

Data Integration and Delivery through a Web-Enabled Environmental Data Warehouse

Steven M. Kloiber¹, Terrie O'Dea², and Scott Sherman³

¹ Presenting Author; Metropolitan Council, 230 East Fifth Street, St. Paul, MN 55101.

² Metropolitan Council, 2400 Childs Road, St. Paul, MN 55106

³ Metropolitan Council, 230 East Fifth Street, St. Paul, MN 55101.

Biographical Sketch of the Authors

Steve Kloiber is a Senior Water Resource Planner with the Metropolitan Council of the Twin Cities Metropolitan Area (Minneapolis and St. Paul, MN) and is involved with GIS-based watershed modeling of NPS pollutant loading as well as the development of an environmental data warehouse. Dr. Kloiber recently completed his Ph.D. in civil/environmental engineering at the University of Minnesota in March, 2002. His dissertation is on the use satellite remote sensing and GIS for regional assessment of lakes. Terrie O'Dea is a Principal Scientist with the Metropolitan Council. She oversees data management for the Water Quality Monitoring Section and, along with Dr. Kloiber she is the co-leader on the Council's environmental information management system project. Scott Sherman is a Principal Developer with the Metropolitan Council and he is responsible for developing database application to meet the Council's business needs. The authors have been involved with several database development projects including an environmental data warehouse that presently contains over 10 million records integrated from multiple sources and covering a time period of more than two decades.

Abstract

The Metropolitan Council's Environmental Services Division (MCES) has an extensive commitment to monitoring the quality of the environment of the Twin Cities (Minneapolis and St. Paul, Minnesota) Metropolitan Area (TCMA). Its monitoring programs collect water quality information on hundreds of lakes, rivers and streams throughout the TCMA. MCES also collects information on wastewater discharge and industrial discharge. Some of these databases cover decades and include millions of individual observations. To make better use of this data, to support environmental planning, and to meet the ever-demanding needs of the public, MCES has developed a coordinated Environmental Information Management System (EIMS) to provide timely and reliable environmental information. EIMS aims to enhance data sharing and facilitate data distribution within MCES, with other agencies and the public.

The key concept of EIMS is a centralized environmental data warehouse accessible through a client-server model of networked data management. Monitoring data may be generated by field instrumentation, the MCES laboratory, contract labs, or other agencies. These data move to business-unit databases for review and editing. Once reviewed, the data are published to a read-only data warehouse. The warehouse hardware and software is responsible for storing, filtering, and sorting the data as well as forwarding selected records in response to user requests. Data from the EIMS are delivered through a flexible, user-friendly Internet interface that includes menu-driven searching, keyword searching and interactive mapping. The data are provided at various levels of detail including raw reviewed data, summarized information, and published reports.