

## EDUCATION

- ◆ California State University, Sacramento  
MS in Civil Engineering, 1995
- ◆ California State University, Sacramento  
BS in Civil Engineering, 1988



## PROFESSIONAL LICENSES, SOCIETIES and HONORS

- ◆ Registered Civil Engineer in California
- ◆ Member, American Society of Civil Engineers
- ◆ Sacramento-San Joaquin Bay-Delta Hugo B. Fischer Award

## PROFESSIONAL HISTORY

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|----------------|---|
| 2000 - Present | MBK Engineers, Sacramento, CA<br><b>Senior Water Resources Engineer</b>                 |
| 1996 - 1999    | Surface Water Resources, Inc., Sacramento, CA<br><b>Senior Water Resources Engineer</b> |
| 1989 - 1996    | Water Resources Management, Inc., Sacramento, CA<br><b>Water Resources Engineer</b>     |
| 1987 - 1989    | Boyle Engineering, Sacramento, CA<br><b>Civil Engineer</b>                              |

## PROJECT HISTORY

- ◆ **Revising Colusa Basin and Sacramento River Representation in CalSim.**  
Provide a revision to the CalSim model schematic to better represent the physical characteristics of the Colusa Basin, Stony Creek, and portions of the Sacramento River. The task included revising the model connectivity and logic that routes water through the system. A working version of the model was produced, with model development and refinement of model inputs in order to: 1. Revise depiction of agricultural demands; 2. Validate diversions and stream flows using recent historical data; 3. Revise accretions in Colusa Basin; 4. Revise representation of refuge operation.
- ◆ **Documenting CalSim II.**  
Work with USBR to design and create a document describing aspects of the CalSim II model hydrology. 1. The hydrology documentation is designed. 2. Information is incorporated into the document. 3. The documentation is enhanced. 4. The hydrology document is linked to CalSim.

- ◆ **Hydrologic Support for Development of CalSim-III.**  
Hydrologic analysis and support needed to improve and enhance the CalSim-II water resources planning model. The project goals are to: 1. Improve accuracy of representation of water supplies and water use; 2. Reconcile differences between CVGSM and CalSim; 3. Reduce development time for new hydrology inputs associated with new land use scenarios; 4. Represent groundwater sufficiently accurately for impact analysis and preliminary conjunctive use studies; 5. Be relatively simple, accessible, and well-documented.
  
- ◆ **Upper San Joaquin River Basin Storage Investigation.**  
Served as an integral part of the team evaluating new storage in the upper San Joaquin River Basin watershed for Reclamation. Responsible for development of analytical tools and performing hydrologic analysis for reservoir operations and conjunctive management of Friant water supply. Evaluated effects of new storage on CVP/SWP water system using CalSim II.
  
- ◆ **San Joaquin River Basin CalSim Model Development.**  
Key developer of the CALSIM depiction of the San Joaquin Basin River Basin and reservoirs including New Hogan, New Melones, Don Pedro, New Exchequer, Eastman, Hensley, and Millerton Reservoirs; including operations of all water districts in the San Joaquin River Basin.
  
- ◆ **Sacramento River Basin-Wide Water Management Plan.**  
Evaluation of current water use practices within the Sacramento Valley and identification of possible water management practices that could improve the overall water management. Development of a detailed evaluation of increased efficiency and associated water supply benefits within the CVP.
  
- ◆ **Delta Risk Management Strategy.**  
Developed reservoir operations model to simulate CVP/SWP system response to Delta levee breaches and changed Delta conditions. Integrated reservoir operations module with Delta hydrodynamic calculator to dynamically operate system reservoirs and revise water allocations in the CVP/SWP export area.

- ◆ **CALFED Common Assumption.**  
Assisted with development of the Common Assumptions Common Model Package being use by CALFED Surface Storage Investigation teams to complete Plan Formulation, Feasibility Study Reports, Environmental Impact Studies, Environmental Impact Reports, and other environmental documents.
- ◆ **Folsom Dam and Reservoir Interim Reoperation Agreement - Sacramento Area Flood Control Agency (SAFCA).**  
Performed hydrologic and temperature model simulations for the SAFCA Interim Reoperation of Folsom Dam and Reservoir Environmental Impact Report/Environmental Assessment. Primary hydrologic issues requiring consideration included changes in reservoir storage and river flows in the American River and Central Valley Project/State Water Project system. Provided technical assistance on all water supply, power analysis, and temperature studies for impact analyses.
- ◆ **Sacramento Area Water Forum Plan Supplement and Environmental Impact Report - City-County Office of Metropolitan Water Planning.**  
Developed modeling assumptions regarding reservoir operations and hydrologic data for all hydrologic and temperature analyses related to the Water Forum EIR. Performed all hydrologic, temperature, and salmon mortality modeling for the CVP and SWP system that was used as the basis of impact assessment for water supply, power, fisheries, riparian vegetation, recreation, and cultural resources.
- ◆ **Hamilton City Pumping Plant Fish Screen Improvement Project EIR/EIS - Glenn-Colusa Irrigation District.**  
Developed the water supply model to assess environmental impacts associated with project alternatives for the Hamilton City Pumping Plant Fish Screen Improvement Project. Performed the temperature and salmon mortality modeling for assessing impacts due to project alternatives.
- ◆ **Long-Term Groundwater Stabilization Project EIR - Placer County Water Agency/ Northridge Water District.**  
Developed hydrologic and temperature modeling assumptions and performed model simulations. Designed model simulations to investigate potential effects on fishery, riparian habitat, power supply, water-related recreation, and cultural resources along the American River and CVP system.
- ◆ **Central Valley Project Water Supply Contracts EIS/EIR - Sacramento County Water Agency.**  
Performed the hydrologic and water temperature modeling to determine potential impacts to the lower American River, Sacramento River, and the Delta that could result from diverting a portion of Central Valley Project Water Supply Contracts P.L. 101-514 water from Folsom Reservoir. Worked closely with SWRI fishery biologists to design the hydrologic modeling studies and to determine output needed to conduct the necessary environmental assessments.

