Napa County Groundwater Sustainability Annual Report – Water Year 2017

March 20, 2018

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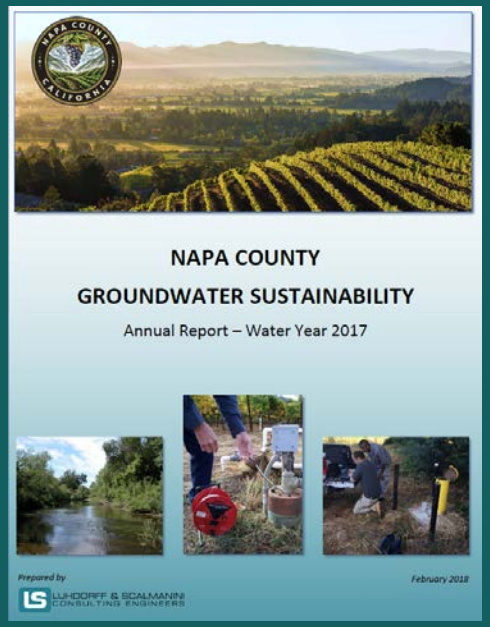
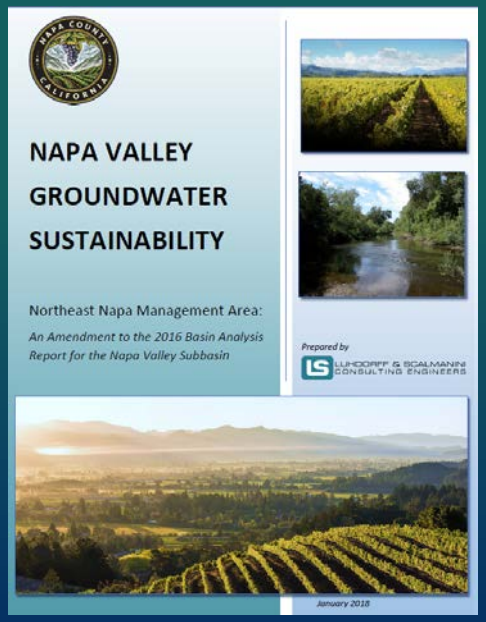
LUHDORFF & SCALMANINI CONSULTING ENGINEERS

Overview

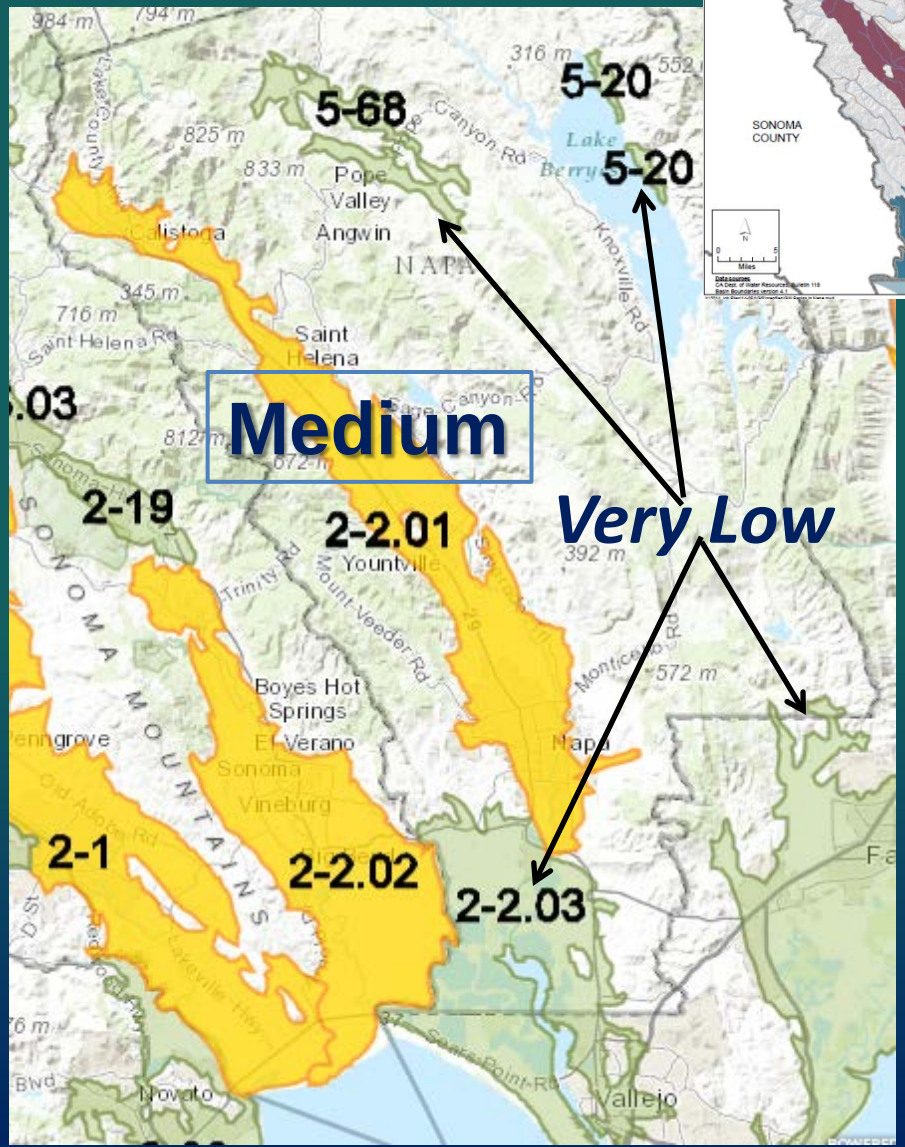
- SGMA update
- 2017 Annual Report Highlights
- NE Napa Study & Management Area Amendment to Basin Analysis Report
- Summary and Recommendations

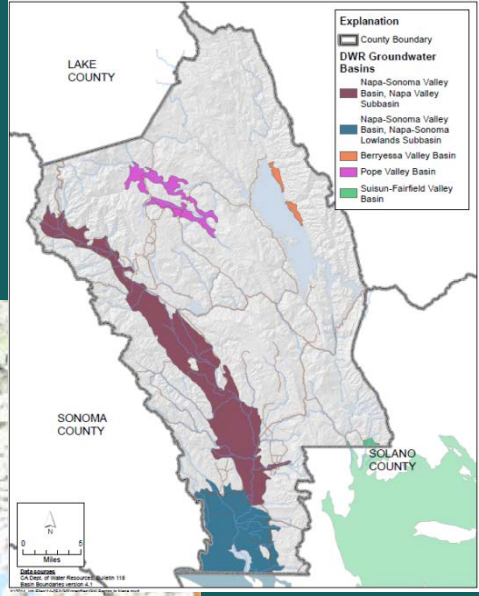




Groundwater Basins: SGMA Prioritization

- Napa Sonoma Valley Basin
  - **Napa Valley Subbasin (Med)**
  - Napa-Sonoma Lowlands Subbasin (VL)
- Berryessa Valley Basin (VL)
- Pope Valley Basin (VL)
- Suisun-Fairfield Valley Basin (VL)

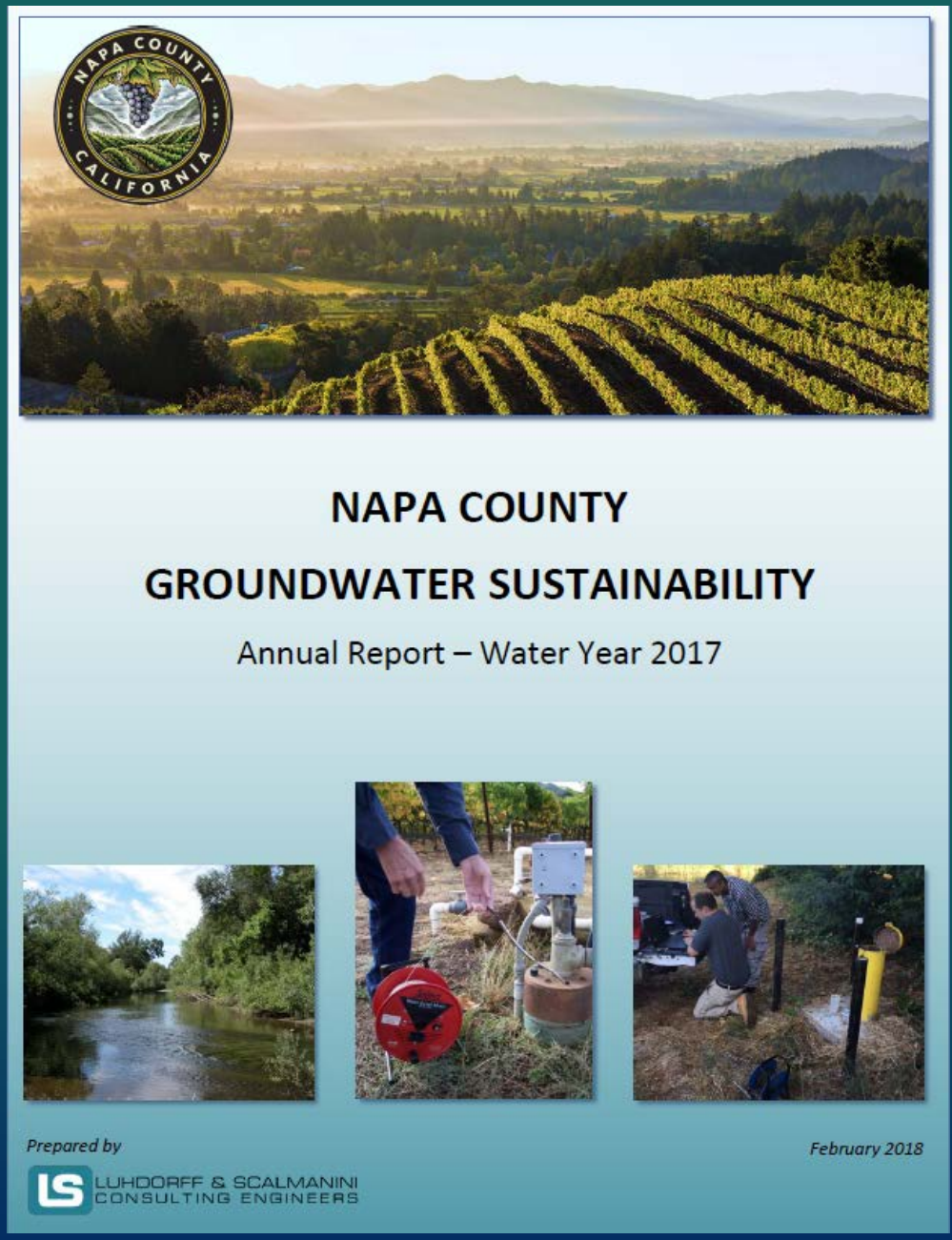




SGMA Basin Analysis Report & Annual Report

- **BAR Submitted to DWR 12/16/2016**
  - Functionally equivalent to a GW Sustainability Plan
  - For basins operated sustainably for at least 10 years
    - Napa Valley Subbasin sustainability analysis □28 yrs
  - Covers the whole DWR-designated Subbasin
  - Conditions typical throughout the basin
  - Report under review by DWR
- **SGMA sustainability metrics used in Napa County 2016 Annual Report**
- **April 1, 2018: First Annual Report due for SGMA**

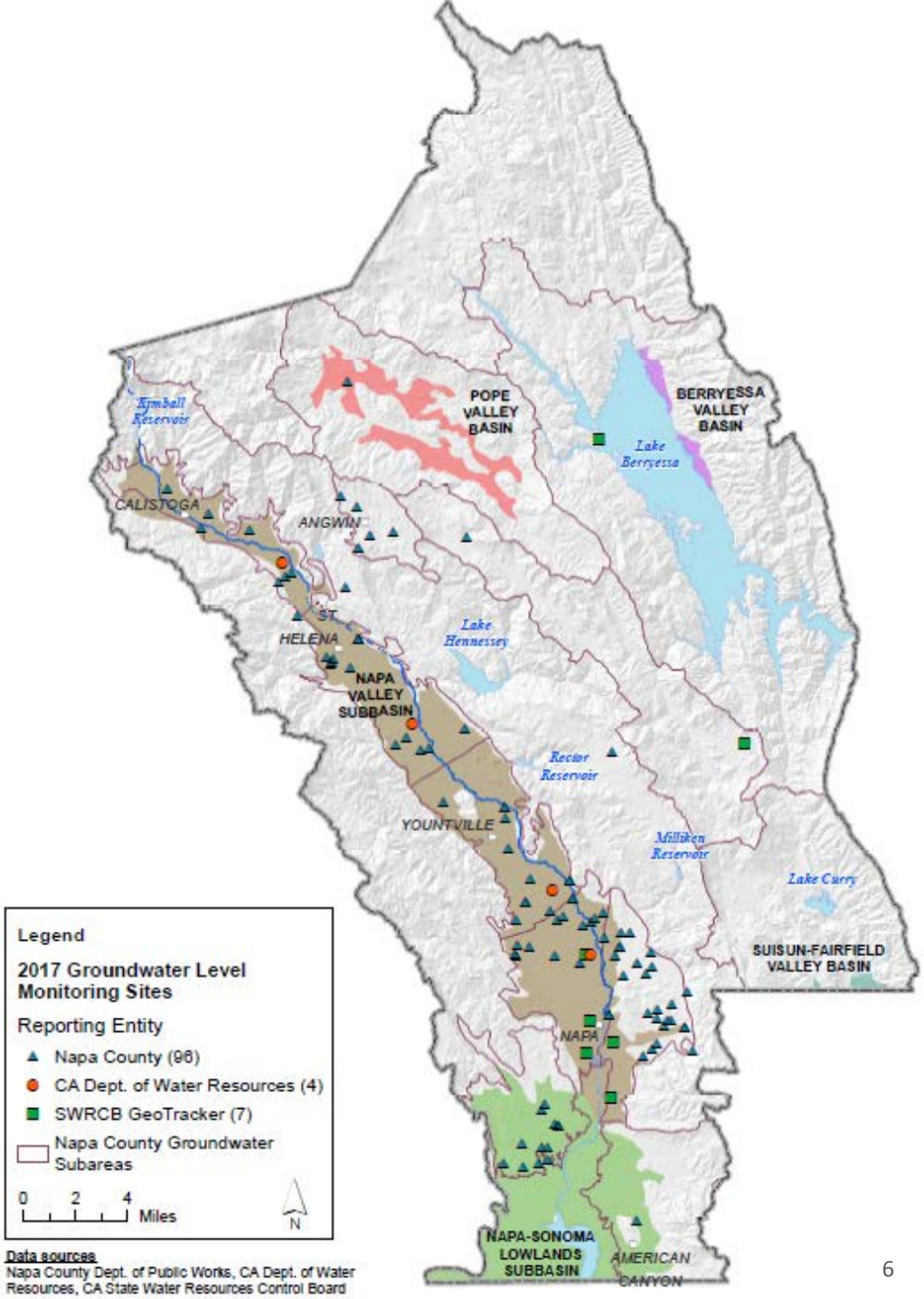
GROUNDWATER CONDITIONS: Highlights Annual Report Water Year 2017



