

St. Clair River: Management of Contaminated Sediment Update



St. Clair River Background

Sediment Recovery

1950s – most of river on shores impaired or degraded

1990 – recovery apparent but Zones 1, 2 & 3 identified for further study based on benthic community studies

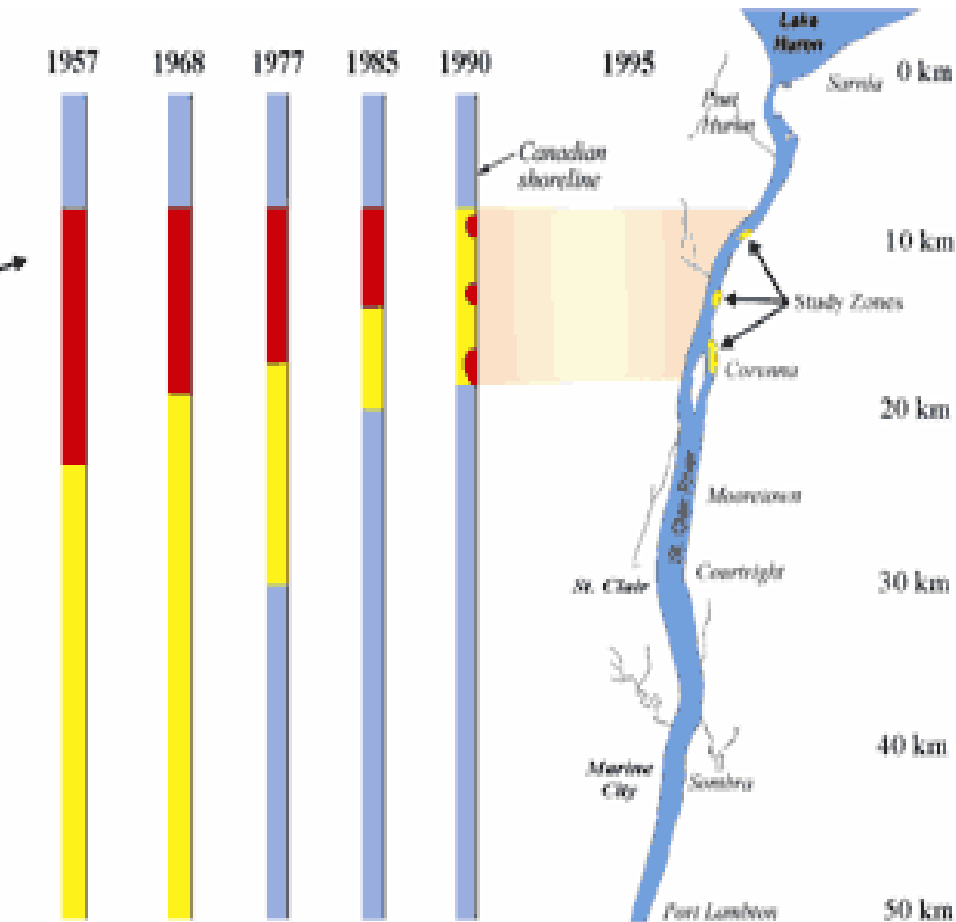
2004 – Dow Chemical completed \$18 M (USD) cleanup of Zone 1

This graphic represents a band of sediment extending 100 metres from the Canadian shore

