Sonoma Valley Salt & Nutrient Management Plan

RMC Water and Environment

Todd Engineers

DEPARTMENT OF WATER RESOURCES

Sonoma Valley Groundwater Management Program

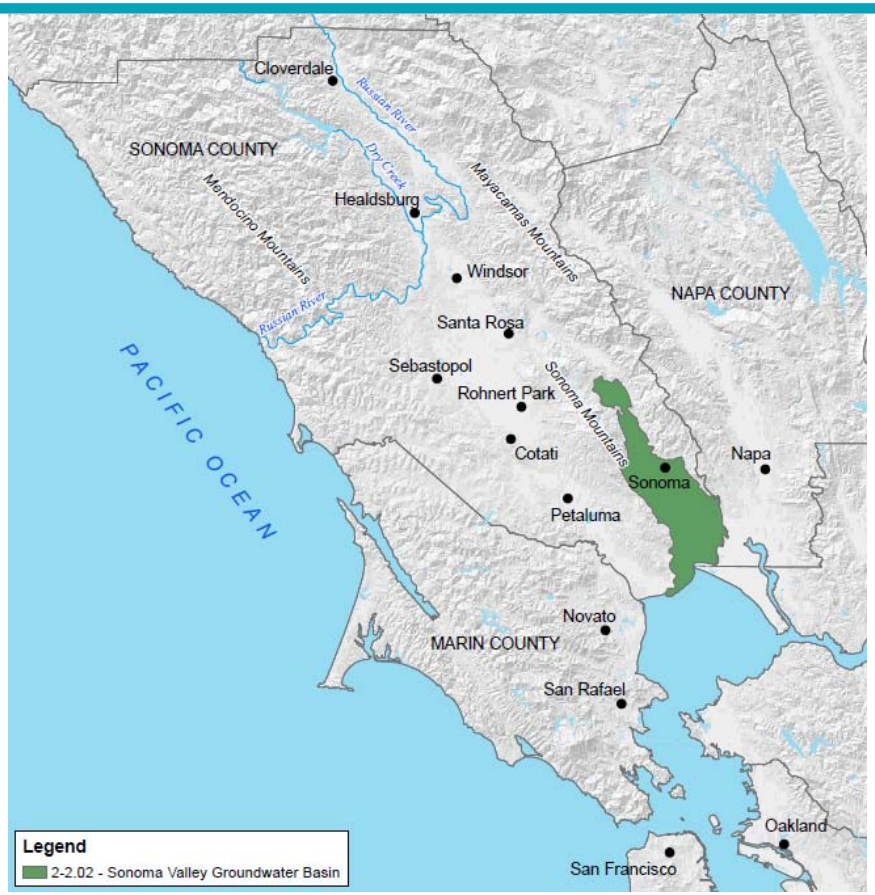
Water Boards

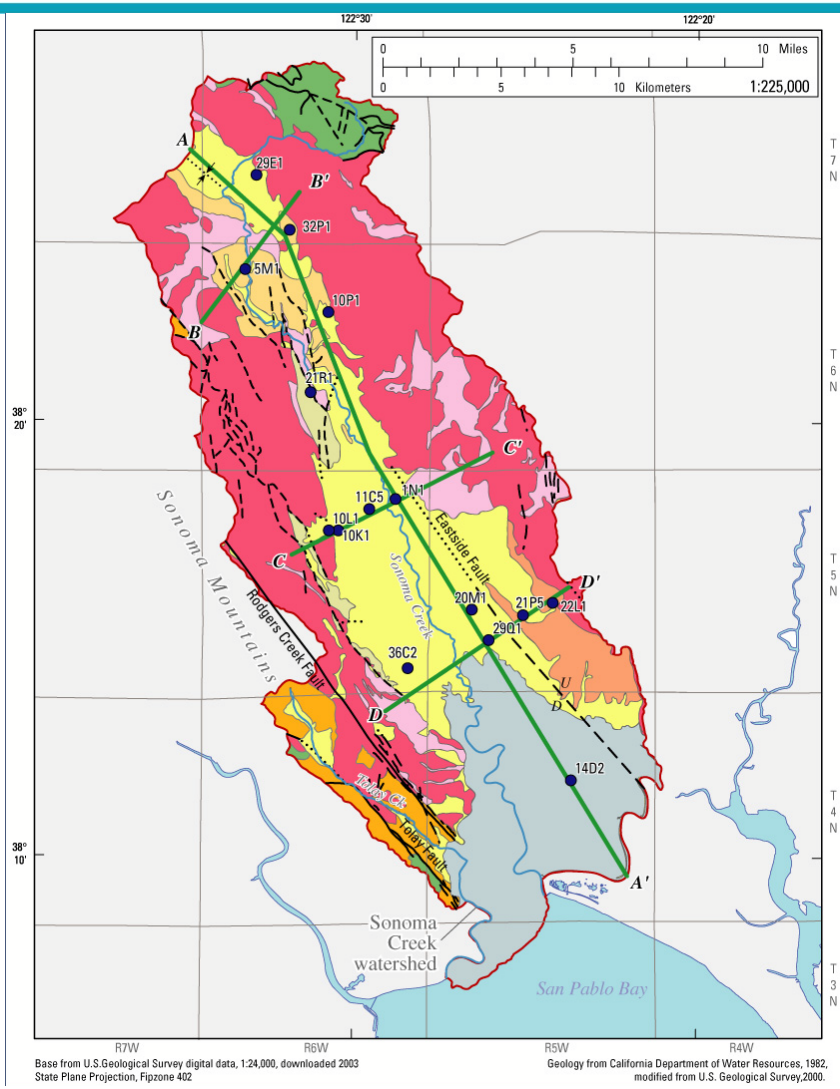
SONOMA COUNTY WATER AGENCY

SonomaValleyCounty SanitationDistrict

www.sonomacountywater.org

Location & Geologic Setting of Sonoma Valley Groundwater Basin



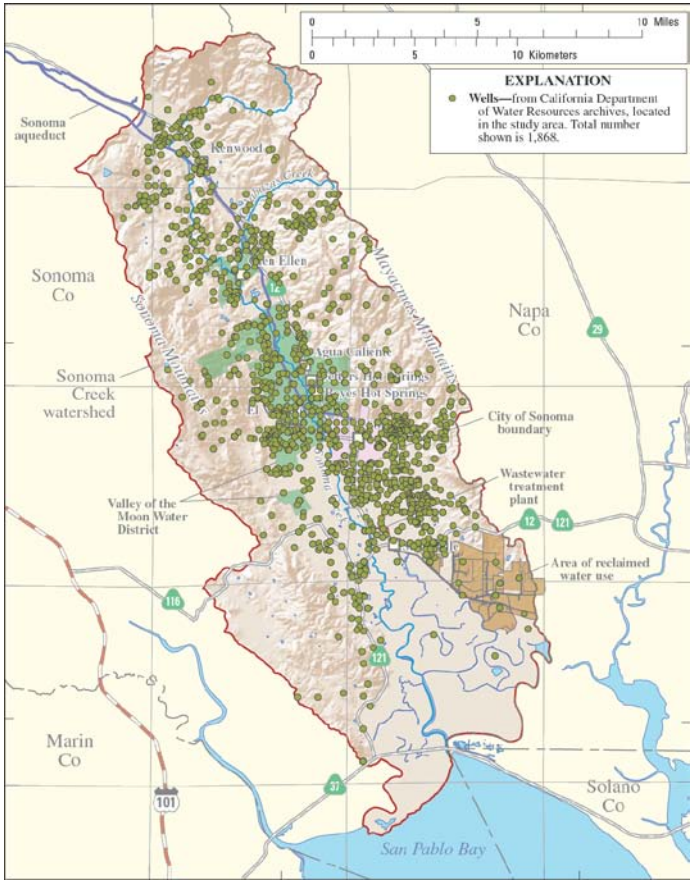


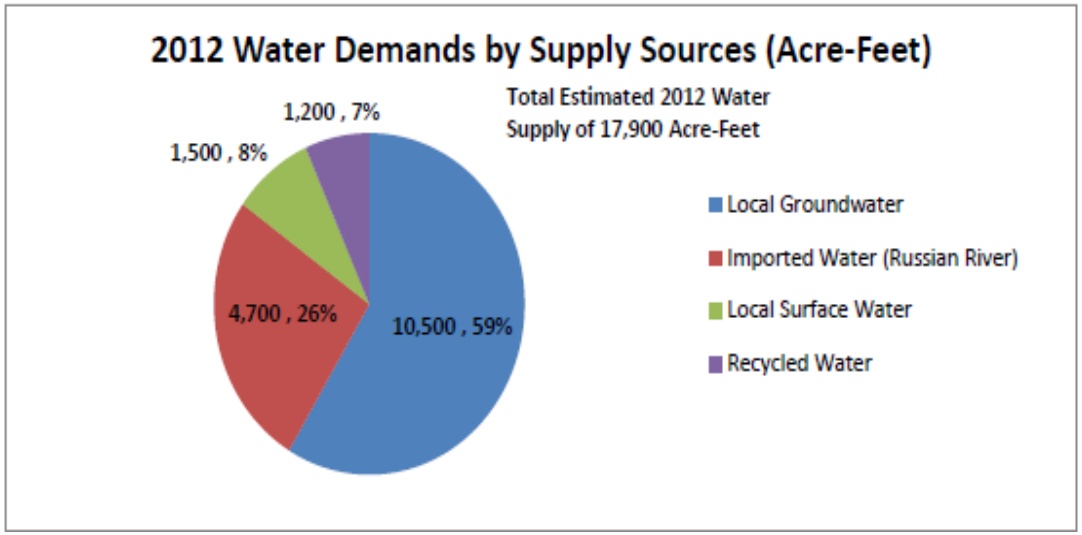
Complex Geology:

- Intermixed sedimentary and volcanic deposits
