

**September 30, 2006
Work Plan for Fiscal Year 2007**

I. Ecological/Water Systems Operations Models, CVPIA Section 3406(g)

II. Responsible Entities

| | Agency | Name | Role |
|---------|---------------|-------------------|-----------------|
| Lead | USBR | Lloyd E. Peterson | Program Manager |
| Co-Lead | USFWS | Andrew Hamilton | Program Manager |

III. Program Objectives for FY 2007

The objective is to develop readily usable and broadly available models and supporting data to evaluate the ecologic and hydrologic effects of existing and alternative management strategies of public and private water facilities and systems in the Sacramento, San Joaquin, and Trinity watersheds. Specific to FY are:

- A. CalSim III Development
- B. Completion of CalSim II San Joaquin Review & Documentation
- C. Reservoir & River Water Quality, Temperature, and Habitat Model Developments
- D. Training of agency and private sector staff in use of models
- E. Membership and Participation in Professional Organizations

IV. Status of the Program

The Ecological/Water Systems Operations Models, CVPIA Section 3406(g) program is a continuing program that started in 1994.

The program has supported the Ecosystem Modeling Consensus Project, review and update of the Central Valley Ground-Surface water model (CVGSM); development of a graphical user interface (GUI) and database for PROSIM and SANJASM (note: This GUI effort was abandoned because CalSim replaced PROSIM and SANJASM, as well as DWRSIM); development of the 3-D temperature model for Whiskeytown Reservoir, development of CalSim II, and hydrologic input for CalSim.

Since 1998 this program has supported a steadily increasing level of support for CalSim II development and application. The California Department of Water Resources (DWR) and Reclamation have made a large investment in CalSim and it is essential for Interior to participate in and guide its development and application. CalSim II is now available for public use and is used in most, if not all, current water supply improvement studies.

This program also supports the new development of reservoir and river management models including water quality and biologic models used by the Division of Planning, U.S. Fish and Wildlife Service (USFWS) and private contractors for modeling support for operations and planning.

This program supports training conducted by Reclamation and the California Department of Water Resources. The Mid-Pacific Region Division of Planning, the U.S. Fish and Wildlife Service, the California Department of Water Resources (DWR), and other stakeholders have been trained under funding from this program.

This program also provides Reclamation with the opportunity to leverage the funds by participating in cost-sharing of development and applications of CalSim and other models.

The primary benefit of this funding has been the development of CalSim into the reservoir system model of choice for investigations of managing and modifying the Central Valley Project and the State Water Project. CalSim was the model applied to develop the most recent Central Valley Project Operations Criteria and Plan (CVPOCP).

V. FY 2005 Accomplishments

- A. The staff of the River Systems Analysis Branch (MP-710), Reclamation's Technical Service Center, Derek Hilts (USFWS), and private contractors developed code and data, reviewed CalSim II, and participated in CalSim III development.
- B. Support of a comprehensive review of the CalSim II simulation of salinity at Vernalis on the San Joaquin River; and improved simulation of the east side reservoir operations and irrigations demands. This review has received an additional \$80,000 of support from the California Water and Environmental Modeling Forum, Calfed Science and water districts. This activity is unprecedented in that Reclamation simultaneously publicly introduced these model enhancements and initiated an outside review in a meeting in Modesto (August 2005). Reclamation will release the results of the peer review and its responses to issues raised in early 2007.
- C. In cooperation with California DWR, Reclamation has begun significant improvements for the new CalSim III model including improved methods for evaluating hydrologic inputs based on DWR's Integrated Flow Model (IWFM), groundwater simulation capability based on the new California Central Valley Simulation model (C2VSIM), and a revised water quality simulation for the San Joaquin River. CalSim III will include a consistent implementation of hydrology and groundwater in both the Sacramento and San Joaquin Valley. These activities will be completed during FY 2007.

VI. Tasks, Costs, Schedules, and Deliverables

Narrative Explanation of Tasks (note these are in order of priority)

| A. 3406(g) Narrative Explanation of FY 06 Tasks | | |
|--|---------------|---|
| Program Objective ID* | Task # | Narrative Explanation of Task (Lead Agency in Parenthesis) |
| A-E | 1 | Program management – Managing this program and administration of contracts (USBR) |
| B | 2 | Completing review and documentation of CalSim II code. (USBR) |
| A | 3 | Completing development of the baseline CalSim III model including documentation sufficient for model review. |
| A | 4 | US Fish and Wildlife Service staff oversight of modeling activities (USFWS) |
| C | 5 | Development of additional physical & biological modeling capabilities to simulate reservoir and river hydrodynamics, water quality, sediment transport, habitat suitability, and biologic models for simulation of river and reservoir management. |
| D,E | 6 | Membership and participation in professional organizations including membership in the California Water and Environmental Modeling Forum and conferences with organizations such as American Society of Civil Engineers and American Water Resources Association. |
| Key to Objective ID | | |
| <ul style="list-style-type: none"> • A. CalSim III Development & Documentation • B. CalSim II Review and Documentation, • C. Physical & Biological Process Based Reservoir & River Management Models • D. CalSim and other Model Training & Workshops • E. Membership and Participation in Professional Organizations | | |