Unimpaired
 Impaired
 Degraded

} sediment

Graph courtesy of SLEA

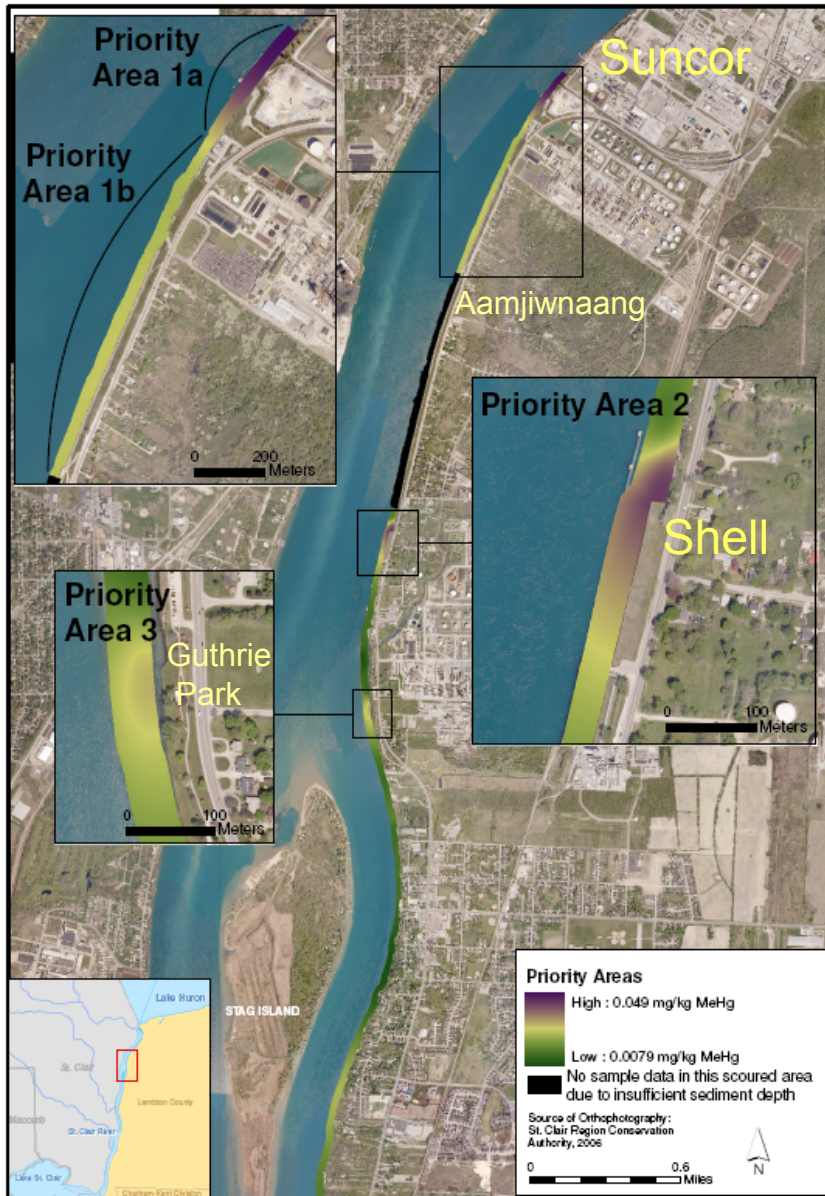


St. Clair River

Sediment Project Background

- Work for the project is directed by the Sediment Technical Team, a working group of the CRIC. The Technical Team includes reps from EC, MOE, St. Clair Region Conservation Authority, Sarnia-Lambton Environmental Association (SLEA), Aamjiwnaang First Nations (FN), Walpole Island FN and St. Clair Township.
- In March 2009 the consulting firm, ENVIRON completed an assessment of the sediment contamination in the remaining area of interest using the Canada-Ontario Decision-Making Framework for Assessment of Great Lakes Contaminated Sediment.
- These results were communicated to key stakeholders during summer/fall 2009.
- A contract for developing Sediment Management Options was issued in November 2009 (currently underway).

St. Clair River Priority Areas



1. Sediment Chemistry
 - 61% of sediment samples more than 2 mg/kg Hg (Provincial SEL)
 - Hg in buried sediment up to 5 times higher than surface sediment in some places
2. Sediment Toxicity
 - No strong evidence of toxicity to Hg
3. Changes to Benthic Community
 - No strong evidence of community changes due to Hg compared to reference sites
4. Potential for Biomagnification
 - Negligible risk to wildlife that eat fish
 - **Risks to some fish species**
 - **Priority Areas identified based on risk to fish**

Management Goals

Removal of Hg-contaminated sediment:

