Bay of Quinte Remedial Action Plan

Phosphorus Control Efforts

TCC Source Protection Committee
November 3, 2009

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Presentation Overview

- Great Lakes Water Quality Agreement & Remedial Action Plans
- Beneficial Use Impairments in the Bay of Quinte.
- Phosphorous Control Measures.
- Clean Up Results based on Research and Monitoring in the Bay of Quinte.
- Algal Blooms

Acknowledgements

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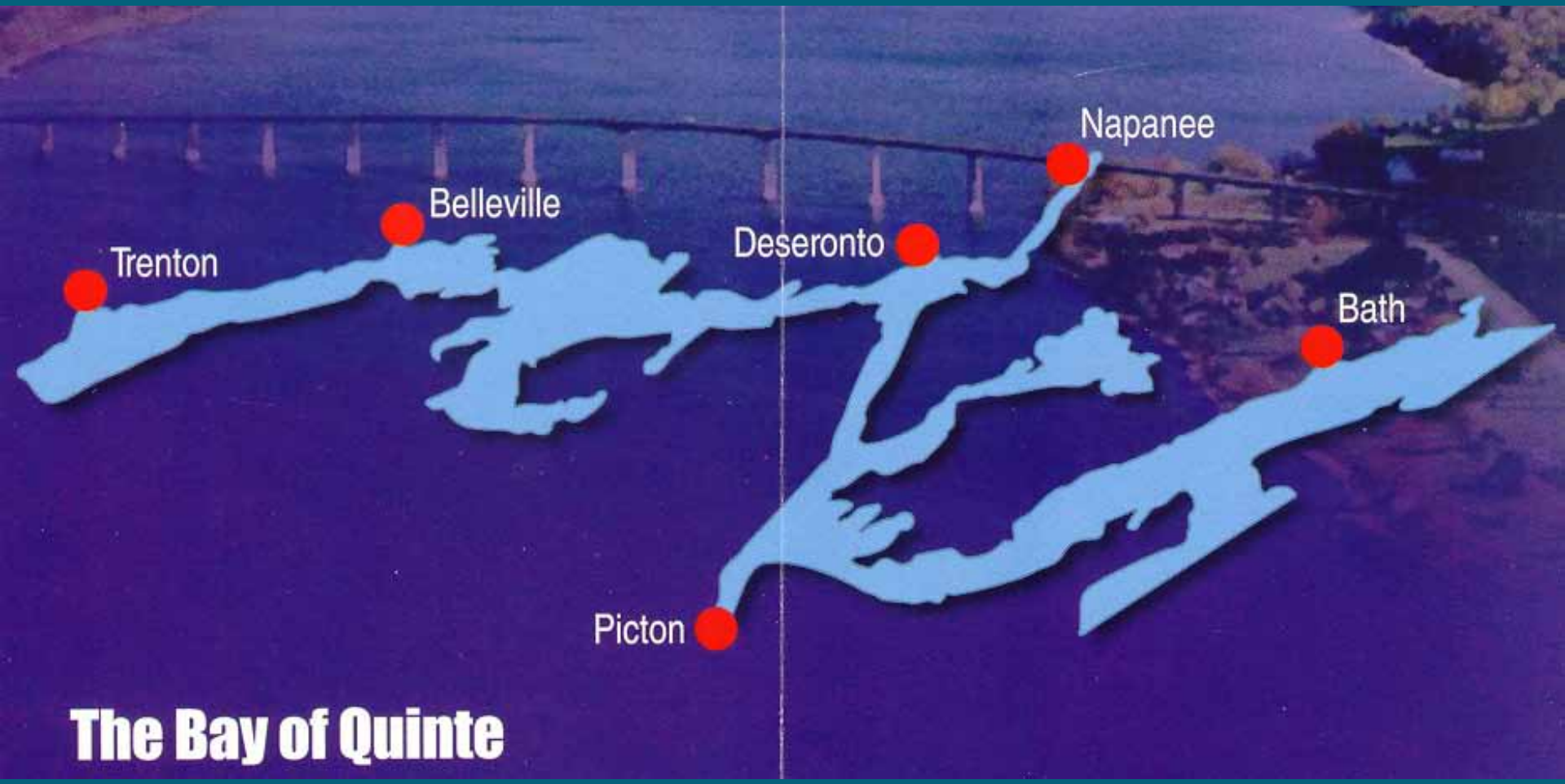
Great Lakes Water Quality Agreement

