



*CALSIM Water Transfers Tool,
Central Valley Gaming Model,
and Model Evolution*

Presentation to

CWEMF/CWP Screening and Decision
Support Tools Workshop

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Introduction

- Modeling philosophy and role of screening tools
- CALSIM Water Transfers Tool
- Central Valley Gaming Model
- Model evolution

Modeling Philosophy

- One size never fits all
- Many problems are initially ill-defined
- Need to explore decision space, develop understanding, and build consensus
- Often existing tools are ill-suited for exploratory analyses
- Post-processing spreadsheets omit system responses

Modeling Philosophy (cont)

- Screening tools fill the gap between detailed system tools and post-processing analyses
- Leverage existing, more complex models to provide boundary conditions
- Truth-testing of operational rules is required in more complex models

Need for Tools to Analyze Transfers

- Water transfers have important role in water management programs
- Purchases from willing sellers to augment water supply reliability or to redirect water supplies for environmental protection
- Transfers affect current and future programs
- Tools needed to evaluate transfers and interrelationship with facility operations

Water Programs Considering Analysis of Water Transfers

- South Delta Improvements Program
 - effect of additional export capacity on transfer capability
- Sac Valley Water Management Agreement
 - system improvements, determining “real” water, ability to be exported by both SWP and CVP
- No. of Delta Offstream Storage Investigations
 - protection of existing transfer facility usage, enhanced transfer capability with greater regulating storage
- California Water Plan
 - how will transfers affect future water supply reliability/planning?

Critical Issues & Modeling Needs

- Transfer operations
 - timing, need for re-regulation, carriage water costs
- Facility usage, priorities, and need
 - storage and conveyance use and additional need
- Water supply impacts
 - potential water supply benefits, system re-operation
 - impacts on proposed facilities
- Is it “real” water?

CALSIM WTT Goals

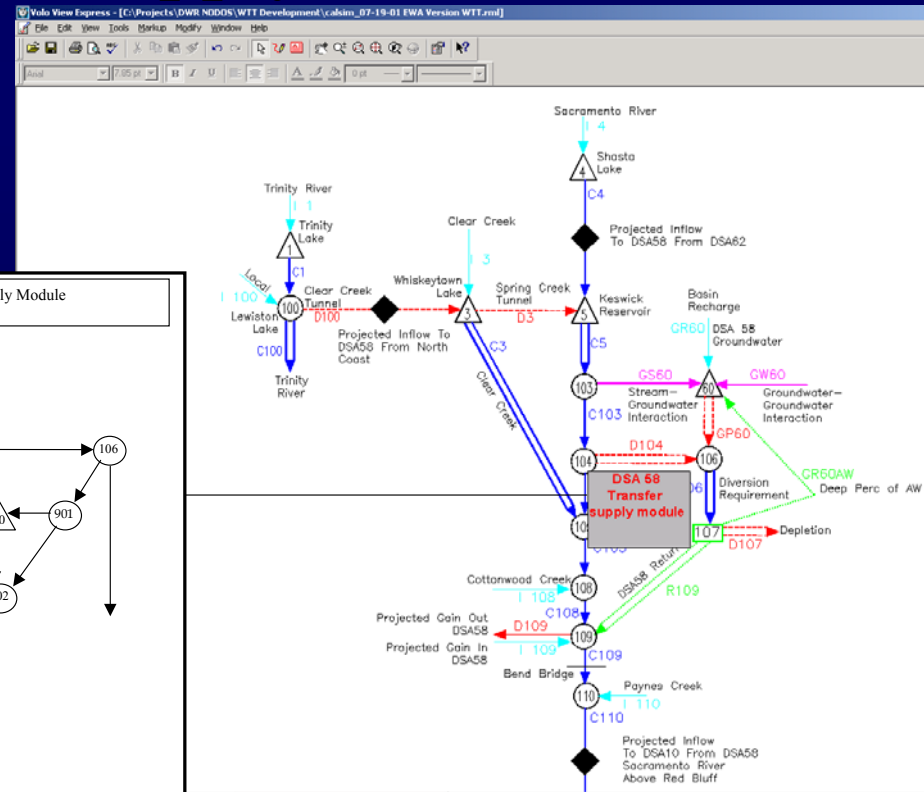
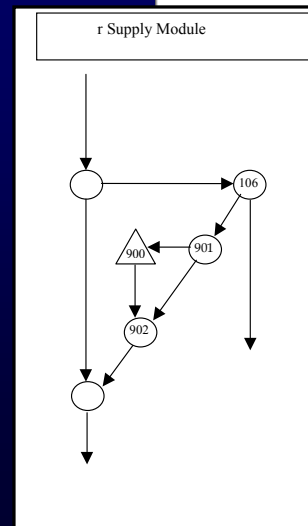
- Provide rapid screening of transfer alternatives
- Include hierarchy of facility use priorities
- Incorporate the most significant components of the full CALSIM II model
- Evaluate timing and availability of conveyance and storage capacity
- Evaluate potential water supply/environmental gains of transfers under existing and proposed facilities
- Provide integration with more detailed system-wide CALSIM II modeling

