Phase II GIS-Based Sediment Quality Database for the St. Louis River Area of Concern (AOC)

Help Section for ArcView Users

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Disclaimer

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List of Acronyms

AOC	Area of Concern
ARDC	Arrowhead Regional Development Commission
CAC	Citizens Action Committee
C-CAP	Coastal Change Analysis Program
CD	Compact Disk
DNR	Department of Natural Resources
ESRI	Environmental Systems Research Institute
GIS	Geographic Information System
GLNPO	Great Lakes National Program Office
IJC	International Joint Commission
MARPLOT	Mapping Application for Response, Planning and Local Operational Tasks
MESL	MacDonald Environmental Sciences Ltd.
MN	Minnesota
MPCA	Minnesota Pollution Control Agency
MS	Microsoft
NAD	North American Datum
NOAA	National Oceanic and Atmospheric Administration
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RAP	Remedial Action Plan
SQL	Structured Query Language
SQT	Sediment Quality Target
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
WDNR	Wisconsin Department of Natural Resources
WI	Wisconsin

Glossary of Terms

ARC/INFO coverage - A topological data structure for geographic features. The coverage format is suitable for spatial analysis and large geographic data management applications.

ArcView - Desktop Geographic Information System (GIS) and mapping software that provides data visualization, query, analysis, and integration capabilities along with the ability to create and edit geographic data.

Attribute Table - A table that is linked to a spatial data source, such as a shapefile, that contains descriptive information about the geographic features. An attribute is a characteristic of a geographic feature described by numbers or characters, typically stored in tabular format, and linked to the geographic feature.

Basemap - A planning level data layer that defines the project extent.

Data Frame (ArcView 8/9) - In the ArcMap application, a frame on the map that displays layers occupying the same geographic area.

Extension - An ArcView file that allows users to share customizations, documents, or other objects in a project independent manner. Extensions are easily and intuitively used by anyone and can be created by anyone familiar with Avenue.

Image Data - An image is a graphic representation or description of an object that is typically produced by an optical or electronic device. Some common examples of image data include remotely sensed data, such as satellite data, scanned data, and photographs.

Layer (ArcView 8/9) - A collection of similar geographic features, such as rivers, lakes, counties, or cities, in a particular area or place, referenced together for display on a map. A layer references geographic data stored in a data source, such as a coverage, and defines how to display it.

Layout - The layout is used to prepare graphics for output from ArcView. A layout is a map that defines what data will be used for output and how they will be displayed.

Map Document (ArcView 8/9) - In the ArcMap application, the disk-based representation of a map. Map documents have a .mxd file extension.

Metadata - Data that describes spatial data. A metadata file describes the spatial dataset in terms of who created it, for what purpose it was created, and when it was created. The metadata file will also provide an indication of data quality, history and availability.

Project (ArcView 3.x) - A project is the file in which work in ArcView is stored. A project typically contains all the views, tables, charts, layouts and scripts that you use for a particular ArcView application. These are the components of a project.

Project Window (ArcView 3.x) - The Project window has a scrolling list of icons on its left side that allows users to choose the component to display or to create a component of a particular type. Each icon in the project window represents a way of looking at your data (i.e., views, tables, charts, layouts, etc.); each icon represents a document user interface.

Projection - Transforming three-dimensional space onto a two-dimensional map is called 'projection'. Projection formulas are mathematical expressions which convert data from a geographical location (latitude and longitude) on a sphere or spheroid to a representative location on a flat surface.

Script (ArcView 3.x) - A script is the component of an ArcView project that contains Avenue code to accomplish three general objectives: automate tasks, add new capabilities to ArcView, and build complete applications.

Shapefile - A simple, non-topological format for storing the geometric location and attribute information of geographic features.

Table of Contents - The component of the view/data frame that lists the themes included in the view/data frame. The Table of Contents is used to control how the view/data frame is drawn. Each view has its own Table of Contents.

Theme (ArcView 3.x) - A set of geographic features in a view. A theme represents a source of geographic data such as a spatial data source, an image data source, or a table.

View (ArcView 3.x) - An interactive map that allows users to display, explore, query and analyze geographic data in ArcView.

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Phase II

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Chapter 1. Introduction

The St. Louis River constitutes the second largest tributary to Lake Superior. The headwaters begin in northeastern Minnesota (MN), and the lower estuary, which covers an area of approximately 12,000 acres, bisects the border between Duluth, MN and Superior, Wisconsin (WI; MPCA and WDNR 1992). The lower estuary culminates in the Duluth-Superior Harbor, which is one of the largest inland seaports in the world and the most heavily used port in the Great Lakes basin.

The middle and lower portions of the estuary support a variety of industrial, commercial, residential, and recreational activities. In addition, these areas provide essential habitats for aquatic organisms (e.g., walleye) and aquatic-dependent wildlife species (e.g., bald eagle). However, aquatic habitats in some of these areas have been adversely affected by economic development of the St. Louis River over the past 130 years.

In 1987, concerns over environmental quality conditions prompted the International Joint Commission (IJC) to designate 43 Areas of Concern (AOCs) in the Laurentian Great Lakes region between the United States and Canada (IJC 1989). The lower 72 nautical kilometers of the St. Louis River from Cloquet, MN to the Duluth, MN and Superior, WI entries to Lake Superior were designated as one of these AOCs. Contaminated sediments contribute to several use impairments in the St. Louis River AOC, including the issuance of fish advisories, restrictions on dredging, and habitat impairments to bottom-feeding organisms. A number of ecosystem health indicators have been selected to support the assessment of sediment quality conditions within the St. Louis River AOC, including sediment chemistry, sediment toxicity, benthic macroinvertebrate community structure, tissue chemistry, the physical characteristics of sediments, and biomarkers in fish (Crane *et al.* 2000). Investigations conducted using data on multiple indicators provide a weight-of-evidence approach for assessing the effects of contaminated sediments on the beneficial uses of this aquatic ecosystem.

As part of the Remedial Action Plan (RAP) process for the St. Louis River AOC, stakeholders identified a need to compile the sediment quality data collected from the St. Louis River in a database format. As a first step, the Arrowhead Regional Development Commission (ARDC) developed a sediment quality database in 1990 that included all

available sediment quality data (31 studies) from the early 1970s to 1990 (ARDC 1990). The sources of these studies included the United States Army Corps of Engineers, United States Environmental Protection Agency (USEPA), Minnesota and Wisconsin state agencies, contractors, and university researchers. However, no attempt was made to evaluate quality assurance/quality control (QA/QC) procedures in these studies due to a lack of resources. In addition, accurate locational information was not available for most of these sampling stations so the data could not be plotted on maps based on geographic information system (GIS) software.

A matching sediment chemistry and toxicity database was completed in 2000 to support an evaluation of the predictive ability of numerical sediment quality targets (SQTs) in the St. Louis River AOC (Crane *et al.* 2000; 2002). The Minnesota Pollution Control Agency (MPCA) sought additional funding to expand this Microsoft™ (MS) Access database with a wider range of sediment quality data (e.g., bioaccumulation, fish tissue, and additional sediment chemistry and toxicity data). In October 2000, the MPCA obtained a grant from the USEPA's Great Lakes National Program Office (GLNPO) to develop the first phase of a GIS-based sediment quality database for the St. Louis River AOC and an associated GIS-mapping component [i.e., GIS data were compiled in Environmental Systems Research Institute (ESRI) ArcView 3.2 format]. MacDonald Environmental Sciences Ltd. (MESL) was retained in April 2001 to assist the MPCA with this effort; MESL had developed the previous matching sediment chemistry and toxicity database for the MPCA. A Quality Assurance Project Plan (QAPP) was completed and approved by GLNPO in July 2001 (Crane 2001) so that work could commence on the project. In October 2001, MESL and MPCA staff met with over 60 stakeholders in Duluth and St. Paul to obtain input on the development of this GIS-based database. Stakeholders were asked to identify priority sediment quality indicators, sources of candidate data sets, and key types of GIS data for the St. Louis River watershed (MacDonald *et al.* 2001). Their input was very useful in producing Phase I of the GIS-based sediment quality database (Smorong and Crane 2003; Smorong *et al.* 2003).

Due to the large amount of sediment quality data that have been collected from the St. Louis River AOC since 1990, funding is being obtained by the MPCA and its collaborators in a phased approach to further the development of the GIS-based sediment quality database. The Duluth office of the MPCA recently changed the scope of GLNPO grant number

GL97540401-2 in order to develop a comprehensive sediment management plan for the lower St. Louis River AOC. Continuation of the GIS-based database (i.e., Phase II) was identified as one task of this grant, for which Judy Crane is the MPCA project manager and Brian Fredrickson is the MPCA grant manager. MESL was retained in September 2003 to complete additional Phase I tasks and to conduct the Phase II updates of the GIS-based database and ArcView 3.2 projects. In addition, MESL was tasked with converting the ArcView 3.2 projects to a version compatible with a more recent version of ESRI's mapping software (i.e., ArcMap 8.3). A QAPP was completed and approved by GLNPO in May 2004 (Crane 2004) so that work could begin.

Phase III of the GIS-based sediment quality database was initiated in September 2004 through a grant from Minnesota's Lake Superior Coastal Program to the MPCA (grant/project manager is Judy Crane); MESL has been retained to work on this project. Additional sediment quality data sets from the Minnesota portion of the AOC will be added to the Phase III database. The St. Louis River Citizens Action Committee (CAC) in collaboration with the MPCA, Wisconsin Department of Natural Resources (WDNR), and MESL will submit a grant application to the Wisconsin Coastal Management Program in November 2004 to propose conducting Phase IV of the GIS-based sediment quality database. If funded, this project would begin in July 2005 under the project management of Judy Crane (MPCA); additional sediment quality data sets from the Wisconsin portion of the AOC would be added to the database under this proposed phase. In addition, the ArcView 3.2 projects and ArcMap 8.3 map documents would be updated with additional GIS data under the proposed Phase IV project. The expanded database, and associated GIS-mapping components, will support the assessment, preservation, and restoration of the lower St. Louis River AOC and adjoining Lake Superior ecosystems.

The purpose of this Help Section for ArcView Users is to provide an overview of the GIS component of this project, a summary of the updates that were completed as part of the Phase II effort, and general instructions for displaying the GIS data compiled in the ArcView 3.2 projects and ArcMap 8.3 map documents. The Help Section is organized into eight chapters and is indexed in such a way as to provide a quick reference guide for users. For more detailed information regarding the content and organization of the GIS-based sediment quality database and GIS mapping applications, users should refer to the accompanying Technical Documentation (Smorong *et al.* 2004). The Technical Documentation is available

upon request by contacting Judy Crane (MPCA) at 651-297-4068 (voice), 651-297-7709 (fax), or judy.crane@pca.state.mn.us (email).

Users should note that this Help Section is not meant to replace formal training in the use of ESRI's ArcView 3.x and ArcView 8/9 software. ESRI provides formal training sessions, a detailed built-in Help Section, as well as on-line technical support for ArcView 3.x and ArcView 8/9 users (see their web site at: http://www.esri.com/). Users should refer to these information sources for detailed guidance on the use of ArcView 3.x and ArcView 8/9 software.

Chapter 2. Summary of Phase II Updates

This chapter is intended to provide database users with a summary of the changes and additions that have been incorporated into the GIS mapping applications during Phase II of the project. As such, the additional GIS data sets that have been included during this phase of the project are described. In addition, the conversion of the ArcView 3.2 projects to the newer software version (ArcMap 8.3 map documents) is described in terms of the rationale for undertaking the conversion, and the differences that now exist between the two GIS mapping applications.

2.1 Additional GIS Data Included

The ten new watershed GIS data sets that have been incorporated as part of the Phase II effort are listed and described in Table 1. This table identifies the project that the new data set was incorporated into and provides a brief summary of the GIS data set. More information about these data sets is included in Tables 2 through 11 (which provide a summary of the GIS data included in each of the GIS maps), including important information about each individual data set [i.e., details about the data source, how the data were accessed, any errors or problems that have been identified, and where the data and associated metadata are located on the project compact disks (CDs)]. The data sets that were incorporated during Phase II of the project are identified in Tables 2 through 11 with an asterisk in the 'Theme Name' column.

Users should note that it was beyond the scope of this project to correct errors in the GIS attribute data. Please refer to Chapter 6 for more details regarding how known inaccuracies in the GIS data were handled.

2.2 Conversion of ArcView 3.2 Projects to ArcMap 8.3 Map Documents

During Phase I of this project, GIS data was compiled into ten ArcView projects (the terminology used to describe an electronic representation of a map) using ESRI's ArcView 3.2 software. Since the completion of the Phase I portion of the project, ESRI has released ArcView 8/9, which is an updated GIS application that is quite different from ArcView 3.x. The ArcView 8/9 software has a new format and new features, with many new tools and options available. Importantly, many of the tasks are executed using methods different from those available in ArcView 3.x. In addition, ArcView 8/9 integrates three applications: ArcCatalog, ArcToolbox (which are new applications), and ArcMap (which is the primary application, and the most similar to ArcView 3.x).