- Layers have been uplifted, tilted and faulted
- Fault zones can form conduits for upwelling of deeper geothermal groundwater and barriers of groundwater flow

Water Use in Sonoma Valley

- At least 2,200 permitted wells
- Provides water supply for variety of uses
- Urban demand primarily met through imported Russian River water





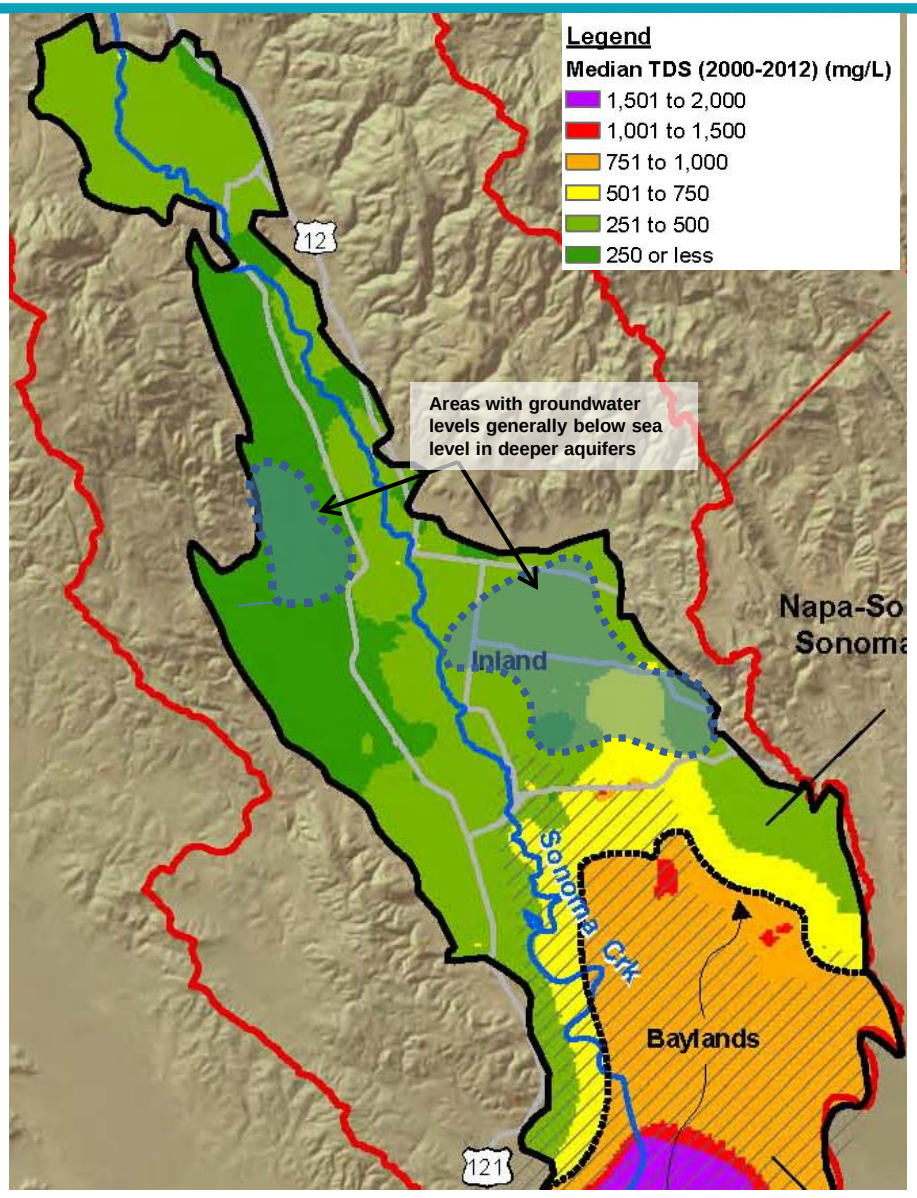
Salinity In Southern End of Sonoma Valley

Salinity Sources:

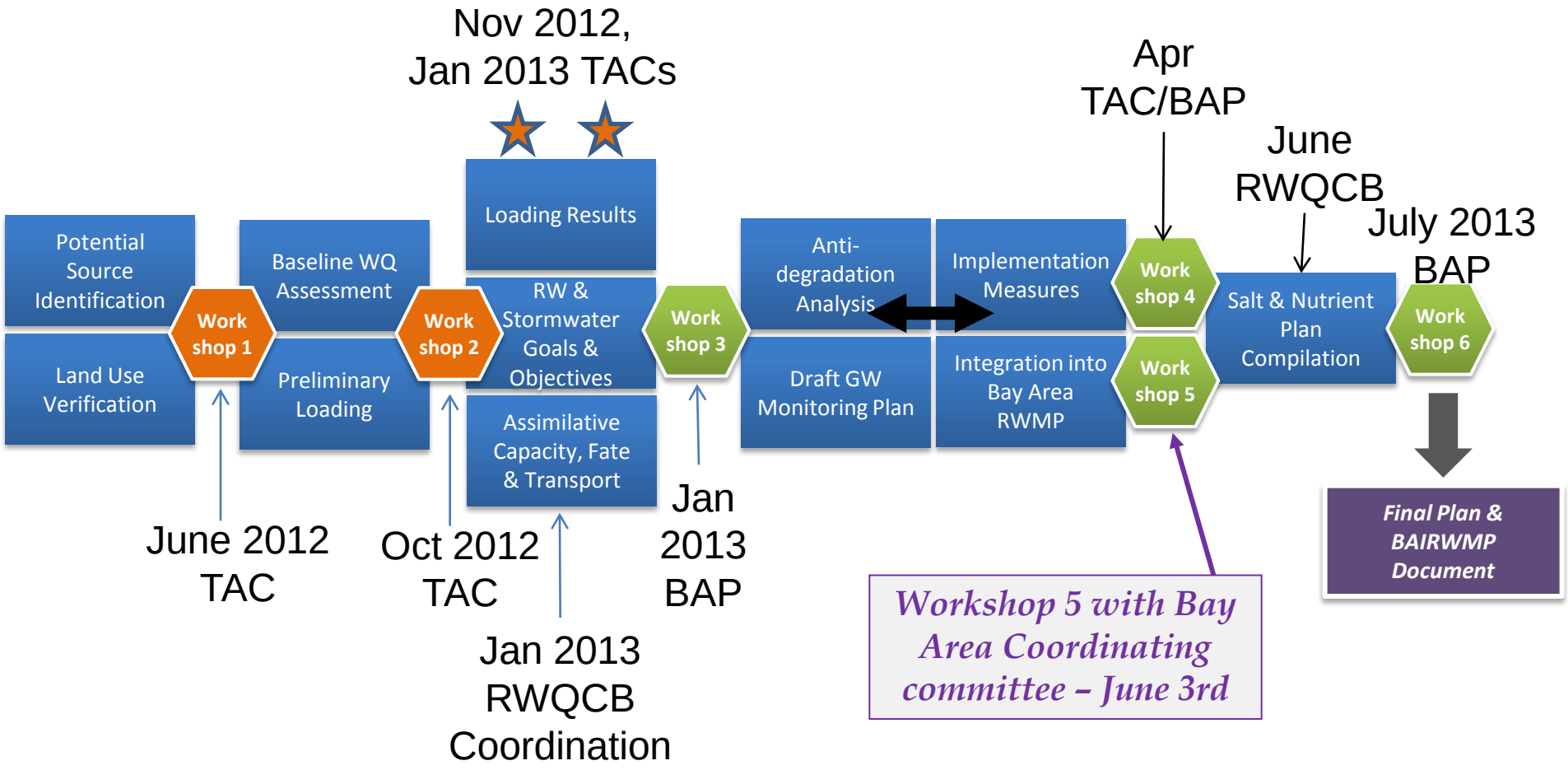
- **Historical Brackish Water**
- **Thermal Water**
- **Connate Water from older formations**