B. 3406(g) Schedule and Deliverables

| # | Task | Start | End | Deliverable |
|----------|---|--------------|------------|---|
| 1 | Program Management | 10/1/06 | 9/30/07 | Annual work plans; awarding and management of grants; supervision of staff on 3406(g) funded projects |
| 2 | CalSim II Review/Documentation | 10/1/06 | 1/30/07 | Completion of CalSim II Peer Review Documentation |
| 3 | CalSim III Development | 10/1/06 | 6/30/07 | Completion of the CalSim III baseline simulation model |
| 4 | USFWS CalSim Oversight | 10/1/06 | 9/30/07 | Reviews of CalSim participation in development meetings |
| 5 | Physical & Biological Model Development | 10/1/06 | 9/30/07 | Development of River & Habitat Management tools |
| 6 | Participation in Prof. Organizations | 10/1/064 | 9/30/07 | Shared technology |

C. Summary of Program Costs and Funding Sources.

| # | Task | Total Cost | W&RR | DWR | CALFED | Other Reclamation Funds |
|---|---|-------------|-----------|-----------|--------|-------------------------|
| 1 | Program Management | \$140,000 | \$40,000 | \$100,000 | | |
| 2 | CalSim II Review/Documentation | \$82,000 | \$32,000 | \$50,000 | | |
| 3 | CalSim III Development | \$738,000 | \$238,000 | \$500,000 | | |
| 4 | USFWS CalSim Oversight | \$52,000 | \$52,000 | \$0 | | |
| 6 | Physical & Biological Model Development | \$224,000 | \$124,000 | \$100,000 | | |
| 7 | Participation in Prof. Organizations | \$62,000 | \$34,000 | \$28,000 | | |
| | Task Totals | \$1,298,000 | \$520,000 | \$778,000 | | |

D. CVPIA Program Budget.

| # | Task | FTE | Direct Salary and Benefits Cost | Contract Costs | Misc. Costs | Admin Costs | Total |
|---|---|------|---------------------------------|-----------------|----------------|-----------------|------------------|
| 1 | Program Management | 0.25 | \$38,000 | | | \$2,000 | \$40,000 |
| 2 | CalSim II Review/Documentation | 0.20 | \$30,000 | | | \$2,000 | \$32,000 |
| 3 | CalSim III Development | 1.5 | \$225,000 | \$10,000 | | \$3,000 | \$238,000 |
| 4 | USFWS CalSim Oversight | 0.30 | \$45,000 | \$2,000 | | \$5,000 | \$52,000 |
| 6 | Physical & Biological Model Development | 0.75 | \$112,000 | \$10,000 | | \$2,000 | \$124,000 |
| 7 | Participation in Prof. Organizations | 0.20 | \$30,000 | | \$4,000 | | \$34,000 |
| | USBR | | \$435,000 | \$20,000 | \$4,000 | \$9,000 | \$468,000 |
| | USFWS | | \$45,000 | \$2,000 | | \$5,000 | \$52,000 |
| | Total by Category | | \$480,000 | \$22,000 | \$4,000 | \$14,000 | \$520,000 |

| CVPIA 3406(g) Five Year Budget Plan FY 2007-FY2011 (\$ Thousands) | | | | | | |
|---|------|------|------|------|------|-------|
| | 2007 | 2008 | 2009 | 2010 | 2011 | Total |
| W&RR | 520 | 572 | 597 | 672 | 658 | 3019 |

VII. Future Years Commitments/Actions

CalSim development will be continued in future years to reflect the development of new CVP/SWP operational criteria, new physical and biological data and improvements modeling technologies. These activities will include the development of new code to reflect operational changes and the incorporation of new physical data on water quality, temperature, sediment, habitats, and groundwater into future versions of the model. Additionally, the development of new physical and biological models that can be linked to CalSim will be supported to provide a means to evaluate the physical and biologic significance of the results of CalSim simulations. The spatial domain of the CalSim model will also be expanded in the future versions. The current CalSim versions treat deliveries on the Friant-Kern canal as a time series (based on historical demand). Future development will explicitly include the Friant service area using the new methodologies currently being implemented in the Sacramento and northern San Joaquin Valley regions. Improvements in the CalSim interface and computational efficiency will also be pursued to improve the throughput for studies using the model. Reclamation and the Service are developing output-based performance goals, which include data collection in support of making the models effective. Specifically, new data sets are needed for: characteristics for sediment transport and channel meander of the river systems, collecting new temperature data sets, collecting groundwater temperature and quality data.