

# CV-SALTS Annual Report



# CV

Central Valley



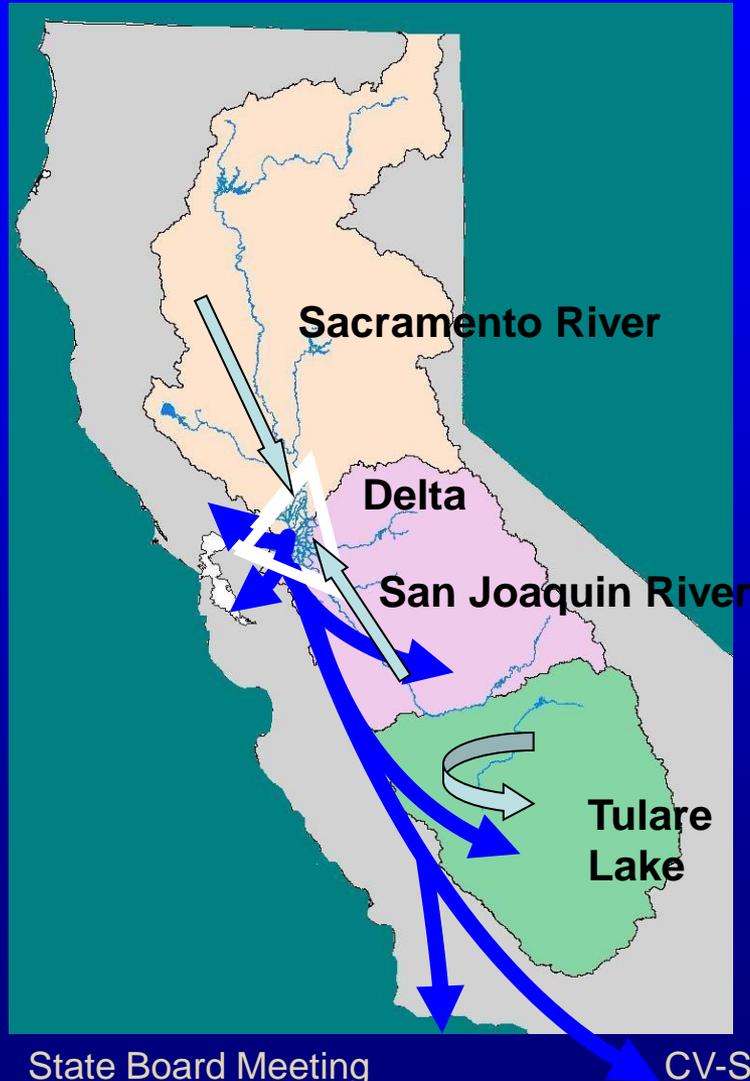
# SALTS

Salinity Alternatives for Long-term Sustainability



- Collaborative Basin Planning Effort
- Utilizing Stakeholder Process to Develop Salinity and Nitrate Management Plan

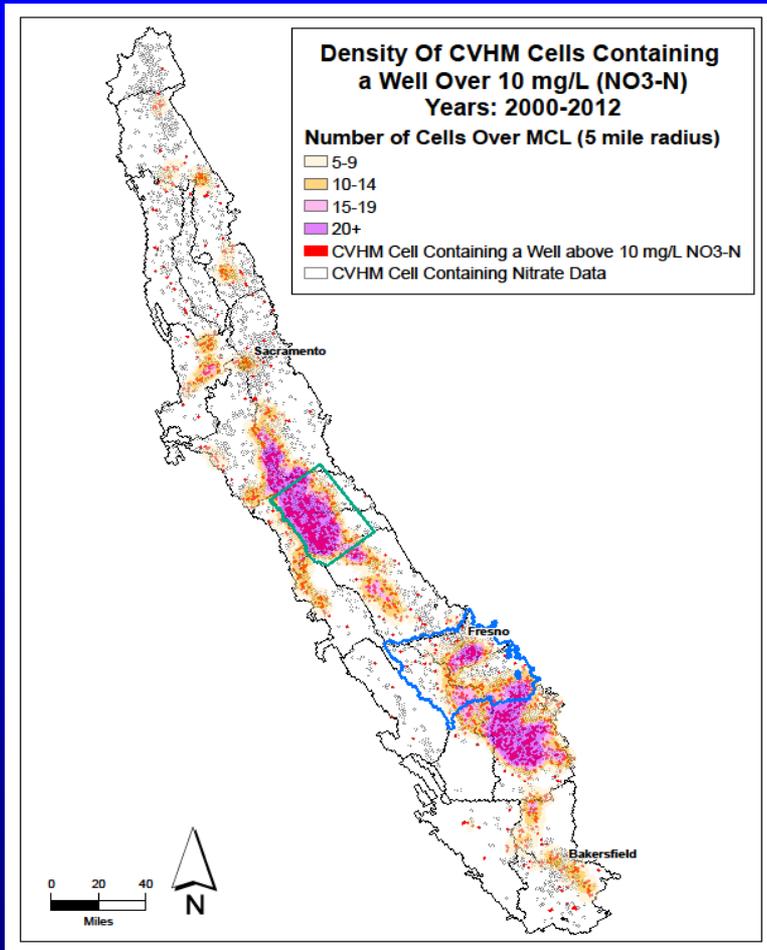
# Central Valley Salt Issues



More salt enters the region than leaves

- Impacts (current/legacy)
  - Agricultural Production
  - Drinking Water Supplies
- Economic Cost
  - Direct Annual: \$1.5 Billion
  - Statewide annual income impact: \$3.0 Billion
- Diverse Sources

# Central Valley Nitrate Issues



- Legacy Conditions
- Direct Impacts
  - Drinking Water Supplies
- Economic Costs
  - Treatment
  - Alternate Supply
- Diverse Sources

# CV-SALTS Launch

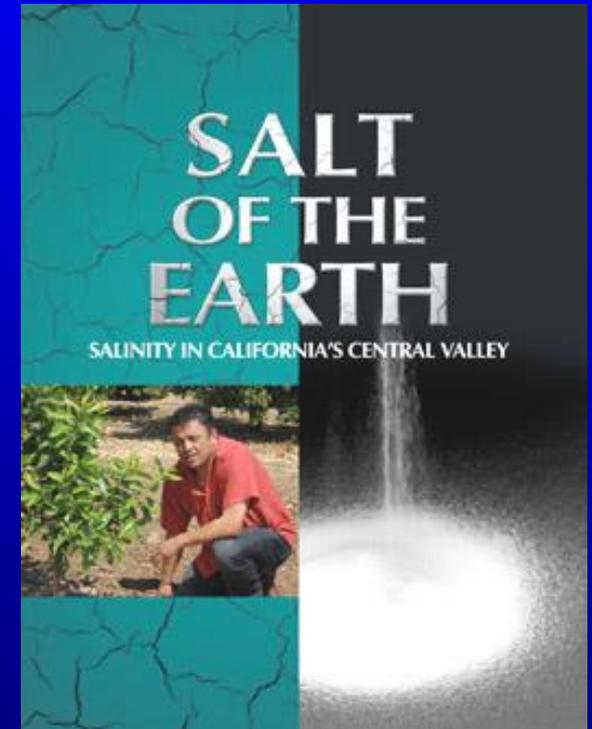
## 2006: Joint Planning Workshop

### – Initial Products

- Economic study
- Metadata report
- Educational Video
- Strategy

## 2009: MOA

- State Water Board
- Central Valley Water Board
- Central Valley Salinity Coalition
  - Stakeholder Non Profit



## Cleanup and Abatement (CAA) Funds Provided Seed Money

- \$1.2-million (Res. #2009-0023)
- \$3.8-million (Res. #2010-0042)
  - \$2.0-million initially
  - \$1.8-million after demonstration of progress to/approval by State Board
    - Approved December 2012

## **Additional Res. #2010-0042 Requirements:**

- Annual Report at Public Hearing
  - Expenditures to Date
  - Services Provided
  - Contribution from Stakeholders
  - Accomplishments
  - Timeline to Complete Work

# Expenditures to Date Services Provided Stakeholder Contributions

Debbie Webster

Executive Officer CVCWA

Vice Chair, CV-SALTS Executive  
Committee

# CVSC 28 Member Benefit Non-Profit

- County of San Joaquin
- City of Stockton
- Stockton East Water District
- The Wine Institute
- City of Tracy
- California Rice Commission
- City of Manteca
- City of Modesto
- San Joaquin River Group
- City of Vacaville
- City of Fresno
- City of Davis
- Westlands Water District
- California Association of Sanitation
- Central Valley Clean Water Association
- California League of Food Processors
- Tulare Lake Drainage District/ Tulare Lake Basin Water Storage District
- San Joaquin Valley Drainage Authority
- Sacramento Regional County Sanitation
- Western Plant Health Association
- East San Joaquin Water Quality Coalition
- California Cotton Growers and Ginners
- Southern San Joaquin Valley Water Quality Coalition
- Ironhouse Sanitary District
- Discovery Bay Community Services
- Dairy CARES/Western United Dairymen
- Pacific Water Quality Association
- Los Angeles County San District

# Expenditures for Services and Stakeholder Contributions

	Since July 2008
CAA Resolution #2009-0023	\$971,650
CAA Resolution #2010-0042	\$1,313,789
Central Valley Salinity Coalition (CVSC) expenditures and direct match through September 2013*	\$2,609,889
Additional Stakeholder Contributions --Treatment/Feasibility studies; basin planning support; water quality data	\$11,037,151
<b>Total:</b>	<b>\$15,932,479*</b>

\*Does not include in-kind service participating on committee(s)

# Services Provided

## CAA Funded Projects Completed

- Updated 2012 Strategic Plan, Framework and Workplan
- GIS Database for Central Valley Beneficial Uses and Objectives
- White Papers (MUN) and (AGR)
- Salinity Water Quality Criteria Review for Aquatic Life
- **Initial Conceptual Model**
- **Phase 1 SSALTS**
- LSJR: workplan, problem statement, background, beneficial use evaluation
- Continued Outreach (website; brochure)
- **CEQA Scoping Sessions Support**
  - Modesto, Rancho Cordova, Colusa, Fresno