Groundwater Levels:

- **Shallow-Zone generally stable and above sea levels**
- **Declining trends observed in deep zone wells with groundwater elevations locally below sea level**



Sonoma Valley SNMP Approach



Existing Water Quality Analysis

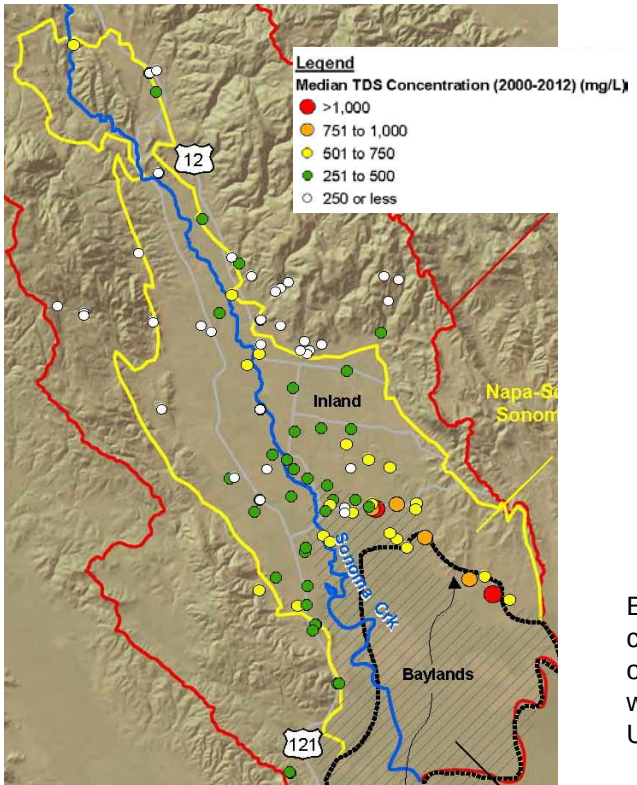
Existing Water Quality Analysis

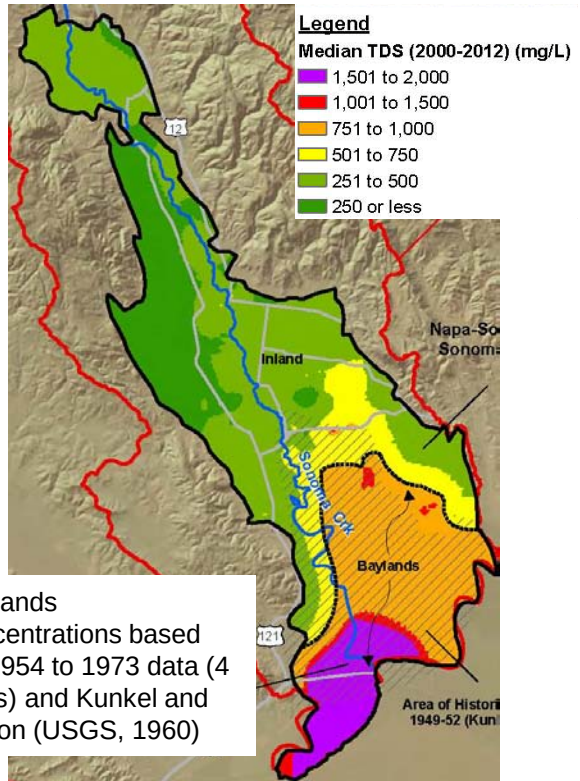
- Data Sources: DWR, CDPH, GAMA, USGS, SCWA
- Inclusion of 2003-2006 USGS Study data is critical for a good baseline analysis
- Depth information is limited – averaging across all depth intervals for mixing model
- Overall good water quality with very low nitrate, and flat trends for TDS and nitrate
- Baylands: area of historic saline groundwater to be considered a separate zone in mixing analysis

Existing Groundwater Quality - TDS

Well Medians → **Contour Maps** → **GIS Spatial Analyst Tools**

Avg. WQ





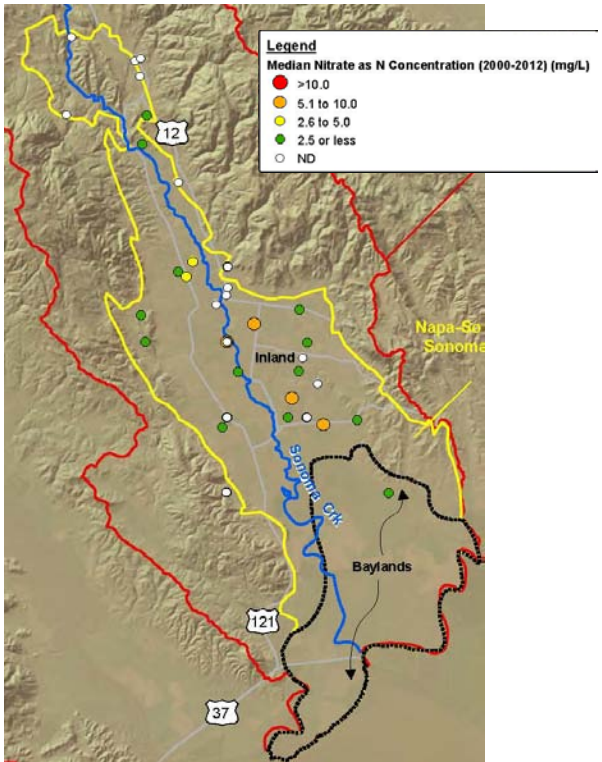
Baylands concentrations based on 1954 to 1973 data (4 wells) and Kunkel and Upson (USGS, 1960)