GW Level Monitoring, 2017

- Napa Co., 96 (including 10 SW/GW)
- DWR, 4
- GeoTracker, 7

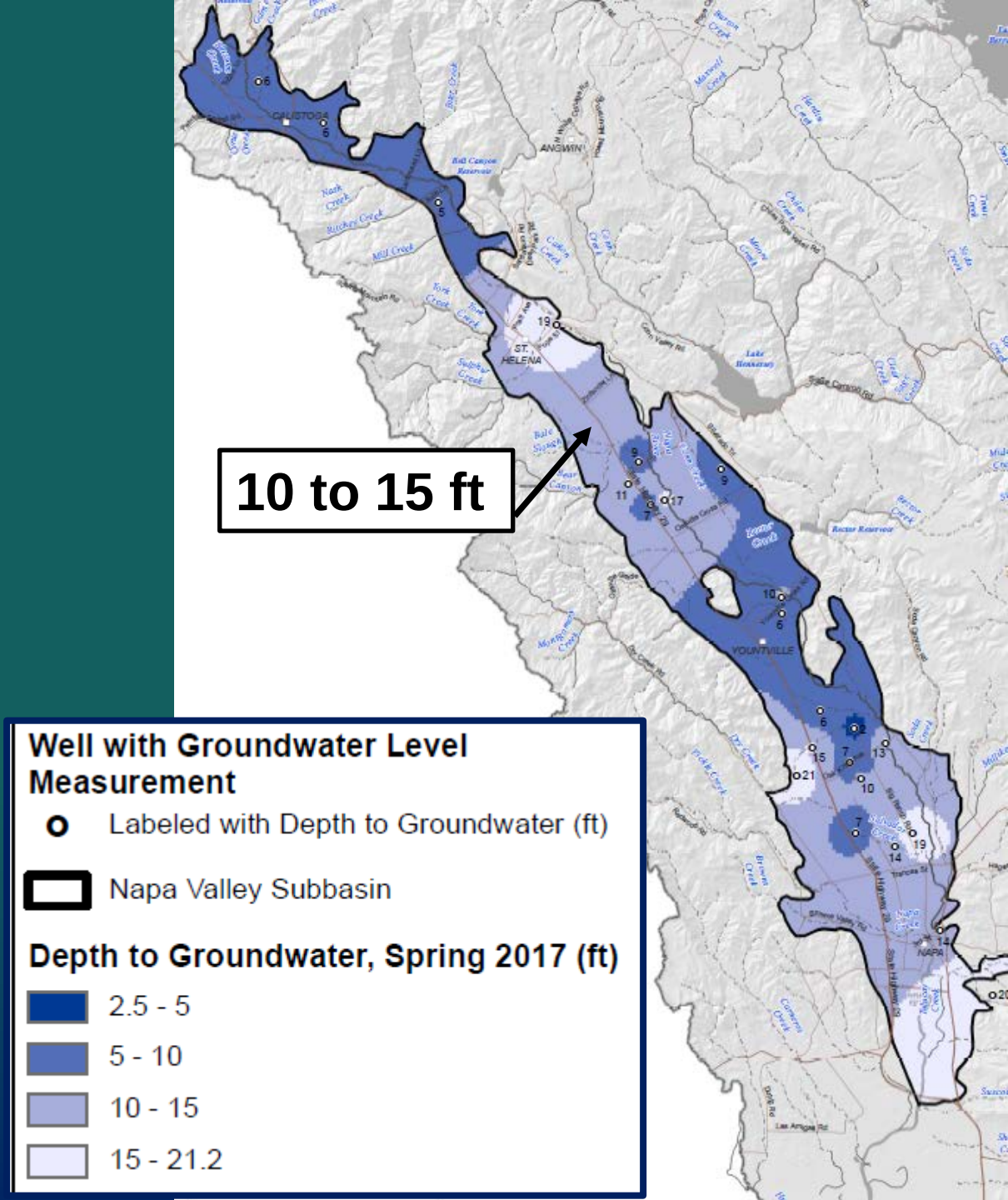
Total Wells = 107 Sites



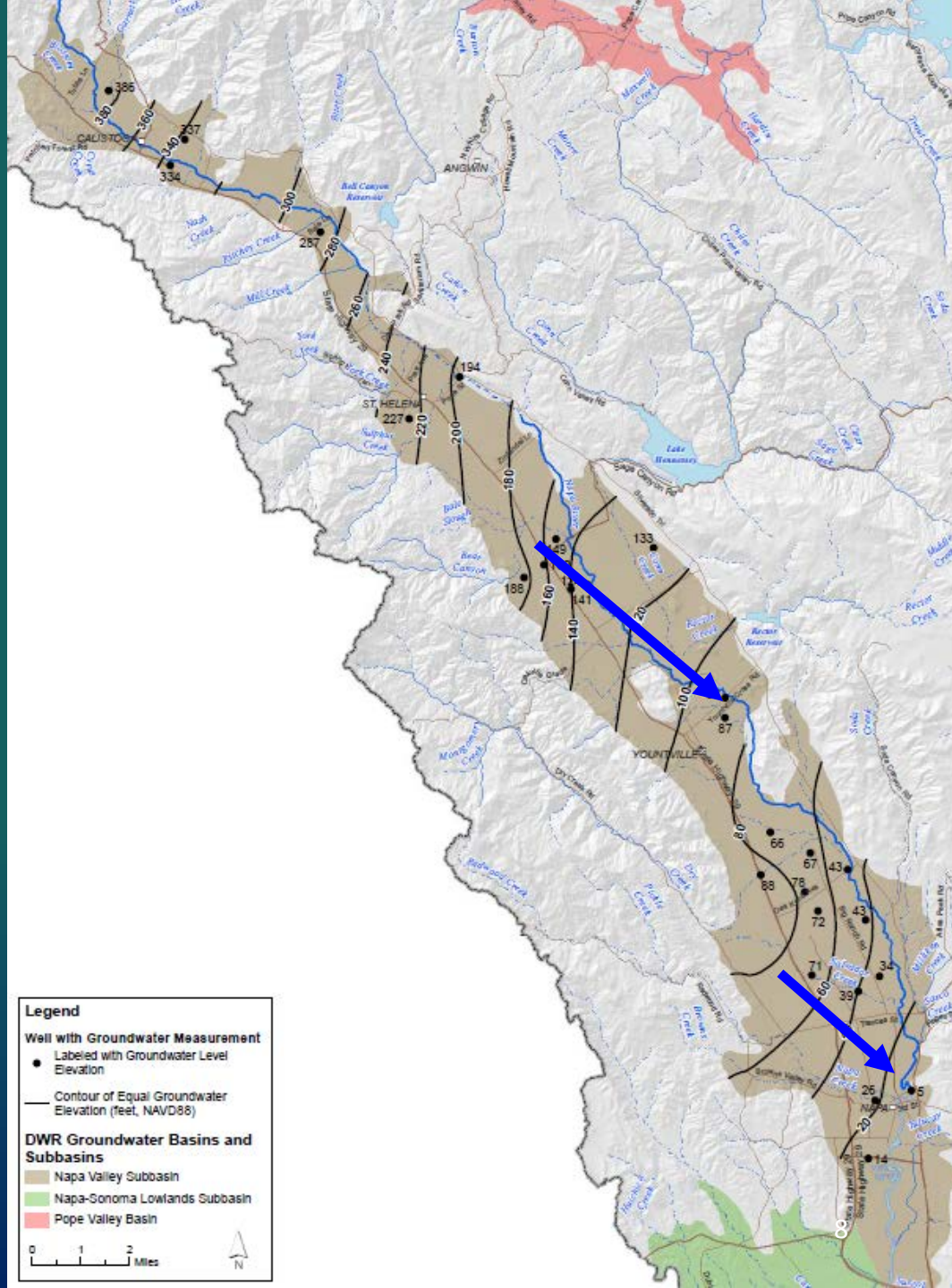
Depth to Groundwater

Feet below ground surface

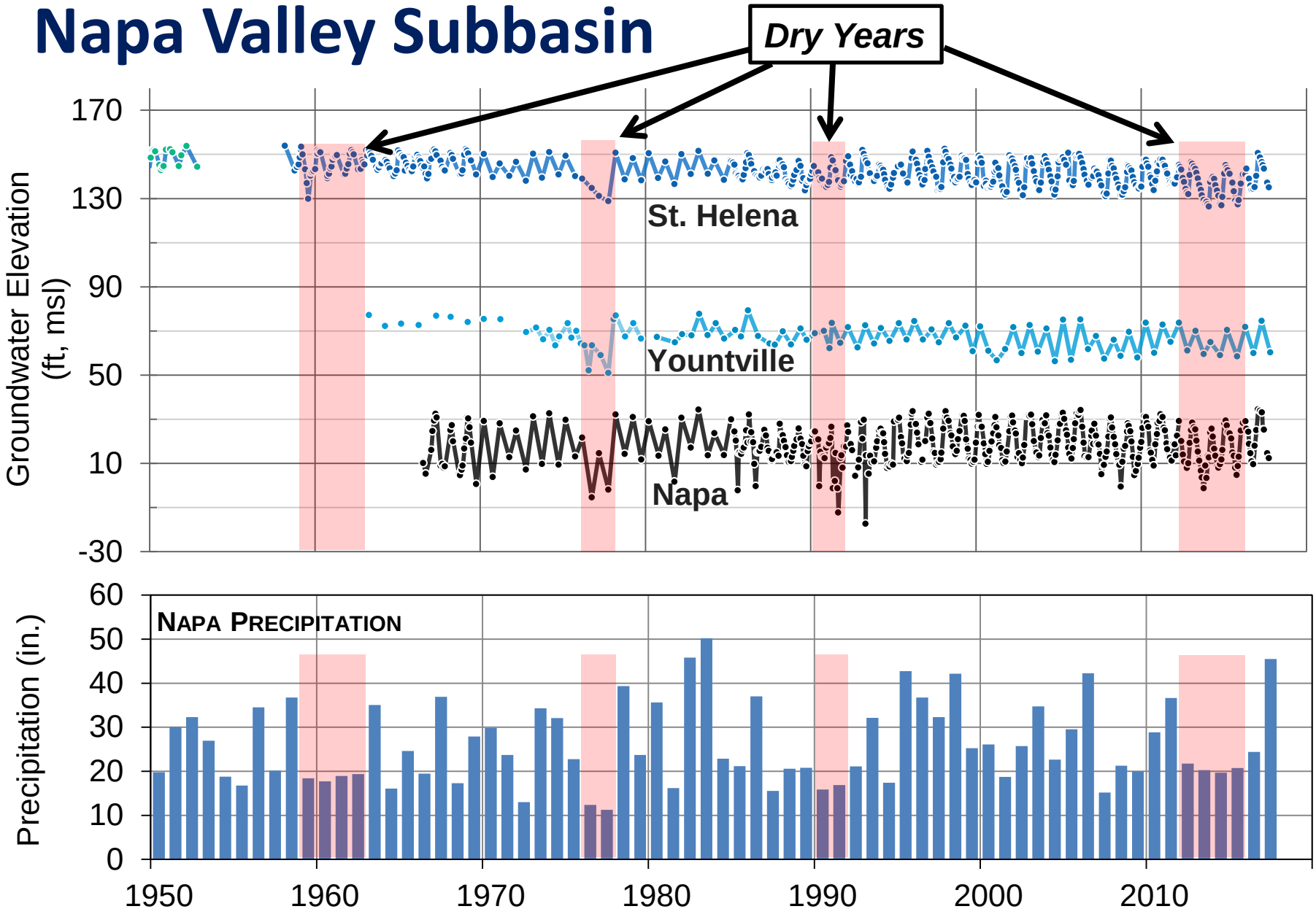
Water table (Valley Floor) generally very shallow; basin quite "full"



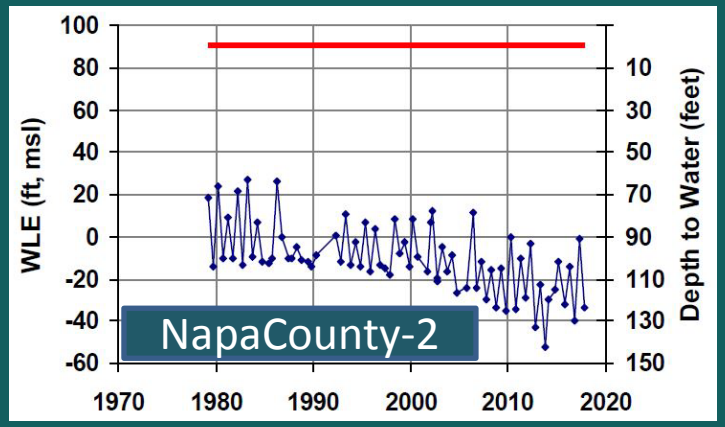
Spring 2017 GW Elevations

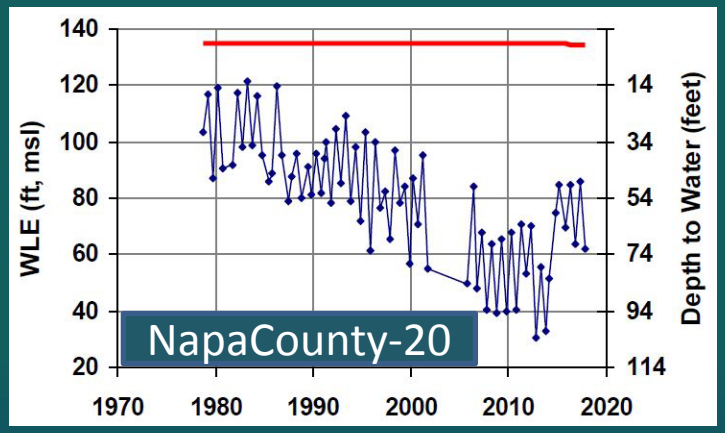


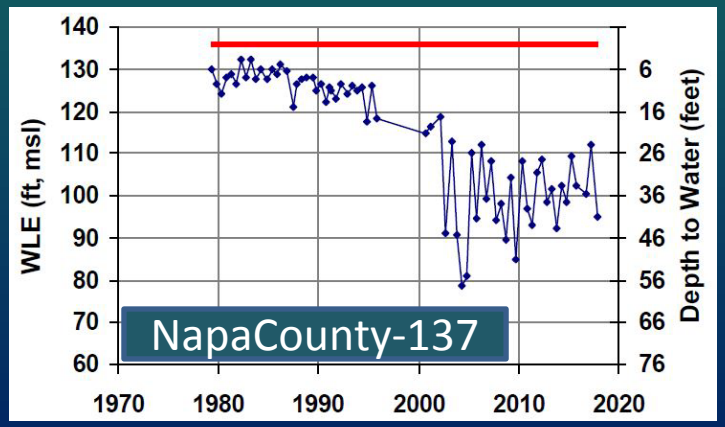
Groundwater Conditions: Napa Valley Subbasin

