California Water and Environmental Modeling Forum

2014
ANNUAL MEETING
PROGRAM

20 Years of Supporting the California Water Community

SUMMARY OF SESSIONS

Monday, February 24

Time	Session	Moderator	Room
8:00 - 8:30	Registration		Sierra Hallway
8:30 - 10:15	1. Delta Simulation Model 2 (DSM2) Model Development and Applications	Tara Smith	Sierra 1
	2. IWFM & IDC 2012-2013 Enhancements and Applications	Tariq Kadir	Folsom/Natoma
10:15 - 10:30	Break		
10:30 - 12:15	3. Sacramento and San Joaquin Basins Study: Modeling Climate Change Impacts and Adaptation Strategies	Michael Tansey	Sierra 1
	4. Integrated Water Resources Models	Ali Taghavi	Folsom/Natoma
12:15 - 12:45	Lunch - Included in registration fee		Restaurant
12:45 - 1:30	5. Keynote Speaker - Gary Bardini	Benjamin Bray	Sierra 1
1:30 - 3:15	6. Advances in Climate Change Assessment	Jamie Anderson & Tapash Das	Sierra 1
	7. Reservoir Water Quality Modeling – Applications for Better Management	Stephen McCord	Folsom/Natoma
3:15 - 3:30	Break		
3:30 - 5:15	8. CalSim II/CalLite 2/WRIMS 2 Updates and Applications	Tom FitzHugh	Sierra 1
	9. Technical Analysis in Support of California Water Plan Update 2013	Abdul Khan	Folsom/Natoma
5:15 - 6:15	10. Business Meeting	Benjamin Bray	Sierra 1
6:15 - 8:00	11. Social and Awards Program	Marianne Guerin	Sierra 1

ORGANIZATIONAL MEMBERS

California Department of Water Resources

California State Water Resources Control Board

Contra Costa Water District

East Bay Municipal Utility District

ICF International

Metropolitan Water District of Southern California

U.S. Bureau of Reclamation

Tuesday, February 25

Time	Session	Moderator	Room
7:30 - 8:00	Registration		Sierra Hallway
8:00 - 9:45	12. Recent Innovations in Numerical Modeling Techniques and Model Data Management	Jonathan Traum	Sierra 1
	13. Modeling Floodplain Hydraulics and Habitat	Paul Frank	Folsom/Natoma
9:45 - 10:00	Break and poster set-up		Sierra 2
10:00 - 11:30	14. Pop-up Talks	Nigel Quinn & Stacy Tanaka	Sierra 1
11:30 - 1:30	Lunch - Included in registration fee		Restaurant
11:30 - 1:30	15. Poster Session	Stacy Tanaka	Sierra 2
1:30 - 3:15	16. Natural Delta Outflow: Part 1	Paul Hutton	Sierra 1
	17. Real-time Modeling	Nigel Quinn	Folsom/Natoma
3:15 - 3:30	Break		
3:30 - 5:15	18. Natural Delta Outflow: Part 2	Paul Hutton	Sierra 1
	19. From the Sierra to the Sea: Snowmelt, Floodplains, Stormwater, Faucets, and More	Josué Medellín-Azuara	Folsom/Natoma
5:30 - 8:00	20. Social with Strategy Session on Benchmarking	Benjamin Bray & Chris Bowles	Sudwerk

Wednesday, February 26

Time	Session	Moderator	Room
7:30 - 8:00	Registration		Sierra Hallway
8:00 - 9:45	21. Applying Models to San Joaquin River Restoration Program Decision Making	Katrina Harrison	Folsom/Natoma
	22. Modeling from Over the Mountains and Across the Pond	Chris Bowles	Sierra Ballroom
9:45 - 10:00	Break		
10:00 - 11:50	23. CWEMF/IEP Joint Session – Modeling Ecosystem Responses to Management Actions	Benjamin Bray	Sierra Ballroom
11:50 - 1:20	Lunch at area restaurants		
11:50 - 1:20	24. Student Mentor Lunch	Eleanor Bartolomeo	Local Restaurant
12:45 - 1:15	25. Delta Modeling Summit Meeting	Chris Enright	Folsom/Natoma
1:20 - 3:00	26. CWEMF/IEP Joint Session – Modeling Ecosystem Responses to Management Actions	Steve Lindley	Sierra Ballroom

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Poster Session

Watercourse Engineering Inc.

Lunches

CDM Smith

LARRY WALKER ASSOCIATES

cbec eco engineering

AGENDA

Monday, February 24

8:00 – 8:30 a.m. – Registration in Sierra Hallway

8:30 – 10:15 a.m.

