Application to the Central Valley: CVGSM2 Update

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CVGSM2, what and where?

- Background on hydrology and discretization of CVGSM and CVGSM2
- Enhancements and changes along the way…. CVGSM → CVGSM2
- Major differences between the 2 applications
- Adjustments and Calibration process
- Where are we today?

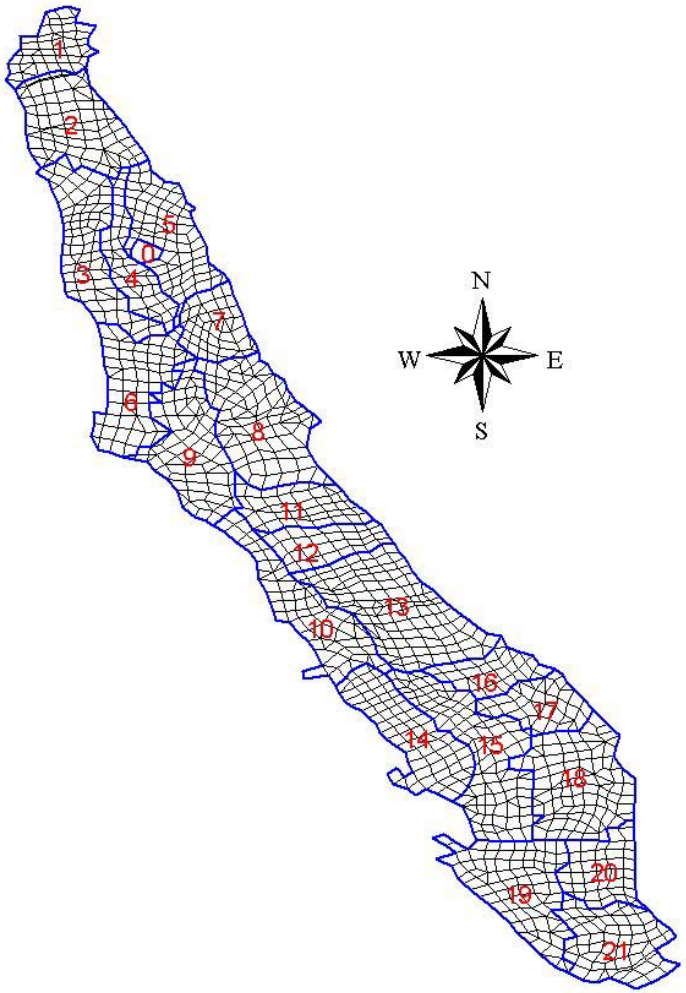
What is CVGSM?

- **CVGSM is the application of IGSM 5.0 to the Central Valley (Sacramento, San Joaquin and Tulare Lake Basins)**

- **First calibration of CVGSM 1991 (1922-1980)**

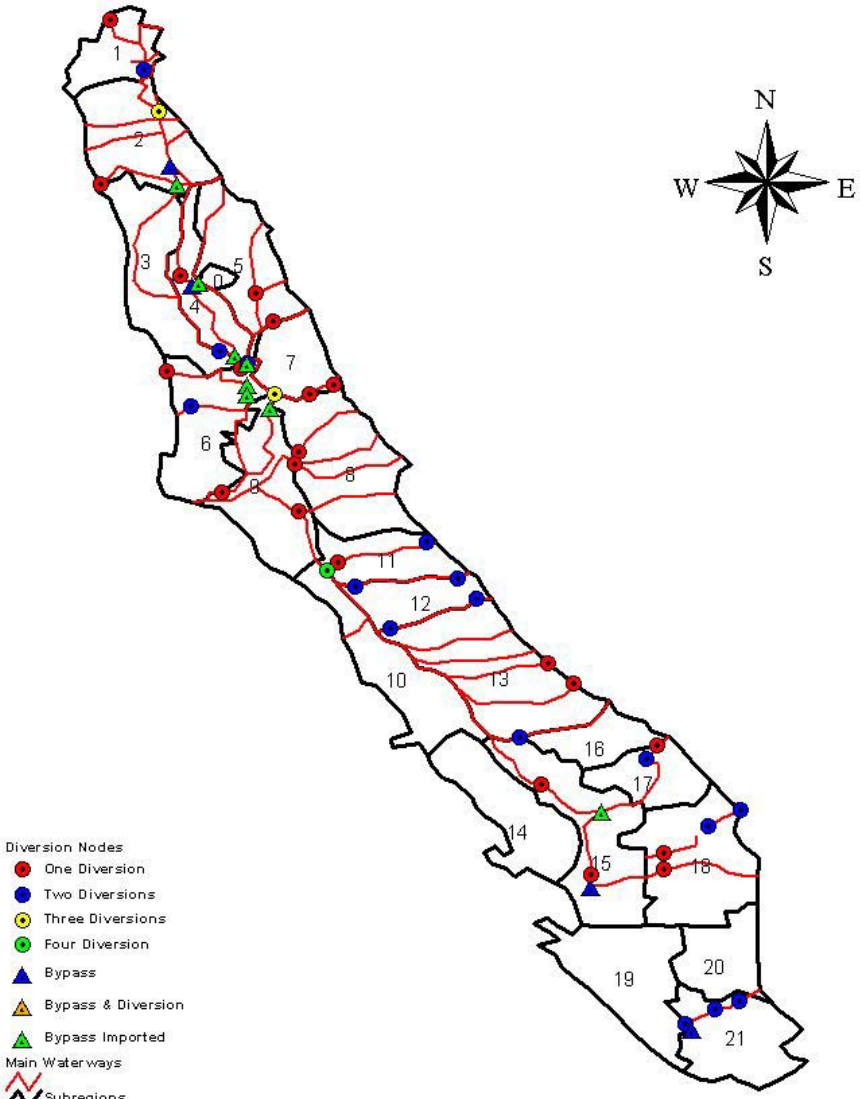
- **Last calibration of CVGSM 1995 (1922-1993) based on streamflows over entire period with 42 well locations throughout valley regions.**
  - Historical hydrology from Oct. 1921 → Sept. 1993 (monthly hydrology with yearly crop acreages)

