

# Summary of Meeting Proceedings

*Prepared by the INFORM Core Office, HRC-GWRI*

## FIRST OVERSIGHT AND IMPLEMENTATION COMMITTEE MEETING

**6 October 2003, Sacramento, California**

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PRESENT:

*Agency Representatives*

Paul Fujitani,	Central Valley Operations, U.S. Bureau of Reclamation
Robert Hartman,	California Nevada River Forecast Center, National Weather Service, NOAA
Gary Hester,	California Department of Water Resources
Mona Ismail,	GCAP Inc./CALFED ( <i>through a conference call</i> )
Borden Johnson,	Sacramento District, U.S. Corps of Engineers
Claudia Nierenberg,	Office of Global Programs, NOAA ( <i>through a conference call</i> )
Joe O'Hagan,	PIER, California Energy Commission
Eric Stremm,	California Nevada River Forecast Center, National Weather Service, NOAA

*INFORM Co-Pis and INFORM Core Office Staff*

Theresa Carpenter,	Hydrologic Research Center
Aris Georgakakos,	Georgia Water Resources Institute
Kosta Georgakakos,	Hydrologic Research Center
Nick Graham,	Hydrologic Research Center
Jason Sperfslage,	Hydrologic Research Center

The meeting was held at the National Weather Service California Nevada River Forecast Center (CNRFC) Conference Room in the Joint Operations Center (3310 El Camino Ave.), started at 1:00PM and ended at 3:45PM. The meeting consisted of two parts. Part I gave a brief overview of the INFORM Progress, status, strategic planning issues and Oversight and Implementation Committee (OIC) mandate, while Part II focused on general INFORM implementation issues. The Meeting was held in a discussion format with the Co-PI's leading it with a set of discussion issues prepared in a power point format. The presentation material is attached to become part of this Summary of Meeting Proceedings. Tables 1 and 2 present the issues discussed.

**Table 1: PART I, INFORM STRATEGIC PLANNING**

*Vision Statement*

Increase efficiency of water use in Northern California using climate, hydrologic and decision science

*Goal and Objectives*

Demonstrate the utility of climate and hydrologic forecasts for water resources management in Northern California

Implement integrated forecast-management systems for the Northern California reservoirs

Perform tests with actual data and with management input

*Application Area*

*Integrated System Design*

*Demonstration Concept*

*Work Accomplished*

Feasibility studies for Folsom with historical data show benefits to management

Contracts in place (NOAA, CEC, CALFED)

Oversight and Implementation Committee in place

Initial technical phase of INFORM in progress

- Downscaling for precipitation
- Hydrologic/Uncertainty Modeling
- Decision Modeling

*Folsom System*

*Time Line of Deliverables*

*Implementation Strategy*

Link climate and weather forecasts of precipitation and temperature to hydrologic models

Link decision models with forecasts and downstream objectives to assess alternative policy options

Run integrated forecast-decision system for selected cases with management input to assess performance

Order of implementation: from individual reservoirs to the four-reservoir system (Folsom, Oroville, Shasta, Trinity)

Collaborative workshops

*Oversight and Implementation Committee (OIC)*

Provides strategic advice to INFORM Co-PIs on project direction

Provides assistance in the implementation of demonstration project

- Issues that cut across agency mandates
- Issues that influence implementation strategy, plans and timing

Develops collaboration protocol for specific technical issues

Assists Co-PIs in developing and executing the demonstration plan

Meets 2 times per project year and, as required, through an electronic forum

*INFORM Core Office*

Provides administrative assistance to INFORM Co-PIs and collaborating Agencies

Generates informational printed and web-site material, general interest meeting reports and announcements

Staff

- Kosta Georgakakos, HRC
- Theresa Carpenter, HRC
- Corinne Rice, HRC

*Implementation Issues for First OIC Meeting*

CNRFC Links to NCEP and climate/weather models

Reservoir management objectives for INFORM

Downstream simulation model (CALSIM-type)

Software/platform/database and links to operations

Collaboration and workshop plans

*Follow-on to First OIC Meeting*

Meeting Report

Development of any necessary modifications to INFORM Project tasks and timeline, and submission to Funding Agencies for approval  
Initiation of Agency and Co-PI collaboration by implementation task

## ***Table 2: PART II, INFORM IMPLEMENTATION ISSUES***

### *Implementation Issues for 1<sup>st</sup> Meeting*

Software/platform/database and links to operations

- Hourly Precipitation Data
- Daily Precipitation Data
- Daily Temperature and Pan Data
- Snow Data
- Streamflow Discharge

CNRFC links to NCEP's climate and weather models

- Precipitation forecast processing at CNRFC

### *Forecast Model and Data*

Forecast models and model-specific bias-adjustment algorithms available for quasi-operational use

Availability of retrospective simulation and forecast data

Reliable flow of consistent real-time forecast products

Links to NOAA NCEP (e.g., Experimental Modeling Center)

### *Climate Forecast Data*

Fields: Prec, 10m T, (U, V, T, Q, H, at 700mb and 850mb)

Archive all received from NCEP CMB

Maximum lead time: at least 3 months

Retrieve and store these fields from any retrospective runs (forecast or AMIP) from current version of model

### *Synoptic Forecast Data*

ETA 48 km (12 km?) and GFS

Fields: U, V, T, Q, H (necessary to run dynamic / statistical downscaling models) – Archive all

Request forecast data from NCEP (GFS, ETA 12 km)

### *Issues to resolve:*

What is the relationship of INFORM system to CNRFC models and databases?