Session 1. Delta Simulation Model 2 (DSM2) Model Development and Applications
Moderator: Tara Smith (DWR)
Location: Sierra 1

DSM2 Version 8.1 Calibration – Lianwu Liu and Prabhjot Sandhu (DWR)

Using DSM2 in Support of Delta Smelt Lifecycle Modeling – Chandra Chilmakuri (CH2MHill)

Modeling Seasonal Nutrient Transformations and Losses in the Delta: Project Findings on the Effects of Time-varying DICU Concentrations Using DSM2 V8.1.2 – Marianne Guerin (RMA)

Delta Barriers Study – Subir Saha (DWR)

Session 2. IWFM & IDC 2012-2013 Enhancements and Applications
Moderator: Tariq Kadir (DWR)
Location: Folsom/Natoma

2013 Enhancements to IWFM and IDC – Emin Can Dogrul (DWR)

Yolo County IWFM Demand Calculator (IDC) Parameter Development – Bryan Thoreson (Davids Engineering)

Yolo County IWFM: Calibration and Model Application for Developing Conjunctive Use Framework in an Aquifer-Floodplain Recharge Operation – Carlos Flores (UC Davis)

Using PEST to Calibrate IWFM Models – Charles Brush (DWR)

10:30 a.m. – 12:15 p.m.

Session 3. Sacramento and San Joaquin Basins Study: Modeling Climate Change Impacts and Adaptation Strategies
Moderator: Michael Tansey (Reclamation)
Location: Sierra 1

Sacramento and San Joaquin Basins Study Overview – Michael Tansey (Reclamation)

Assessments of Climate Change Impacts on Central Valley Supplies and Demands – Brian Van Lienden (CH2MHill)

Analyzing and Presenting Central Valley System Risk and Reliability through the 21st Century – Armin Munevar (CH2MHill)

Next Steps – Arlan Nickel (Reclamation)

Session 4. Integrated Water Resources Modeling
Moderator: Ali Taghavi (RMC Water & Environment)
Location: Folsom/Natoma

Integrated Water Resources Modeling for the California Water Plan: WEAP Applications – Mohammad Rayej (DWR)

Updates to the USGS Central Valley Hydrologic Model – Jonathan Traum (USGS)

C2VSim Refined Grid Version Development and Applications – Mesut Cayar (RMC Water & Environment)

Model Development to Support a Growing Understanding and Management of Local Groundwater in Butte County – Christina Buck (Butte County Department of Water and Resource Conservation)

12:15 – 12:45 p.m.

Lunch

Pick up a box lunch (if you registered by Feb 14) and then join us for the keynote speech by Gary Bardini in Sierra 1.

Lunch sponsored by CDM Smith and CWEMF.

12:45 – 1:30 p.m.

Session 5. Keynote Speaker
Moderator: Benjamin Bray (CWEMF/EBMUD)
Location: Sierra 1

Gary Bardini, Deputy Director Department of Water Resources

1:30 – 3:15 p.m.

Session 6. Advances in Climate Change Assessment
Moderators: Jamie Anderson (DWR) and Tapash Das (CH2MHill)
Location: Sierra 1

Detection of a 12-15 year Hydrologic Cycle in Streamflow and Precipitation Data Using Wavelet Analysis – Guobiao Huang (DWR)

Comparison of CMIP5 and CMIP3 Climate Model Precipitation Projections in California – Jianzhong Wang (DWR)

Do New Climate Change Predictions Demand New Impact Studies? – Ed Maurer (Santa Clara University)

Perspectives on Extremes and Improving Infrastructure Resiliency in a Changing Climate – Armin Munevar and Tapash Das (CH2MHill)

Session 7. Reservoir Water Quality Modeling – Applications for Better Management
Moderator: Stephen McCord (McCord Environmental)
Location: Folsom/Natoma

Comprehensive Water Quality Modeling – The Value of Continued Model Development: Keno Reservoir, Klamath River, Oregon – Mike Deas (Watercourse Engineering)

Three-dimensional Hydro-thermal Modeling of the Lower Stanislaus River and its Three Reservoirs – Andrew Parker (Tetra Tech)

Mokelumne System Temperature Management: Integrating Modeling Tools and Monitoring Programs into Planning and Operations – Benjamin Bray (EBMUD)

Enhancement of the Coldwater Pool Management Model for the Purpose of Identifying the Coolest Thermal Regime Possible in the Lower American River – Chris Hammersmark (cbec eco-engineering)

3:30 – 5:15 p.m.

