

Summary of Findings

CALFED Science Program, California Bay-Delta
Authority

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Scientific Review Panel



Reasonable approach?

■ Yes

- Standard approach for modeling complex water systems
- Institutionally acceptable & improvement over past
- Going in the right direction
- Provides insights
- Operational-planning model

■ No

- Cumbersome for many uses
- Quick “what-if” runs are difficult
- Not transparent or easy to use
- Hard to incorporate new model components



Approach? – Cont.

■ Improvements needed

- GUI needed
- Comparative vs absolute modeling - need ability for both
- Modular approach needs enhancing
- Integration approach needs newer software methods

■ Questions

- Is this a statewide planning model, or just Central Valley?
- May be too focused on Central Valley vs “State water tool.”



Strengths & weaknesses

■ Strengths

- Built on previously accepted models and methods
- Agreed hydrology data and schematic
- Broadening vision of system and requirements
- More open, public and engaging

■ Weaknesses

- Lack of internal mass balance checks in post-processor
- Long run times
- Limited uncertainty and error analysis
- Forecast methodology for operations
- Estimation of Ag demands and GW availability & usage
- Narrow administrative support
- Inadequate assessment of strengths and weakness needed



Limitations, uncertainties, & impediments

- Accuracy of naturalized historic record, especially given climate change
- Poor monitoring of water use
- Uncertainties
 - Institutional
 - Economic
 - Technological
 - Resources needed for training on more than just software, include principles too
- Lack of shared vision among the larger community of stakeholders (developers and users)



Needed developments, special studies or tests

- More realistic modeling of water allocation process
- Postprocessor
- Reliability and Historical studies not yet convincing
 - Additional calibration and verification studies needed
 - Calibrating what? Verifying what?
 - Need to address other dimensions of reliability (resilience and vulnerability, etc.)
 - More self-critical interpretation
- Are needs and interests of water districts being met?
- Different levels of detail, spatial and temporal



Needed developments – Cont.

- Documentation
- Graphic User Interface
- Internal checks needed
- Improve demands estimation (esp. ag and muni)
 - Demands should be weather and economic sensitive
- Data management and metadata
- Allow different levels of detail (spatial & temporal)
- Allow dynamically changing weights as a function of variables
- Dealing with nonlinearities
- Improve representation of GW – SW interaction



Strengthen development & use process

- Broaden model administration and control of model development → **Consider a modeling consortium.**
- Provide more complete documentation
- Establish software maintenance program
- Add internal checks
- Initiate and support User's Group
- Distribute publications widely
- Establish ongoing peer review process
 - Need more technical review of model(s) and data
- Ensure quality of data, especially from other models
- Use standard software & data QA/QC procedures



Long-term use & development

- Provide more precision (adaptable spatially and temporally)
- Provide simple to complex versions
- Larger geographical representation (Tulare and S. Calif.)
- Enhance representation of GW – SW interaction
- Allow head dependent discharges
- Public view of CalSim II does not agree with insider's view
 - Involve operators/districts through interaction with model
 - Develop a shared vision among the larger community of stakeholders (developers and users)
- Give more attention to demand management
- Implement independent consortium to help run, test, analyze, and document the model



Long-term use & development – Cont.

- Include ecosystem modeling
- Enhance representation of “non-project” water
- Improve software
- Incorporate uncertainty
- Secure resources needed to do these things
- Opportunity for optimization



Summary

- CALSIM II modeling approach is appropriate for performance estimation, reliability assessment, and operational studies.
- CALSIM II is a substantial improvement over previous models and provides a basis for consensus.
- More comprehensive, modular, and flexible implementation is needed.
- Management procedures are particularly important for improving model and application QC and documentation. A consortium is recommended.
- Continued technical review by experts and stakeholders is desirable.