The ArcView 3.2 projects were converted to ArcMap 8.3 map documents, to take advantage of the features offered by the more updated version of ESRI's GIS software. In ArcMap 8/9, 'map documents' (equivalent to the ArcView 3.x 'project') are the files used to store information such as data frames (similar to ArcView 3.x views), graphs, tables, and layouts. Each of the ten projects that were produced in ArcView 3.2 was converted to ArcMap 8.3 map documents. As there are few differences between the two versions, database users can utilize either of the GIS applications to obtain the underlying GIS data.

One difference between the two versions of the GIS applications is the interpretation of the National Oceanic and Atmospheric Administration's (NOAA) Coastal Services Center Coastal Change Analysis Program (C-CAP) data that are presented in the Land Use project (the organization of the GIS data into different projects will be described in more detail in Chapter 3 of this report). The Coastal Services Center developed an ArcView extension that allows for the interpretation of land cover and change analysis data (i.e., the C-CAP Legend Handler). Unfortunately, ArcView 8/9 does not support extensions that were developed for ArcView 3.x. So although the C-CAP data are included in the ArcMap 8.3 version, the C-CAP legend handler is not available to assist the user in interpreting the data. For ArcView 8/9 users that have access to the Spatial Analyst extension, the Coastal Services Center is in the process of developing a Data Handler extension that will enhance the users ability to

access and manipulate the C-CAP land cover and change analysis data. This tool can be accessed from the following website: www.csc.noaa.gov/crs. Users who do not have Spatial Analyst may want to check the Coastal Services Center website periodically to check for updates to the Legend Handler extension.

One other difference that should be noted is the creation and use of 'layers' in the ArcMap 8.3 map documents (a layer is similar to a 'theme' in ArcView 3.x; it references geographic data stored in a data source and defines how to display it). To provide background, the ArcView 3.2 projects were specifically designed so that each shapefile would retain its legend properties when added to a view or project. This enables GIS users to create their own maps using the data that were compiled during this project, and retain the legend properties that were generated. This functionality is important because the legend properties define how the data are displayed, which is often critical for the correct interpretation of the data. Unfortunately, certain legend properties (e.g., selected symbols, fills) do not import directly into ArcMap 8/9. For shapefiles for which this occurred, the legends were updated in ArcMap 8.3 and a 'layer' file was saved. The layer file makes it possible for ArcMap 8/9 users to add the theme to a new map document or data frame and retain the legend properties. However, the user should note that there is currently no documentation as to which themes have associated layer files (i.e., the ArcView user will not know that the shapefile legend properties do not display in ArcMap 8.3 until the shapefile is added to a new data frame or map document). However, the layer files that were created were saved in the same sub-directory as the associated shapefile, which will be obvious when the user is adding data to a data frame.

Chapter 3. Description of the GIS Component of the Project

This chapter is intended to provide users with a detailed description of the GIS component of the project. As such, this chapter includes a discussion of the types of GIS data included in ten ArcView 3.2 projects and ArcMap 8.3 map documents and how these data are organized on the project CDs, as well as a listing of the individual data sets.

3.1 Organization of GIS Data on the Project CDs

3.1.1 ArcView 3.2 Projects and ArcMap 8.3 Map Documents

The GIS data that were compiled have been organized into ArcView 3.2 projects and ArcMap 8.3 map documents (i.e., files in which work in ArcView is stored). The ArcView 3.2 projects are also compatible with other versions of ArcView 3.x. In addition, the ArcMap map documents are compatible with other versions of ArcMap 8.x or 9.x. As mentioned in Section 2.2, the ArcView 3.2 projects and ArcMap 8.3 map documents have been developed to be functionally equivalent (i.e., users may access either one or the other GIS application, but do not need to refer to both versions). Accordingly, the remainder of this document will refer to both the ArcView 3.2 projects and the ArcMap 8.3 map documents as 'GIS maps' unless the topic necessitates referring to one or the other specifically.

Nine GIS maps were created for the following themes: contaminated areas, ecological areas, geographic features, hydrology, land use, recreation, USEPA Inland Sensitivity Atlas, water quality, and water use. In addition, a GIS map that included a black and white version of the basemap was created. All of the data sources represented in these ten GIS maps are in the Universal Transverse Mercator (UTM) Zone 15 North American Datum (NAD) 83 map projection. Users should note that all changes to labeling, theme order, magnification, etc. (i.e., display changes) are saved when the GIS maps are saved. Therefore, it is recommended that users work in a copy of the GIS maps so that the original format and/or display is always available.

3.1.2 Spatial Data

The GIS applications are comprised of spatial data (i.e., geographic data that stores the geometric location of particular features, along with attribute information describing what these features represent). Spatial data are also known as digital map or digital cartographic data. Spatial data are georeferenced to known locations on the Earth's surface. Spatial data accurately records geographic locations by employing a specific coordinate system, unit of measurement, and map projection. The GIS maps included on the project CDs include the following types of spatial data: image data [aerial photographs and scanned United States Geological Survey (USGS) topographic maps], shapefiles, and layers.

3.1.3 Accessory Information

An ArcView extension prepared by NOAA has been included on project CD #1 (see Section 4.1.2 for installation instructions). The C-CAP Legend Handler extension allows users to manipulate the display of NOAA's C-CAP land cover and change data in ArcView 3.x. The C-CAP land cover and change data can be viewed in the Land Use project. This image data set has associated metadata and instructions for effectively using the C-CAP Legend Handler [included on project CD #1, in the same sub-directory as the associated shapefile (i.e., "C:\STLR_GIS Project\Shapefiles")].

In addition, when metadata were available for spatial data, this information was included on the project CDs, in the same sub-directory as the associated shapefile (i.e., "C:\STLR_GIS Project\Shapefiles"). See Section 3.2 for more information regarding how the GIS data are organized on the project CDs, and how this information has been indexed.

3.1.4 Basemap of the St. Louis River Area of Concern

Three different basemaps (i.e., a planning level set of data) were compiled in each of the ten GIS maps. Each GIS map includes three views of different basemaps. The view named "Orthophotos" includes digital orthographic aerial photographs (image data); the view named "Quad maps" includes USGS digital orthographic topographic maps (image data); and, the remaining view (the main view) includes a basemap comprised of several basic line and

polygon shapefiles. Note that the image files are large and slow down ArcView's refresh rate substantially. As such, users are afforded quick access to each of the three basemaps, as any or all of the orthophotos or quad maps can be incorporated into the main view (i.e., the view that contains the feature geographic data). To incorporate the orthophotos or quad maps in the main view of the ArcView 3.2 projects:

1. Use the "Quad map index" theme to determine the relevant images to include;
2. Open the "Orthophotos" or "Quad Maps" view;
3. Select the desired image in the view's Table of Contents (i.e., make it active);
4. Click on "Copy themes" under the "Edit" menu;
5. Return to your main view and click on "Paste themes" under the "Edit" menu; and,
6. The image will be added to the top of the Table of Contents. Move the image to the bottom of the Table of Contents (click on it and drag it down).

To incorporate the orthophotos or quad maps in the main data frame of the ArcMap 8.3 map documents:

1. Use the "Quad map index" theme to determine the relevant images to include;
2. Activate the "Orthophotos" or "Quad Maps" data frame (right click on the data frame in the Table of Contents and select 'activate');
3. In the Table of Contents, select the desired image in the "Orthophotos" or "Quad Maps" data frame;
4. Right click and select "Copy";
5. Click on the main data frame, right click, and select "Paste layer"; and,
6. The image will be added to the top of the Table of Contents for the main data frame. Move the image to the bottom of the Table of Contents (click on it and drag it down).

3.2 GIS Data Included

The watershed GIS data included in the ten GIS maps are listed and described in Tables 2 through 11. Table 1 provides a summary of the GIS data that were incorporated into the

various GIS maps as part of the Phase II effort. These tables provide important information about each individual data set, such as details about the data source, how the data were accessed, any errors or problems that have been identified, and where the data and associated metadata are located on the project CDs.

Users should note that it was beyond the scope of this project to correct errors in the GIS attribute data. Please refer to Chapter 6 for more details regarding how known inaccuracies in the GIS data were handled.

Chapter 4. Instructions for Displaying Data

This chapter provides general guidance for displaying the data contained in the GIS maps and for using specific ArcView 3.x or ArcMap 8/9 tools and functions to manipulate the GIS maps.

4.1 Setting up the GIS Application to Run on a Personal Computer

4.1.1 Set-up Instructions

In order for the data to display correctly in ArcView 3.x, the files saved on the project CDs must be copied to specific sub-directories. The following set-up instructions are relevant to personal computers that have ArcView 3.x locally installed (i.e., these instructions will need to be modified for personal computers that have ArcView 3.x installed on a network).

1. Copy the contents of project CD #1 directly onto the hard drive. The resulting pathway must be "C:\STLR_GIS Project\....".
2. Copy the two folders ("ccap_nad83" and "Quads_Orthophotos") on project CD #2 into the "C:\STLR_GIS Projects\Shapefiles\Land_Use_Information" subdirectory.

Note that some ArcView installations may create a problem with viewing the NOAA C-CAP land use and change analysis data. In the main view (i.e., Land Use) of the Land Use project (ArcView 3.2), there should be three themes that appear near the bottom of the Table of Contents: CCAP Land Cover 1995; CCAP Land Cover Change 1995-2000; and, CCAP Land Cover 2000. If these themes are not included in this view, they can be added by clicking the 'Add Theme' button, selecting 'Image Data Source' in the 'Data Source Types:' drop-down list, navigating to the following sub-directory "C:\STLR_GIS Project\Shapefiles\Land_Use_Information\ccap_nad83", and adding the following files: ccaplu95.img, ccaplu00.img, and ccaplu95-00.img.

For ArcMap 8.3 users, it is not necessary to save the GIS data to a specific subdirectory on the hard drive.

4.1.2 Installing the Extension

The Land Use project has several shapefiles that need an extension in order to be viewed. The C-CAP Legend Handler extension is a tool that provides options for displaying and viewing NOAA's C-CAP land cover and change analysis data. The extension (ccaplegendhandler.avx) is saved in the following subdirectory on project CD #1: "C:\STLR_GIS Project\Extensions". Information about the C-CAP land cover data set and instructions for using the C-CAP Legend Handler are saved in the following sub-directory and file: "C:\STLR_GIS Project\Shapefiles\Land_Use\Information\ccap_nad83\ ccaplegendhandler_about.pdf".

Copy and paste the "ccaplegendhandler.avx" file into the following subdirectory: "C:\ESRI\AV_GIS30\ARCVIEW\EXT32\". In the main View of the Land Use project, enable the extension by clicking on "Extensions" under the "File" menu, and clicking the check box next to the "C-CAP Legend Handler" item. When the extension is enabled, there will be a menu item called "C-CAP Legend Handler" in the View window. Options for using this tool can be viewed by selecting "Menu definitions".

For ArcMap 8.3 users, it is not necessary to follow these instructions, since ArcMap 8.3 does not support this extension (see Section 2.2 for more details).

4.2 Opening a Project/Map Document; Opening a View/Data Frame

4.2.1 ArcView 3.x

Open ArcView 3.x by double clicking the desktop icon. In the "Welcome to ArcView GIS" window select "Open an existing project". Next, navigate to "C:\STLR_GIS

Project\Projects" and select a project file (e.g., Contaminated Areas.apr). In the Project window, activate the **Views** option (from the list on the left side of the window), and double-click on the name of the view of interest (e.g., Contaminated Areas).

4.2.2 ArcMap 8/9

Open ArcMap 8/9 by double clicking the desktop icon. In the "ArcMap" window select "An existing map". Next, navigate to "C:\STLR_GIS Project\Projects" (or wherever the data have been saved) and select a map document file (e.g., Contaminated Areas.mdx). The map document opens to the Contaminated Areas data frame (data frames are listed in the Table of Contents as main sub-headings). To activate a different data frame, right click on the data frame and select 'Activate'.

4.3 Themes/Layers

4.3.1 ArcView 3.x

A theme is a set of geographic features in a view that represents a source of geographic data (e.g., spatial data such as an ArcView shapefile), or an image data source (e.g., a satellite photograph).

4.3.2 ArcMap 8/9

Geographic information on a map is displayed as layers, with each layer representing a particular type of feature, such as a stream, lake, highway, political boundary, or wildlife habitat. Layers are listed in the Table of Contents.

4.4 Theme/Layer Table of Contents

4.4.1 ArcView 3.x

Each view has its own Table of Contents that lists the themes in the view. The Table of Contents shows the name of each theme in the view, the legend for each theme, whether a theme is turned on or off, the order the themes are drawn in, and which themes are active. A theme's legend can be hidden in the Table of Contents (hiding a theme's legend enables you to save space in a view's Table of Contents, especially when the theme's legend has a large number of classes). When a legend is hidden, the name of the theme and its check box remain visible so you can still turn the theme on and off, double-click it to edit its legend, drag and drop it to change drawing order, etc. To hide or show a theme's legend, click on the theme's name in the Table of Contents to make it active, and then choose Hide/Show Legend from the Theme menu.