- Original agreement in 1972
- Current one signed in 1987 under review
- 43 Areas of Concern (AOCs) identified around Great Lakes
- Each one was required to produce a Remedial Action Plan (RAP)

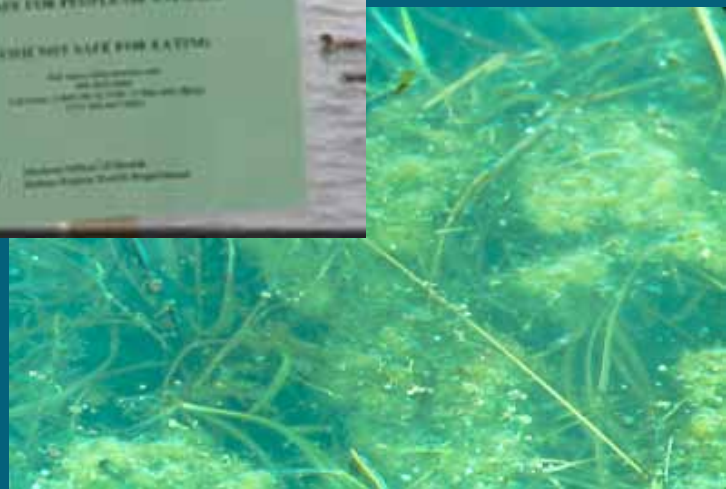
Remedial Action Plans

- Assess Impaired Beneficial Uses
- Prepare a Plan
- Implement the Plan
- Report on Progress
- Develop and Implement Management Systems to Sustain the Gains