Session 8. CalSim II / CalLite2 / WRIMS 2 Updates and Applications
Moderator: Tom FitzHugh (Reclamation)
Location: Sierra 1

CalSim II Logic Updates – Nancy Parker (Reclamation)

Using CalSim II to Analyze the Impact of Climate Change on California's Water Systems under Varying Delta Regulatory Environments – Holly Canada (DWR)

Developments and Applications of WRIMS New Timestep Features – Hao Xie (DWR)

Visualization of CalSim Results Using the Palantir Software – Mike Urkov (NewFields) and Tom FitzHugh (Reclamation)

Session 9. Technical Analysis in Support of the California Water Plan
Moderator: Abdul Khan (DWR
Location: Folsom/Natoma

Overview of the California Water Plan Update 2013 – Paul Massera (DWR)

Evaluating Central Valley Water Vulnerabilities and Management Responses for the California Water Plan – David Groves (RAND Corporation)

Groundwater Findings and Recommendations for the California Water Plan and Status of CASGEM Program – Dan McManus and Mary Scruggs (DWR)

Indicators for Evaluating and Reporting Water Sustainability in the California Water Plan – Fraser Shilling (UC Davis)

5:15 – 6:15 p.m.

Session 10. Business Meeting

Moderator: Benjamin Bray (CWEMF/EBMUD)
Location: Sierra 1

We will be asking the members to vote on proposed changes to the CWEMF Bylaws. The changes to the Bylaws can be found on page 52.

6:15 – 8:00 p.m.

Session 11. Social and Awards Program

Moderator: Marianne Guerin (CWEMF/RMA)
Location: Sierra 1

Social sponsored by RMC Water and Environment, Tetra Tech, and Resource Management Associates.

Tuesday, February 25

7:30 – 8:00 a.m. – Registration in Sierra Hallway

8:00 – 9:45 a.m.

Session 12. Recent Innovations in Numerical Modeling Techniques and Model Data Management
Moderator: Jonathan Traum (USGS)
Location: Sierra 1

Integrated Water Resources Modeling and Data Management Tools: Automated Sharing of Model Data on the Web – Mesut Cayar (RMC Water and Environment)

Visualizing Hydrologic Data and Simulation Results with Python and ArcGIS – Donald Martin (USGS)

POD Model Reduction: A Method for Reducing the Computational Burden of Solving Systems of Equations from Numerical Models – Scott E. Boyce (UCLA)

PEST - Beyond Basic Model Calibration – Jonathan A. Traum (USGS)

Session 13. Modeling Floodplain Hydraulics and Habitat
Moderator: Paul Frank (NewFields)
Location: Folsom/Natoma

Hydraulic Modeling of Floodplain Inundation and Gravel Movement on the Stanislaus River to Support Better River Management Decisions – Paul Frank (NewFields)

Large Scale Hydrodynamic Modeling for Multi-Objective Floodplain Management – Chris Bowles (cbec eco-engineering)

2-D Floodplain Modeling of Yolo Bypass – William Fleenor (UC Davis)

Analyses Supporting Quantification of Rearing Habitat Targets in the Central Valley – Mary Matella (American Rivers/California Coastal Commission)

10:00 – 11:30 a.m.

Session 14. Pop-up Talks
Moderators: Stacy Tanaka (Watercourse Engineering) and Nigel Quinn (Berkeley National Laboratory/Reclamation)
Location: Sierra 1

Five-minute overviews summarizing modeling work using a maximum of five PowerPoint slides per speaker. Please contact Stacy Tanaka, Nigel Quinn, or Elaine Archibald to sign up for a talk.

11:30 a.m. – 1:30 p.m.

Lunch

Pick up a box lunch (if you registered by Feb 14) and then join us for the Poster Session in Sierra 2.

Lunch sponsored by Larry Walker Associates and NewFields.

11:30 a.m. – 1:30 p.m.

Session 15. Poster Session
Moderator: Stacy Tanaka (Watercourse Engineering)
Location: Sierra 2

Poster session sponsored by Watercourse Engineering.

Poster Session Titles

The Hydrology of Joe DeVries – William Fleenor (UC Davis)

Insufficient Validation of Integrated Hydrologic Models Applied at a Regional Scale Undermines their Credibility – Hubert Morel-Seytoux (Hydroprose)

Using ArcGIS to Process PRISM Climate Data: Application to DETAW as an Example – Jane Schafer-Kramer (Department of Water Resources)

What Does the Water Year 2011 Data Show Us about Salinity Intrusion? – Russ Brown and Anne Huber (ICF)

Modeling for Floodplain Inundation: Applications of HEC-RAS2D to the Yolo Bypass – Laila Kasuri (UC Davis)

Flood Storage Allocation Rules for Parallel Reservoirs – Rui Hui (UC Davis)

Optimization Storage Balancing in the Sacramento Valley – Timothy Nelson and Jay Lund (UC Davis)