# Services in Progress

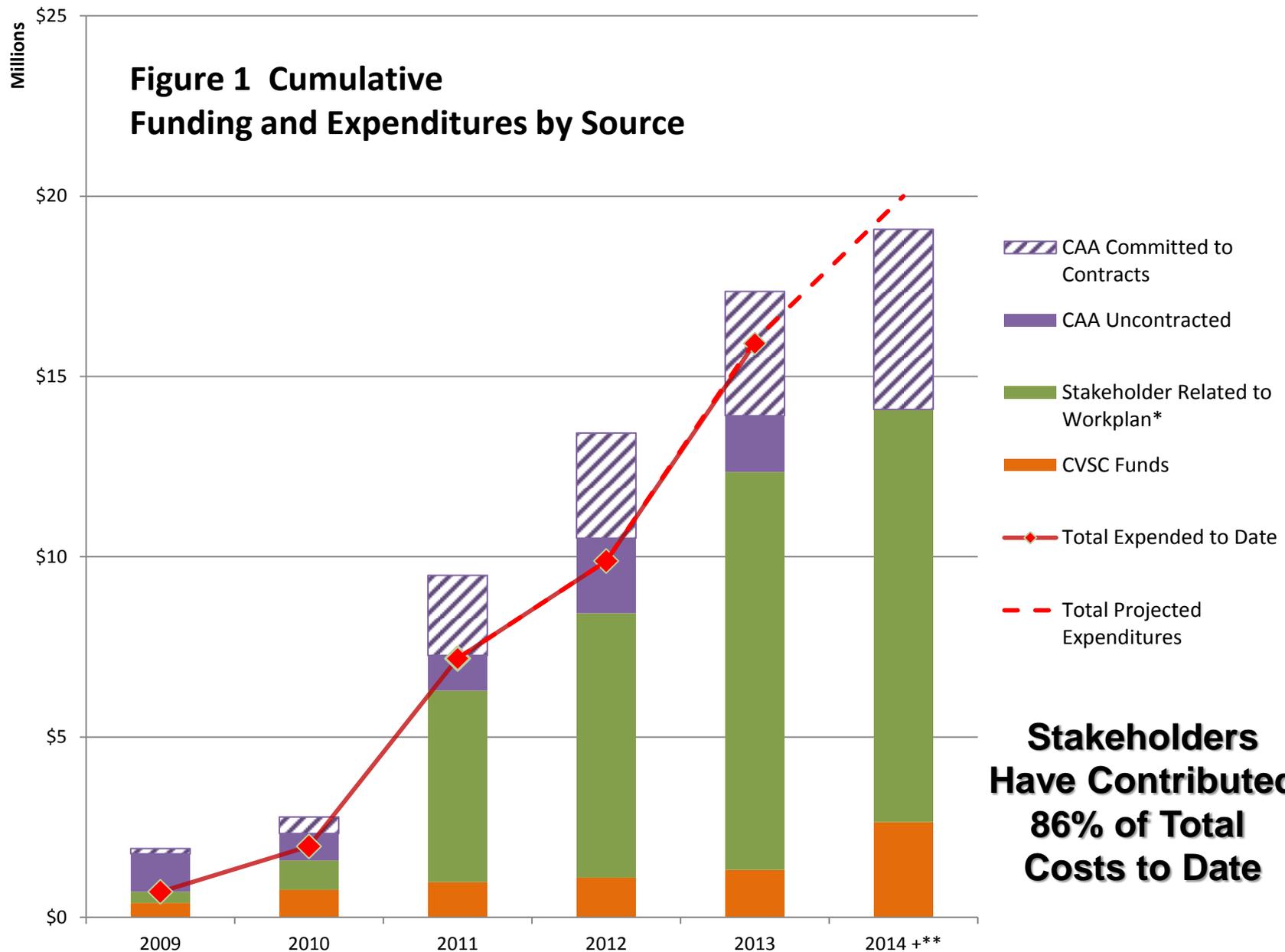
## CAA Co-Funded Projects

- Administrative, Technical & Facilitation Support
- AGR salinity objectives by management zone
- Phase II Conceptual Model
- SSALTS Phase 2
- Case studies to ground truth policy and implementation options
  - MUN Surface and Groundwater
  - Ag Beneficial Use
  - Nitrate in drinking water

# Stakeholder Current and Future Contributions

Description*	2008-2014+
CVSC Support Total (To Date \$2,609,889)	<u>\$4,080,186</u>
--Program support	\$2,149,730
--Pilot salt source/fate studies	\$494,712
--Direct Workplan Contributions for projects and support	\$1,435,744
Stakeholder Support Total (To Date \$11,037,151)	<u>\$11,439,547</u>
--Treatment Alternative Studies	\$7,809,562
--Gathering Water Quality Information	\$3,629,985
<b>Total:</b>	<b>\$15,519,733</b>

**\*Details for specific projects in Tables 2 and 4 of the staff report**



**Stakeholders  
Have Contributed  
86% of Total  
Costs to Date**

# Central Valley Salinity Coalition

- By 2014 will contribute over \$2.6 Million
- Stakeholders also contributed more than
  - >\$1,159,000 for in kind costs to participate in more than 175 meetings
  - \$1.4 M for Direct Workplan Support
  - \$3.6 M for Gathering Water Quality Data
  - \$7.8 M for Treatment Alternative Studies
  - \$43.5 M for Implementation related Efforts



# Sampling of Other Activities

## Permit Required (>\$7-million)

- Treatment feasibility analyses
- Receiving water studies
- Salinity minimization plans
- Public education/outreach

## Implementation Activities (>\$43-million)

- Containment
- Reuse
- Source Reduction
- Cost Share
- Evaluation

# Accomplishments Next Steps and Timeline

David Cory

San Joaquin Valley Drainage Authority  
Chair, Central Valley Salinity Coalition

# Strategy and Framework

## Revise Regulatory Structure

- Beneficial Uses; Water Quality Objectives; Policies

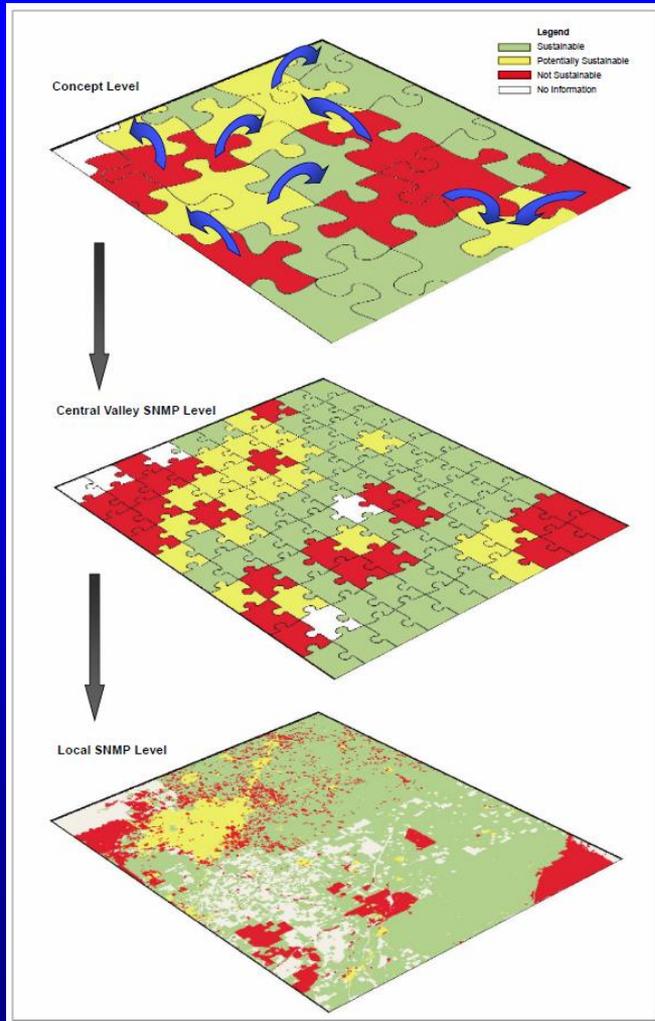
## Provide basis for short and long-term management of salts and nitrate at appropriate geographic scales

- Protect and Ensure Safe Drinking Water (Nitrate)
- Sustainable Basin-Wide Salt Balance
- Evaluate Compliance
- Provide Regulatory Flexibility

# Approach



# Supports



Policy



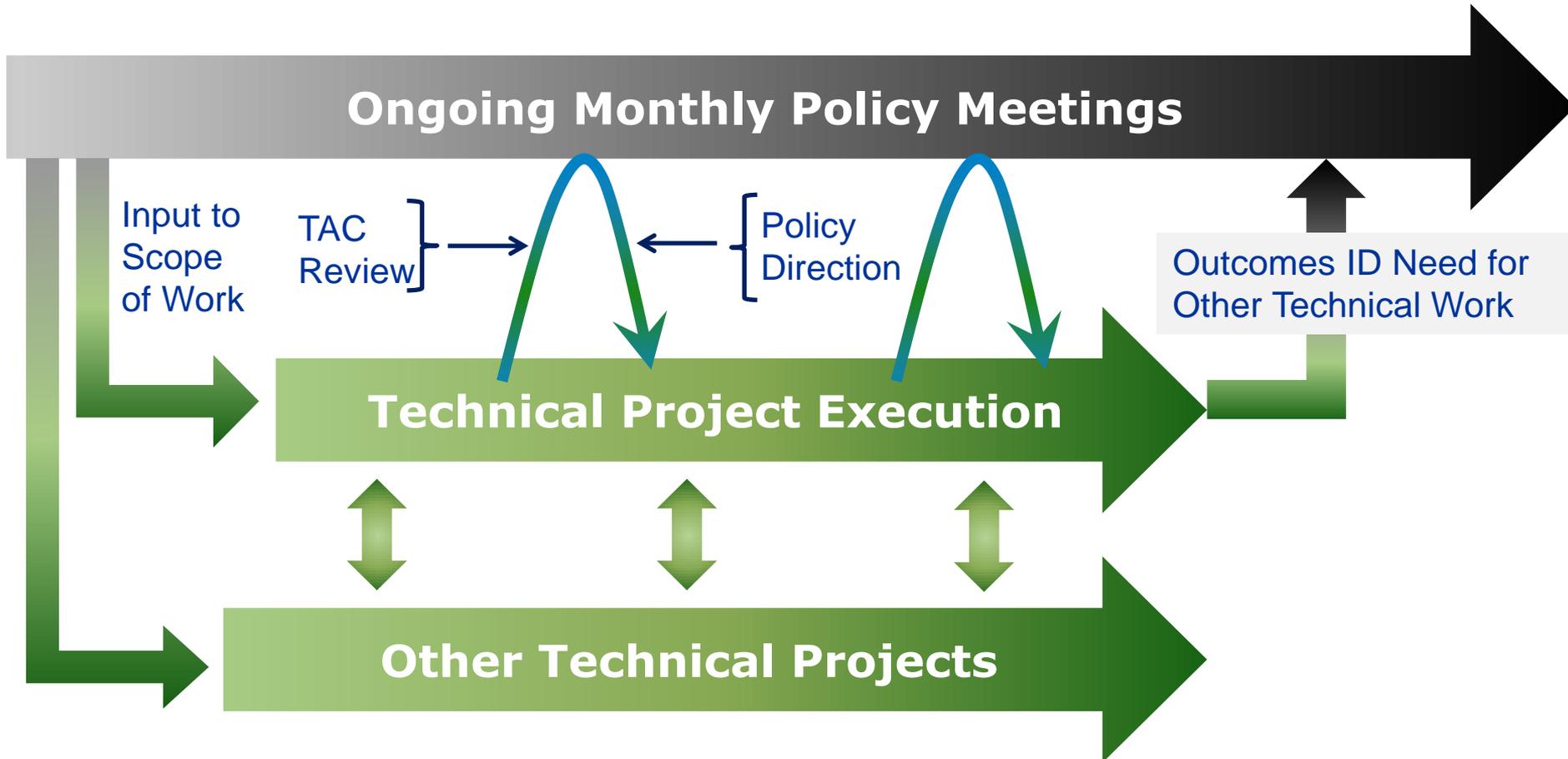
Central Valley SNMP  
(Management Zones)



