

# **Current & Legacy Chemical Contaminants in Nearshore Lake Ontario:**

## **Monitoring & Research Considerations**

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**Lake Ontario Contaminant Monitoring & Research Workshop**  
*Planning for the 2008 Cooperative Monitoring Year*

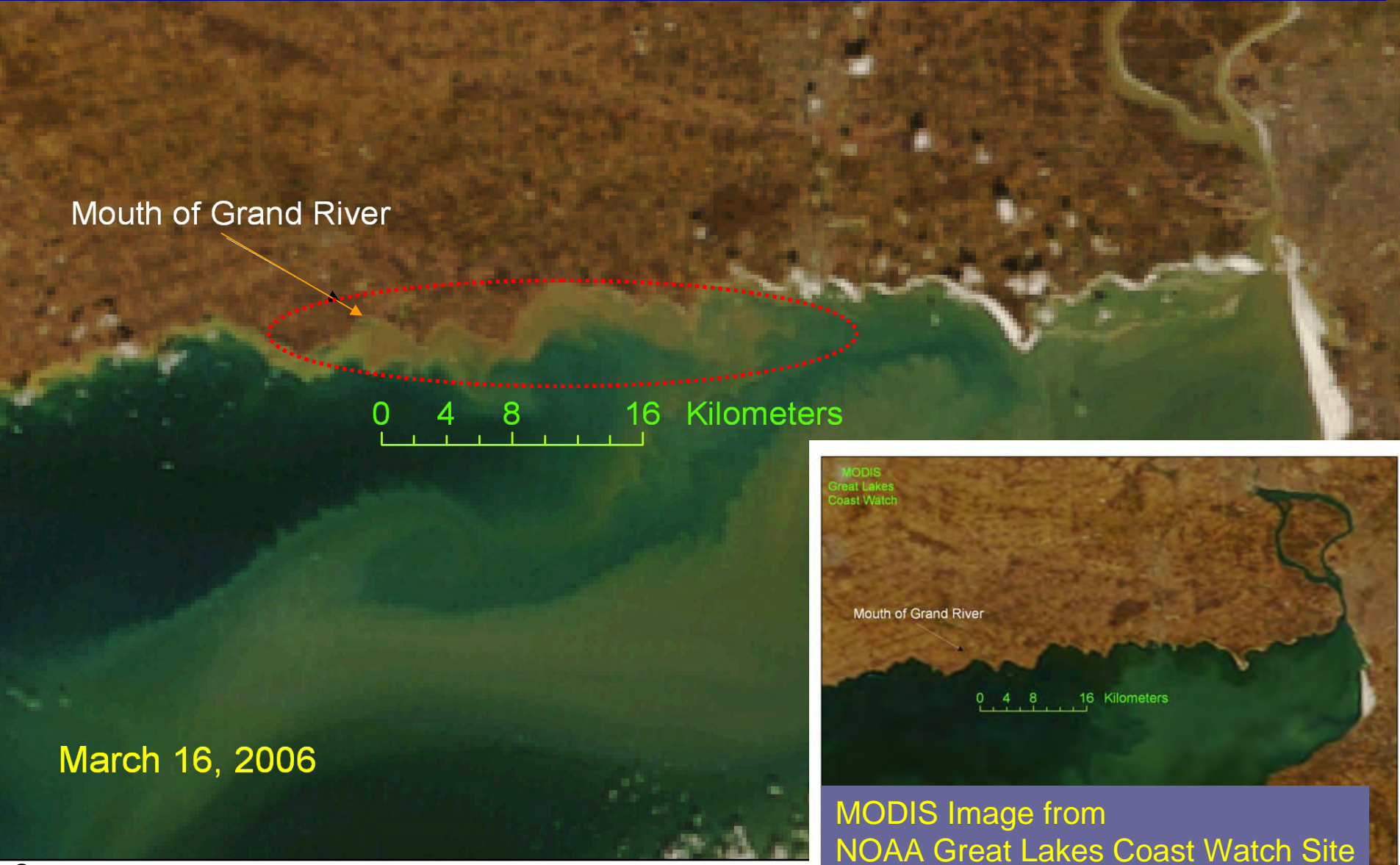
# Importance of Great Lakes Nearshore Areas