Sacramento Basin Flood Control Linear Program – James Connaughton and Benjamin Lord (UC Davis)

Better Redd than Dead: Optimizing Chinook Salmon Survival through Dam-release Manipulation at Folsom Dam (American River, CA) – Rebecca M. Quiñones (UC Davis)

The HOBBES Project at Year One: Adventures in Organizing, Documenting, and Displaying California's Water System Information – Josué Medellín-Azuara (UC Davis)

Effectiveness and Tradeoffs between Portfolios of Adaptation Strategies Addressing Future Climate and Socioeconomic Uncertainties in California's Central Valley – Mike Tansey (Reclamation)

Ninety Years of Salinity Monitoring in the Suisun Bay and Western Delta – Sujoy Roy (TetraTech)

Comparing Consumptive Agricultural Water Use in the Sacramento-San Joaquin Delta: A Proof of Concept using Remote Sensing – Josué Medellín-Azuara (UC Davis)

Using Real-time in situ Water Quality Sensors to Detect Wastewater Effluent in the Sacramento River to Help Understand Controls on Nutrient and Phytoplankton Dynamics – Thi Pham (CSU Sacramento)

Economic Analysis in the Department of Water Resources – Emmanuel Asinas (DWR)

California Water Sustainability Indicators Framework – Abdul Khan and Rich Juricich (DWR)

Water Planning Information Exchange (Water PIE) – Greg Smith and Rich Juricich (DWR)

1:30 – 3:15 p.m.

Session 16. Natural Delta Outflow: Part 1
Moderator: Paul Hutton (MWDSC)
Location: Sierra 1

Evapotranspiration from Natural Vegetation in the Central Valley of California: Monthly Grass Reference Based Vegetation Coefficients and the Dual Crop Coefficient Approach – Dan Howes (CSU San Luis Obispo)

Natural Delta Outflow Water Balance – Paul Hutton (MWDSC)

Natural Flow Monthly Routing Model – Andy Draper (MWH Americas)

Session 17. Real-time Modeling
Moderator: Nigel Quinn (Berkeley National Laboratory/Reclamation)
Location: Folsom/Natoma

A Real Time Salinity Visualization and Management Tool – Jun Wang (Reclamation)

Manager Module for the WARMF Water Quality Simulation and Forecasting Model – Joel Herr (Systech)

Web-based Services in Support of Water Quality Forecasting Model Visualization – Amye Osti (34-North)

Data Quality Assurance for Basin-scale Real-time Water Quality Management – Nigel Quinn (Berkeley National Laboratory/Reclamation)

3:30 – 5:15 p.m.

Session 18. Natural Delta Outflow: Part 2
Moderator: Paul Hutton (MWDSC)
Location: Sierra 1

Simulated 1922-2009 Daily Inflows to the Sacramento – San Joaquin Delta under Predevelopment Conditions Using Precipitation-Runoff Models and C2VSIM: Preliminary Results –Tariq Kadir (DWR)

Generating a Historical Delta Bathymetric-Topographic Digital Elevation Model (Part I): Data Collection and Development – Robin Grossinger and Sam Safran (San Francisco Estuary Institute)

Generating a Historical Delta Bathymetric-Topographic Digital Elevation Model (Part II) Data Interpolation – William Fleenor (UC Davis)

Development of a Three-Dimensional, Stratified Flow Model of the Natural Delta – John DeGeorge (RMA)

Session 19. From the Sierra to the Sea: Snowmelt, Floodplains, Stormwater, Faucets, and More
Moderator: Josué Medellín-Azuara (UC Davis)
Location: Folsom/Natoma

Optimization Storage Balancing in the Sacramento Valley – Timothy Nelson (UC Davis)

Flood Optimization and Bypass Expansion Value for the Sacramento Valley – James Connaughton (UC Davis)

Flood Storage Allocation Rules for Parallel Reservoirs – Rui Hui (UC Davis)

Connectivity in California Water Resources Infrastructure – Erik Porse (UC Davis)

Modeling Residential Water, Energy, Carbon Footprint and Costs in California – Alvar Escriva-Bou (UC Davis)

Value of Reuse and Groundwater Conjunctive Use in the Bay Area – Michelle Lent (UC Davis)

5:30 – 8:00 p.m.