CALSIM WTT Overview

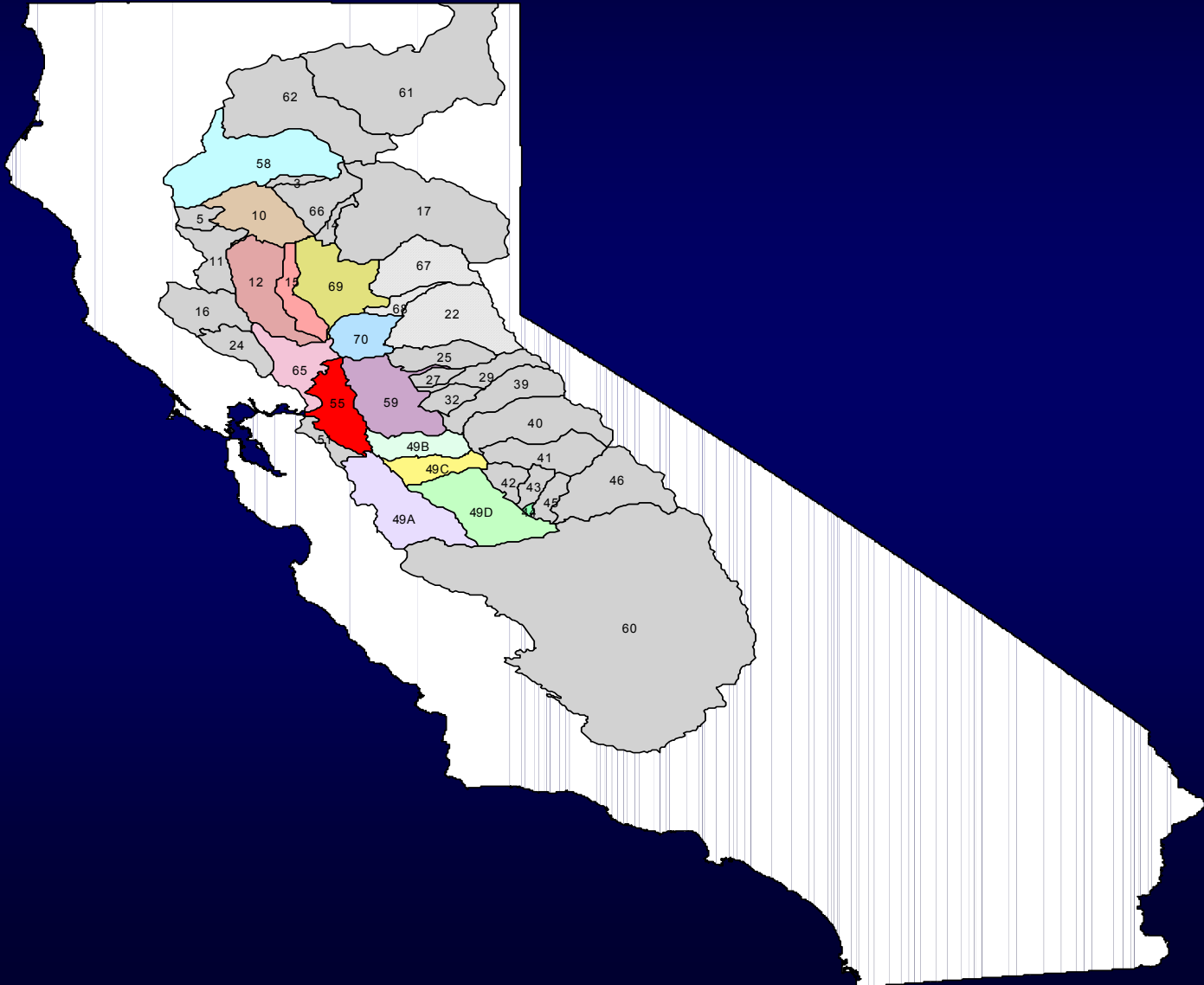
- Scaled-down version of CALSIM model
- Major facilities and constraints of CALSIM
- Transfer “supply” and “demand” nodes
- Layering concept for evaluating transfers at varying priorities
- Simulates both in-basin and cross-Delta transfers
- System re-operation including reservoirs, export facilities, Delta salinity, etc.

CALSIM WTT Application

- “Common Assumptions” process
- Focus on facility needs/competition
- Transfer locations: 10 supply, 20 demand
- Rapid screening or fully dynamic modes