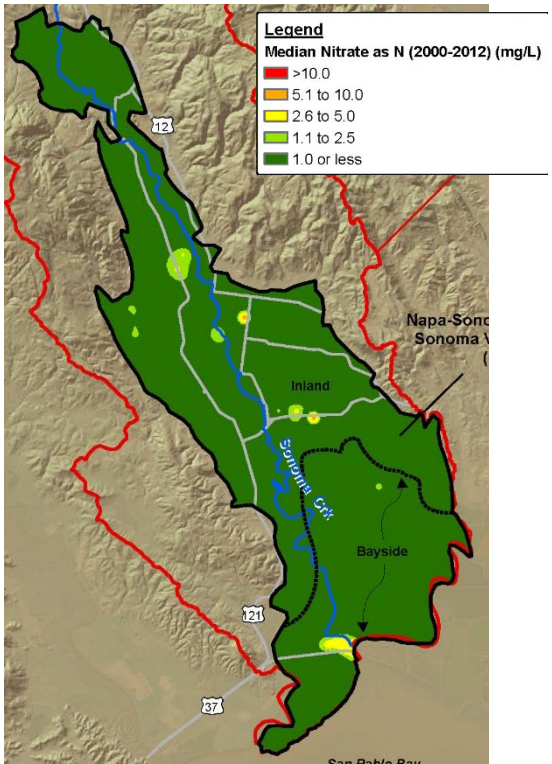
Average TDS = 372 mg/L

Existing Groundwater Quality – Nitrate-N

Well Medians → **Contour Maps** → **GIS Spatial Analyst Tools**

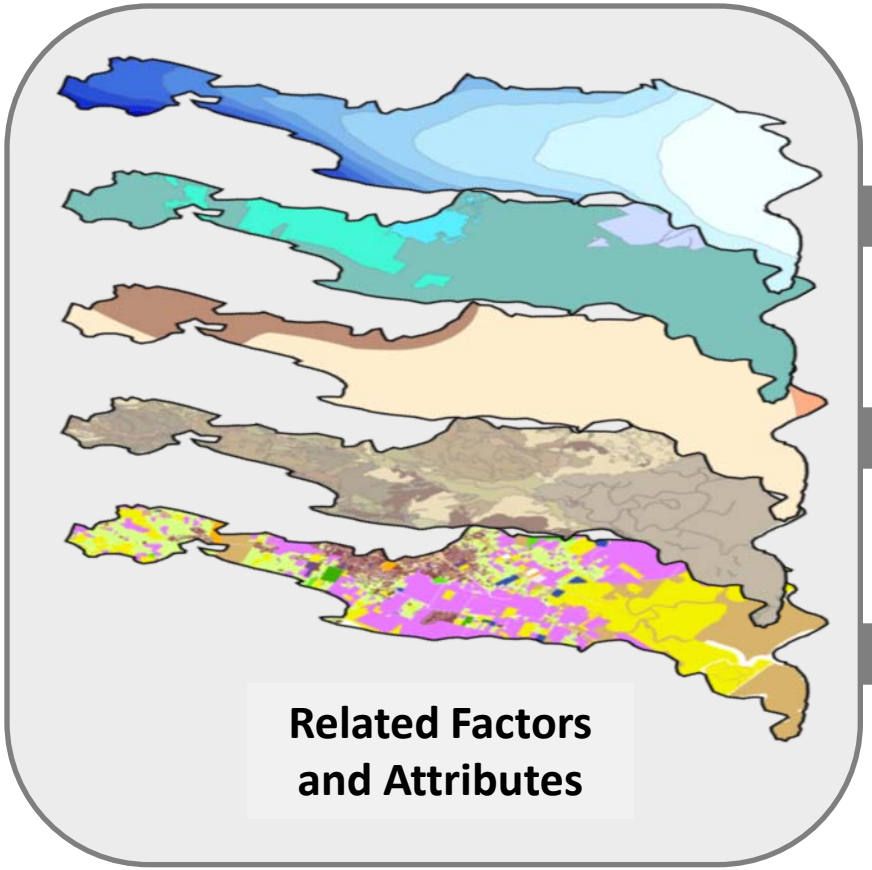
Avg. WQ

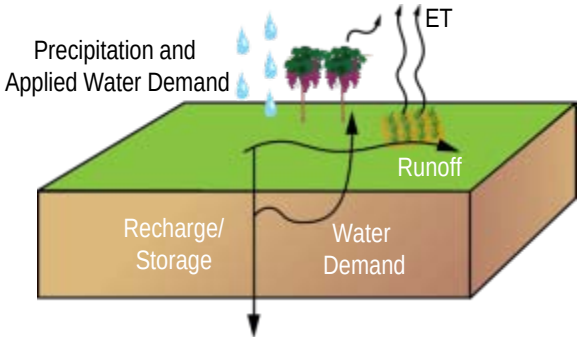




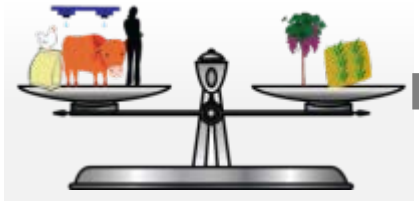
Average NO_3-N = 0.07 mg/L

Basin Characteristics Are Analyzed to Yield Load Estimates