4.4.2 ArcMap 8/9

Every map has a Table of Contents. The Table of Contents shows you what layers the map contains and also how the map symbolizes the geographic features in those layers. Some maps display all the layers in one data frame. Others, such as those with insets and overviews, will have more than one data frame. The Table of Contents shows how the layers are organized into data frames. A data frame simply groups, in a separate frame, the layers that are displayed together. The Table of Contents shows the name of each layer in the data frame, how the layer is represented on the map (e.g., symbols, colors, fills), whether a layer is turned on or off, and the order the layers are drawn in.

A layer's legend can be hidden in the Table of Contents (hiding a layer's legend enables you to save space in the Table of Contents, especially when the layer's legend has a large number of classes). When a legend is hidden, the name of the layer and its check box remain visible so you can still turn the layer on and off, double-click it to edit its legend, drag and drop it to change drawing order, etc. To hide or show a layer's legend, click the plus or minus sign to the left of the layer name in the Table of Contents.

4.5 Turning Themes On or Off

4.5.1 ArcView 3.x

To turn a theme on or off, click on the check box next to the theme's name in the Table of Contents.

4.5.2 ArcMap 8/9

To turn a layer on or off, check or uncheck the check box next to the layer. When the layer is on, it draws on the map.

4.6 Making a Theme Active

4.6.1 ArcView 3.x

Many of the operations one can perform on a view apply to the active theme(s). To make a theme active, click the theme's name or legend in the Table of Contents. The theme will highlight to show it is active. To make more than one theme active, hold down the SHIFT key when clicking on the themes.

4.6.2 ArcMap 8/9

In ArcMap 8/9, there is no active theme concept incorporated into the functioning of the software. Therefore, actions that are performed relative to a specific layer are selected by right clicking on the layer of interest and choosing from the menu items available.

4.7 Order Themes are Drawn

4.7.1 ArcView 3.x

The theme at the top of the Table of Contents is drawn on top of those below it. Themes that form the background of a view are therefore at the bottom of the list. Simply drag themes up and down in the Table of Contents to change the order they are drawn in.

4.7.2 ArcMap 8/9

The theme at the top of the Table of Contents is drawn on top of those below it. Themes that form the background of a view are therefore at the bottom of the list. Simply drag themes up and down in the Table of Contents to change the order they are drawn in.

4.8 Viewing a Theme's Attribute Table

4.8.1 ArcView 3.x

Some spatial data sources, such as shapefiles and ARC/INFO coverages have their own attribute tables containing descriptive information about the geographic features they contain. When a theme representing one of these spatial data sources is added to a view, this attribute table can be accessed by pressing the Open Theme Table button. 

When opening a theme's attribute table, select features on the view by selecting their records in the table, and vice versa.

4.8.2 ArcMap 8/9

Some spatial data sources, such as shapefiles and ARC/INFO coverages, have their own attribute tables containing descriptive information about the geographic features they contain.

To view a layer's attribute table, right click on the layer in the Table of Contents and then select 'Open Attribute Table' on the drop-down menu.

4.9 Adding Themes and Image Data from the Project CDs

4.9.1 ArcView 3.x

It is possible to add feature and image data that have been included on the project CDs to any of the ten ArcView 3.2 projects. To determine where a certain theme has been saved on the project CDs, refer to the *Location of GIS Data* column in Tables 2-11. To add an existing ArcView shapefile or image to a view:

1. Click the Add Theme button; 
2. In the Data Source Types box, choose Feature Data Source (for shapefiles) or Image Data Source (for image data);
3. Navigate to the directory that contains the theme of interest. Double-click on the directory name to list the files it contains; and,
4. ArcView shapefiles are listed with a .shp extension. Image data have .tif or .img extensions. Double-click on the shapefile or image data of interest.

4.9.2 ArcMap 8/9

It is possible to add feature and image data that have been included on the project CDs to any of the ten ArcMap 8.3 map documents. To determine where a certain shapefile or image file has been saved on the project CDs, refer to the *Location of GIS Data* column in Tables 2-11. To add an existing ArcView shapefile or image to a view:

1. Click the Add Data button on the Standard toolbar;
2. Click the Look in drop down arrow and navigate to the folder that contains the layer;

3. Click the layer; and,
4. Click Add. The new layer appears on your map.

4.10 Editing a Theme Legend

ArcView 3.x and ArcMap 8/9 allow users to modify theme/layer legends to make visually appealing maps that assist with communicating data to target audiences. There are several different Legend Types to choose from, including:

- Single value legends will only show the extent and location of the data (e.g., all sediment sampling sites are shown as green dots);
- Graduated color legends will show the data according to specific numerical ranges (e.g., highly contaminated sediments are shown as red dots, moderately contaminated sediments are shown as yellow dots, and relatively clean sediments are shown as green dots);
- Graduated symbols are similar to graduated color legends but show the change in classification according to symbol size rather than color change; and,
- Unique value legends allow the user to chose the classification field from the theme's attribute table (e.g., clay-influenced bays are reddish-brown shading, sheltered bays are olive shading, and industrially-influenced bays are salmon shading).

4.10.1 ArcView 3.x

To access the theme legend, double click on the theme in the Table of Contents. Chose the Legend Type from the drop down list.

4.10.2 ArcMap 8/9

In the Table of Contents, right-click the layer of interest and click Properties, then click the Symbology tab.

4.11 Moving Around in the View/Data Frame

ArcView 3.x and ArcMap 8/9 have several different tools available to allow users to display and explore the geographic data included in the view. These tools are similar in the two GIS applications. The following descriptions apply directly to ArcView 3.x, and any significant deviations in ArcMap 8/9 are noted in italics.

Pointer tool; allows the user to select, move and resize graphics.

Identify tool; allows the user to retrieve the information in the attribute table that corresponds to a specific line, point, or polygon. Note: In order to view the data of a particular line, point, or polygon, its theme must be active.

Zoom in/Zoom out tools; allows the user to zoom in or out of the position by clicking on the view (e.g., by drawing a box in a particular section of the view).

Pan tool; allows the user to move around the map. Pan the view by dragging in any direction with the Pan tool.

Measuring tool; allows the user to measure the distance between two specific points. Click at the start point and double-click the end point (length will be displayed in the bottom left corner of the screen). The line can have one or more line segments.

Zoom to Active Theme; allows the user to zoom to the extent of a particular theme (make theme active first). *In ArcMap 8/9 this button is not included*

on the standard toolbar. To zoom to a particular layer you must right-click on the layer of interest, then select 'Zoom to layer'.

Zoom to Previous Extent; allows the user to zoom to the previous screen magnification. *In ArcMap 8/9, there is also a button that allows the user to zoom to the next extent (represented by an arrow pointing in the opposite direction).*

Zoom to Selected; allows the user to zoom to selected features (after selecting features). *In ArcMap 8/9, this button is not included on the standard toolbar. To zoom to selected features, click on the 'Selection' menu, then select 'Zoom to Selected Features'.*

Add Shapefile; allows the user to access file folders and navigate to a specific shapefile. This shapefile is then added to the view window.

Open Theme Table; allows the user to open the data table that corresponds to the active theme. *In ArcMap 8/9, this button is not included on the standard toolbar. To open an attribute table, right-click on the layer of interest, then select 'Open Attribute Table' in the drop-down menu.*

Select Feature Tool; allows the user to select features with the mouse by pointing at them or by dragging a selection box over them. Features that fall partly or wholly inside the box will be selected. Features will be selected from all of the currently active themes. The selected features will also be highlighted in the theme's attribute table. To view the attribute data for these points, open the attribute table and use the Promote button (the selected records will appear at the top of the table). *This tool is available in ArcMap 8/9, but the button has a slightly different appearance. ArcMap 8/9 users should note that the tools and methods for selecting features in ArcMap 8/9 are considerably different than ArcView 3.x. It is recommended that users read the 'Selecting Features' topic in the ArcGIS Desktop Help tool.*

Chapter 5. Linking the MS Access 2000 Sediment Quality Database with the GIS Applications

5.1 Introduction

The MS Access 2000 database that was compiled as a part of this project contains sediment quality data for the St. Louis River AOC. These data can be accessed and plotted in the GIS maps, which allows users to spatially view and interpret the sediment quality data. The database can be accessed using the Structured Query Language (SQL) connection feature in ArcView 3.x. This feature allows you to query a database using SQL and store the returned records in an ArcView table. The database can be accessed using a similar tool in ArcMap 8/9.

In order to plot the data that is imported into the GIS maps, the data must have associated geographical coordinates. The sediment quality database stores the UTM Zone 15 NAD 83 coordinates in the STATION table. As such, the user must combine the data of interest (e.g., mercury concentrations, toxic/not toxic designations for 10-day *Hyalella azteca* sediment toxicity tests) with these geographical coordinates. To accomplish this task, a query must be designed and saved [see the Phase II Help Section for Database Users (Smorong and Crane 2004) for instructions on how to design custom queries in MS Access 2000].

The following sections provide instructions for linking the GIS map projects with the MS Access 2000 version of the GIS-based sediment quality database. Query results obtained from NOAA's Query Manager software (version 2.5) can also be seamlessly linked to the ArcView 3.2 projects (at this time, NOAA has not produced tools to directly link the Query Manager software with ArcView 8/9). NOAA's Query Manager software provides a menu of flexible, built-in database queries, and seamless linking to two different mapping applications [ArcView 3.x and Mapping Application for Response, Planning and Local Operational Tasks (MARPLOT)]. The advantage that Query Manager offers is the easy-to-use user interface, which is suitable for users with little or no experience using database software. Although there is some loss of flexibility if complex data analyses are necessary, Query Manager offers a wide range of data queries and provides an excellent way for most

users to view and query the data. Users should refer to the Phase II Help Section for Database Users (Smorong and Crane 2004) for additional information regarding the accessibility, installation, and set-up of the Query Manager software, as well as information on how to link the Query Manager and ArcView 3.x applications.

5.2 Instructions for ArcView 3.2 Projects

The following section provides step-by-step instructions for linking the MS Access 2000 database with the ArcView 3.2 projects:

1. Open the project of interest, and make the Project window active (select the first window listed when clicking on the "Windows" menu);
2. In the Project window, select "SQL Connect" from the "Project" menu;
3. In the "Connection:" drop-down list, select "MS Access Database";
4. Click on the "Connect" button, browse to the sediment quality database file, and double-click on the file name to select it;
5. The tables and queries that are available to ArcView 3.x are listed in the "Tables" window - double-click on the table or query of interest;
6. The fields that are available to ArcView 3.x are listed in the "Columns" window - double-click on each of the specific fields of interest, or the "<All Columns>" item;
7. In the "Output table:" box, provide a name of the table that will be imported into ArcView 3.x; and,
8. Click on the "Query" button.

The following section provides step-by-step instructions for plotting the imported data in an ArcView 3.2 view:

1. Open the view of interest;

2. Select "Add Event Theme" from the "View" menu;
3. In the "Add Event Theme" window, select the table that was imported using the SQL Connect feature in the "Table" drop down list;
4. In the "Add Event Theme" window, select the geographic coordinates that should be used to plot the data in the "X field" and "Y field" drop down lists (note that the "X-coord" and "Y-coord" should be selected, respectively); and,
5. In the view's Table of Contents, turn the theme on.

5.3 Instructions for ArcMap 8.3 Map Documents

The following section provides step-by-step instructions for linking the MS Access 2000 database with the ArcMap 8.3 map documents:

1. Open an ArcMap 8.3 map document of interest (e.g., ContaminatedAreas.mxd);
2. Open ArcCatalog by clicking the ArcCatalog button on the standard toolbar. Click the 'Connect to Folder' button. Navigate to the location of the Access database. Click OK to establish a connection to the folder;
3. In the Catalog tree, expand the connection that was just established by clicking its plus sign. Double-click on the database to open it;
4. Drag and drop the table or query of interest from ArcCatalog into the ArcMap 8.3 Table of Contents. In ArcMap 8.3, click on the 'Source' tab at the bottom of the Table of Contents;
5. Right-click on the table or query that was just added, then choose 'Data', then select 'Export...';
6. Browse to determine the location the .dbf file will be saved and enter a name for the file (this step converts the Access 2000 table to a .dbf file that can be interpreted by ArcMap 8.3). The new .dbf file will be added to the Table of Contents (when viewing the 'Source' tab);

7. Click 'Yes' when ArcMap 8.3 asks 'Do you want to add the new table to the current map?'; and,

8. Right click on the new table, select 'Display x,y data'. Ensure that the correct fields are selected in the 'Specify the fields for the X and Y coordinates' window (i.e., X-coord and Y-coord). The imported data will automatically plot in the data frame.