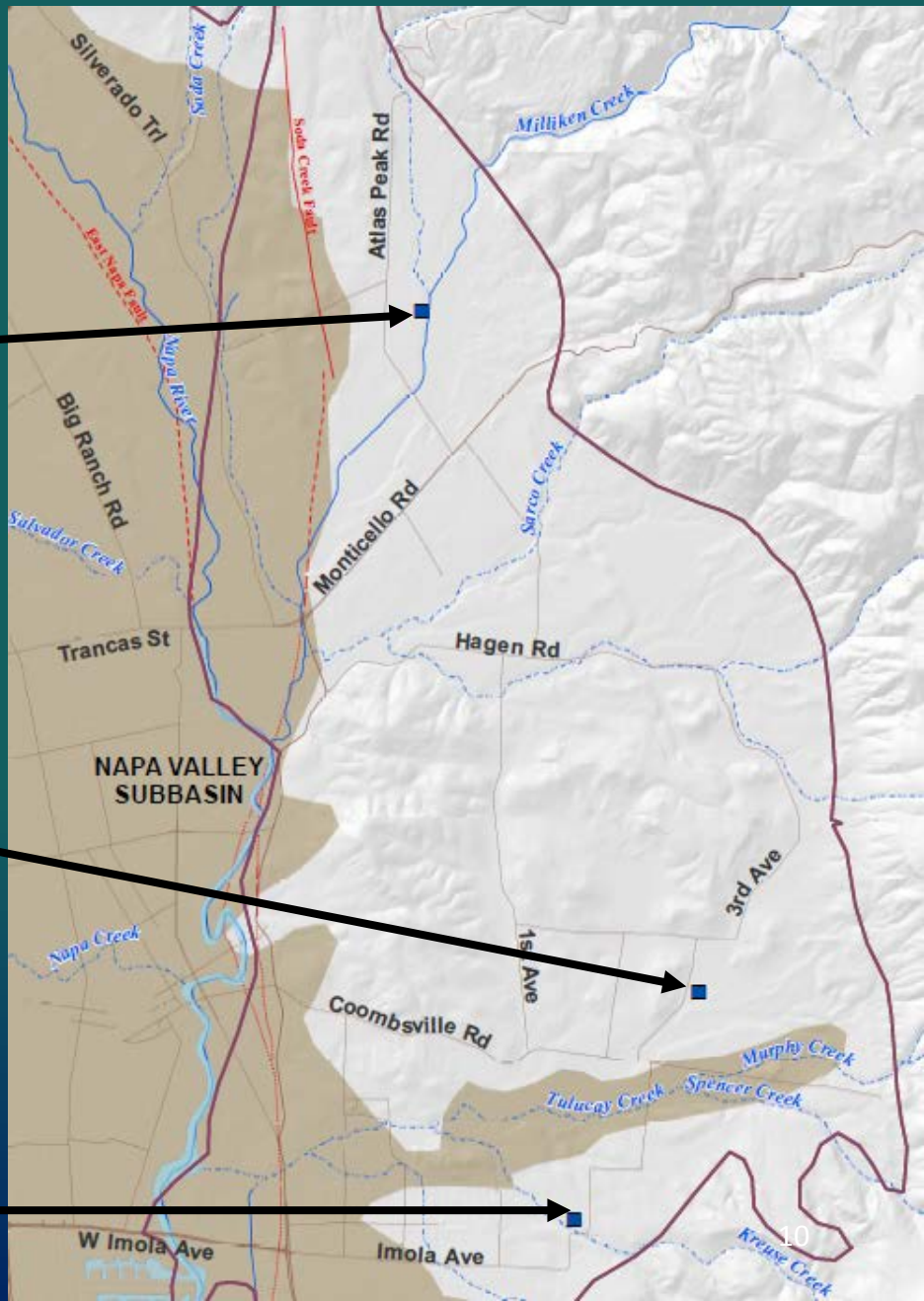


MST Hydrographs





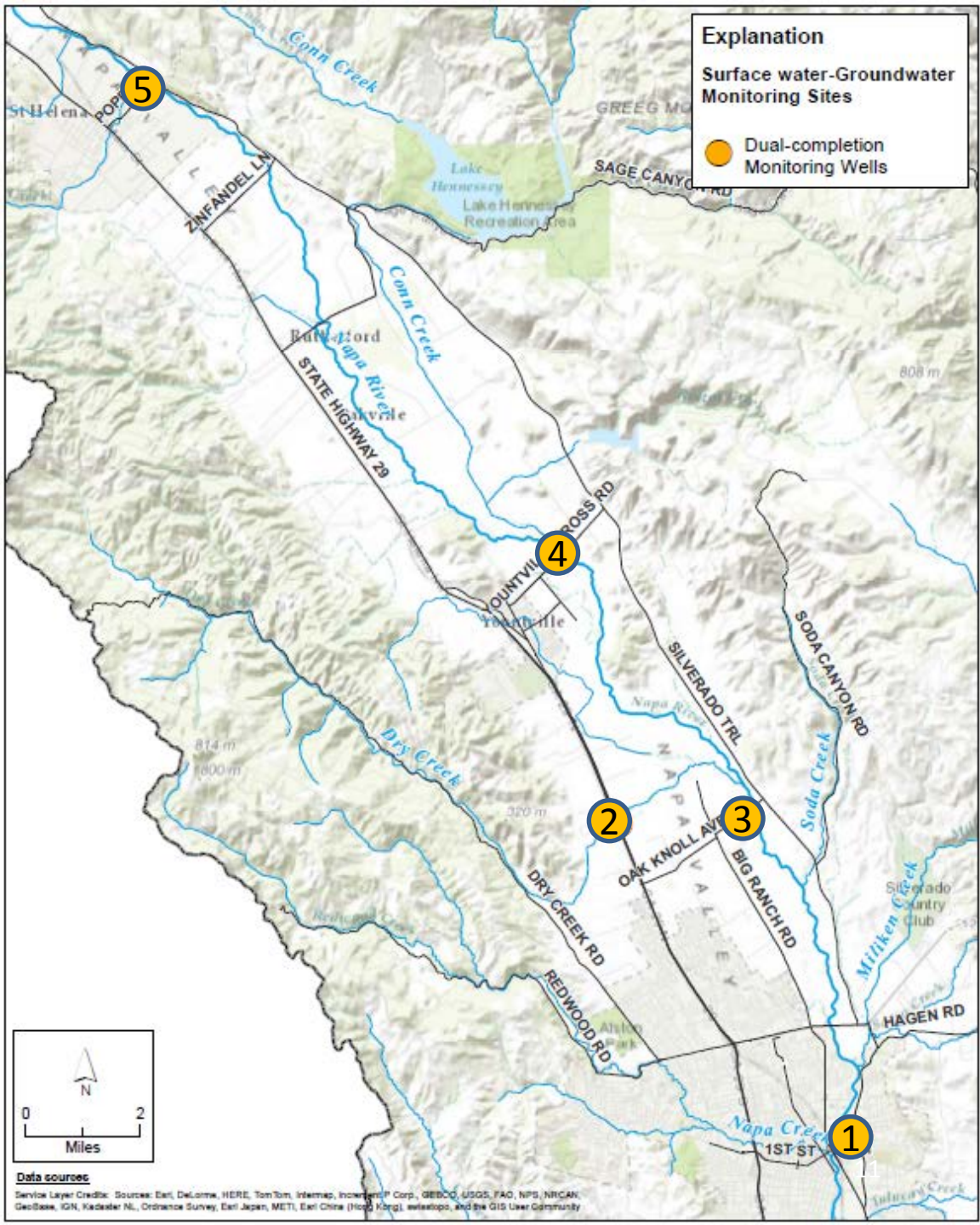




Surface Water/ Groundwater

Monitoring at 5 Sites

- Shallow Monitoring Wells (MWs) each site
  - Levels & quality
- Stream gauge each site
  - Streamflow & quality

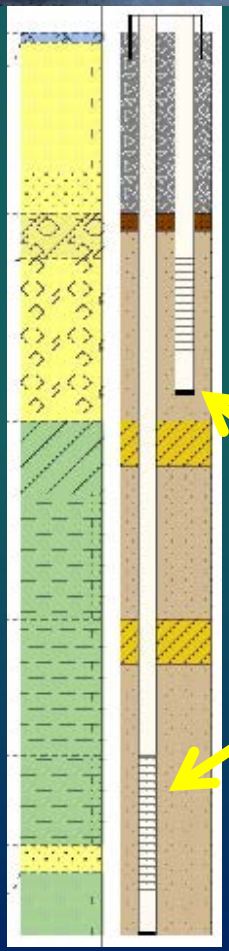


GW Monitoring Wells Near River

Above Ground
Locked Protection

Looking Down at MWs

2-inch dia. casings



Below Ground
"Nested" Monitoring Wells

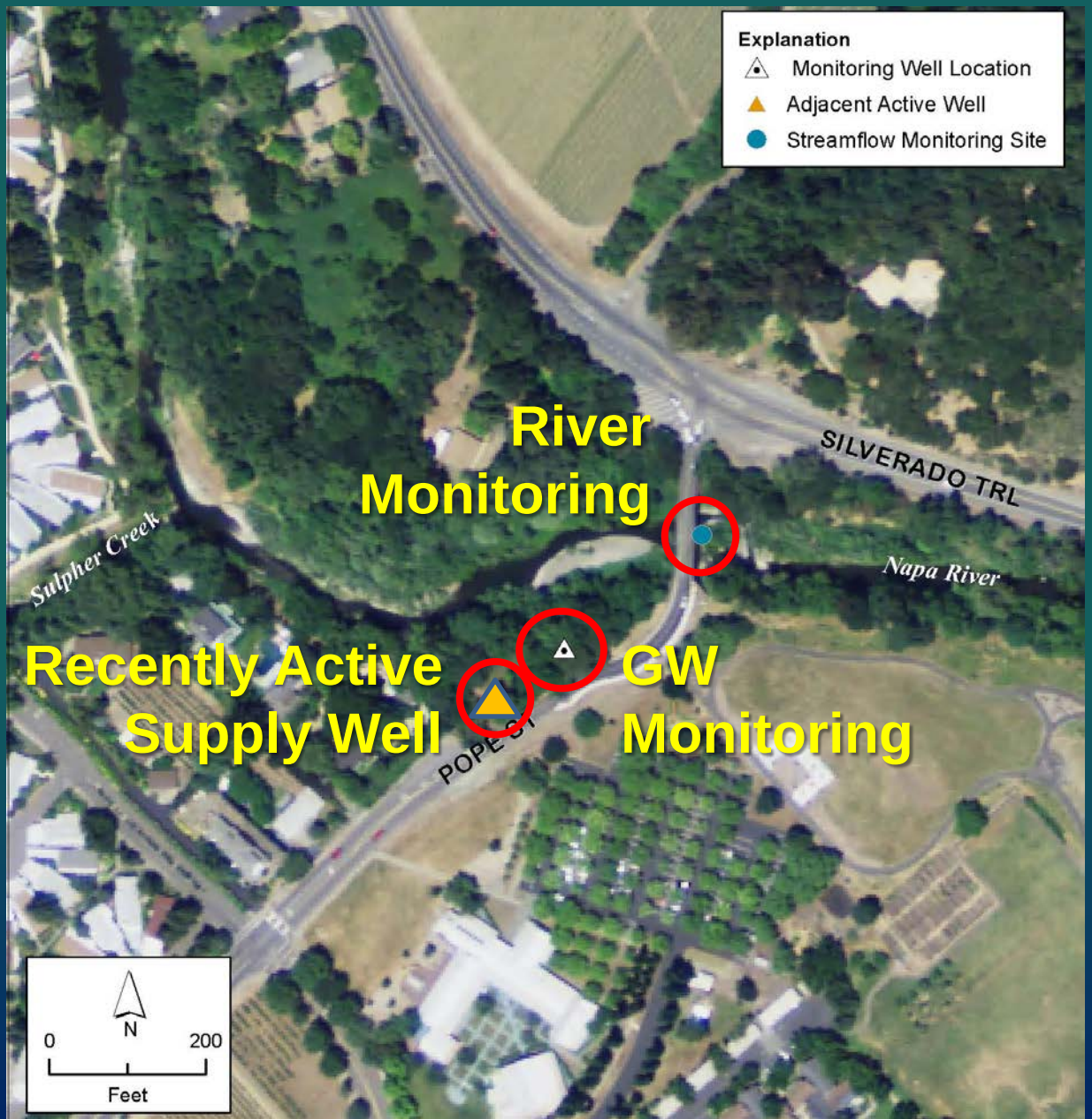
40 ft Deep

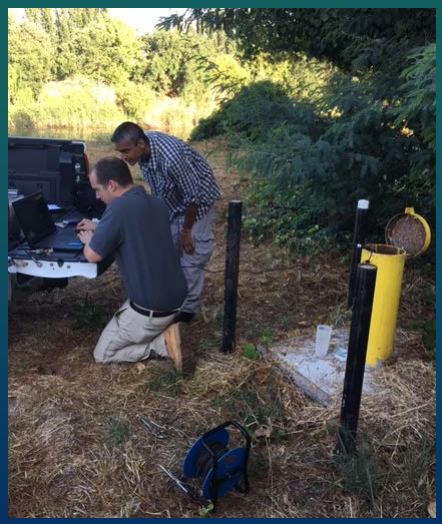
2-inch dia. casings

100 ft Deep

Not to Scale

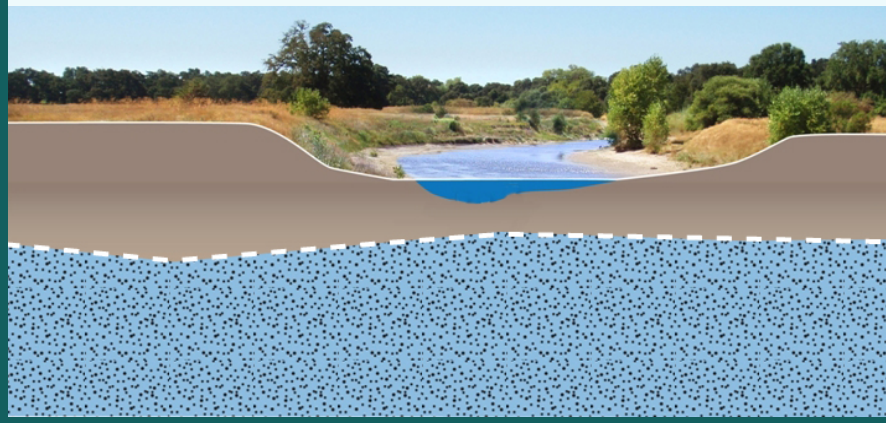
SW/GW Interaction: Site 5 St. Helena



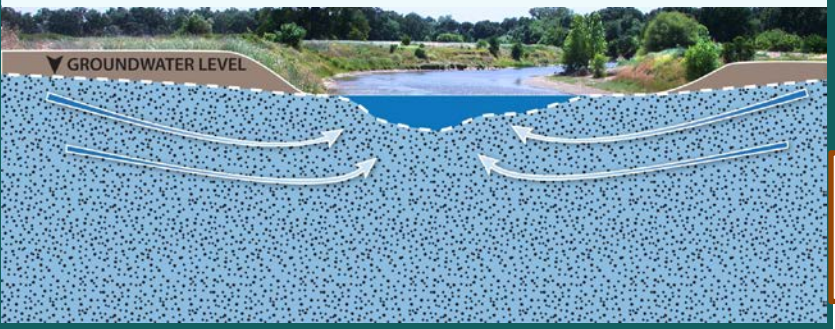


SW/GW Interaction

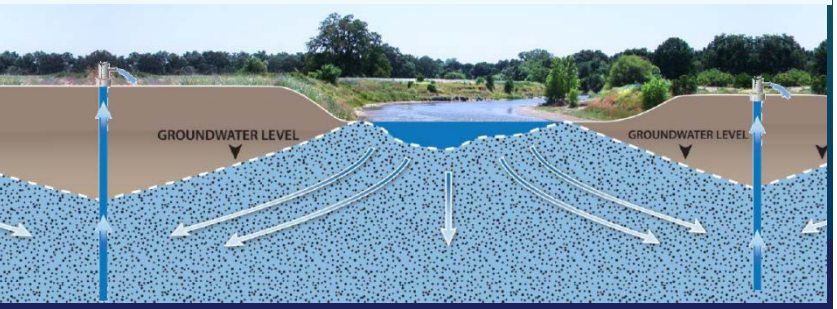
Indirect Connection
Stream Seepage Independent of GW Levels