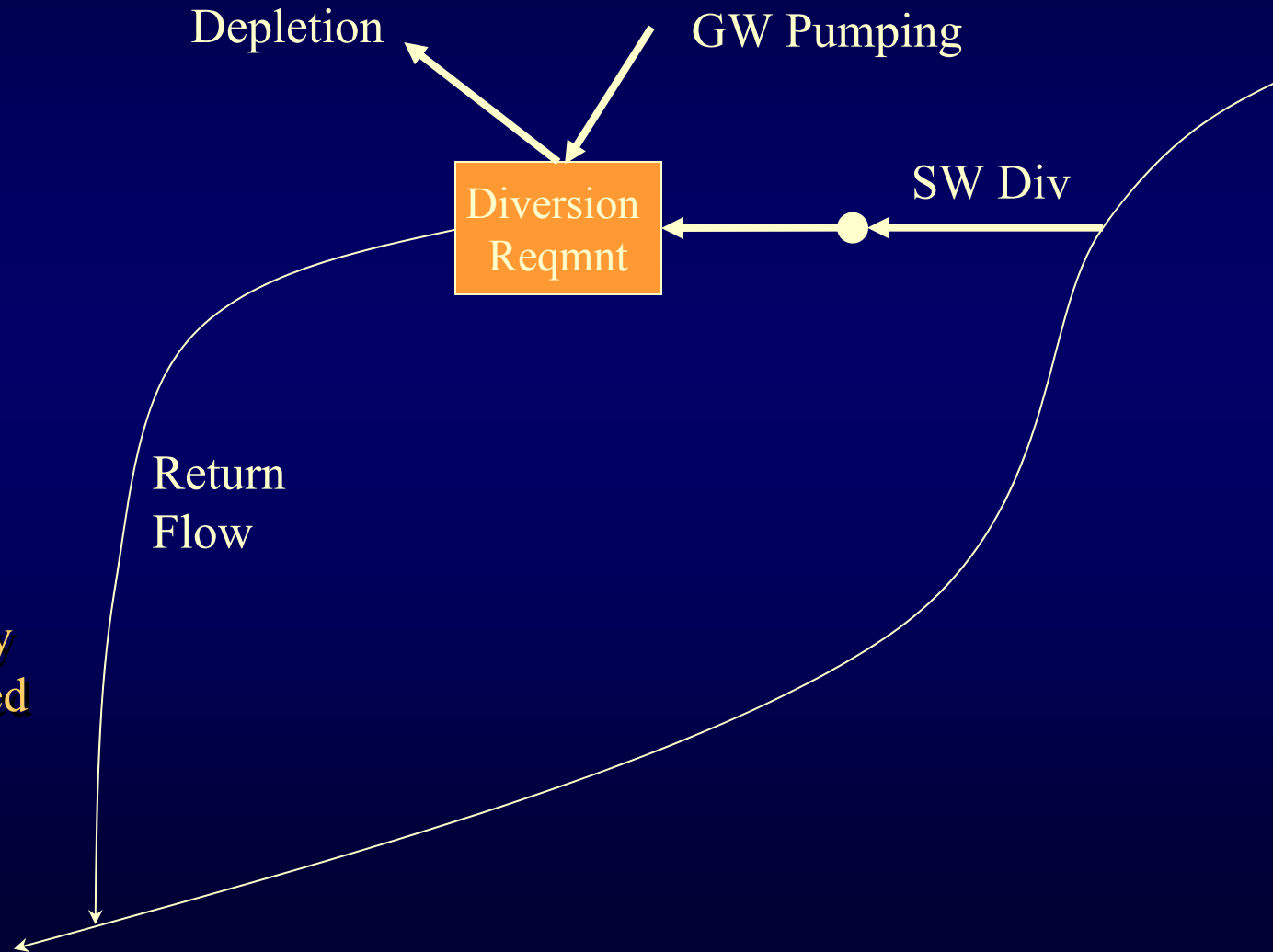


Depletion Study Area Focus



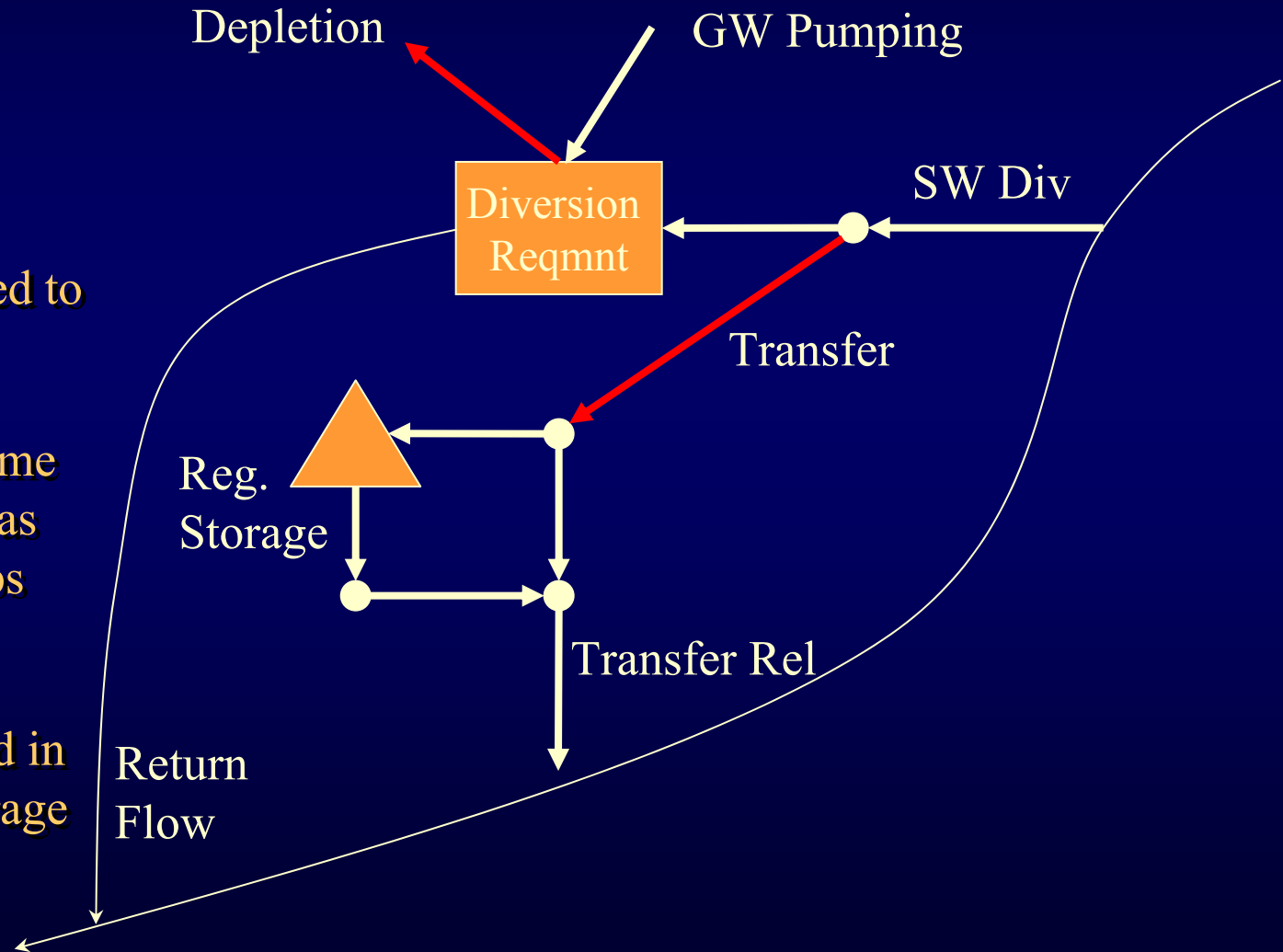
Depletion Study Area Focus

- Depletion study areas for Valley floor
- Diversion requirement represents land use-based water demand
- Transfers initially to be implemented at this scale



