Development of Delisting Targets for Presque Isle Bay Area of Concern

Workshop Summary Report

Sediment Quality Monitoring Workshop
June 21 - 22, 2005
Stull Nature Center, Presque Isle State Park
Erie, Pennsylvania

Prepared for:

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1.0 Introduction

On June 21 - 22, 2005, a workshop was convened in Erie, PA (Stull Nature Center, Presque Isle State Park) to support the development of a sediment quality monitoring program for the Presque Isle Bay Area of Concern (PIB AOC). More specifically, the PIB AOC Sediment Sub-committee and representatives of the National Science Advisory Group on Sediment Quality Assessment met to:

- Define the objectives of a sediment quality monitoring program for PIB AOC;
- Identify the key questions to be answered using data generated in a sediment quality monitoring program;
- Describe the elements of a sediment quality monitoring program that will provide the data and information needed to answer the key questions that are posed;
- Identify the locations, sampling methods, number of samples, and metrics that will be included in the sediment quality monitoring program for Presque Isle Bay; and,
- Review progress on the development of delisting targets and related issues (i.e., from the May, 2005 workshop).

The workshop agenda is provided in Appendix 1 of this summary report, a list of workshop participants is provided in Appendix 2, and the results of the workshop are summarized below.

2.0 Objectives of Sediment Quality Monitoring Program

Workshop participants were asked to identify the objectives that should be addressed by the sediment quality monitoring program. Based on the input that was provided, the key objectives of the monitoring program should be to:

- Assess temporal trends in sediment quality conditions;
- Assess compliance with delisting targets; and,
- Assess compliance with ecosystem health targets.

Workshop participants also noted the need for data to support public health risk assessment. However, it was understood that the historical sediment chemistry and fish

tissue chemistry data could be used in the near-term to conduct such analyses and that additional data could be collected in the future if important data gaps are identified. Specific concerns included the presence of fish consumption advisories and the potential effects on human health associated with dermal contact with contaminated sediments.

3.0 Assessment of Historical Trends in Sediment Quality Conditions in Presque Isle Bay

Workshop participants recognized that periodic sampling of surficial sediments at fixed locations in the Bay has not provided a robust basis for assessing temporal trends in sediment quality conditions. For this reason, an alternate approach was recommended for future temporal trend assessment. More specifically, the following steps were recommended:

- Use sequential analysis of sediment cores to assess temporal trends;
- Focus on 1 or 2 coring locations within the Bay (target PIB-07 and PIB-14, making sure that the selected sites are outside the dredged areas of the Bay);
- Use 4" diameter cores with core tube liners;
- Slice cores into a total of five core segments to facilitate chemical and toxicological analysis (0-5 cm, 5-10 cm, 10-30 cm, 30-50 cm, and 50-80 cm; Note: it is likely that 3 - 4" diameter cores will need to be collected from each location to obtain sufficient material to conduct chemical and biological assessments);
- Conduct 10-d toxicity tests with the midge, *Chironomus dilutus*, and 28-d toxicity tests with the amphipod, *Hyalella azteca*, on each core segment;
- Analyze each core segment for conventionals (i.e., grain size, moisture, TOC, etc.), total metals, PAHs (34), pesticides, and PCBs. Consideration should also be given to measuring black carbon if standard methods can be identified;
- Include field duplicates in the sampling program (1:10 to 1:20 level); and,
- Slice cores into a total of 32 core segments to facilitate ^{210}Pb and ^{137}Cs dating of sediments.

In addition to the primary sampling locations, consideration should be given to collecting and archiving sediment cores from PIB-16 and Thompson Bay. Also, a single 1m core should be collected and archived for paleolimnology assessment (i.e., from PIB-07; e.g., evaluating changes in chironomid species over time).

4.0 Assessment of Compliance with Delisting Targets

Based on the results of the May, 2005 workshop, elutriate chemistry is the primary indicator of sediment quality conditions relative to delisting targets for Presque Isle Bay. However, workshop participants noted that the list of indicators may expand pending input from USEPA on information requirements for demonstrating restoration of the restrictions on dredging beneficial use impairment. As a substantial data set exists on elutriate chemistry for dredged materials from Presque Isle Bay, it was concluded that additional elutriate chemistry data need not be collected during the 2005 sampling program.