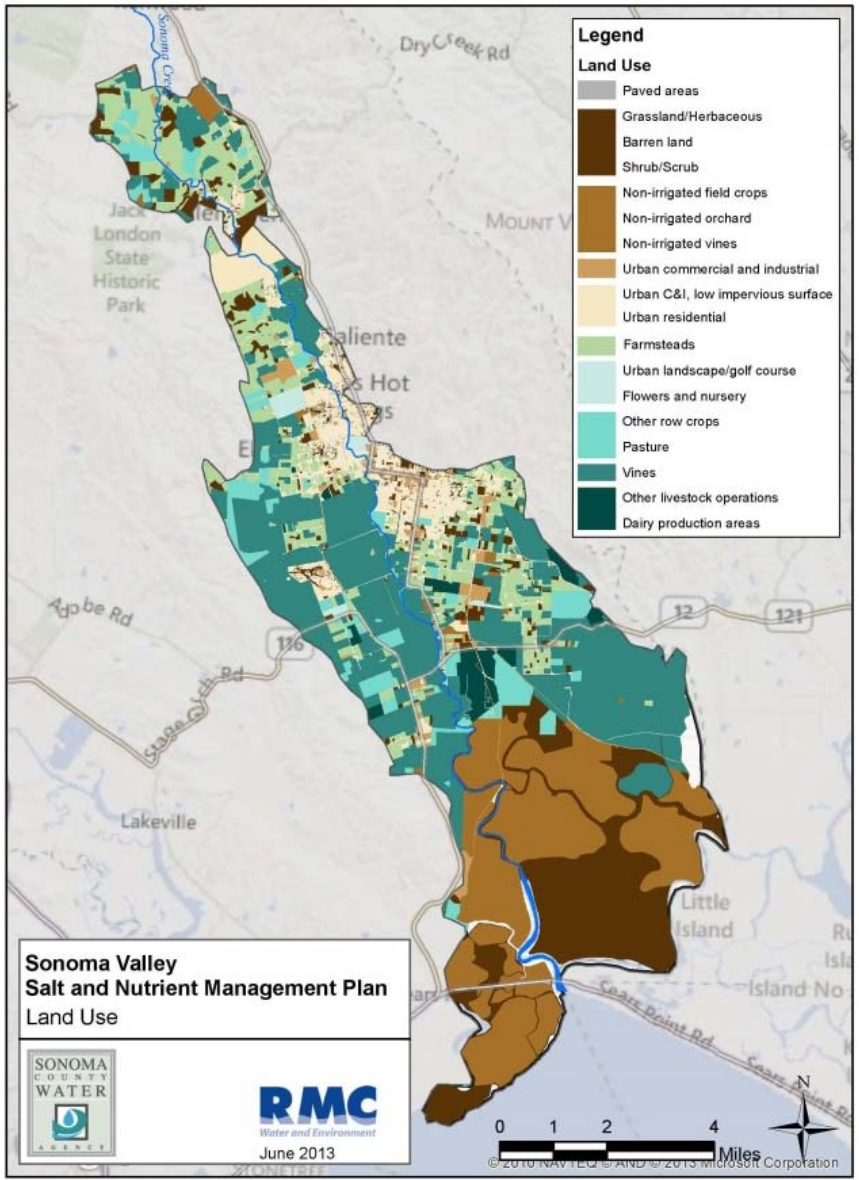


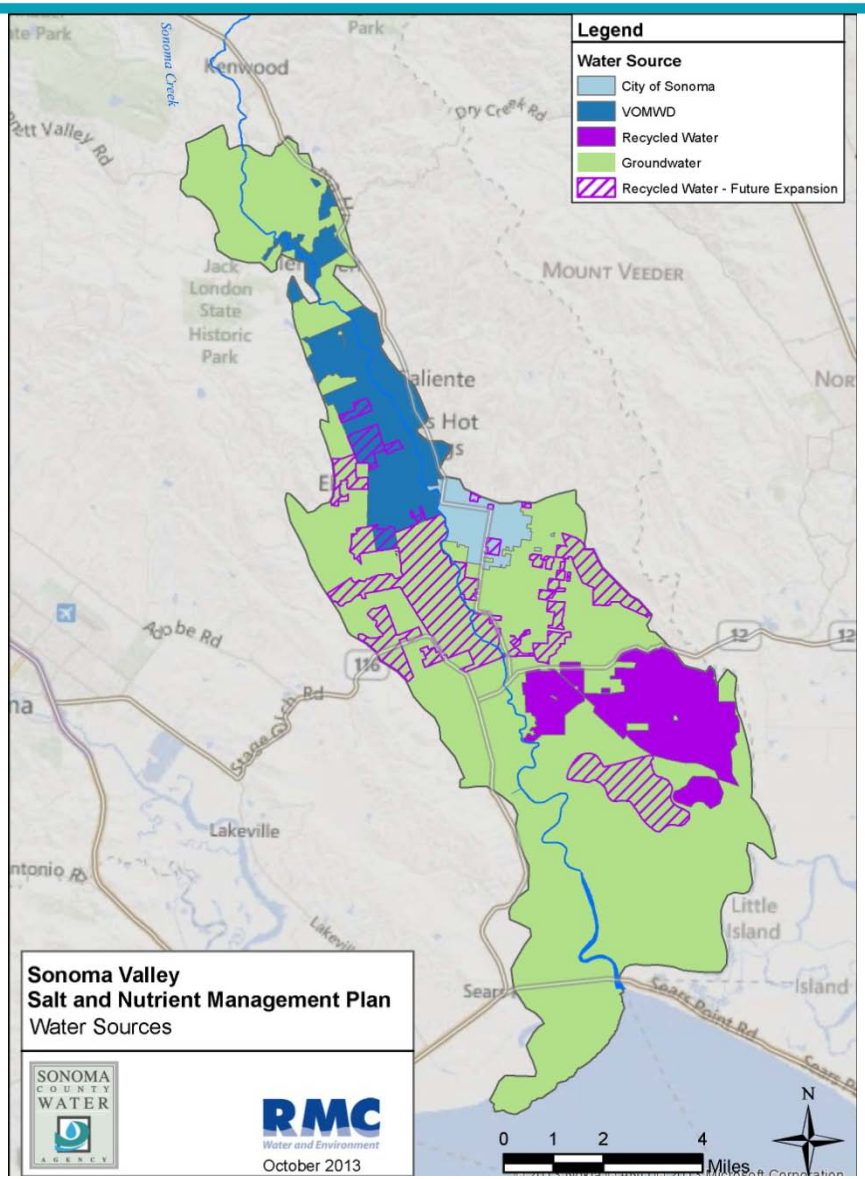
Salt Load



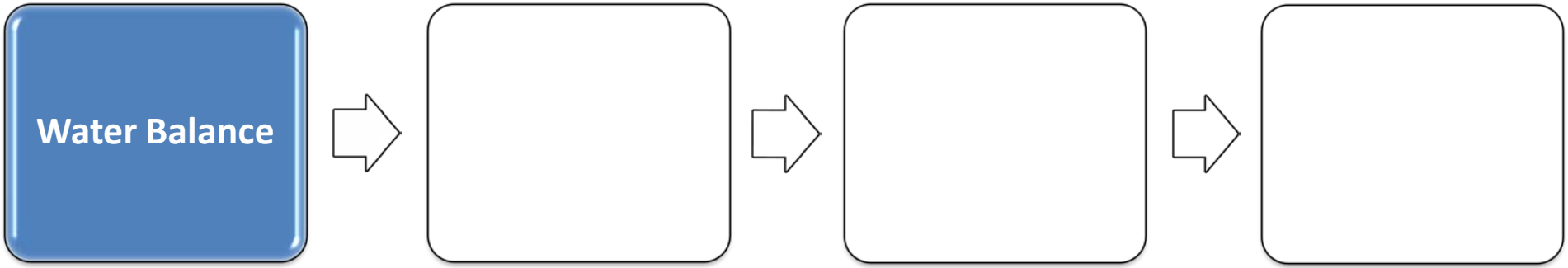
Nutrient Load

Land Use and Applied Water Estimates

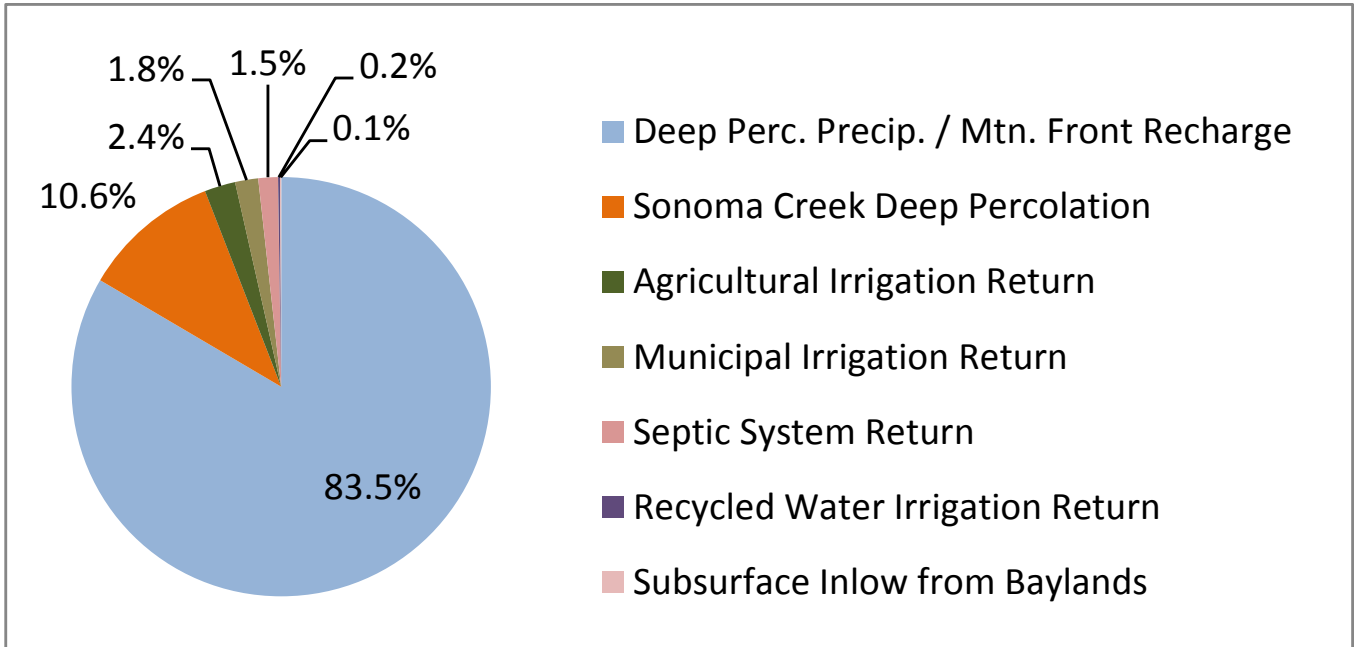




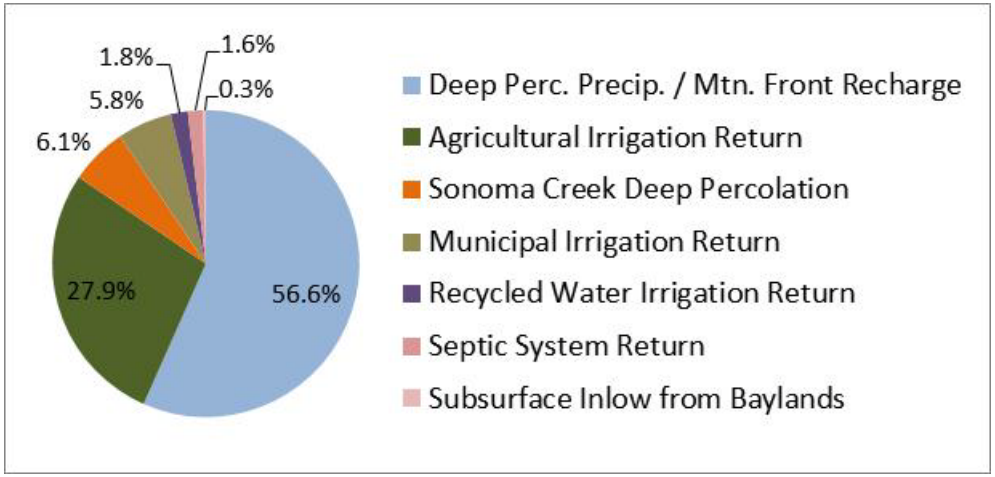
Baseline Analysis – Precipitation and Recharge Dominate System



