Napa County
Updated Conceptualization & Characterization of Hydrogeologic Conditions in Napa County by LSCE and MBK Engineers

presentation for

Napa County Groundwater Resources Advisory Committee

by

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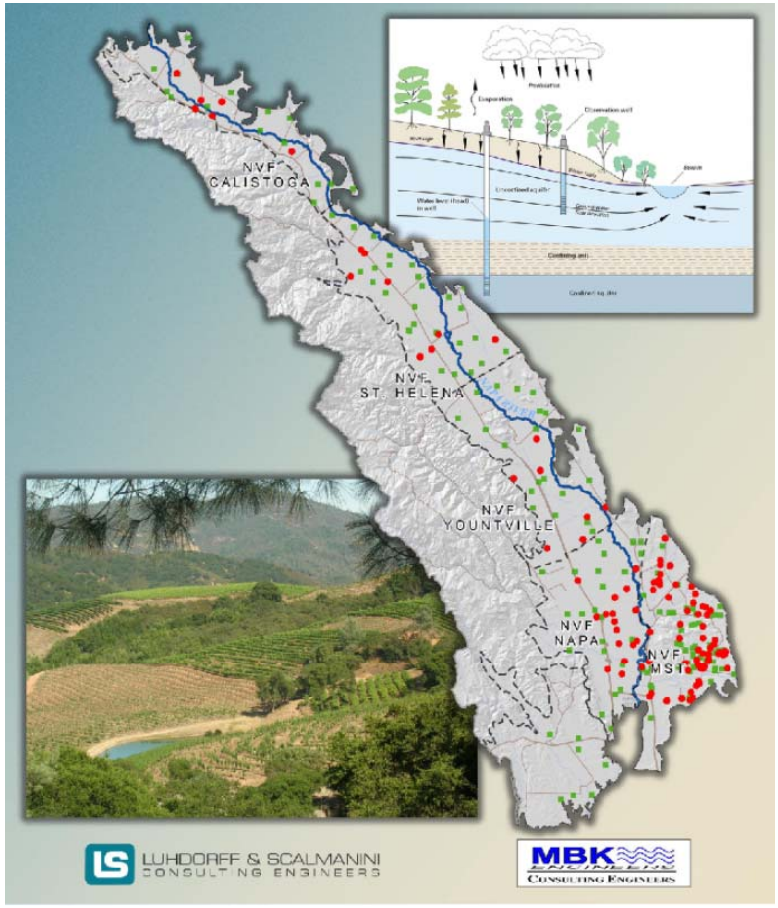
Presentation Overview

- Hydrogeologic Conceptualization & Characterization: Project Purpose (Tasks 1-4)
- Revisit GW Monitoring Recommendations (esp. GW Levels)
- Outline of Updated Conceptualization & Characterization (Tasks 1-4)
- GRAC Questions Related to Project Tasks 1-4
- Groundwater Levels
  - Addn'l GRAC Questions



Purpose Project Tasks 1-4, County's Interests, and LSCE/MBK Tasks

1. Implement Key Recommendations from County's Comprehensive GW Monitoring Program
2. Address County CEQA-Related Interests
   - Discretionary projects/independent landowner
   - Potential pumping effects on surface water and neighboring wells
3. Relationship between SW/GW issues and LSCE/MBK tasks

Future Recommendations – GW Levels

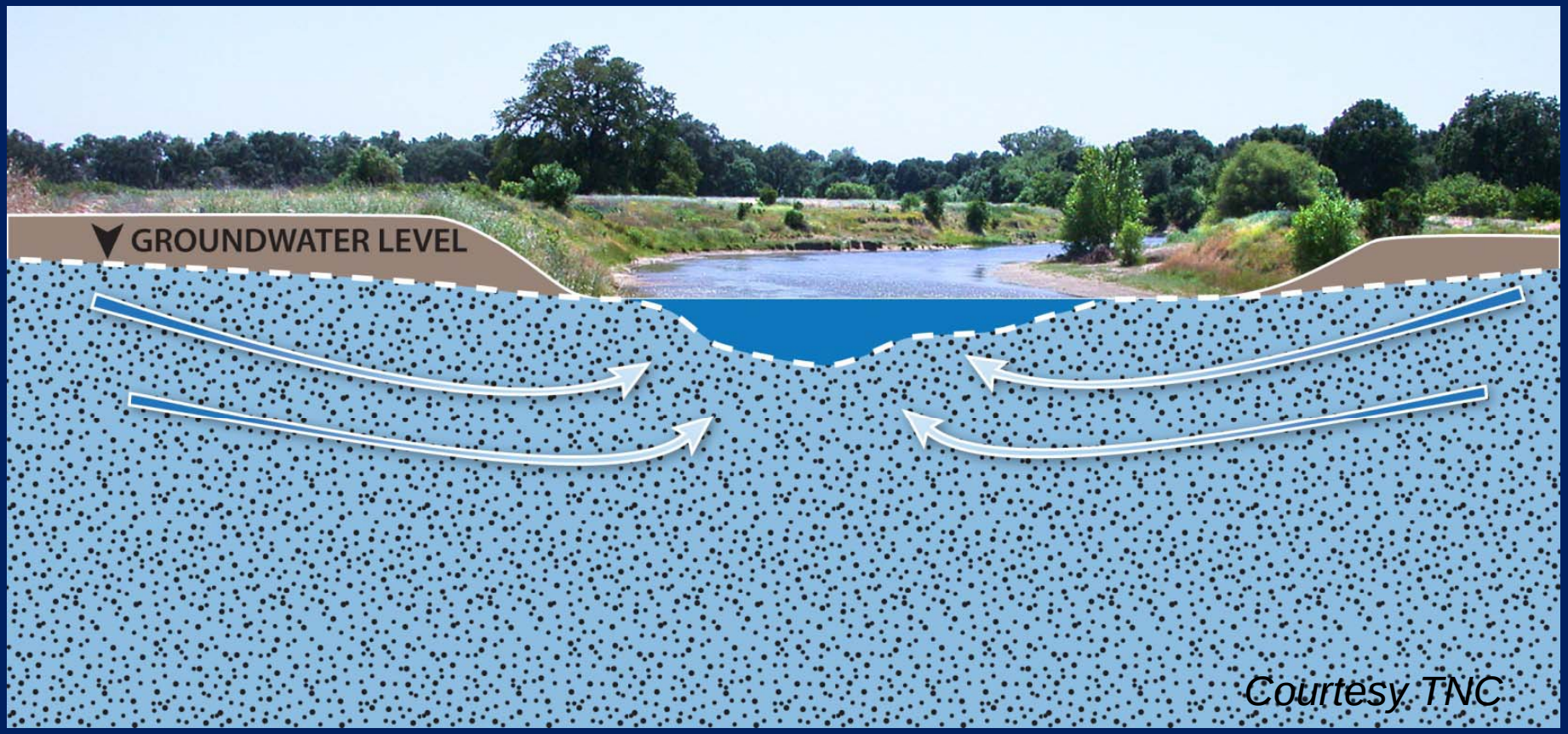
- GW Level Monitoring Objectives
  - Occurrence/movement
  - Factors that affect conditions/trends
  - Monitoring data gaps
  - Water budgets for key subareas
  - GW conditions, including availability
- GW Level Network Priorities
  - High Priority Subareas and Monitoring Needs
    - Based on where population/ag demands are great and gw conditions need more investigation
    - NVF-Calistoga/MST/Napa/St. Helena/Yountville, Carneros, & Pope Valley
    - Improved spatial distribution; subsurface geologic conditions for aquifer ID; improve understanding of SW/GW relationships