Direct Connection
Maintains/Discharges to Stream (Groundwater Baseflow)

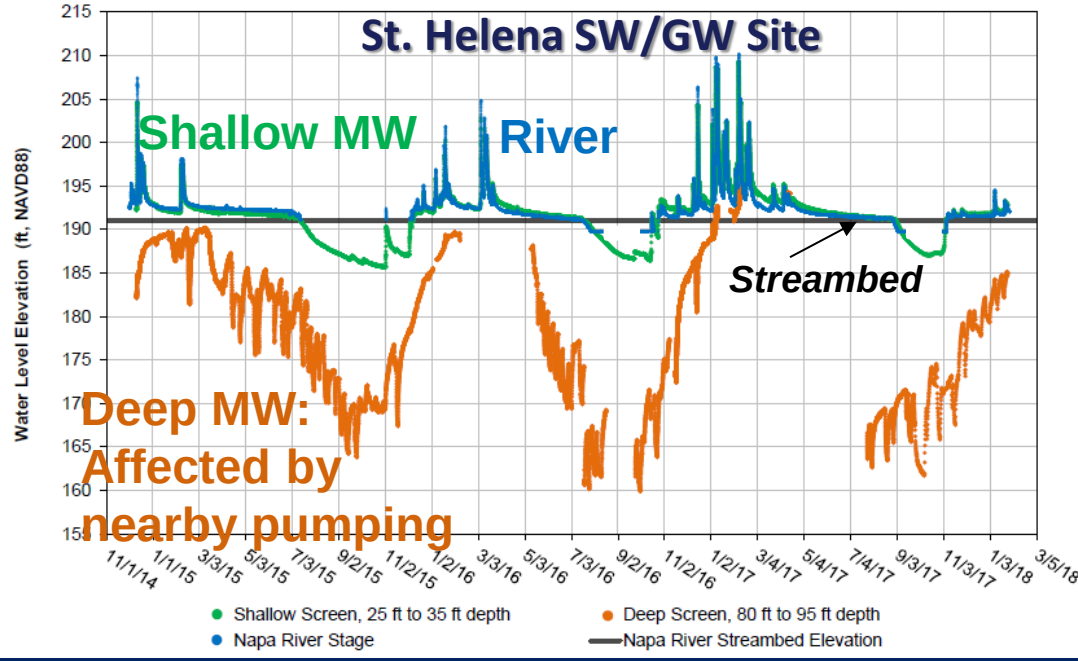


Groundwater Pumping
Stream Loses Water/ Recharge to GW

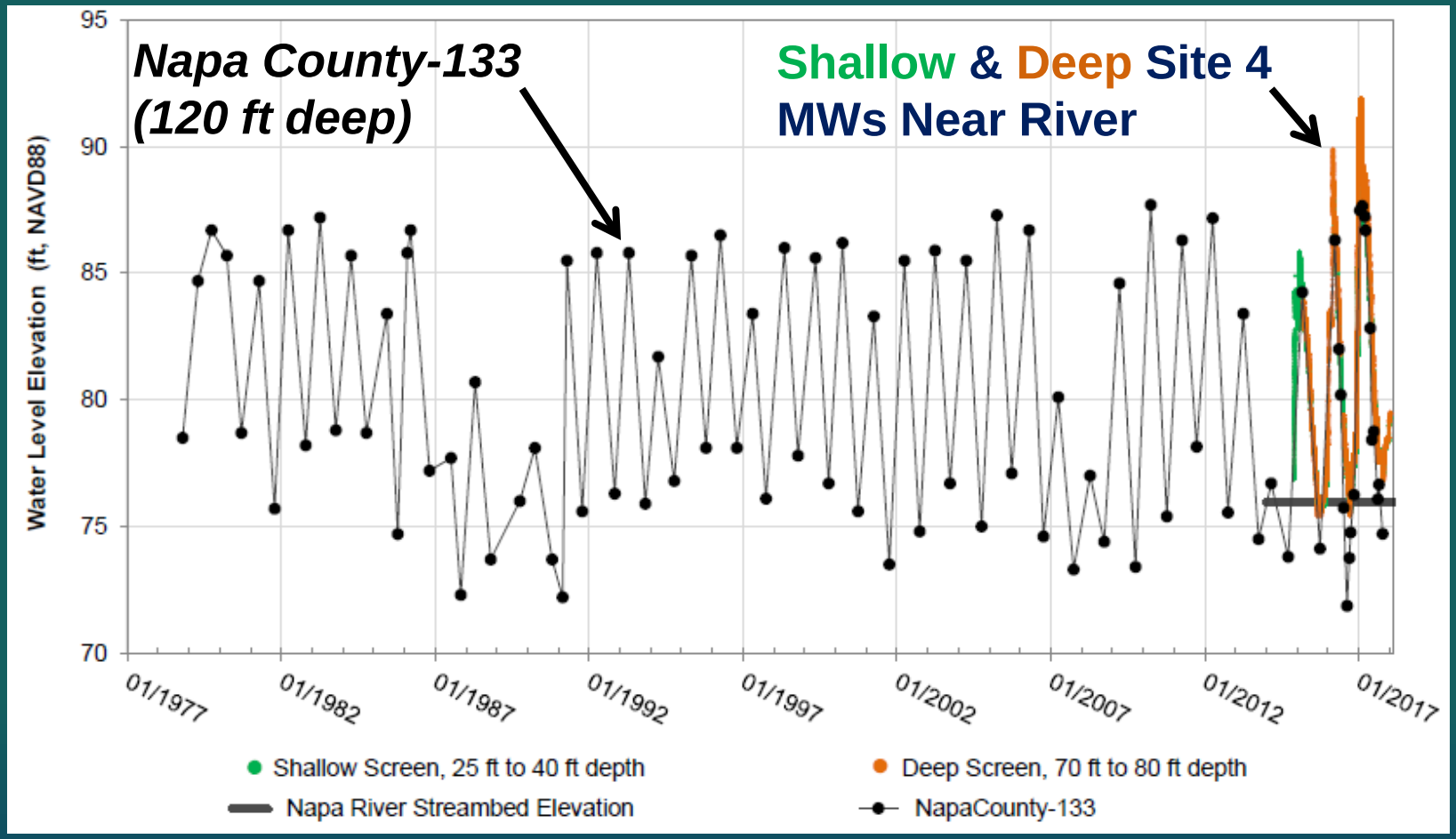


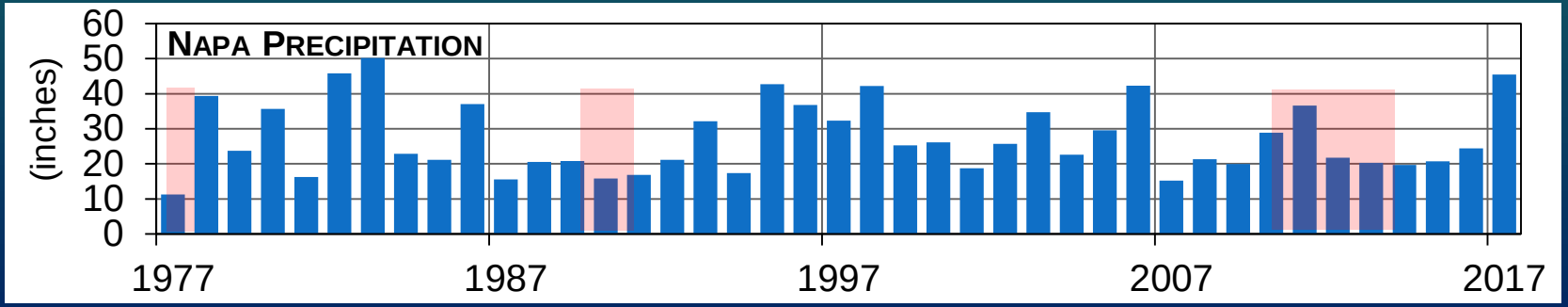
Courtesy TNC

River and Shallow MW not exhibiting short- term pumping effects



SW/GW Site 4 Compared to Historical GW Levels



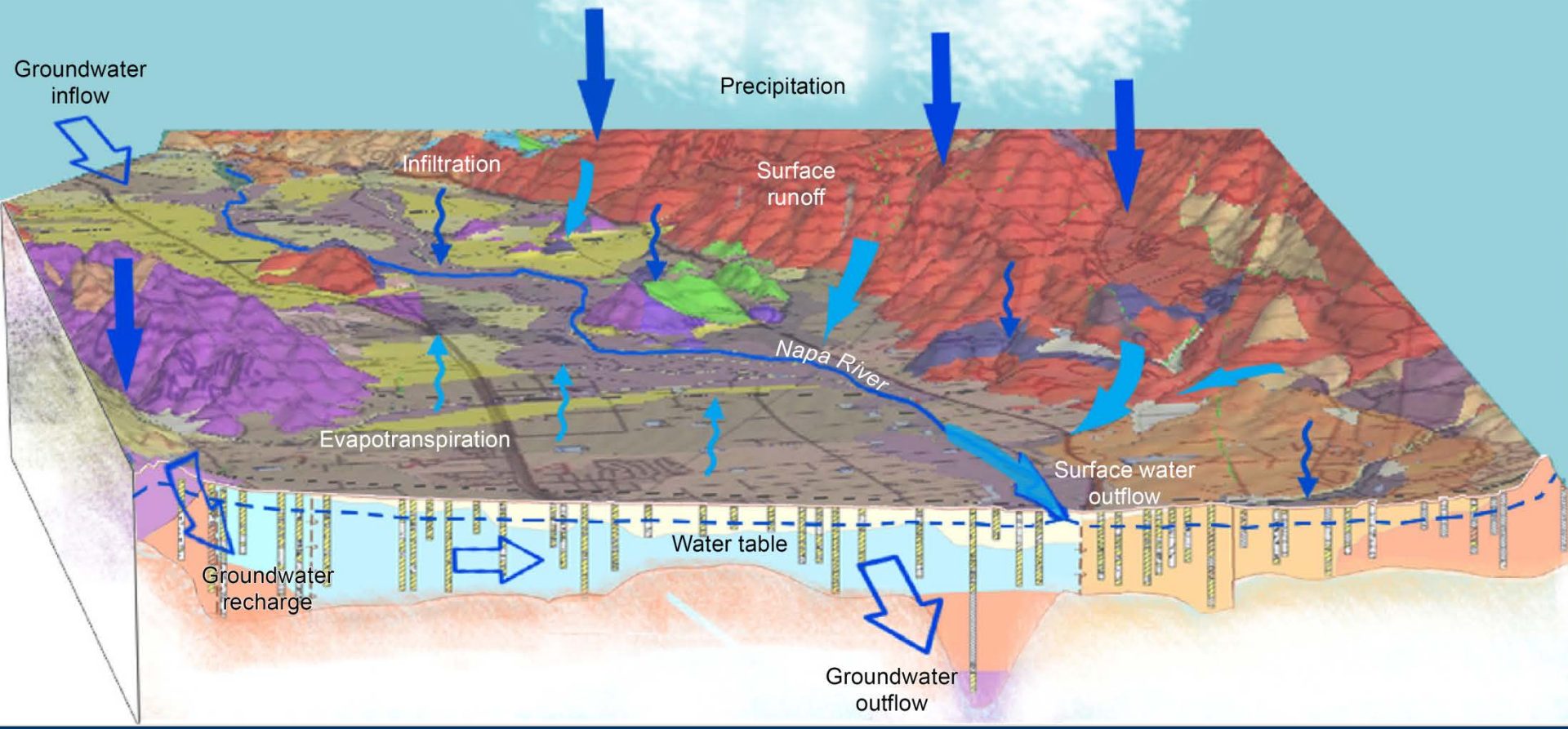


Napa Valley Subbasin Sustainable Groundwater Management

Metrics and Tracking: Sustainability Indicators

Water Budget:
Core Element of Groundwater Sustainability

Inflows – Outflows = ΔS *Change in GW Storage*



Water Budget Results

Est. Inflows (1988-2015)	Avg. Annual Ac-Ft/Yr
Upland Runoff	*145,000*
GW Recharge	69,000
Imported SW Deliveries	17,000
Uplands Subsurface Inflow	5,000

−

Est. Outflows (1988-2015)	Avg. Annual Ac-Ft/Yr
SW Outflow and Baseflow	*176,000*
Net GW Use	13,000
Net SW Use	14,000
GW Subsurface Outflow	19,000
Urban Waste-water Outflow	8,000

=

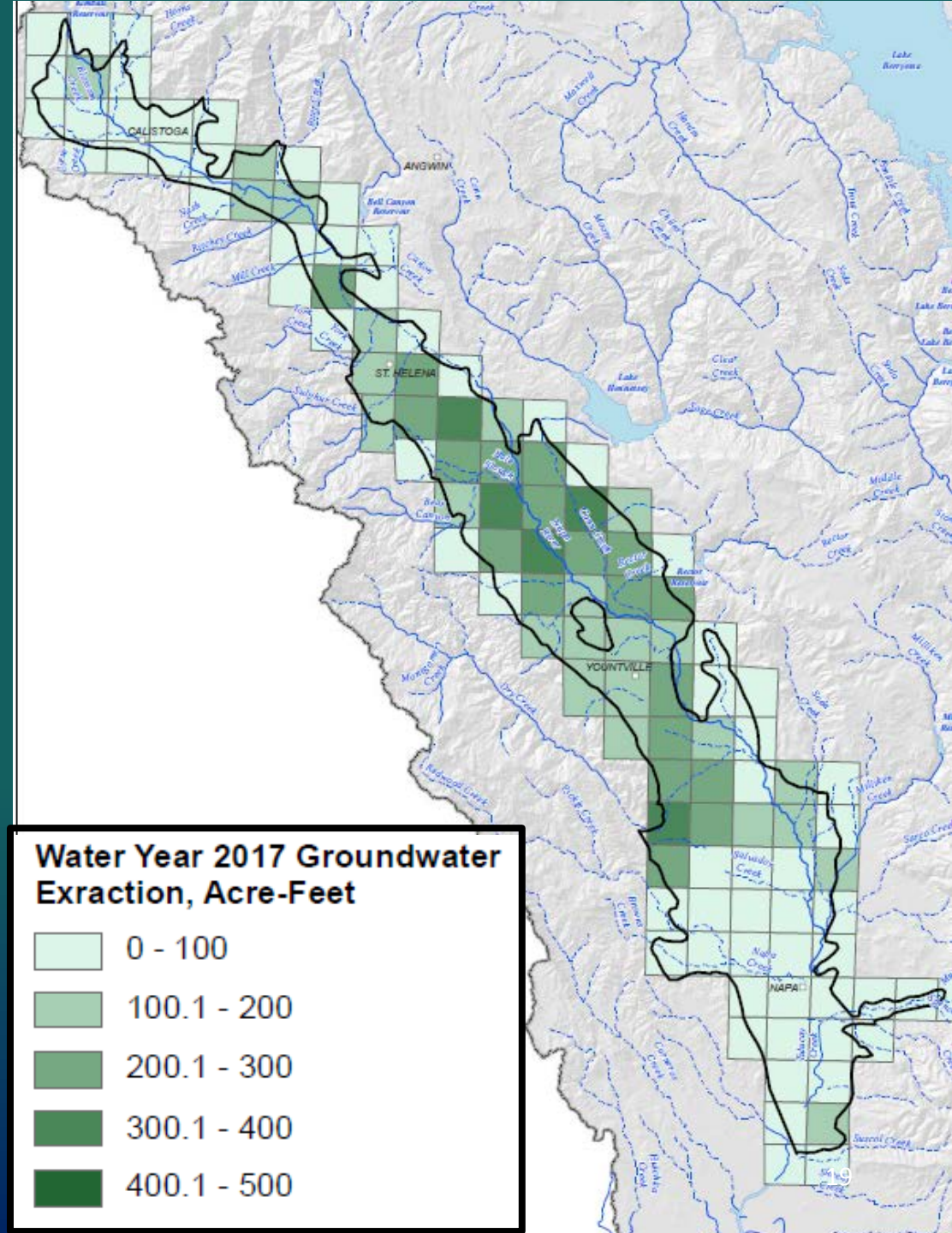
Net Avg. Annual Change in Subbasin Storage ≈ 6,000 Acre-Ft/Yr

