

# Adaptive Management of Erosion and Sediment Control Best Management Practices (BMPs)

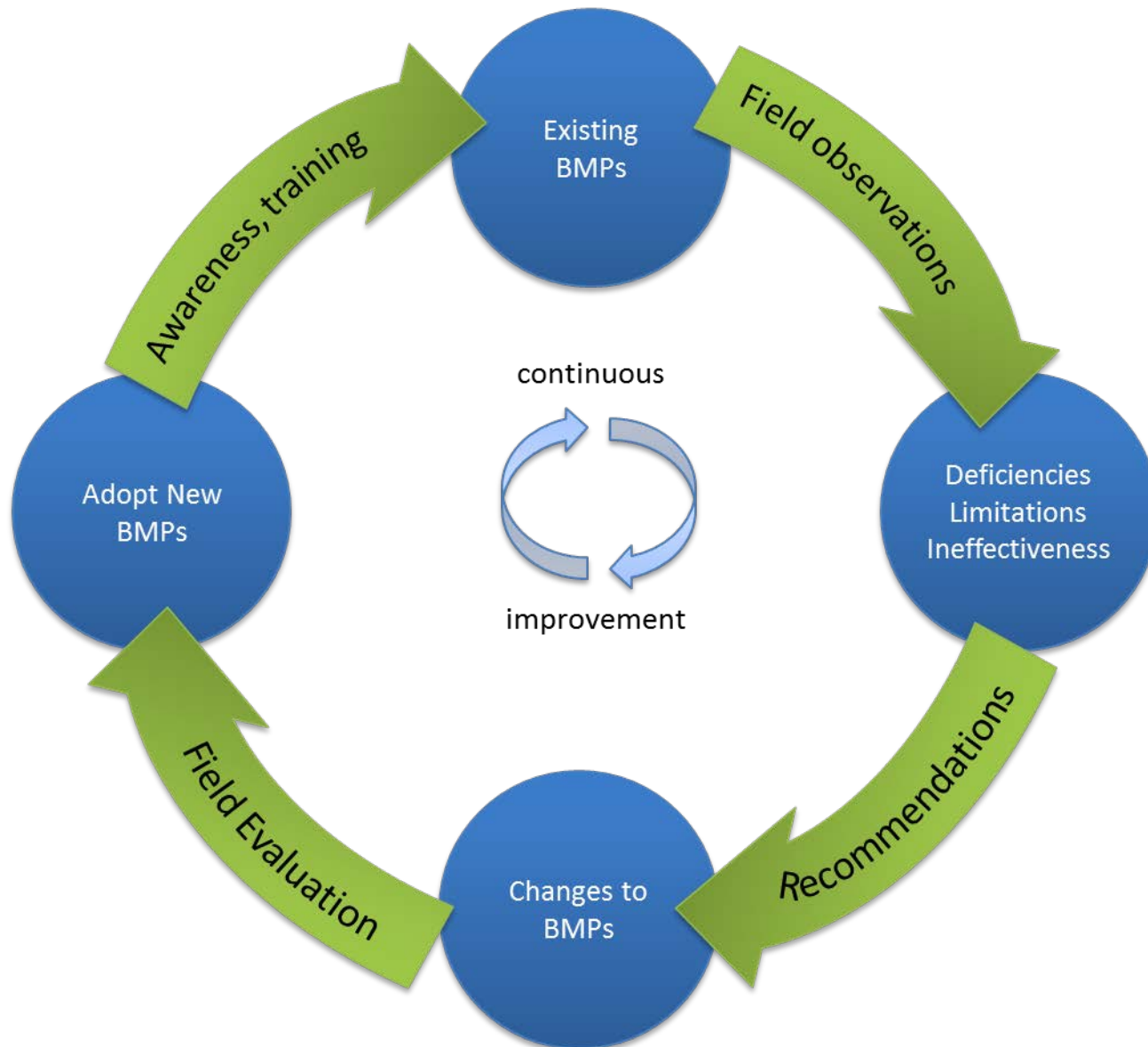
**Presenter:** Denis Rushton, P. Eng.

**Date:** May 18, 2016

# Adaptive Management (AM)

The definition of AM for the purpose of this presentation:

“ ..... is a process for continually improving erosion and sediment control *Best Management Practices* (BMPs) based on field observations of their limitations or ineffectiveness in preventing erosion or the release of sediment from the worksite.”



# Present Situation

- General lack of awareness of new products for those preparing ECPs
- Lack of appropriate field supervision during the installation of BMPs
- Little to no feedback on the effectiveness of BMPs
- When assessing sediment impacts on a project, it is difficult to determine whether failure of a BMP is because of a poor installation or the ineffectiveness of the BMP(s).

