



## Water Utility Management

**Client**  
Tampa Bay Water Department

**Location**  
Tampa Bay, FL, USA

## Water Resources Decision Support System

### Project Highlights

- Increased the agency's efficiency in planning for and operating new supply sources
- Enhances effective management of Tampa Bay Water's complex water supply/resource systems
- Provides for consistent and uniform decision-making in a complex and dynamic water supply environment

### Project Description

CH2M HILL developed a needs assessment for a real-time decision support system (DSS) for Tampa Bay Water. The objective of this project was to assess, develop, and implement strategies for operating Tampa Bay Water's diverse water supply and resource facilities. Tampa Bay Water owns twelve groundwater supply systems, which are operated in accordance with permits issued by the Southwest Florida Water Management District (SWFWMD). Eleven wellfields are operated under the Consolidated Water Use Permit as an integrated system utilizing a set of simulation-optimization models, which prioritize minimization of environmental impacts while reliably meeting demands. Tampa Bay Water, with the assistance of CH2M HILL, developed the DSS requirements to provide an integrated information system with agency-wide access to information needed by management and "non-primary" system users. The DSS:

- Increased the agency's efficiency in operating the new supply sources
- Enhanced effective management of Tampa Bay Water's complex water supply/resource system
- Improved the agency's data collection, storage and retrieval process
- Facilitated regulatory compliance
- Provided for consistent and uniform decision-making in a complex and dynamic water supply environment
- Enhanced the ability of the agency to predict supply availability and adjust operations accordingly

The DSS enabled the agency to satisfy its management, operations, member, and regulatory objectives.

The DSS is an interactive computer-based system that helps water managers and other decision makers utilize data and models to solve complex, uncertain management issues. The DSS has three functional units: database, models and analytical tools, and a graphic user interface. Tampa Bay Water authorized CH2M HILL to assess, develop, and implement projects for its Water Resource DSS program.

The project is divided into two phases.

## Phase 1—2001

Phase I involved a needs assessment and overall design development for the DSS. Specifically, Phase I accomplished the following:

- Assessed current business and operations systems, processes, and staffing relevant to the DSS
- Gathered and analyzed business and operations process requirements for the DSS system
- Assessed integrating the DSS into future infrastructure and water production changes
- Developed an integrated DSS solution for Phase II, which included implementing business and operational process changes, defining systems architecture, identifying new components and requirements for integrating and linking current and new systems; and determining application development requirements for new components to implement the DSS



The plan that resulted from Phase I was implemented in Phase II. During Phase I, fourteen requirements were identified and prioritized based on four criteria. The four criteria were:

- Provides cost savings through increased efficiency or productivity
- Meets multiple needs/requirements
- Enhances credibility and repeatable decision making
- Improves operational reliability

The next step was to identify, investigate, and evaluate technical alternatives to meet the 14 priority requirements. Alternatives were evaluated using four additional criteria:

- Total lifecycle
- Degree to which alternative meets DSS requirements
- Agency resource impacts
- Compatibility with Tampa Bay Water information technology (IT) strategic plan

Individual components were used at different times, depending upon need, and were compatible with the agency's IT strategic plan. In addition, a modular approach was used for developing and maintaining the DSS components. This allowed various elements to be developed independently as funding and resources became available, and allowed individual modules to function and provide decision support as Tampa Bay Water brought the new water supply systems on line. Effective management of software development is a key to successful implementation of the DSS. A project delivery methodology, using the Rational Unified Process, was employed to



ensure the production of high-quality, clearly documented software that meets the needs of the agency within a predictable schedule and budget.

#### Phase 2—2002

- Initiated DSS program management and QA/QC implementation
- Converted the existing database into a scheme suitable for long term implementation of the DSS, including converting and integrating certain stand-alone applications into the DSS that were running on individual personal computers (software development)
- Developed and implemented a graphic user interface, allowing Tampa Bay Water staff to manage DSS execution, decision support analysis, and associated models, and to report and store the results (software development)
- Converted the existing software to a Windows-based system (software conversion)
- Developed and implemented automated QA/QC tools for agency data