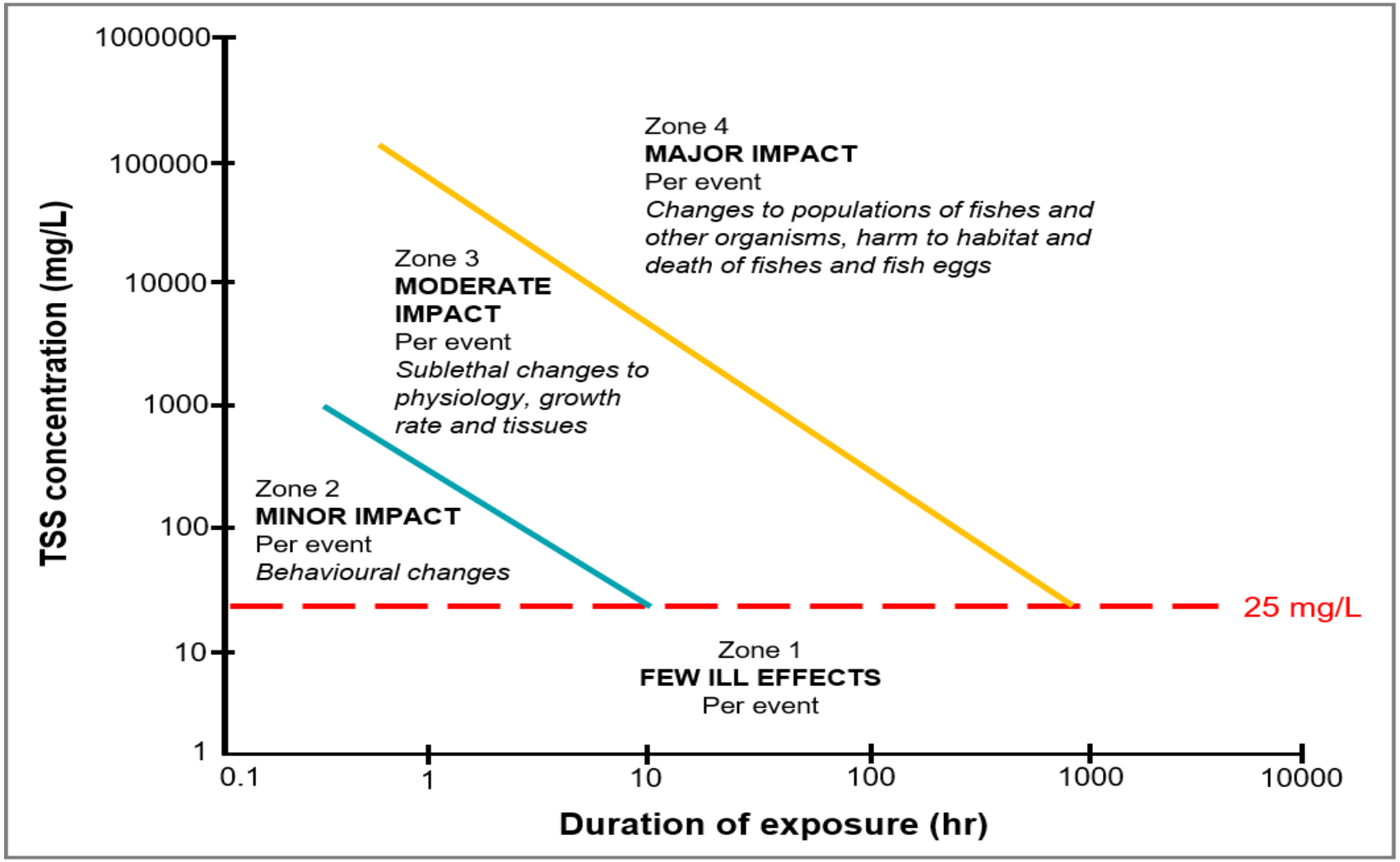
Turbidity: a measure of the degree to which light is scattered by substances that are dissolved or suspended within a liquid



Total suspended solids: a measure of the amount (weight) of solids suspended in a liquid

Impacts to fish and habitat based on TSS concentration and exposure duration

(modified from Newcombe, 1986)