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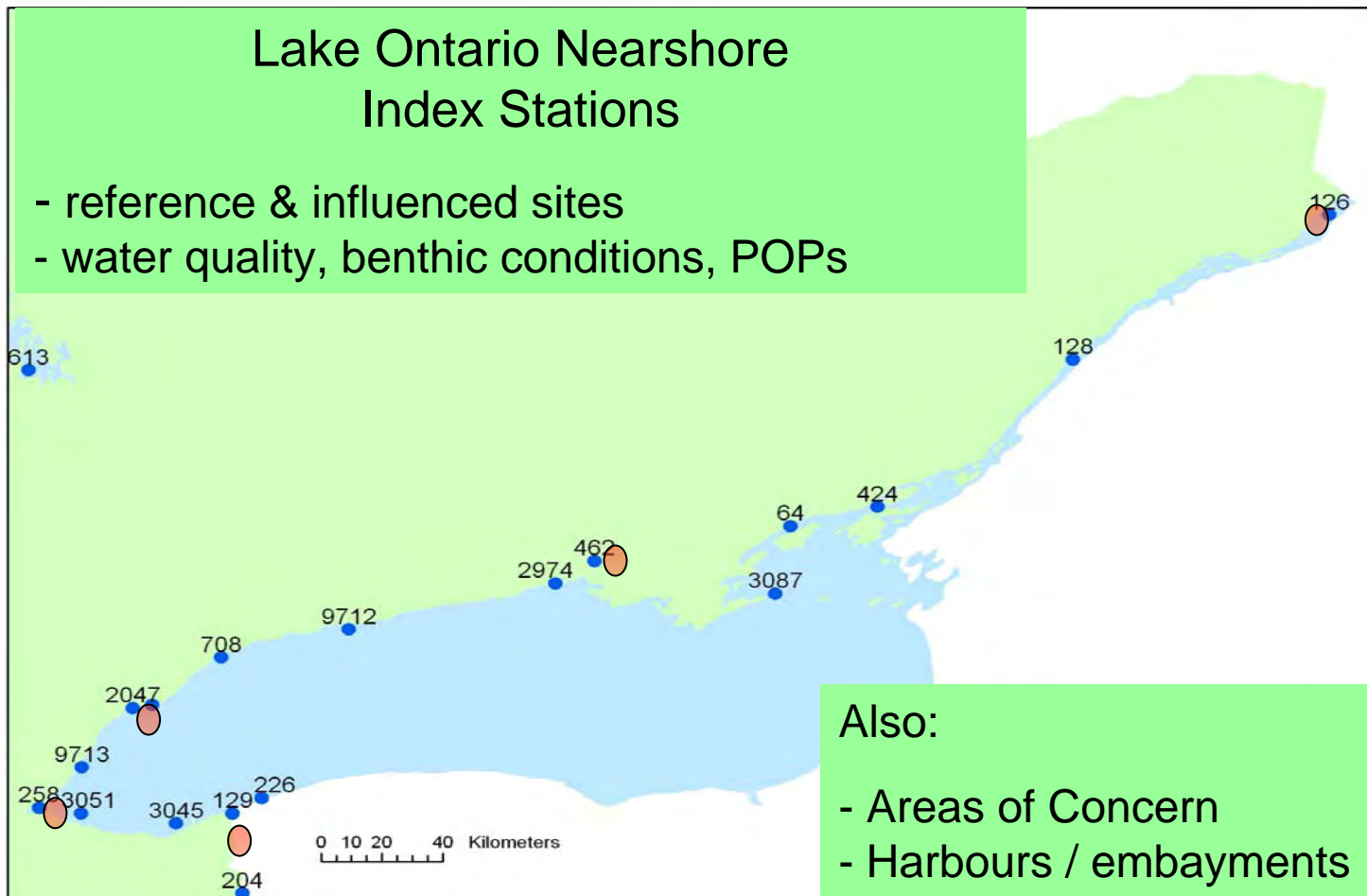
- **Site of human interaction:**
  - Recreation, property, drinking water, waste management
- **Urban / agricultural watersheds**
  - Integrate source inputs, concentration / exposure gradients, mixtures
- **Highly dynamic, but changing**
  - Along-shore currents, plumes, mixing, “shunting” of nutrients & materials
  - New habitat, foodweb structure (invasive species)
- **Climate Change will impact each in the nearshore**