CVGSM SUBREGIONS & ELEMENT CONFIGURATION



- TOTAL AREA ~20,000 sq. miles
- 3 AQUIFER LAYERS
- 1393 NODES POINTS
- 1392 FINITE ELEMENTS
- 21 SUBREGIONS

CVGSM SURFACE WATER SPECIFICATIONS



- 72 STREAM REACHES
- 121 BOUNDARY SMALL WATERSHED INFLOWS
- 97 SURFACE WATER DIVERSIONS
- BUENA VISTA and TULARE LAKE BEDS
- 8 BYPASS CANAL

Migration from CVGSM to CVGSM2

- Effort began May 2001 to extend hydrology from water year 1993 → 1998
- Land use updated from interpolating between survey years to a yearly land use distribution by element and land use type
- Internal crop demand calculations for entire modeled area, including Tulare Lake Region
- Input data reviewed with DWR Districts
- Verification of methodologies for calculated flows, diversions, and other estimates where possible

Where are we today with CVGSM2?

Hydrology Development

- Time series data updated through 1998
- Precipitation from monthly to daily to capture runoff pattern
- Coordination with ND, CD, and SJD
- Documentation of data sources and development

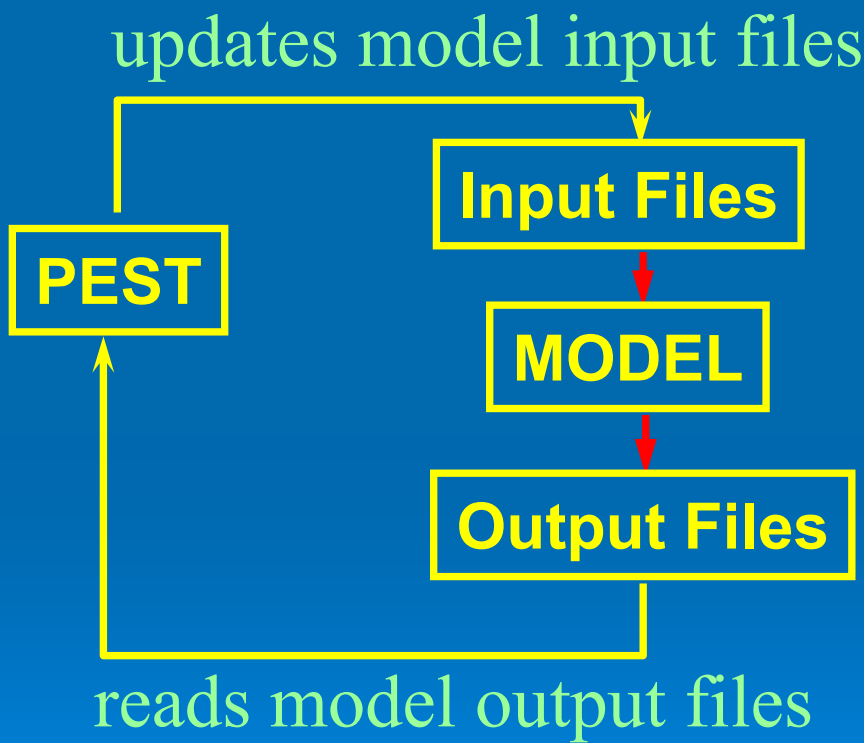
Calibration Preparation

- DWR Districts providing GW well observations and data verification when possible
- Increasing observed GW level data (original CVGSM 41 wells, CVGSM2 120-150)