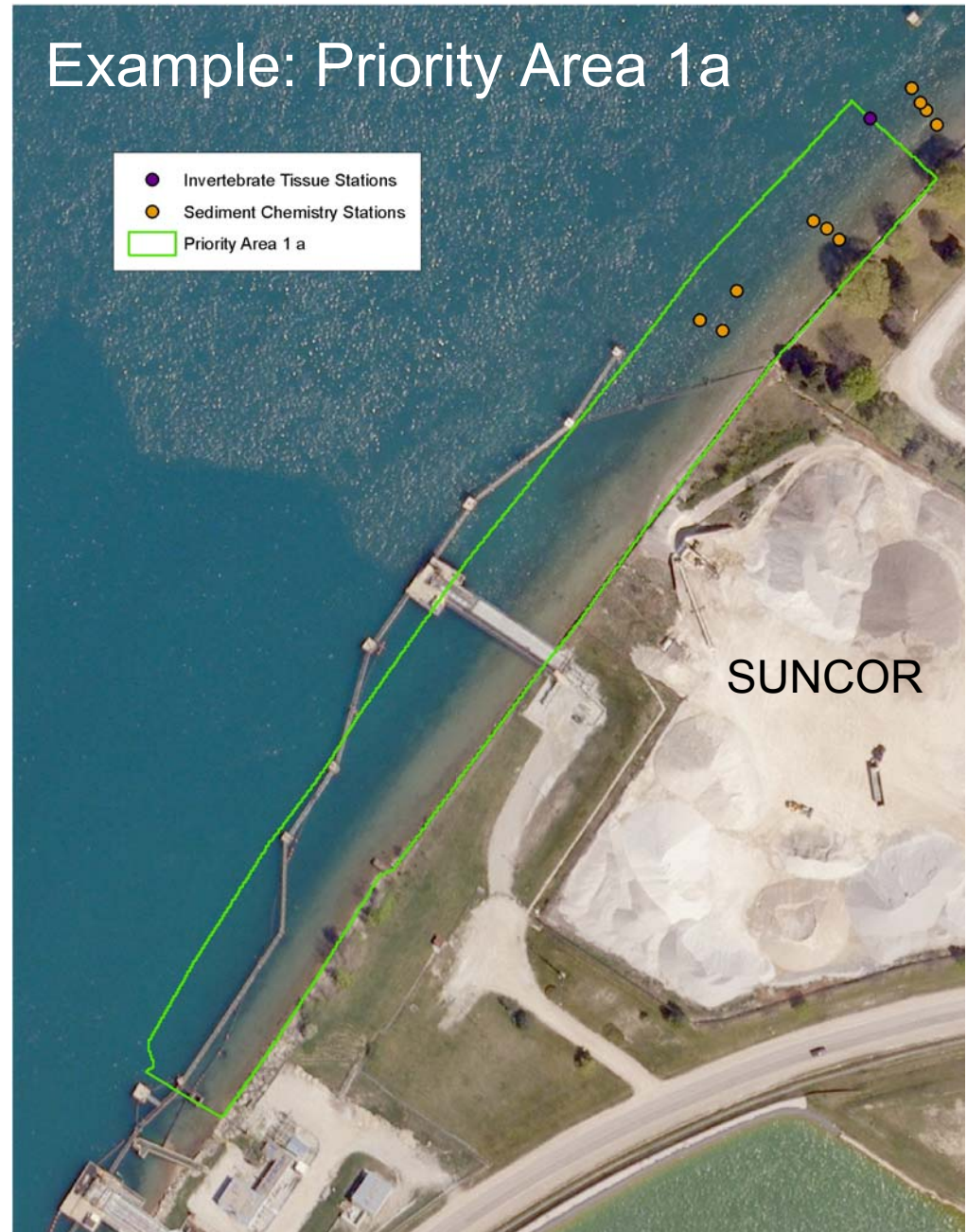
1. as a source to downstream sites
2. to promote local risk reduction
3. for contaminant mass removal

Management Options Being Considered

	Priority Area 1a (Suncor)	Priority Area 1b	Priority Area 2 (Shell)	Priority Area 3 (Guthrie Park)
dredging with thin layer capping of residuals	X		X	X
isolation capping	X	X	X	X
thin layer capping		X		
Monitored Natural Recovery	X	X	X	X