# Tributary Discharge: A pervasive Influence on Nearshore Water Quality

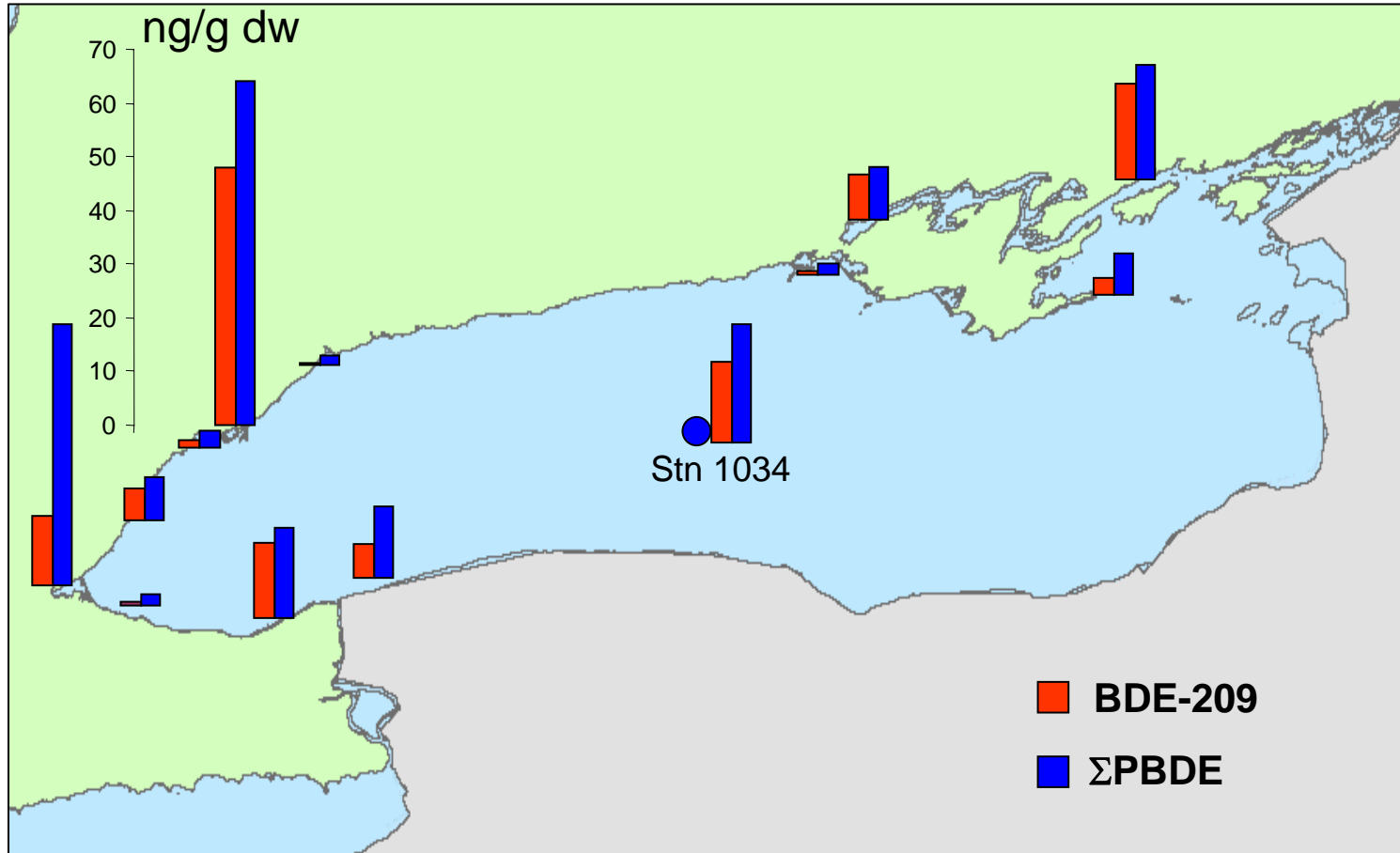
- water quality of tributaries to lower Great Lakes usually poor relative to lake
- discharges drive strong gradients in water chemistry over mixing areas



