2006 Annual Meeting
Poster Session Titles

Tuesday, March 1, 2006

Poster 1: Take the Taste Challenge, Rich Losee (MWDSC), Marianne Guerin (CCWD) and Tara Smith (CA DWR)

Think you know water? You may have been modeling it for years but can you identify what makes up drinking water when it is placed right under your nose? This is your opportunity to show what your taste buds are made of. Courtesy of Metropolitan Water District, some carefully selected and created water samples will be available for your tasting discernment. Clarity, odor, taste, mouth-feel, aftertaste may be a few of the techniques you can use to determine substances such as total dissolved solids, chlorine, Geosmin, and Methylisoborneol (MIB).

Poster 2: Using Particle Tracking to Indicate Delta Residence Time, Jim Wilde, Michael Mierzwa and Bob Suits (CA DWR)

To aid the Pelagic Organism Decline Hydrology and Project Operations Satellite Team's analysis of trends in Delta hydrodynamics, DWR Delta Modeling staff used DWR's Particle Tracking Model to develop time series of indices of Delta residence time. The indices are generated daily due to changing Delta hydrodynamics and relate to a specific particle injection location and region in which particles are subsequently tracked. This poster summarizes the methodology used to create time series of residence time indices and presents several applications for their use in assessment of Delta conditions.

Poster 3: CUP (Consumptive Use Program), Morteza N. Orang, Richard L. Snyder and J. Scott Matyac (CA DWR)

The California Department of Water Resources (DWR) and the University of California (UC) have developed a user-friendly Excel application program (CUP) to improve the dissemination of K_c and crop evapotranspiration (ET_c) information to California growers and water purveyors. CUP computes reference evapotranspiration (ET_o) from monthly means of solar radiation, maximum and minimum temperature, dew point temperature, and wind speed using the daily Penman-Monteith equation. The program uses a curve fitting technique to derive one year of daily weather and ET_o data from the monthly data. In addition, daily rainfall data are used to estimate bare soil evaporation as a function of mean of ET_o and wetting frequency in days. A bare soil K_c value is calculated to estimate the off-season evapotranspiration and as a baseline for in-season K_c calculations. CUP accounts for the influence of orchard cover crops on K_c values and for immaturity effects on K_c values for tree and vine crops. Further, the program computes and applies all ET_o and K_c values on a daily basis to determine crop water requirements by month, by season, and by year.

Poster 4: SIMETAW (Simulation of Evapotranspiration of Applied Water), Morteza N. Orang, Richard L. Snyder and J. Scott Matyac (CA DWR)

CUP (consumptive use program) and SIMETAW (simulation of evapotranspiration of applied water) are two new computer programs that have been developed through a joint effort between the California Department of Water Resources and the University of California, Davis to help the water planners to improve their long-term estimates of their crop evapotranspiration, using improved methodologies. These programs can estimate daily reference evapotranspiration (ETo) using the daily Penman-Monteith equation, which has been recommended by American Society of Civil Engineers (ASCE) and United Nations FAO as a standard method for calculating daily ETo. Then crop and soil information are used to calculate daily crop coefficients (Kc) and crop evapotranspiration (ETc).

Poster 5: Mono Basin Operations Model, Stacy Tanaka (Watercourse Engineering), Mark Hanna (LA Dept. of Water and Power), Sarah Null and Mike Deas (Watercourse Engineering)

Mono Lake, located on the Eastern slope of the Sierra Nevada Mountain Range, is a highly saline lake. The lake and surrounding area provides habitat for birds and other wildlife, and four of the lake's tributary streams are a water supply source for the city of Los Angeles. To assist the Los Angeles Department of Water and Power (LADWP) in balancing basin exports with short-term and long-term commitments to protect Mono Basin streams and Mono Lake elevations, LADWP has developed daily and monthly time step operations models. The STREam Analysis Model (STREAM) is a daily time step water balance model where daily flow requirements for the four Mono Basin creeks diverted by LADWP (Lee Vining, Walker, Parker, and Rush) are used to estimate operations of the Lee Vining Conduit and Grant Lake Reservoir. The Los Angeles Aqueduct Simulation Model (LAASM) is a monthly water balance model of the Los Angeles Aqueduct that is used to assess long-term implications of identified creek and reservoir management strategies on water supply delivery. To ease application and analysis, these two models were improved and embedded in a graphical user interface (GUI). This software interface is termed the Mono Basin Operations Model (MBOM) and it allows users to run either of the models, view input and output in tabular or graphical form, store simulations, and other features. MBOM includes a database to store input as well as output data. The objective of this model redevelopment project was to facilitate planning, operations, management, and reporting for department personnel.