Chapter 6. Known Errors in GIS Data Sources and ArcView 3.x

In the process of compiling the GIS maps, a number of errors in the source data were identified. Users should be aware that identifying and correcting errors in the GIS data were not identified as a work plan task for this phase of the project. As such, even though GIS data from reliable data sources were preferentially included (e.g., USGS, USEPA, state agencies), there are some known inaccuracies in the GIS data. Users should also be aware that the metadata were current as to the time period the GIS information was assembled by the source agencies. The notable inaccuracies in the GIS data are listed below:

- Contaminated Areas project; Contaminated Sediment Hot Spots theme: the boundaries indicated are estimates and should not be construed as an estimation of the area requiring sediment remediation;
- Contaminated Areas project; Superfund Sites theme: the boundaries indicated are estimates and should not be construed as an estimation of the area requiring sediment remediation;
- Contaminated Areas project; Air Emissions (MN) theme: the Potlatch facility was bought out several years ago by Sappi;
- Ecological Areas project; MN DNR Important Habitat Sites theme: the location of some of the sites are inaccurate (e.g., Interstate Island is shown at the end of Rices Point instead of on Interstate Island; the Bong Bridge site is shown at Erie Pier; Hog Island is shown in Allouez Bay);
- Hydrology Project; Land Areas of the St. Louis River theme: some land areas such as Rices Point, Clough Island, Interstate Island, and Hearding Island are not included in this theme;
- Hydrology Project; Water bodies of the St. Louis River theme: this theme does not include the reservoirs, Superior Bay is shown to extend too far over to Duluth, and Allouez Bay is cut off;

- Hydrology Project; MN Watersheds theme: the watershed designated as Keene Creek in the attribute table is not located near Keene Creek, which drains into the Interlake/Duluth Tar Superfund site; and,
- USEPA Inland Sensitivity Atlas Project: this project is a stand alone product available from the USEPA. It has been included on the project CD as it was available from the source agency, with the exception of some data layers originating from the WDNR that were deemed to be proprietary. The Inland Sensitivity Atlas used a different basemap than was used for the other projects included on the project CDs, which excludes many boat slips in the outer harbor. In addition, fewer marinas are identified in this project, as compared to the Recreation project (marinas theme). Also, part of the Minnesota state boundary is erroneously shown in Wisconsin.

Users should be aware of the following error in ArcView 3.x software: if two projects are opened in a row ***without*** closing out of ArcView completely, you may receive an error message (e.g., "Illegal Instruction!" or "Segmentation violation!"). Closing and re-opening ArcView resolves this problem.

Chapter 7. Project Contact

For further information about the ArcView 3.2 projects or ArcMap 8.3 map documents, contact Judy Crane at:

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Users will be notified when additional phases of this project have been completed.

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Table 1. Summary of Data Sets Compiled during Phase II of the Project.

Project	Table that Includes Summary Information	Data Category	Theme Name	Data Description
Ecological Areas	Table 3	Managed Areas	Douglas County Endangered Resources (by Township)	Presence of one or more occurrences of rare or natural communities that have been reported only at the township level (of the Public Land Survey referencing system; a township is comprised of 36 Sections).
Ecological Areas	Table 3	Managed Areas	Douglas County Endangered Resources (by Section)	Presence of one or more occurrences of rare or natural communities that have been reported at the section level (of the Public Land Survey referencing system; a section equals one square mile).
Geographic Features	Table 4	Geography	Geographical Names (WI)	Names of all places, features, and areas which appear on the USGS 7.5-minute quadrangle map series (from the National Geographic Names Data Base).
Hydrology	Table 5	Lakes	USGS DLG Lakes and Wetlands (Carlton County)	1:100,000 scale hydrography (lakes only) derived from USGS Digital Line Graph's (DLG's) of the same scale.
Hydrology	Table 5	Streams/Rivers	USGS DLG MN Streams (Carlton County)	1:100,000 scale hydrography (rivers and streams only) derived from USGS Digital Line Graph's (DLG's) of the same scale.
Land Use	Table 6	Land Cover/Use	Future Land Use	Future land use by the City of Superior. They will use this map to rework their zoning and land use codes.
Land Use	Table 6	Land Cover/Use	Harbor Shoreline - 1861	Representation of Superior Port harbor shoreline in 1861.

Table 1. Summary of Data Sets Compiled during Phase II of the Project.

Project	Table that Includes Summary Information	Data Category	Theme Name	Data Description
Land Use	Table 6	Land Cover/Use	Harbor - 1861	Representation of Superior Port harbor in 1861.
Land Use	Table 6	Roads/Rails	DOT Roads (Carlton County)	This data set contains roadway centerlines for roads found on the USGS 1:24,000 mapping series. Those roadways that are Interstate, Trunk Highway, or CSAH (county state/aid Highway) are current through the 2000 construction season.
Recreation	Table 7	Recreation	Bike Routes (Duluth and Superior)	Identifies off-road trails and on-street signed bike routes in Duluth and Hermantown and other recommended unsigned on-street routes throughout the Twin Ports area.

MN = Minnesota; WI = Wisconsin

Table 2. Summary of Data Sets Compiled for the Contaminated Areas GIS Maps.

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available?
Contaminated Areas	Contaminated Sediment Hot Spots	Location of hot spot sites (i.e., areas of high sediment contaminant concentrations).	MPCA (Crane *et al.* 1997)	Crane *et al.* 1997	Shapefile created by MESL	hotspots.shp	Contaminated_Areas\Hotspots	NA	YES
	Superfund Sites	Location of CERCLA Superfund Sites.	MPCA	IT Corp. 1997; URS Corp. 2002	Shapefile created by MESL	superfund.shp	Contaminated_Areas\ Superfund_Sites	NA	YES
Facilities/ Point Sources	Location of Feedlots (MN)	Location of feedlots.	--	MPCA	GIS data sent by MPCA (Tad Schindler)	feedlots.shp	Contamination_Points\ Feedlots	Users have no basis for interpreting attribute data (GIS data provides location data only).	NO
	Hazardous Waste Generators (MN)	In Minnesota, commercial entities that produce any amount of hazardous waste are regulated as hazardous-waste "generators" with requirements that depend upon the amount of waste they produce.	MPCA	MPCA	GIS data sent by MPCA (Tad Schindler)	hwgen.shp	Contamination_Points\ Hazardous_Waste_Generators	Users have no basis for interpreting attribute data (e.g., Type, Size and LCM fields). Refer to www.pca.state.mn.us/programs/bau_p.html for more information about the program.[1]	NO
	Industrial Facilities	Industrial Facilities Discharge Sites - these sites are industrial or municipal point sources discharging to surface waters.	USEPA/Office of Water/OST	USEPA 2003	BASINS website	ifdgood.shp	Contamination_Points\ Industrial_Facilities	Users will need to refer to the metadata file to interpret the field names in the attribute table.	YES

Table 2. Summary of Data Sets Compiled for the Contaminated Areas GIS Maps.

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available?
Facilities/ Point Sources (cont.)	Landfills (MN)	Location, type, and status of landfill sites.	--	MPCA	GIS data sent by MPCA (Tad Schindler)	landfills.shp	Contamination_Points\ Landfills	Users have no basis for interpreting attribute data in the 'Rank' field.	NO
	Leaking Underground Storage Tanks (MN)	Location and status of LUSTs.	--	MPCA	GIS data sent by MPCA (Tad Schindler)	lust.shp	Contamination_Points\ Leaking_Underground_Storage_Sites	Users have no basis for interpreting attribute data in the 'LCM' field.	NO
	Oil Storage Facilities (# of oil tanks)	Location, contact information and product type/volume of oil storage facilities.	Great Lakes Commission	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	fixed oil storage facilities_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA	YES
	Permit Compliance System	USEPA-regulated facilities listed in the USEPA Envirofacts Permit Compliance System (PCS) database.	USEPA	USEPA 2003	BASINS website	permitcomp_final_utm.shp	Contamination_Points\ Permit_Compliance_System	Users have no basis for interpreting attribute data in several fields because metadata does not provide code descriptions (GIS data provides location and facility names only; Envirofacts database can be referenced for code descriptions).	YES
	Pipelines	Locations and routes of pipelines carrying crude oil or refined oil products.	Great Lakes Commission	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	pipelines_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	YES

Table 2. Summary of Data Sets Compiled for the Contaminated Areas GIS Maps.

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available?
Facilities/ Point Sources (cont.)	Resource Conservation and Recovery Information	USEPA-regulated facilities listed in the USEPA Envirofacts Resource Conservation and Recovery Information System (RCRIS; a system in which information is provided by generators, transporters, treaters, storers, and disposers of hazardous waste to state environmental agencies).	USEPA	USEPA 2003	BASINS website	rcris_final_utm .shp	Contamination_Points\ Resource_Conservation_and_ Recovery_Information	Users have no basis for interpreting attribute data in several fields because metadata does not provide code descriptions (GIS data provides location and facility names only; Envirofacts database can be referenced for code descriptions).	YES
	Toxic Release Inventory Sites	USEPA-regulated facilities listed in theToxic Release Inventory System (TRIS).	USEPA	USEPA 2003	BASINS website	tri_final_utm.s hp	Contamination_Points\ Toxic_Release_Inventory_Site	Users have no basis for interpreting attribute data in several fields because metadata does not provide code descriptions (GIS data provides location and facility names only; Envirofacts database can be referenced for code descriptions).	YES
	Salvage Yards (MN)	Location, licensing information, facility descriptions and inspection information for salvage yards.	--	MPCA	GIS data sent by MPCA (Tad Schindler)	salvage.shp	Contamination_Points\ Salvage_Yards	Users have no basis for interpreting attribute data in several of the fields (i.e., ps_lic, dism_cov).	NO

Table 2. Summary of Data Sets Compiled for the Contaminated Areas GIS Maps.

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available?
Discharges/ Emissions	Air Emissions (MN)	Location and names of facilities with air emissions, and contaminant concentrations in air emissions.	MPCA (data obtained from Chun Yi Wu)	MPCA 1999	Shapefile created by MESL	airemissions.shp	Contamination_Points\ Air_Emissions	Users to note that the units of contaminant concentrations in air emissions are lbs.	YES

BASINS = Better Assessment Science Integrating Point and Nonpoint Sources; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; GIS = Geographic Information System; LUST = Leaking Underground Storage Tanks; MESL = MacDonald Environmental Sciences Ltd.; MN = Minnesota; MPCA = Minnesota Pollution Control Agency; NA = Not Applicable; OST = Office of Science and Technology; PCS = Permit Compliance System; RCRIS = Resource Conservation and Recovery Information System; TRIS = Toxic Release Inventory System; USEPA = United States Environmental Protection Agency.

[1]The web link indicated was active at the time this project was completed. Since web site addresses are subject to change and information may be updated over time, it is recommended that users download accessory information as soon as possible.

Table 3. Summary of Data Sets Compiled for the Ecological Areas GIS Maps (asterisks in the 'Theme Name' column indicate data sets that were incorporated during Phase II of the project).

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Ecological Sites	Environmentally Sensitive Areas[1]	Special places meritting spill protection (areas not publically managed, with no special designation).	Great Lakes Commission	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	envirosensres_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	YES
	Habitat Sites	Location of sites of important habitat in the Lake Superior Basin, mapped as part of the Lake Superior Binational Program.	MN DNR	UMN and NRRI 2003	Lake Superior Decision Support Project website	habitatsites_utm.shp	Ecological_Areas_and_Classification\ Habitat_Sites	Users will need to refer to the metadata file to interpret the field names in the attribute table. Link to file referred to in the metadata file doesn't work.	YES
Lower St. Louis River Habitat Plan	Lower St. Louis River Habitat Plan Aquatic Habitat	Aquatic habitat types within the Lower St. Louis River, from the Fond du Lac Dam to the Duluth and Superior entries to Lake Superior (established by the MN DNR and the WI DNR).	Community GIS Services, Inc.	SLRCAC 2002	CD - Lower St. Louis River Habitat Plan	aquatic_habitat.shp	Lower_STLR_Habitat_Plan\ Aquatic_Habitats	NA	YES
	Lower St. Louis River Habitat Plan Plant Communities	Plant community types within a quarter mile buffer of the Lower St. Louis River, from the Fond du Lac Dam to the Duluth and Superior entries to Lake Superior (established by the MN DNR, the WI DNR, and CGIS).	Community GIS Services, Inc.	SLRCAC 2002	CD - Lower St. Louis River Habitat Plan	plant_communities.shp	Lower_STLR_Habitat_Plan\ Plant_Communities	NA	YES

Table 3. Summary of Data Sets Compiled for the Ecological Areas GIS Maps (asterisks in the 'Theme Name' column indicate data sets that were incorporated during Phase II of the project).

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Lower St. Louis River Habitat Plan (cont.)	Lower St. Louis River Habitat Plan Project Area	Project area of St. Louis River.	--	SLRCAC 2002	CD - Lower St. Louis River Habitat Plan	project_area.shp	Lower_STLR_Habitat_Plan\Project_Area	NA	NO
Managed Areas	Managed Areas[1]	Boundaries of federal, state, regional and private lands with special ecological, natural, or recreational value, that are uniquely vulnerable to oil spills (mapped for the Western Lake Superior Inland Sensitivity Atlas).	Great Lakes Commission	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	managed resource areas_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	YES
	MN DNR Scientific and Nat. Areas	Location of Scientific and Natural Areas (SNAs) delineated under the SNA Program (MN DNR).	MN DNR - Scientific and Natural Areas Program	MDNR 2003a	Minnesota DNR GIS Data Deli website	snaxxpymn.shp	Ecological_Areas_and_Classification\MN_DNR_Scientific_and_Natural_Areas	NA	YES
	Douglas County Endangered Resources (by Township)*	Presence of one or more occurrences of rare or natural communities that have been reported only at the township level (of the Public Land Survey referencing system; a township is comprised of 36 Sections).	WI DNR - Bureau of Endangered Resources (Natural Heritage Inventory)	WDNR 2004	WDNR Natural Heritage Inventory County Maps website	douglas_co_twp_utm.shp	Ecological_Areas_and_Classification\WI_DNR_NHI	Users note that PDF versions of maps can be accessed at http://dnr.wi.gov/org/land/er/workinglists/mapsbycounty.htm[2]	YES

Table 3. Summary of Data Sets Compiled for the Ecological Areas GIS Maps (asterisks in the 'Theme Name' column indicate data sets that were incorporated during Phase II of the project).

