STAKEHOLDER ADVISORY FORUM MEETING
MAY 9, 2003
STAGES IN MODELING PROCESS

- Conceptual model
- Model construction
- Calibration
  - steady-state
  - transient
- Verification
- Prediction
PRESENTATION

• TRANSIENT SIMULATION
  - Hydraulic Properties
  - Boundary Conditions
  - Stresses -- monthly stress periods

• TRANSIENT CALIBRATION
  - Calibration targets
  - Calibration results
HYDRAULIC PROPERTIES
HYDRAULIC CONDUCTIVITY
SWRI + CONDUITS

Conduit
K <= 25 ft/d
Recharge zone
BOUNDARY CONDITIONS
BOUNDARY CONDITIONS

Northern boundary: General-Head (SS) > Constant-Flux (Transient)
STRESSES
Annual recharge

Year

Annual recharge (1000 acre-ft per year)


Annual recharge
PUMPAGE

Cells with pumpage
TRANSIENT CALIBRATION TARGETS
TRANSIENT CALIBRATION TARGETS
HYDRAULIC HEADS

• Calibration targets
  (1) Hydraulic heads - long-term record wells
    - County Index wells
    - match hydrographs
  (2) Hydraulic heads - selected time periods
    - periods of above- and below-normal precipitation
    - match hydraulic heads for a set of wells
TRANSIENT CALIBRATION TARGETS
HYDRAULIC HEADS

• Selected time periods
  (1) Below-normal precipitation
      (a) 1952-57
          -May thru November 1956
          - 175 wells
  (2) Above-normal precipitation
      (a) 1973-77
          - November 1974 thru July 1975
          - 172 wells
TRANSIENT CALIBRATION TARGETS
SPRINGFLOW

• 5 springs simulated:

  San Marcos       compiled
  Comal            compiled
  Leona            compiled
  San Pedro        compiled*
  San Antonio      compiled*

*Based on relation with index well J-17
TRANSIENT CALIBRATION PROCESS
TRANSIENT CALIBRATION
REVISIONS

• Recharge adjusted
  - Cibolo Creek basin reduced by 50 percent
  - High recharge years (>1,400,000 acre-ft) reduced by 20 percent (1958, 1973, 1981, 1987)
• Storativity zones and values adjusted
• Hydraulic conductivity and placement of conduits adjusted
• Drain (spring) elevation and conductance adjusted
TRANSIENT CALIBRATION RESULTS
TRANSIENT CALIBRATION
PERIODS

• To make size of data sets and simulation run times more manageable

(1) 1947-60
  - includes drought period

(2) 1961-75
  - includes period of high water levels

(3) 1976-90
TRANSIENT PERIOD 1947-60
Central Bexar County
Southwest Medina County
South-central Uvalde County
North-central Comal County
Central Hays County
HYDRAULIC HEAD RESIDUALS

(For August 1956)

Negative value ( ) indicates simulated head is higher than measured head.
HYDRAULIC HEAD RESIDUALS

(For August 1956)

Negative value (●) indicates simulated head is higher than measured head.
HYDRAULIC HEAD RESIDUALS

(For August 1956)

Negative value (●) indicates simulated head is higher than measured head
HYDRAULIC HEAD RESIDUALS

(For August 1956)

Negative value ( ) indicates simulated head is higher than measured head
Algebraic mean residual: 4.8 ft
Absolute mean residual: 19.5 ft
San Antonio Springs -- 1947-60

Springflow (cubic feet per day)

Date

Measured
Simulated
TRANSIENT PERIOD 1961-75
Central Bexar County
East-central Uvalde County
HYDRAULIC HEAD RESIDUALS
(For February 1975)

Negative value (●) indicates simulated head is higher than measured head
HYDRAULIC HEAD RESIDUALS

(For February 1975)

Negative value (○) indicates simulated head is higher than measured head.
HYDRAULIC HEAD RESIDUALS

(For February 1975)

Negative value (○) indicates simulated head is higher than measured head
Algebraic mean residual: -12.6 ft
Absolute mean residual: 33.5 ft
Comal Springs -- 1961-75

Springflow (cubic feet per day)

Measured
Simulated

Date
Jan-61 to Jan-76

Comal Springs -- 1961-75

Springflow (cubic feet per day)

Measured
Simulated

Date
Jan-61 to Jan-76
TRANSIENT PERIOD 1976-90
Northeast Bexar County
Southwest Medina County
East-central Medina County
South-central Uvalde County
East-central Uvalde County
LEFT TO DO
TASKS TO BE COMPLETED

• Complete 1991-2000 verification simulation
• Complete sensitivity analysis
• Local calibration
• Complete reports
  (2) Interpretive report (WRIR)
  (3) Fact Sheet