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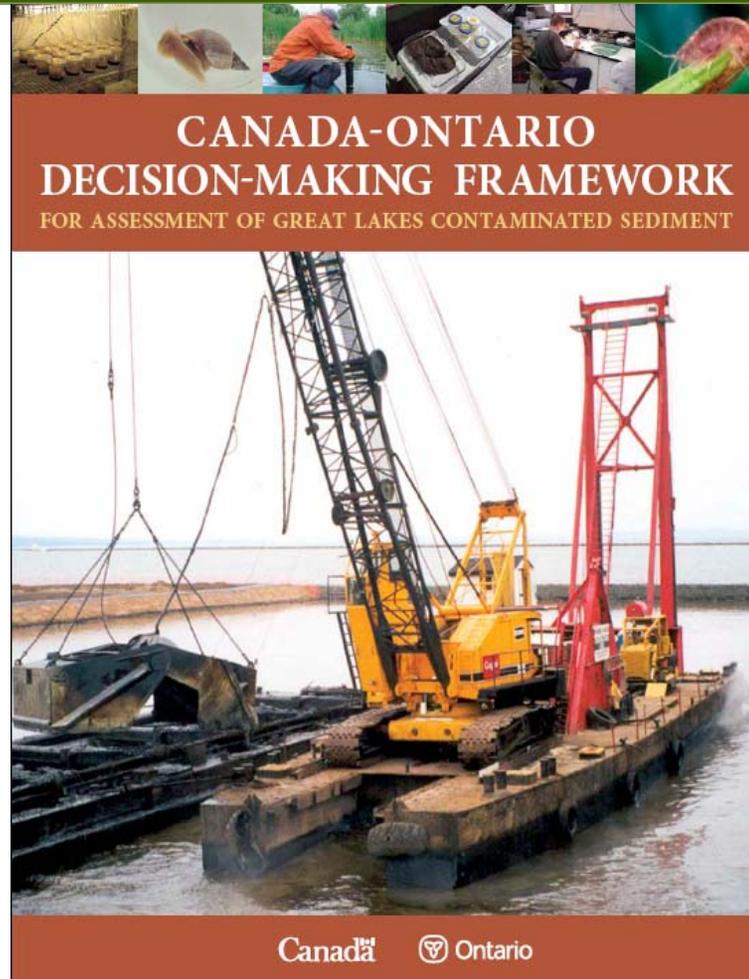
Canada-Ontario Decision Making Framework for Assessment of Great Lakes Contaminated Sediment

**SAME Regional Conference
Buffalo, NY
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Restoration Programs
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Contents

- Background
- Principles
- The Framework
- Review
- Next Steps



DRAFT – Page 2 – August 20, 2007



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Background

- Contaminated sediments are of national and international concern
- Need for consensus on conduct of scientific assessments of contaminated sediments
- Need for a framework that is consistent, transparent, scientifically rigorous, technically defensible, understandable by laypersons
- Sediment decision-making framework for Great Lakes Areas of Concern a commitment in the 2002 Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem

Principles

Apply within context of common sense, i.e., not inflexibly

- Sediment chemistry data should not be used alone
- Remediation decisions primarily based on biology
- Lines of evidence (LOE) that contradict properly conducted field surveys may be incorrect
- Remediation not implemented if it will cause more harm than good

Designed to be:

- Rigid, without being inflexible
- Capable of addressing site-specific considerations
- Capable of determining both localized and regional risks

Linearity in thought process, not necessarily in actions



Initial Screening Assessment

Conservative Chemical Screening :
Contaminants are of **possible** concern

Step 1:

- Examine available data
- Develop initial Conceptual Site Model

Step 2:

- Develop and implement Sampling and Analysis Plan

Decision 1:

- Contamination exceeds lowest criteria and/or can biomagnify?

NO

YES



Initial Screening Assessment cont.

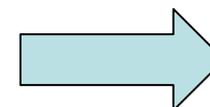
Comparisons to Reference Potential Risk based on Chemistry

Step 3

- Statistical comparison to reference sites

Decision 2:

- Contaminants exceed lowest criteria, can biomagnify and not different from reference? **NO**
- Contaminants exceed lowest criteria and/or can biomagnify and higher than reference? **YES**



Preliminary Quantitative Assessment

Contaminated areas screened in are further investigated, to determine:

- Is there a problem?
- Are additional investigations required?

STEP 4:

- a) Model biomagnification potential
- b) Assess sediment toxicity
- c) Assess benthic community structure

DECISION 3:

- a) Biomagnification a potential concern?
- b) Sediments toxic?
- c) Benthic community impaired?



**DECISION
MATRIX**



Step 5: Decision Matrix

	■	◼	◻
Chemistry	Adverse effects likely	Adverse effects may or may not occur	Adverse effects unlikely
Toxicity endpoints	Major	Minor	Negligible
Overall toxicity	Significant	Potential	Negligible
Benthos alteration	“different” or “very different”	“possibly different”	“equivalent”
Biomagnification potential	Significant	Possible	Negligible
Overall WOE assessment	Significant adverse effects	Potential adverse effects	No significant adverse effects



Preliminary Quantitative Assessment cont.

DECISION 4:

Negligible environmental risk:

- No further actions needed 2/16



Confirmed environmental risk:

- Management actions required 2/16

Further investigations required:

- Determine reasons for findings and/or conduct further assessments and re-evaluate risk 12/16



Detailed Quantitative Assessment

Step 6: Conduct further assessments

**Decision 5:
Environmental Risk?**

NO



YES



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DRAFT – Page 10 – August 20, 2007

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Detailed Quantitative Assessment

Step 7: Assess deeper sediments

Decision 6:

- Contaminants in deeper sediments exceed lowest criteria and/or can biomagnify and may be uncovered.

