

**PHASE IV GIS-BASED SEDIMENT QUALITY DATABASE FOR THE
ST. LOUIS RIVER AREA OF CONCERN—WISCONSIN FOCUS**

Supplement to the Phase II/III Technical Documentation

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FORWARD

The Phase IV geographic information system (GIS)-based sediment quality database for the St. Louis River Area of Concern (AOC)—Wisconsin focus represents a collaborative project between the St. Louis River Citizens Action Committee (CAC), Minnesota Pollution Control Agency (MPCA), Wisconsin Department of Natural Resources (WDNR), and Exa Data & Mapping Services, Inc. in conjunction with their subconsultants from Premier Environmental Services, Inc. and Searay Environmental. This project was funded by the Wisconsin Coastal Management Program (WCMP) and the National Oceanic and Atmospheric Administration (NOAA), Office of Ocean and Coastal Resource Management under the Coastal Zone Management Act, Grant # NA05NOS4191067, through a grant agreement with the St. Louis River CAC. In addition, the MPCA contributed over 60% of state matching funds to this project. The grant for this project ended June 30, 2006.

This report was prepared by Dr. Judy Crane (MPCA) in which her salary was used beyond the state match required for the St. Louis River CAC's grant under award number WCMP 86003-006.07 from NOAA, U.S. Department of Commerce. The statements, findings, conclusions, and recommendations are those of the author and do not necessarily reflect the views of NOAA, the Department of Commerce, or the MPCA.



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The Phase IV work products include sediment quality and GIS data obtained from earlier phases of this database project. These earlier projects were funded as follows:

- Phase I (completed September 30, 2003): Grant number GL97536301-1 (\$81,000) from the U.S. Environmental Protection Agency's (EPA) Great Lakes National Program Office (GLNPO) plus a 5% state match from the MPCA. MacDonald Environmental Sciences Ltd. (MESL) provided contractual assistance on this project. These GIS projects were produced in ArcView 3.2 by MESL staff.

- Phase II (completed December 22, 2004, as one component of a MPCA-Duluth grant to develop a comprehensive sediment management plan for the lower St. Louis River AOC): Grant number GL97540401-2 (\$40,000 of funds for the Phase II project) from GLNPO plus a 5% state match from the MPCA. MESL provided contractual assistance on this project. The GIS products were produced in ArcView 3.2 and ArcMap 8.3 by MESL staff.
- Phase III (completed December 31, 2005): Grant number MLSCP 306-28-06 (\$50,000) from Minnesota's Lake Superior Coastal Program (MLSCP) plus a 50% state match from the MPCA. MESL and Exa Data & Mapping Services, Inc. provided contractual assistance on this project. The GIS products were not updated during the Phase III database project.

Work products from Phases I through IV are either available on the MPCA's Contaminated Sediment Web page at: <http://www.pca.state.mn.us/water/sediments/studies-stlouis.html#assessment> or by contacting Dr. Crane at:

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LIST OF ABBREVIATIONS AND ACRONYMS

AOC	Area of Concern
CAC	Citizens Action Committee
CPRD	Coastal Protection and Restoration Division
EPA	Environmental Protection Agency
GIS	Geographic Information System
GLNPO	Great Lakes National Program Office
MARPLOT	Mapping Application for Response, Planning and Local Operational Tasks
MESL	MacDonald Environmental Sciences Ltd.
MLSCP	Minnesota's Lake Superior Coastal Program
MN	Minnesota
MPCA	Minnesota Pollution Control Agency
MS™	Microsoft™
NOAA	National Oceanic and Atmospheric Administration
P.O.	Post Office
U.S.	United States
USEPA	United States Environmental Protection Agency
WCMP	Wisconsin Coastal Management Program
WDNR	Wisconsin Department of Natural Resources
WI	Wisconsin

ACKNOWLEDGMENTS

A number of individuals assisted with the preparation of earlier phases of the GIS-based sediment quality database. These individuals have been acknowledged in the documentation that accompanied each phase of the database. The Phase IV project team members that assisted with other project tasks have been acknowledged in other report and database documentation.

Kate Angel was the WCMP Program Liaison to the St. Louis River CAC for this grant. Lynelle Hanson and Phil Monson were the respective grant managers from the St. Louis River CAC. The funding acknowledgments for this project were provided in the Forward of this report.

Jan Eckart and Julie Lendway (MPCA) provided word processing and report production support. Todd Biewen and Frank Kohlasch (MPCA) provided useful supervisory assistance, and Todd Biewen was instrumental in securing state match funding for Dr. Crane's position during state fiscal year 2006.

CHAPTER 1

PROJECT UPDATES

This report is the last project deliverable for the Phase IV GIS-based sediment quality database project focusing on the Wisconsin side of the St. Louis River Area of Concern (AOC). Since the Minnesota Pollution Control Agency (MPCA) has already exceeded the 60% state match requirement for this grant, this report will be very brief.

The databases, geographic information system (GIS) work products, and report deliverables that have been produced for this project are described under the Phase IV project heading on the MPCA's Contaminated Sediment Web page at: <http://www.pca.state.mn.us/water/sediments/studies-stlouis.html#assessment>. The project files are stored at the MPCA's Environmental Analysis and Outcomes Division, whereas files specific to the grant are stored at the St. Louis River Citizens Action Committee's (CAC) office.