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Managed Areas (cont.)	Douglas County Endangered Resources (by Section)*	Presence of one or more occurrences of rare or natural communities that have been reported at the section level (of the Public Land Survey referencing system; a section equals one square mile).	WI DNR - Bureau of Endangered Resources (Natural Heritage Inventory)	WDNR 2004	WDNR Natural Heritage Inventory County Maps website	douglas_co_section_utm.shp	Ecological_Areas_and_Classification\WI_DNR_NHI	Users note that PDF versions of maps can be accessed at http://dnr.wi.gov/org/land/er/workinglists/mapsbycounty.htm[2]	YES
Vegetation	PLS Presettlement Vegetation (MN)	General location of bearing trees used in conjunction with the original Public Land Survey (PLS; 1908) and information on vegetation type information.	MN DNR - Section of Wildlife - Minnesota County Biological Survey	MDNR 2003a	Minnesota DNR GIS Data Deli website	pls_veg.shp	Ecological_Areas_and_Classification\PLS Corners with Presettlement Vegetation Info	Users note that codes can be accessed on WWW through the metadata file (See Section 5 - HTML Table on the website).[2]	YES
Mussel Distribution	USGS Zebra Mussel Distribution (1989-1998)	Compilation of reports of confirmed zebra mussel sightings in the United States from 1988 to the present (from a variety of federal, State, and municipal agencies, public utilities, universities, engineering and private consultant firms).	USGS, Florida Caribbean Science Center	USGS 2003a	The National Atlas of the USA website	zebra_mussels.shp	Ecological_Areas_and_Classification\Zebra_Mussel_Distribution	NA	YES

Table 3. Summary of Data Sets Compiled for the Ecological Areas GIS Maps (asterisks in the 'Theme Name' column indicate data sets that were incorporated during Phase II of the project).

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Mussel Distribution (cont.)	MN DNR Mussel Sites 1991, 2000, 2002	Location of state- and/or federally-listed mussels.	MN DNR - Natural Heritage Program	MPCA	GIS data sent by MPCA (Judy Crane via Sarah Hoffman)	stl_musselsites_1991.shp; stl_musselsites_2000.shp; stl_musselsites_2002.shp	Ecological_Areas_and_Classification\Mussels	It is unclear what these data represent, based on the current information and metadata available. Refer to http://www.dnr.state.mn.us/ecological_services/nhnrp/mussel_survey/index.html for more information about the data.[2]	YES

ATV = All Terrain Vehicle; CAC = Citizens Action Committee; CD = Compact Disc; CGIS = Community GIS Services, Inc.; DNR = Department of Natural Resources; GIS = Geographic Information System; MN = Minnesota; MPCA = Minnesota Pollution Control Agency; NA = Not Applicable; NRRI = Natural Resources Research Institute; PLS = Public Land Survey; SNAs = Scientific and Natural Areas; UMN = University of Minnesota; USA = United States of America; USEPA = United States Environmental Protection Agency; USGS = United States Geological Survey; WI = Wisconsin; WWW = World Wide Web.

[1]These shapefiles only contain natural heritage data from Minnesota DNR. Wisconsin DNR natural heritage information was not included at the request of the Wisconsin DNR.

[2]The web link indicated was active at the time this project was completed. Since web site addresses are subject to change and information may be updated over time, it is recommended that users download accessory information as soon as possible.

Table 4. Summary of Data Sets Compiled for the Geographic Features GIS Maps (asterisks in the 'Theme Name' column indicate data sets that were incorporated during Phase II of the project).

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Geography	Geographical Names (MN)	Names of all places, features, and areas which appear on the USGS 7.5-minute quadrangle map series (from the National Geographic Names Data Base).	USGS	MDNR 2003a	Minnesota DNR GIS Data Deli website	geonames.shp	Geographic Features\Geography	Users note that codes can be accessed on WWW through the metadata file (See Section 5 - HTML Table on the website).[1]	YES
	Geographical Names (WI)*	Names of all places, features, and areas which appear on the USGS 7.5-minute quadrangle map series (from the National Geographic Names Data Base).	USGS Geographic Names Information System (GNIS)	USGS 2004	USGS GNIS website	geographic_names_wi_utm.shp	Geographic Features\Geography	Users note that codes can be accessed on WWW through the metadata file (See Section 5 - HTML Table on the website).[1]	YES
Landforms	Landforms (MN)	Geomorphology data describing a wide variety of conditions related to surficial geology.	University of Minnesota-Duluth Geology Department; MN Geological Survey, MN DNR	MDNR 2003a	Minnesota DNR GIS Data Deli website	landforms.shp	Geographic Features\Landforms	Users note that codes can be accessed on WWW through the metadata file (See Section 5 - HTML Table on the website).[1]	YES
Soils	Soils	State Soil Geographic (STATSGO) database: digital general soil association map developed by the National Cooperative Soil Survey.	USEPA	USEPA 2003	BASINS website	statsgo_utm.shp	Geographic Features\Soils	Users note that codes can be accessed on WWW through the metadata file (See Section 5 - HTML Table on the website).[1]	YES

BASINS = Better Assessment Science Integrating Point and Nonpoint Sources; DNR = Department of Natural Resources; GIS = Geographic Information System; HTML = HyperText Markup Language; MN = Minnesota; NA = Not Applicable; STATSGO = State Soil Geographic Database; USEPA = United States Environmental Protection Agency; USGS = United States Geological Survey.

[1]The web link indicated was active at the time this project was completed. Since web site addresses are subject to change and information may be updated over time, it is recommended that users download accessory information as soon as possible.

Table 5. Summary of Data Sets Compiled for the Hydrology GIS Maps (asterisks in the 'Theme Name' column indicate data sets that were incorporated during Phase II of the project).

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Hydrologic Units	USGS Hydrologic Management Units	Hydrologic Units (USGS Office of Water Data Coordination), which includes the list descriptions and name of region, subregion, accounting units, and cataloging unit.	Steeves, Peter and Douglas Nebert	USGS 2003b	Water Resources of the United States website	huc04_250K_utm.shp	Hydrology\Hydrologic_Units	NA	YES
Lakes	MN DNR Lakes	MN DNR 24,000K Lakes (medium scale lake polygons derived from the National Wetlands Inventory (NWI) polygons and MNDOT Basemap lake delineations, integrated with the DNR 24K Streams Layer).	MN DNR - MIS Bureau	MDNR 2003a	Minnesota DNR GIS Data Deli website	dnrlkpymaj03.shp	Hydrology\Lakes\DNR_24K_Lakes	Users note that codes can be accessed on WWW through the metadata file (See Section 5 - HTML Table on the website).[1]	YES
	USGS DLG Lakes and Wetlands (MN)	1:100,000 scale hydrography (lakes only) derived from USGS Digital Line Graph's (DLG's) of the same scale.	USGS	MDNR 2003a	Minnesota DNR GIS Data Deli website	dlglkpystlo.shp	Hydrology\Lakes\DLG_Lakes_and_Wetlands_Polygons	Users note that codes can be accessed on WWW through the metadata file (See Section 5 - HTML Table on the website).[1]	YES
	USGS DLG Lakes and Wetlands (Carlton County)*	1:100,000 scale hydrography (lakes only) derived from USGS Digital Line Graph's (DLG's) of the same scale.	USGS	MDNR 2003a	Minnesota DNR GIS Data Deli website	dlglkpycarl.shp	Hydrology\Lakes\DLG_Lakes_and_Wetlands_Polygons\dlglkpycarl	Users note that codes can be accessed on WWW through the metadata file (See Section 5 - HTML Table on the website).[1]	YES

Table 5. Summary of Data Sets Compiled for the Hydrology GIS Maps (asterisks in the 'Theme Name' column indicate data sets that were incorporated during Phase II of the project).

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Streams/Rivers	Duluth Trout Streams	Designated trout streams of Duluth (as reported by Duluthstreams.org).	MESL	DuluthStreams 2003	Shapefile created by MESL	dulutroutstreams.shp	Hydrology\Streams_Rivers\Duluth Trout Streams	NA	YES
	Land Areas of the St. Louis River	Location of islands, points, etc. (to support the navigation of vessels).	NOAA, National Ocean Service, Office of Coast Survey	NOAA 2003a	Electronic Navigational Charts Download website	land_region_polygon_utm.shp	Hydrology\Streams_Rivers\Land Areas…	Users have no basis for interpreting attribute data because metadata does not define the information contained in the attribute fields (GIS data provides location data only). Metadata for this data is unreliable (see readme file).	YES
	USGS DLG MN Streams (extra coverage)	1:100,000 scale hydrography (rivers and streams only) derived from USGS DLG's of the same scale.	USGS	MDNR 2003a	Minnesota DNR GIS Data Deli website	dlgstlnstlo.shp	Hydrology\Streams_Rivers\DLG_Streams_MN	Users note that codes can be accessed on WWW through the metadata file (See Section 5 - HTML Table on the website).[1]	YES
	USGS DLG MN Streams (Carlton County)*	1:100,000 scale hydrography (rivers and streams only) derived from USGS Digital Line Graph's (DLG's) of the same scale.	USGS	MDNR 2003a	Minnesota DNR GIS Data Deli website	dlgstlncarl.shp	Hydrology\Streams_Rivers\DLG_Streams_MN	Users note that codes can be accessed on WWW through the metadata file (See Section 5 - HTML Table on the website).[1]	YES
	MN and WI Streams	Location of small to medium size streams (ESRI shapefile).	ESRI	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	streams_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA	YES

Table 5. Summary of Data Sets Compiled for the Hydrology GIS Maps (asterisks in the 'Theme Name' column indicate data sets that were incorporated during Phase II of the project).

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Streams/Rivers (cont.)	Trout Streams and Resource Waters	Special designated resource areas that are uniquely vulnerable to oil spills (mapped for the Western Lake Superior Inland Sensitivity Atlas).	Great Lakes Commission	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	special designated resource areas_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA	YES
	Water Bodies of the St. Louis River	Location of bays, lakes, etc. (to support the navigation of vessels).	NOAA, National Ocean Service, Office of Coast Survey	NOAA 2003a	Electronic Navigational Charts Download website	water_area_utm.shp	Hydrology\Streams_Rivers\Water_Areas_St. Louis River	Users have no basis for interpreting attribute data because metadata does not define the information contained in the attribute fields (GIS data provides location data only). Metadata for this data is unreliable (see readme file).	YES
Watersheds	WI Watersheds	Watersheds of WI.	--	WDNR 2003	WI DNR FTP site	wiwatsheds.shp	Hydrology\Watersheds\Watersheds_WI	NA	YES
	MN Watersheds	Statewide minor watershed delineations with major/minor watershed identifiers and names for provinces, major watersheds, and basins.	MN DNR - Division of Waters	MDNR 2003a	Minnesota DNR GIS Data Deli website	mnwatersheds.shp	Hydrology\Watersheds\Watersheds_MN	Users note that codes can be accessed on WWW through the metadata file (See Section 5 - HTML Table on the website).[1]	YES
	FEMA Floodways (MN)	Federal Emergency Management Agency (FEMA) floodways [Q3 Flood Data derived from the Flood Insurance Rate Maps (FIRMs)].	Federal Emergency Management Agency (FEMA)	MDNR 2003a	Minnesota DNR GIS Data Deli website	femafloodways.shp	Hydrology\Watersheds\FEMA_Floodways	Users note that codes can be accessed on WWW through the metadata file (See Section 5 - HTML Table on the website).[1]	YES

Table 5. Summary of Data Sets Compiled for the Hydrology GIS Maps (asterisks in the 'Theme Name' column indicate data sets that were incorporated during Phase II of the project).

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Water Boundaries (St. Louis River)	St. Louis River Depths	Water depths (to support the navigation of vessels).	NOAA, National Ocean Service, Office of Coast Survey	NOAA 2003a	Electronic Navigational Charts Download website	depth_area_polygon_utm.shp	Hydrology\St._Louis_River_Boundaries\Depths_Polygon	Users have no basis for interpreting attribute data in some of the fields (e.g., prim, grup, river, ruin) because metadata does not define the information contained in the attribute fields. There is no information available concerning how depth data was obtained and what datum it is relative to. Data presentation assumes that "Drval1" represents water depth and is more relevant than "Drval2". Metadata for this data is unreliable (see readme file).	YES
	St. Louis River Outline	Boundary of St. Louis River (line).	--	MPCA	GIS data sent by MPCA (Judy Crane)	stlouidl_utm.shp	Hydrology\St._Louis_River_Boundaries\River_Outline	NA	NO
Wetlands (Water Features)	National Wetlands Inventory - Lines	Linear wetland features (including selected streams, ditches, and narrow wetland bodies) mapped as part of the National Wetlands Inventory (NWI).	MN - Division of Waters	MDNR 2003a	Minnesota DNR GIS Data Deli website	nwilines.shp	Hydrology\National_Wetlands_Inventory_Lines	Users note that codes can be accessed on WWW through the metadata file (See Section 5 - HTML Table on the website).[1]	YES

Table 5. Summary of Data Sets Compiled for the Hydrology GIS Maps (asterisks in the 'Theme Name' column indicate data sets that were incorporated during Phase II of the project).