- Aerial Precipitation and mountain-front recharge represent most of the inflows (83.5%)
- Return flows collectively represent only 5.8% of total inflows

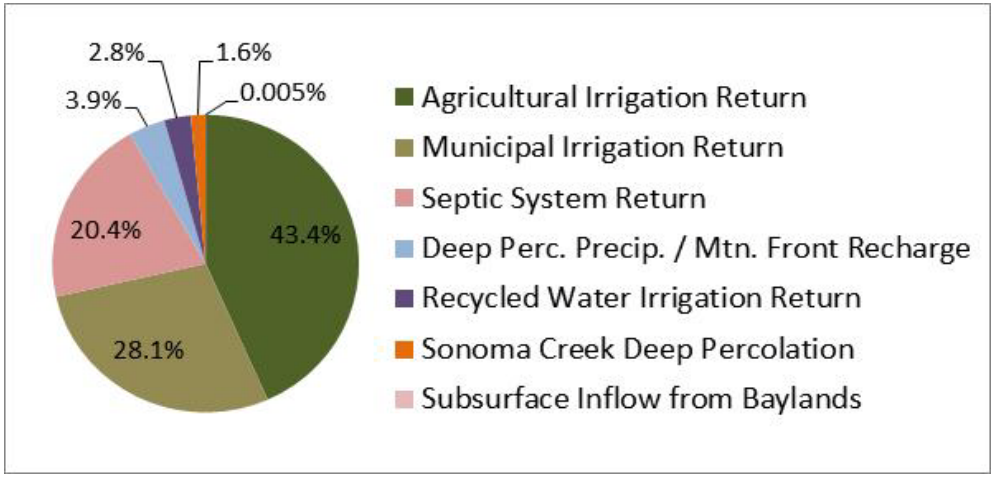


TDS – Mass Loading



Inflows	Baseline Average Flow (AFY)	Baseline Average TDS (mg/L)	TDS Mass (Tons)	TDS Mass (%)
Aerial Precipitation / Mtn. Front Recharge	49,915	250	16,994	56.6%
Agricultural (non-RW) Irrigation Return	1,415	4,347	8,363	27.9%
Sonoma Creek Leakage	6,363	210	1,817	6.1%
Municipal Irrigation Return	1,074	1,182	1,726	5.8%
Agricultural (RW) Irrigation Return	91	4,344	538	1.8%
Septic System Return	621	572	483	1.6%
Subsurface Inlow from Baylands	51	1,220	84	0.3%
Total	**59,529**		**30,003**	**100%**
Volume-Weighted Average		**368**		

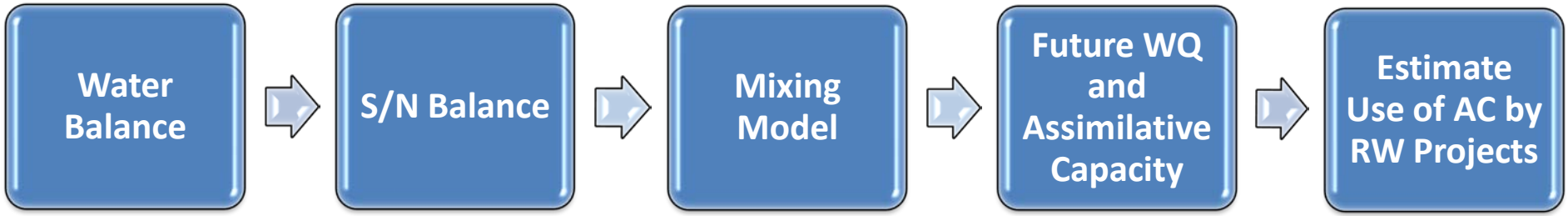
Nitrate-N – Mass Loading



Inflows	Baseline Average Flow (AFY)	Baseline Average Nitrate (mg/L)	Nitrate-N Mass (Tons)	Nitrate-N Mass (%)
Agricultural (non-RW) Irrigation Return	1,415	23.82	45.8	43.4%
Municipal Irrigation Return	1,074	20.31	29.7	28.1%
Septic System Return	621	25.51	21.5	20.4%
Aerial Precipitation / Mtn. Front Recharge	49,915	0.06	4.1	3.9%
Agricultural (RW) Irrigation Return	91	23.81	2.9	2.8%
Sonoma Creek Leakage	6,363	0.19	1.6	1.6%
Subsurface Inlow from Baylands	51	0.07	0.005	0.005%
Total	**59,529**		**106**	**100%**
Volume-Weighted Average		**1.31**		

Future WQ and AC

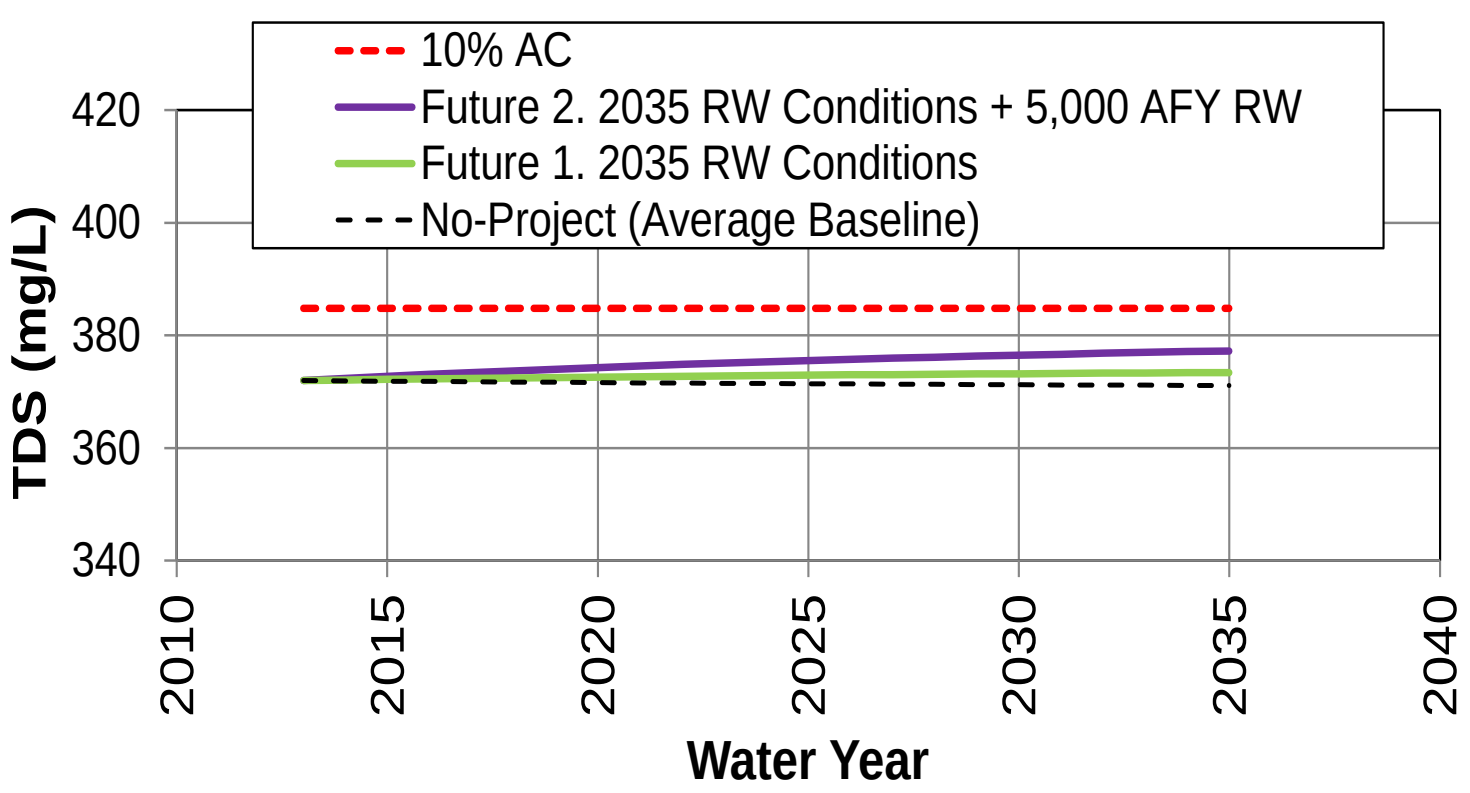
Future Planning Horizon 2013 - 2035



- Same approach as baseline
- Simulate future annual water quality and AC
- Estimate use of AC by recycled water projects
  - Single RW project uses less than 10% of the available AC
  - Multiple RW projects use less than 20% of the available AC