Napanee
Belleville
Trenton
Deseronto
Bath
Picton
The Bay of Quinte

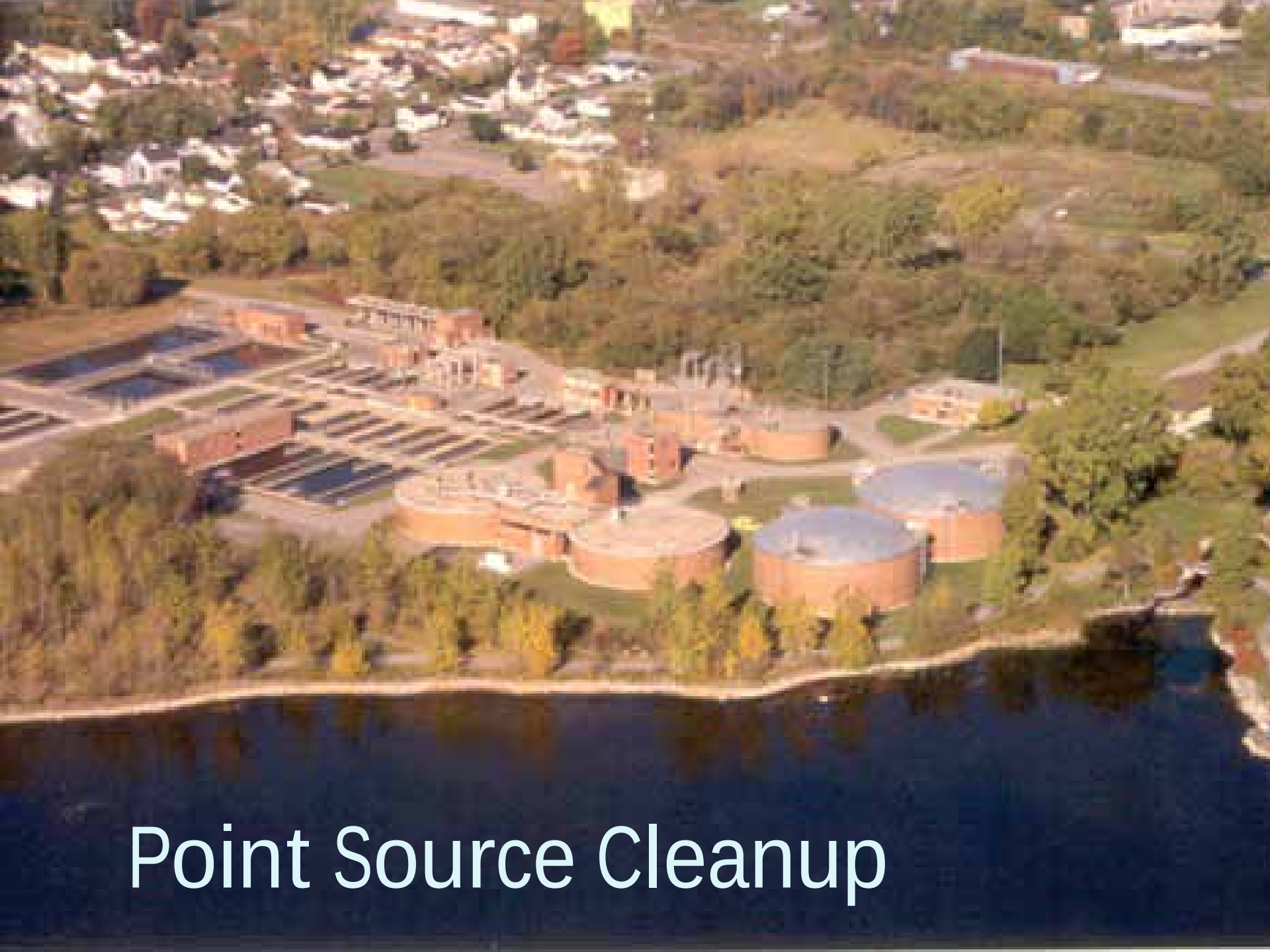
Impaired Beneficial Uses

- **Too much algae**
  - *Nutrient overload*
- **Closed beaches**
  - *Bacterial contamination*
- **Fish consumption restrictions**
  - *Toxic contamination*
- **Contaminated sediments**
  - *Toxic contamination*
- **Loss of fish & wildlife habitat**



Main Sources of Phosphorous Loading to the Bay of Quinte

- On Bay Sewage Treatment Plants (4%)
- Urban Runoff (4%)
- Major Tributaries (Trent, Moira, Salmon & Napanee Rivers) (92%)
- About 5% of the Tributary Load is from STPs



Point Source Cleanup

What has been achieved?

- Point source cleanup
  - STPs upgraded resulting in an average 50% reduction in phosphorous loading
  - On Bay and Upstream STPs all meeting P targets of 0.3 mg/l and 0.5 mg/l repectively
  - Storm water management implemented as a routine measure

Upstream Source Actions

What has been achieved?