SW/GW Issue

Direct Connection

High Groundwater Levels

Maintains/Recharges Stream

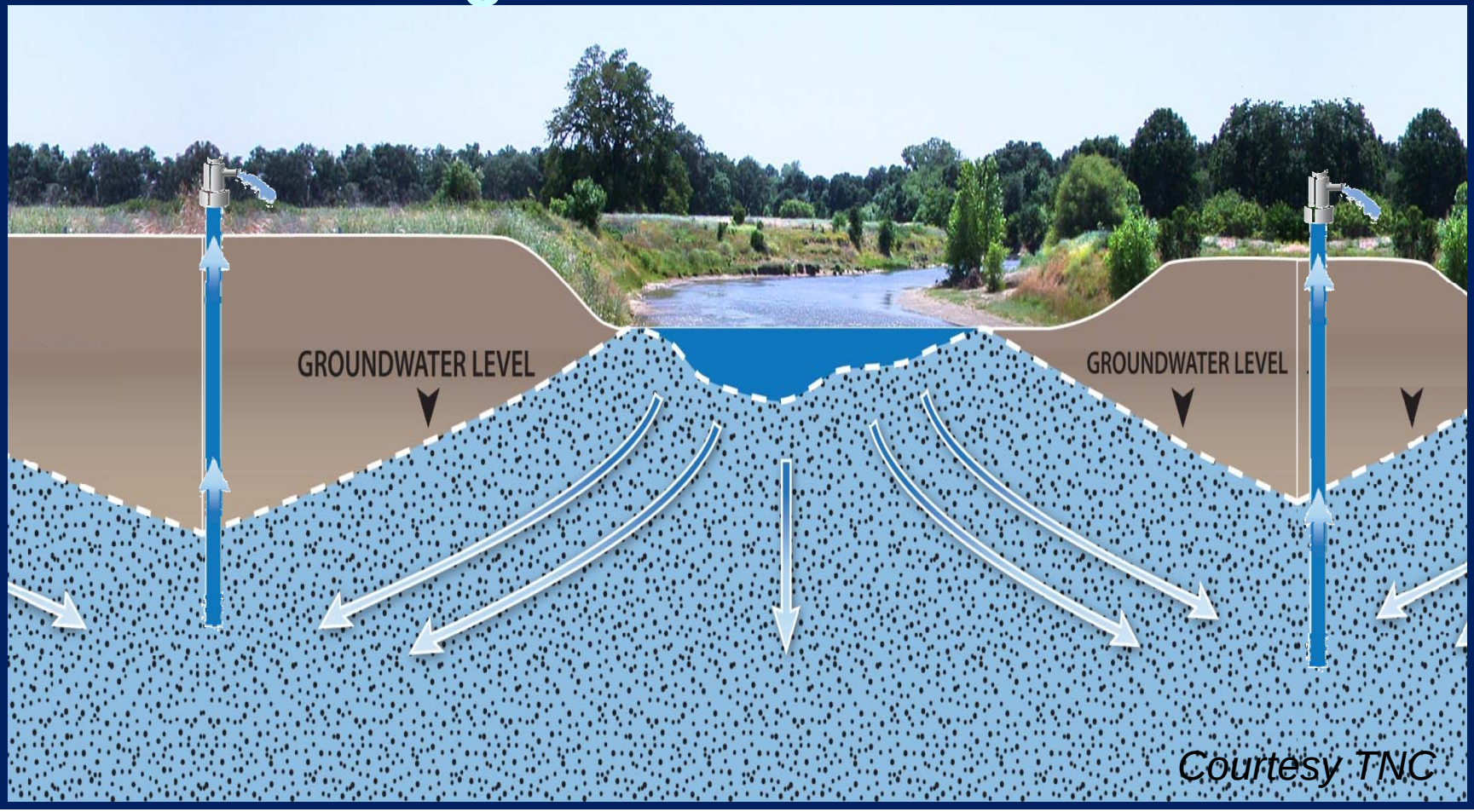


Courtesy TNC

SW/GW Issue

Direct Connection

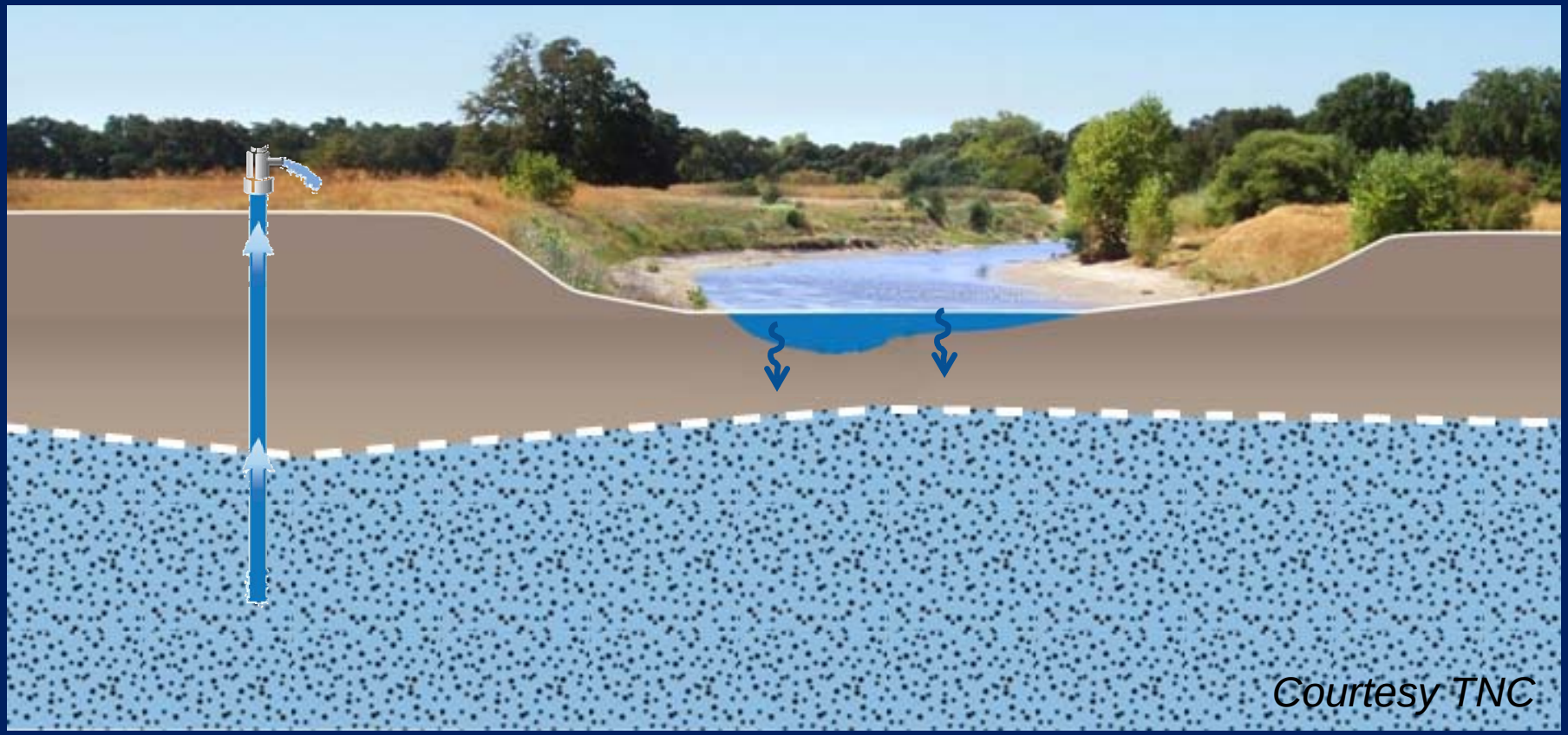
Groundwater Pumping Induces Recharge



Courtesy TNC

SW/GW Issue

Indirect Connection
Stream Seepage Independent of Groundwater Levels



Updated Conceptualization & Characterization of Hydrogeologic Conditions in Napa Count

Project Approach Overview

Task 1: Updated hydrogeologic conceptualization and characterization for priority areas

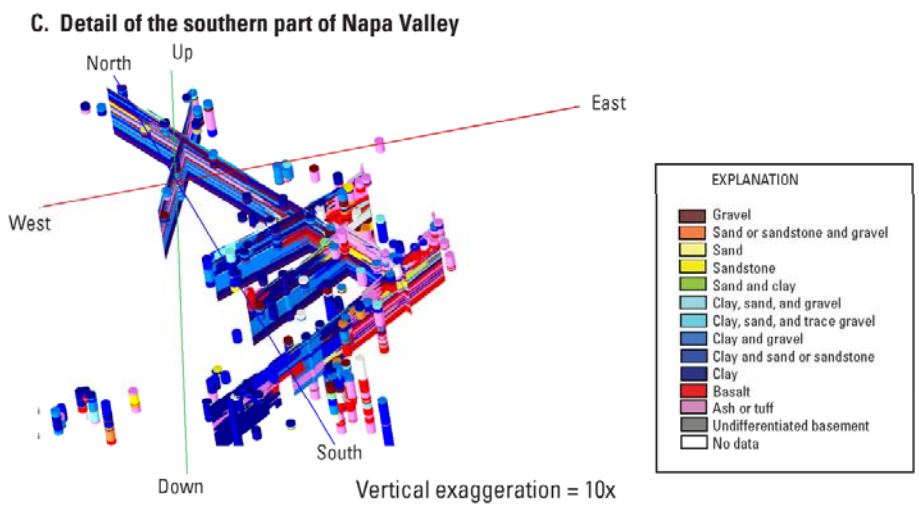
Task 2: ID supplemental GW monitoring wells for high priority areas

Task 3: Refine and further characterize areas with greatest recharge potential

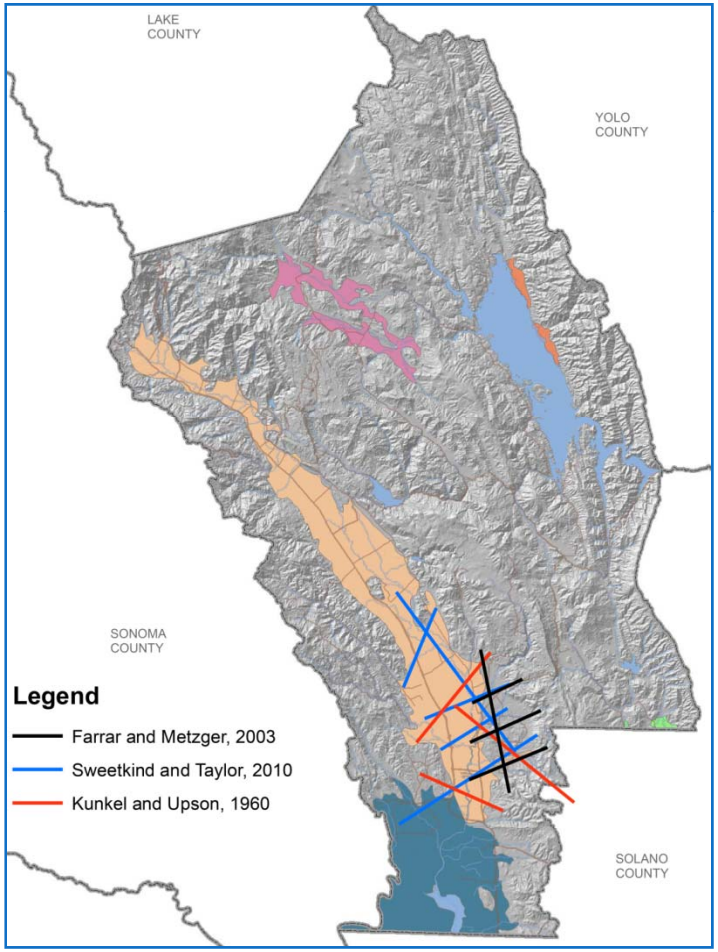
Task 4: Guidance for CEQA-related issues and analysis of SW/GW interactions

Task 1 – Updated Hydrogeologic Characterization and Conceptualization

- Update with decades of more recent geologic data
- Linkage to SW/GW issue
  - Physical system
  - Mechanisms



Sweetkind and Taylor (pre-1960 data digitized)



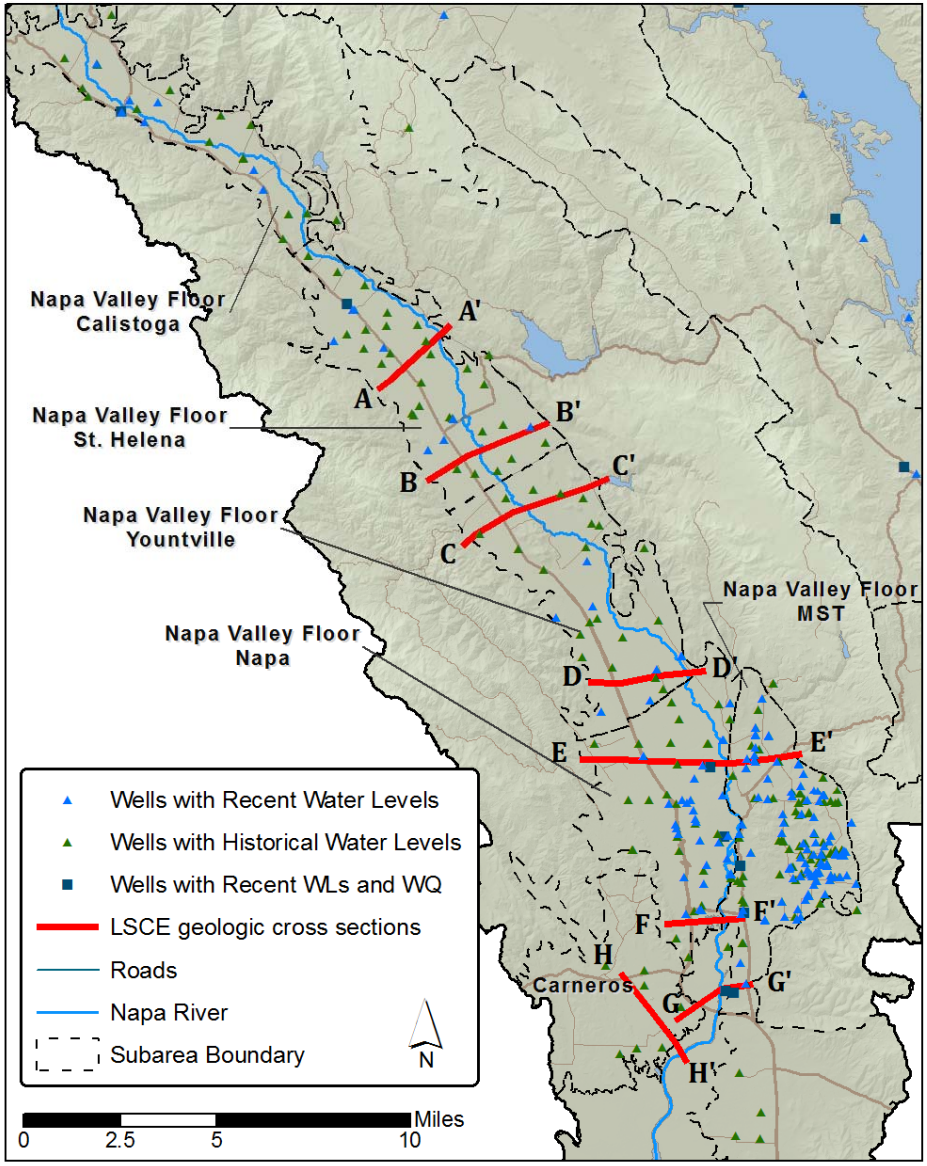
USGS Geologic Cross Section Locations

Task 1 – Geologic Cross Sections

- Obtain addn'l drillers' reports
  - ~ 6300 reports previously
  - ~ 250 reports from DWR added in 2012
- Rationale for cross-section locations
  - Improve physical conceptualization NVF
  - Define aquifer system (including physical & hydraulic characteristics), especially near river
  - Coordinate x-section locations with wells with WL records (as possible)
- Assessing quality of drillers' logs & location data
- Coordinating with input from County