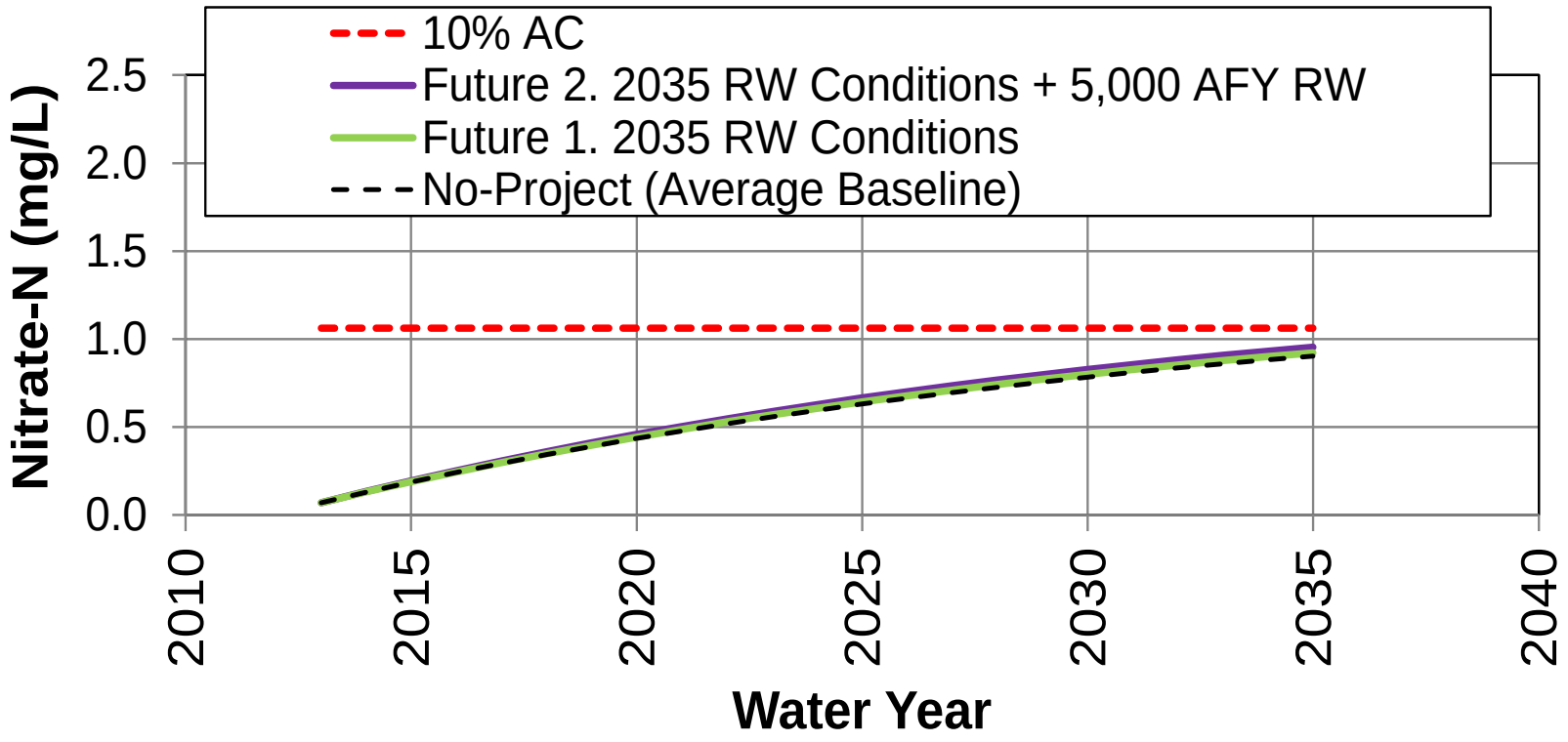
Future Average TDS Concentrations

- 2035 RW Conditions: 1.1% Assimilative Capacity used



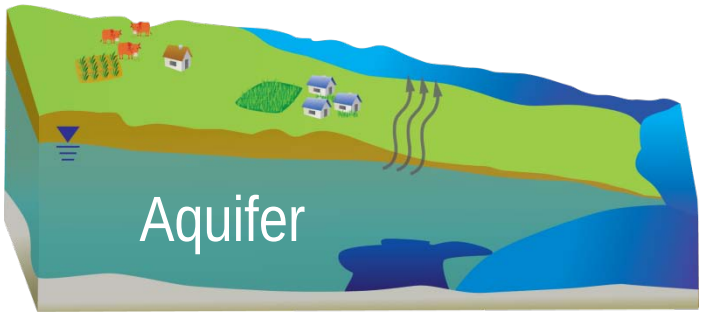
Future Average Nitrate Concentrations

- 2035 RW Conditions: 8.6% Assimilative Capacity used



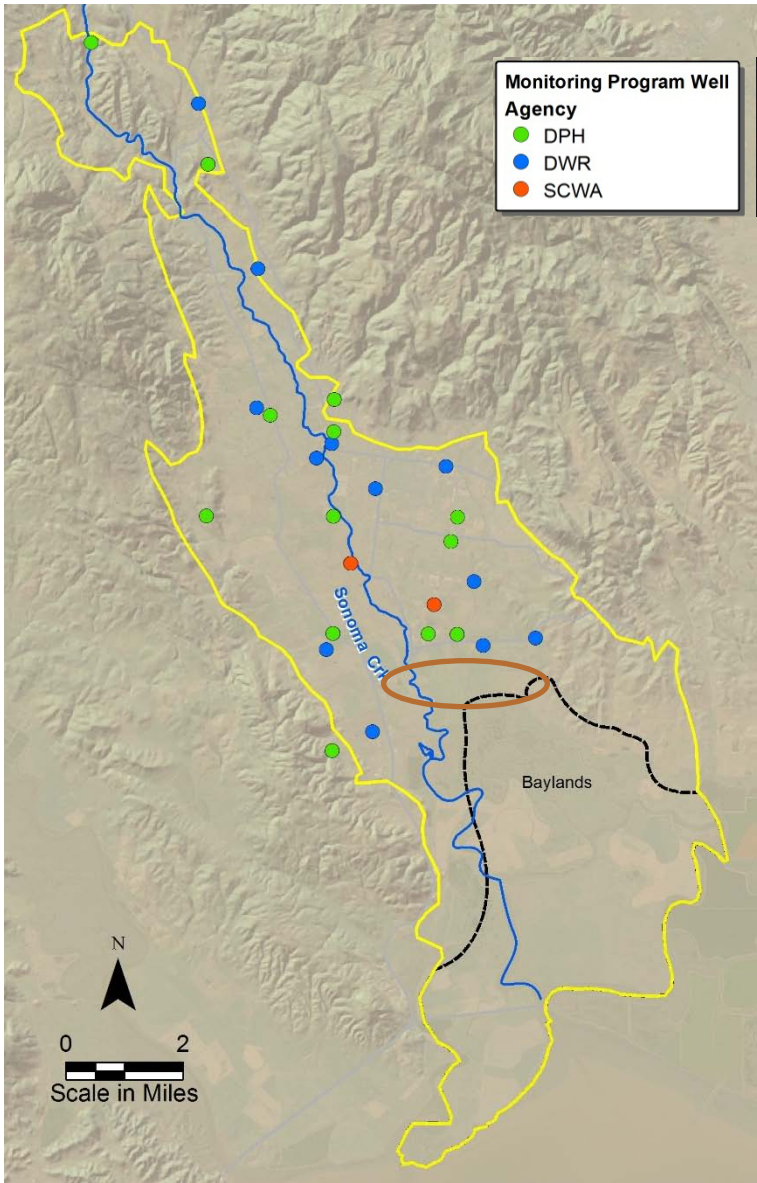
Current Management Measures are Effective and Should Continue