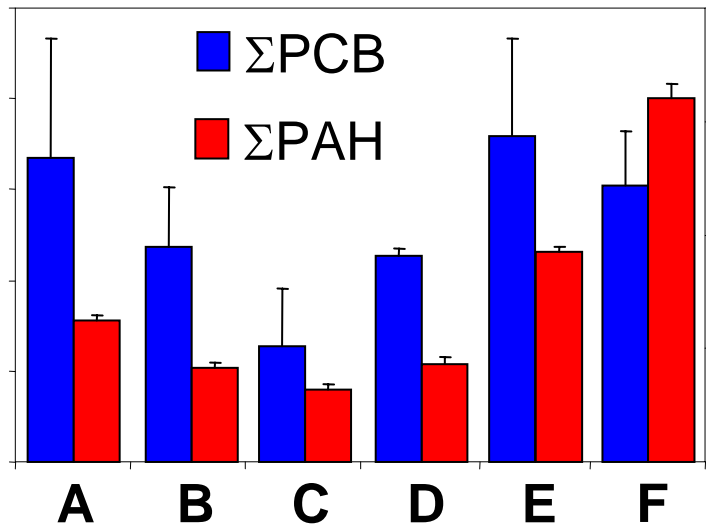
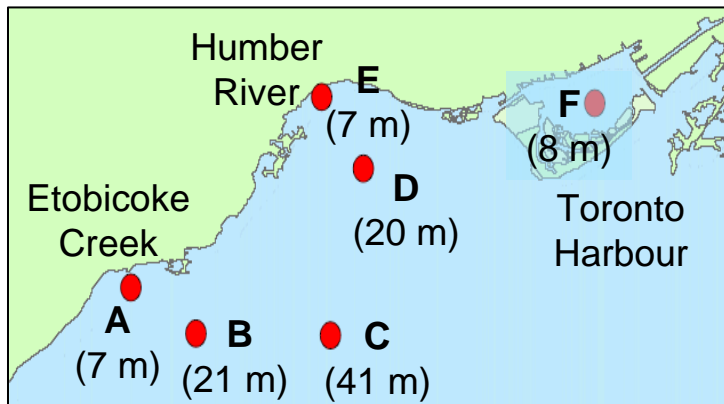
# Contaminant Monitoring Activities