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Wetlands (Water Features; cont.)	National Wetlands Inventory - Points	Wetland point features (typically wetlands that are too small to be as area features at the data scale) mapped as part of the National Wetlands Inventory (NWI).	MN - Division of Waters	MDNR 2003a	Minnesota DNR GIS Data Deli website	nwipoints.shp	Hydrology\National_Wetlands_Inventory_Points	Users note that codes can be accessed on WWW through the metadata file (See Section 5 - HTML Table on the website).[1]	YES
	National Wetlands Inventory - Polygons	Wetland area features mapped as part of the National Wetlands Inventory (NWI).	MN - Division of Waters	MDNR 2003a	Minnesota DNR GIS Data Deli website	nwipolys.shp	Hydrology\National_Wetlands_Inventory_Polygons	Users note that codes can be accessed on WWW through the metadata file (See Section 5 - HTML Table on the website).[1]	YES

DLG = Digital Line Graph; DNR = Department of Natural Resources; ESRI = Environmental Systems Research Institute; FEMA = Federal Emergency Management Agency; FIRMs = Flood Insurance Rate Maps; ftp = File Transfer Protocol; GIS = Geographic Information System; HTML = HyperText Markup Language; MESL = MacDonald Environmental Sciences Ltd.; MIS = Management Information Services; MN = Minnesota; MNDOT = Minnesota Department of Transportation; MPCA = Minnesota Pollution Control Agency; NA = Not Applicable; NOAA = National Oceanic and Atmospheric Administration; NWI = National Wetlands Inventory; USEPA = United States Environmental Protection Agency; USGS = United States Geological Survey; WI = Wisconsin; WWW = World Wide Web.

[1]The web link indicated was active at the time this project was completed. Since web site addresses are subject to change and information may be updated over time, it is recommended that users download accessory information as soon as possible.

Table 6. Summary of Data Sets Compiled for the Land Use GIS Maps (asterisks in the 'Theme Name' column indicate data sets that were incorporated during Phase II of the project).

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Harbor Facilities	Harbor Facilities	Industrial harbor facilities (to support the navigation of vessels).	NOAA, National Ocean Service, Office of Coast Survey	NOAA 2003a	Electronic Navigational Charts Download website	harbor_facilities_points_utm.shp	Land_Use_Information\Harbor_Facilities	Users have no basis for interpreting attribute data in several fields because metadata does not define the information contained in the attribute fields (GIS data provides location and facility names only). Metadata for this data is unreliable (see readme file).	YES
Land Cover/Use	General Land Use/Cover	Land Cover/Use (Duluth Area).	USEPA/Office of Water/OST	USEPA 2003	BASINS website	l_dulumn_utm.shp	Land_Use_Information\Lands_Cover_and_Use\Land Cover_Use (Duluth Area)	NA	YES
	Land Ownership	Public/private ownership as designated by NRRI (includes a breakdown of public ownership by agency, and also includes private industrial forest holdings).	Natural Resources Research Institute	UMN and NRRI 2003	Lake Superior Decision Support Project website	landown_utm.shp	Land_Use_Information\Lands_Cover_and_Use\Public_Private_Ownerships	NA	YES
	Land Use 1800s	Industrial land use along the lower St. Louis River for the pre-industrial time period.	Community GIS Services, Inc.	Kellner *et al.* 1999	St. Louis River Historic Reconstruction Project	grid1800s.shp	Land_Use_Information\Lands_Cover_and_Use\Property_Ownership_and_Land_Use\Grid 1800s	Datum is NAD27 so is not aligned with the basemap.	YES

Table 6. Summary of Data Sets Compiled for the Land Use GIS Maps (asterisks in the 'Theme Name' column indicate data sets that were incorporated during Phase II of the project).

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Land Cover/Use (cont.)	Land Use 1950s	Industrial land use along the lower St. Louis River for the industrial time period.	Community GIS Services, Inc.	Kellner *et al.* 1999	St. Louis River Historic Reconstruction Project	grid1950s.shp	Land_Use_Information\Lands_Cover_and_Use\Property_Ownership_and_Land_Use\Grid 1950s	Datum is NAD27 so is not aligned with the basemap.	YES
	Land Use 1980s	Industrial land use along the lower St. Louis River for the post-industrial time period.	Community GIS Services, Inc.	Kellner *et al.* 1999	St. Louis River Historic Reconstruction Project	grid1980s.shp	Land_Use_Information\Lands_Cover_and_Use\Property_Ownership_and_Land_Use\Grid 1980s	Datum is NAD27 so is not aligned with the basemap.	YES
	Mines	Known mining operations, mineral deposits/occurrences and processing plants [derived from the Mineral Availability System (MAS)/Mineral Industry Location System (MILS)].	USEPA/Office of Water/OST	USEPA 2003	BASINS website	mines_utm.shp	Land_Use_Information\Lands_Cover_and_Use\Minerals_Mines	NA	YES
	Future Land Use*	Future land use by the City of Superior. They will use this map to rework their zoning and land use codes.	Arrowhead Regional Development Commission (ARDC)	Duluth-Superior Metropolitan Interstate Committee 2003a	GIS data sent by ARDC (Andrew Hayden)	future_land_use_403.shp	Land_Use_Information\Lands_Cover_and_Use\Future_Land_Use	The Superior Port Land Use Plan (June 2003) is available to download at http://www.ardc.org/library/plans/mic/supportland03.pdf[1]	YES

Table 6. Summary of Data Sets Compiled for the Land Use GIS Maps (asterisks in the 'Theme Name' column indicate data sets that were incorporated during Phase II of the project).

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Land Cover/Use (cont.)	Harbor Shoreline - 1861*	Representation of Superior Port harbor shoreline in 1861.	Arrowhead Regional Development Commission (ARDC)	Duluth-Superior Metropolitan Interstate Committee 2003a	GIS data sent by ARDC (Andrew Hayden)	harbor1861.shp	Land_Use_Information\Lands_Cover_and_Use\1861_Harbor	The Superior Port Land Use Plan (June 2003) is available to download at http://www.ardc.org/library/plans/mic/supportland03.pdf[1]	YES
	Harbor - 1861*	Representation of Superior Port harbor in 1861.	Arrowhead Regional Development Commission (ARDC)	Duluth-Superior Metropolitan Interstate Committee 2003a	GIS data sent by ARDC (Andrew Hayden)	1861_poly2.shp	Land_Use_Information\Lands_Cover_and_Use\1861_Harbor	The Superior Port Land Use Plan (June 2003) is available to download at http://www.ardc.org/library/plans/mic/supportland03.pdf[1]	YES
NOAA C-CAP Data	C-CAP Land Cover 1995	Dataset consists of a 1995-era Landsat 7 Thematic Mapper scene which was analyzed according to the Coastal Change Analysis Program (C-CAP) protocol to determine land cover.	NOAA Coastal Services Center/Coastal Change Analysis Program (C-CAP)	NOAA 2003b	CD - NOAA C-CAP Data, MN DNR GAP Veg Data	ccaplu95.img	Land_Use_Information\ccap_nad83	Users should note that files with ".metadata" extensions can be viewed using Wordpad.	YES
	C-CAP Land Cover 2000	Dataset consists of a 2000-era Landsat 7 Thematic Mapper scene which was analyzed according to the Coastal Change Analysis Program (C-CAP) protocol to determine land cover.	NOAA Coastal Services Center/Coastal Change Analysis Program (C-CAP)	NOAA 2003b	CD - NOAA C-CAP Data, MN DNR GAP Veg Data	ccaplu00.img	Land_Use_Information\ccap_nad83	Metadata not available for this dataset, but it is reasonable to assume that the metadata file provided for the 1995 data set generally applies to the 2000 data set.	NO

Table 6. Summary of Data Sets Compiled for the Land Use GIS Maps (asterisks in the 'Theme Name' column indicate data sets that were incorporated during Phase II of the project).

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
NOAA C-CAP Data (cont.)	C-CAP Land Cover Change 1995-2000	This data is a change analysis of 1995 C-CAP land cover and 2000 C-CAP land cover for the Great Lakes Region of the U.S.	NOAA Coastal Services Center/Coastal Change Analysis Program (C-CAP)	NOAA 2003b	CD - NOAA C-CAP Data, MN DNR GAP Veg Data	ccaplu95-00.img	Land_Use_Information\ccap_nad83	Users should note that files with ".metadata" extensions can be viewed using Wordpad.	YES
Tribal Interests	Tribal Lands and Inter	Native Reservations MN.	Great Lakes Commission	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	tribal interests_t	USEPA_Inland_Sensitivity_Atlas	NA	
Roads/Rails	State Forest Roads (MN)	Roads administered by the Commissioner of Natural Resources to provide access to lands administered by the Division of Forestry.	MN DNR - Division of Forestry	MDNR 2003a	Minnesota DNR GIS Data Deli	stfrdlnmn.shp	Land_Use_Information\Roads\State_Forest_Roads	NA	YES
	Interstate Trunk Highways (MN)	Includes Interstate, US trunk highway, and Minnesota trunk highway system highway centerlines.	MN Department of Transportation, Survey and Mapping	MDNR 2003a	Minnesota DNR GIS Data Deli	interstatetrunkhwy.shp	Land_Use_Information\Roads\Interstate_Trunk_Highways	NA	YES
	County State Aid Roads (MN)	County state-aid highway (CSAH) is a category of highways based on funding designation.	MN Department of Transportation, Survey and Mapping	MDNR 2003a	Minnesota DNR GIS Data Deli	county_state_aid.shp	Land_Use_Information\Roads\County_State_Aid_Highways	Users note that codes can be accessed on WWW through the metadata file (See Section 5 - HTML Table on the website).[1]	YES

Table 6. Summary of Data Sets Compiled for the Land Use GIS Maps (asterisks in the 'Theme Name' column indicate data sets that were incorporated during Phase II of the project).

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Roads/Rails (cont.)	DOT Roads (St. Louis County)	This data set contains roadway centerlines for roads found on the USGS 1:24,000 mapping series. Those roadways that are Interstate, Trunk Highway, or CSAH (county state/aid Highway) are current through the 2000 construction season.	MN Department of Transportation, Survey and Mapping	MDNR 2003a	Minnesota DNR GIS Data Deli	dotroads.shp	Land_Use_Information\Roads\ DOT_Roads	Users note that codes can be accessed on WWW through the metadata file (See Section 5 - HTML Table on the website).[1]	YES
	DOT Roads (Carlton County)*	This data set contains roadway centerlines for roads found on the USGS 1:24,000 mapping series. Those roadways that are Interstate, Trunk Highway, or CSAH (county state/aid Highway) are current through the 2000 construction season.	MN Department of Transportation, Survey and Mapping	MDNR 2003a	Minnesota DNR GIS Data Deli	dotrdlncarl.shp	Land_Use_Information\Roads\ DOT_Roads	Users note that codes can be accessed on WWW through the metadata file (See Section 5 - HTML Table on the website).[1]	YES

BASINS = Better Assessment Science Integrating Point and Nonpoint Sources; C-CAP = Coastal Change Analysis Program; CD = Compact Disc; CSAH = County State-Aid Highway; DLG = Digital Line Graph; DNR = Department of Natural Resources; DOT = Department of Transportation; GAP = Gap Analysis Project; GIS = Geographic Information System; HTML = HyperText Markup Language; MAS = Mineral Availability System; MESL = MacDonald Environmental Sciences Ltd.; MILS = Mineral Industry Location System; MIS = Management Information Services; MN = Minnesota; NA = Not Applicable; NAD27 = North American Datum of 1927; NOAA = National Oceanic and Atmospheric Administration; NRRI = Natural Resources Research Institute; NWI = National Wetlands Inventory; OST = Office of Science and Technology; UMN = University of Minnesota; US = United States; USEPA = United States Environmental Protection Agency; USGS = United States Geological Survey; Veg = Vegetation; WI = Wisconsin.

[1]The web link indicated was active at the time this project was completed. Since web site addresses are subject to change and information may be updated over time, it is recommended that users download accessory information as soon as possible.

Table 7. Summary of Data Sets Compiled for the Recreation GIS Maps (asterisks in the 'Theme Name' column indicate data sets that were incorporated during Phase II of the project).

