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# Stormwater Management: Getting the Temperature Just Right

Implementing Stormwater Management Design to Minimize Thermal Loading

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# INTRODUCTION

- Choosing, designing and implementing a stormwater treatment train systems that mitigate thermal loading requires a collaborative approach that pushes innovative solutions.
- To start we need to know the:
  - language
  - current BMP
  - emerging BMPs



### THERMAL TRANSFER

Heat Absorption: Surface temperature Length of time in contact with warm surface/in sun Total area of warm surface Type of material

Heat Loss: Covered conveyance Dissipation of thermal energy Dilution with groundwater Surface to volume ratios

### SYSTEM COMPONENTS

#### Design

- Up-gradient
- Inlet structure
- Stormwater pond
- Outlet structure
- Riparian corridor

#### Natural

- Headwater features/infiltration
- Streams
- Rivers
- Wetlands
- Floodplains
- Riparian corridor



## WHY?

- The design teams for SWM systems are expected to mitigate thermal loading
  - Specifically for cold/cool water systems and species at risk but there is growing concern for even warm water systems

### **STATUS QUO SOLUTION**



#### What has been the go to approach?



### **CONSISITENTLY APPROVED BMPs**

Deep pools
Bottom draw
Vegetation
>1:3

But does it work?

### CASE STUDIES: GTA

- SWM Ponds deep pools with bottom draw
- Dry SWM Pond
- The SWM plan proposes underground storage



### BARRIERS

#### Systemic

- Cost
- Design standards and policies
- Vocabulary
- Lack of proven maintenance procedures
- Aesthetics and community design
- Public Opinion

#### Design

- Site conditions
- Expectations
- Timelines
- Limited number of previously approved innovative designs

### **FACILITATING INNOVATION**

- Early and responsive communication
- Use visuals
- Foster a focus on innovative design
- Acknowledge and address concerns proactively
- Identify the "champion"





# **EMERGING BMPs**

#### • LIDs

- Reframing for source control and temperature
- Still in the early adopter stage

#### MOECC Source Control Targets

- Onsite control for the 90th percentile of rainfall events
- Permeability targets
- Reduced pond size



# CONCLUSION



- In the pond thinking will not meet thermal targets
- Bring your best ideas to the table, identify the barriers early in the design process & collaborate to push innovation

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