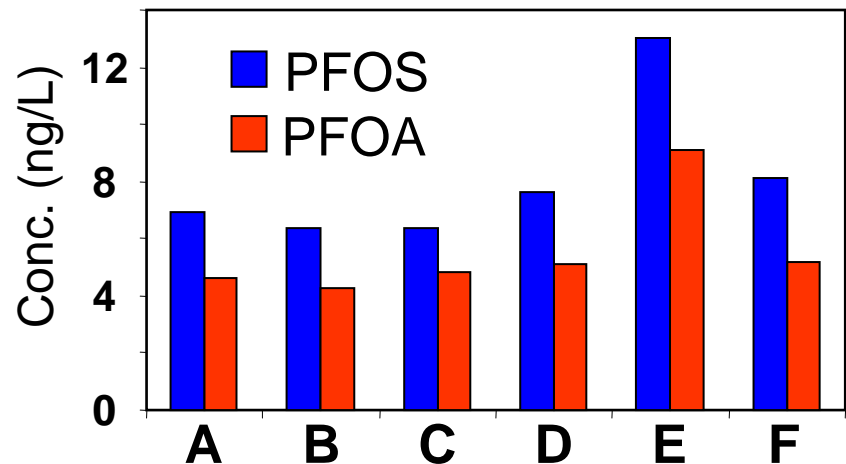
# Polybrominated Diphenylethers



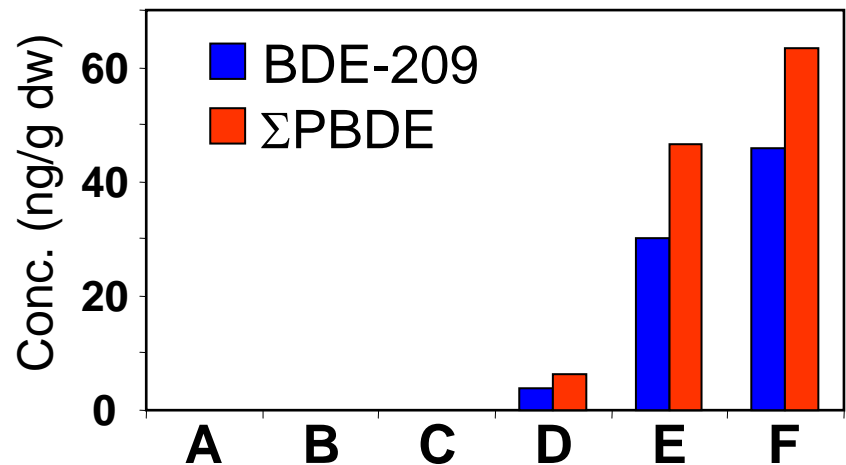
# Nearshore Contaminant Gradients



Passive Water Samplers (SPMDs)