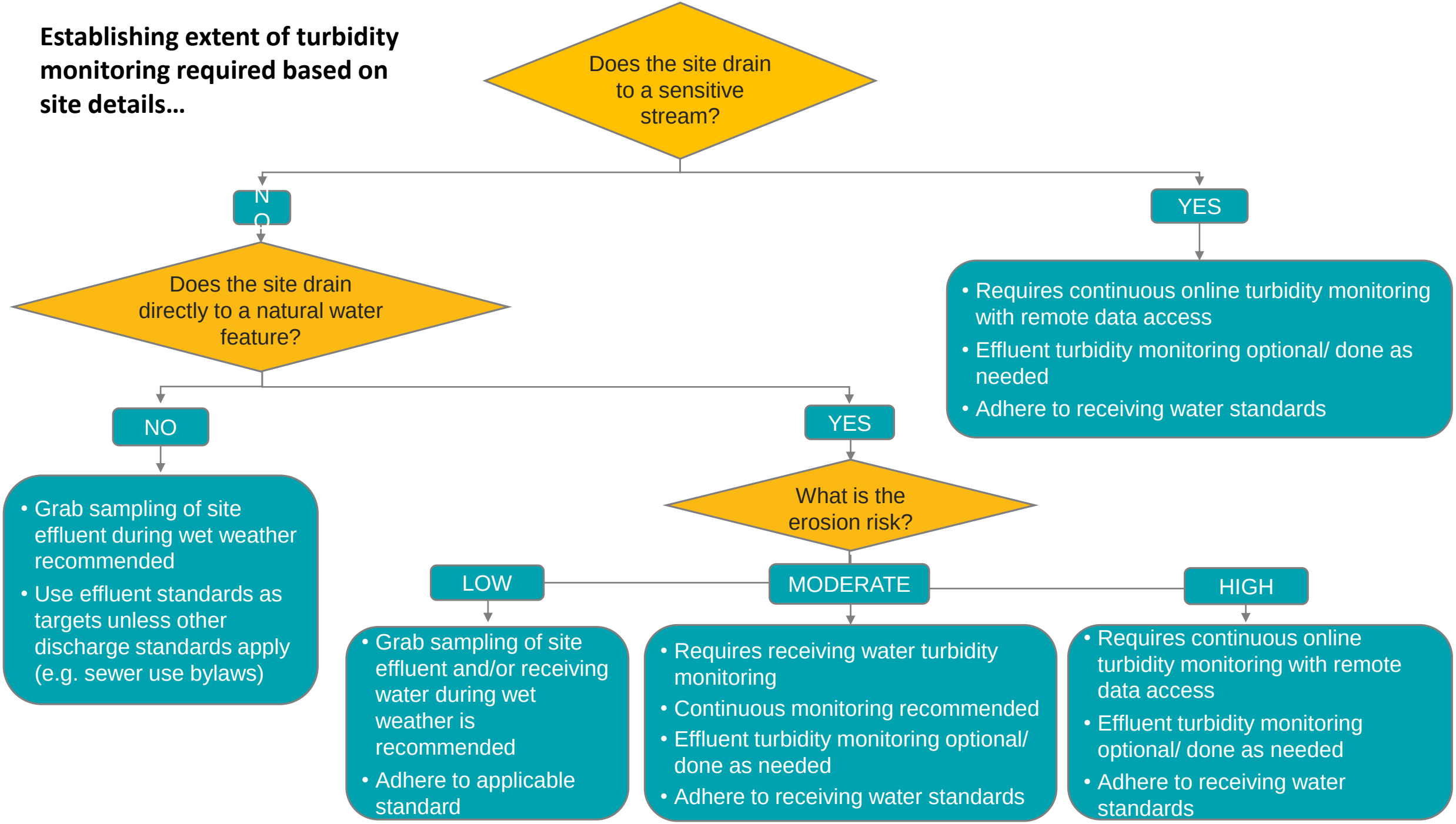
Turbidity monitoring approaches

Method	Location(s)	Advantages	Disadvantages
Handheld turbidity measurement of grab samples	Site discharge points Receiving water D/s and U/s of site	• Straightforward • Low equipment cost • Greater capacity to pinpoint sources • Can be carried out even in the winter	• Staff costs for site visits and sampling • Duration is not assessed
Continuous online turbidity measurement	Outlet of sediment control pond Receiving water D/s and U/s of site	• Concentration & duration = more accurate assessment • Convenience - data logged at all times of day and night • Set location means higher precision and comparability • In receiving water - readily comparable to existing CWQG for aquatic life	• Higher equipment costs • More data = higher staff costs for data QA/QC • Staff costs for equipment cleaning and maintenance • Not typically operational during winter
Continuous online turbidity measurement with remote real-time data access	Outlet of sediment control pond Receiving water D/s and U/s of site	In addition to those listed for continuous online turbidity measurement (without remote access): • Convenience of remote access • Opportunity for faster problem response	• Highest equipment cost • More data = higher staff costs for data QA/QC • Staff costs for equipment cleaning and maintenance • Not readily operational during winter