Area Specific

(SNMPs; archetypes; prototypes)

# Nexus Between Policy & Technical Work



# CV-SALTS Accomplishments 2013

- Policy discussions and decisions
  - Beneficial Use and Water Quality Objective review
  - Implementation planning
- Conducting cutting edge technical work

**Stakeholders Provide Direct Oversight**

# Policy Discussions

## Fundamental Areas

- Appropriate application and level of protection for MUN and AGR
  - Ag dominated water bodies
  - Groundwater zones

## Implementation Areas

- Including conservation and recycling
- Utilizing assimilative capacity
- Consideration of drought conditions
- Restoring/providing beneficial uses in impacted areas

# CONSIDERATIONS FOR SALT & NITRATE MANAGEMENT

Constituent	Use	POLICY DISCUSSIONS
<b>Salinity</b>	AGR	1) Translators for Narrative Objectives
		2) Multi-Factor Flowchart for Reasonable Protection
		3) Ag Zoning Map (dependence and salt-sensitivity)
	MUN	1) Application of Secondary MCLs as numeric WQOs
		2) Point-of-Compliance Policy
		3) Application of MUN use (surface and groundwater)
<b>Nitrate</b>	AGR	Agriculture is not the most sensitive use and is unlikely to drive more stringent water quality standards for nitrate
	MUN	1) Affirm WQO = 10 mg/L Nitrate-N
		2) Establish Zone-of-Influence Evaluation Process
		3) Alternative Compliance Options

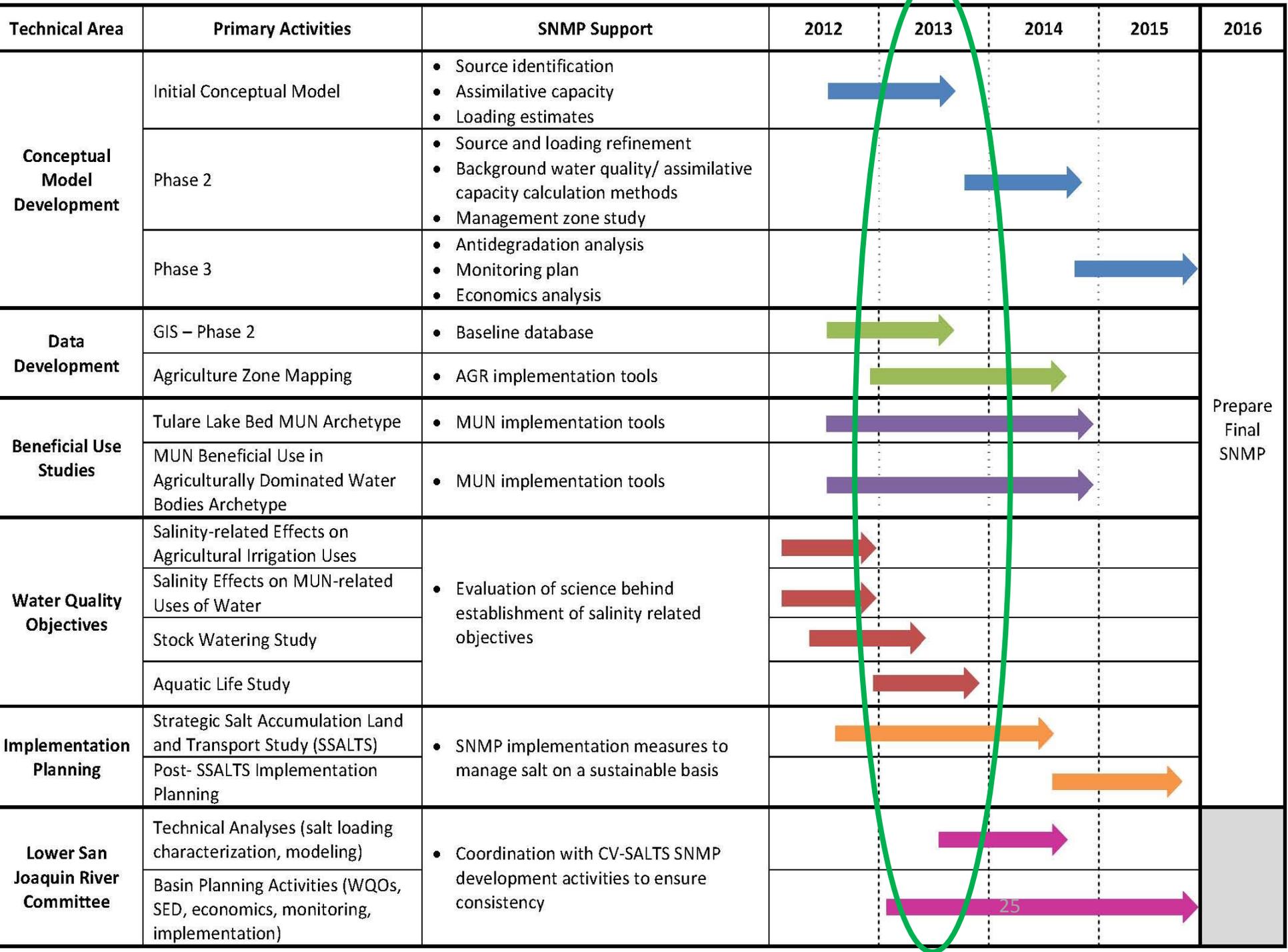
## 2012/2013 Stakeholder Policy Discussions

# Technical Review Process

- Technical Advisory Committee – Meets monthly to discuss technical issues/provide comment on technical deliverables
- Project Committee – Designated ad hoc committee to provide more frequent/detailed reviews of selected technical products, e.g., Conceptual Model deliverables.

Special thanks to:

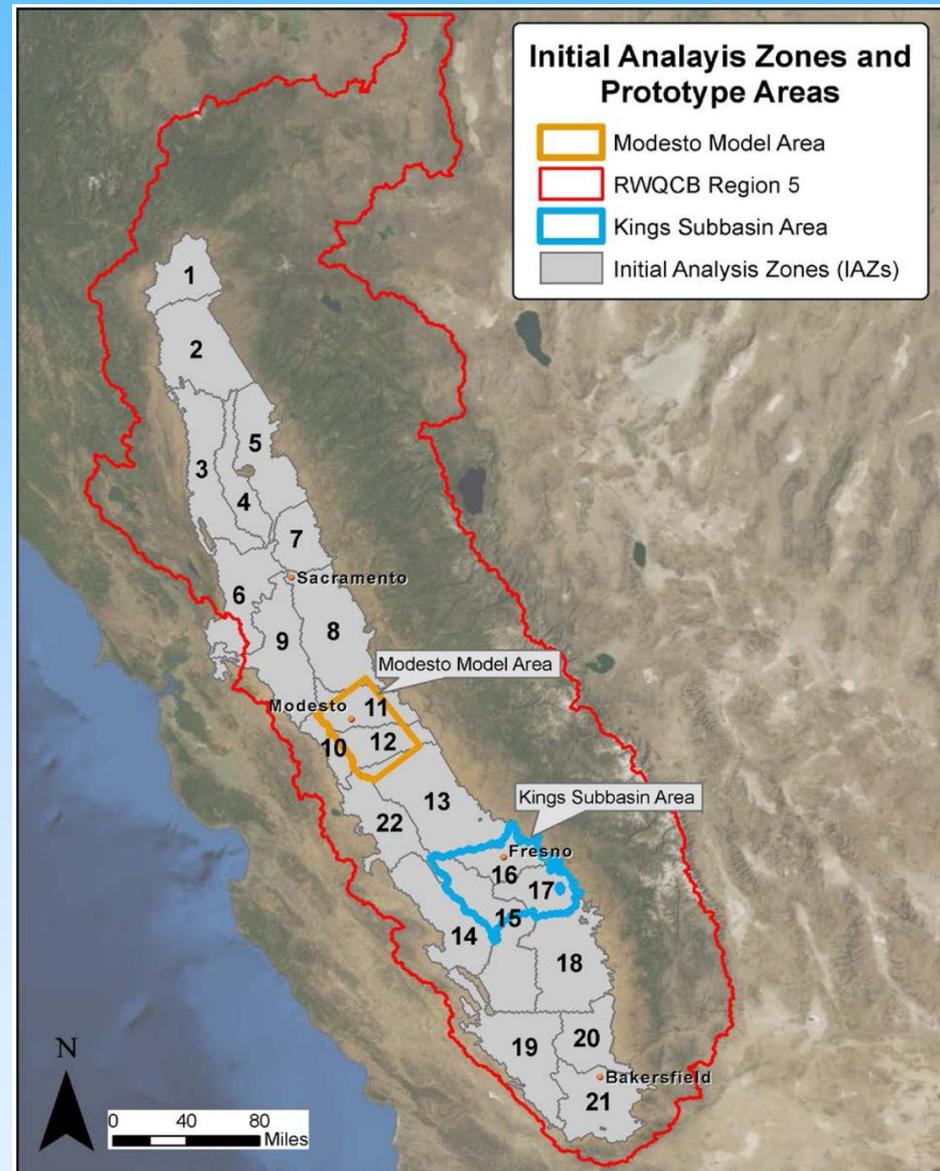
- Central Valley Regional Water Quality Board Staff - Clay Rodgers , Rob Busby and Jeanne Chilcott
- CV-SALTS Participants – David Cory, Debbie Webster, Nigel Quinn and Roger Reynolds
- Outside Volunteers – Thomas Harter (UC Davis) and Randy Hanson (USGS)