(uncertainty in individual budget components; *italicized more uncertain*)

Groundwater Use (2017 AF)

- Ag (vines & other): 10,853
- Municipal: 293
- Unincor. Dom: 363
- Unincor. Landscp: 3,403
- Unincor. Wineries: 1,213

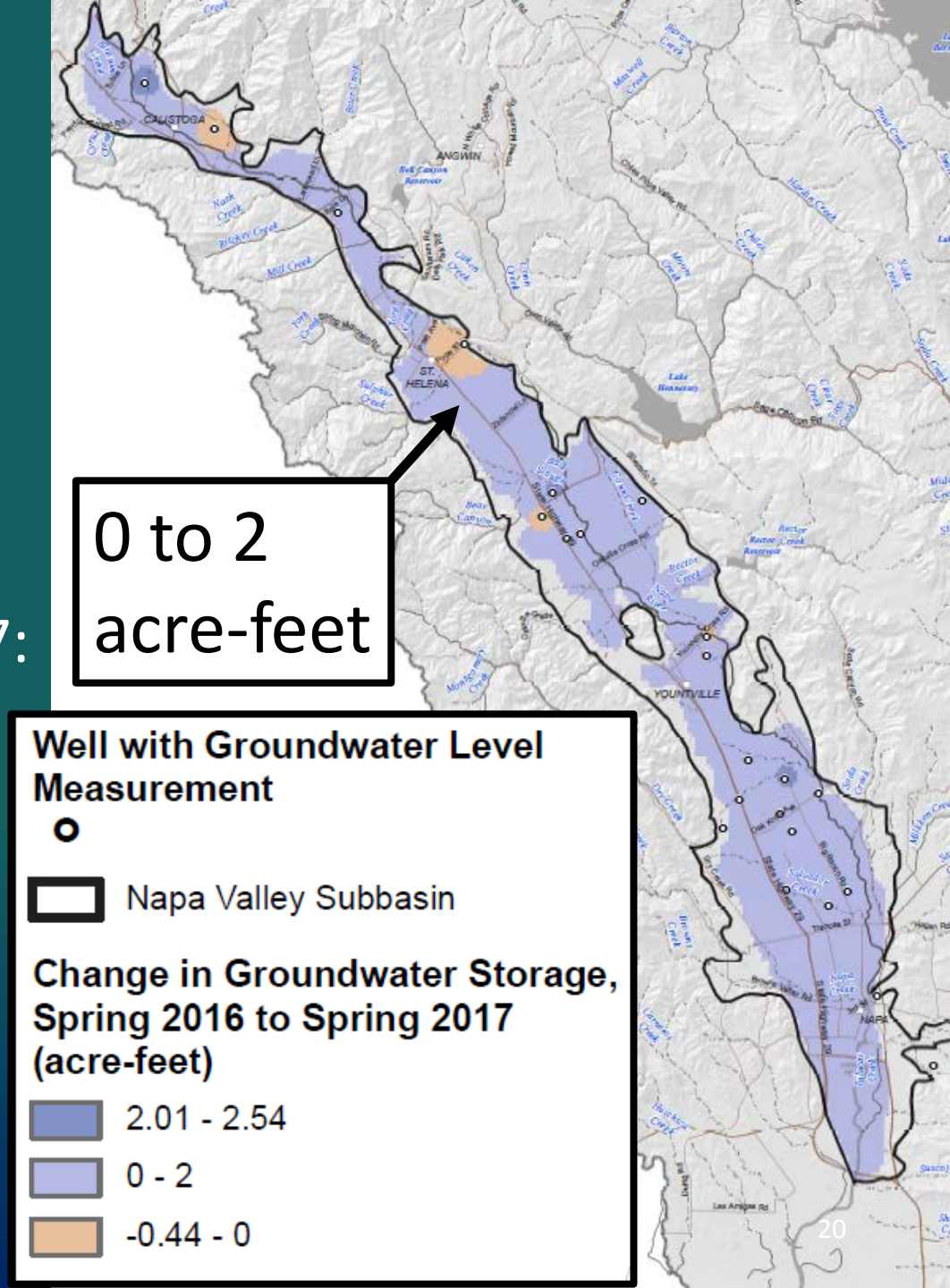
TOTAL = 15,831 AF



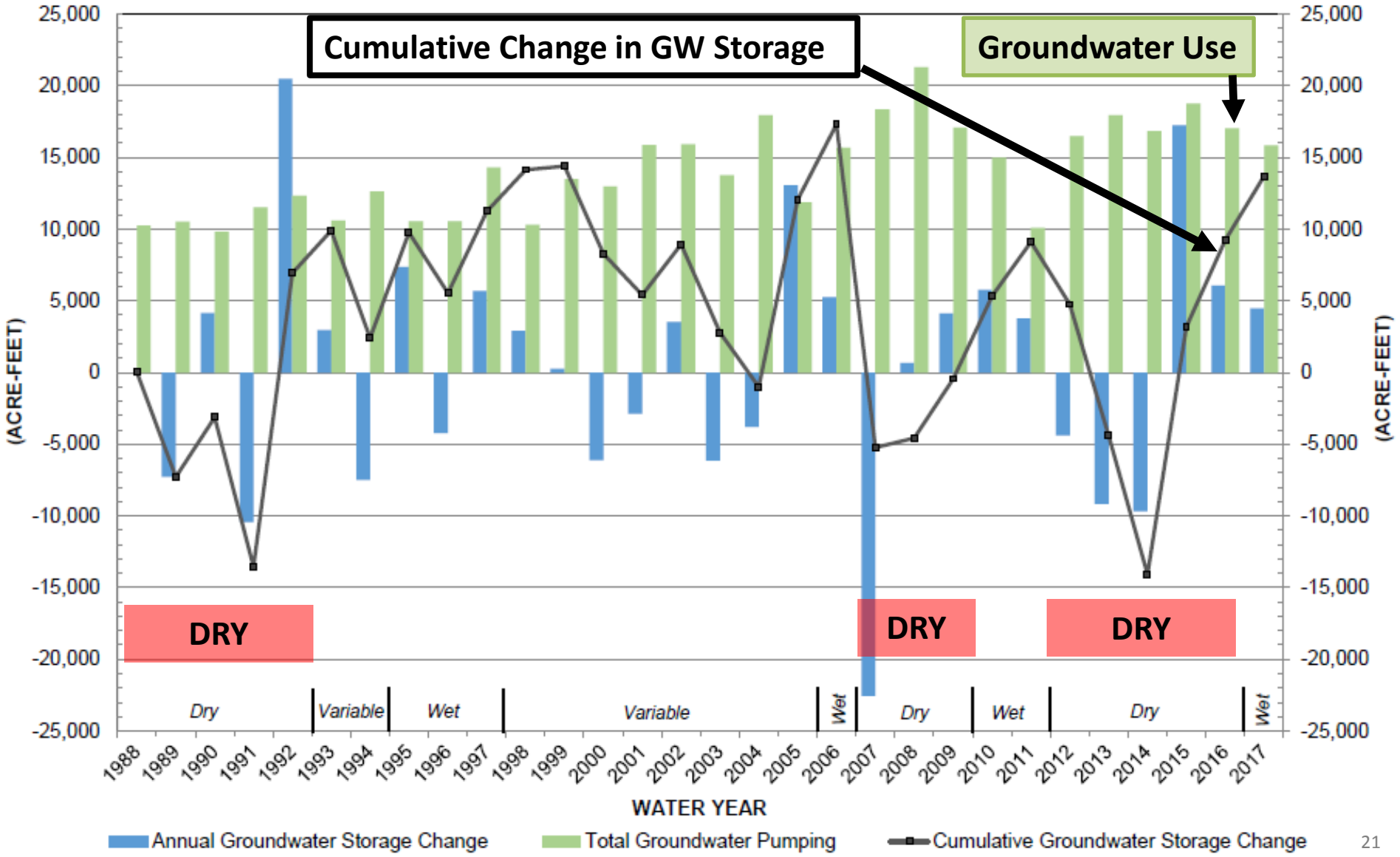
Change in Groundwater Storage

- Spr 2016 to Spr 2017: +4,470 Acre-Feet
- Cumulative 1988 to 2017: +13,702 Acre-Feet; Increase in GW Storage

Napa Valley Subbasin is essentially a "full" basin.



Groundwater Use and Storage Change



Sustainable Yield and Related Terms

Sustainable Yield

(Definition; Water Code Section 10721(v)):

"*Maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus, that can be withdrawn annually without causing an undesirable result*."

Undesirable Result

A key term linked to accomplishing sustainability.

Summary of Groundwater Use and Change in Groundwater Storage

Description	Quantity (Acre Feet)
Groundwater Extraction 2016 & 2017	17,039 and 15,831
Avg. Annual Recharge (1988-2015)	69,000
Sustainable Yield (Estimated Range)	17,000 to 20,000
2016 and 2017: Annual Storage Change	+6,056 and +4,470
1988-2017: Cumulative Storage Change	**+13,702**

…… The County and everyone living and working in the county will integrate stewardship principles and measures in groundwater development, use, and management to protect economic, environmental, and social benefits and **maintain groundwater sustainability indefinitely without causing undesirable results**, including unacceptable economic, environmental, or social consequences.
(Excerpt Napa SGMA Sustainability Goal)

Groundwater Sustainability Indicators

Not Causing Undesirable Results:
Means Avoiding Significant and Unreasonable …

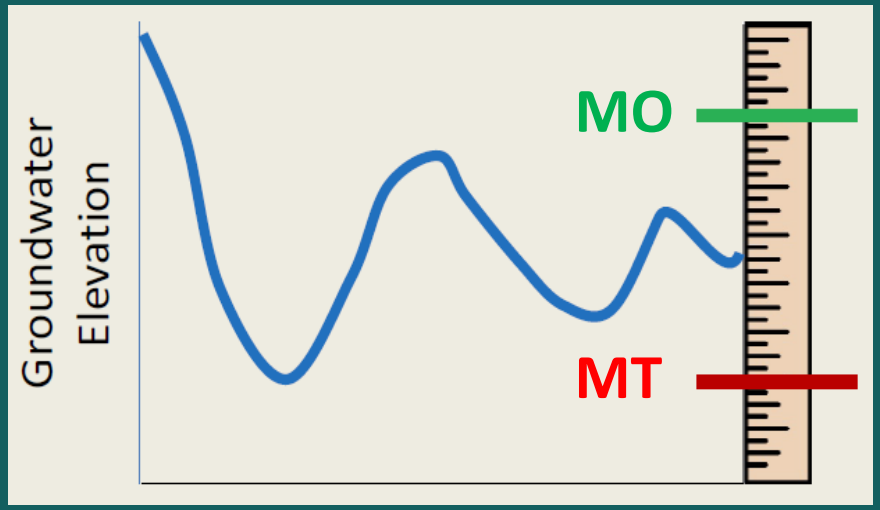
Lowering of GW Levels	**Reduction of GW Storage**	**Seawater Intrusion**
Water Quality Degradation	**Land Subsidence**	**Depletion of Surface Water**

Napa Valley Hydrogeologically Sensitive to this Indicator

Minimum Thresholds and Measurable Objectives

- **Minimum Threshold (MT)**

"a numeric value for each sustainability indicator used to define undesirable results" (Sec 351)



(DWR, March 2016)

- **Measurable Objective (MO)**

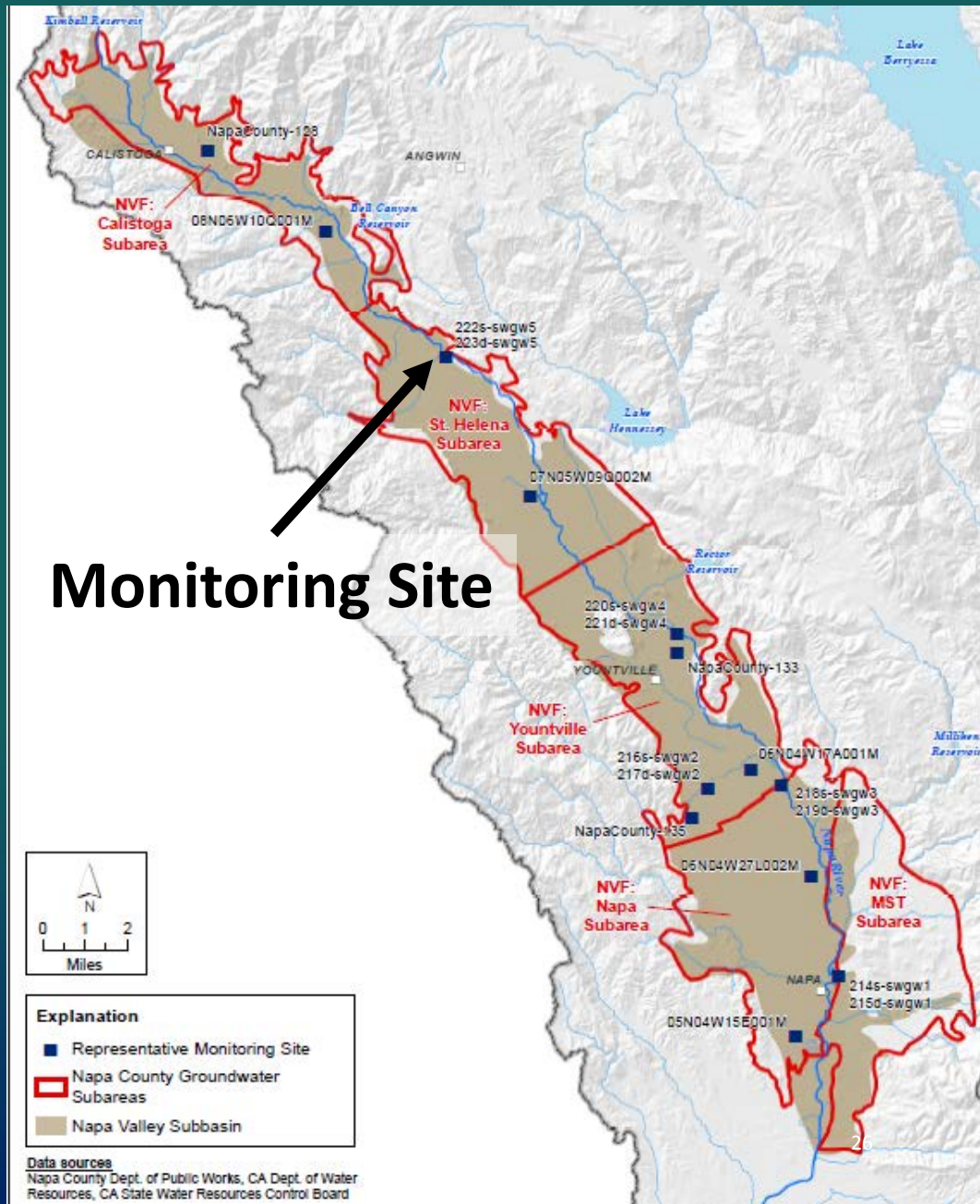
"specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions" (Section 351)

Measurable objectives and minimum thresholds are established to ensure GW sustainability or improve GW conditions.