Session 20. Evening Program – Strategy Session on Benchmarking

Moderators: Benjamin Bray (EBMUD) and Chris Bowles (cbec eco-engineering)
Location: Sudwerk Brewhouse Grille, 9900 Greenback Lane, Folsom

Dr. Chris Bowles, CWEMF Steering Committee Member, has proposed that CWEMF could perhaps be the forum, or a vehicle, to undertake various benchmarking efforts for hydrodynamic models used frequently in California. Benchmarking is the process of comparing models using a series of standard cases designed to stretch models to their limits. It is not intended to show which models are the best, but to identify which models are more appropriate for specific uses. It is not the same process as validation or calibration. Benchmarking efforts could be tailored for models used in the Delta, the floodplains of the Central Valley, foothill, and coastal streams, and could be 1D, 2D or 3D, hydrodynamic, sediment transport and water quality models. Dr. Bowles is proposing, on behalf of CWEMF, that an initial pilot benchmarking effort could be undertaken, for example, on floodplain modeling. If successful, similar benchmarking efforts could be introduced to a variety of model types and geographic areas. Dr. Bowles and others will provide a little insight into benchmarking efforts undertaken in the UK and elsewhere, as examples.

Join Dr. Bowles, other members of the CWEMF Steering Committee and other CWEMF members in a brainstorming session on how, what, where, and when benchmarking could be conducted in California. Food and drinks will be provided.

Social sponsored by CH2MHill, ICF, and MBK.

Wednesday, February 26

7:30 – 8:00 a.m. – Registration in Sierra Hallway

8:00 – 9:45 a.m.

Session 21. Applying Models to San Joaquin River Restoration Program Decision Making
Moderator: Katrina Harrison (Reclamation)
Location: Sierra Ballroom

Water Supply Forecasting Effects on the SJRRP – Todd Vandegrift (Reclamation)

Modeling Subsidence Impacts on Channel Capacity along the San Joaquin River and Eastside Bypass – Alexis Phillips-Dowell (DWR)

Using Multiple Scale Groundwater Models to Assess the Impacts of Restoration Flows in the San Joaquin River – Brian Heywood (CDM Smith)

Comparing Fisheries Benefits of the Reach 2B and Mendota Pool Bypass Project – Chip McConnaha (ICF)

Session 22. Modeling from Over the Mountains and Across the Pond
Moderator: Chris Bowles (cbec eco-engineering)
Location: Folsom/Natoma

Assessing Ecological Responses to Alternative Flow Regulation Plans in the Great Lakes – Tad Slawecki (LimnoTech)

To Dredge or Not To Dredge? Local Versus Systematic Approaches to Critical Floodplain Habitat Management – F. Douglas Shields (cbec eco-engineering)

Parallelized Modeling for 2D Flood Prediction with Links to Watershed Management and Floodplain Hydro-morphology – Rob Lamb (JBA Trust, UK)

Simple Models and Realistic Expectations for Stream Restoration – Martin Doyle (Duke University)

10:00 – 11:50 a.m.

Session 23. CWEMF/IEP Joint Session – Modeling Ecosystem Responses to Management Actions
Moderator: Benjamin Bray (EBMUD/CWEMF)
Location: Sierra Ballroom

Overview of Work on Natural Delta Outflow – Paul Hutton and Curt Schmutte (MWDSC)

Landscape Change in the Delta, 1850-2000: Implications for Ecological Functions – Robin Grossinger (SFEI)

Managing Finite Supplies for Environmental Goals – Walter Bourez (MBK Engineers)

Evaluation of the Effects of Prospect Island Restoration on Sediment Transport and Turbidity – Michael MacWilliams (Delta Modeling Associates)

Collaborative Science Informing Mokelumne River Fisheries Management – Jose Setka (EBMUD)

11:50 a.m. – 1:20 p.m.

Lunch at area restaurants

11:50 a.m. – 1:20 p.m.

Session 24. Student Mentor Lunch – For students and mentors who signed up in advance.
Moderator: Eleanor Bartolomeo
Location: Local Restaurant

Students and mentors should gather in the lobby of the Lake Natoma Inn by noon to walk to a local restaurant for lunch.

Lunch sponsored by cbec eco-engineering.

12:45 – 1:15 p.m.

Session 25. Delta Modeling Summit Meeting
Moderator: Chris Enright
Location: Folsom/Natoma

The Delta Science Program will partner with CWEMF to hold a Delta Modeling Summit workshop this spring or summer to envision modeling systems that are responsive to emerging science and management questions. Join Chris Enright for an informal discussion about the purpose and objectives of the upcoming Delta Modeling Summit.

1:20 – 3:00 p.m.