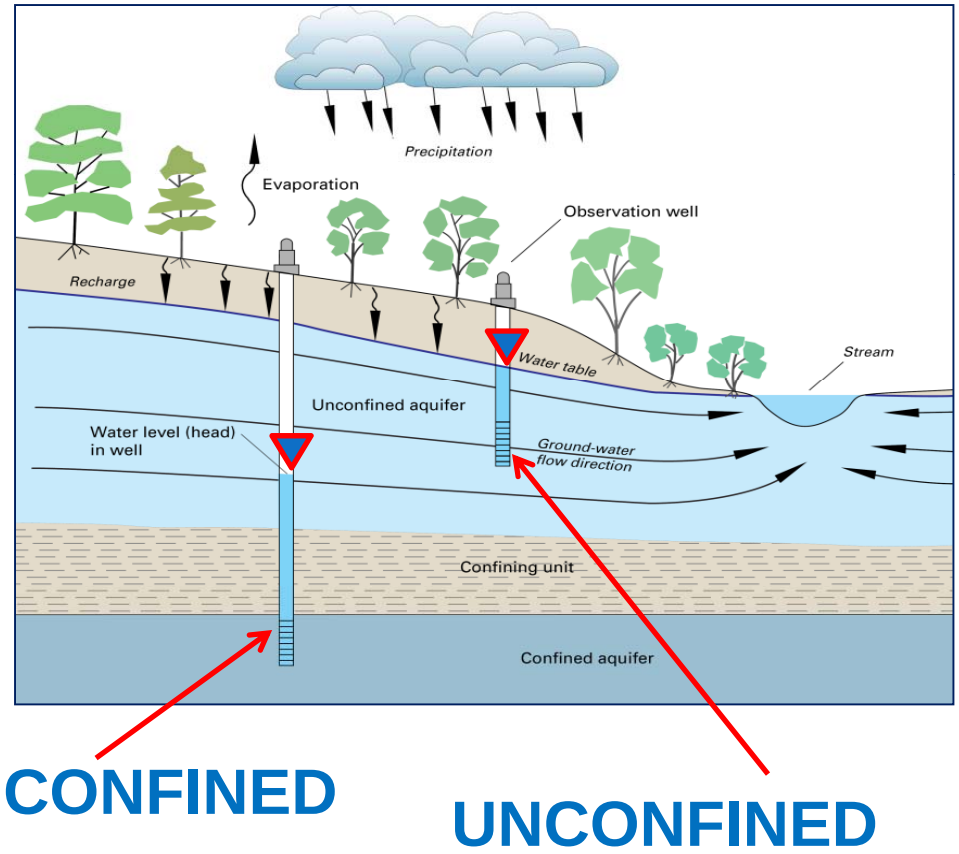
Task 1 – Geologic Cross Sections

- Locating wells with drillers' reports very time intensive
- 180 drillers' reports selected to create cross sections
- Drillers' reports used to create cross sections added to Napa DMS



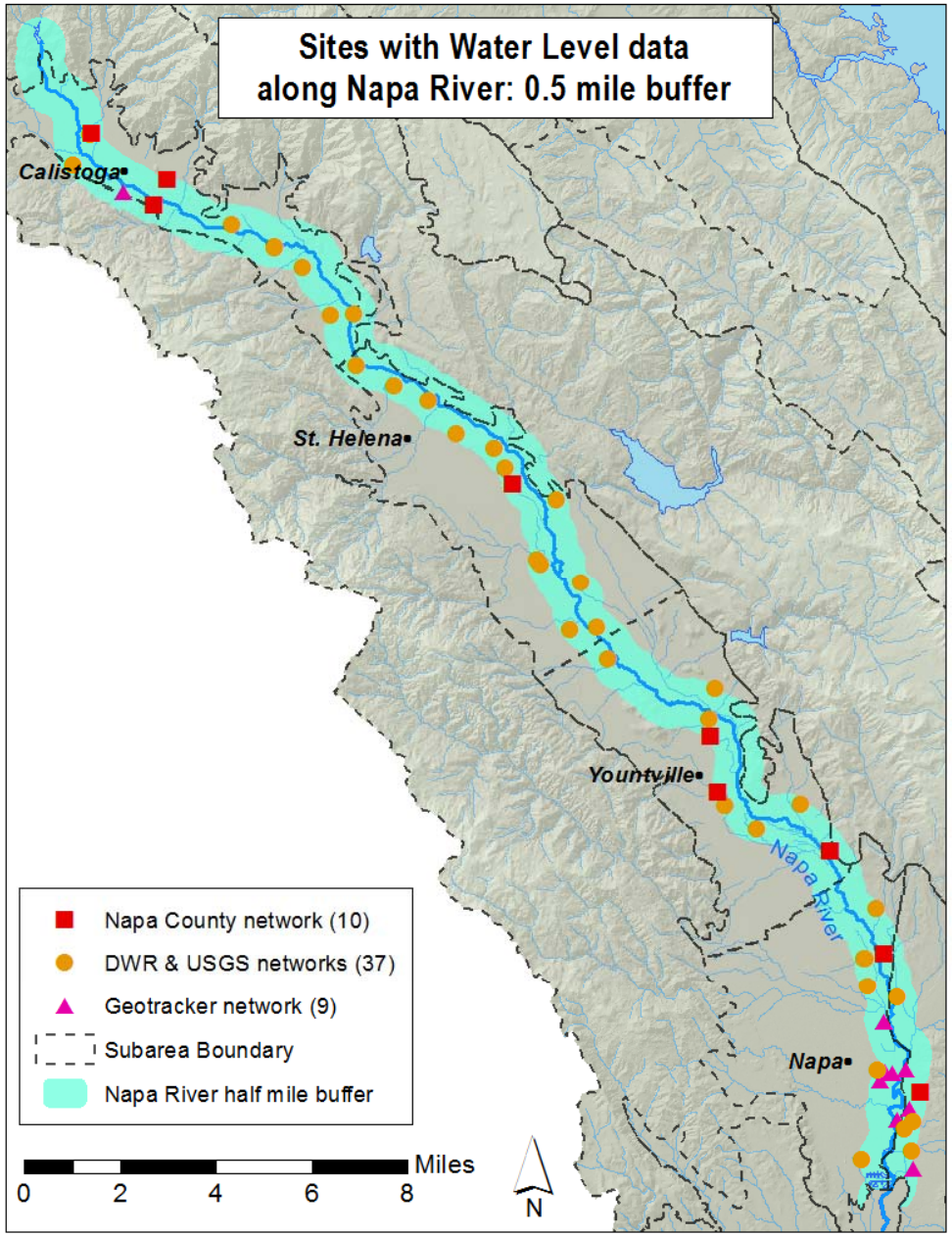
Task 2 – Supplemental Groundwater Monitoring in High Priority Subareas

- Objective: refine & update existing County monitoring network
  - SW/GW monitoring locations
  - Aquifer specificity
- Future monitoring data collected by County



Task 2 – Wells with at least 5 yrs WL Data near Napa River

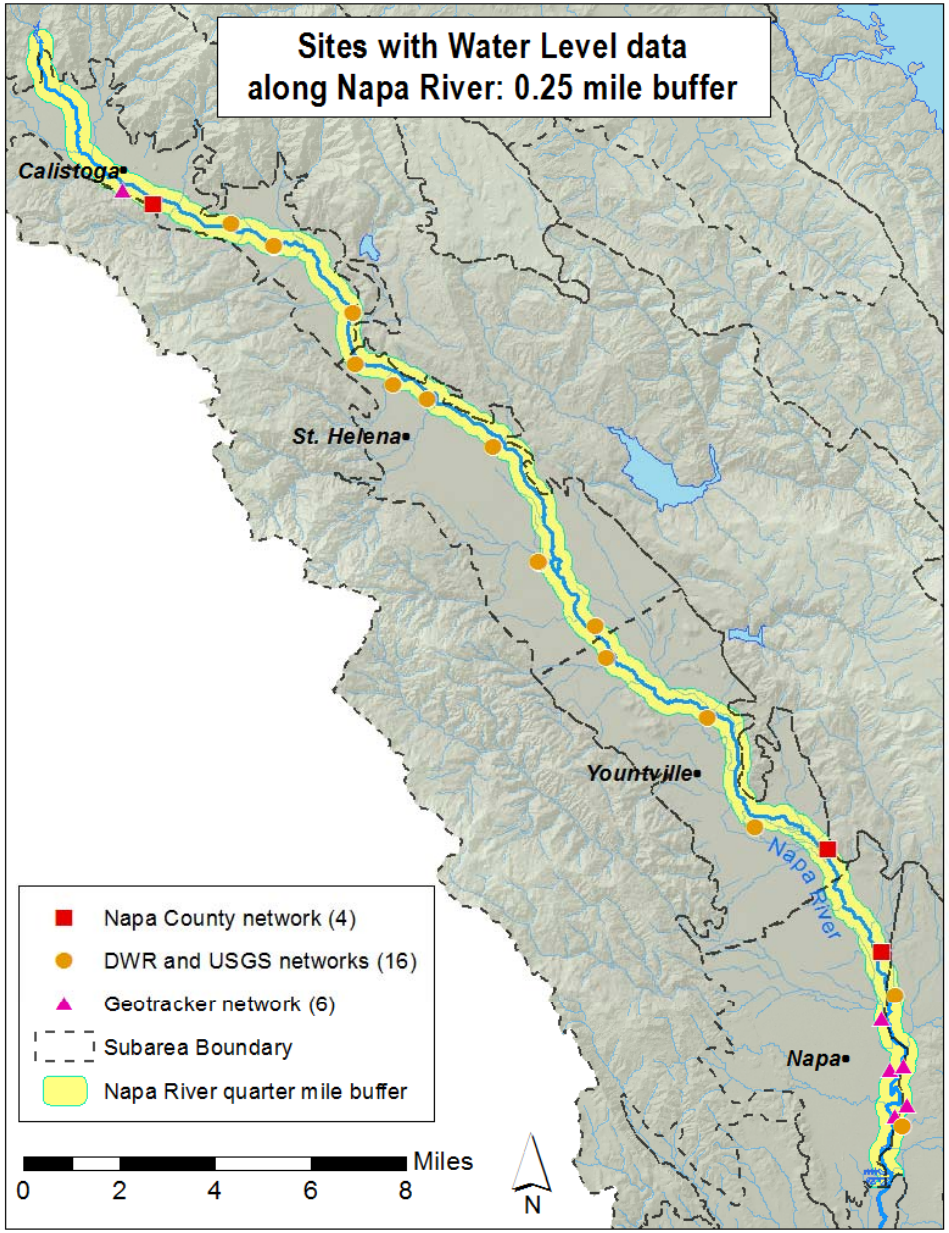
	¼ mile buffer	½ mile buffer
Total sites (Geotracker)	**26** (6)	**56** (9)
Sites with Recent Data, post 2005	**11** (6)	**21** (9)
Sites with Historic Data, pre 2005	**15** (0)	**35** (0)



Task 2 – Challenges in Locating Wells

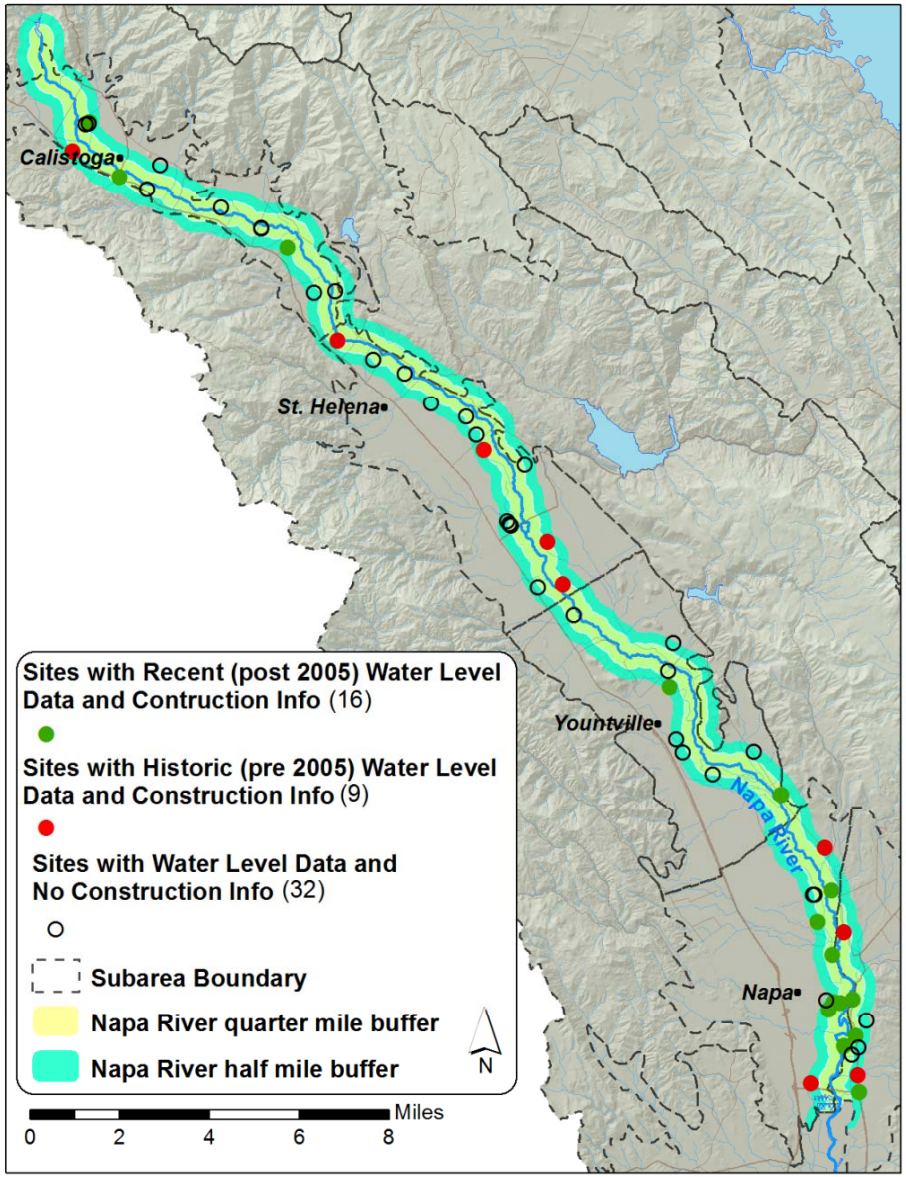
- Napa DMS queries used to ID identical wells monitored by multiple agencies (typically DWR and USGS)