SGMA Representative Monitoring Sites

- Representative wells to ensure sustainability
- 18 locations
- Metrics for each sustainability indicator, as applicable

Ongoing:
Other Countywide GW Data to be Analyzed, Updated, & Reported (107 wells)



Sustainability Indicators: Streamflow

Representative Monitoring Sites Well ID	Date Monitored	Measured Minimum 2017 Fall WLE (Feet, AMSL)[1]	Streamflow Depletion	
			Minimum Threshold (Fall GWE, Feet AMSL)	Measurable Objective (Fall GWE, Feet AMSL)
06N04W17A001M[2]	-	Fire in area	37	50
06N04W27L002M	9/25/2017	12.3	-2	12
07N05W09Q002M	9/25/2017	135	127	135
08N06W10Q001M	9/25/2017	282	269	281
NapaCounty-76[3]	-	Fire in area	-	-
NapaCounty-122	11/8/2017	-23	-	-
NapaCounty-128	10/3/2017	331	320	331
NapaCounty-133	10/25/2017	75	72	76
NapaCounty-135	10/26/2017	38	-	-
Napa County 214s-swgw1	10/22/2017	2	2	4
Napa County 215d-swgw1	11/6/2017	2	2	4
Napa County 216s-swgw2	11/7/2017	74	61	76
Napa County 217d-swgw2	10/30/2017	64	61	76
Napa County 218s-swgw3	11/17/2017	33	29	32
Napa County 219d-swgw3	10/24/2017	33	29	32
Napa County 220s-swgw4	10/31/2017	77	75	77
Napa County 221d-swgw4	10/25/2017	77	75	77
Napa County 222s-swgw5	10/15/2017	187	185	190
Napa County 223d-swgw5	9/26/2017	168	164	175
NapaCounty-229	11/8/2017	-62	-	-

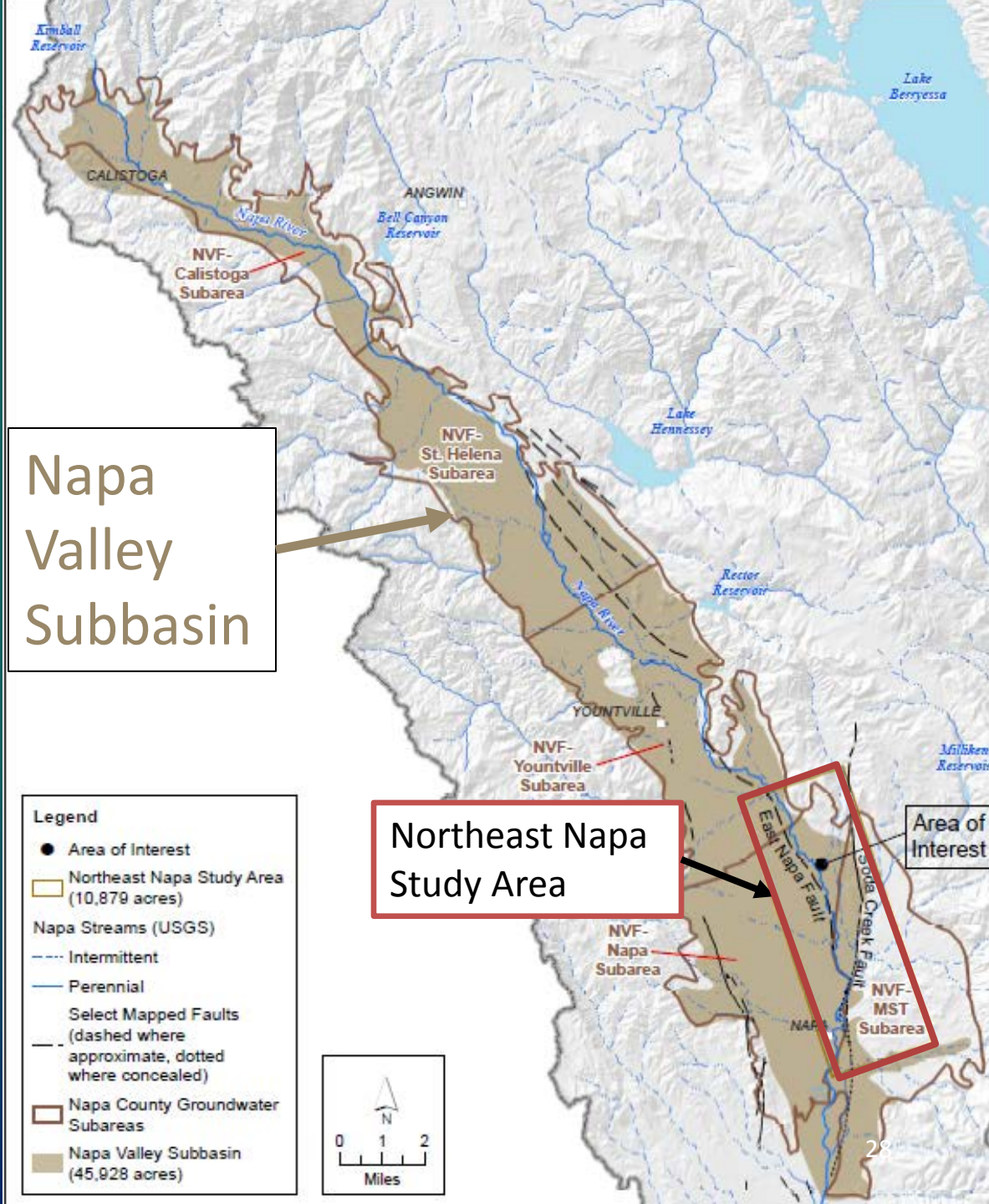
All above Minimum Threshold

Northeast Napa Study

Study and GW Model to Evaluate:

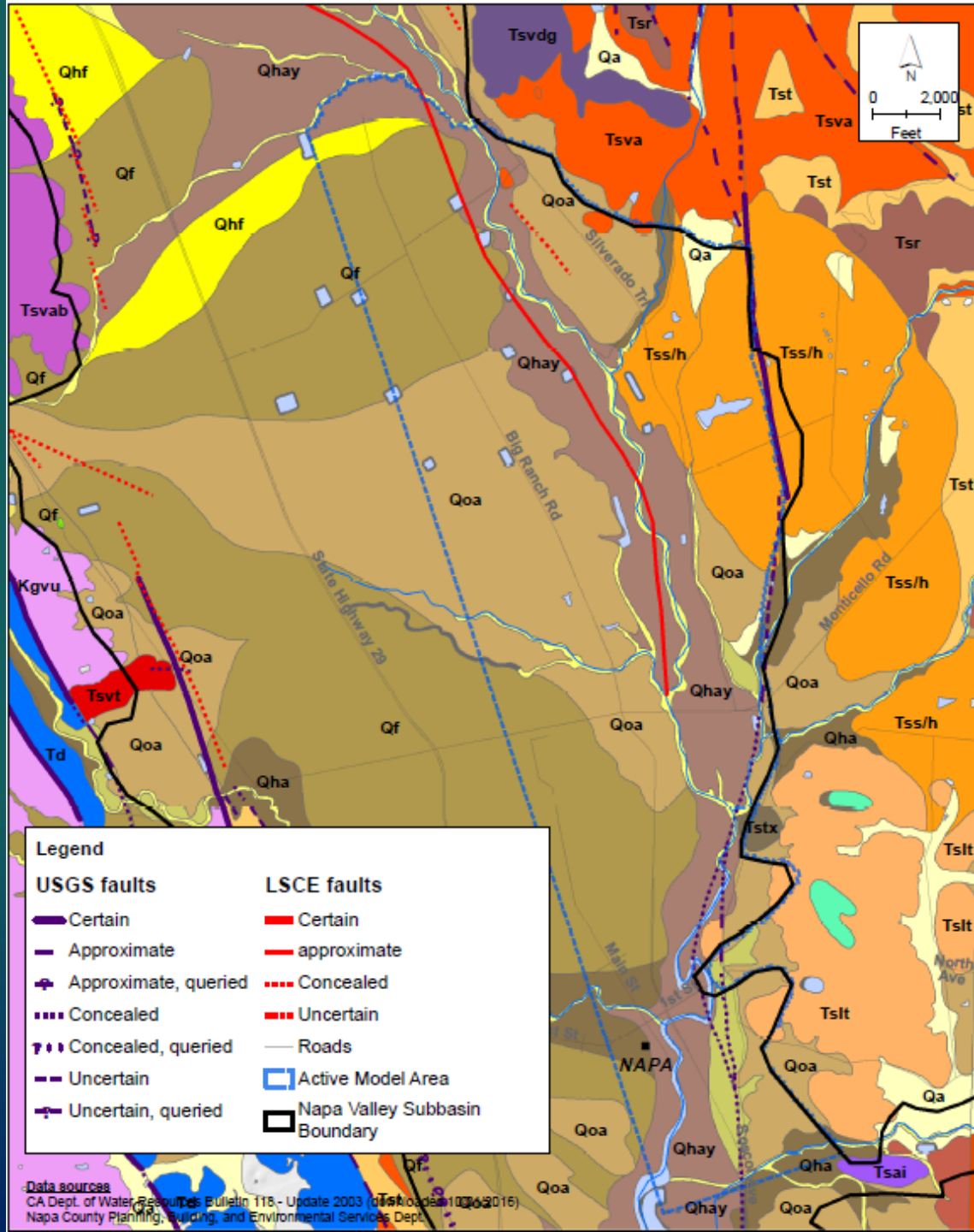
- Historical WL declines local area east of Napa River
- Mutual well interference
- Potential effects from MST Subarea
- Potential effects of pumping on streamflow

Completed: Sept. 2017

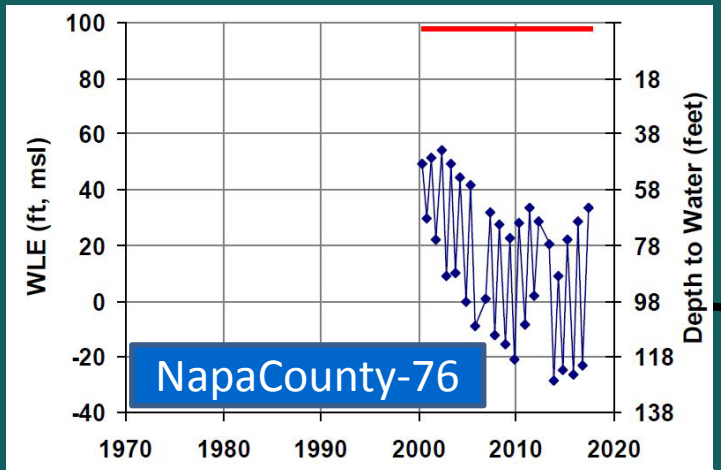


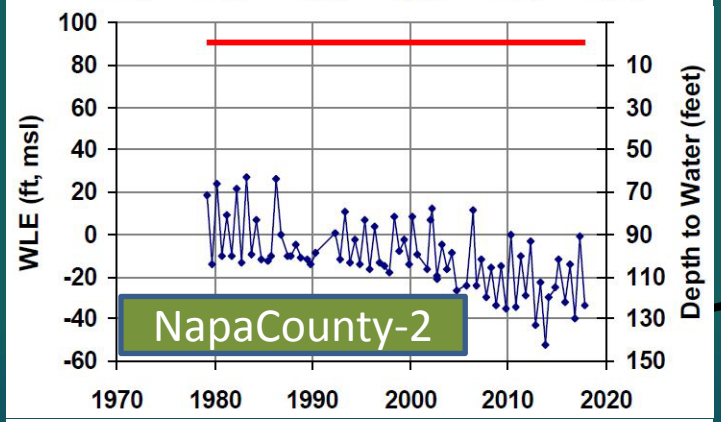
Geologic Setting

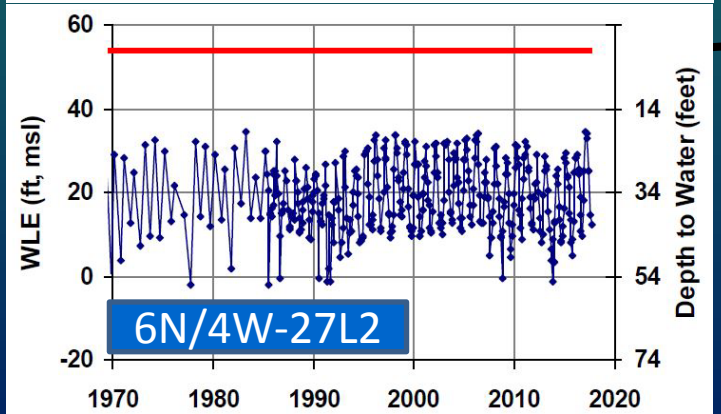
- Hydrogeologic Conceptualization Napa Valley Subbasin and NE Napa Study Area