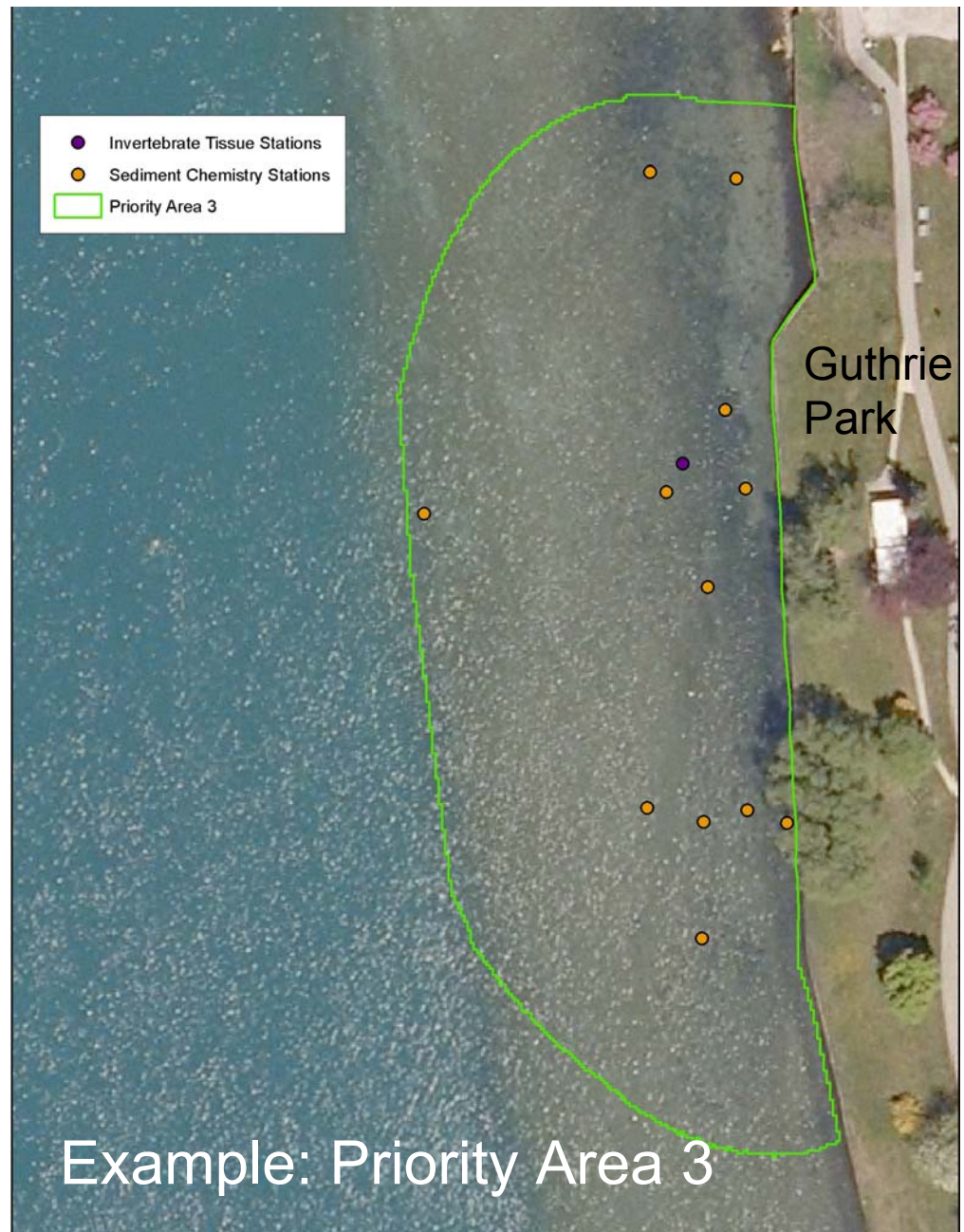
Considerations for Dredging

- Estimated dredge volumes based on assumption of dredging to 50 cm
- A 15-20 cm cap can be placed post-dredging for residuals management (thin-layer capping)
- Pre-design investigations required to:
 - further delineate spatial and vertical extent
 - assess shoreline stabilization
 - determine availability/access to material handling areas
 - develop water treatment protocol