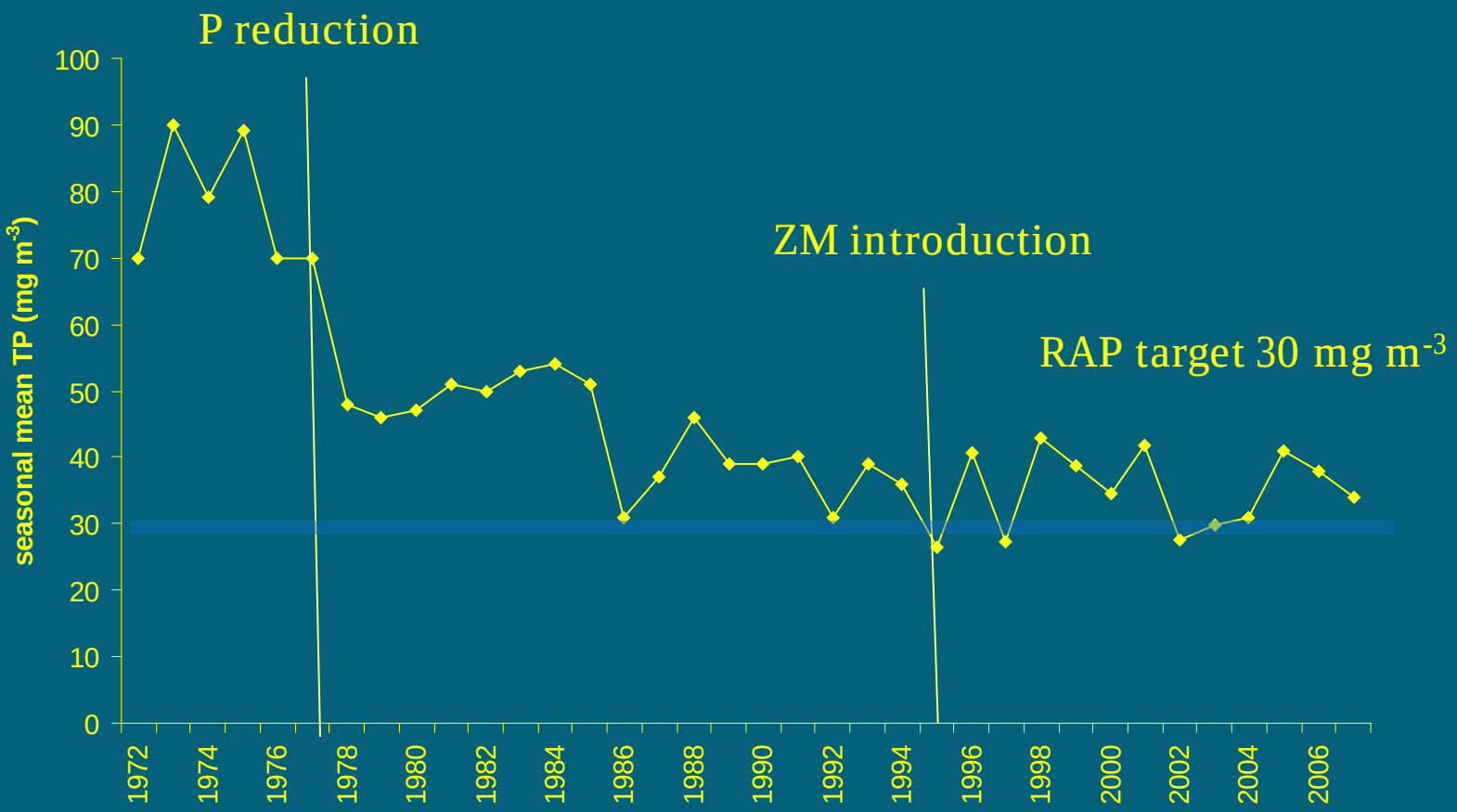
- Diffuse sources
  - Improved practices at over 400 farms have prevented over 16,500 kilograms of phosphorous from reaching streams draining to the Bay

History of Project Quinte

- First year of study 1972
- Initial goal to evaluate effectiveness of phosphorus reduction on the bay
- Now an integrated ecosystem management framework (PMP, FHMP, FMP).