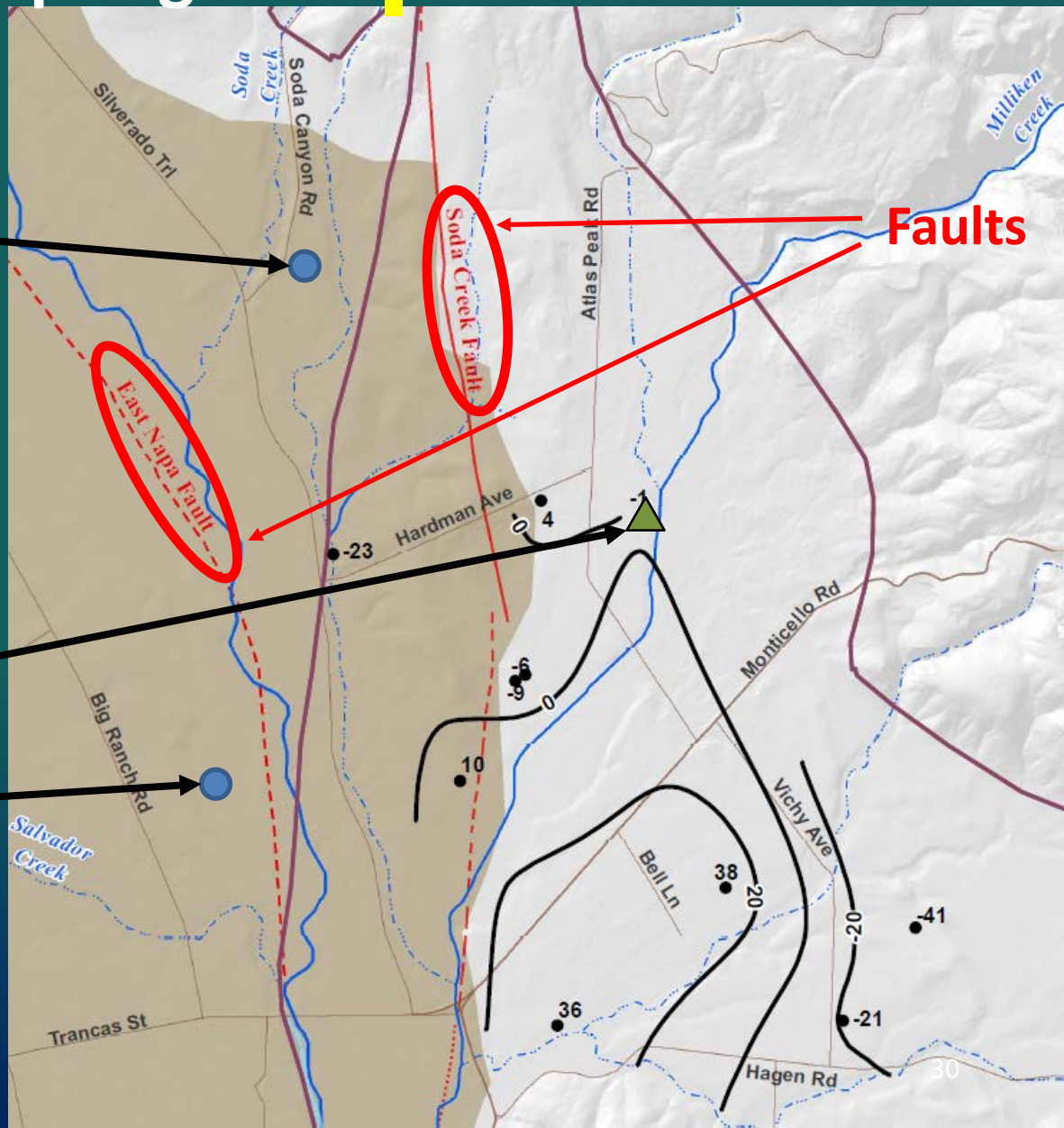


NV Subbasin, Northeast Napa Area & MST: Spring 2017

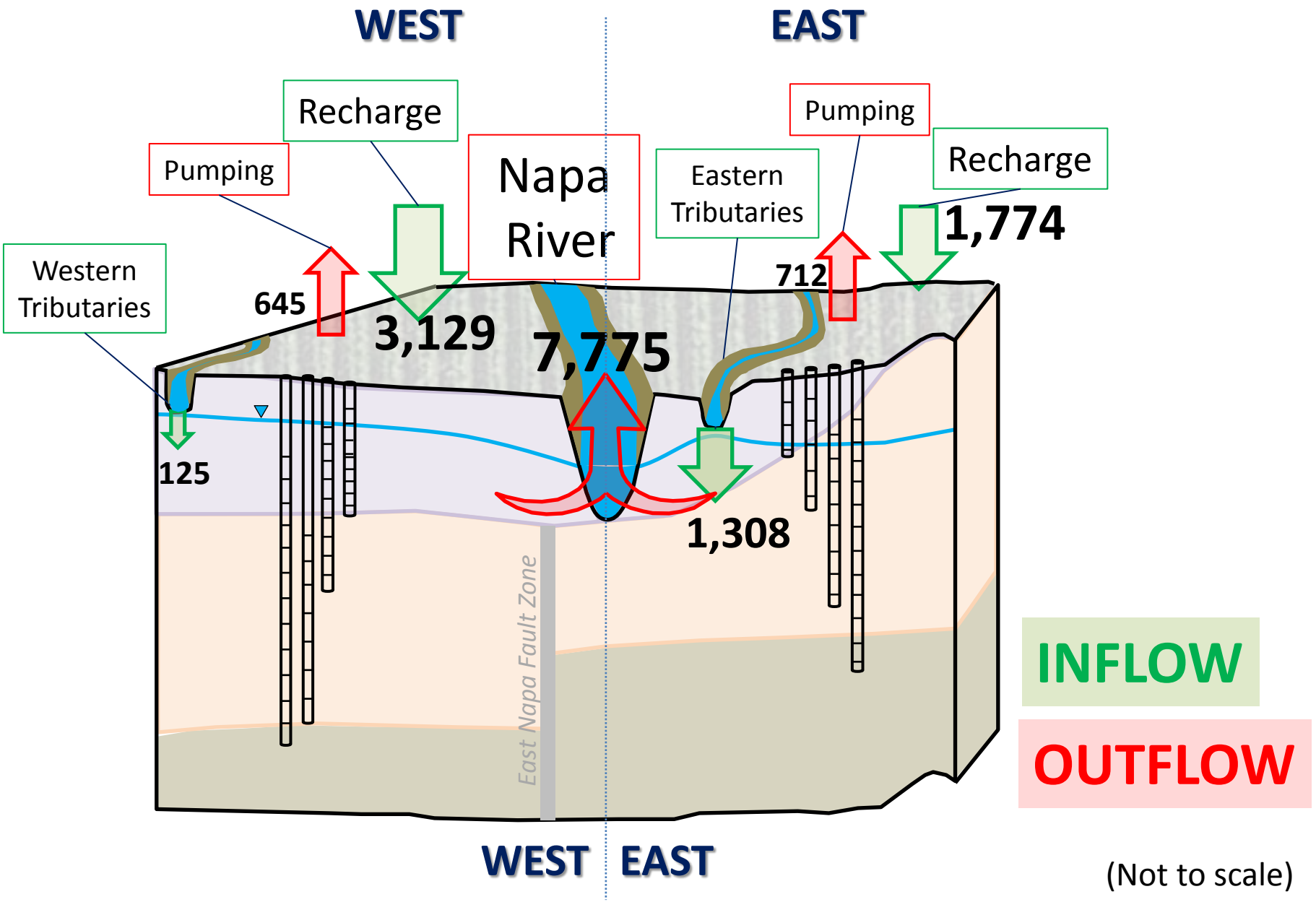




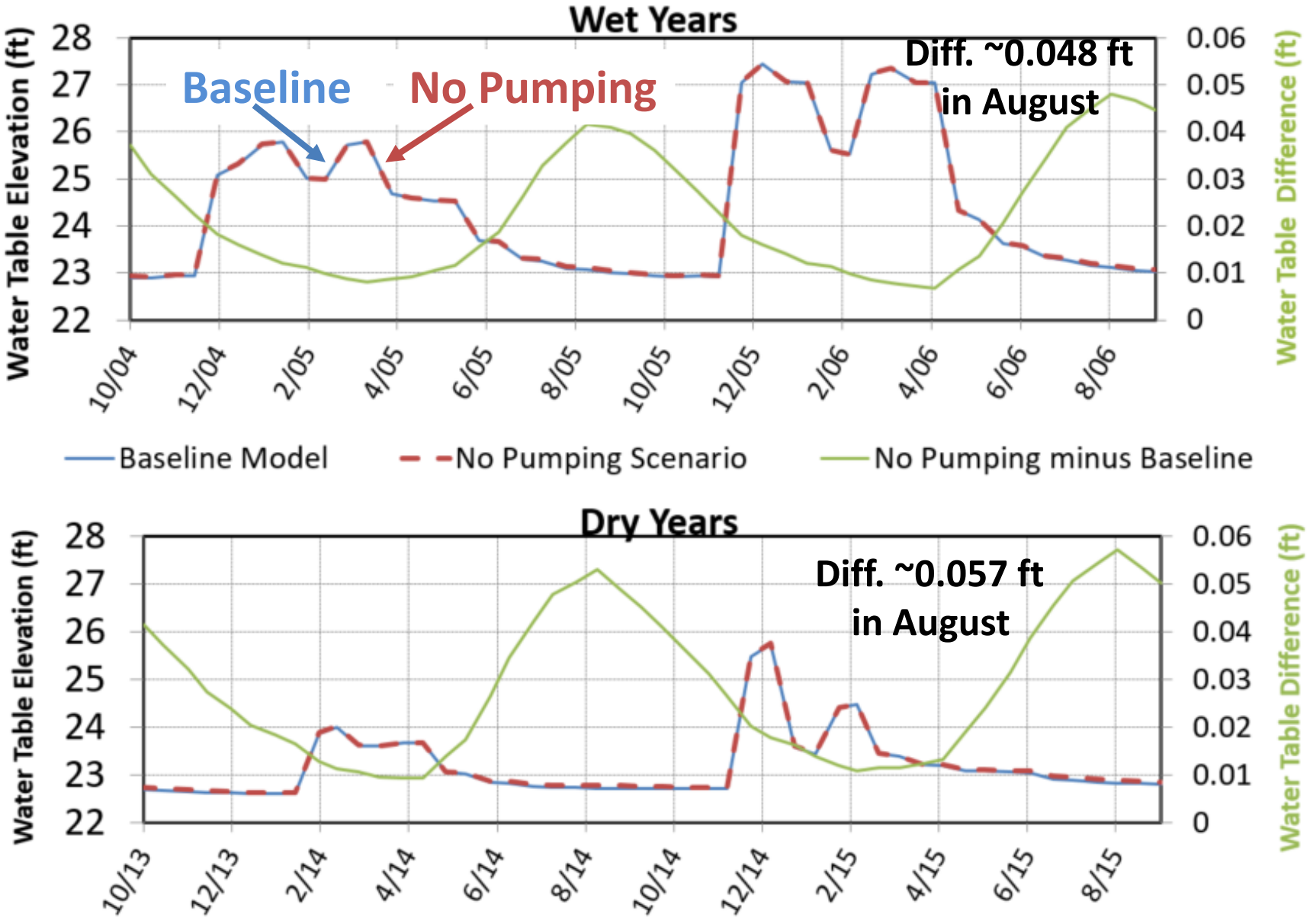




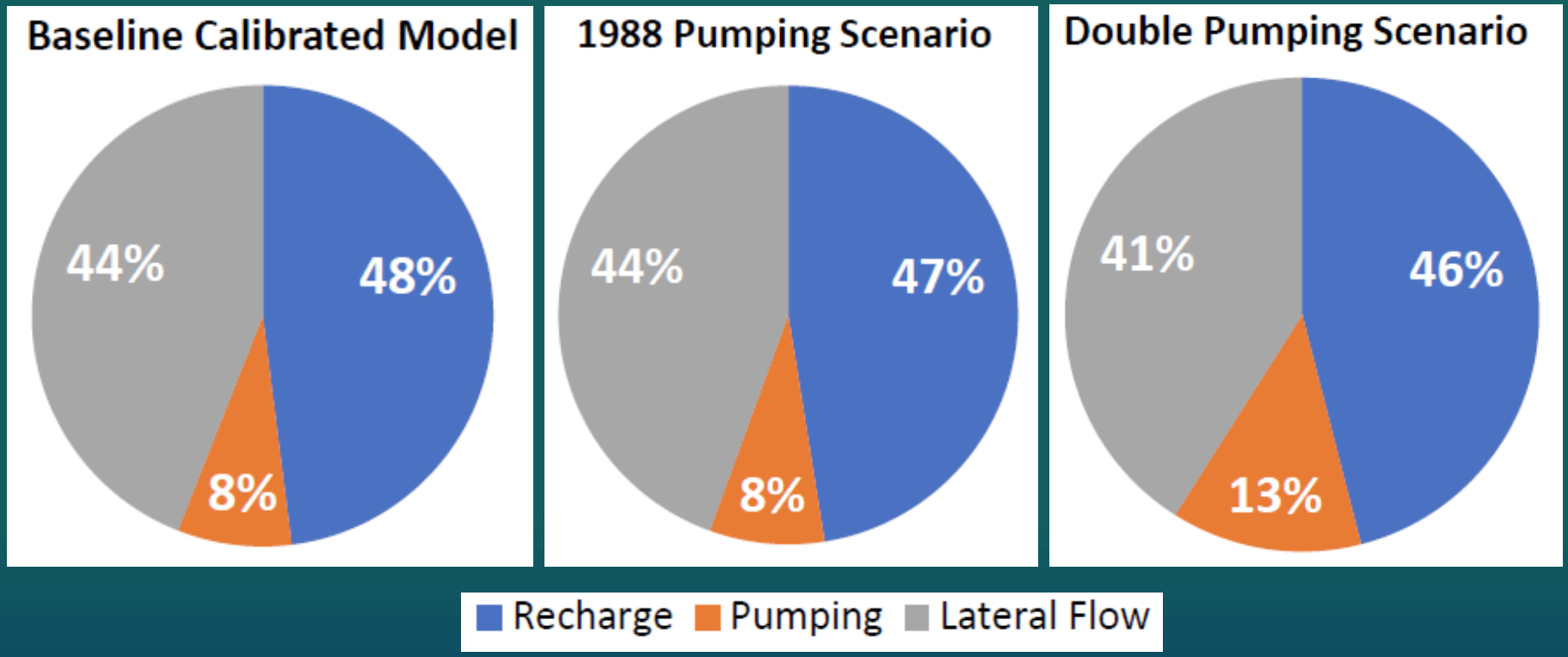
Select Average Baseline Water Budget Components (AFY)



Water Table: Baseline vs. No Pumping



NE Napa Area: Influence of Water Budget Components on GW-SW Interactions



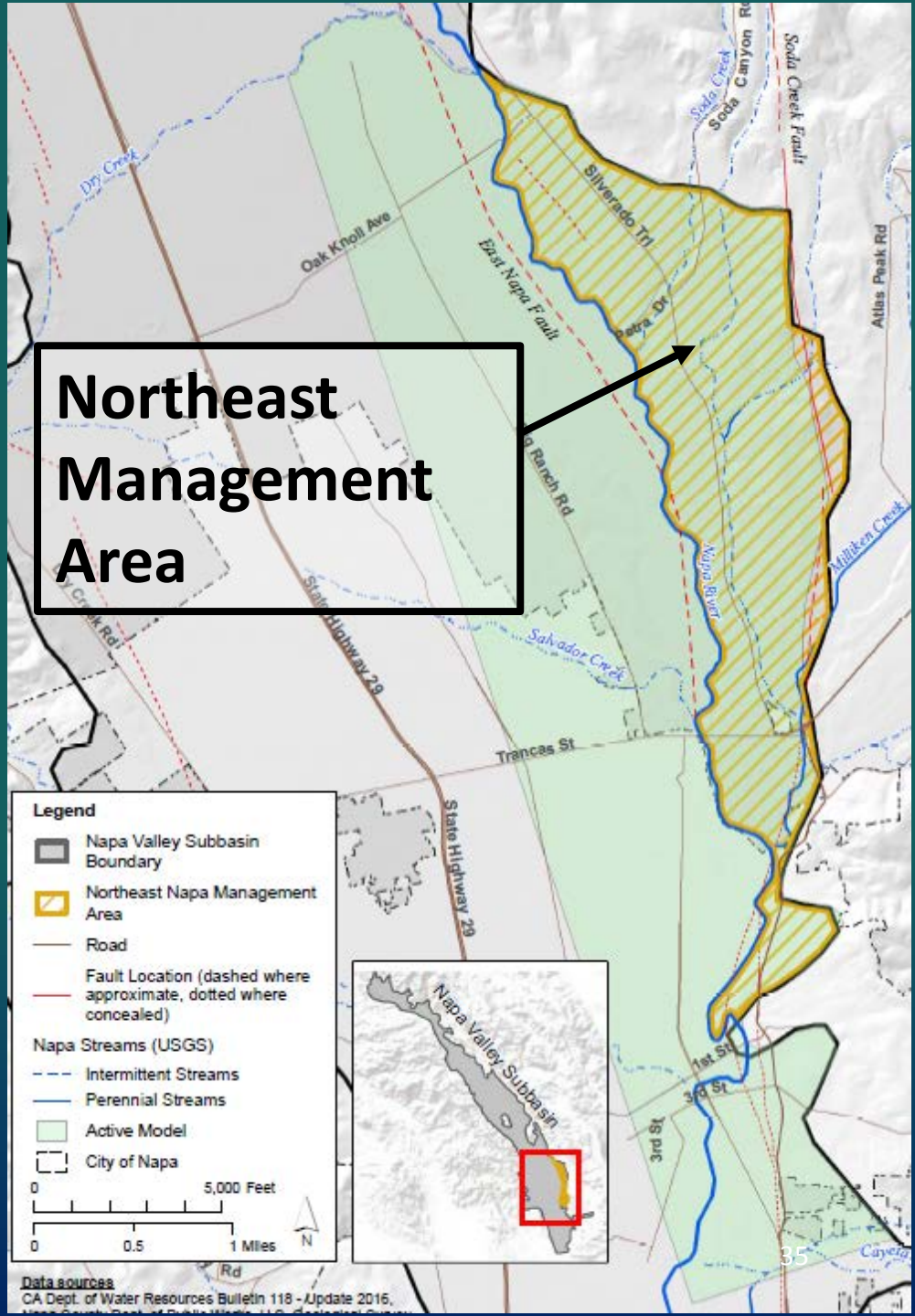
The small variations between these scenarios indicates the primary role of climate-driven effects.