Technical Area	Primary Activities	SNMP Support	2012	2013	2014	2015	2016	
<b>Conceptual Model Development</b>	Initial Conceptual Model	<ul style="list-style-type: none"> <li>Source identification</li> <li>Assimilative capacity</li> <li>Loading estimates</li> </ul>	→					
	Phase 2	<ul style="list-style-type: none"> <li>Source and loading refinement</li> <li>Background water quality/ assimilative capacity calculation methods</li> <li>Management zone study</li> </ul>		→				
	Phase 3	<ul style="list-style-type: none"> <li>Antidegradation analysis</li> <li>Monitoring plan</li> <li>Economics analysis</li> </ul>			→			
<b>Data Development</b>	GIS – Phase 2	<ul style="list-style-type: none"> <li>Baseline database</li> </ul>	→					
	Agriculture Zone Mapping	<ul style="list-style-type: none"> <li>AGR implementation tools</li> </ul>		→				
<b>Beneficial Use Studies</b>	Tulare Lake Bed MUN Archetype	<ul style="list-style-type: none"> <li>MUN implementation tools</li> </ul>	→					Prepare Final SNMP
	MUN Beneficial Use in Agriculturally Dominated Water Bodies Archetype	<ul style="list-style-type: none"> <li>MUN implementation tools</li> </ul>	→					
<b>Water Quality Objectives</b>	Salinity-related Effects on Agricultural Irrigation Uses	<ul style="list-style-type: none"> <li>Evaluation of science behind establishment of salinity related objectives</li> </ul>	→					
	Salinity Effects on MUN-related Uses of Water		→					
	Stock Watering Study		→					
	Aquatic Life Study		→					
<b>Implementation Planning</b>	Strategic Salt Accumulation Land and Transport Study (SSALTS)	<ul style="list-style-type: none"> <li>SNMP implementation measures to manage salt on a sustainable basis</li> </ul>	→					
	Post- SSALTS Implementation Planning			→				
<b>Lower San Joaquin River Committee</b>	Technical Analyses (salt loading characterization, modeling)	<ul style="list-style-type: none"> <li>Coordination with CV-SALTS SNMP development activities to ensure consistency</li> </ul>		→				
	Basin Planning Activities (WQOs, SED, economics, monitoring, implementation)			→ 26				

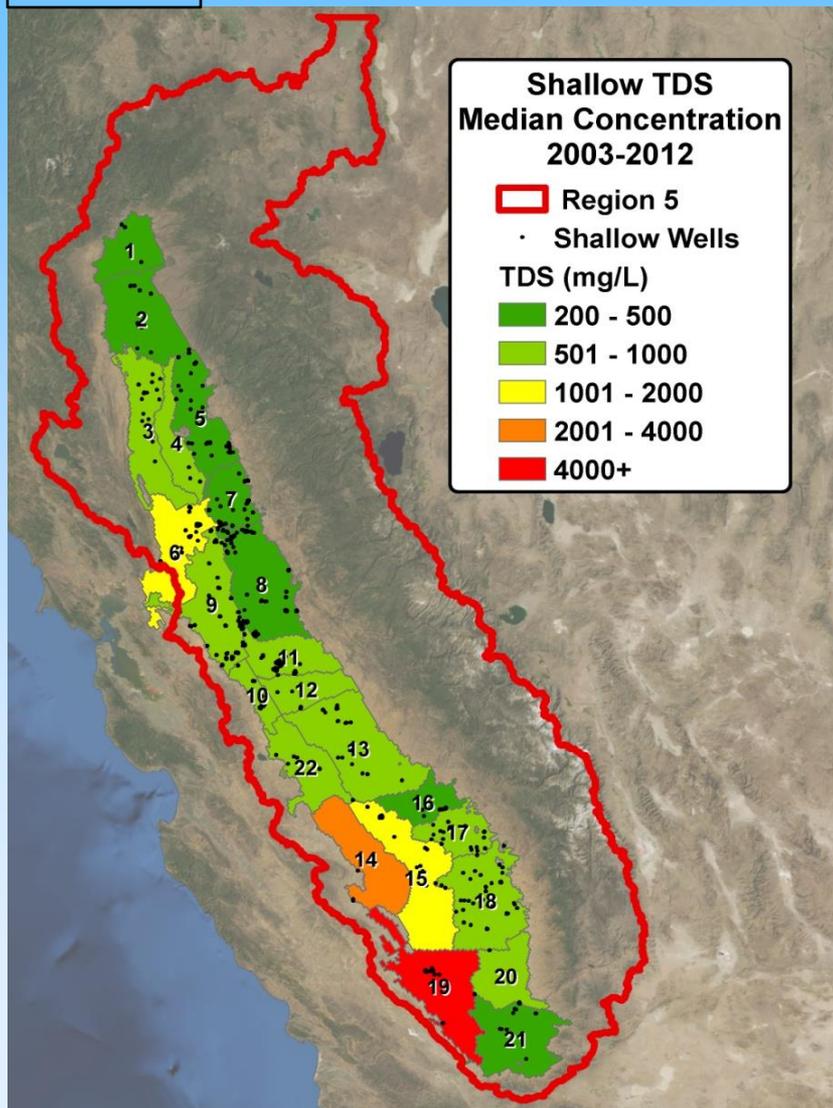
# Initial Analysis Zones and Prototype Areas

- 22 Sub-regions
  - Based on USGS CVHM model
- Combined 2 models
  - CVHM (groundwater)
  - WARMF (surface)
- Future Focus Areas
  - Modesto
  - Kings Subbasin