Water



Sediment

# October Workshop – Biological Component

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## 1. Nearshore assessment

- Nutrient transport, nearshore eutrophication

## 2. Offshore assessment

- Lower food web status

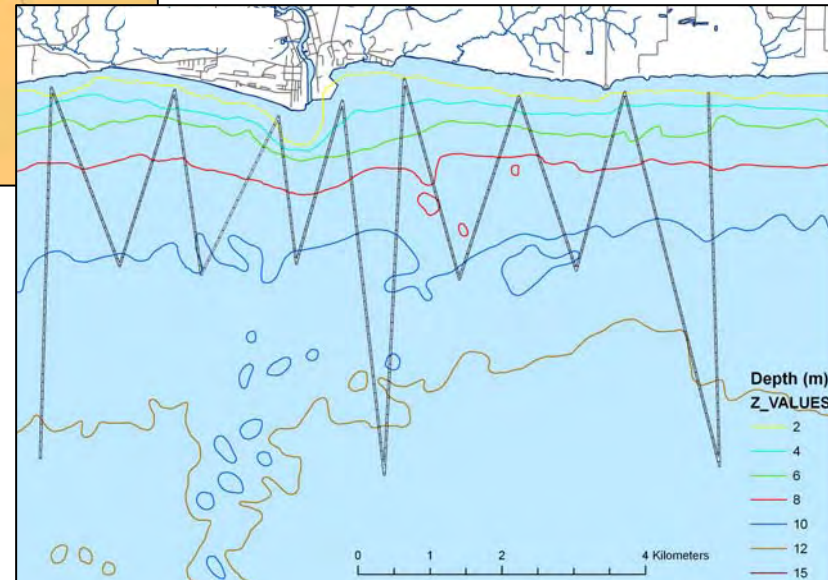
## 3. Lakewide lake trout assessment

## 4. Biomarker assessment of food web changes

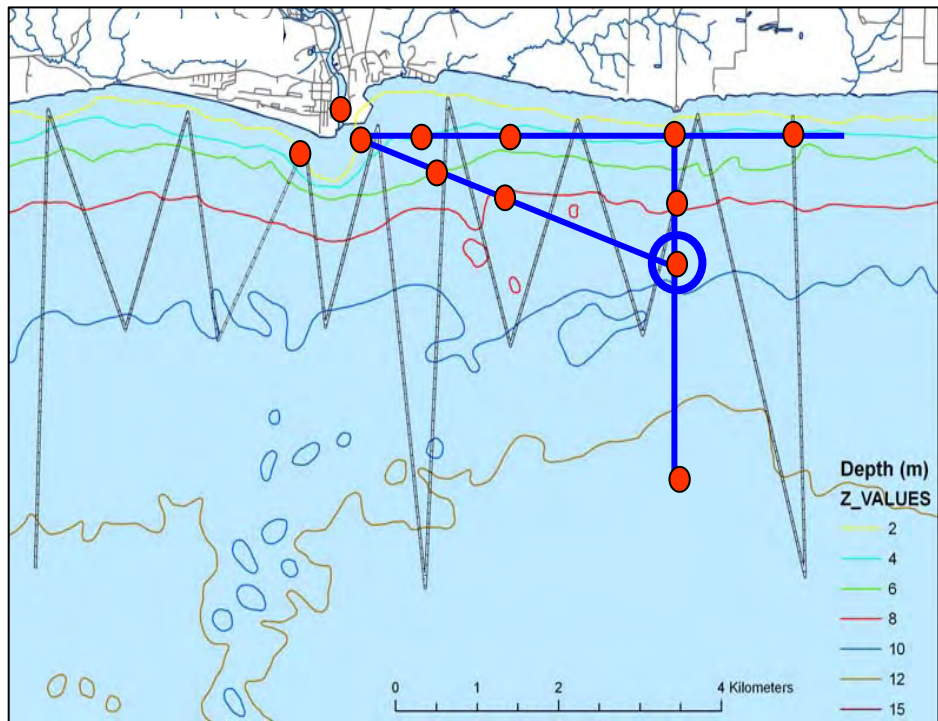
# Planned / Proposed Initiatives for L. Ontario



- Urban, agricultural, undeveloped shoreline
- Current meters, nutrients, optical sensors, turbidity, etc.
- Hydrodynamic modeling



# Nearshore Contaminant Dynamics



- Characterize influence of features & contaminants dynamics in nearshore areas & implications for:
  - Ecological exposures
  - Source water protection (intakes / zones)
  - POPs vs. current-use chemicals
- Hydrophobic & hydrophilic passive samplers
  - C. Metcalfe (Trent U.)
  - PPCPs, hormones, CUPs, etc.

# Proposed Nearshore Contaminant Work

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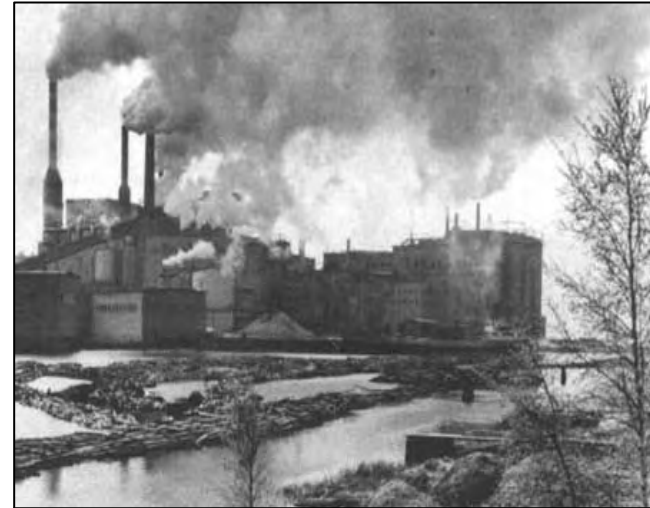
- Passive sampler array deployment in 3 selected nearshore areas coupled with detailed water quality, physical modeling (biological component workshop)
  - Funding for analysis to be identified
- Consider:
  - contaminant work on US side?
  - analytes, collaborators, funding?
  - pathogens?