Session 26. CWEMF/IEP Joint Session – Modeling Ecosystem Responses to Management Actions
Moderator: Steve Lindley
Location: Sierra Ballroom

Recent Developments in a State-Space Model for Delta Smelt Population Dynamics – Ken Newman (USFWS)

Coupled Physical-Biological Models for Investigating the Effects of Complex Management Actions on Sacramento River Chinook Salmon Populations – Steve Lindley (NMFS)

An Agent-based Model of Chinook Salmon Smolts in the Sacramento-San Joaquin Delta: Effect of Water Exports and Inflows on Survival and Migration Patterns – Doug Jackson (NMFS)

Applying Predator-prey Models to Reach-specific Survival Estimates of Juvenile Late-fall Chinook Salmon in the Sacramento-San Joaquin River Delta – Russell Perry (USGS)

A New Era of Delta Science – Peter Goodwin (Delta Stewardship Council)

Session 15. Poster Session

The Hydrology of Joe DeVries – William Fleenor (UC Davis)

Abstract not available.

Insufficient Validation of Integrated Hydrologic Models Applied at a Regional Scale Undermines their Credibility – Hubert Morel-Seytoux (Hydroprose)

Prediction of impacts of various management strategies in water systems can be in error for many reasons. One is due to the "inaccuracy" of the components of the numerical model supposed to represent the physical behavior of the system. Our investigations have shown that the use of a coarse grid size can lead to significant errors. Two examples will illustrate that point. One is the case of the estimation of the flow exchange between a stream and a hydraulically connected aquifer. Another involves the estimation of the reduction of outflow from a stream and the amount of seepage from the stream under transient conditions of inflow into the stream and pumping from a well in the vicinity of the river. These investigations provide criteria to estimate the coarsest grid size that can still produce an acceptable error. In addition the derived analytical techniques (the basis for the comparisons with results from a range of very fine to very coarse grids) provide an alternative to using only purely numerical components.

Using ArcGIS to Process PRISM Climate Data: Application to DETAW as an Example – Jane Schafer-Kramer (DWR)

The PRISM Climate Group at Oregon State University has been producing spatially-reference grids of historical climate data that are recognized as the highest-quality spatial climate data sets currently available. In this poster, a non-programmer presents a workflow for automating the pre-processing of long-term PRISM precipitation data into monthly time-series for input specified boundaries using ArcGIS ModelBuilder. Results for application to DETAW (Delta Evapotranspiration of Applied Water) boundaries are shown. The approach can be easily extended to other areas.

What Does the Water Year 2011 Data Show Us about Salinity Intrusion? – Russ Brown and Anne Huber (ICF)

There is a wealth of available data for evaluating salinity in the San Francisco Estuary. Data collected by the USGS, DWR, and USBR in the Delta and San Francisco Bay during water year 2011 were evaluated to better understand the effects of outflow on seawater intrusion. Water year 2011 was selected because Delta outflow varied widely from approximately 2,500 cfs to 225,000 cfs. Electrical conductivity (EC), flow, elevation, and velocity data collected every 15 minutes at multiple locations, as well as USGS boat survey data were integrated and evaluated. The data show how salinity varies longitudinally and vertically through the SF Estuary as well as how the salinity gradients vary in response to tidal flow and net outflow. At any given location, the daily range of EC values (caused by tidal excursion) is much greater than vertical stratification. Delta outflow is the primary control for seawater intrusion. Other factors such as tidal strength and gravitational circulation play a secondary role. Effective outflow (described as the G-model by CCWD) was used to estimate the daily EC at each monitoring location and to estimate the daily X2 position more accurately than the daily X2 equation. Adding a term representing the high tides of the spring-neap tidal cycle improved the daily EC estimates. Although

outflow, X2, and daily average EC values provide an accurate summary of the SF Estuary salinity gradients, the 15-minute data reveal many more interesting hydrodynamic events.

Modeling for Floodplain Inundation: Applications of HEC-RAS2D to the Yolo Bypass – Laila Kasuri (UC Davis)

At 59,000 acres, the Yolo Bypass is the Central Valley's largest contiguous floodplain that has integrated waterfowl and bird habitat into an area with flood control and agricultural uses. The Bay Delta Conservation Plan (BDCP) has proposed more extensive ecological restoration projects adding native fish as an additional purpose for the Yolo Bypass. Ecological reconciliation might become a larger part of the landscape of the Bay-Delta over the next fifty years requiring better tools to simulate proposed changes. The aim of this research is to develop a hydraulic model for evaluating and demonstrating the flood conveyance and water management impacts of proposed land-use changes in the Yolo Bypass. The application of the newly developed flood simulation software (HEC-RAS-2D) to the Yolo Bypass will help assess whether proposed solutions are realistic and their possible effects on the floodplain. This type of decision-making application is likely relevant for other floodplain restoration efforts in California and elsewhere.