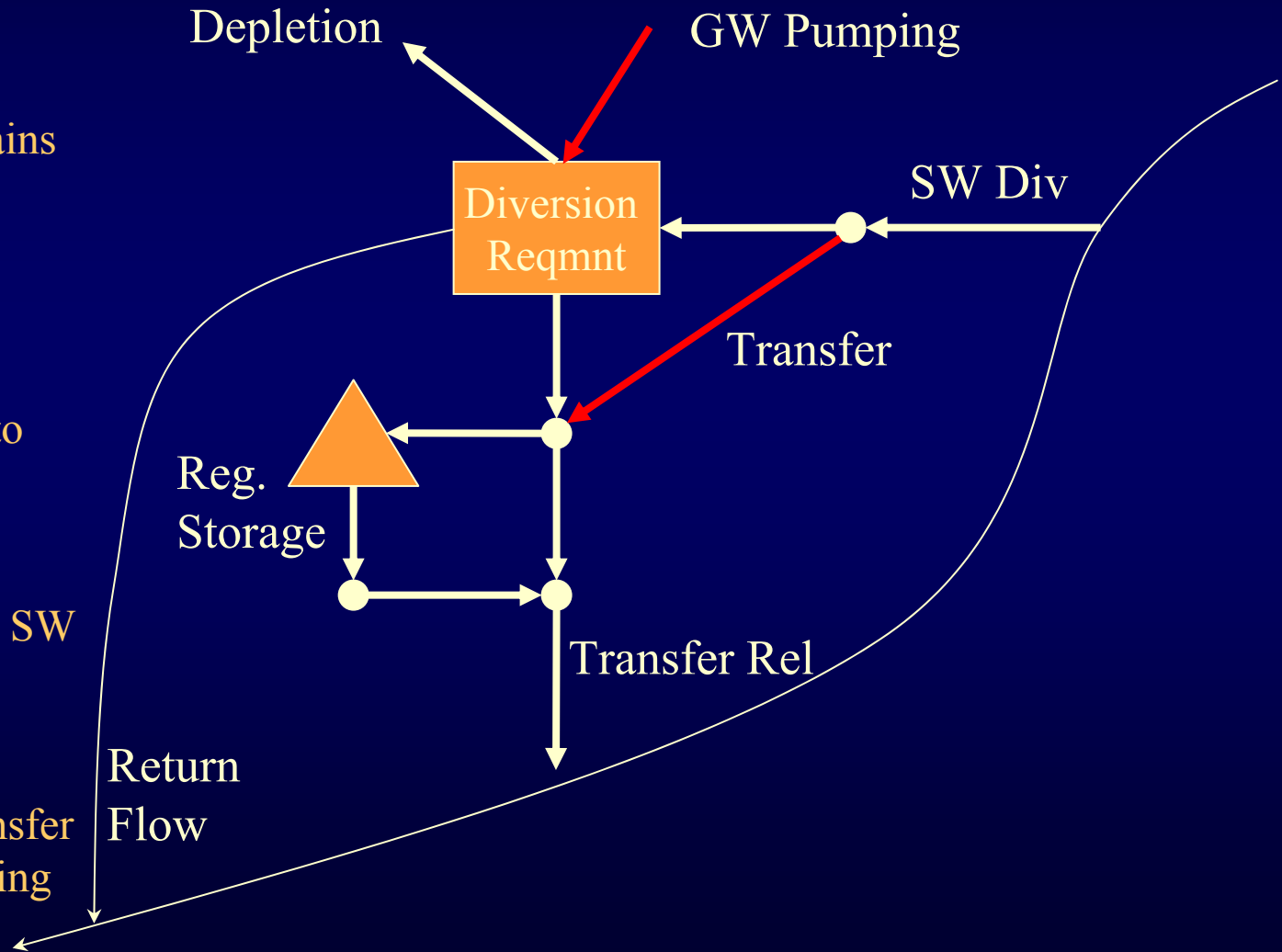
Crop Idling Transfers (WTT)

- Diversion requirement reduced
- Transfer limited to ETAW
- Modeled as same SW diversion as pre-transfer ops
- Can be direct transfer or held in regulating storage