Calibration and Parameter Estimation

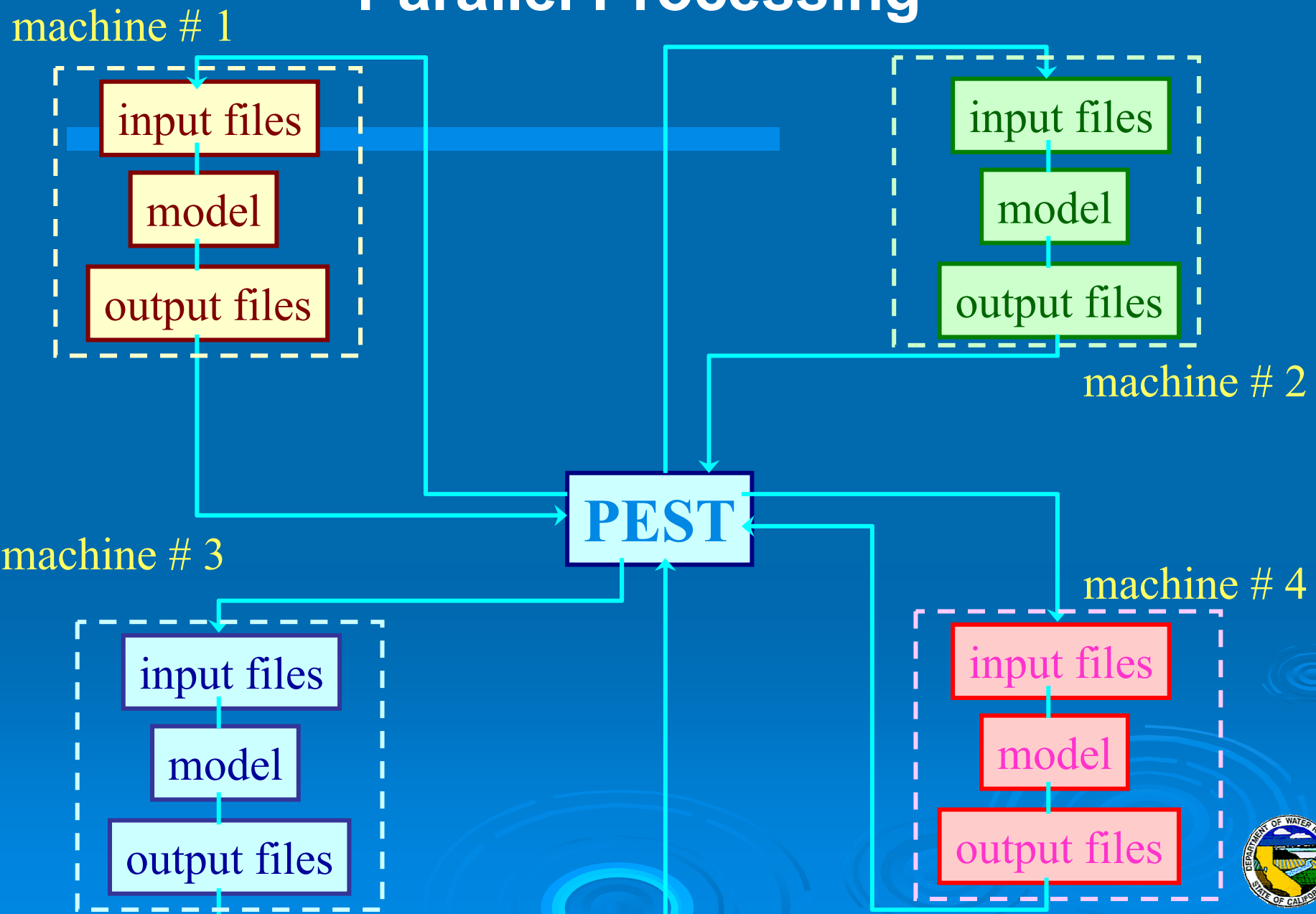
- Calibration currently focused on ND and CD regions
- Automating calibration process by using WinPEST (Parameter Estimation model)
- 69 well locations in Sacramento Valley currently and three stream locations on Sacramento River
- Calibrating CVGSM2 on a daily time step from Oct 1975 – March 1998 with 2 observations per year (Fall and Spring)
- Parallel processing using multiple workstations to reduce calibration run times

PEST - CVGSM2 Interaction



- Improves iteratively parameter estimates to decrease SSR between observed GW levels and stream flows vs simulated values from CVGSM2
- Large parameter set increases run time, requires additional interaction functionality, regularization techniques, smoothing functions, etc.

Parallel Processing



Calibration Outlook

- Verify results from initial calibration: GW levels, SW flows, demands, pumping, budgets, updated parameter statistics and correlations
- Expand calibration area to include SJD region
- Verify updated parameterization and simulation results
- Carry out sensitivity Analyses
- Get input from within and outside DWR
- Document procedures and results
- Make model and results available to the public
- Expected preliminary results Spring/Summer 2004 (?)