

# Graphical Fish Database Browser for Synthesized Long Term Resource Monitoring Fisheries Data

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## Problem

The Long Term Resource Monitoring Program (LTRMP) is the Nation's largest river monitoring program and provides the only source of standardized ecological data for natural resource management on the Upper Mississippi River System (UMRS). The program collects data on water quality, vegetation, invertebrates, and fish. One of the primary goals of the LTRMP is to provide ready access to data for managers within the UMRS Basin.

To accomplish this goal, the Upper Midwest Environmental Sciences Center provides access to LTRMP data through a series of Web pages that permit users to search the databases (e.g., [http://www.umesc.usgs.gov/data\\_library/fisheries/fish1\\_query.html](http://www.umesc.usgs.gov/data_library/fisheries/fish1_query.html)). This approach returns raw data to the user that are useful for determining species captured, their abundance at a sampling site, and for plotting georeferenced observations within a geographical information system. However, many users have requested direct access to summarized status and trends information. Summarizing the raw data into status and trends information is computer-intensive and requires a detailed understanding of the LTRMP sampling design. Consequently, most users do not have the time or resources to do this.

## Another Way

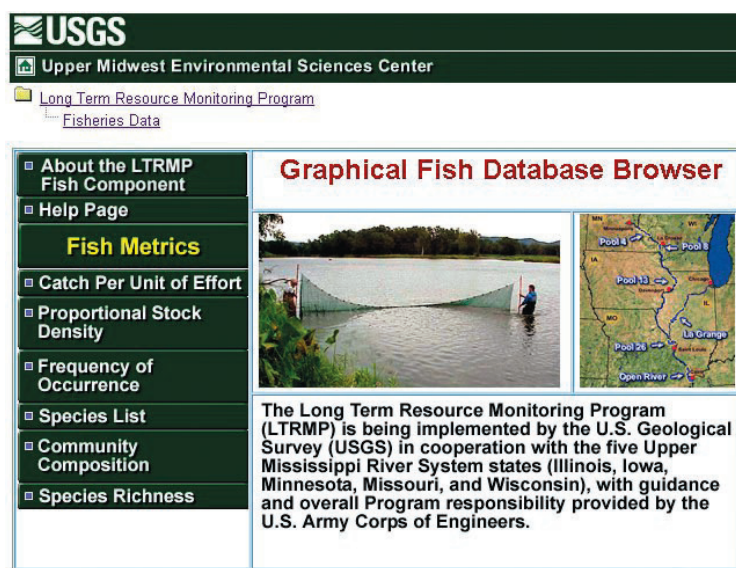
In 2002, we developed new ways to serve LTRMP data that complement existing methods. We chose to test new concepts on the LTRMP fisheries database because it is a large, complex database that provided a good test of our concepts. Since 1993, the LTRMP fish component has made more than 25,000 site visits and collected more than 3 million fish of 134 different species. These observations are spread across six study reaches and are collected using 10 different gear types and eight different sampling strata.

We developed the Graphical Fish Database Browser (Figure 1) by summarizing the data in the fisheries database to derive a suite of population and community metrics, generating new databases containing these metrics, and then building a state-of-the-art Web application to search these databases. The Graphical Fish Database Browser features an easy-to-use interface and requires only basic computer knowledge.

## Key Features

Six population and community metrics are available to search (Figure 1). Population metrics focus on abundance (catch per unit effort), size structure (proportional stock density), and how often a species is collected (frequency occurrence). Community metrics focus on patterns in the individual species collected each year within a study reach (species list), comparisons of the different species collected across study reaches (community composition), and trends in the total number of species collected annually within each study reach (species richness).

After the user selects a metric, a more detailed search interface is provided (Figure 2) that allows the user to select data fields from a series of three to five drop-down lists. Results of the search are provided as an interactive graphic (Figure 3), or a data table, depending on the metric selected. This Web page has many additional features including the ability to print the graphics generated, view an interactive map of the study reach-