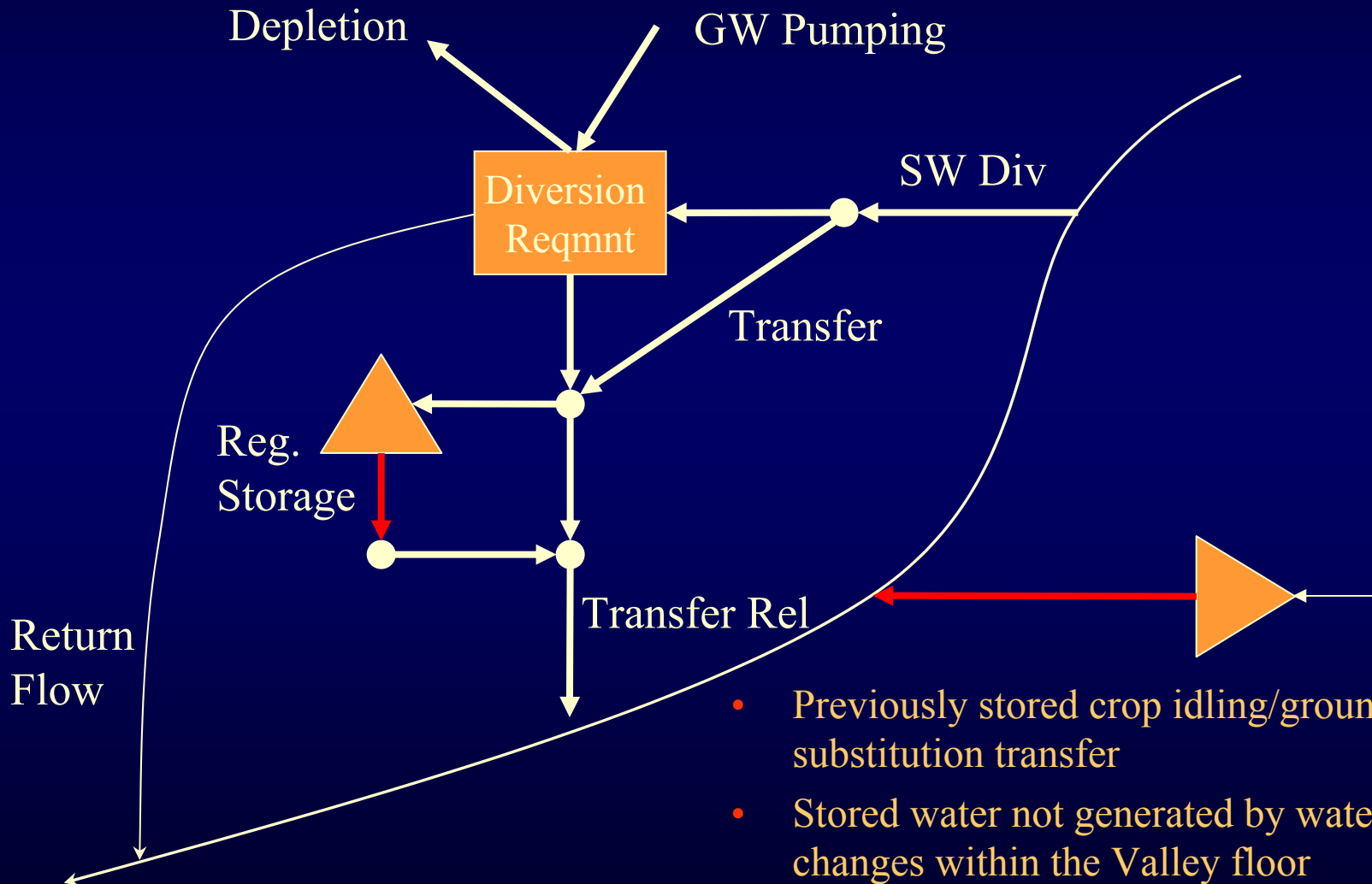


GW Substitution Transfers (WTT)

- Diversion requirement remains same
- GW pumping increased
- Transfer limited to increase in GW pumping
- Modeled as same SW diversion as pre-transfer ops
- Can be direct transfer or held in regulating storage



Stored Water Transfers (WTT)



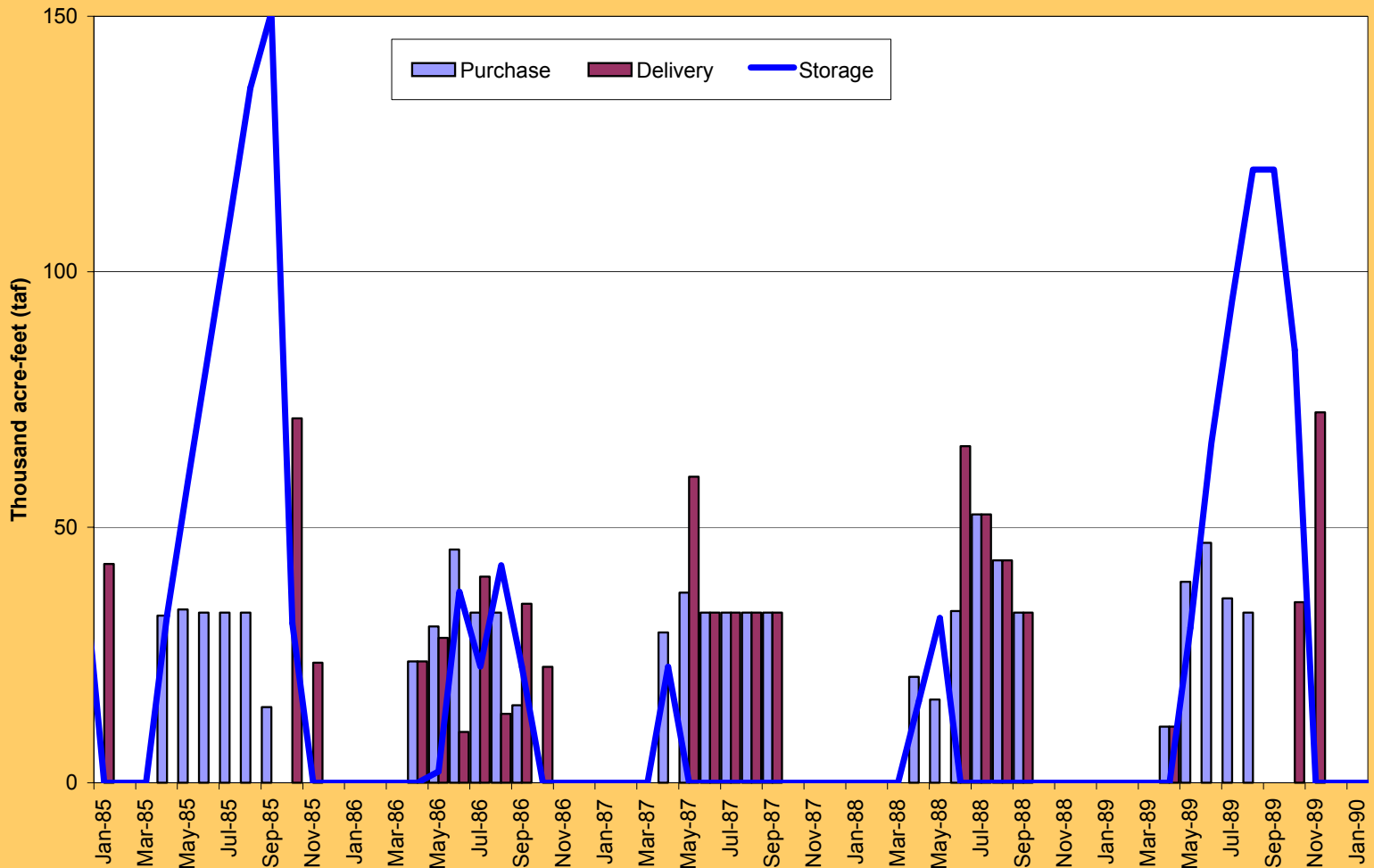
- Previously stored crop idling/groundwater substitution transfer
- Stored water not generated by water management changes within the Valley floor
- Balanced or Term 91 conditions?