Poster 6: Benefits of Multiple Conservative Water Quality Constituents in Historical and Forecast Simulations, Michael Mierzwa, Jim Wilde and Bob Suits (CA DWR)

In August 2004, in order to investigate possible causes of taste and odor complaints from South Bay Aqueduct water users, the Delta Simulation Model 2 (DSM2) was used to investigate the sources of water at the SWP’s Clifton Court Forebay. At the time it was believed that a significant amount of the water reaching the South Bay Aqueduct was organic-rich water coming from the Jones Tract pump-off operations. DSM2 volumetric fingerprinting results were useful in aiding water quality experts access the possible sources of the South Bay Aqueduct taste and odor issues. Based on the usefulness of the model in identifying the sources of water reaching the SWP, DSM2 volumetric fingerprints were again used by water stakeholders to explain possible causes of abnormally high organic carbon concentrations in January and February 2005. By February 2005, DSM2 volumetric fingerprints, similar to those used in August 2004 and January and February 2005 were being incorporated into the MWQI weekly water quality reports as a semi-regular feature. In March 2005, two additional fingerprints, (1) source of EC at Clifton Court Forebay and (2) source of DOC at Clifton Court Forebay, were added to the weekly water quality reports in order to provide better insight into the relationship between source water and water quality at the SWP. This poster focuses on discussing the benefits of using comparisons fingerprinting and sources of water and mass in interpreting and understanding the modeling results of conservative water quality constituents and general circulation patterns in the Sacramento-San Joaquin Delta.

Poster 7: Progress on Incorporating Climate Change into Management of California's Water Resources, Jamie Anderson and Francis Chung (CA DWR)

The California Department of Water Resources and U.S. Bureau of Reclamation joint Climate Change Work Team has recently completed a report titled "Progress on Incorporating Climate Change into Planning and Management of California's Water Resources." This poster will present highlights from the report including (1) Motivation for the report, Executive Order S-3-05, (2) Report overview, (3) Climate change scenarios examined, (4) Potential impacts of climate change to (a) State Water Project and Central Valley Project operations, (b) Delta water quality, (c) Flood management, (d) Evapotranspiration and (5) Future directions, emphasis on risk analysis.

Poster 8: Modeling Topographic Shading for Temperature Modeling, Michael L. Deas (Watercourse Engineering), Josh Viers and Nate Roth (ICE, UC Davis)

Topographic shading was added to the water quality model RMA-11 explicitly identify the impact of reductions in solar radiation due to local geography in the Klamath River Basin from Klamath Falls to the Pacific Ocean – over 250 miles. The work was completed in cooperation with the Information Center for the Environment (ICE) in the Department of Environmental Science & Policy at the University of California, Davis. Watercourse Engineering, Inc. provided ICE with a geographical description of the river and all model nodes (either every 75 meters or 150 meters). This information was used in concert with a digital elevation model to determine sunrise and sunset at all model nodes. RMA-11 was modified to incorporate the information into the heat budget calculations.

Poster 9: Water Quality 1A, George Nichol (SWRCB)

This poster will start from the grass-root level. Shown will be the first step of accounting for whether one has a plug-flow waterway or a completely mixed waterway. Then the accounting for a water quality constituent as it flows along in the waterway and of what happens to the constituent as it grows, decays, or is transformed will be accounted for, leading to the equations to use (i.e. the model) for making predictions of the constituent concentration at points downstream.