- Geotracker sites include shallow wells installed for monitoring/remediation; can be useful for other purposes



Task 2 - Connecting wells with WL Data to Well Construction Data

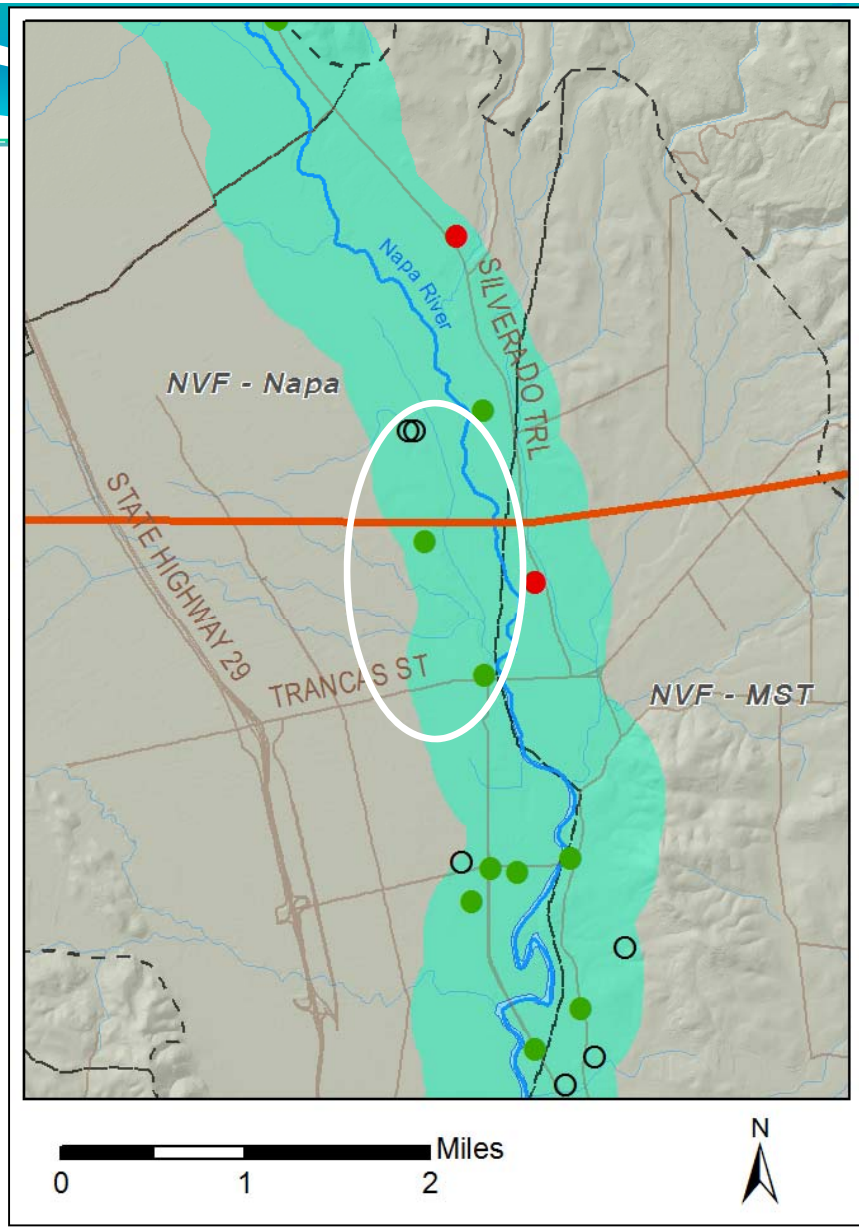
	¼ mile buffer	½ mile buffer
Non-Geotracker sites with WL data and Driller's Log	**6**	**16**
Geotracker sites with WL data and Driller's Log	**6**	**9**



Critical to Understand GW Levels and Quality Relative to Well Construction and the Aquifer System.

Task 2: Example for Northern NVF-Napa

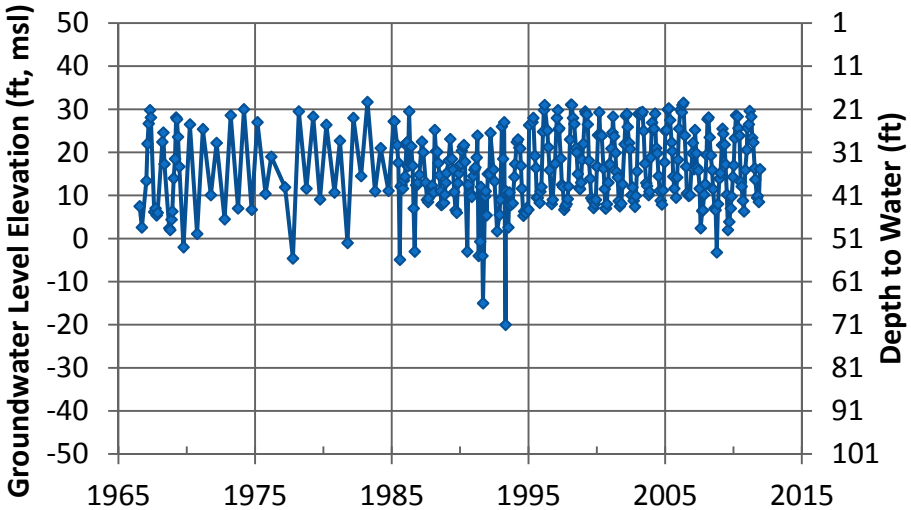
- Sites with Recent (post 2005) water level data and construction info
- Sites with Historical (pre 2005) water level data and construction info
- Sites with water level data and no construction info