Transfer Assumptions

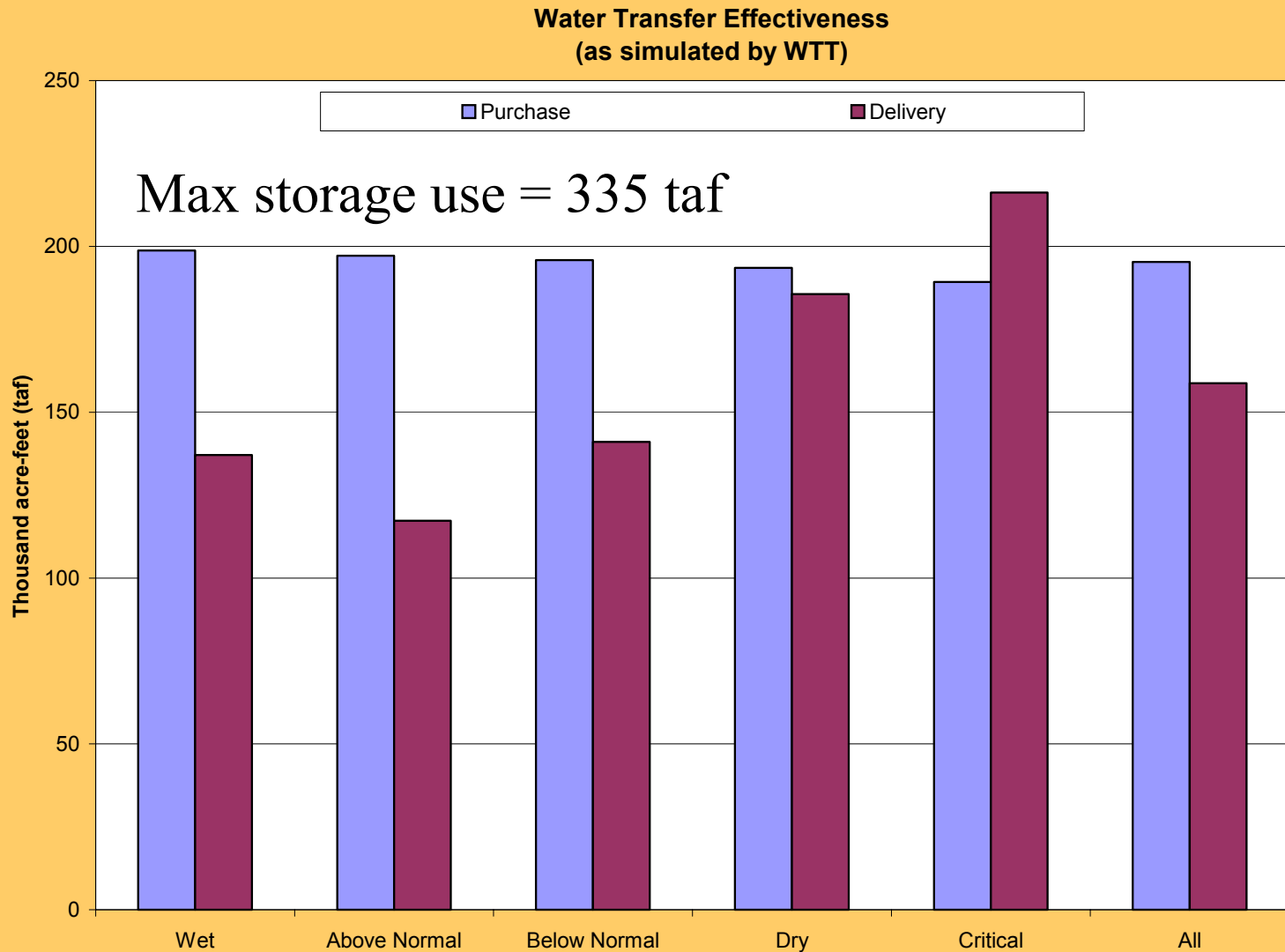
- Water transfer supply sources (amount and type)
- Water transfer beneficiaries (max demand)
- Access of beneficiary to each supply source
- Conveyance and storage priorities
- Example includes 200 taf/yr purchase from No. Sac Valley (DSA 58) and delivery to SWP contractor at junction of E/W Branch