5.0 Assessment of Sediment Quality Conditions in Presque Isle Bay Relative to Ecosystem Health

Workshop participants indicated that the primary objective of the ecosystem health assessment is to determine if contaminated sediments pose unacceptable risks to benthic organisms, fish, wildlife, or human health in Presque Isle Bay. It was further noted that risks to the fish community are being addressed through the collection of information on the incidence of lesions and tumors in brown bullhead, *Ameiurus nebulosus*.

Because the chemicals of potential concern (COPCs) in Presque Isle Bay sediments (i.e., metals and PAHs, with the exception of arsenic and mercury) tend not to accumulate in aquatic food webs, risks to wildlife associated with exposure to sediment-associated COPCs are likely to be tolerable. Comparisons of the concentrations of these COPCs in Presque Isle Bay sediments to sediment quality criteria for wildlife suggested that risks to piscivorus wildlife were low in the Bay. Nevertheless, it was recommended that the available fish tissue chemistry for the Bay be compared to levels that have been observed elsewhere in Lake Erie and to toxicity thresholds for wildlife to determine if these or other COPCs pose unacceptable risks to piscivorus birds or mammals. In addition, it was recommended that PAHs be requested as a target analyte in the Pennsylvania Fish Tissue Monitoring Program to provide additional information for assessing the potential effects of these COPCs on wildlife species.

Relative to human health, it was noted that the fish consumption advisories that have been issued for Lake Erie provide a basis for managing risks to human health associated with consumption of contaminated fish. In addition, exposure to contaminated sediments during wading is likely to be minimal because few people swim near the southern shore of the Bay (which is the most contaminated). Nevertheless, it was recommended that

USEPA guidance on human health risks assessment be consulted and appropriate procedures used to assess human health risks.

Because issues related to fish, wildlife, and human health can be addressed using existing data, workshop participants recommended that the 2005 sampling program be focused on assessing risks to sediment-dwelling organisms. More specifically, the following steps were recommended:

- Collect surficial sediment samples at up to 33 locations in Presque Isle Bay;
- Use a combination of directed and stratified random sampling to obtain samples with a broad range of COPC concentrations (i.e., to support the derivation of site-specific concentration-response models) and to provide broad spatial coverage of the Bay;
- Include sampling stations in the Presque Isle ponds and the nearshore areas of Lake Erie to provide sufficient numbers of samples from reference areas (i.e., to implement the reference envelope approach for assessing toxicity to sediment-dwelling organisms);
- Include sampling stations at the mouth of each tributary to obtain further information on the quality of sediments that are being exported to the Bay;
- Conduct 10-d toxicity tests with the midge, *Chironomus dilutus*, and 28-d toxicity tests with the amphipod, *Hyalella azteca*, on each sediment sample;
- Analyze each sediment sample for conventionals (i.e., grain size, moisture, TOC, etc.), total metals (including mercury), simultaneously extracted metals (SEM), acid volatile sulfides (AVS), PAHs (34), and PCBs (21 NIST congeners). Screen for organochlorine pesticides, dioxins, and semi-volatile organic compounds (e.g., phthalates) in 20 to 33% of the samples. Consideration should also be given to measuring black carbon, if standard methods can be identified; and,
- Include field duplicates in the sampling program (1:10 to 1:20 level).

6.0 Emerging Issues

While it was recognized that metals and PAHs represent the primary COPCs in Presque Isle Bay, workshop participants noted that new issues may emerge in the future, including:

- Phenoxy herbicides;

- Hormone mimickers;
- Plasticizers;
- Polybrominated diethyl ethers (PBDEs); and,
- Other metals.

As such, monitoring programs and sediment quality management strategies may need to address these emerging issues in the future.

7.0 Next Steps

Workshop participants identified a number of tasks that should be undertaken in the near-term to support the development and implementation of delisting targets for Presque Isle Bay, including:

- The Public Advisory Committee (PAC) should continue to serve as a watchdog for the Bay, identifying and addressing issues as they emerge;
- Additional detective work should be conducted to identify likely sources, if the results of the 2005 investigations show that the sediments from the tributaries are still contaminated at levels of concern;
- The Environment Canada decision regarding the restrictions on delisting the restrictions on dredging beneficial use impairment should be forwarded to USEPA to assist in developing guidance on requirements for delisting this beneficial use impairment; and,
- The delisting targets need to include an incidence of exceedance of the targets (e.g., 5-10%), a magnitude of exceedance of the targets (e.g., 2x), and a schedule for meeting the targets.