The following bullets provide brief updates regarding changes to the database and GIS work products.

- A number of data sets were not included in the Phase IV database due to a lack of resources. In particular, several small U.S. Environmental Protection Agency (EPA) data sets published in the peer-reviewed literature were not included in the database since geospatial coordinates were not usually available for the station locations. A record of these data sets is available in the MPCA project file.
- Users should be aware that there may be slightly different sampling information for different data types (e.g., sediment chemistry, sediment toxicity, benthic invertebrate community) in the Microsoft™ (MS™) Access databases. The ptbl – SAMPLE table was originally set-up to include mostly sediment chemistry, sediment toxicity, and tissue residue data. For some studies (e.g., Study ID's 04, 05, and 06), the benthic invertebrate community data were added to a later phase of the database (i.e., either Phase III or Phase IV). In some cases, the sediment depths may be different for the benthic samples, but this information will not be captured under the current database structure. Thus, the sampling data may not be as accurate in order to be useful (e.g., to accommodate queries of matched sediment quality data).
- Queries that are run using the drop-down menu of queries in the MS™ Access 2000 database are automatically hidden. To view hidden queries so that they can be linked to GIS software, follow these steps: go to the Tools menu, select Options and the View tab. On the top right of the 'Show' area, check 'Hidden objects.' This step shows the hidden objects in gray font.
- The MS™ Access 2000 sediment quality database must be compacted and repaired on a periodic basis. Every time a user runs a query or opens or closes a table, the program saves it in a little bit of extraneous memory. Eventually, the program can double in size.

If working regularly with a database, compact and repair it twice a month. To do this, go to the menu item Tools, then Database Utilities. From the arrow off from Database Utilities, select Compact and Repair database. If this feature runs quickly, then there was not much extraneous information to compact. If it is slow, then the user should consider compacting and repairing the database more frequently in the future.

- A new addition (ptbl – BENTHIC: Form) was made to the internal screening database to provide information on the review of benthic invertebrate community data sets (Figures 1 and 2).

The screenshot shows the Microsoft Access application window titled "Microsoft Access" with the "ptbl - BENTHIC : Form" open. The form is in "Form View" and contains several input fields and checkboxes. The fields include "MESL Lib#", "Screener", "Phase", "References", "Was a Guidance document used to Collect? i.e. SOP", "Analytical Procedures Comments", "Procedure Page Number", "QA/QC Procedure", "QA/QC Page Number", "Minimum DQOs met? Please provide details.", "DQO Page Number", "Indicate QA/QC or DQO deficiencies", "Does the study include a reference site?", "Reference Page Number", "Benthos collected in close proximity to other samples?", "Proximity Page Number", "What sampling device was used?", and "Samp Device Page Number". The status bar at the bottom indicates "Record: 1 of 1 (Filtered)" and "Form View".

Figure 1. Top half of ptbl – BENTHIC: Form.

- Several new GIS data sets, as well as updated versions of previously included GIS data, were added to the ArcMap 9.1 map documents. Identification of these new or updated data sets, as well as the sources of them, is available in the MPCA project file.
- NOAA's Coastal Protection and Restoration Division (CPRD) have created a collection of database and GIS tools to support the protection and restoration of coastal species and habitats. Query Manager is their database program, for which Query Manager-compatible database files were produced for the Phase IV sediment quality database. MARPLOT is a basic mapping application from CPRD that has limited geographic

manipulation available. The CPRD GIS Tools represent a collection of scripts and extensions used by the CPRD GIS Team and their partners. These tools aid in analysis and mapping of spatial data by simplifying or automating tasks such as Importing Query Manager data into ArcMap, and providing functionality to accomplish complex tasks. Most of these GIS Tools are written for either ArcView 3.x or ArcGIS 9.x. For further information about these CPRD Tools, refer to the NOAA web page at: <http://mapping.orr.noaa.gov/website/portal/cprdtools/>.

The screenshot displays the Microsoft Access interface for the 'ptbl - BENTHIC: Form'. The window title is 'Microsoft Access' and the current database is 'Tahoma'. The form is in 'Form View' and shows the following fields and controls:

- Reference site: [Text Box] other samples? [Text Box]
- What sampling device was used? [Text Box]
- Was Water Depth, Particle Size and/or TOC measured? [Text Box]
- What is the taxonomic resolution for benthos identification? [Text Box]
- Were deformities in Chironomid larvae observed? [Checkbox] Deformity Page Number: [Text Box]
- What kind of benthic metrics were determined from the study? [Text Box] Benthic Metrics Page Number: [Text Box]
- Data Statistically analyzed? [Checkbox] Statistics page Number: [Text Box]
- Samp Device Page Number: [Text Box]
- Supplemental info Page Number: [Text Box]
- Taxa Resolution Page Number: [Text Box]
- COMMENTS: [Text Area]
- Open Question and Decision Form [Button]

The status bar at the bottom indicates 'Record: 1 of 1 (Filtered)'.

Figure 2. Bottom half of ptbl – BENTHIC: Form.

CHAPTER 2

PROJECT CONTACT

For further information about the Phase IV project deliverables, contact Dr. Judy Crane at:

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