The screenshot shows the web interface for the Graphical Fish Database Browser. At the top is the USGS logo and the text 'Upper Midwest Environmental Sciences Center'. Below this is a breadcrumb trail: 'Long Term Resource Monitoring Program' > 'Fisheries Data'. The main content area is titled 'Graphical Fish Database Browser' and features a navigation menu on the left with the following items: 'About the LTRMP Fish Component', 'Help Page', 'Fish Metrics', 'Catch Per Unit of Effort', 'Proportional Stock Density', 'Frequency of Occurrence', 'Species List', 'Community Composition', and 'Species Richness'. To the right of the menu are two images: a photograph of a fishing net being pulled from a river and a map of the Upper Mississippi River System showing study reaches (Pool 4, Pool 3, Pool 2, Pool 1) and the location of La Grange, Missouri. Below the images is a text box stating: 'The Long Term Resource Monitoring Program (LTRMP) is being implemented by the U.S. Geological Survey (USGS) in cooperation with the five Upper Mississippi River System states (Illinois, Iowa, Minnesota, Missouri, and Wisconsin), with guidance and overall Program responsibility provided by the U.S. Army Corps of Engineers.' At the bottom of the page is a horizontal navigation bar with links: 'About the LTRMP Fish Component | Help Page | Catch Per Unit of Effort | Proportional Stock Density | Frequency of Occurrence | Species List | Community Composition | Species Richness'.

**Figure 1.** This is the front page of the Graphical Fish Database Browser. Here, users can learn about the Long Term Resource Monitoring Program's fish component, view a Help Page, or select which of the six population and community metrics they wish to search.

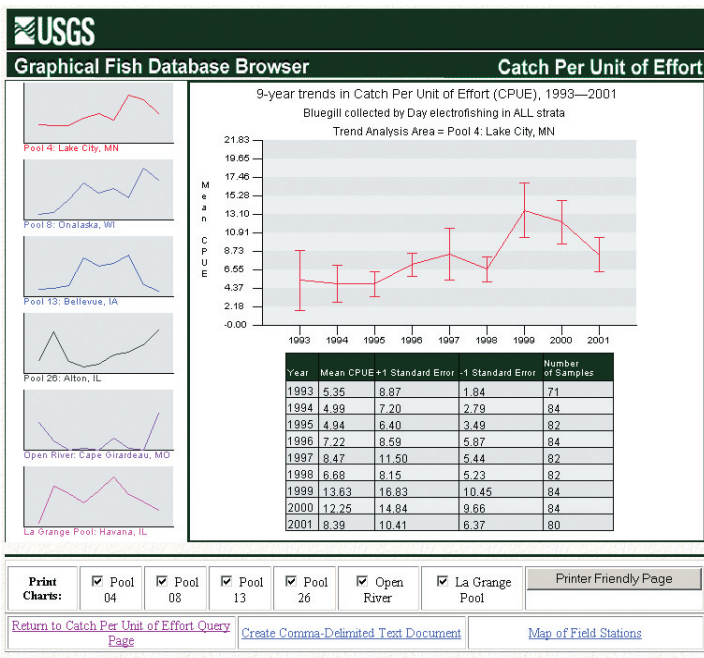


**Figure 2.** This is an example of a Search Page for one of the six metrics available through the Graphical Fish Database Browser (Figure 1). In this example with "Catch Per Unit of Effort," the user simply selects a gear type, a sampling stratum, a species, and a range of years in which they are interested.

es, and download a text file of the search results. These features are explained in more detail in a Help Page included with the browser ([http://www.umesc.usgs.gov/data\\_library/fisheries/graphical/fish\\_database\\_help.html](http://www.umesc.usgs.gov/data_library/fisheries/graphical/fish_database_help.html)).

## Result

The new browser helps fulfill a primary LTRMP goal of providing ready access to monitoring data. This new tool does not replace the former browser interface, but supplements and enhances it. Users can still perform detailed searches on the full data set using the old browser utility. However, the new browser allows easy access to summarized data that can answer many common questions about the status and trends of fishes within the UMRS. We hope to develop similar data browsers that apply these same techniques to other LTRMP databases soon.



**Figure 3.** This is an example of the Results Page for a search on annual estimates of catch per unit of effort for bluegill (*Lepomis macrochirus*) collected by day electrofishing over all strata. The left panel provides generalized trend lines for each of the six study reaches. The larger plot and data table in the center of the display contain additional detail for a specific study area (here, Pool 4: Lake City, MN). The study area depicted changes as the user moves the mouse pointer over the smaller plots in the left panel. From this page, one can also generate a printer-friendly page of results, download the actual data used to generate the results, or view an interactive map of the study reaches with links to information about each field station within the Program.



This report is a product of the Long Term Resource Monitoring Program.

### For further information, contact

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