Appendix 1 – Workshop Agenda
Development of a Sediment Quality Monitoring Program for Presque Isle Bay Area of Concern

June 21 - 22, 2005
Stull Nature Center, Presque Isle State Park, Erie, Pennsylvania

Objectives: This workshop is being convened to support the development of a sediment quality monitoring program for the Presque Isle Bay Area of Concern (PIB AOC). More specifically, the PIB AOC Sediment Sub-committee and representatives of the national Science Advisory Group on Sediment Quality Assessment will meet to:

- Review progress on the development of delisting targets and related issues (i.e., from May workshop);
- Define the objectives of a sediment quality monitoring program for PIB AOC;
- Identify the key questions to be answered using data generated in a sediment quality monitoring program;
- Describe the elements of a sediment quality monitoring program that will provide the data and information needed to answer the key questions that are posed; and,
- Identify the locations, sampling methods, number of samples, and metrics that will be included in the sediment quality monitoring program for PIB.

WORKSHOP AGENDA

Tuesday, June 21, 2005 (8:30 AM - 4:30 PM)

Morning: 8:30 - 12:00

1.0 Welcome and Introductions (Eric Obert, PA Sea Grant/Lori Boughton, PDEP; 15 minutes)

2.0 Project Background (Lori Boughton, PDEP; 10 minutes)
- Background on PIB
- Project Overview and Approach
- Project Milestones and Schedule

3.0 Sediment Quality Issues and Concerns (DDM; 15 minutes)
- Sources and Releases of Contaminants
- Identification of Chemicals of Potential Concern (COPCs)
- Environmental Fate and Transport
- Key Exposure Pathways
- Receptors Potentially at Risk
- Conceptual Site Model

4.0 Review of Progress on the Development of Delisting Targets and Related Tasks, Overview of Progress to Date:
- Development of Delisting Targets
- Development of Ecosystem Health Targets
- Guidance from USEPA on delisting of restrictions on dredging BUI
- Guidance from Canada/Ontario Steering Committee on Remedial Action Plans on delisting of restrictions on dredging BUI

5.0 Work Group Session 1

Workshop participants will be charged with the task of answering the following questions:
- What are the principal objectives of the sediment quality monitoring program for PIB AOC?
- What are the key questions to be answered using data generated in a sediment quality monitoring program?

12:00 - 13:00 Lunch

Afternoon: 13:30 - 16:30

6.0 Preliminary Field Sampling Plan for Presque Isle Bay (Don MacDonald, MESL)
- Monitoring Objectives
- Temporal Trend Assessment
- Compliance with Delisting Targets
- Compliance with Ecosystem Health Targets

7.0 Work Group Session 2

Workshop participants will be charged with the task of answering the following questions:
- What are the essential elements of a monitoring program that will provide the data and information needed to assess ecosystem health in PIB?

- What are the locations, sampling methods, number of samples, and metrics that will be included in the ecosystem health assessment component of the sediment quality monitoring program for PIB?

8.0 Reconnaissance of Presque Isle Bay (Workshop participants will meet at the Erie Yacht Club at 5:00 PM and board the SeaGrant research vessel, Momentum, for a two hour reconnaissance of the bay; bring a jacket, but leave your fishing rod at home)

Wednesday, June 21, 2005 (8:30 AM - 4:30 PM)

1.0 Welcome and Introductions (Eric Obert, PA Sea Grant/Lori Boughton, PDEP; 10 minutes)

2.0 Work Group Session 3

Workshop participants will be charged with the task of answering the following questions:

- What are the essential elements of a monitoring program that will provide the data and information needed to assess temporal trends in sediment quality conditions?
- What are the locations, sampling methods, number of samples, and metrics that will be included in the temporal trend assessment component of the sediment quality monitoring program for PIB?

12:00 - 13:00 Lunch

3.0 Work Group Session 4

Workshop participants will be charged with the task of answering the following question:

- How should the temporal trend assessment and ecosystem health assessment components of the monitoring program be refined to accommodate program implementation within the available budget (i.e., what are the highest priority elements of each portion of the monitoring program)?

4.0 Next Steps

Appendix 2 - Workshop Participants

Walter Berry - PIB SC (berry.walter@epamail.epa.gov) - *via conference call*
Lori Boughton - PIB SC; PAC SSC (lboughton@state.pa.us)
Jerry Covert (jbcovert1@aol.com)
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Judy Taylor - PAC SSC (jutaylor@state.pa.us)
Bob Wellington - PAC SSC (bobsbluewing@hotmail.com)

PAC SC = Presque Isle Bay Steering Committee; PAC SSC = PAC's Sediment Subcommittee