Can ensemble weather and climate forecasts be accommodated by CNRFC operational systems?

How do we acquire historical weather and climate (ensemble) forecasts? NCEP as a partner in this effort.

Should we represent Forecaster adjustments to weather and climate forecasts in INFORM?

### *Decision Support for Drought Forecasting, Assessment, and Management*

### *Decision Support for Flood Forecasting, Assessment, and Management*

### *Integrated Decision Support for Drought and Flood Management*

### *Issues to resolve for reservoir management*

Water uses impacted by reservoir management

- Water use type and geographic area
- Relevant Hydrologic Quantity (level, stage, discharge, volume)
- Applicable Time Scale (inter-annual, seasonal, monthly, weekly, daily, hourly)
- Reservoir(s) Involved (water use aggregation where applicable)
- Competing Water Uses (by reservoir and system-wide; information format)

Agencies/NGOs involved – DSS made operational

- Relevant Agencies/NGOs by Water Use and Reservoir
- Operational Process during Droughts, Floods, and Normal Periods
- DSS Demonstration Plan (Distributed? Centralized? Shared?)

### *Downstream simulation model*

Which downstream objectives should we include in INFORM?

Temporal resolution of CALSIM

Links to CNRFC's Downstream Models

Computer code availability

*Collaboration and workshop plans*

Protocol for collaboration

- Agency contact persons for technical matters for each basin and reservoir
- INFORM Core Office web site for exchange of data, discussion, progress reports and graphics/results

Informational and Training Workshops in Technical Areas (1 per year)

- Climate science
- Hydrologic science
- Decision science

Important points made during the meeting by OIC Members in response to the issues identified by the Co-PIs are:

1. Current link of CNRFC models with climate information is through the Climate Prediction Center (CPC) probability outlooks; however, CNRFC would like to move toward the utilization of gridded climate information to generate ensemble streamflow.
2. Designing the INFORM system as a standalone system, at least initially, with a mirror image of the hydrologic modeling framework of CNRFC, and with data links to CNRFC and to management agencies is a reasonable approach.
3. Forecaster adjustments to NCEP synoptic-scale atmospheric forecasts will be treated approximately in the INFORM system, which will use NCEP ETA model products to drive the 0-5 days flow forecasts.
4. It is reasonable to assume that downstream concerns (some involving the Bay Delta) may be approximated in an aggregate way as downstream boundary objectives for the system of INFORM reservoirs.
5. The DSS component of the INFORM demonstration plan is envisioned as a "shared" resource by the management agencies.
6. CALSIM has a monthly resolution and it is not expected that within the time horizon of this project there will be a daily-resolution version available for Co-PI use. The code will be made available to the Co-PIs for INFORM.
7. Given the length of time it has taken the contracting process, and to align the tasks and time line of the three funding agencies, it is reasonable to modify the task and deliverables time line with a new critical review date of 1 March 2004.

OIC Members' comments and suggestions, which require Co-PI action are:

1. It is desirable to include an additional CALFED technical person in INFORM OIC
2. Keep fisheries agencies aware of our planning and OIC Meeting Proceedings (identify contacts through OIC Members)
3. The OIC should include an additional representative from the State Water Project (Gary Hester, member of OIC, will provide a contact person for the Co-Pis)
4. The INFORM implementation plan should be augmented to include the New Bullards Bar Dam on the Yuba River and the Black Butte Dam on Stony Creek, as they significantly contribute to the regulation of the tributary waters of the Sacramento River.
5. OIC should include an additional representative from the Yuba County

6. California Nevada River Forecast Center (CNRFC) Staff and INFORM Co-PI's should approach the National Centers for Environmental Prediction (e.g., Experimental Modeling Center) for the development of a link between CNRFC databases and climate and synoptic scale forecast products and retrospective run output.
7. INFORM Co-PI's and CNRFC Staff should contact Climate Diagnostics Center (CDC) to see if we can utilize their developing work on building a 14-day retrospective forecast database.
8. INFORM Co-PI's will work with CNRFC to finalize the historical hydrometeorological database to be used in INFORM for various calibration and validation tasks.
9. Maximum forecast lead-time for ensemble streamflow forecasts should be one year.
10. The Co-PIs will work with the California Department of Water Resources (DWR) and U.S. Bureau of Reclamation OIC contacts to define the link between the Bay Area management objectives with the objectives of the INFORM reservoirs.
11. After initial discussions with management agency the INFORM Co-PIs will generate a template decision support system design for review by OIC.
12. INFORM Co-PIs will work with DWR OIC member to determine the status and availability of CALSIM codes for use in INFORM.
13. Workshops have been identified as important components of the INFORM project and should be planned far in advance to allow wide participation by the forecast and management Agencies.
14. The INFORM Core Office will establish a secure web site for the exchange of data and information among OIC members and Co-PIs. Pre-approval of all publications by the OIC will be sought.
15. The INFORM Co-PIs will develop a new time line for tasks and deliverables for submission to the three funding agencies (NOAA, CEC, and CALFED).