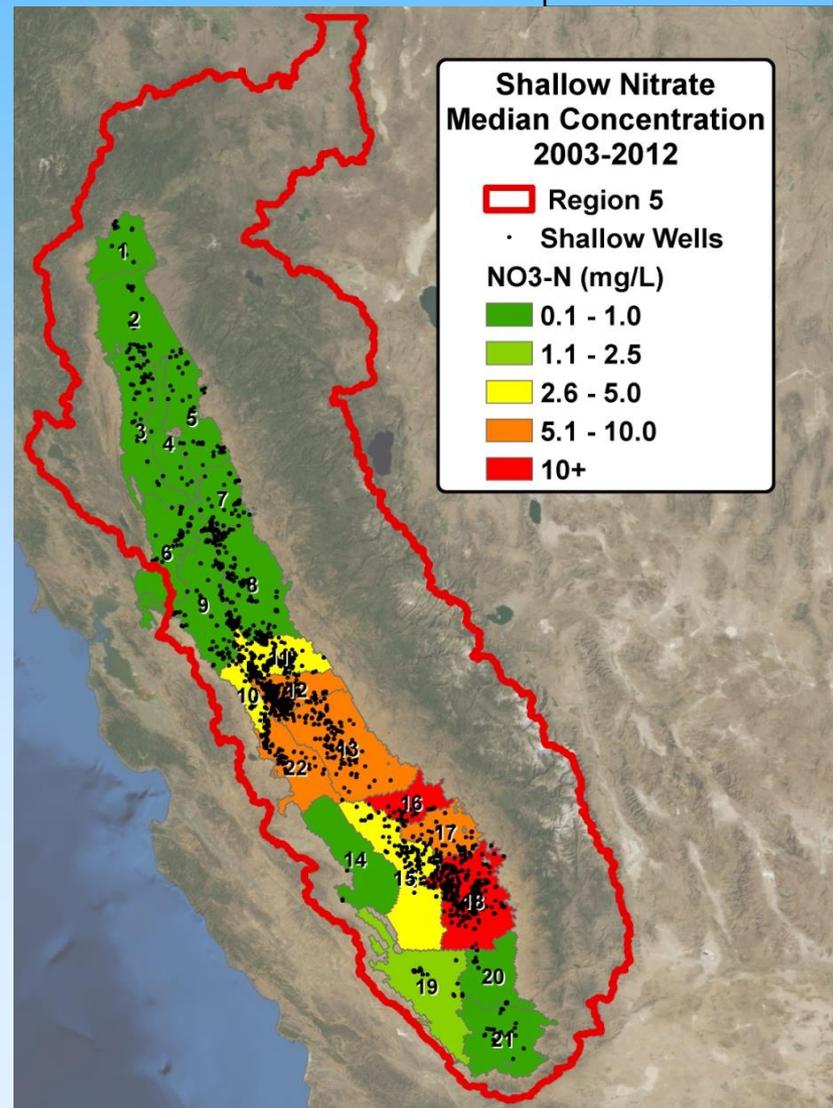


# Ambient Shallow GW Quality - Median CVHM Cell Concentration (Shallow Wells 2003-2012)

TDS



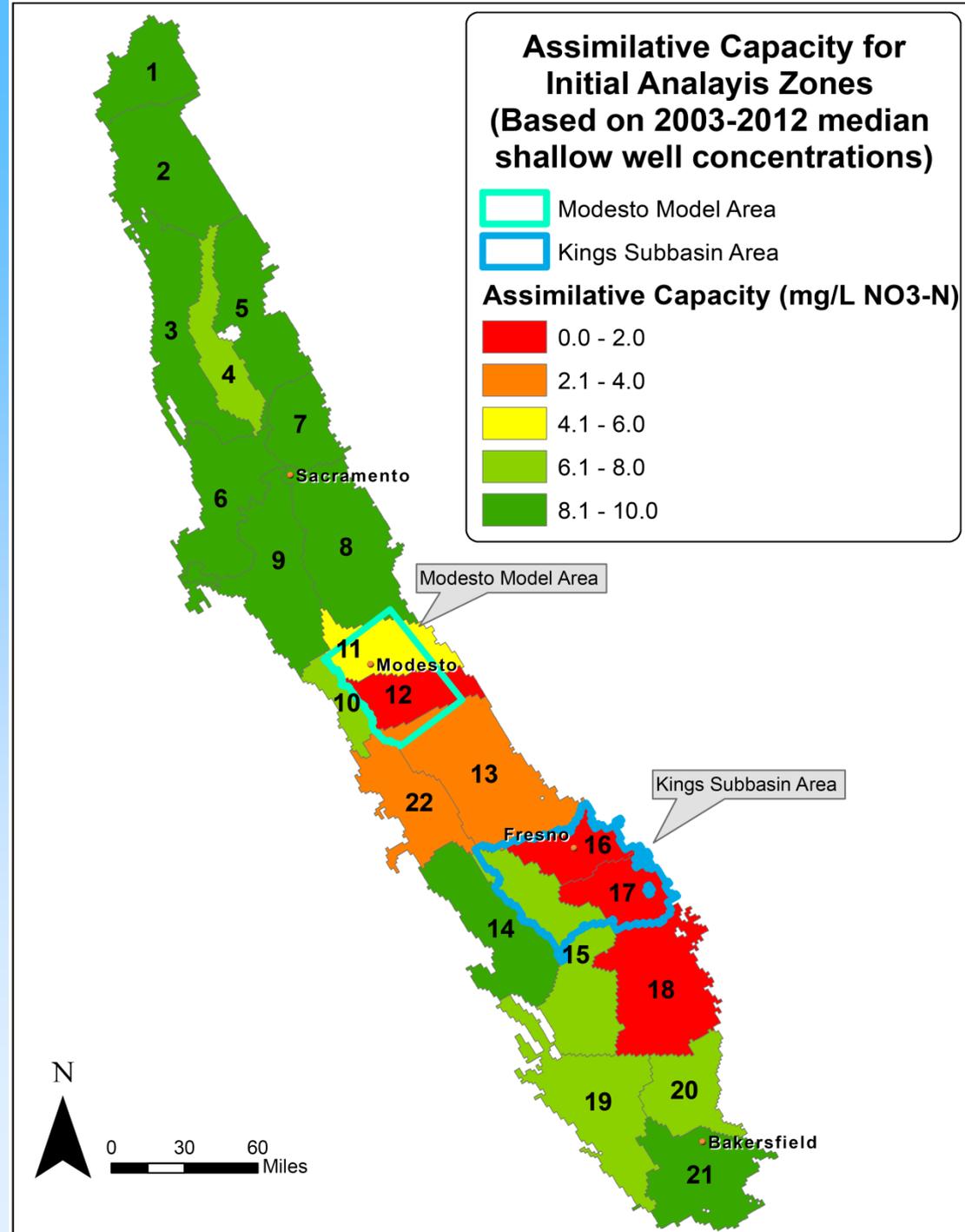
NO<sub>3</sub>-N



# Preliminary Assimilative Capacity: NO<sub>3</sub>-N

■ Relative to NO<sub>3</sub>-N at  
10 mg/L

State Board Meeting  
21 January 2014

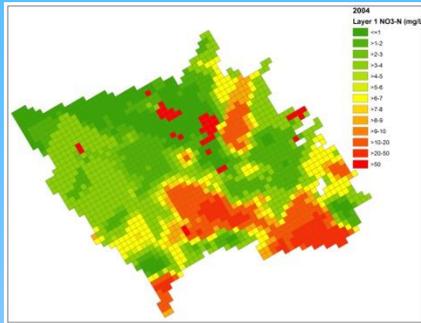
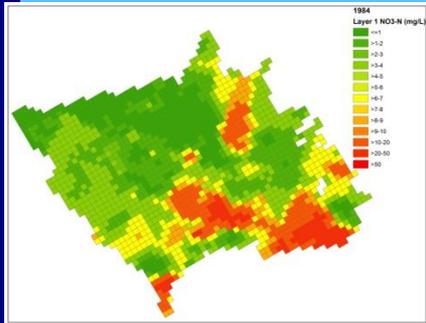


1984

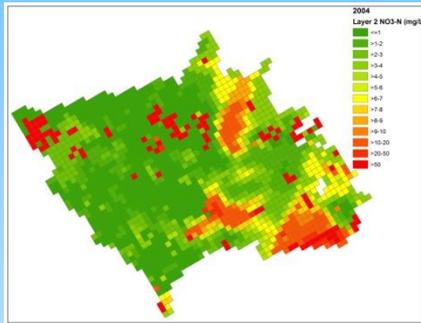
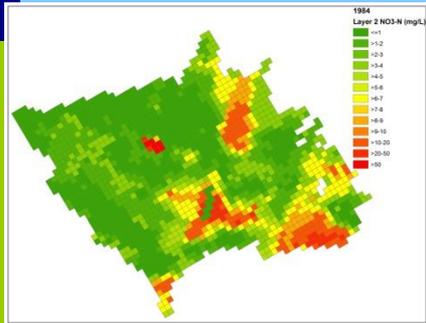
2004

# 20-Yr Simulated GW Quality Changes (1984-2004)

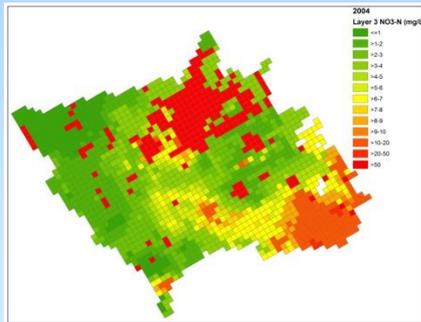
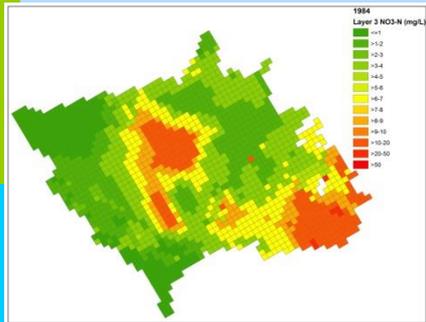
Layer 1



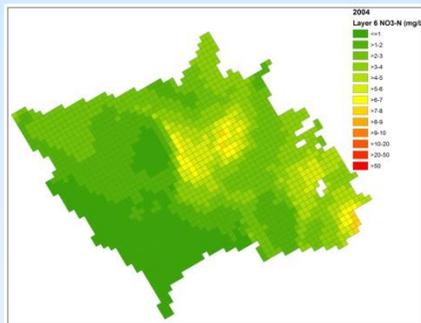
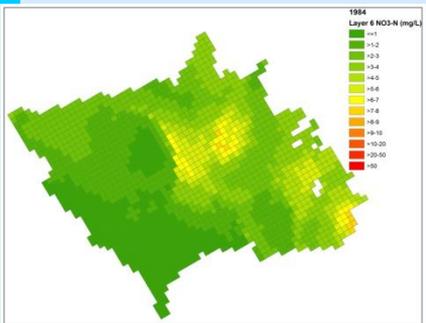
Layer 2



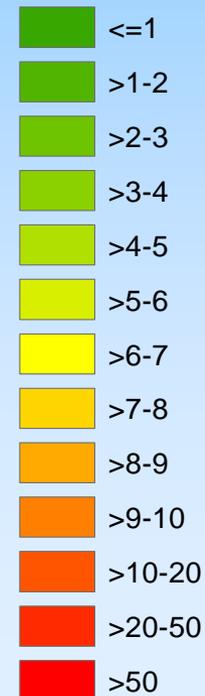
Layer 3



Layer 6

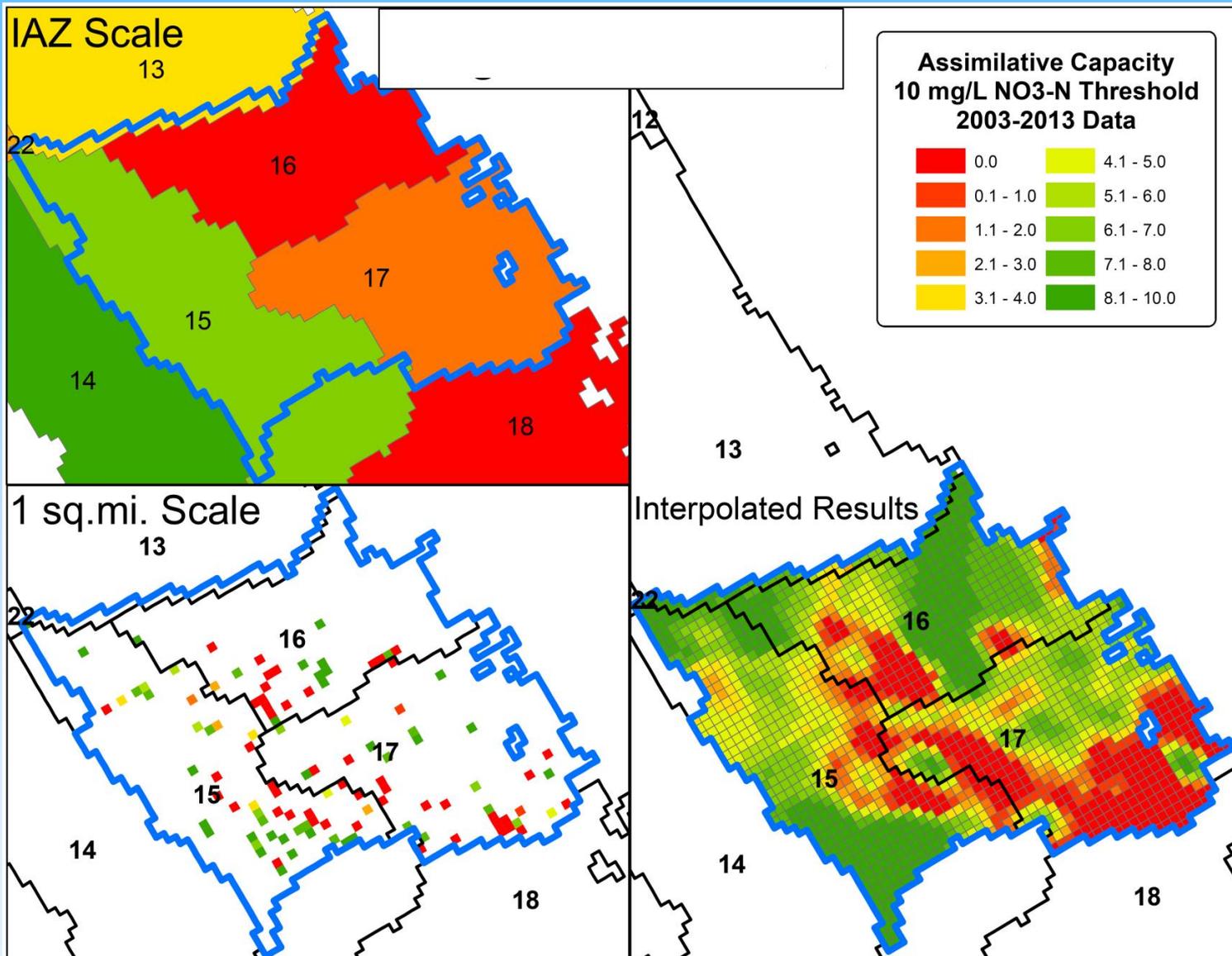


Nitrate  
(mg/L as N)