Poster 10: Using DSM2 for Rapid Feasibility Assessment of Responses to Massive Island Inundation, Tawnly Pranger (CA DWR)

In 2005, RMA produced a study showing the impacts of a 30-levee breach scenario within the Delta. This study revealed that the Tracy and Banks pumping facilities would be unable to send water south for over a year due to increased salinity at those locations. One potential solution to this problem was to put barriers into the Delta to hydraulically separate the bulk of the flow of fresh water coming down from the San Joaquin from the salinity inundated Delta. DSM2 was used to quickly assess multiple barrier configurations to see which, if any, would be feasible. The result of the studies was that the use of barriers could allow for a reduced amount of pumping to be resumed. With a feasible solution identified, time and effort can now be spent on more in depth analysis of a more exact solution.

Poster 11: Climate Change Impacts on High Elevation Hydropower Generation in California's Sierra Nevada: A Case Study in the Upper American River, Sebastian Vicuna, Rebecca Leonardson, John A. Dracup, Michael Hanemann (UC Berkeley) and Larry Dale (LBNL)

California utilities manage a complex infrastructure of high elevation hydropower generation systems that contributes to a significant portion of the State's hydropower. These systems have relatively small storage capacity and rely on snowmelt to maintain generation during the spring season. Under a climate change scenario, much of the spring snowmelt may disappear and this study is designed to evaluate the likely impact on hydropower generation. A linear programming model was developed to simulate SMUD's reservoir hydroelectric system on the Upper American River. The model estimates hydropower generation for a base (historical) case and different climate change hydrologic scenarios. The paper predicts that the earlier stream flow will have little impact on either hydro-generation or revenue. This finding is explained in part by the degree of operational foresight assumed (~30 days of perfect foresight) and the pattern of high early summer energy prices assumed in the model. Other assumptions about operational foresight and the value of electricity generation, particularly the value to meet sudden spikes in demand earlier in the year (e.g., May) and perhaps late in the summer and fall, might lead to a different conclusion.

Poster 12: Hydrologic Impact Analysis using Refined and Updated Integrated Groundwater and Surface Water Model, Ali Taghavi, (WRIME), James McCormack (Sacramento City and County), Robert Caikoski (Co. of Sacramento), John Coppola (Sac Co. WA) and Chris Smith and Yiguo Liang (WRIME)

As part of the preparation of environmental impact report for the Zone 40 Water Supply Master Plan developed by the Sacramento County Water Agency, a hydrologic analysis was conducted using the Integrated Ground and Surface water Model (IGSM) developed for the Sacramento County. The model, developed originally in 1993, used monthly hydrologic and water demand and supply data and simulated the groundwater and surface water flows in monthly time step. Recent research and monitoring by The Nature Conservancy and the University of California, Davis (UCD) provided new data (the detailed stream channel geometry, streambed parameters, and shallow aquifer parameters), as well as an improved understanding on the stream-aquifer interaction for the Cosumnes River, an unregulated river flowing from northeast to southwest across the central basin of the Sacramento County. The IGSM code has been updated in recent years to allow for simulation of the non-linear formulation of the stream-aquifer interaction on a daily hydrologic time step. Newly available data, improved understanding for the Cosumnes River hydrogeology, along with the updated IGSM version, made it possible to analyze the impacts of proposed water projects on regional groundwater levels as well as on localized stream-aquifer interaction in a much more detailed level. Sacramento County Water Agency (SCWA), the Sacramento County Department of Environmental Review and Assessment (DERA), and WRIME, Inc. conducted this study by: 1) updating the original Sacramento County IGSM by refining the model grid along the corridor of the Cosumnes River, incorporating the most recent data on stream characteristics of the Cosumnes River, developing daily hydrologic data, and employing the latest version of IGSM code; 2) re-calibrating the updated model including the use of additional groundwater monitoring records from UCD; and 3) re-evaluating the impacts of Zone 40 Water Supply Master Plan on regional and localized groundwater levels, as well as on Cosumnes River streamflows. The refined and updated model greatly improved simulations of groundwater levels in the refined area and of the streamflows of the Cosumnes River.