Report Findings: NE Napa Study Area

- **Average change in GW storage is about in balance.**
- Pumping is relatively small part of water budget.
- **GW discharge into Napa River dominates the GW budget.** Recharge is 2nd largest water budget component.
- Baseline v. No pumping: Very small difference in water table and river stage for wet and dry years (hundredths of a foot)
- Statistical analyses of model recharge, lateral flows and pumping relative to Napa River baseflow show
  - Climate effects: **87 to 92%** of effect on baseflow,
  - Pumping: **8 to 13%** of effect on baseflow.

Northeast Napa Management Area

- 1,960 acres; 4% of Napa Valley Subbasin
- Hydrogeologic setting; not typical of overall Napa Valley Subbasin
- Management approaches to ensure continued sustainability in NE Area
- October 2017 Napa BOS supports NE Management Area designation

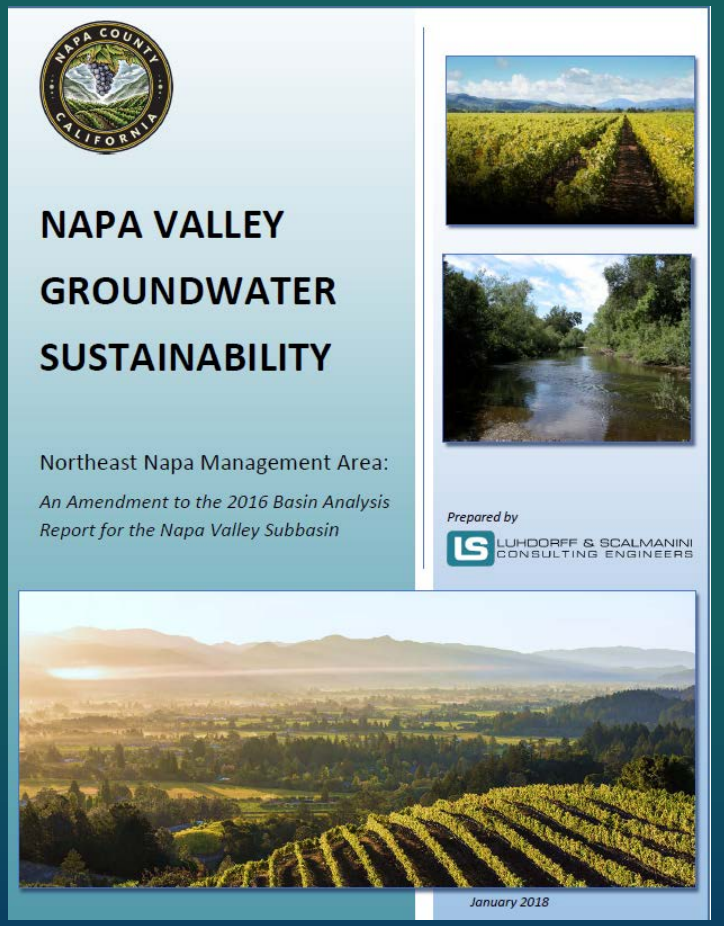


Summary of Recommendations

	RECOMMENDATIONS	Management Area (NE Napa/ East of River)	All Napa Valley Subbasin
A	Add SW/GW Monitoring Wells	☐	☐
B	Management Area Designation	Completed	
C	Discretionary Projects – Additional WAA Review (Tier 2)	☐	
D	New Well Tracking in Management Area	☐	
E	New Well Pump Testing	☐ (All)	(Deeper formations)
F	GW Flow Model Development		☐
G	Increase Conservation & Recharge	☐	☐

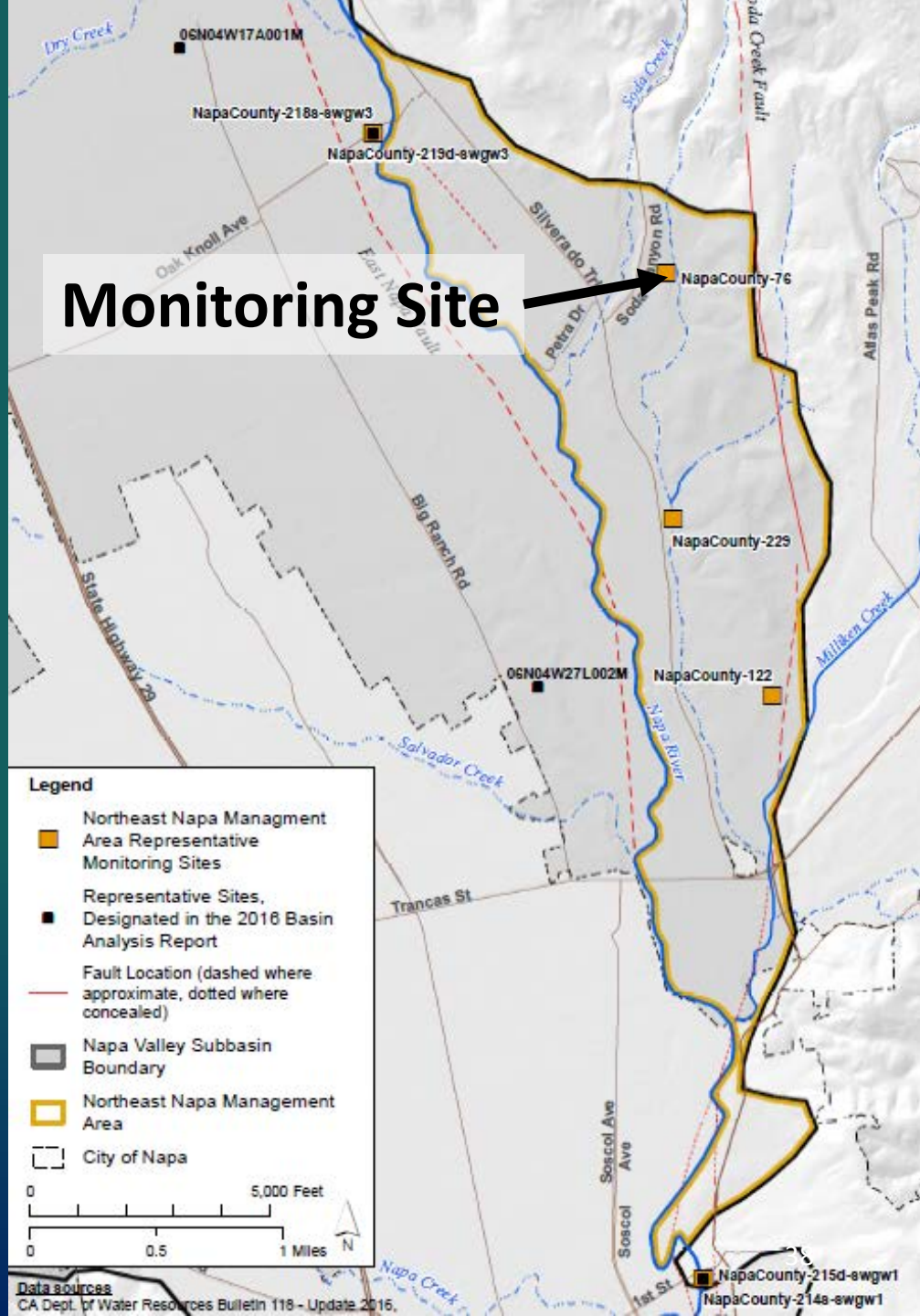
Northeast Napa Management Area Amendment

- Amendment to Basin Analysis Report; **does not change findings in that Report**
- Adds new Northeast Napa Management Area
- Establishes Representative Monitoring Wells in NE Napa Management Area
- Establishes Sustainability Criteria in NE Napa Management Area



SGMA Representative Monitoring Sites

- 3 Additional Representative Monitoring Wells
- 2 Previously Established SW/GW Sites



Northeast Napa Amendment Recommendations

- Incorporates all 7 recommendations from NE Napa Study Report as SGMA Management Actions
- Reflects direction from the Board of Supervisors for updates to the County Groundwater Ordinance
  - Discretionary project review
  - Tracking new well construction in Management Area

2017 Annual Report: Summary

- GW levels stable in majority of wells Napa Valley Subbasin
  - Year-to-year declines observed in a few wells (SE St. Helena area; SW Yountville area; NE Napa area)
  - Some response to drought conditions, with subsequent recovery in 2016 and 2017
- GW level declines in MST moderated
  - Some wells stabilized since 2008/2009
  - Some wells stabilized in more recent years

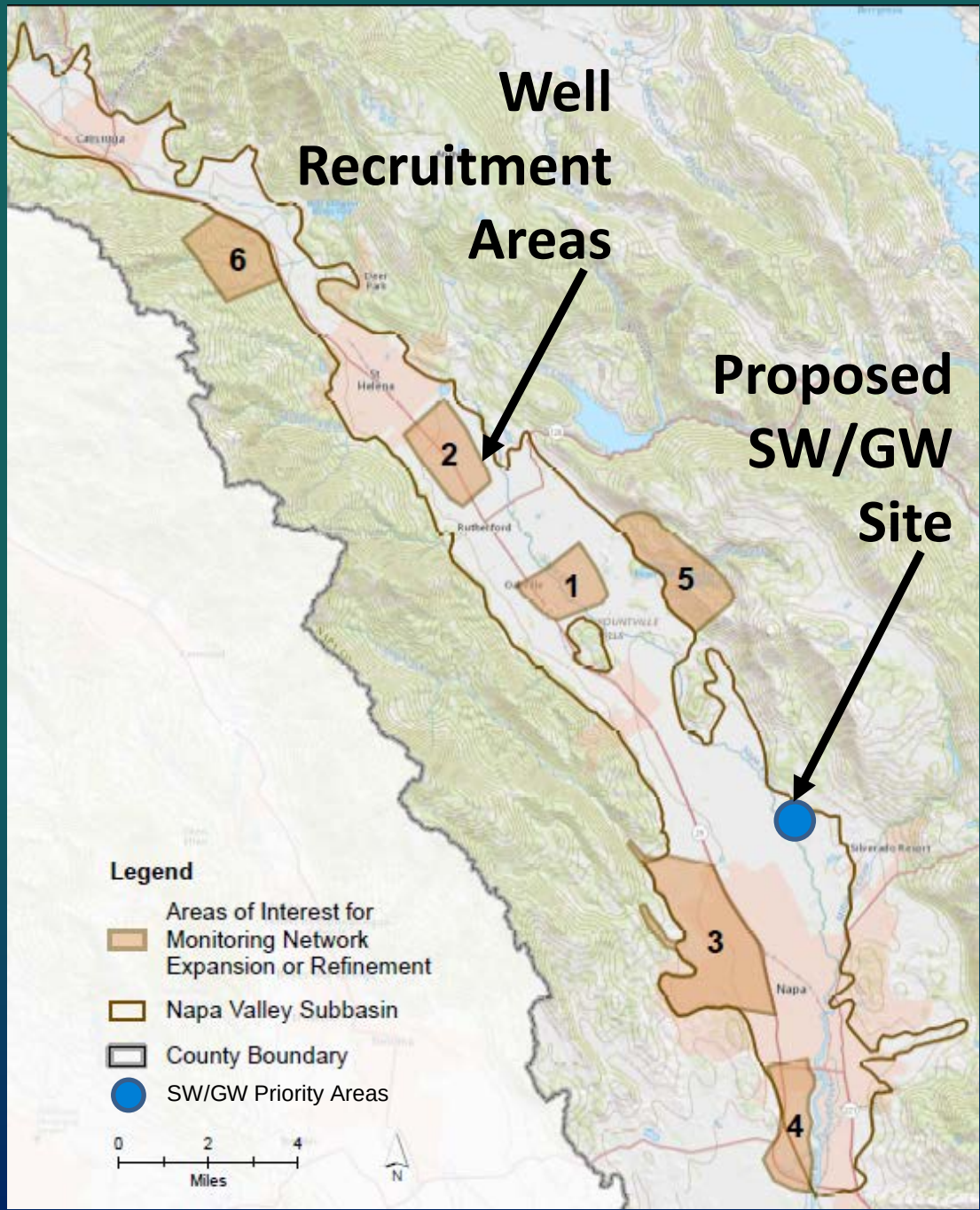
Basin Analysis Report
SGMA Implementation Progress

In addition to 2017 Annual Report, NE Napa Special Study and Amendment to the Basin Analysis Report:

- Northeast Napa Management Area Designation
- Revised Conditions of Approval for Discretionary Permits
- Published Well Owner's Guide
- Do It Yourself (DIY) GW Level Monitoring Program
- Napa Valley Subbasin GW Model Dataset Development
- Collaborations to Improve Best Available Water Use Data
- Coordination with Other Water Management & Planning Programs
  - Integrated Regional Water Management Plans
  - Napa County Watershed Information & Conservation Council

Monitoring Well Recruitment

- Areas 1, 2, & 4: Depth Zones; Relatively Shallower Well & Deeper Well
- Areas 3, 5, & 6: Margin of Valley Floor, Mountain Front Recharge
- SW/GW Interaction: NE Napa Area, other sites under consideration



2017 Annual Report: Recommendations

- Refine MW Distribution
  - Address data gaps
  - Collaborate with cities & others
- Ongoing WQ Sampling
- Improve Data Collection from Discretionary Permittees
- Evaluate Recharge and Water Conservation Opportunities
- Evaluate Groundwater Dependent Ecosystem Distribution
- Groundwater Ordinance Updates
  - In response to NE Napa Study & Management Area

Thank You