06N/04W-27L2

Source: **DWR**
RPE: **51', msl**

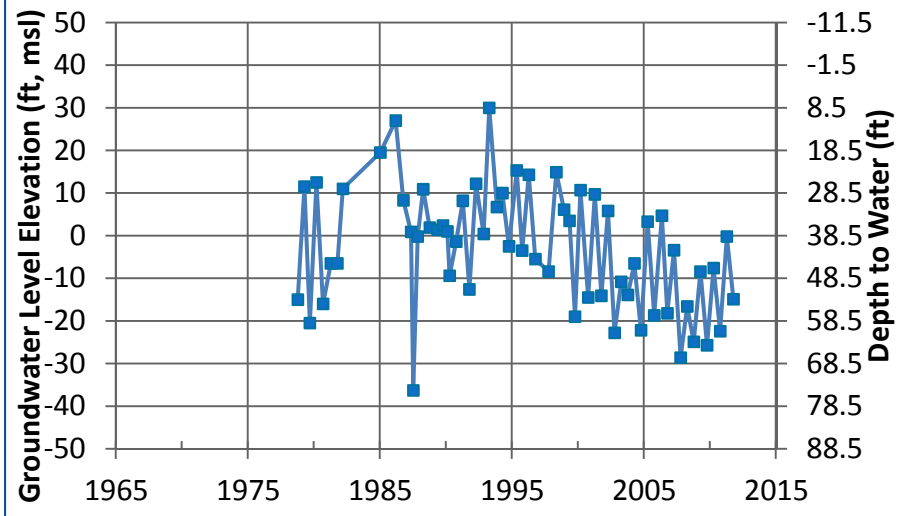
Perforated Interval = **60' - 120'**



NapaCounty-75

Source: **Napa County**
RPE: **38.5', msl**

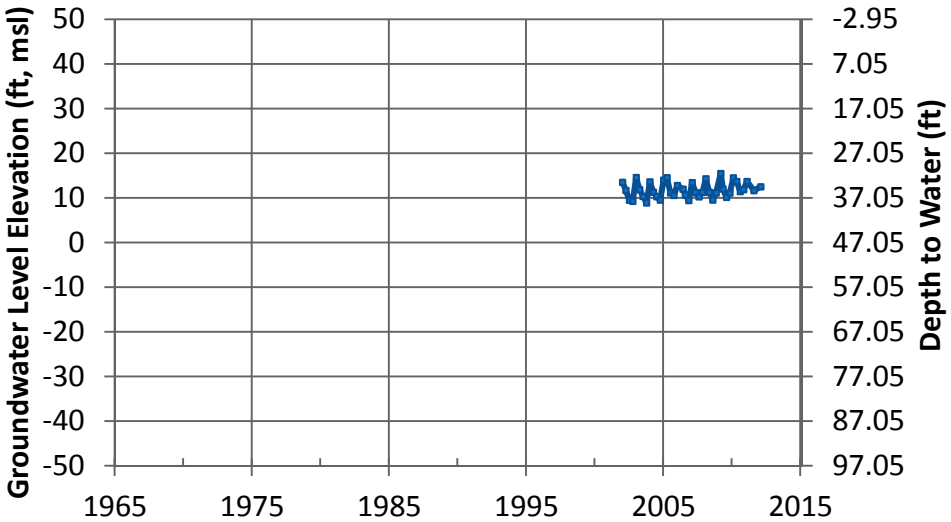
Perforated Interval = **45'-205'**

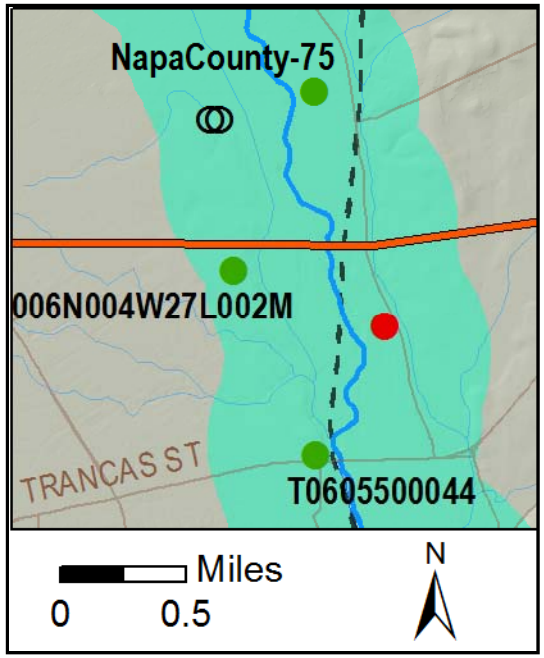


T0605500044 MW-16

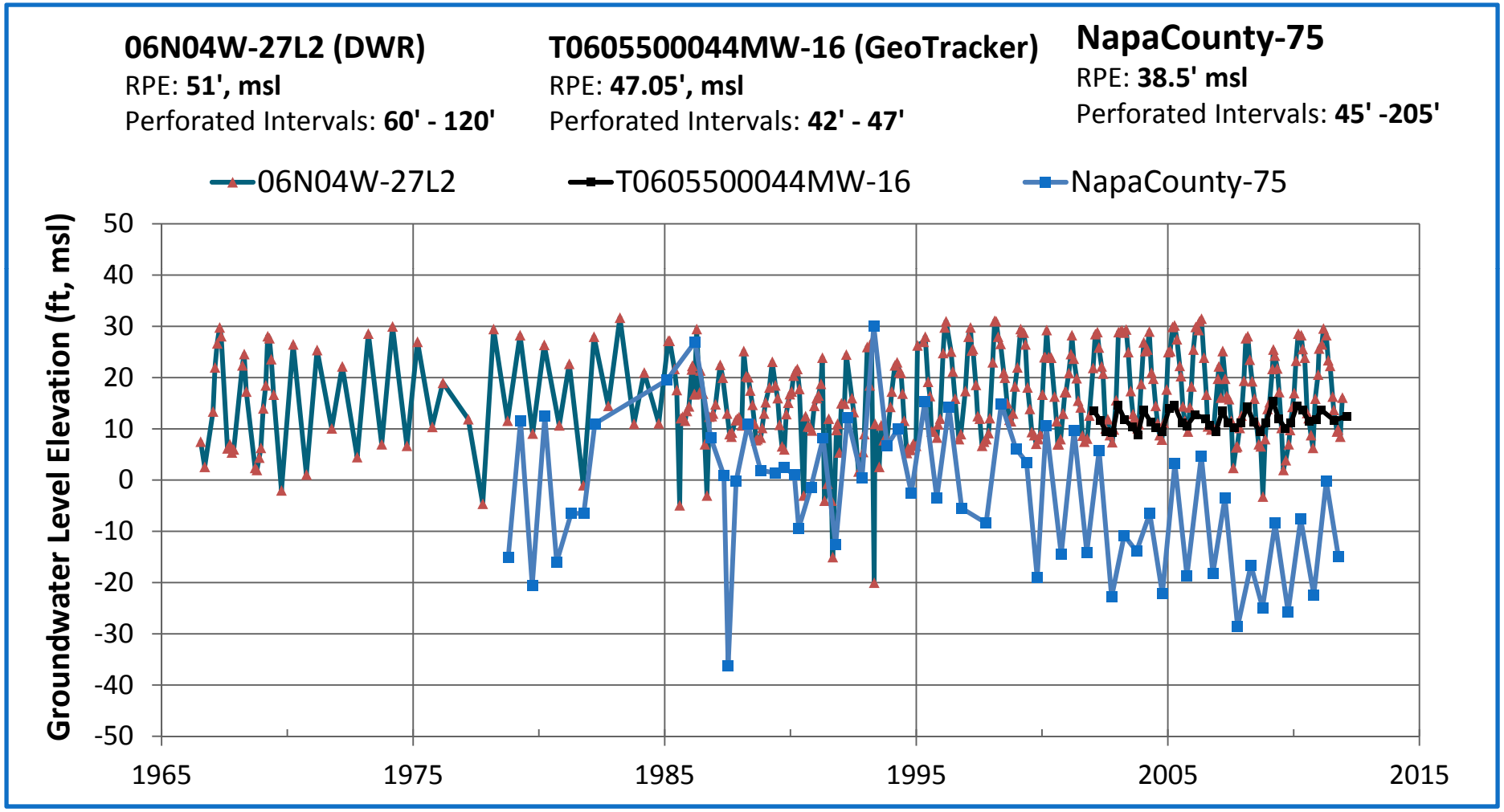
Source: **GeoTracker**
RPE: **47.05', msl**

Perforated Interval = **42' - 47'**





NVF-Napa: West and East of Napa River



Questions from GRAC

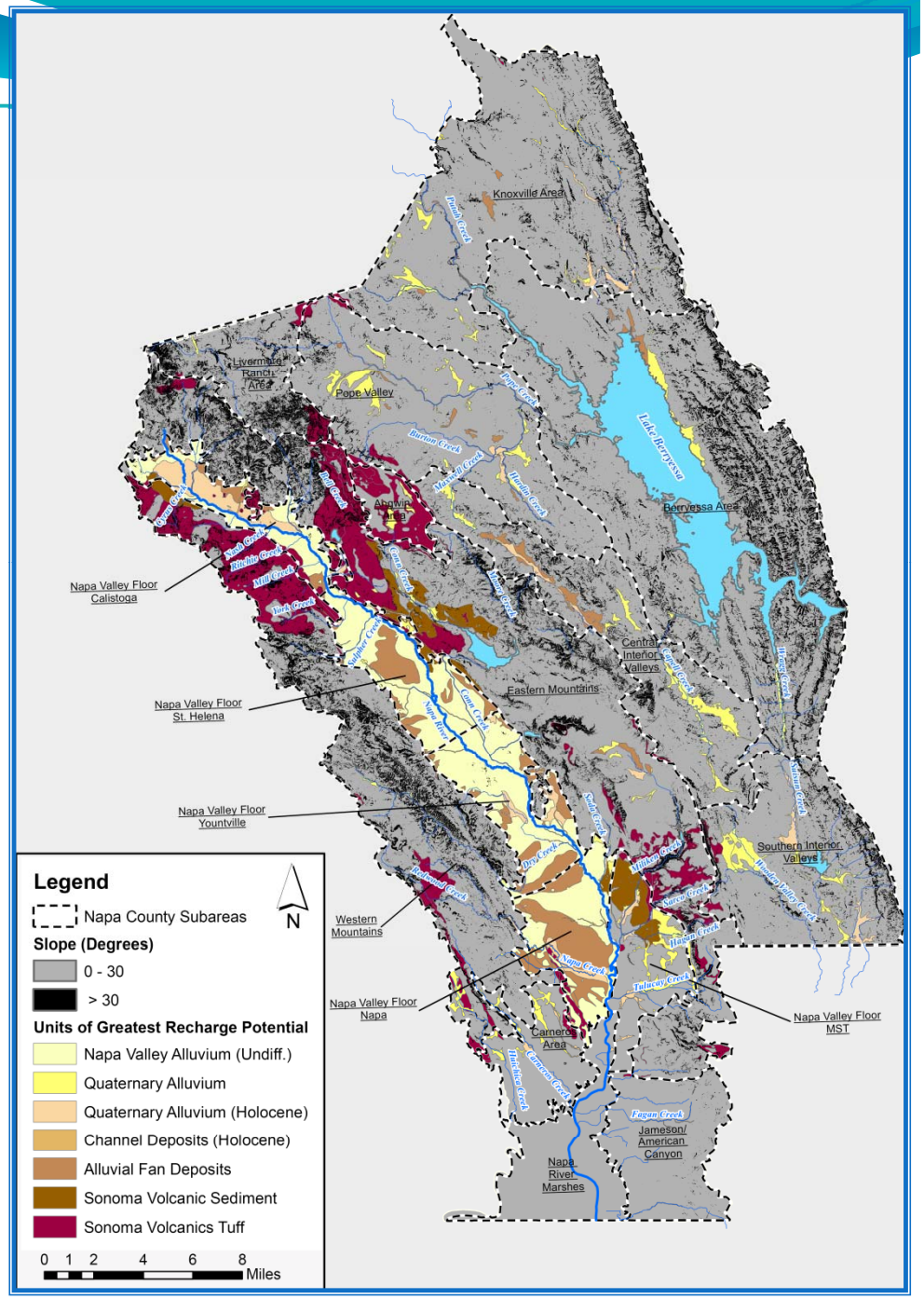
- **Should GW level monitoring focus on augmenting network in MST & Carneros rather than entire County ?**
  - Meaningful baseline data important in main Napa Valley, as well as MST & Carneros
- **Accurate well monitoring data important; encourage accurate locations?**
  - Very useful and potentially less confusing to track different sets of location coordinates
- **Does the necessary info exist to assess sw/gw relationships and gw flow between basins/subareas and recharge sources?**
  - To be addressed in new project tasks (Updated Hydrogeologic Conceptualization, Evaluation of Existing Monitoring Network & Recommendations for Supplemental Monitoring to Meet Objectives)

Questions from GRAC (contin.)

- **Future monitoring in Pope Valley and Berryessa Valley GW Basins – plans to initiate?**
  - Recommended in 2009-2011 studies & CASGEM Plan
- **Data and deliverables outlined in Tasks 2 and 3 help show physical interconnections between SW/GW?**
  - Tasks 1 & 2 – geologic cross-sections; current & recommended GW monitoring (SW/GW interaction)
  - Task 3 – further characterization of recharge
- **Climate Change and identification of future effects via GW monitoring (e.g., sea level rise, increased flooding, weather patterns, etc.)?**
  - GW Monitoring: Task 2, esp. recommendations for main NVF; also GRAC input to Plan for Ongoing GW Monitoring Program

Task 3 – Further Characterization of Areas of Greatest Recharge Potential

- Map: GW elevations, river thalwegs, soil properties, land use data
- Napa Valley water budget analysis
  - Review previous work
  - Estimates of regional and local recharge, especially Napa Valley Floor