Flood Storage Allocation Rules for Parallel Reservoirs – Rui Hui (UC Davis)

Optimal operating policies have been derived for reservoirs in series and in parallel for various purposes, but little formal analysis has been done for flood operations of parallel reservoirs. For flood management in a parallel reservoir system, reservoir releases should be managed together to reduce downstream peak flow and minimize flood damage. The optimal allocation of available flood storage among parallel reservoirs should be allocated so each reservoir's flood storage allocation provides the same incremental reduction to downstream flood flows. This approach is developed mathematically and applied for deterministic and probabilistic inflow cases. The applicability and effectiveness of these derived flood storage allocation rules are demonstrated by the case study of Oroville Reservoir and New Bullards Bar Reservoir in California's Sacramento River Basin with a single historical 1997 flood and an uncertain storm.

Optimization Storage Balancing in the Sacramento Valley – Timothy Nelson and Jay Lund (UC Davis)

Reservoirs serve as vital elements of California's water resource infrastructure, serving to moderate the temporal variability in water supply and reduce the severity of floods. Managing the system effectively requires well defined operating rules that will guide reservoir operators in making decisions with limited knowledge of water availability in the future. In this study the CALVIN model, an economic optimization model, is used to produce monthly operating rules for the major reservoirs of the Central Valley, optimized to minimize the total cost of the system. The rules are divided into two classes: 1) release rules used to define release based on the current and past state of the system and 2) storage allocation rules to balance the storage of water between multiple reservoirs. Operating rules will also be developed from CALSIM II results to represent more realistic operations. Finally, the optimized rules will be compared with the CALSIM II rules to determine where optimizations could be applied in the actual system.

Sacramento Basin Flood Control Linear Program – James Connaughton and Benjamin Lord (UC Davis)

A flood control linear program (FCLP) was developed to optimize releases from five reservoirs in the Sacramento Basin based on input hydrographs and penalty functions for excessive downstream flows, reservoir storage, and ramping. The FCLP program is applied using inflow hydrograph data from the 1986, 1995, and 1997 flood events to produce optimal reservoir releases. Shasta, Black Butte, Oroville, and New Bullard's bar reservoirs synchronize and alternate releases to minimize the combined peak flow downstream at the Fremont Weir for all three events. Folsom reservoir acts more independently and makes releases before and after peak upstream flows to avoid exceeding the channel capacity. Releases depend on the travel time to river convergences and the flows accumulated from local runoff in addition to the penalty functions. The FCLP will be further developed to explore optimal reservoir operation for additional hydrograph shapes, changes in weir geometry and an updated economic penalty curve.

Better Redd than Dead: Optimizing Chinook Salmon Survival through Dam-release Manipulation at Folsom Dam (American River, CA) – Rebecca M. Quiñones (UC Davis)
Collaborators: Lauren Adams, Ted Grantham, Josué Medellín-Azuara, Jay Lund, and Peter Moyle

Low precipitation levels in winter 2014 have resulted in unprecedented drought conditions in many California rivers. Flows in Central Valley streams have dropped so low as to threaten the survival of fall Chinook salmon (*Oncorhynchus tshawytscha*) embryos already incubating in redds. Regulated rivers, however, may offer an opportunity to increase embryo survival through optimal dam operation. Here, we use historical streamflow data to create probability curves of dam releases from Folsom Dam in the American River. This data is used to assess water-level scenarios that result in varying degrees of redd stranding. Redd stranding occurs when adult salmon build redds in areas that dry once water levels drop and results in complete embryo mortality. Our goal is to identify dam releases that optimize embryo survival by evaluating the relationship between release level and duration, and stream volume. Although we assume uniform channel configuration and redd distribution, our analysis can help elucidate the relative viability of salmon redds resulting from different release decisions. Consequently, our analysis can be viewed as analogous with a redd risk assessment.

The HOBBES Project at Year One: Adventures in Organizing, Documenting, and Displaying California's Water System Information – Josué Medellín-Azuara (UC Davis)
Collaborators: Andrew Bell, Alvar Escriva-Bou, Quinn Hart, Rui Hui Jay R. Lund, Erik Porse, Samuel Sandoval-Solis, Nicholas Santos, and David Waetjen (UC Davis)

The HOBBES project is a bottom-up approach for organizing, documenting, and making water information available to support water modeling efforts in California. The database schema of the HOBBES project accommodates a wide range of elements from the California water system and allows geocoding for displaying information. The HOBBES database management and documentation system emphasizes data organization and documentation standards, fosters local involvement in data management, allows flexibility in the modeling algorithms and may decrease the startup cost of water modeling projects. After a year of work, the HOBBES development team has drafted a database schema, use cases and started web-based interface to display information. This has been done in collaboration with agencies, non-government organizations, consultants, and academic institutions. Next steps include implementing the use cases with the web user interphase and hold a late spring workshop to present our progress to the water community.