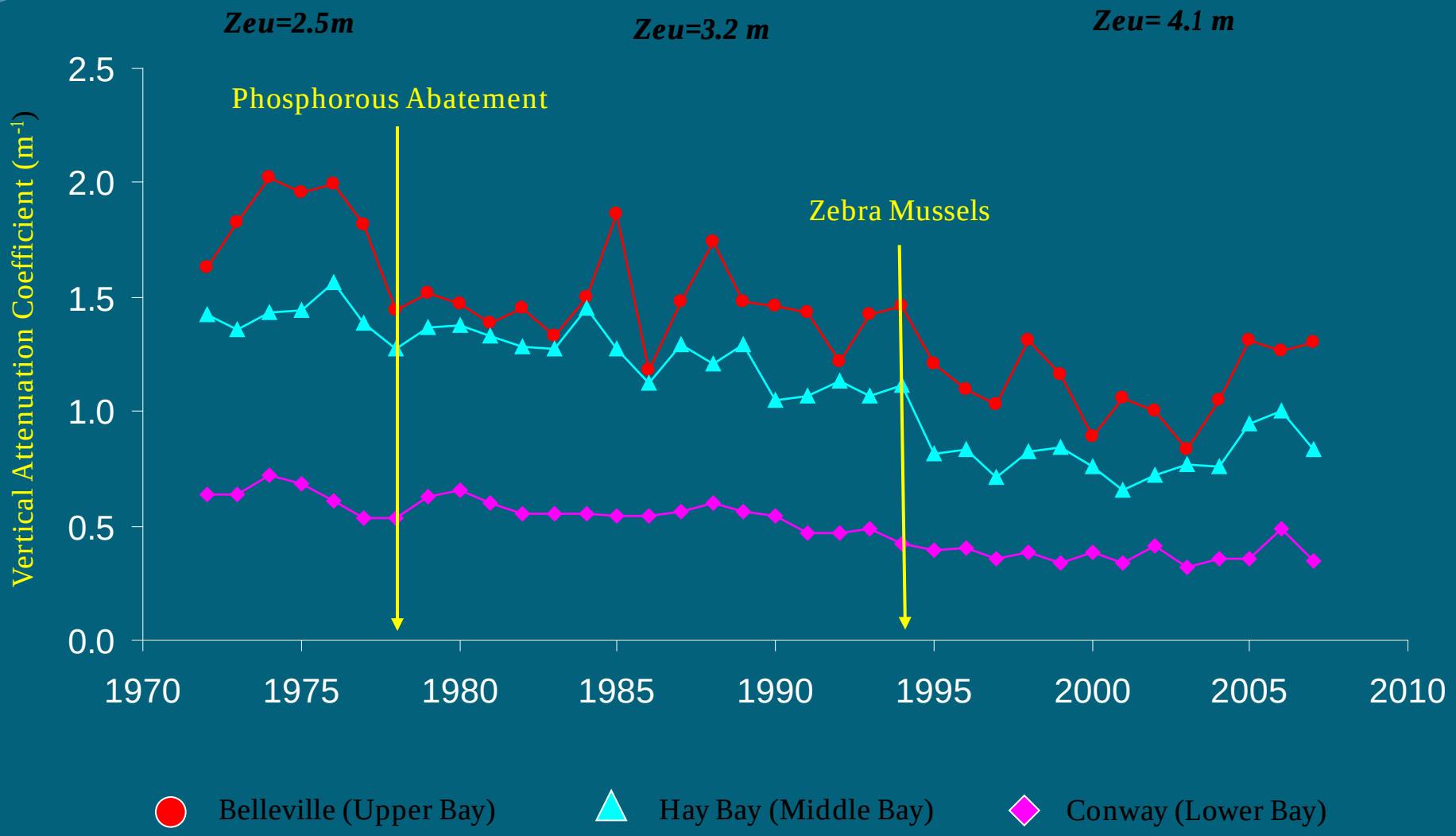
- Time Stanzas & Focus:
  - 1972-77: pre P control
  - 1977-82: post P control
  - 1982-1987: low-level monitoring
  - 1988 - present: evaluate in-bay response to remedial actions and impacts of exotic species