Defining high priority sites

- Continuous online receiving water turbidity monitoring with remote data access required on projects that:
  - are on sites that drain to sensitive streams
  - have high erosion risk AND are located on sites that drain to natural water features.
- Encourage more proactive management of these types of sites to mitigate sediment releases and impacts to aquatic habitat.
- ***Sensitive stream:*** *those which are known or potential habitat for species at risk in Ontario – as listed in Ontario Regulation 230/08 – and those serving as spawning or nursery habitat for coldwater species.*

Establishing extent of turbidity monitoring required based on site details…



Proposed turbidity monitoring requirements in ESC Guide

For high erosion risk sites and “sensitive” streams:

- At least two continuous in stream turbidity monitoring stations (U/S and D/S of the site) with remote data access
- Monitoring at both stations for one monitoring season (May – Nov) before construction begins in order to establish background turbidity levels
- Continuous monitoring from May to November throughout the construction period
- Monitoring continuing until the site is 80% stabilized (with permanent vegetation areas well-established and effectively preventing erosion)
- Cold season monitoring with handheld turbidimeter at discharge points and/or in receiving water during wet weather (e.g. thaw, rain) or during site dewatering activities
- Report issues according to the defined protocol

Response and reporting protocol - Dry weather

Turbidity exceedance	Duration of exceedance	Parties to notify	Actions and reporting required
≥ 8 NTU above DWB	≥ 30 min	○ Inspector, contract administrator ○ Contractor (once corrective actions are determined)	○ Immediately cease all discharges from the site until the source of elevated turbidity can be found and rectified ○ Send preliminary notification to parties within 10 hrs after first light ○ Prepare final assessment report within 48 hrs of the end of the exceedance
≥ 2 NTU above DWB	≥ 24 hrs		
≥ 330 NTU above WWB	≥ 30 min	○ Inspector, contract administrator, contractor, landowner, municipality, conservation authority ○ MNRF (if applicable) ○ Spills Action Centre	○ Immediately cease all effluent discharge from the site ○ Immediately implement actions defined in the spills response plan, including containment, clean up and notification of Spills Action Centre and other parties. ○ Send final assessment report to all parties within 48 hrs of the end of the exceedance

Response and reporting protocol – Wet weather

Turbidity exceedance	Duration of exceedance	Parties to notify	Actions and reporting required
≥ 8 NTU above WWB (if WWB is ≤ 80 NTU) OR ≥ 10% above WWB (if WWB is > 80 NTU)	≥ 30 min	○ Inspector, contract administrator ○ Contractor (once corrective actions are determined)	○ Rectify deficiencies within 24 hrs of the beginning of the exceedance ○ Send preliminary notification to parties within 10 hrs after first light ○ Prepare final assessment report within 48 hrs of the end of the exceedance
	≥ 10 hours	○ Inspector, contract administrator, contractor, landowner, municipality, conservation authority ○ MNRF (if applicable)	○ Send update reports daily until exceedance is rectified. ○ Rectify deficiencies within 24 hrs of the beginning of the exceedance ○ Send final assessment report to all parties within 48 hrs of the end of the exceedance
≥ 330 NTU above WWB	≥ 30 min	○ Inspector, contract administrator, contractor, landowner, municipality, conservation authority ○ MNRF (if applicable) ○ Spills Action Centre	○ Immediately implement actions defined in the spills response plan, including containment, clean up and notification of Spills Action Centre and other parties. ○ Send preliminary assessment report to all parties within 10 hrs after first light. ○ Send final assessment report to all parties within 48 hrs of the end of the exceedance