# NSTIR's Standard Specification

- Environmental Protection Division (Chapter 7)
- Team Leader is Ian MacCallum (NSTIR)
- Committee made up of (NSTIR construction and maintenance personnel, contractors (NSRBA), suppliers, consultants)
- Provides forum to keep specifications current with respect to advancements in new products and to then to make changes existing BMPs or implement new BMPs when warranted (i.e., silt fence, grubbing berms)

# Typical Issues Addressed by the Committee

Flow Checks (Recent)



Flow Checks (1994)



# Lets Look at the Following Issues

- Slope preparation for Hydroseeding
- Poor Hydroseeding results
- Silt Fence
- Topsoil saved for reuse
- Erosion Control Blankets and Hydraulic Mulches
- Site inspection during and after precipitation events

# Hydroseeding

Observed Deficiencies with respect to:

1. Certification from Contractor that bags of seed and fertilizer are labeled in accordance with the Canada Seed Act and Fertilizer Act?
2. Are specified application rates checked for hydroseeding?
3. Is the prepared surface of slopes being approved prior to the application of hydroseeding?



# Slope Preparation for Hydroseeding



## Poor Vegetative Growth

- Poor results won't likely improve unless an amendment is applied
- The reasons for poor vegetative growth should be investigated
- Fertilization the following spring can increase cover from 15% to 85% by increasing the vigor of each plant species
- Segregation of seed during the hydroseeding operation or poor surface preparation are often the causes

# Fertilization the Following Spring



# Segregation of Seed Mix



# Hydroseeding 2012

August 24, 2012



November 6, 2012



# Silt Fence

- Silt fence acts like a sediment pond
- The proper installation of a silt fence is more involved than most construction personnel believe
- If installed wrong, the potential effectiveness of silt fence is dramatically reduced
- Silt fence should be installed in a “J-hook” configuration on sloping ground

# Silt Fence in “J-Hook” Configuration



# Re-Use of Topsoil

- The benefits of saving and re-using topsoil with respect to promoting vegetative growth is undisputed:
  - Native seed source
  - Drought and disease tolerant
  - Increased infiltration
  - Erosion protection
- The first NSTIR highway project where topsoil saved and re-used was in 1997



# Topsoil Saved and Re-Used



# ECB Blankets and Hydraulic Mulches

- Recent specification changes for Erosion Control Blankets place an emphasis on the existing conditions:
  - Slope Protection (3:1, 2.5:1, > 2:1)
  - Degradable Channel Protection
  - Permanent Channel Protection (min. 10 lb/ft<sup>2</sup>, 12 lb/ft<sup>2</sup>, 15 lb/ft<sup>2</sup>)
- Hydraulic Mulches (FRM) products have been used with good success

# Trial of ECBs in 1998 (by NSTIR)



# Observation Based on Field Trials



# ECB Conforms to Contour



# Wood Excelsior ECB Used in 1994



# Coconut ECB Used in 2015



# Slope Stabilization Using TRM and Hydraulic Mulch

Slopes Eroded > 1:1



Armour Rock Placed to OHW





# (cont'd) Slope Stabilization Using TRM and Hydraulic Mulch

Hydraulic Mulch Applied to TRM



Finished Slopes Next Spring



# Hydraulic Mulch Dormant Seed Application

Applying Hydraulic Mulch Dec 20<sup>th</sup>



April 23<sup>rd</sup> No Soil Loss



# Hydromulching a Long Slope

Berm at Top of Slope to Prevent Erosion Until Germination



# Stabilization of CN Embankment Slope

CN Embankment to be Cut Back



Cutting Back Existing 1.8 :1 Slope



# (Cont'd) Stabilization of CN Embankment Slope

Temporary Stabilization of Slope



Permanent Stabilization of Slope



# Site Inspection



- Site inspection during the placement of (BMPs) is extremely important and often underemphasized.
- Proper installation is the most important element in the performance of BMPs.
- Site Inspector should present deficiencies to the Contractor in writing.
- Site Inspector should follow-up to see if deficiencies have been corrected.

# Poor Installations

- Poorly installed BMPs increase maintenance and repair costs and these costs will become magnified in the event of a major storm event.
- Poorly installed BMPs will not stand up to the rigors of construction activity often leading to offsite sediment discharges and increased risk of regulatory enforcement action.

# Monitoring and Maintenance

- Are BMPs adequate or are additional controls required?
- Inspect discharge locations to ensure that BMPs are effective especially after precipitation events.
- Site Inspector should present deficiencies to the Contractor in writing.
- Site Inspector should follow-up to see if deficiencies have been corrected.





# No Inspection or Follow Up





**Standards should be set with the  
expectation that they be met.**

- Barry Fagan, *The Five Pillars of Stormwater Management*