

Existing Computer Model / Tool Characteristics and Applicability to System Reoperation Studies

**STATEWIDE WATER ANALYSIS NETWORK
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Modeling Needs

- Statewide-System wide-Central Valley
- System Reoperation objectives:
 - Water supply reliability
 - Flood protection/hazard reduction
 - ECO system protection/restoration
- Models need Dynamically linked

Model Information		Water Supply Models			
		CalSim III	CalLite/WEAP PA	USRDOM/CalSim II (NODOS)	INFORM
Model capabilities	<i>time step</i>	monthly	CalLite: monthly WEAP: various	monthly and daily	various
	<i>representation of hydrology in Central Valley</i>	SWP/CVP service area and beyond	SWP/CVP service area and beyond with WEAP PA	SWP/CVP service area	Northern California only
	<i>stream routing</i>	no	no	stream routing at Upper Sacramento River	yes
	<i>surface water and groundwater interaction</i>	Dynamically linked with C2VSIM	simple representation	simple representation	simple representation
	<i>Watershed runoff modeling</i>	Yes, through CalSim Hydrology	yes, through WEAP, to be completed	no	yes
	<i>multiple time step optimization in water allocation</i>	no	no	no	yes
	<i>Linkage to models / tools</i>	no, but similar linkage as CalSim II can be implemented	SWAP	USRWQM, Reclamation Temperature & Mortality models, SALMOD, WRCLCM (IOS), LTGEN SWP Power, SWAP, LCPSIM/SUPEM, LCRBWQM/SBWQM	no
	<i>reliability analysis</i>	no built-in tool	no built-in tool	no built-in tool	some
	<i>Optimization/management tool</i>	no built-in tool	no built-in tool	no built-in tool	limited/unknown

Model Information		Water Supply Models			
		CalSim III	CalLite/WEAP PA	USRDOM/CalSim II (NODOS)	INFORM
System Reoperation building blocks	<i>cooperate among SWP, CVP and other local projects</i>	limited with COA agreement	limited with COA agreement	limited with COA agreement	limited with COA agreement
	<i>reoperate reservoirs (Forecast based or cooperated operation and rule curve revision)</i>	limited with monthly time step, no FBO	limited with monthly time step, no FBO	monthly operation decision with daily stream routing, no FBO	yes
	<i>integrate management of groundwater and surface water</i>	yes	limited	limited	limited
	<i>change stream flow patterns</i>	no	no	yes. But limited to upper Sacramento River	yes
System Reoperation Objectives	<i>water supply representation</i>	yes	yes	yes	yes
	<i>flood protection representation</i>	limited, no stream routing	limited, no stream routing	limited, stream routing at Upper Sacramento River only	limited, stream routing but need better representation of water system
	<i>ecosystem representation</i>	limited can be implemented as CalSim II	limited can be implemented as CalSim II	limited linked, but not dynamically linked with some ecosystem models	no

Model Information		Water Supply Models			
		CalSim III	CalLite/WEAP PA	USRDOM/CalSim II (BDCP/NODOS)	INFORM
Model analysis	<i>Issues</i>	not released yet, no stream routing	integration not completed, simple representation of SWP and CVP, SJR region to be added, some features still under development	newer model, need experienced modeler	lack of details for representing SWP and CVP, need implementation of Delta salinity control in addition to X2 requirement
	<i>advantage</i>	better hydrology resolution, linked to C2VSIM	water demand calculation, watershed runoff module, easier use and faster execution	stream routing at Upper Sacramento River, linked with some other ecosystem and water quality models	runoff module, stream routing, forecast based operation, reservoir decision support system (current policy and Adaptive, Risk-based Policy up to nine months), energy consumption in reservoir operation
	<i>Model Improvement</i>	for candidate models: (1) without stream routing capability or dynamically linked flood hydraulic model, implementing flood measures and controls index in the models is needed; (2) if not dynamically linked with ecosystem models, implementing ecosystem measures and controls in the models is needed. Use the model linking techniques developed in BDCP and NODOS efforts. (3) developing an automation/optimization tool to speed up modeling effort, perform reliability analysis and help make optimal management decision. (4) Model improvement to simulate forecast related operations			implement water system in more detail as CalLite, improve delivery logic, link with ECO models
			if CalSim III is not available, implementing surface water and groundwater interaction		
	<i>Model Recommendation #1</i>	main	reconnaissance level study	x	x
	<i>Model Recommendation #2</i>	if not available	reconnaissance level study	main	x
<i>Model Recommendation #3</i>	if not available	main	if not available	x	

Hydraulic Models for Flood Evaluation

- the HEC-RAS model developed through CVFED (Central Valley Flood Evaluation and Delineation) flood mapping effort is recommended because it is the first DWR numerical model covering the entire Central Valley;
- DSM2 is recommended for Delta hydrodynamic simulation due to its long time application in Delta;
- UNET/HEC-5 CVFPP modeling suite from Comprehensive Study can be used if the recent HEC-RAS model is not available

Ecosystem Models and Evaluation Tools

- All ecosystem, water quality models or environmental flow definition should be reviewed for quality control purpose.
- All ecosystem related models should be used if they pass quality control check and do not have duplicate functions as other selected models.
- Existing ecosystem and water quality models linked with CalSim II in BDCP and NODOS effort should be reviewed and applied if possible.

Questions?

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