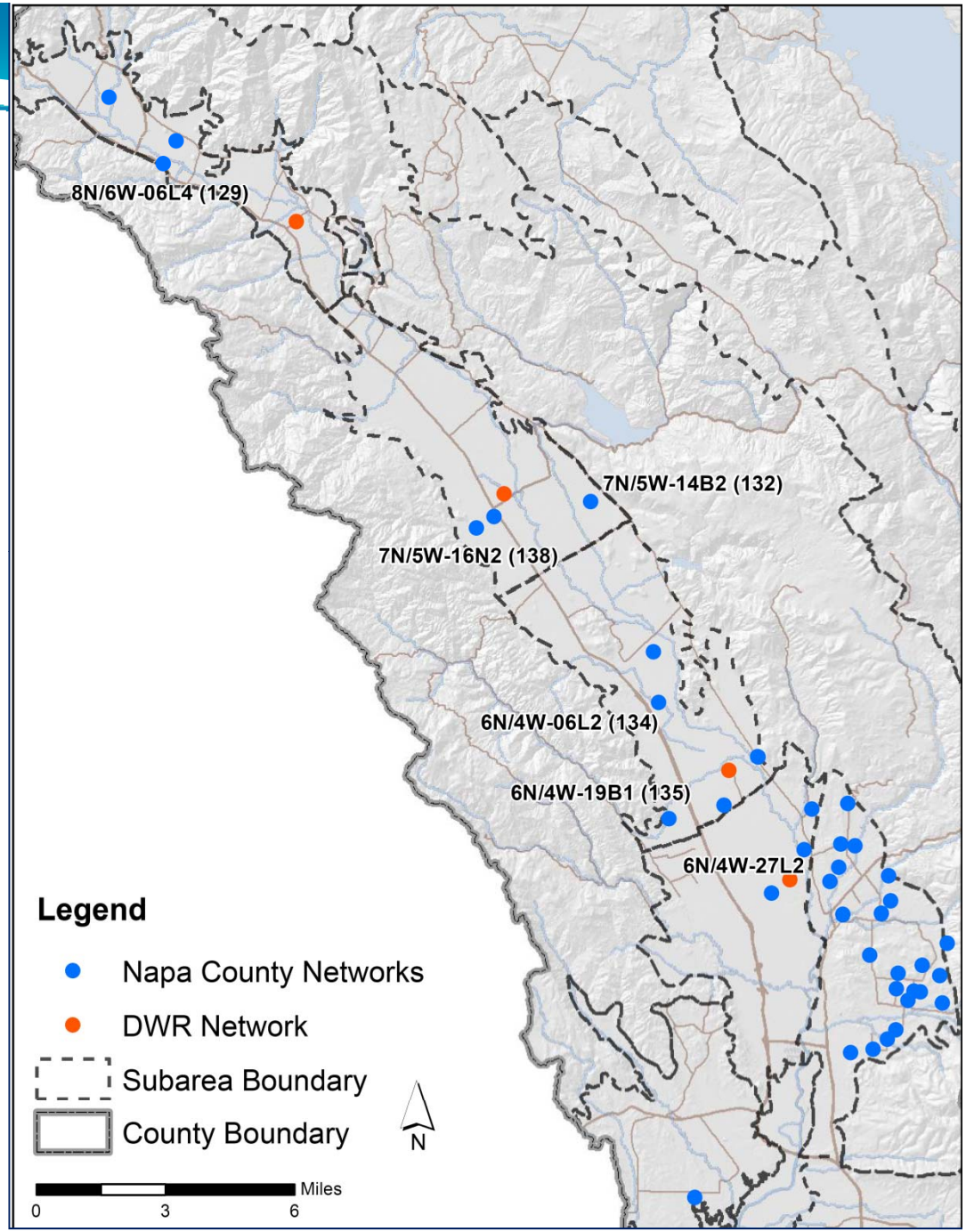


Task 4 – Analysis of Surface Water and Groundwater Interactions

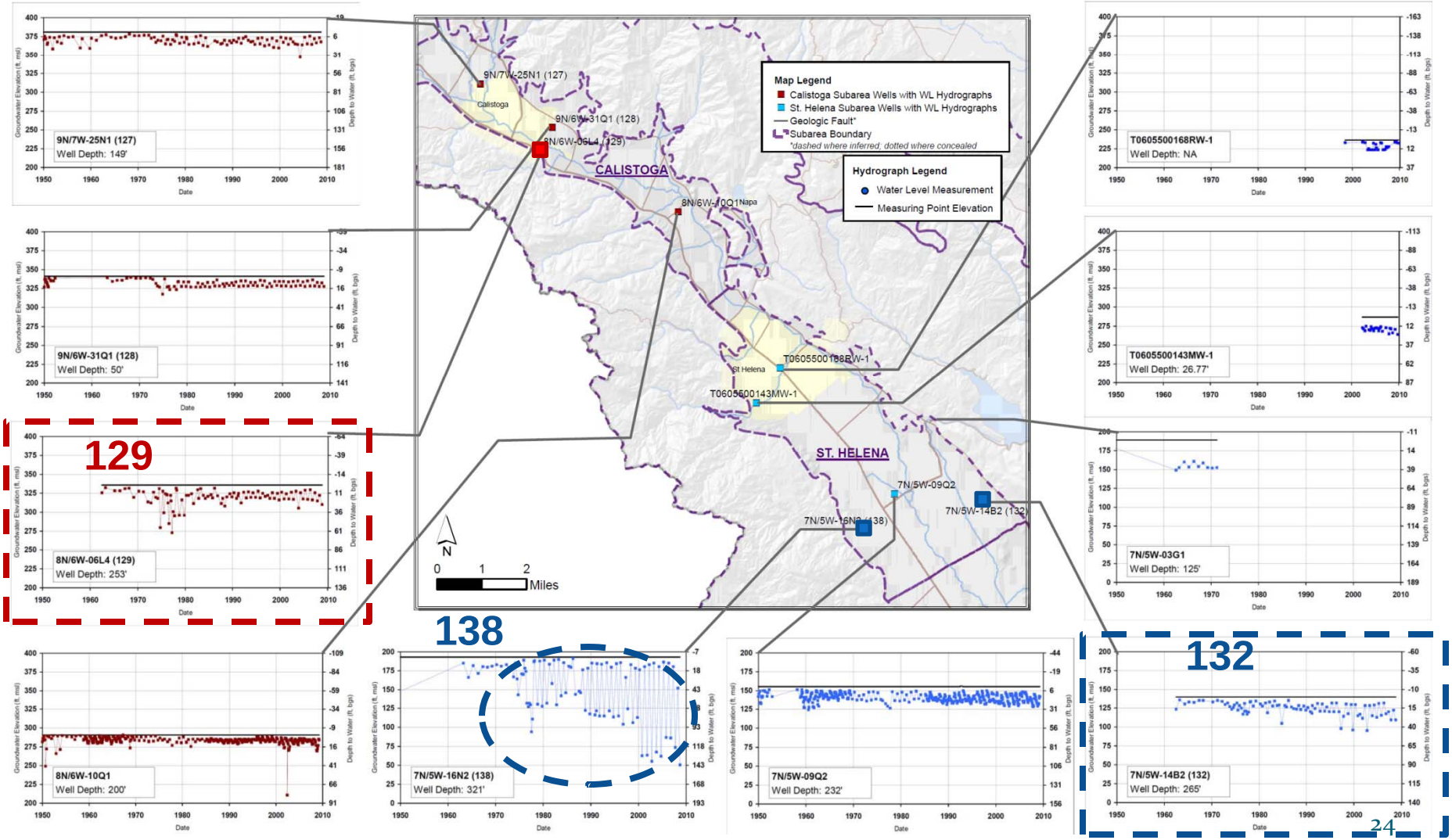
- Objective: Develop guidance to assist County in CEQA process for evaluating GW pumping effects
  - Potential effect of GW pumping on SW courses
  - Neighboring wells (e.g., well interference)
  - Ecologic factors (e.g., biological, flow, temp)
- Methodologies of determining effects of GW pumping on SW
- Guidance document: analysis of GW pumping effects; well interference; ecologic considerations

GRAC Questions

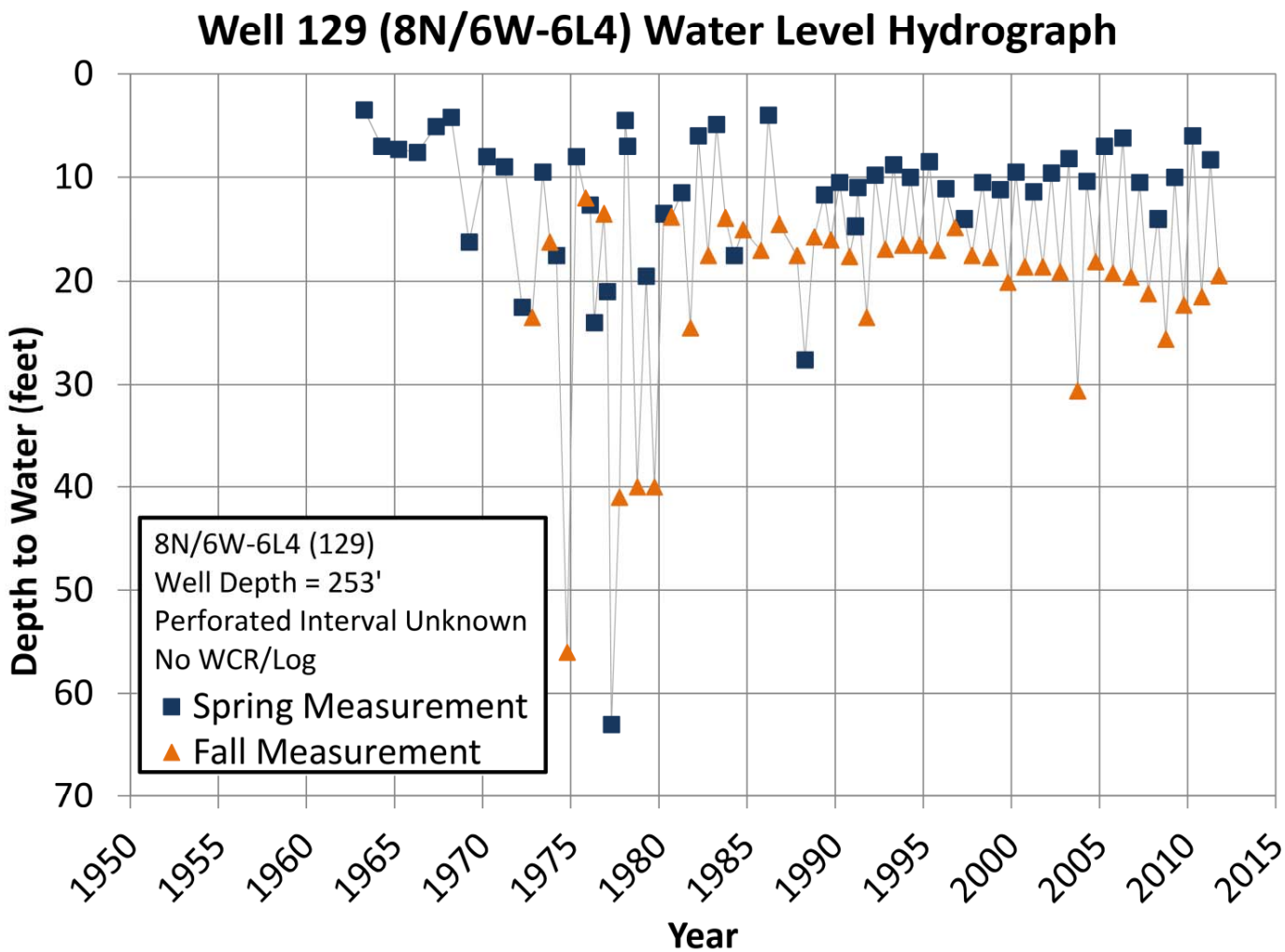
- Hydrographs
  - Well 129
  - Well 132
  - Well 138
  - Well 134
  - Well 135
- Trends (6N/4W-27L2)
  - Dry water year
  - Spr. vs. Fall
  - Early Spr. vs. later Spr. Meas.



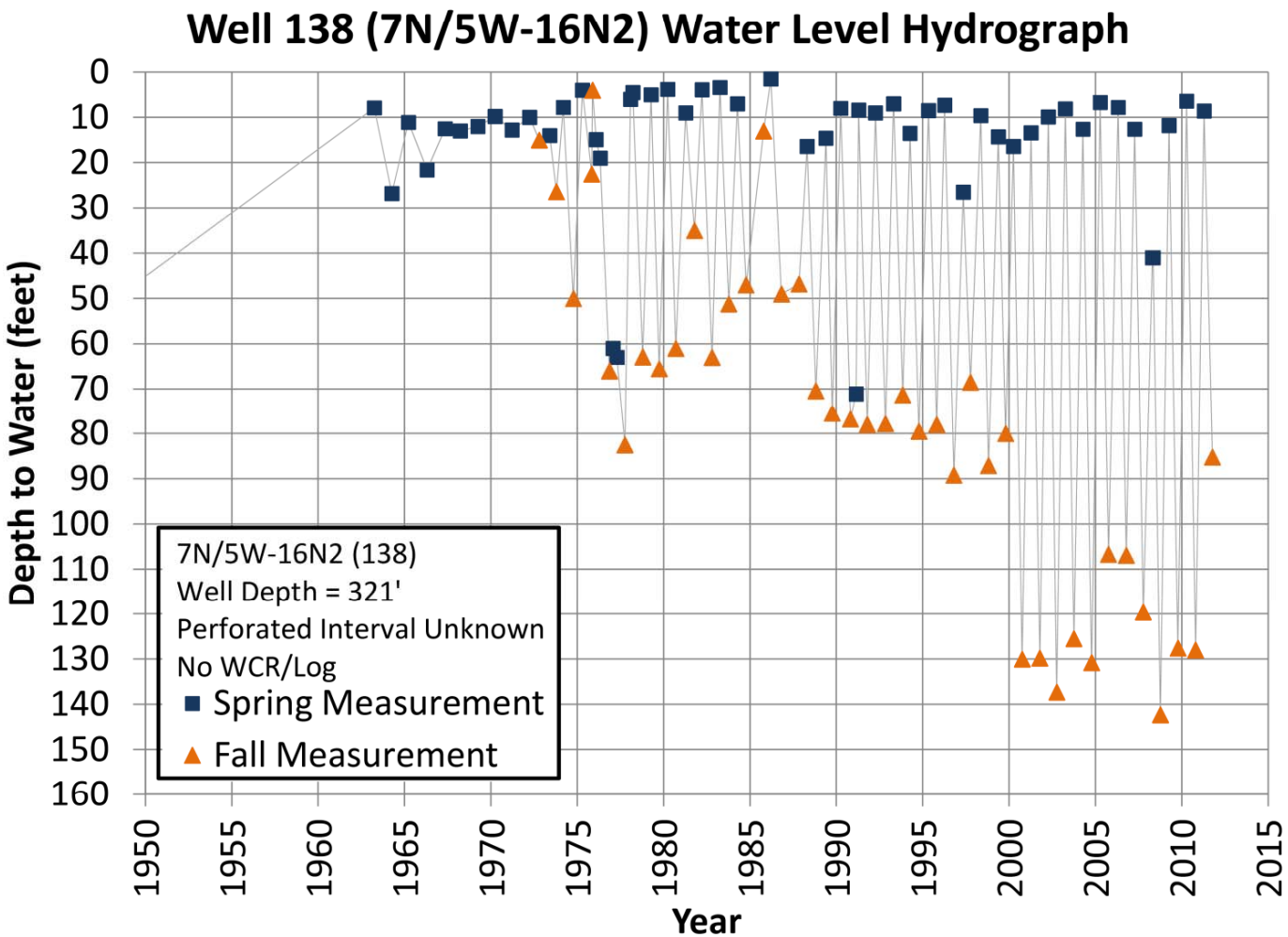
Representative Hydrographs – Northern Napa Valley