Considerations for Capping

- The 40-60 cm isolation cap should include an armouring layer (such as gravel) to limit potential for cap erosion
- Cap material should be coarse-grained with low total organic carbon (TOC)
- Institutional controls should be established to limit vessel traffic within cap area footprint
- Pre-design survey required to evaluate:
 - slope stability and cap thickness limits
 - requirements for silt curtains during implementation



Example: Priority Area 1b



Considerations for Monitored Natural Recovery

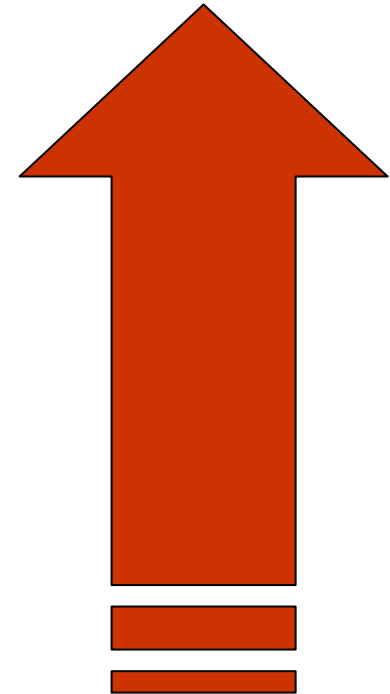
- Pre-design investigations required to understand:
 - site recovery potential (extent and rate)
 - suitability of Monitored Natural Recovery for St. Clair River Area of Interest

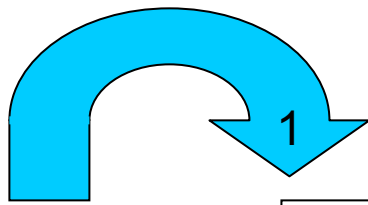
Certainty of Project Cost Estimate

Stages of Sediment Projects

Increasing Certainty in Estimate

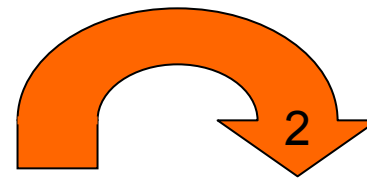
- (7) Post Construction
- (6) During Construction
- (5) Tender Award
- (4) Detailed Engineering Design
- (3) Preliminary Engineering Design
- (2) Conceptual Design
- (1) Sediment Assessment





Consultants
(ENVIRON)

Technical Team

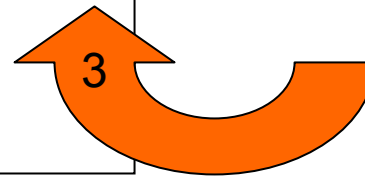


Consultation

First Nations
Municipalities
BPAC
Public

- 1) SMO report submitted.
- 2) After selection of preferred option based on technical feasibility, engage community, stakeholders, FNs, etc.
- 3) Document response.
- 4) Adjust preferred options, if required.
- 5) Make recommendation to Risk Managers.
- 6) Decision made based on technical and socio-economic considerations.
- 7) Implementation.

CRIC



Risk Managers

MOE/EC



Implementation



St. Clair River

Next Steps

1. Complete Pre-design Investigations (Fall 2010)
 - sediment cores and sonar surveys
 - benthic studies (MOE 2010, EC 2011)
 - Incorporate results into SMO report, refine cost estimates
2. Selection of Preferred Option(s) (Fall/Winter 2010)
 - by technical team → CRIC
 - Senior Management support
3. Consultation of Preferred Option(s) (Winter 2010/11)
 - Consult with public, First nations, municipalities, industry, BPAC
4. Initiate Detailed Engineering Design and Environmental Assessment (April 2011)
6. Implementation of Preferred Option (2013-15)