Initial feedback on new proposed turbidity monitoring requirements

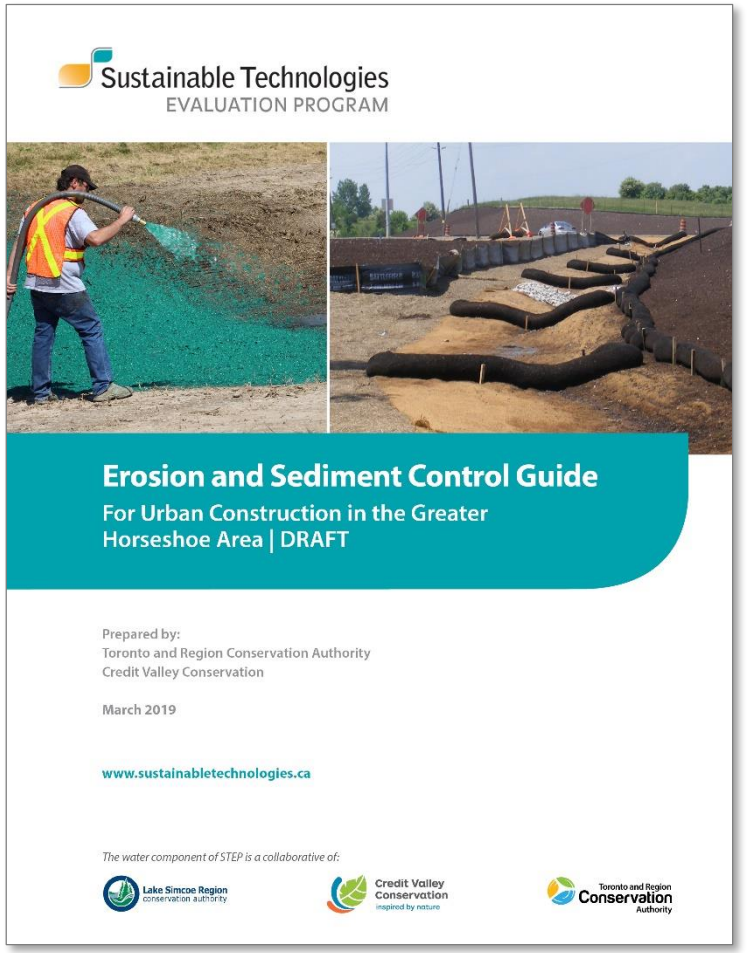
- Automatic alerts to project stakeholders should be avoided
- Reporting required during an exceedance should not be onerous – allow personnel to focus on identifying and fixing problems
- Final report (after exceedance is remedied) can be more detailed.
- Collecting one season of pre-construction data could be a challenge on some projects, so alternative background establishment protocol should be provided
- Turbidity cannot be used as evidence to prove a violation/offense has occurred in cases where a regulatory body is pursuing charges

Next steps

- Draft ESC Guide is now officially available for public review
- To access the draft Guide and submit your feedback, go to:

  sustainabletechnologies.ca/esc-guide

  And enter password “trieca2019”
- Revise based on feedback and aim to release final Guide in June 2019
- Dissemination and development and delivery of associated training



Thank You

Questions? Comments? Ideas?

Contact:

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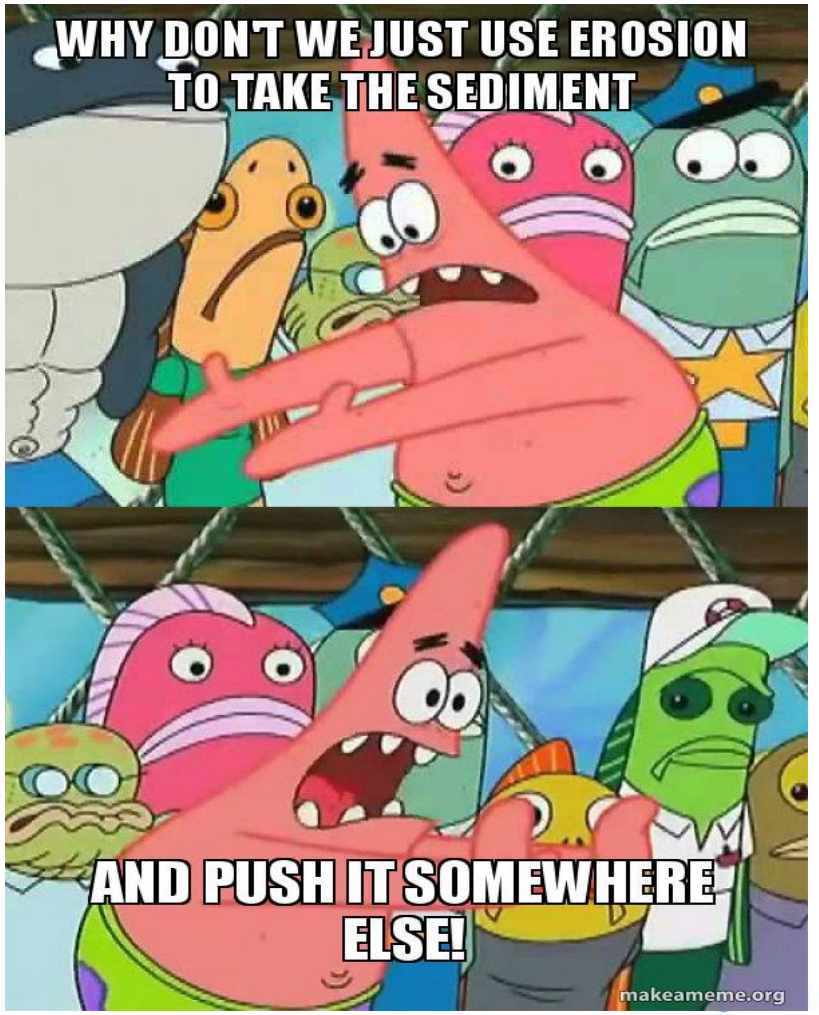
Visit www.sustainabletechnologies.ca for more information



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