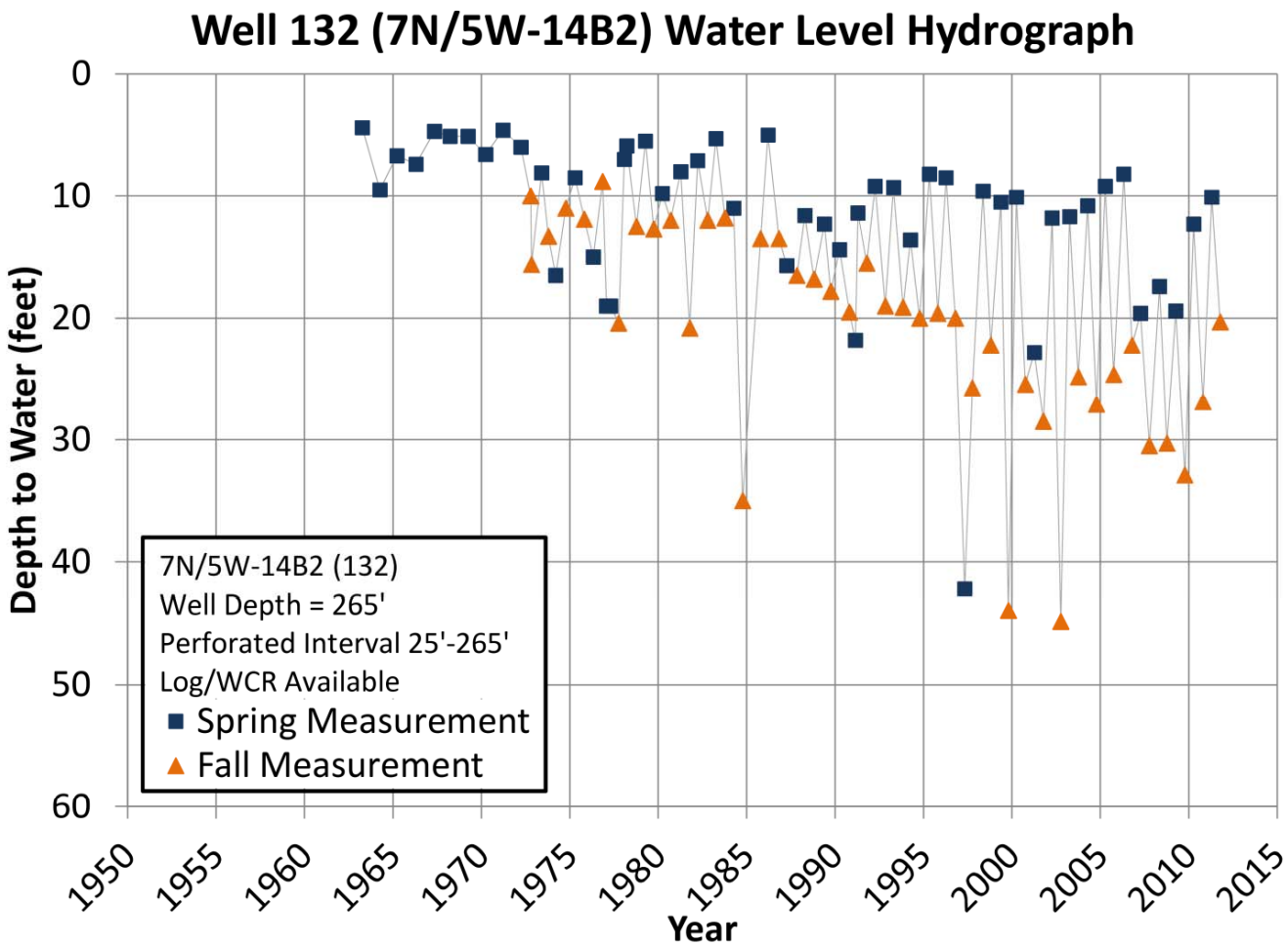
Hydrograph: 129 N. Napa Valley; Calistoga Subarea



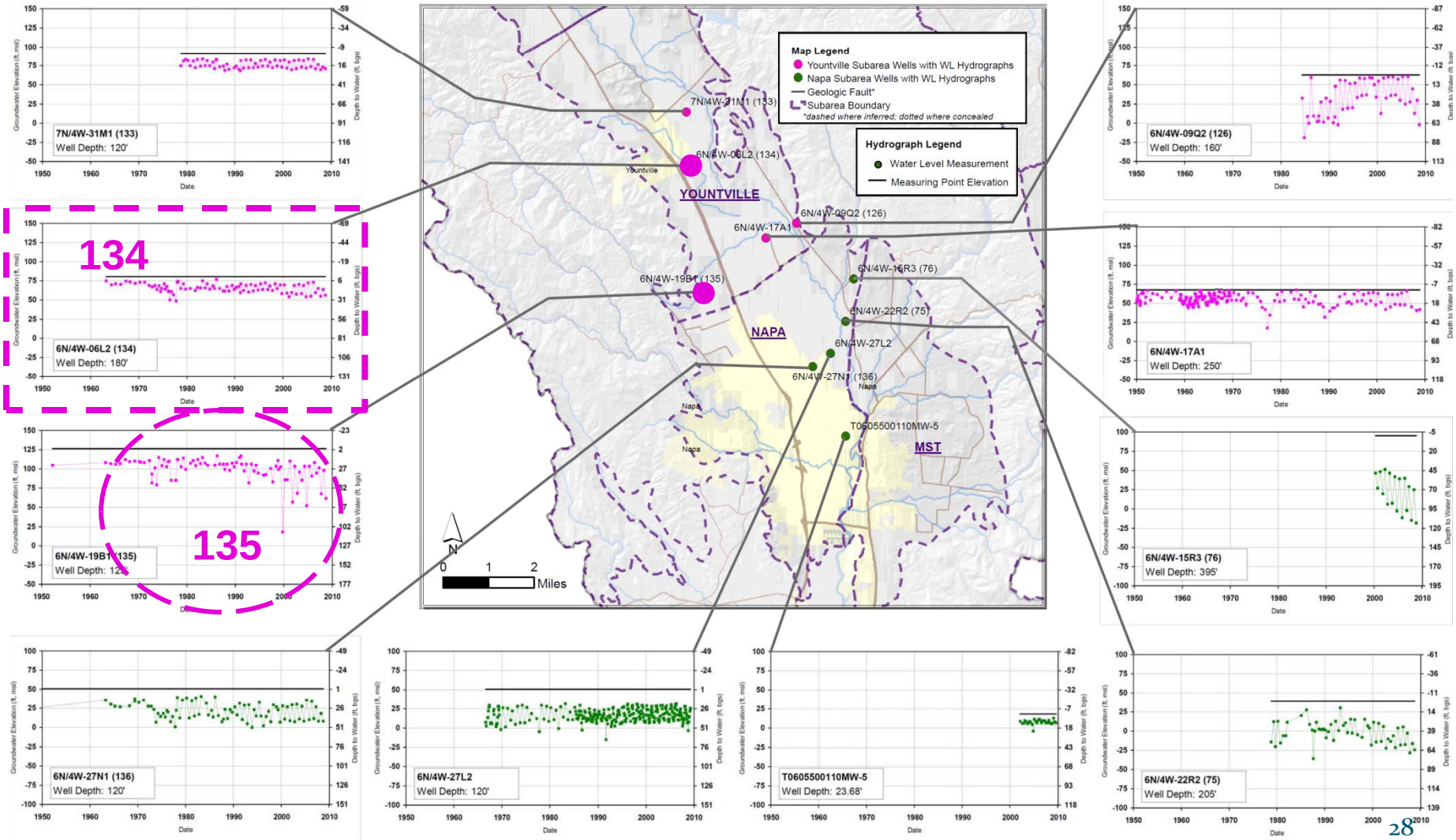
Hydrograph: 138 N. Napa Valley; St. Helena Subarea



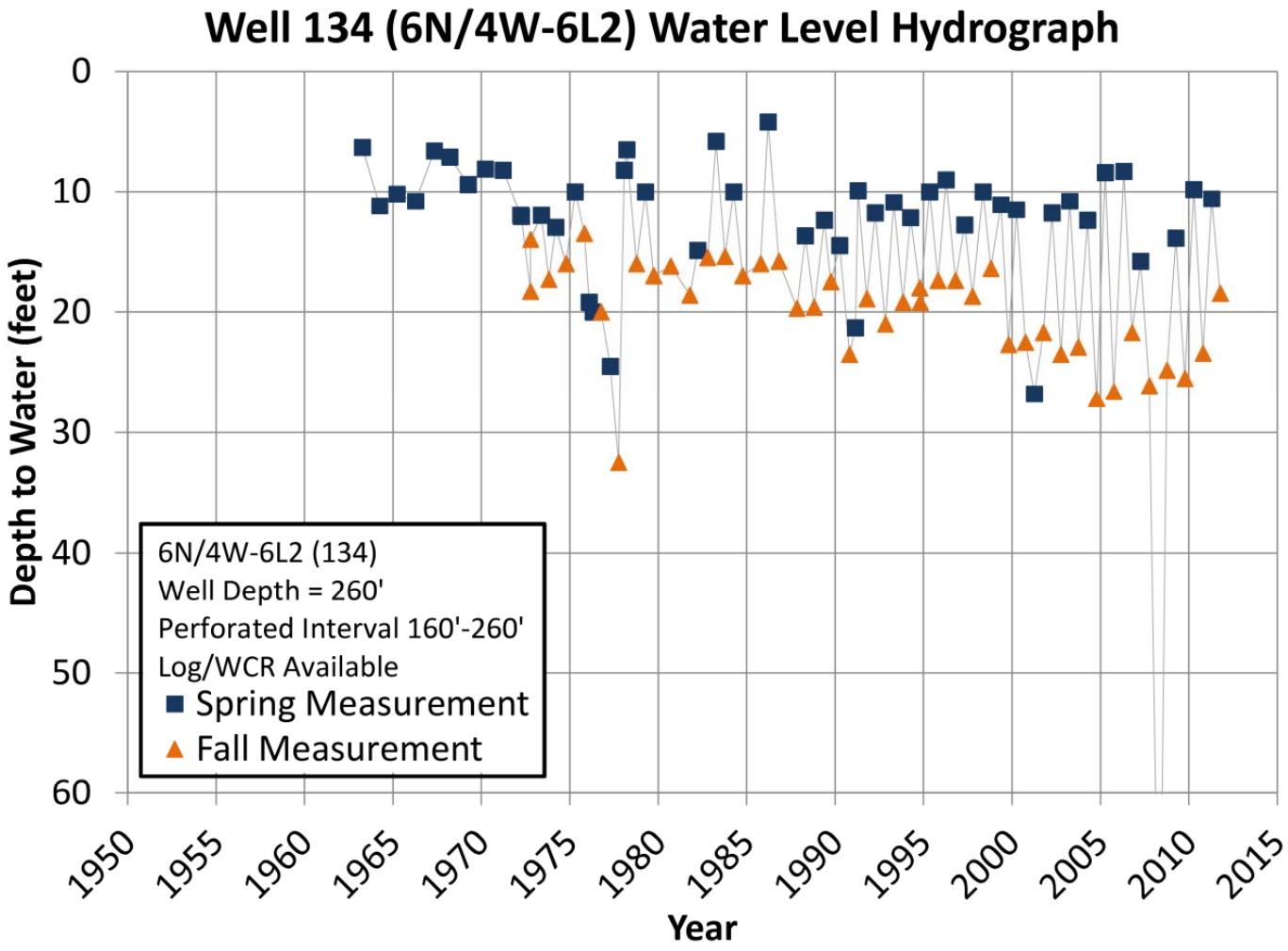
Hydrograph: 132 N. Napa Valley; St. Helena Subarea