- Agricultural BMPs
- RW BMPs (part of permit)
- Groundwater Management Plan Programs
  - Monitoring Programs (groundwater levels and quality)
  - Water recycling projects to offset groundwater pumping
  - Encourage LID
  - Identify Stormwater Management – Groundwater Recharge projects
  - Evaluate feasibility for groundwater banking
- Onsite Wastewater Treatment System (Septic) BMPs
- Municipal Wastewater Source Control



SNMP Groundwater Monitoring Plan

- Utilize existing network
  - DWR, CDPH, SVGMP wells
  - TDS, EC, Nitrate
  - Report through Geotracker
  - Expand reporting to CDPH
- Data Gaps
  - Additional wells near saline intrusion helpful
  - Well completion information

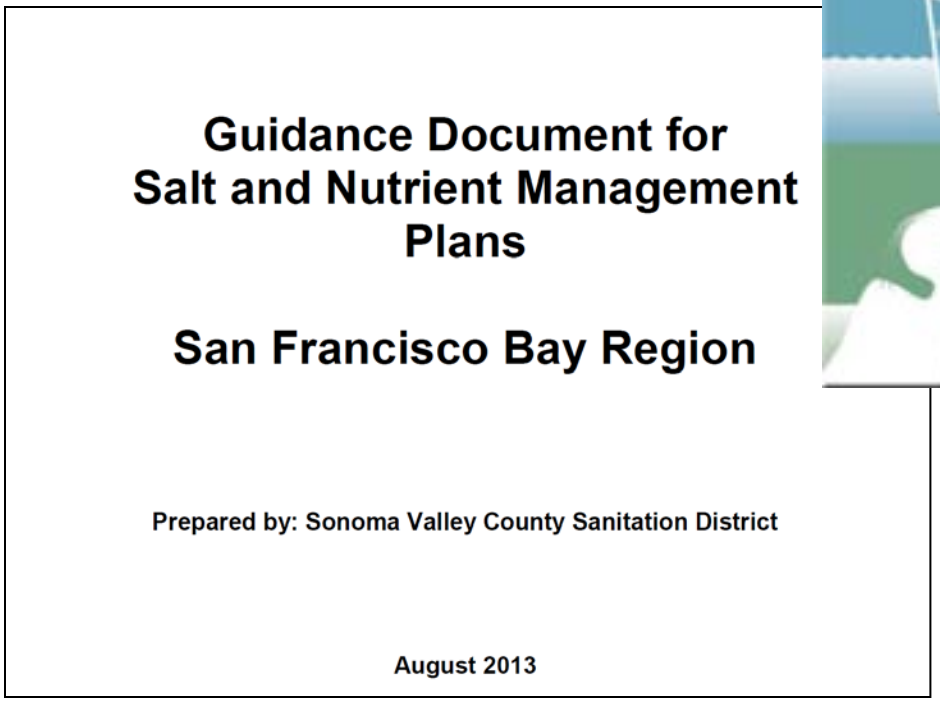


How will the SNMP be used?

- BMPs “endorsed” to continue
- Groundwater Monitoring reporting to be facilitated immediately by SVCSD
- Living document – posted to www.scwa.ca.gov/SNMP/
  - Future updates could be triggered by:
    - Major changes in land use or land management practices
    - Changes in basin management (e.g. recharge projects)
    - New information from the Monitoring Program (increasing trends, BPOs exceeded)

SNMP Guidance Document Development

- Funding through Bay Area IRWMP included development of guidance document to assist other Bay Area agencies in developing SNMPs



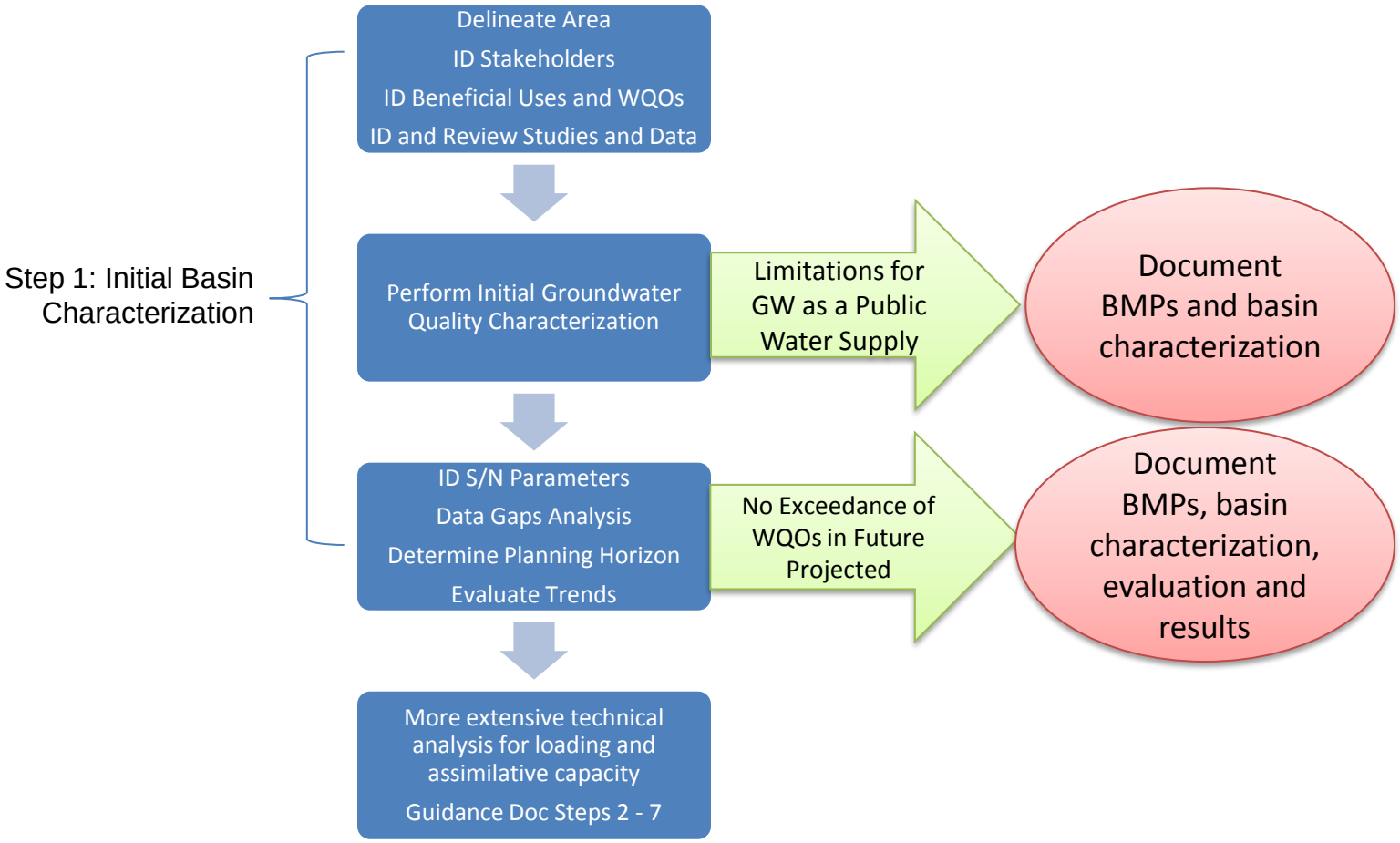
- Included in 2013 Bay Area IRWMP Update

http://bairwmp.org/

SNMP General Approach - Discussion Draft Identified 7 Steps

1. Initial Basin Characterization
2. RW and Recharge Water Goals
3. Comprehensive Review of Salt and Nutrient Sources
4. Salt/Nutrient Loading and Implementation Measures
5. Antidegradation Analysis
6. Basin/Sub-basin Wide Monitoring Plan
7. Plan Documents and Regional Water Board Coordination

Off-Ramps within SNMP Development



Thank You

www.scwa.ca.gov/svgroundwater/