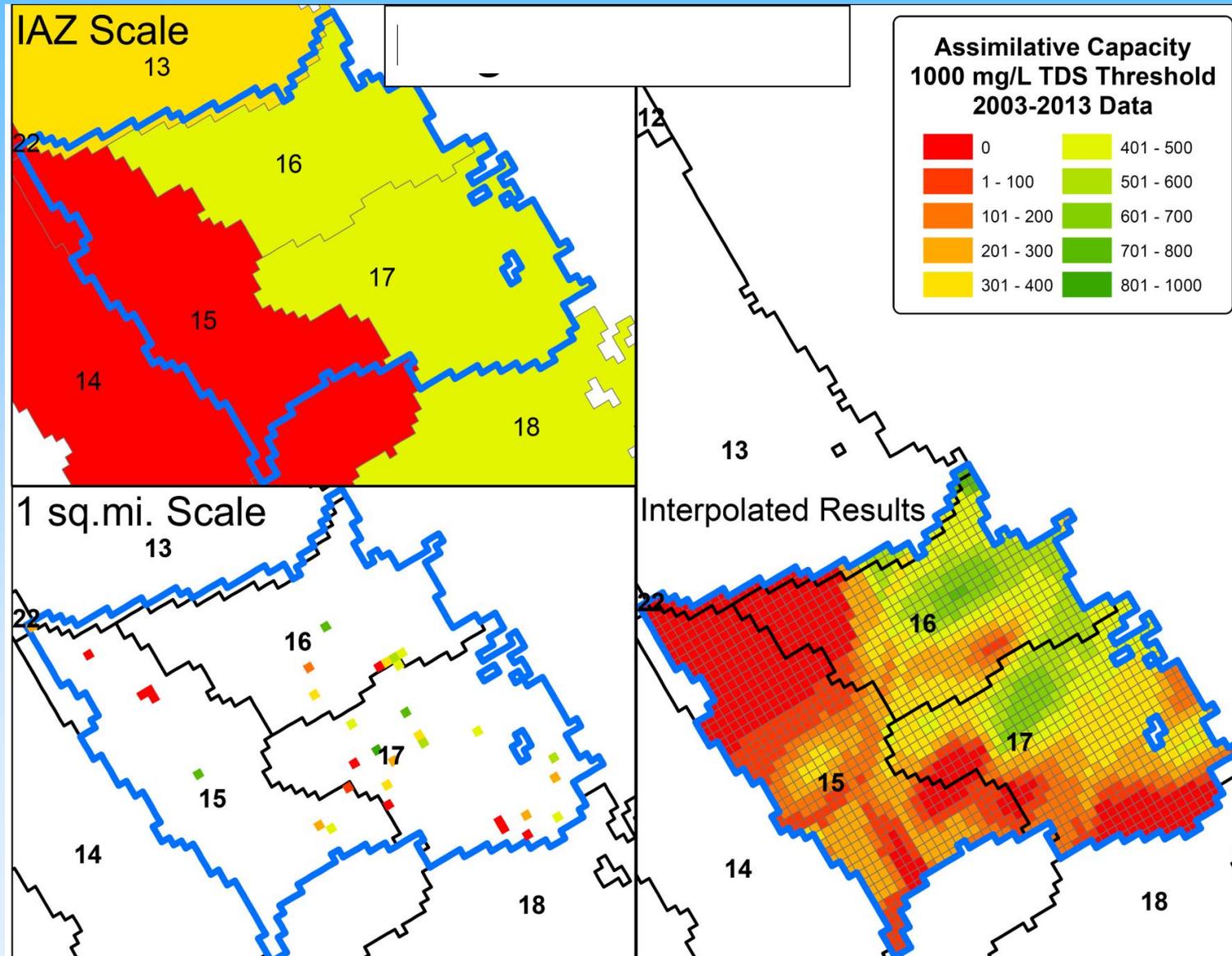
# Subbasin Model: Assimilative Capacity

## NO<sub>3</sub>-N 10 mg/L



# Subbasin Model: Assimilative Capacity

## TDS 1000 mg/L



# Legacy Nitrate

July 2013

Workshop on

Alternative Compliance Strategy

Addressing Nitrate

Contamination

October 2013

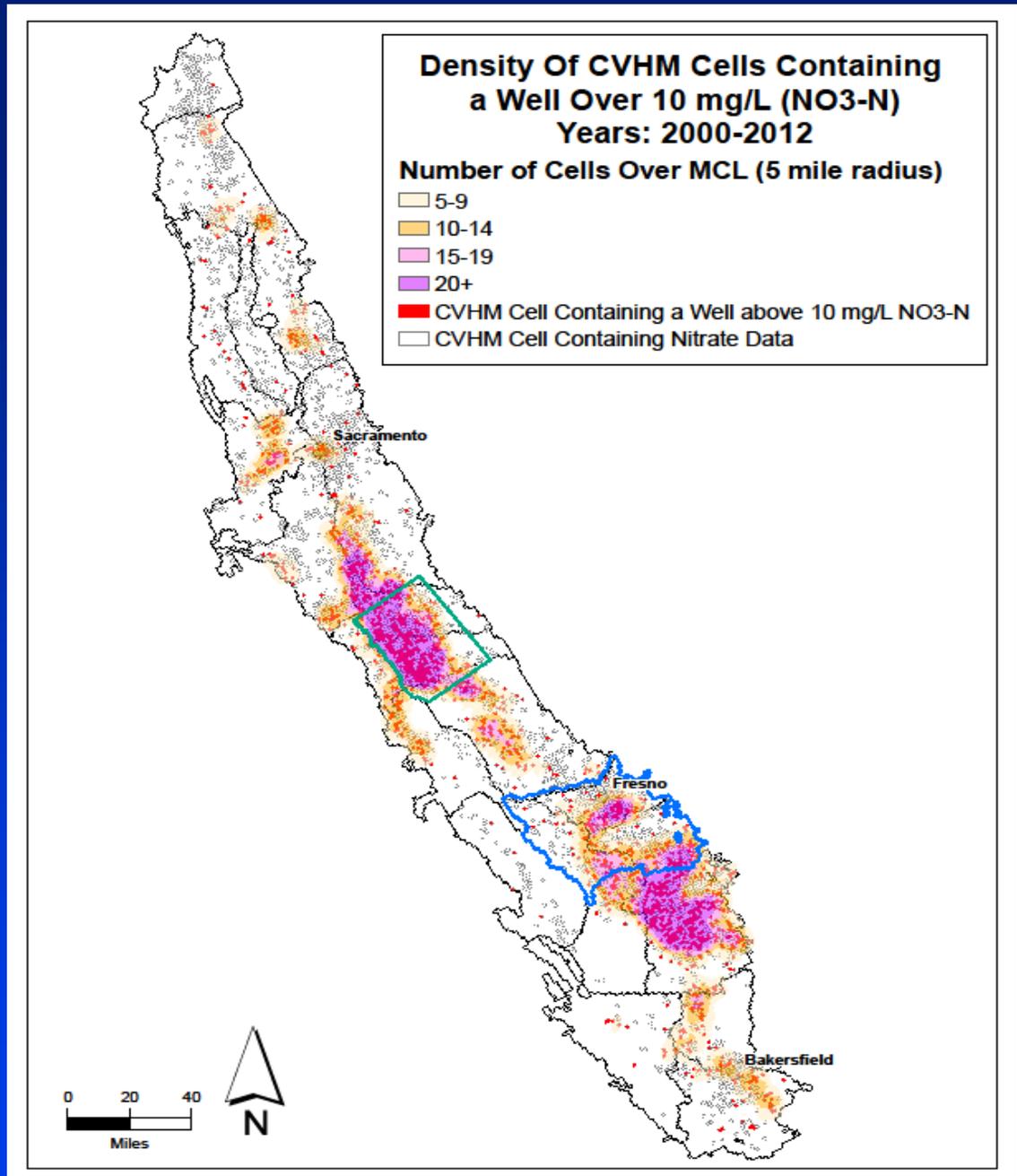
CEQA Scoping

On-going Discussions

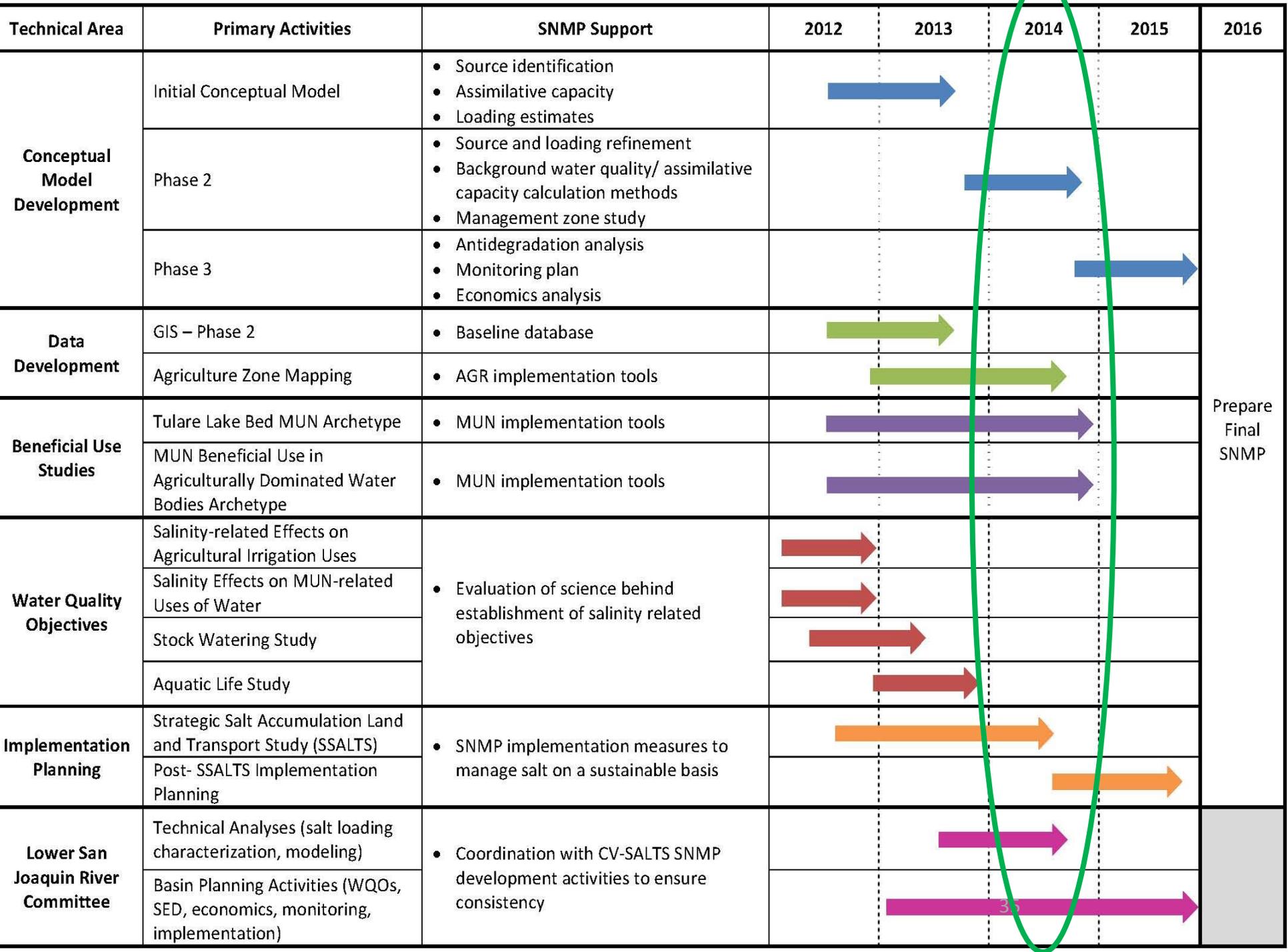
Public Policy Meetings:

- Restore/protect beneficial uses
- Balance Economic Costs
- Sustainable Management

State Board Meeting  
21 January 2014



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Conceptual Model Development	Initial Conceptual Model	<ul style="list-style-type: none"> <li>Source identification</li> <li>Assimilative capacity</li> <li>Loading estimates</li> </ul>	→					
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	Basin Planning Activities (WQOs, SED, economics, monitoring, implementation)			→				



# Summarized CV-SALTS Workplan Schedule

*Revised 11/1/13*

CV-SALTS Program Element	2011	2012	2013	2014	2015	2016	Final SNMP →	2017	BPA →	2018	+
<b>Program Management</b>											
<b>Technical Studies</b>											
Initial Conceptual Model											
Phase 2 SNMP											
Phase 3 Antidegradation Monitoring Economics											
<b>Archetypes/Case Studies</b>											
Groundwater MUN (Tulare)											
Surface Water MUN (Sac Valley POTWs)											
Management Practice Development											
Lower San Joaquin River Salt and Boron Objectives											
<b>Implementation Planning</b>											
SSALTS Study											
Implementation Planning											
<b>Documentation for Approval</b>											
<b>CEQA Equivalent Documentation</b>											
<b>BPA Documentation Process Support</b>											
<b>Initial Implementation</b>											
<b>Monitoring and Reporting</b>											
Phase II SNMP											

# Anticipated Outcomes

- Updated Central Valley Basin Plans
- Compliance with Recycled Water Policy
- Concerns Addressed:
  - Salt
  - Nitrate
  - Impacted Areas in the Valley
  - Flexibility for innovative solutions
- Ability to fold in area specific plans

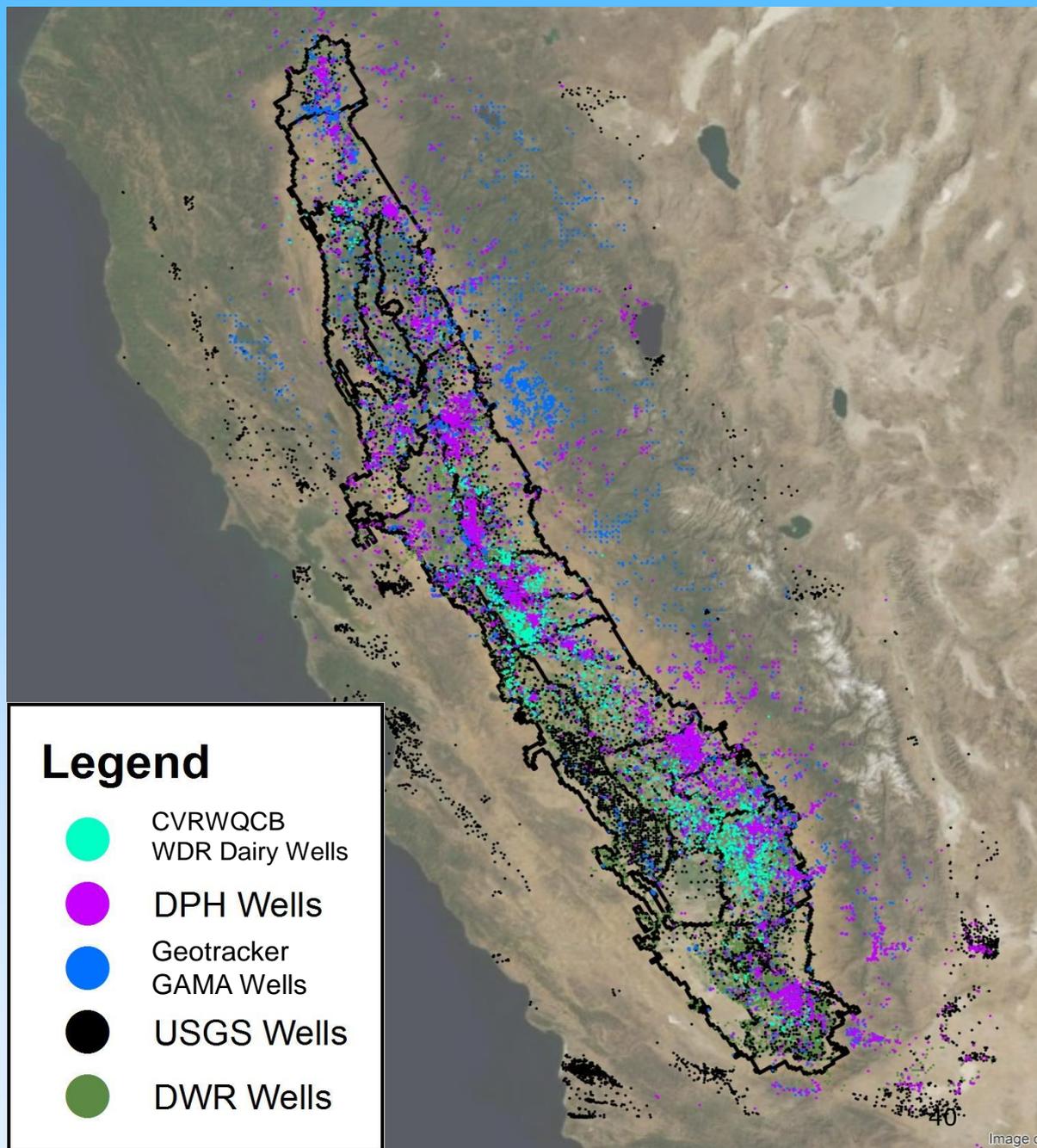
# Questions?

# Extra Slides

# Groundwater Quality Data: All Wells with Salt and Nitrate Data

**Full dataset =**

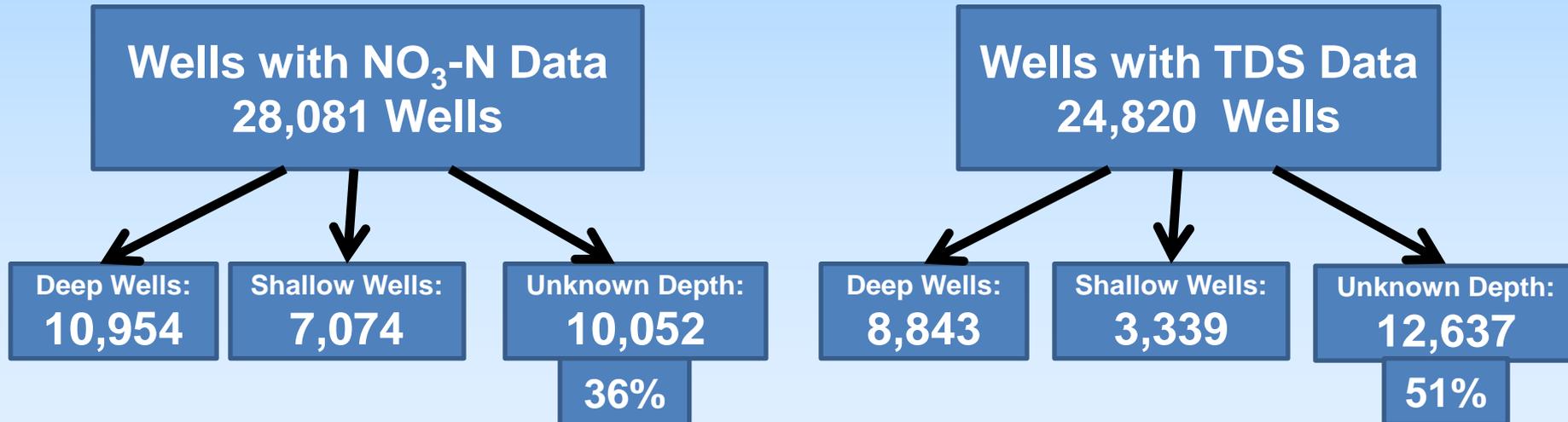
- **50,478 wells**
- **33,305 wells in IAZs**