# Nearshore Source Influences

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## 60's / 70's / 80's

- industrial emissions (air, water);  
POPs



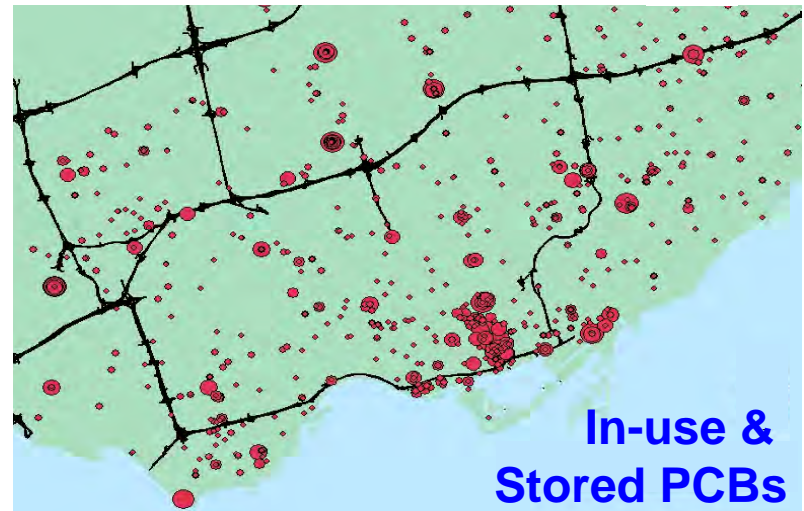
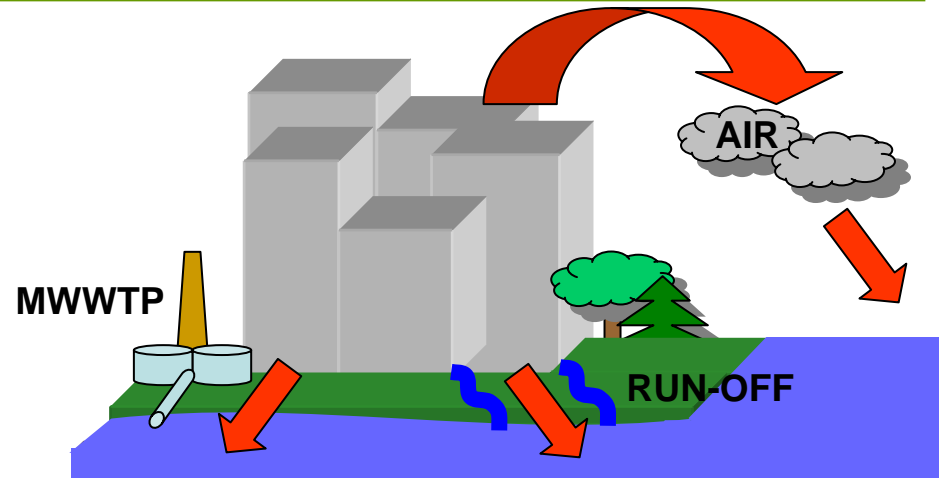
## Today

- consumer / building materials
  - atmospheric emissions (indoor air)
  - MWWTPs (effluents, biosolids)
  - varying chemistries



# Urban Pathways, Lake Influences

- **Atmospheric pathway**
  - fugitive emissions; residuals
- **Surface run-off, tributaries**
  - atmospheric deposition
  - weathering, wear
  - storm water
- **Municipal Wastewater**
  - Captures & focuses, redistribution
  - effluents & biosolids
- **“Legacy” & Current-use**
  - dominant pathway may vary by chemical / class



# Proposed Urban-Lake Interface Activities

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- characterize the 3 pathways (**funded, planned**)
- model parameterization & validation (**funded, planned**)
- **Lake air & water measurements (2008)?**
  - A-W flux characterization, gradients
- **Extend to other areas (beyond 2008)?**
  - Other US / CAN urban areas