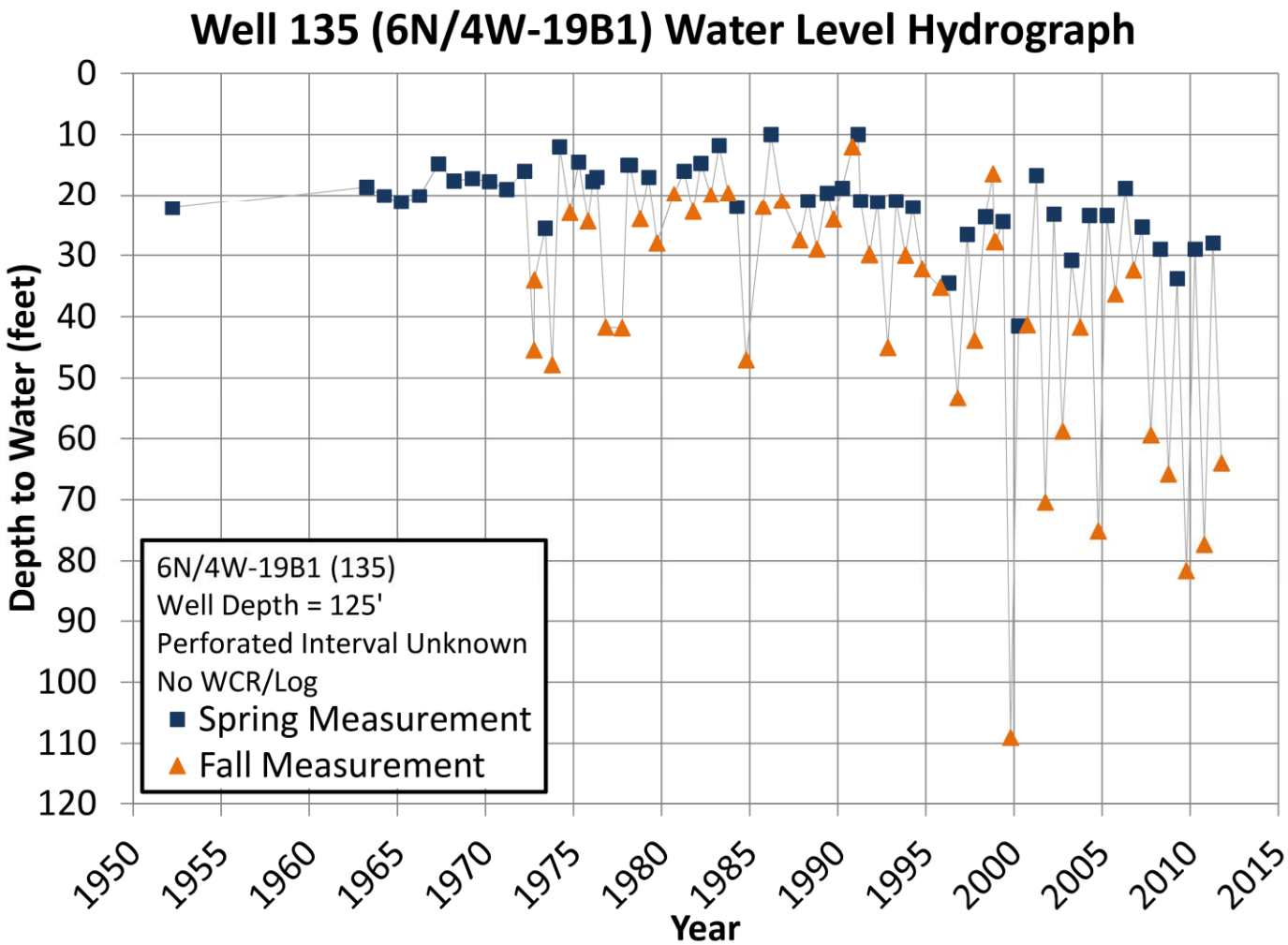
Representative Hydrographs – Southern Napa Valley



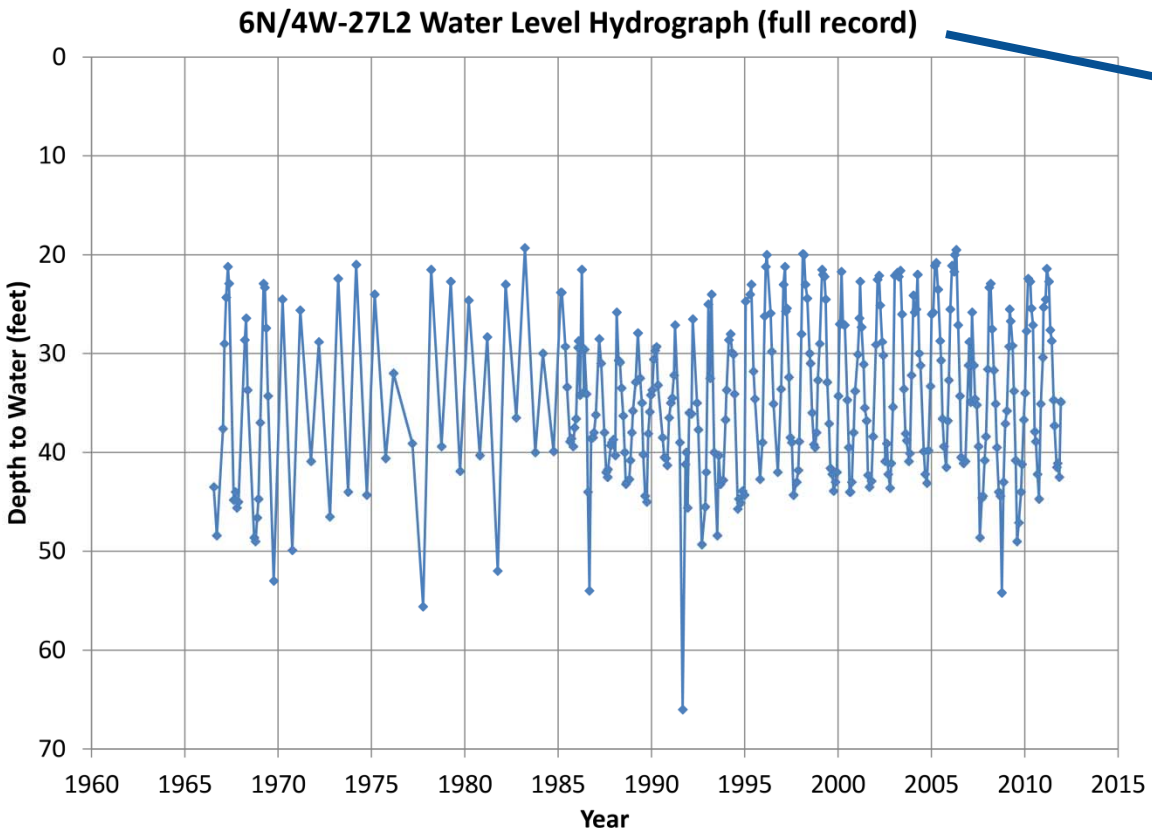
Hydrograph: 134 N. Napa Valley; Yountville Subarea

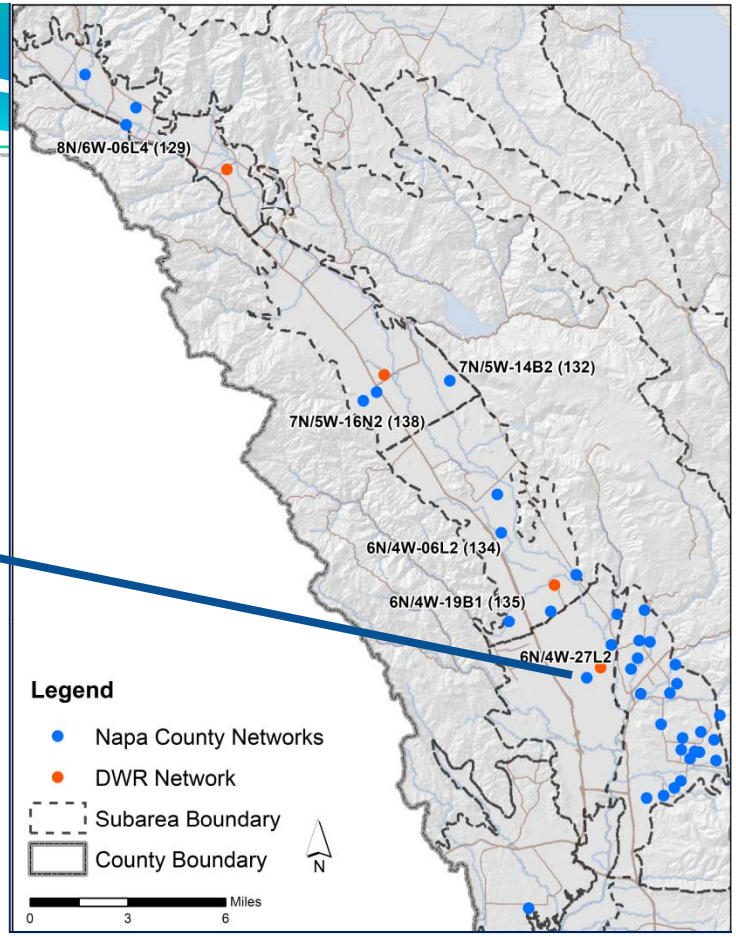


Hydrograph: 135 N. Napa Valley; Yountville Subarea

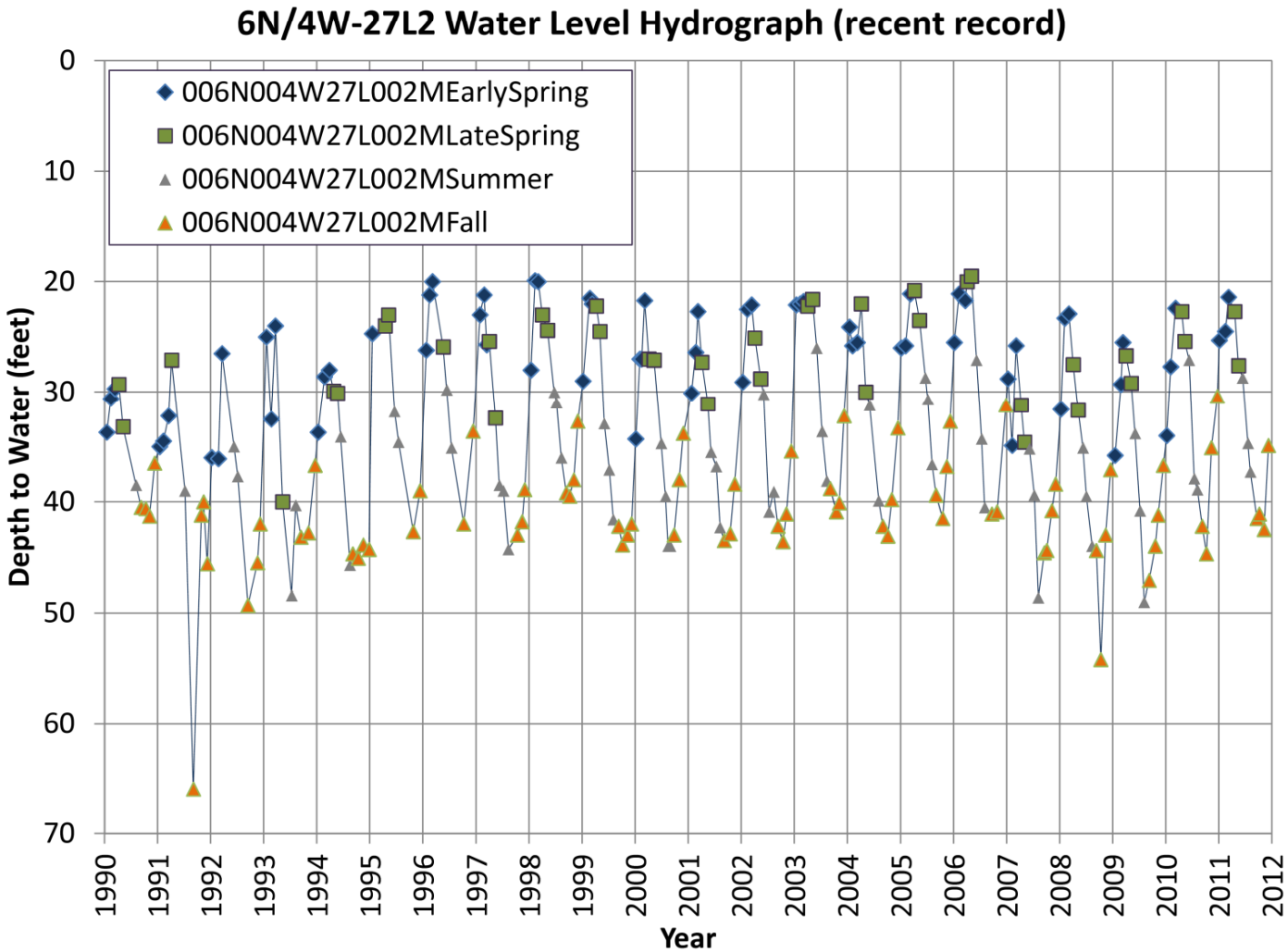


Hydrograph: Long Record Napa Subarea





Hydrograph: Excerpt of Record, Napa Subarea Measurement Timing Makes A Difference



Questions from GRAC (contin.)

- **Addressing uncertainty?**
  - Important to first address basic information needs
    - Well location
    - Well construction
    - Well construction relative to aquifer system
    - Reference point elevations
  - Other variables
    - Water year type/precipitation trends
    - Timing of measurements (potential for measurement bias)
    - Local vs. regional factors (e.g., local pumping,
    - hydrogeologic conditions, sources of recharge)
- **Monitoring network density?**
  - Depends on monitoring objectives and questions to be answered
  - Network likely to evolve over time (e.g., may currently have well with long WL record but no well construction)

Thank You

Discussion

&

Questions