Status of Total Phosphorus in the Bay of Quinte



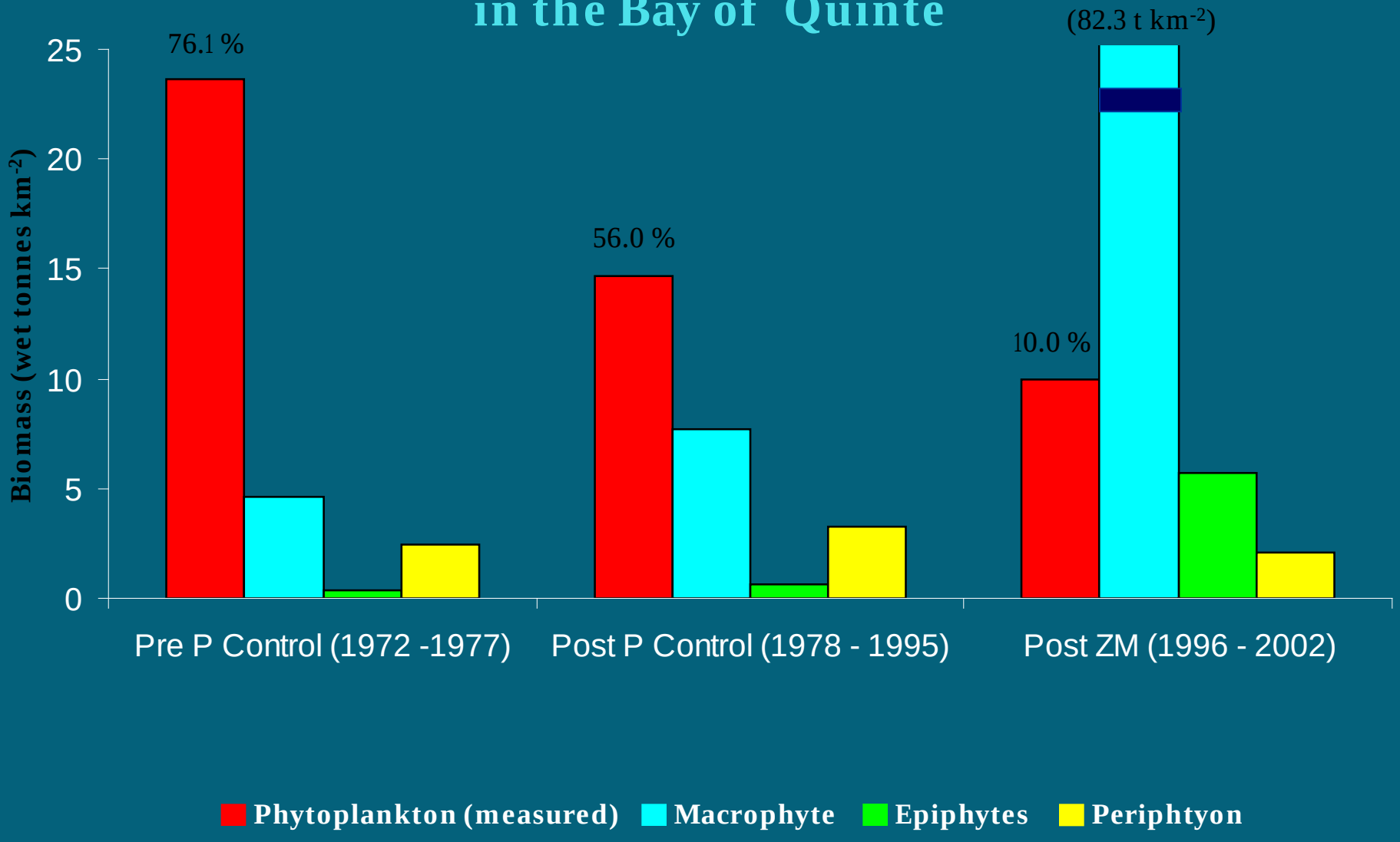
Ecosystem Restructuring – The Culprit

Long term Trends in Light Attenuation



Ecosystem Response to Increased Transparency

Changes in Biomass of Primary Producers in the Bay of Quinte




Bay of Quinte
Cyanobacterial Impairments:
CCIW, Burlington, ON

Mean Phytoplankton Composition and Biomass at Belleville 2000-2007

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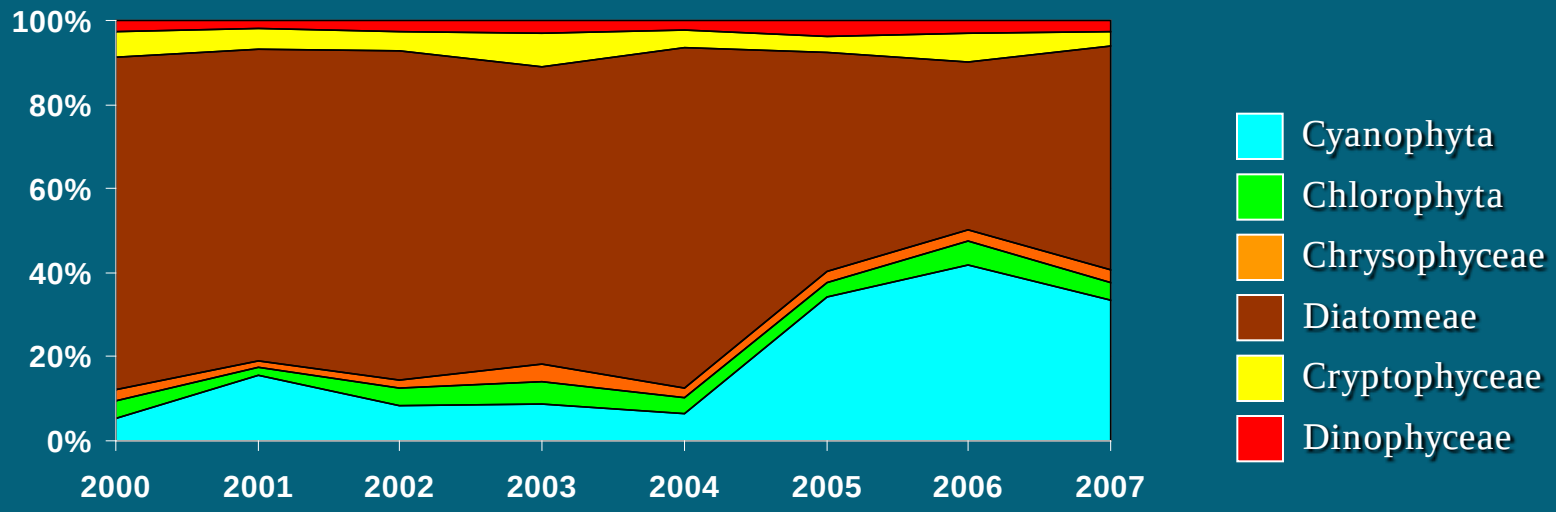
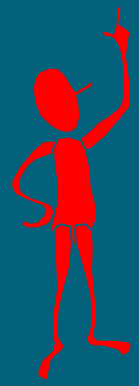


risk of toxins?
à Blooms are misleading!



- **Toxins - with or without visible blooms**
  - benthos
  - deep layer plankton
  - bloom decay / toxin release

- **Not all blooms toxic:**
  - varies with
    species, strains, growth
    & environment

Summary

- Bay of Quinte Phosphorous Control program has been successful in reducing phosphorous levels in the Bay.
- The program focused on both point and diffuse sources on the Bay and upstream in the watersheds.
- Invasive species eg. Zebra Mussels are key factors in the restructuring of the Bay ecosystem.
- A phosphorous management plan is being prepared to guide future control efforts.
- Ongoing research and monitoring is essential to our understanding of the ecosystem changes.