Illustrative Results for WY 85-89

WTT Example Simulation Results for Water Year 1985-89



Transfer Effectiveness



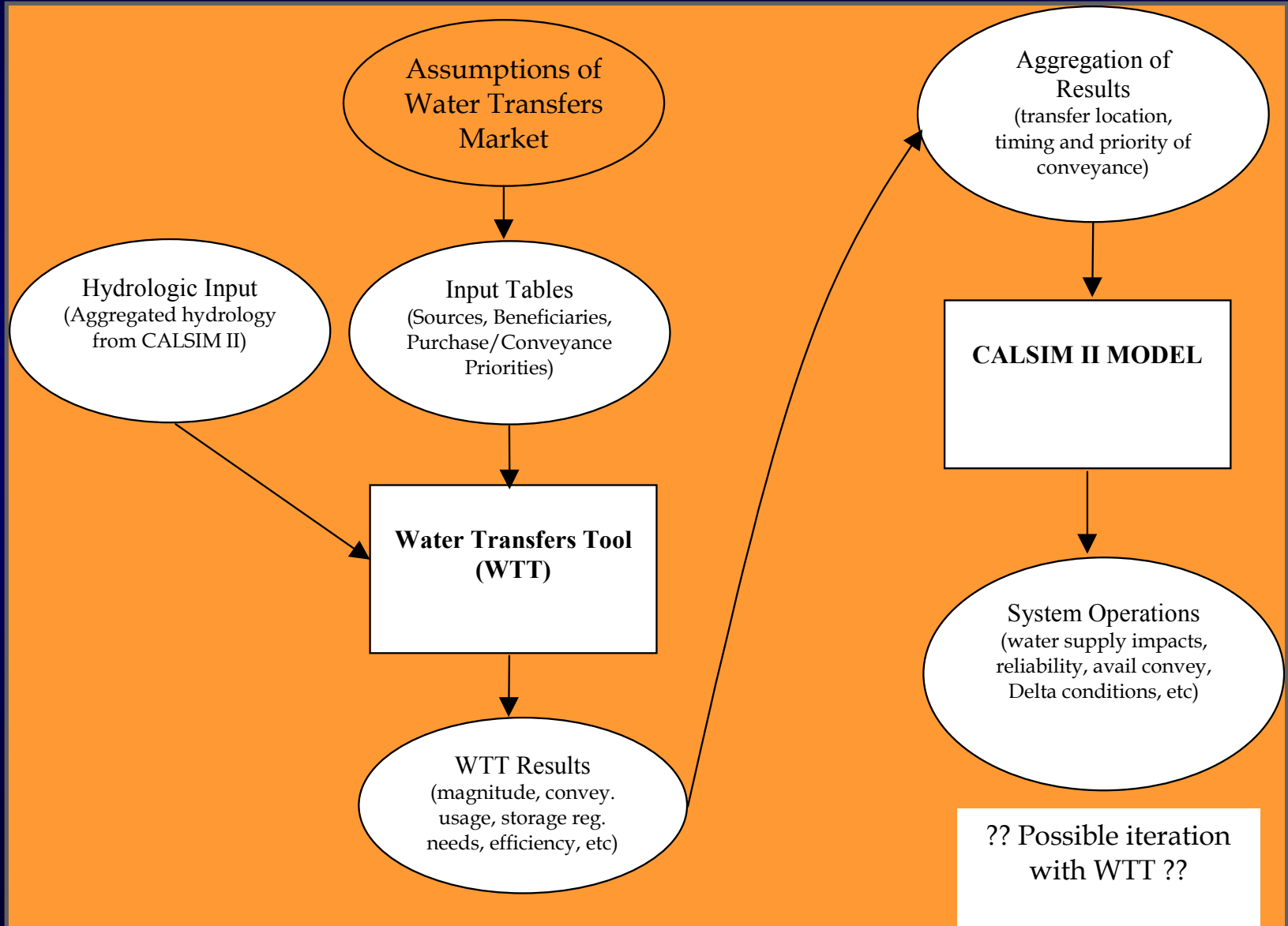
Sources and Beneficiaries

		Supply Sources →					
		Sacramento River			Yuba-Feather Rivers		
		Storage	Groundwater Substitution	Crop Idling	Storage	Groundwater Substitution	Crop Idling
Beneficiaries	Environmental Water Account						
	North of Delta						
	South of Delta						
	Dry Year Program						
	North of Delta						
	South of Delta						
	SWP						
	North of Delta						
	South of Delta						
	CVP						
	North of Delta						
	South of Delta						
	ERP						
	North of Delta						
	South of Delta						
	Water Acquisition Program						
	Level 4 - South of Delta						
	Level 4 - North of Delta						
	Instream Flows						
	Sacramento River (ind.)						
	Yuba-Feather (ind.)						
	American River (ind.)						
	Eastside SJ Valley (ind.)						
	Westside SJ Valley - North (ind.)						
	Westside SJ Valley - South (ind.)						
	Tulare (ind.)						
Bay Area (ind.)							
Central Coast (ind.)							
South Coast (ind.)							

Conveyance Priorities

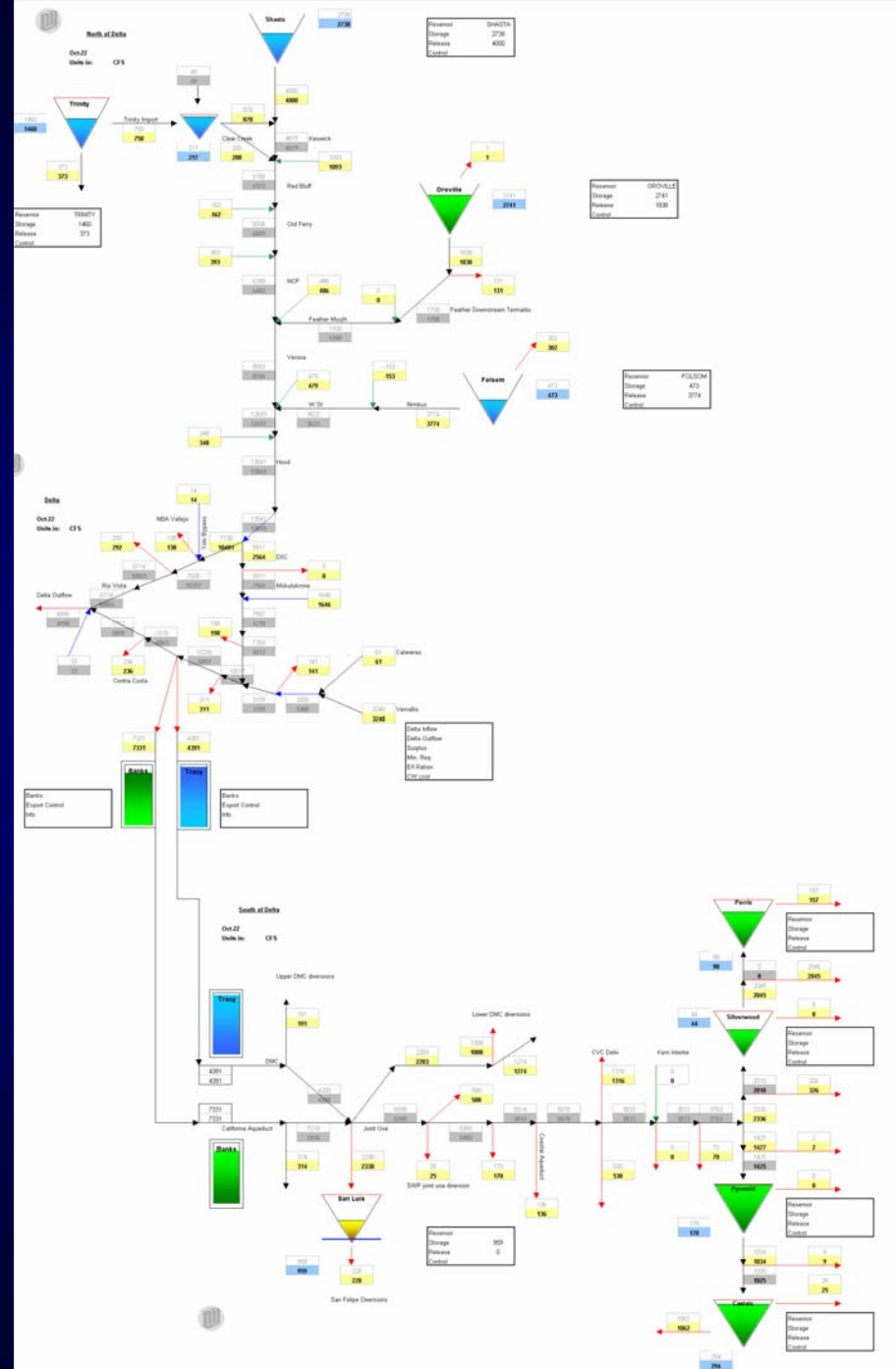
Conveyance Priority	Banks Pumping Plant Use	Tracy Pumping Plant Use
1	SWP	CVP
2	SWP Phase 8 Transfer	CVP Phase 8 Transfer
3	SWP Contractor Transfers	CVP Contractor Transfers
4	CVP JPOD Stage 1	SWP JPOD & EWA/Refuge Level IV JPOD
5	CVP JPOD Stage 2 & EWA/Refuge Level IV JPOD	SWP Contractor Transfers
6	EWA Dedicated Capacity 500 cfs Jul-Sep	Non-CVP-SWP Contractor Transfers
7	CVP JPOD Stage 3 & EWA/Refuge Level IV JPOD	
8	CVP Contractor Transfers	
9	Non-SWP-CVP Contractor Transfers	

