A DECISION SUPPORT SYSTEM FOR ADAPTIVE REAL-TIME MANAGEMENT OF SEASONAL WETLANDS IN CALIFORNIA

Nigel W. T. Quinn and W. Mark Hanna
Contact: Nigel W. T. Quinn, 510/486-7056, nwquinn@lbl.gov

RESEARCH OBJECTIVES

This project describes the planned application of a decision support system (DSS) and the development of a comprehensive flow and salinity monitoring program to improve management of seasonal wetlands in the San Joaquin Valley of California. The Environmental Protection Agency is in the process of regulating salinity discharges from nonpoint sources to the San Joaquin River. This project is seen as a proactive initiative to develop new management strategies and gather data to demonstrate the likely impact of regulation on the long-term health and function of wildfowl habitat.

APPROACH

Seasonal wetlands in the Grassland Water District (GWD) are flooded in the fall and drained in the spring to provide habitat for migratory waterfowl, shorebirds, and other wetland-dependent species. The spring draining period is timed to correspond with optimal germination conditions (primarily optimal soil temperature) for growing naturally occurring moist-soil plants and to make seed and invertebrate resources available to migrating birds. Improved coordination of wetland releases with east-side reservoir releases in the San Joaquin Basin has been suggested as a means of improving compliance with San Joaquin River water-quality objectives.

Flow transducers and electrical conductivity sensors have been placed at control structures within the GWD. These devices take measurements every 15 minutes to provide an accurate measurement of salt loads imported and exported from the GWD. Data logged at each site is telemetered to Berkeley Lab. Daily salinity loading is calculated from the daily mean values, which are compared with daily assimilative capacity determinations (made using data available from the river monitoring stations). Wetland discharge opportunities during the spring months will be evaluated weekly by the project team in collaboration with the district water master.

Salinity balances are calculated at two scales—the district scale (90,000 acres) and the individual duck club scale (640 acres). A DSS is under development to assist in computing GWD wetland water requirements, estimating wetland salinity loads in seasonal wetlands, and selecting the best management practices.

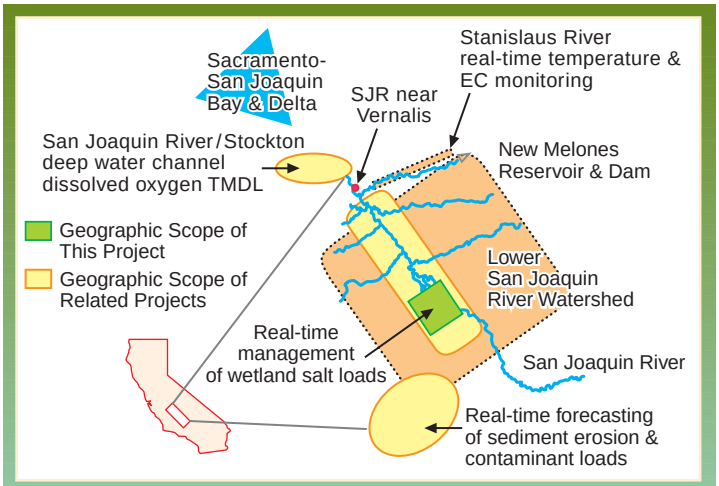

Figure 1. Geographical nexus of CALFED-sponsored real-time flow and water-quality monitoring and management projects

ACCOMPLISHMENTS

Real-time flow, electrical conductivity, and temperature data from the GWD is provided by e-mail and through a Web site (http://socrates.berkeley.edu/%7eph299/Grassland_Realtime/Hanna-Grass/RTWQGWD/) as input to the real-time water-quality forecast model of the San Joaquin River (operated by the San Joaquin River Management Program Water Quality Subcommittee). This is one of a number of real-time monitoring and management projects in the San Joaquin Basin (Figure 1). Agencies such as the U.S. Bureau of Reclamation use the San Joaquin River Management Project Web-posted forecasts of river water quality during periods when water quality in the San Joaquin River is impaired.

SIGNIFICANCE OF FINDINGS

Information obtained through this project will likely be transferable and significantly valuable to all wetlands in the Grassland Ecological Area, including those wetlands managed by state and federal wildlife agencies. Successful implementation of this combined monitoring, experimentation, and evaluation program will provide the basis for adaptive management of wetland drainage throughout the entire 70,000 hectare Grassland Ecological Area. The project involves local landowners, duck club operators, and managers of state and federal refuges in the Grassland Basin.

RELATED PUBLICATION

Quinn, N.W.T, A Decision Support System for real-time management of water quality in the San Joaquin River, California, Environmental Software Systems, Environmental Information and Decision Support (R. Denzer, D.A. Swayne, M. Purvis, and G. Schimak, eds.), Kluwer Academic Publishers, Massachusetts, 1999.

ACKNOWLEDGMENTS

This project is supported by a CALFED grant through the Grassland Water District, Contract No. 0041000.