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Recreation	MN DNR ATV Trails	DNR managed ATV trails.	MN DNR	MDNR 2003b	MN DNR FTP site	trl_giaatvln3.shp	Recreation\DNR_ATV_trails	Users have no basis for interpreting attribute data because metadata does not define the information contained in the attribute fields (GIS data provides location data only).	YES
	MN DNR Snowmobile Trails	Location of snowmobile trails in Minnesota, regardless of funding source.	MN DNR	MDNR 2003b	MN DNR FTP site	trl_snomblln3.shp	Recreation\Snowmobile_Trails	NA	YES
	MN DNR State Trails	State trails DNR maintained by MN DNR Division of Trails and Waterways.	MN DNR	MDNR 2003b	MN DNR FTP site	trl_stateln3.shp	Recreation\DNR_State_Trails	NA	YES
	Jay Cooke State Park Trails	Location of state park trails.	MN DNR	MDNR 2003b	MN DNR FTP site	trl_stprkln4.shp	Recreation\Jay_Cooke_State_Park_Trails	Users have no basis for interpreting attribute data in several fields (e.g., trail_use, trail_src, surface) because metadata does not define the information contained in the attribute fields (GIS data provides location and names only).	YES
	Marinas	Location of local marina facilities for the purpose of response to potential oil spill situations.	Great Lakes Commission	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	marinas_utm_rev.shp	Water_Use_Information\Recreation\Marinas	Users should note that original WLS EPA Inland Sensitivity Atlas shapefile was updated to include 3 additional marinas (as per request of Judy Crane, MPCA).	YES

Table 7. Summary of Data Sets Compiled for the Recreation GIS Maps (asterisks in the 'Theme Name' column indicate data sets that were incorporated during Phase II of the project).

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Recreation (cont.)	Bike Routes (Duluth and Superior)*	Identifies off-road trails and on-street signed bike routes in Duluth and Hermantown and other recommended unsigned on-street routes throughout the Twin Ports area.	Arrowhead Regional Development Commission (ARDC)	Duluth-Superior Metropolitan Interstate Committee 2003b	GIS data sent by ARDC (Andrew Hayden)	Duluth_Superior_Bikeroutes.shp	Land_Use_Information\Lands_Cover_and_Use\Bike_Routes	More information is available at http://www.ardc.org/mic/bikemap/[1]	YES
	Recreational Areas of St. Louis River	Location of recreational areas around the St. Louis River Area of Concern.	Hedberg Map/visitduluth.com	Duluth Convention and Visitors Bureau 2003	Shapefile created by MESL	rec areas.shp	Recreation\Recreational_Areas	NA	YES
	Water Access Sites	Location of water access sites around the St. Louis River Area of Concern.	MN DNR	MDNR 2003b	MN DNR FTP site	shor_waspt3.shp	Recreation\Water_Access_Sites	NA	YES
	Wisconsin Trails (all types)	Location of proposed and existing trails in Wisconsin.	WI DNR - Bureau of Parks and Recreation	WDNR 2003	WI DNR FTP site	trails.shp	Recreation\WI Trails	NA	YES

ATV = All Terrain Vehicle; DNR = Department of Natural Resources; GIS = Geographic Information System; MESL = MacDonald Environmental Sciences Ltd.; MN = Minnesota; NA = Not Applicable; USEPA = United States Environmental Protection Agency; USGS = United States Geological Survey; Veg = Vegetation; WI = Wisconsin, WLS = Western Lake Superior.

[1]The web link indicated was active at the time this project was completed. Since web site addresses are subject to change and information may be updated over time, it is recommended that users download accessory information as soon as possible.

Table 8. Summary of Data Sets Compiled for the USEPA Inland Sensitivity Atlas GIS Maps.

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available?
USEPA Inland Sensitivity Atlas	Dams	Locations of non-navigational dam sites (public water supply, power generation, flood control, irrigation and recreation).	Great Lakes Commission	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	dams_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	YES
	Fixed Oil Storage Facilities (# of oil tanks)	Fixed facilities store quantities of oil in above- or below- ground storage tanks with a storage capacity of 42,000 gallons or more.	Great Lakes Commission	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	fixed oil storage facilities_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	YES
	Water Intakes	Local water intake facilities (for the purpose of effective response to potential oil spill situations).	Great Lakes Commission	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	water_intakes_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	YES
	Marinas	Location of local marina facilities (for the purpose of response to potential oil spill situations).	Great Lakes Commission	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	marinas_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	YES
	Boat Access	Local boat ramp access facilities (for quick and effective notification and response to potential oil spill situations).	Great Lakes Commission	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	boat access_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	YES

Table 8. Summary of Data Sets Compiled for the USEPA Inland Sensitivity Atlas GIS Maps.

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available?
USEPA Inland Sensitivity Atlas (cont.)	Shoreline Sensitivity	Sensitivity to coastal environments and wildlife to spilled oil (Lake Superior).	NOAA, Office of Ocean Resources Conservation and Assessment	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	shoreline sensitivity_utm .shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	YES
	Special Designated Resource Areas	Areas of environmental significance not actively managed by any federal, state, regional or private agency.	Great Lakes Commission	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	special designated resource areas_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	YES
	Sensitive Species[1]	Sensitive biological resources that are potentially at risk during a spill.	Inland Waterways Spill Response Mapping Project	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	sensitive species_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	YES
	Environmentally Sensitive Resource Areas[1]	Special places meritting spill protection (areas not publically managed, with no special designation).	Great Lakes Commission	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	envirosenres_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	YES
	Tribal Lands and Interests	Boundaries of land and water areas that are of specific tribal interest.	Great Lakes Commission	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	tribal interests_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	YES

Table 8. Summary of Data Sets Compiled for the USEPA Inland Sensitivity Atlas GIS Maps.

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available?
USEPA Inland Sensitivity Atlas (cont.)	Managed Resource Areas[1]	Boundaries of federal, state, regional and private lands with special ecological, natural, or recreational value, that are uniquely vulnerable to oil spills (mapped for the Western Lake Superior Inland Sensitivity Atlas).	Great Lakes Commission	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	managed resource areas_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	YES
	Major Water Features	Major water features.	ESRI	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	major water features_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	YES
	Rails	Railway system at the 1:100,000 scale.	Bureau of Transportation Statistics	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	rails_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	YES
	Pipelines	Locations and routes of pipelines carrying crude oil or refined oil products.	Great Lakes Commission	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	pipelines_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	YES
	Streams	Small to medium size streams extracted from the standard Geographic Data Technology line water layer and includes only Fcc codes H10 and H11.	ESRI	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	streams_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	YES

Table 8. Summary of Data Sets Compiled for the USEPA Inland Sensitivity Atlas GIS Maps.

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available?
USEPA Inland Sensitivity Atlas (cont.)	Roads	Interstate, U.S., and state highways and other major thoroughfares.	ESRI	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	roads_utm.shp	USEPA_Inland_Sensitivity_Atlas	Edited Bong Memorial Bridge to match quad map (was considerably off).	YES
	1_25 000 Quad Index	The index to tiles data set depicts the extents to which data are mapped.	Inland Waterways Spill Response Mapping Project	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	1_250000_index_utm.shp	USEPA_Inland_Sensitivity_Atlas	Users note that the image files (i.e., orthoquads) for which these indexes relate to are not included in the dataset.	YES
	1_100 000 Quad Index	The index to tiles data set depicts the extents to which data are mapped.	Inland Waterways Spill Response Mapping Project	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	1_100000_index_utm.shp	USEPA_Inland_Sensitivity_Atlas	Users note that the image files (i.e., orthoquads) for which these indexes relate to are not included in the dataset.	YES
	Great Lakes Boundary	Great Lakes Boundary.	--	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	great lakes boundaries_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	NO
	County Boundaries	County Boundaries.	--	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	county boundaries_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	NO
	State Boundaries	State Boundary.	--	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	state_boundaries_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	NO

ESRI = Environmental Systems Research Institute; GIS = Geographic Information System; NA = Not Applicable; NOAA = National Oceanic and Atmospheric Administration; USEPA = United States Environmental Protection Agency.

1 These shapefiles only contain natural heritage data from Minnesota DNR. Wisconsin DNR natural heritage information was not included at the request of the Wisconsin DNR.

Table 9. Summary of Data Sets Compiled for the Water Quality GIS Maps.

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available?
Clean Water Act Assessments	305b - Aquatic Life Use Assessments (MN)	Aquatic Life Use Support Assessments (Clean Water Act 305b).	--	MPCA	GIS data sent by MPCA (Tad Schindler)	305b_aql00.shp	Water_Quality\Clean_Water_Act_Assessments\Aquatic_Life_Use_Support_Assessments	Attribute table does not adequately describe meaning of data. Users would have to research State 305b program to interpret data.	NO
	305b - Swimming Use Support Assessments (MN)	Swimming Use Support Assessments (Clean Water Act 305b).	--	MPCA	GIS data sent by MPCA (Tad Schindler)	305b_swim00.shp	Water_Quality\Clean_Water_Act_Assessments\Swimming_Use_Support_Assessments	Attribute table does not adequately describe meaning of data. Users would have to research State 305b program to interpret data.	NO
	TMDL - Impaired Waters (MN Lakes)	Impaired Waters - Lakes (Clean Water Act Section 303d).	--	MPCA 2003	TMDL and Minnesota's Waterways website	tmdl02_lakes.shp	Water_Quality\Clean_Water_Act_Assessments\Impaired_Waters	Attribute table does not adequately describe meaning of data. Users would have to research TMDL program to interpret data.	NO
	TMDL - Impaired Waters (MN Streams)	Impaired Water - Streams (Clean Water Act 303d).	--	MPCA 2003	TMDL and Minnesota's Waterways website	tmdl02_streams.shp	Water_Quality\Clean_Water_Act_Assessments\Impaired_Waters	Attribute table does not adequately describe meaning of data. Users would have to research TMDL program to interpret data.	NO
Hydrology	MN and WI Streams	Location of small to medium size streams (ESRI shapefile).	ESRI	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	Streams_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA	YES

Table 9. Summary of Data Sets Compiled for the Water Quality GIS Maps.

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available?
Hydrology (cont.)	MN DNR Lakes	MN DNR 24,000K Lakes (medium scale lake polygons derived from the National Wetlands Inventory (NWI) polygons and MnDOT Basemap lake delineations, integrated with the DNR 24K Streams Layer).	MN DNR - MIS Bureau	MDNR 2003a	Minnesota DNR GIS Data Deli website	dnrlkpymaj03.shp	Hydrology\Lakes\DNR_24K_Lakes	Users note that codes can be accessed on WWW through the metadata file (See Section 5 - HTML Table on the website).[1]	YES
	USGS DLG Lakes and Wetlands (MN)	1:100,000 scale hydrography (lakes only) derived from USGS Digital Line Graph's (DLG's) of the same scale.	USGS	MDNR 2003a	Minnesota DNR GIS Data Deli website	dlglkpystlo.shp	Hydrology\Lakes\DLG_Lakes_and_Wetlands_Polygons	Users note that codes can be accessed on WWW through the metadata file (See Section 5 - HTML Table on the website).[1]	YES
Miscellaneous Water Quality	Bacteria Monitoring Stations	Location of selected water quality monitoring stations that monitor for 10 bacteria-related parameters.	USEPA Office of Water/OST	USEPA 2003	BASINS website	bacstations.shp	Water_Quality\Bacteria Monitoring Stations	Users have no basis for interpreting codes reported in attribute table (metadata file does not define coding system). Theme has 12 additional dbf files (based on 4 year increments) of bacteria data, as well as a parameter table. Users will have to join these tables to the shapefile.	YES
	Drinking Water Supply	Location of water treatment plants.	--	USEPA 2003	BASINS website	drinkwatersupply.shp	Water_Quality\Drinking Water Supply	Meta data is not available for this dataset. Users have no basis for interpreting several fields in the attribute table (e.g., TMP_B, STCO, TYPE).	NO

Table 9. Summary of Data Sets Compiled for the Water Quality GIS Maps.

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available?
Miscellaneous Water Quality (cont.)	Gage Sites	Inventory of surface water gaging station data including 7-Q-10 low and monthly stream flow.	USEPA Office of Water/OST	USEPA 2003	BASINS website	gage.shp	Water_Quality\Gage Sites	NA	YES
	Milestone Monitoring Sites (MN)	Minnesota Milestone Monitoring Sites.	--	MPCA	GIS data sent by MPCA (Tad Schindler)	milestone_sites.shp	Water_Quality\Minnesota Milestone Monitoring Sites	See associated files saved in the same sub-directory as the shapefiles for more information regarding this data set; no metadata.	NO
	Water Quality Monitoring	Location of water quality monitoring sites.	USEPA Office of Water/OST	USEPA 2003	BASINS website	wqmonitoring.shp	Water_Quality\Water Quality Monitoring	Theme has 12 additional dbf files (based on 4 year increments) with statistical summaries of water quality stations, as well as a parameter table. Users will have to join these tables to the shapefile.	YES
	Water Quality Stations	USEPA's STORET Water Quality Observation Data.	USEPA Office of Water/OST	USEPA 2003	BASINS website	waterqualitystations.shp	Water_Quality\Water Quality Stations and Observations	Theme has one additional dbf file containing raw data measurements for stations. User will have to join this table to the shapefile.	YES
	Water Intakes	Local water intake facilities (for the purpose of effective response to potential oil spill situations).	Great Lakes Commission	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	water_intakes_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA	YES

BASINS = Better Assessment Science Integrating Point and Nonpoint Sources; CD = Compact Disc; DLG = Digital Line Graph; DNR = Department of Natural Resources; GIS = Geographic Information System; MIS = Management Information Services; MN = Minnesota; MnDOT = Minnesota Department of Transportation; MPCA = Minnesota Pollution Control Agency; NA = Not Applicable; NWI = National Wetlands Inventory; OST = Office of Science and Technology; STORET = Storage and Retrieval; TMDL = Total Maximum Daily Load; USEPA = United States Environmental Protection Agency; USGS = United States Geological Survey; WI = Wisconsin, WWW = World Wide Web.