Effectiveness and Tradeoffs between Portfolios of Adaptation Strategies Addressing Future Climate and Socioeconomic Uncertainties in California's Central Valley – Mike Tansey (Reclamation)

Abstract not available.

Ninety Years of Salinity Monitoring in the Suisun Bay and Western Delta – Sujoy Roy (TetraTech)
Collaborators: John Rath and Limin Chen (Tetra Tech); Paul Hutton (MWDSC)

The location of the low salinity zone in San Francisco Bay where the bottom salinity is 2 parts per thousand (ppt) (termed as X2 and reported as the distance in kilometers from Golden Gate), has been used as the basis for outflow management in the estuary. There is great interest in understanding how the low salinity zone in general, and the X2 position in particular, has changed over time under different conditions of hydrology, exports, and development. The present work supports such an effort through the compilation and analysis of data over a nine-decade period, with additional screening and cleaning to better characterize salinity trends in the Delta. Data incorporated in this work include historical grab sample data and modern conductivity sensor data from and were compiled into a master database containing surface salinity data from October 1921–September 2012, i.e. water years 1922–2012. The data were largely collected by the state Department of Public Works/ Department of Water Resources and federal agencies. The original data were subjected to an extensive cleaning effort, and then used to calculate the daily and monthly X2 position along the Sacramento and San Joaquin Rivers. Various statistical analyses were performed on the X2 and other isohalines to characterize behavior over time and in response to different hydrologic conditions and are discussed in this poster. This work is supported by a report and electronic appendices detailing the data compilation and analysis steps, and can serve as the basis for future studies of salinity in Suisun Bay and the western Delta.

Comparing Consumptive Agricultural Water Use in the Sacramento-San Joaquin Delta: A Proof of Concept using Remote Sensing – Josué Medellín-Azuara (UC Davis)
Collaborators: Nadya Alexander and Richard E. Howitt (UC Davis)

This study explored the potential of using three different methods to estimate consumptive use of water in crop production on five islands in the Sacramento-San Joaquin Delta (Delta). The authors used the Surface Energy Balance Algorithm for Land (SEBAL) (Bastiaanssen et al., 1998a) on actual evapotranspiration for year 2007 and compared it to evapotranspiration (ET) estimates using methods from the Irrigation Training and Research Center (ITRC) of California Polytechnic State University-San Luis Obispo, and the method used by DWR, Simulation of Evapotranspiration of Applied Water (SIMETAW) model (Snyder et al., 2012) in its California version Cal-SIMETAW (Orang et al., 2013). Initial results from our comparison show strong correlation between the three methods for many of the eight crop types compared and indicate that remote sensing is a promising tool that can be of practical, cost-effective service in managing water while reducing the need for detailed field information. The next phase of this project will examine the individual reference evapotranspiration, crop coefficients, and crop area parameters to determine the sources of inter-model variability in the seasonal ET. This phase will also include additional comparisons with DWR's DETAW model and the METRIC model from the University of Idaho at Kimberly.

Using Real-time in situ Water Quality Sensors to Detect Wastewater Effluent in the Sacramento River to Help Understand Controls on Nutrient and Phytoplankton Dynamics – Thi Pham (CSU Sacramento)

Abstract not available.

Economic Analysis in the Department of Water Resources – Emmanuel Asinas (DWR)

The Economic Analysis Section of the California Department of Water Resources develops and maintains in-house expertise to provide high quality, timely, and cost-effective responses to meet DWR program managers' needs. The section provides technical assistance and policy guidance for economic, demographic, and mathematical analysis to improve the management of California's natural resources.

California Water Sustainability Indicators Framework – Abdul Khan and Rich Juricich (DWR)

A California Water Sustainability Framework was developed for Update 2013 of the California Water Plan to help monitor progress to meeting water sustainability objectives through the development and application of an analytical framework. The framework also includes the development and valuation of a water footprint for California. The framework was developed in collaboration with experts from UC Davis and U.S. EPA Region 9, and a wide array of stakeholders.

Water Planning Information Exchange (Water PIE) – Greg Smith and Rich Juricich (DWR)

Sound decisions require good information. Too often, the lack of access to water resource information constrains our ability to craft innovative solutions to regional issues and integrate these projects into a statewide water management framework. The purpose of the Water Planning Information Exchange is to make access to water resource data easier for everyone.

The goal is to use Water Planning Information Exchange to share any information that would inform the California Water Plan, and other strategic planning efforts at the local and regional levels. The subject material can range from basic hydrologic information, such as surface water, groundwater, water quality and climate information, to information about water use, demographics, water rates, service areas, environmental mitigation, and water projects. Organizations could share all of this water resource information and more through Water Planning Information Exchange.