Lake Ontario Water Quality: Is it affected by Contaminant Transfer by Soil Erosion and Sediment Transport from Construction Sites?

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The Construction Industry

The Construction Industry is one of the major industries in Canada

It contributes about 12% to the country's GDP

- **There has been a steady growth in this industry in recent years**

Residential
Non-residential buildings
Airports
Roads and highways
Gas and oil facilities
Mining
Communication
Others

Factors Affecting The Growth of Construction Industry

- Growth of population
- Industrial and economic activities
- Urban sprawl (*This is particularly true for Toronto and region, which accounts for almost half of Ontario's population)*

Environmental Effects of Construction Activities

- Air pollution
- Loss and fragmentation of
  - natural areas
  - woodlands
  - farmlands and
  - wildlife habitat
- Soil erosion and sedimentation

Soil Erosion

- **Particle detachment**
- **Sediment transport**
- **Sedimentation/sediment deposition**

Affects of Construction Sediments on Water Quality

- Sediments introduce chemicals sorbed to the soil particles in to the aquatic environment
- Sediments make additional surface area available for absorption/adsorption of chemical pollutants already present in water

Fate of Contaminants

- In Toronto and region, most of the contaminants ultimately reach the Lake Ontario, which is the main source of drinking water and recreation in the region.
- The situation is aggravated during heavy storms due to unmanaged overflow
- As a result, the lake becomes a depository of chemicals and other contaminants quite contrary to the expectation of the Great Lakes Water Quality Agreement

Chemicals Used in the Construction Industry

- **Heavy metals (arsenic, cadmium, chromium, lead and mercury etc.)**
- **Organic chemicals (pesticides, PCBs, solvents and wood preservatives)**
- **Acids and other substances**

Policies Governing Water Pollution from Construction Industry in Ontario

- **Environmental Protection Act**
- **Ontario Water Resources Act**
- **Other regulations**
  (e.g. regulations 347 and 362)
- **Ministry Guidelines**

Provincial Water Quality Objective

Provincial Water Quality Objectives suggest criteria for different chemical and physical indicators representing a satisfactory level for surface waters

Name	Objectives (ug/L)
Arsenic	100.0
Cadmium	0.2
Chromium	100.0
Lead	1.0-5.0
Mercury	0.2
Benzene	100.0
Malathion	0.1
Vinyl Chloride	400.0
PCBs	0.001
Pentachlorophenol	0.5
Methylene Chloride	100.0
Trichloroethylene	20.0

Role of Local Governments

- **Municipalities are entrusted with the responsibility to enact by-laws for topsoil preservation, erosion and sediment control.**
- **A study by TRCA also recommended adoption of such by-laws by the municipalities and carrying out monitoring to ensure compliance with the by-laws as far back as 1993**

Conclusions

- ✓ **Development should be designed in a way appropriate to soil type and topography of the area**
- ✓ **It is, therefore, essential to plan and implement correct management practices in order to reduce soil erosion and sedimentation.**

Conclusions (Contd.)

For better environmental performance, we suggest that the government in collaboration with the construction industry conduct studies to:

- ✓ Quantify the amount of contaminant load from the construction industry
- ✓ Monitor soil erosion maintenance
- ✓ Monitor surface water quality near major construction projects
- ✓ Evaluate the potential of ground water pollution due to impoundment facilities

Conclusions (Contd.)

We also reiterate that all the local governments develop by-laws for soil erosion and sedimentation and take urgent measures to improve land and sewer management so as to meet the water quality objectives set by the province in order to ensure safety and health of people in the region.