- ◆ **CALFED Bay/Delta Facilities Evaluation - California Department of Water Resources.**  
Assisted the Department of Water Resources in the evaluation of potential Bay/Delta facilities, implemented either individually or in combination, as a part of the CALFED Program. Provided technical guidance by reviewing model results and evaluating changes to CVP/SWP operations including water supply, stream flow, Delta flow, groundwater and system storage.
- ◆ **San Joaquin Area Simulation Model Development - U.S. Bureau of Reclamation.**  
Participated in the development of the U.S. Bureau of Reclamation's San Joaquin Area Simulation Model. Researched the hydrology in the San Joaquin Valley to develop water demands, stream accretions and depletions, reservoir operation criteria, minimum stream flow requirements, and all data necessary as input to the simulation model.
- ◆ **Republican River Depletion Study - Kansas Water Office.**  
Participated in the Republican River Depletion Study in northern Kansas. Responsible for data and model development and selection of analytical methods. The analysis addressed the effect of increased irrigated acreage, land surface alteration for water conservation, and groundwater pumping within the basin.
- ◆ **Water Operations Model Development - Eastern Irrigation District.**  
Participated in the development of a water operations model for the Eastern Irrigation District in Alberta, Canada. Assisted in model development, data development, and created database interface for data manipulation and program execution.
- ◆ **Central Valley Project/State Water Project Model.**  
Developed the input data for Reclamation's Project Operations Model (PROSIM), and produced the first accepted base run of this model. Using PROSIM, analyzed various project alternatives for Reclamation, Sacramento County, Sacramento Area Flood Control Agency, Glenn-Colusa Irrigation District, Kern County Water Agency, State Water Contractors, Central Valley Project Water Association, and the Metropolitan Water District of Southern California.
- ◆ **Central Valley Project/State Water Project Operations Alternative - Association of California Water Agencies Ag/Urban Technical Group.**  
Assisted the Ag/Urban Technical Group in identifying a preferred CVP/SWP operations alternative for recommendation to CALFED. Using the DWRSIM model, prepared operation studies on multiple alternatives, including options for no new facilities, fully isolated canal water transfer facility, dual facility, and through Delta water transfer.
- ◆ **Water Temperature Evaluations.**  
Evaluated temperature impacts to the Sacramento, American, and Feather Rivers resulting from alternative Central Valley Project/State Water Project operations for several clients, including Sacramento County Water Agency, Sacramento Area Flood Control Agency, City of Sacramento, and the Sacramento Area Water Plan Forum. These evaluations utilized monthly output from CVP/SWP models (e.g., DWRSIM and PROSIM). Utilized temperature modeling results in Reclamation's Salmon Mortality Model to assess impacts to winter-run Chinook salmon in the Sacramento River, and Chinook salmon in the American River. Analyzed output from these model runs to determine compliance with applicable regulations and other flow, storage, and temperature criteria for the different river reaches. Also worked with clients to develop mitigation for any potential temperature impacts.

- ◆ **Integrated Resource Planning Studies - Metropolitan Water District of Southern California.**  
Performed numerous planning studies for the Metropolitan Water District of Southern California using the DWRSIM model.  
Study results were used in MWD's Integrated Resource Planning modeling effort for transfer analysis and by their State Water Project branch. DWRSIM was used to evaluate combinations of the following alternatives: South Delta Improvements, a Through-Delta Facility, Peripheral Canal, Los Banos Grandes, Kern Water Bank and others; under the following constraints: D-1485, National Marine Fisheries Service criteria for winter-run Chinook salmon, Delta smelt criteria, proposed D-1630 standards, and the December 1994 Water Quality Control Plan.
- ◆ **Groundwater Model Development - California State Water Resources Control Board.**  
Participated in the development of the Central Valley groundwater model for the State Water Resources Control Board. Responsible for the surface water input data and aided in the calibration and verification of the model.
- ◆ **Water Transfer Analysis - Metropolitan Water District of Southern California.**  
Assisted MWD by analyzing the water supply benefit and cost of potential water transfers. Analysis involved the development of a model that was used to determine probable yield and cost of potential transfers. The model was also used to provide information that aided MWD when negotiating potential transfers.
- ◆ **Las Vegas Valley Water Supply Optimization Model - Southern Nevada Water Authority.**  
Participated in the development of the Las Vegas Valley Water Supply Optimization Model. Responsible for all data development and network configuration and performed several training sessions for water purveyors in the use of the model. Assisted in negotiations between Las Vegas Valley water purveyors (Boulder City, Henderson, Las Vegas, North Las Vegas, the Big Bend Water District, Clark County Sanitation District, and the Las Vegas Valley Water District) which led to the formation of the Southern Nevada Water Authority.