[1]The web link indicated was active at the time this project was completed. Since web site addresses are subject to change and information may be updated over time, it is recommended that users download accessory information as soon as possible.

Table 10. Summary of Data Sets Compiled for the Water Use GIS Maps.

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Dams	Dams	Location of dams as well as age of the dam, number of people living downstream, and some inspection information.	USEPA Office of Water/OST	USEPA 2003	BASINS website	dam_utm.shp	Water_Use_Information\Dams	Some coding is used in the attribute data table that is not defined in the metadata file.	YES
Dredging	Dredging Depths	Dredging Area Outline.	NOAA, National Ocean Service, Office of Coast Survey	NOAA 2003a	Electronic Navigational Charts Download website	Dredged_area_utm.shp	Water_Use_Information\Dredging	Users have no basis for interpreting attribute data in several fields because metadata does not define the information contained in the attribute fields. Metadata for this data is unreliable (see readme file). Assuming units are meters.	YES
Harbor Facilities	Harbor Facility Points	Harbor Facilites (Industrial) around St. Louis River.	NOAA, National Ocean Service, Office of Coast Survey	NOAA 2003a	Electronic Navigational Charts Download website	harbor_facilities_points_utm.shp	Water_Use_Information\Harbor_Facilities	Users have no basis for interpreting attribute data in several fields because metadata does not define the information contained in the attribute fields. Metadata for this data is unreliable (see readme file).	YES
Hydrology	MN and WI Streams	Location of small to medium size streams (ESRI shapefile).	ESRI	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	Streams_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA	YES

Table 10. Summary of Data Sets Compiled for the Water Use GIS Maps.

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Industry	Industrial Water Use	Location of facilities with water appropriation permits.	MN DNR	MDNR 2003c	Water Use - Water Appropriations Permit Program website	swuds.shp	Water_Use_Information\Industry	NA	YES
Navigation	Navigable Waterway Nodes	Navigable Waterway Nodes (Navigation Points; nodes may represent physical entities such as river confluences, ports/facilities, and intermodal terminals, USACE nodes, or may be inserted for analytical purposes).	Vanderbilt Engineering Center for Transportation Operations and Research, Vanderbuilt University	USBTS 2003	Bureau of Transportation Statistics Geographic Information Services website	waternd_utm.shp	Water_Use_Information\Navigation\Navigable Waterway Nodes	NA	YES
	Navigable Waterway Network	Navigable Waterway Network (Navigation Routes; a comprehensive network database of the nation's navigable waterways).	Vanderbilt Engineering Center for Transportation Operations and Research, Vanderbuilt University	USBTS 2003	Bureau of Transportation Statistics Geographic Information Services website	nav_water-utm.shp	Water_Use_Information\Navigation\Navigable Waterway Network	NA	YES
Public Use	Fish Consumption Advisory Areas	Areas for which Fish Consumption Advisories are issued.	MN Department of Health	MDH 2003	Environmental Health in MN website	fishadvis_update.shp	Water_Use_Information\Public_Use\Fishing_Advisories	NA	YES

Table 10. Summary of Data Sets Compiled for the Water Use GIS Maps.

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Public Use (cont.)	Marinas	Location of local marina facilities (for the purpose of response to potential oil spill situations).	Great Lakes Commission	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	marinas_utm_rev.shp	Water_Use_Information\Public_Use\Marinas	Users should note that original WLS EPA Inland Sensitivity Atlas shapefile was updated to include 3 additional marinas (as per request of Judy Crane, MPCA).	YES
	Prohibited Areas	Prohibited Areas (Swimming Advisories).	St. Louis River Citizens Action Committee	SLRCAC 2001	Shapefile created by MESL	prohibited_areas.shp	Water_Use_Information\Public_Use\Prohibited_Areas	NA	YES

BASINS = Better Assessment Science Integrating Point and Nonpoint Sources; DNR = Department of Natural Resources; ESRI = Environmental Systems Research Institute; GIS = Geographic Information System; MN = Minnesota; MPCA = Minnesota Pollution Control Agency; NA = Not Applicable; OST = Office of Science and Technology; USACE = United States Army Corps of Engineers; USEPA = United States Environmental Protection Agency; WI = Wisconsin, WLS = Western Lake Superior.

Table 11. Summary of Data Sets Compiled for the Basemap Features for the Black and White GIS Maps.

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
BASEMAP									
Roads	Main Roads	Interstate, U.S., and state highways and other major thoroughfares.	ESRI	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	roads_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA	YES
	Road Labels	Labels for major roads in AOC.	ESRI	NA	Shapefile created by MESL	road_Labels.shp	USEPA_Inland_Sensitivity_Atlas	NA	NO
Rails	Rails	Railroads.	Bureau of Transportation Statistics	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	rails_utm.shp	USEPA_Inland_Sensitivity_Atlas	Ownership is delineated with codes (code descriptions not provided in metadata; GIS data provides locations only).	YES
Urban Areas	Major Towns	Major towns of the St. Louis River AOC	MPCA (J. Crane)	NA	Shapefile created by MESL	towns.shp	Land_Use_Information\Urban_Areas	NA	NO
Reach/Water Body Boundaries	DB_AREA	Waterbody Boundaries for St. Louis River AOC	MPCA (J. Crane)	NA	Shapefile created by MESL	water_body_bounds_utm.shp	Hydrology\Reach_Water_Body_Boundaries	NA	NO
	Location Description	Reach Boundaries for St. Louis River AOC.	MPCA (J. Crane)	NA	Shapefile created by MESL	reach_bounds_utm.shp	Hydrology\Reach_Water_Body_Boundaries	NA	NO
Water Boundaries (St. Louis River)	St. Louis River	Boundary of St. Louis River (polygon).	--	MPCA	GIS data sent by MPCA (Judy Crane)	Shp_pol_utm_update.shp	Hydrology\St._Louis_River_Boundaries\River_Polygon	NA	NO

Table 11. Summary of Data Sets Compiled for the Basemap Features for the Black and White GIS Maps.

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Stateline	MN/WI State Line	State Line between MN and WI.	--	NA	Shapefile created by MESL	stateline.shp	Land_Use_Information\Stateline	NA	NO
Counties	County Boundaries	Counties boundaries for MN and WI.	--	MPCA	GIS data sent by MPCA (Judy Crane)	Counties_utm.shp	Land_Use_Information\Counties	NA	NO
	County Mask	extra county coverage for MN and WI.	--	NA	Shapefile created by MESL	county_mask.shp	Land_Use_Information\Counties	NA	NO
	Great Lakes Boundary	Great Lakes Boundary.	--	USEPA 2000	Western Lake Superior USEPA Inland Sensitivity Atlas	great lakes boundaries_utm.shp	USEPA_Inland_Sensitivity_Atlas	NA (presenting data as it is distributed by USEPA)	NO
QUADS/ORTHOPHOTOS									
Topographic Quad Maps	Adolph.tif	quad -- Adolph.	USGS and MN DNR	SLRCAC 2002	CD - Lower St. Louis River Habitat Plan	Adolph.tif	Land Use Information\Quads and Orthophotos\Quads	NA	YES
	Duluth.tif	quad -- Duluth.	USGS and MN DNR	SLRCAC 2002	CD - Lower St. Louis River Habitat Plan	Duluth.tif	Land Use Information\Quads and Orthophotos\Quads	NA	YES
	Duluth_hghts.tif	quad -- Duluth Heights.	USGS and MN DNR	SLRCAC 2002	CD - Lower St. Louis River Habitat Plan	Duluth_hghts.tif	Land Use Information\Quads and Orthophotos\Quads	NA	YES

Table 11. Summary of Data Sets Compiled for the Basemap Features for the Black and White GIS Maps.

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Topographic Quad Maps (cont.)	Esko.tif	quad -- Esko.	USGS and MN DNR	SLRCAC 2002	CD - Lower St. Louis River Habitat Plan	Esko.tif	Land Use Information\Quads and Orthophotos\Quads	NA	YES
	Lakewood.tif	quad - Lakewood.	USGS and MN DNR	SLRCAC 2002	CD - Lower St. Louis River Habitat Plan	Lakewood.tif	Land Use Information\Quads and Orthophotos\Quads	NA	YES
	Parkland.tif	quad -- Parkland.	USGS and MN DNR	SLRCAC 2002	CD - Lower St. Louis River Habitat Plan	Parkland.tif	Land Use Information\Quads and Orthophotos\Quads	NA	YES
	Superior.tif	quad -- Superior.	USGS and MN DNR	SLRCAC 2002	CD - Lower St. Louis River Habitat Plan	Superior.tif	Land Use Information\Quads and Orthophotos\Quads	NA	YES
	W_duluth.tif	quad -- West Duluth.	USGS and MN DNR	SLRCAC 2002	CD - Lower St. Louis River Habitat Plan	W_duluth.tif	Land Use Information\Quads and Orthophotos\Quads	NA	YES
	Quad Index	Q024k directory - Quad Index.	USGS and MN DNR	MDNR 2003b	MN DNR FTP site	indx_q024kpy4 .shp	Land Use Information\Quads and Orthophotos\Quads	NA	YES
Orthophotos	Doq03imq2139.tif	orthophoto -- Saginaw.	MN DNR - MIS Bureau	MDNR 2003a	Minnesota DNR GIS Data Deli website	doq03imq2139. tif	Land Use Information\Quads and Orthophotos\Orthophotos	NA	YES
	Doq03imq2140.tif	orthophoto --Adolph.	MN DNR - MIS Bureau	MDNR 2003a	Minnesota DNR GIS Data Deli website	doq03imq2140. tif	Land Use Information\Quads and Orthophotos\Orthophotos	NA	YES

Table 11. Summary of Data Sets Compiled for the Basemap Features for the Black and White GIS Maps.

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Orthophotos (cont.)	Doq03imq2141.tif	orthophoto -- Duluth Heights.	MN DNR - MIS Bureau	MDNR 2003a	Minnesota DNR GIS Data Deli website	doq03imq2141.tif	Land Use Information\Quads and Orthophotos\Orthophotos	NA	YES
	Doq03imq2142.tif	orthophoto -- Duluth.	MN DNR - MIS Bureau	MDNR 2003a	Minnesota DNR GIS Data Deli website	doq03imq2142.tif	Land Use Information\Quads and Orthophotos\Orthophotos	NA	YES
	Doq03imq2143.tif	orthophoto -- Lakewood.	MN DNR - MIS Bureau	MDNR 2003a	Minnesota DNR GIS Data Deli website	doq03imq2143.tif	Land Use Information\Quads and Orthophotos\Orthophotos	NA	YES
	Doq03imq2239.tif	orthophoto -- Cloquet.	MN DNR - MIS Bureau	MDNR 2003a	Minnesota DNR GIS Data Deli website	doq03imq2239.tif	Land Use Information\Quads and Orthophotos\Orthophotos	NA	YES
	Doq03imq2240.tif	orthophoto -- Esko.	MN DNR - MIS Bureau	MDNR 2003a	Minnesota DNR GIS Data Deli website	doq03imq2240.tif	Land Use Information\Quads and Orthophotos\Orthophotos	NA	YES
	Doq03imq2241.tif	orthophoto -- West Duluth.	MN DNR - MIS Bureau	MDNR 2003a	Minnesota DNR GIS Data Deli website	doq03imq2241.tif	Land Use Information\Quads and Orthophotos\Orthophotos	NA	YES
	Doq03imq2242.tif	orthophoto -- Superior.	MN DNR - MIS Bureau	MDNR 2003a	Minnesota DNR GIS Data Deli website	doq03imq2242.tif	Land Use Information\Quads and Orthophotos\Orthophotos	NA	YES
	Doq03imq2339.tif	orthophoto -- Wrenshall.	MN DNR - MIS Bureau	MDNR 2003a	Minnesota DNR GIS Data Deli website	doq03imq2339.tif	Land Use Information\Quads and Orthophotos\Orthophotos	NA	YES

Table 11. Summary of Data Sets Compiled for the Basemap Features for the Black and White GIS Maps.

Data Category	Theme Name	Data Description	Data Originator	Acquired From	Acquisition Details	File Name	Location of GIS data C:\STLR_GIS Project\Shapefiles\.....	Notes	Metadata available ?
Orthophotos (cont.)	Doq03imq2340.tif	orthophoto -- Frogner.	MN DNR - MIS Bureau	MDNR 2003a	Minnesota DNR GIS Data Deli website	doq03imq2340.tif	Land Use Information\Quads and Orthophotos\Orthophotos	NA	YES

AOC = Area of Concern; BASINS = Better Assessment Science Integrating Point and Nonpoint Sources; CD = Compact Disc; DNR = Department of Natural Resources; FTP = File Transfer Protocol; GIS = Geographic Information System; MESL = MacDonald Environmental Sciences Ltd.; MIS = Management Information Services; MN = Minnesota; NA = Not Applicable; USEPA = United States Environmental Protection Agency; USGS = United States Geological Survey; WI = Wisconsin.