Integration with Systems Models

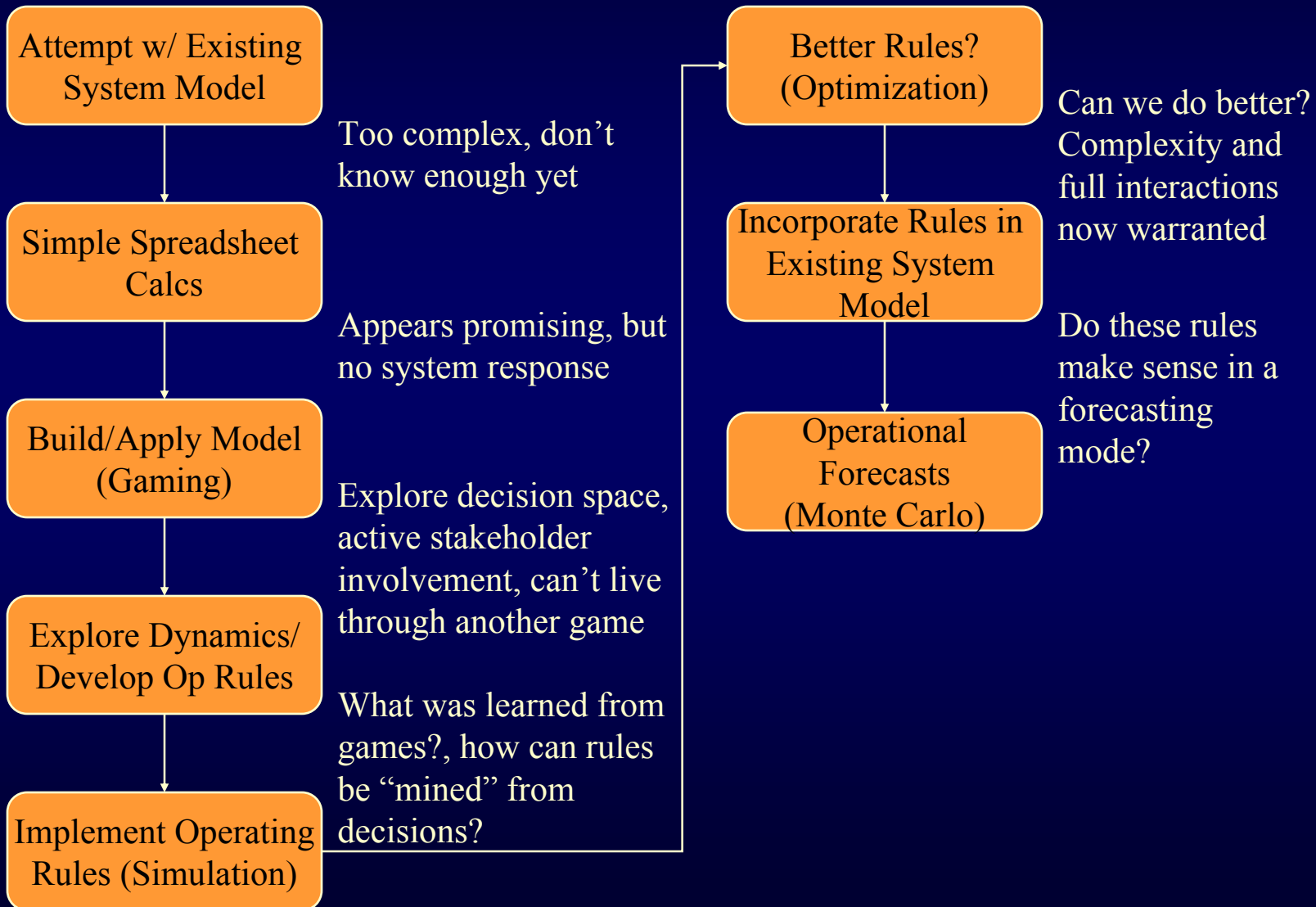


CV Gaming Model

- Interactive gaming model of Central Valley system
- Easily modified
- User re-operates system from CALSIM or historic information
- Multiple scenarios are tracked
- Accounts, water quality, COA, Delta controls, etc



Model Evolution



Summary

- Screening tools fill an important niche in modeling applications
- Promising alternatives need to be truth-tested with more detailed system models
- CALSIM WTT and CV Gaming Model provide rapid screening of alternatives
- Models evolve over time ... it is process of both education and tool development