Poster 13: Environmental Data Management, Saquib Najmus and Donghai Wang (WRIME)

Data Management is a key element of the Groundwater Management Plans (GWMP) and the Integrated Regional Water Management Plan (IRWMP). The data collection, analysis, modeling, and monitoring activities during the plan development and project implementation phases create a large volume of data that needs to be processed, stored, and reported to the public as well as to the state agencies. On one hand, all the data needs to be integrated for the comprehensive planning, while on the other hand, the data is owned by different agencies, which are reluctant to give ownership for fear of loss of control and quality. As a result, innovative approaches are required where a combination of data centralization and distributed computing techniques is employed to solve the problem. A GIS and web based data management architecture will be presented with practical applications to demonstrate the ease of use in data access, sharing, and visualization.

Poster 14: A Regional Groundwater Model for the Butte Basin, R. Paul Hossain, Brian J. Heywood and Robert H. Fitzgerald (CDM)

With increasing interest in the Lower Tuscan Formation as a water source, the four counties overlying this formation (Butte, Colusa, Glenn, and Tehama) need to further improve their understanding of the aquifer. Development of infrastructure to utilize the aquifer is occurring throughout all four overlying counties. A groundwater model that covers the extent of the Tuscan Formation would be a valuable tool to water users in the region, and would provide agencies with the ability to effectively manage water resources at the local and regional scales in response to the increasing pressures of groundwater use in this region of the Sacramento Valley. Two groundwater models have already been developed to help improve the understanding of groundwater in the area. These two models (Butte Basin developed by CDM and Stony Creek Fan developed by WRIME, Inc.) separately represent the east and west sides of the Sacramento Valley. Both models are structurally similar as they both incorporate regional stratigraphy developed by DWR and utilize the same numerical code (IGSM/IWFM). Because both models are starting from the same basis, the development of a combined regional model would be able to build directly on the input data previously developed. Combining these models would also eliminate one of the uncertainties incorporated in both models, such as flow underneath the Sacramento River. Overall, a combined model utilizing information from both sides of the river would be a valuable tool to water users in the region.

Poster 15: Winter Chinook Modeling: Insights into What is Driving Population Trends, Steve Cramer (S.P. Cramer & Associates) and Rick Sitts (MWDSC)

Abundance of winter run Chinook Salmon in the Sacramento River declined precipitously in the 1970s, remained at low levels through the 1990s, and began to gradually increase in the mid 1990's. We explored the factors driving those trends using a life-cycle simulation model. Model functions and parameters were derived from existing monitoring studies to the full extent possible. The initial model version accounted for 74% of variation in run sizes during 1972-2003. That simulation showed that the sharp drop in run size from 1968 to 1974 was driven by mortality of juveniles related to high population density (35,000 to 114,000 spawners), followed by adult losses from impaired adult passage at Red Bluff Diversion Dam (RBDD). Survival was also low from the spawn of 1976 and 1977 broods due to high water temperature during egg incubation. The increasing run sizes since the 1992 brood resulted largely from improved passage at RBDD and the combined smaller effects of low rearing density, improved Delta passage, and reduced ocean harvest mortality (35% to 21%). Life cycle modeling proved to be a useful approach for distinguishing potential benefits of different recovery actions, framing expectations for population growth, and identifying critical data needs to steer future management.

Poster 16: Austin Nelson, 1936-2005, CWEMF

In 2005, Austin Nelson, an engineer and modeler for the Contra Costa Water District and the California Department of Water Resources passed away. From the 1960s to 1980, Austin worked for the California Department of Water Resources where he led and managed a staff of civil engineers who conducted mathematical modeling studies of the Sacramento-San Joaquin Delta. He was given professional awards by the State of California for his publications on those studies. In 1974, he served on the staff of the National Commission on Water Quality in Washington D.C. In 1981, Austin joined the Contra Costa Water District and was appointed Director of Water Resources in 1988. Austin is credited with creating and staffing Contra Costa Water District's Water Resources Department, which under his direction plays a major role in analyzing flows and salinity transport in the Sacramento-San Joaquin River Delta. He retired in 1995 to run his own consulting business and also served as the first executive director of the California Water and Environmental Modeling Forum. He is survived by his wife Pat, and adult children, Kristin and Mark, their spouses and children.