Real-time flow monitoring on Huntington North Inlet Canal.

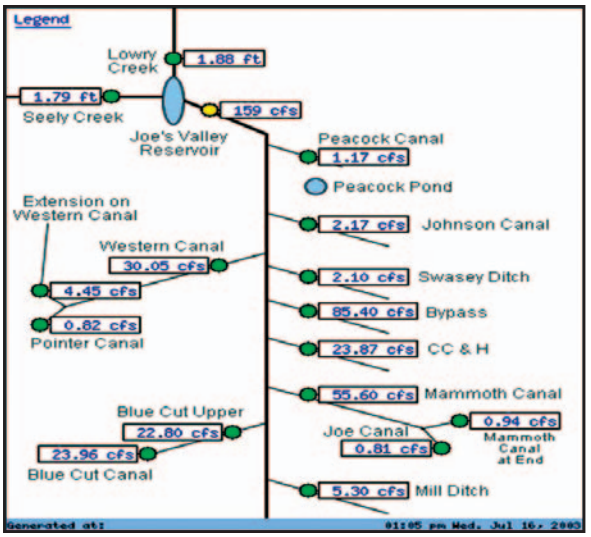
Since 1993, the base station for the district's network has evolved substantially. The first unit consisted of a PC running DOS and the data logger manufacturer's software. The current base station includes a router/firewall, an ADSL modem to connect to the upstream Internet provider, and file and Web servers.

District's Web Site

The district's real-time environmental monitoring system generates a great deal of information, much of it potentially useful to outside organizations. There was a long debate about the best and most efficient method to dispense the data. At the recommendation of the district's computer network consultant, it was decided to connect the environmental monitoring system dynamically to the district's Web site.

In 1999, a first attempt was made at using the district's Web site to distribute the county's real-time information. The Web site includes five major sections: reservoirs, rivers, canals, springs, and weather. Each section allows the user to display real-time data in either a graphical or tabular format. Stylized schematic "stick" maps display hydrologic features annotated with current flows which are dynamically updated each time a visitor loads a page. A flexible graphing tool generates time-series graphs that may be exported to an Adobe Acrobat PDF file for publication-quality output.

The Web site is also designed to exchange data dynamically with a variety of other Web sites, including those of the Natural Resources Conservation Service (SNOTEL), the U.S. Geological Survey, Mesonet (a real-time weather system developed by the University of Utah), and the National Weather Service. The goal is to provide water managers and others with a comprehensive data source for the entire Emery County area. The Web site is the start of creating a "virtual" river basin, an accurate real-time representation of the San Rafael River on the Internet. Already, the site has proved to be very popular with Emery County residents.



Stick diagram showing real-time flows in the canals along Cottonwood Creek.

The software that runs the Web site is based in large part on Open Source packages. The Open Source software movement has created many popular, robust, and secure programs, including the Linux operating system and the Apache Web server. In the spirit of giving back to the open software community, the district's computer network consultant started the OpenBasin project in 2003. At the project Web site (www.openbasin.org), the software that runs the district's Web site is being rewritten and released to the public. It is hoped that a community of users will evolve that will use, test, and enhance this software for the benefit of all.

Future

By any measure, the Emery County real-time monitoring system and Web site have been successful, but having a product that is continually evolving has not always been easy for Humphrey and other system users. It is not uncommon for them to express frustration with new "improvements." Comments such as: "But we just got used to the last one!" are typical. Ways to mitigate the impact of a continually changing product need to be carefully considered, particularly as the rate of technological change continues to increase. Ensuring that new products are backward-compatible is always an issue.

Nevertheless, Humphrey feels that the district has only scratched the surface of the network's potential. With a grant in 2002 from the U.S. Department of Commerce Technology Opportunity Program, the district will be expanding its monitoring/Internet system to empower an even wider range of users.

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Installing monitoring and control equipment.