NO

YES



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DRAFT – Page 11 – August 20, 2007

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Deeper Sediments a Potential Risk

- Further assessment may be required: follow the framework from Step 1 if necessary

OR

Management Actions



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DRAFT – Page 12 – August 20, 2007

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Framework Summary

Four lines of evidence:

- Sediment chemistry
- Toxicity
- Benthic community structure
- Potential for contaminant biomagnification

Incorporates:

- exposure
- effect
- weight of evidence
- risk

- Acknowledges and fits with existing guidance/criteria
- Clearly articulates decision rules and outcomes based on science.
- Identifies the need for sediment management actions on a site by site basis
- Does not include risk management decision making – limited to science



Other Approaches

- **No formal framework of this type exists in other regions or provinces – no fixed rules or approach.**
- **CCME approach using Ecological Risk Assessment and interim sediment quality guidelines (ISQGs) most often used as a default.**
- **Sediment Quality Triad (chemistry, toxicity, benthos) often used. Quebec Region currently developing an ecotoxicological approach (2007)**
- **Ontario has provincial SQGs, BC developed “Director’s criteria”.**
- **COA Framework stresses that evolving science, new information, regional and site specific considerations and best professional judgement should be used to determine which chemical criteria to use. MOE SQGs and CCME ISQGs are cited as examples.**



Framework Review

- **Environment Canada & provincial practitioners nation-wide**
- **National and international expert peer reviews/workshops**
- **CCME Water Quality Task Group**
- **COA Annex Implementation Committee (8 federal departments, 3 provincial ministries)**
- **Scientific Journal peer reviews**
 - **Human and Ecological Risk Assessment**
 - **Society of Environmental Toxicology and Chemistry – Integrated Environmental Assessment and Management (July 2005)**
- **Environment Canada Deputy Minister Committee - all Regions**
- **Ontario Ministry of the Environment Deputy Minister – all Regions and Environmental Bill of Rights Registry**

DRAFT – Page 15 – August 20, 2007



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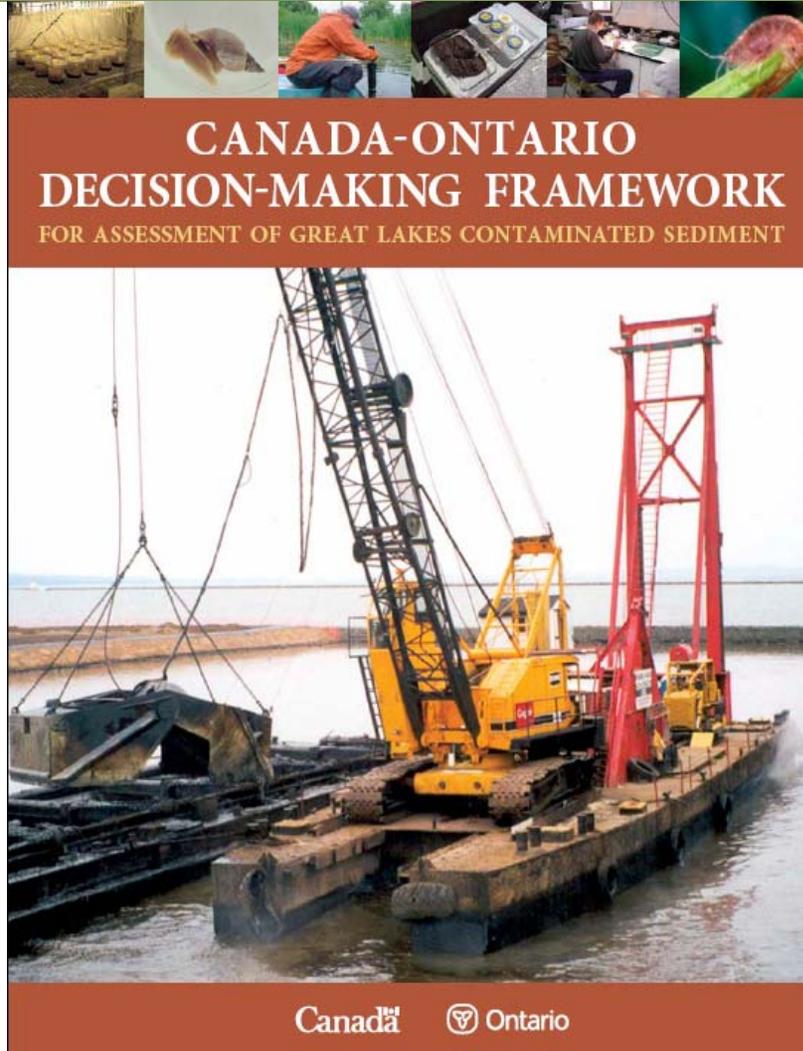
Next Steps

- The framework will be released as a COA document (August 2007) and available for use in Areas of Concern and elsewhere.
- Concurrent with the release of the COA document, MOE will release an integrated sediment management document which incorporates the COA Framework.
- Decision makers, scientific staff and program managers will use the document. It will be made available to consultants and outside researchers engaged in sediment assessments.
- The framework is currently being used by Environment Canada and the Ontario Ministry of the Environment staff to assess and reach scientific conclusions at Great Lakes Areas of Concern.



Thank you

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