# Well Data Characterization

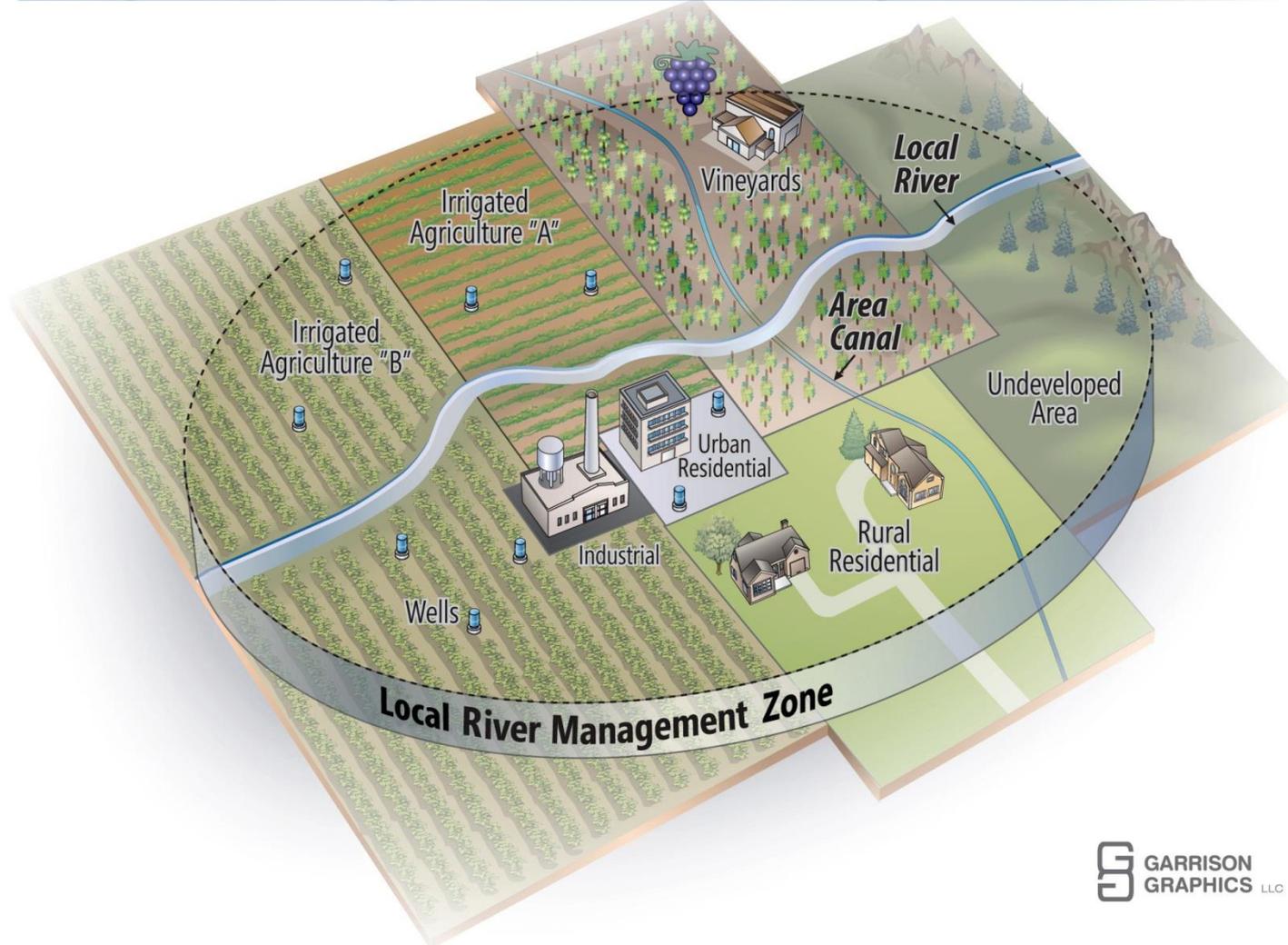
## ■ Issues

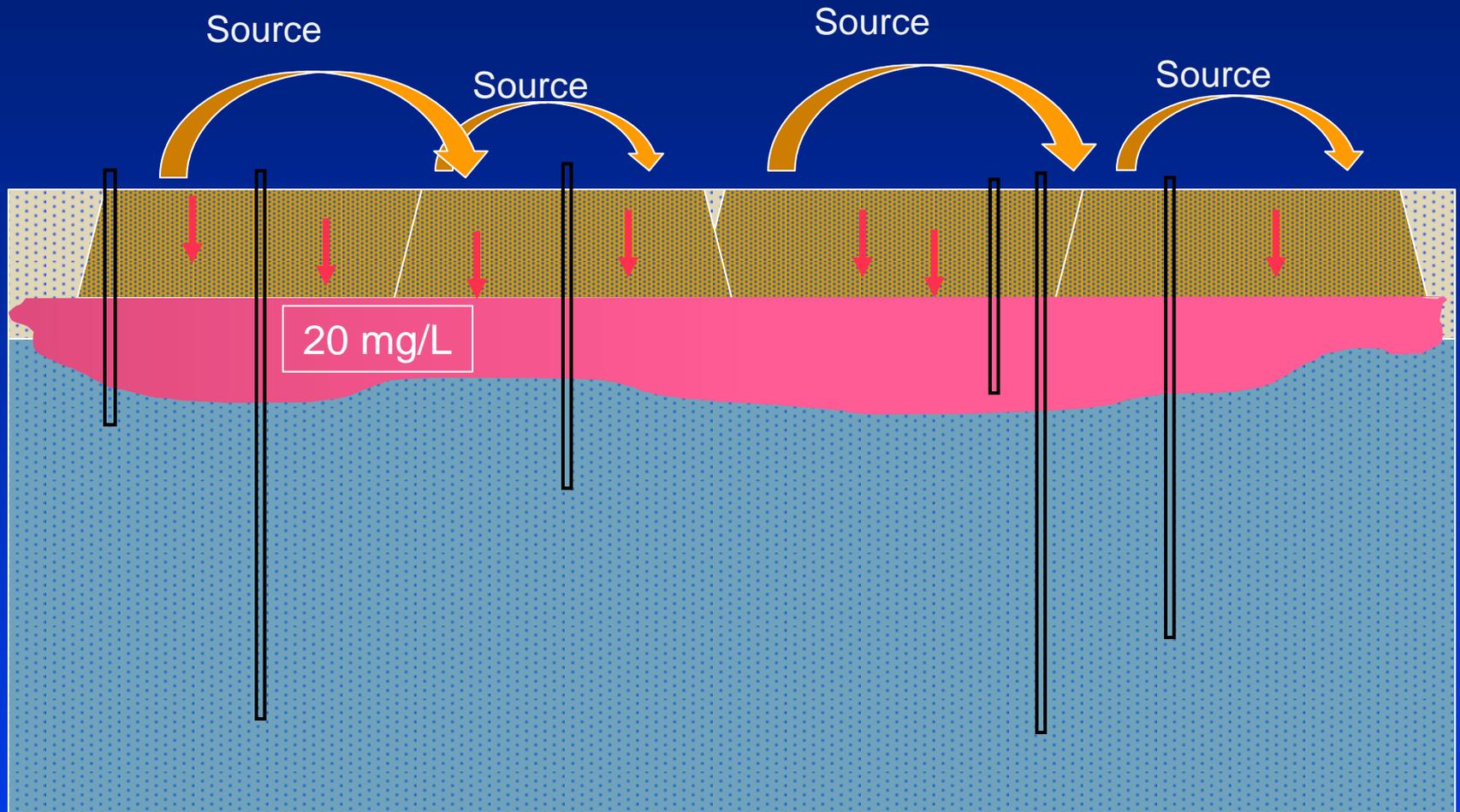
- Many wells do not have readily available construction information
- Many wells not characterized with respect to their completion in the aquifer system



# Management Zone Concept

## Conceptual Relationship of Water Use Areas to a Management Zone





**Is GW Quality  
Better than Objective?**

**No**

**Yes**

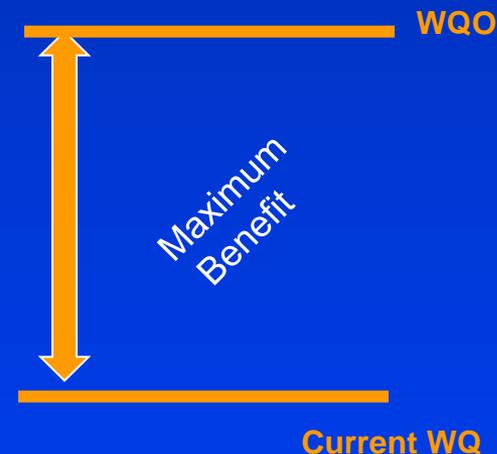
**Cannot allow  
ground water quality to get  
worse**

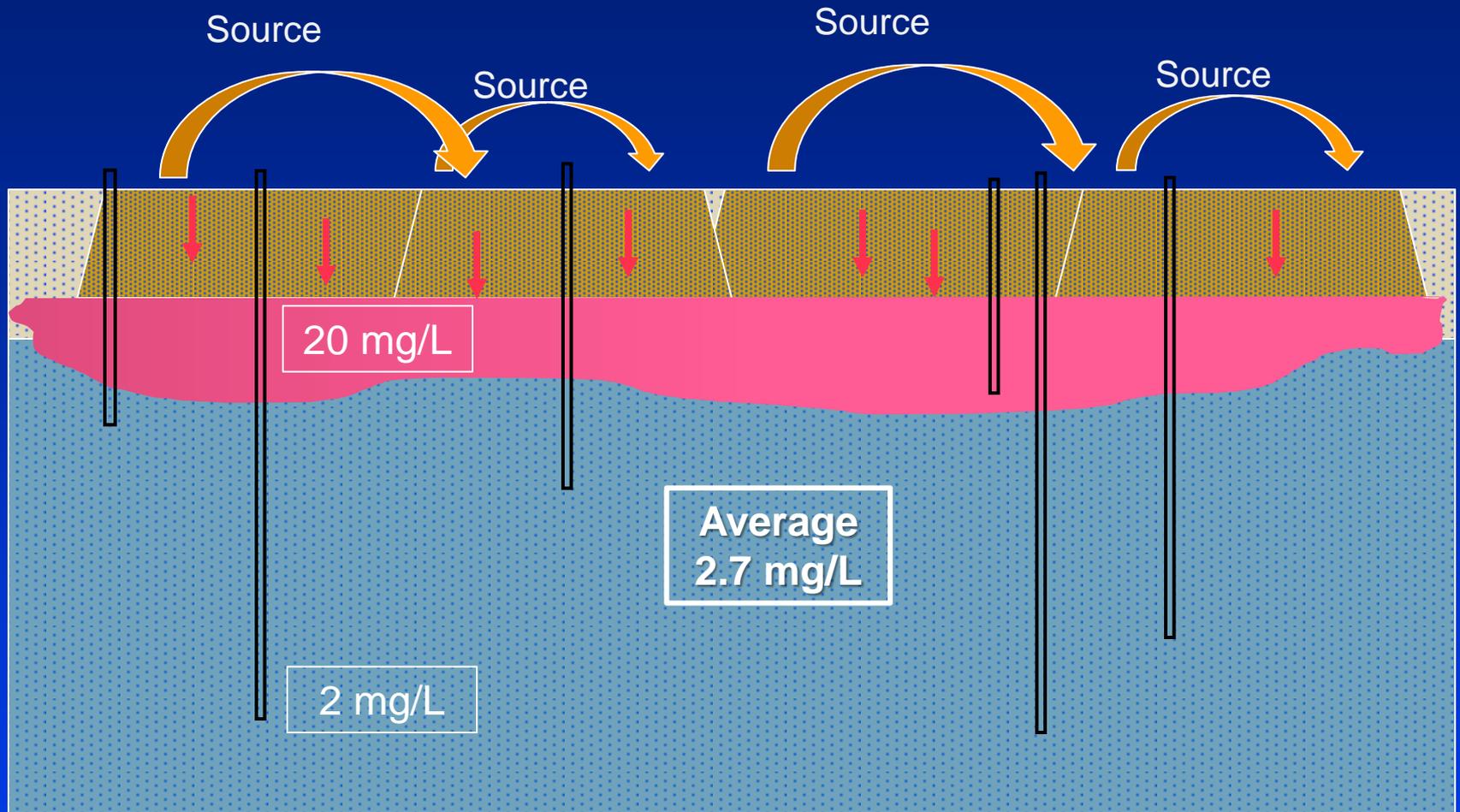
(Compliance at shallow GW)

- Prohibit Discharge
- Permit Conditions
  - ◆ Require “best practices”
  - ◆ Meet objective
- Basin Planning
  - ◆ Site Specific Objectives
  - ◆ Modify Beneficial Uses

**Apply Antidegradation Policy  
(68-16)**

- ◆ Require BPTC
- ◆ Show “Maximum Benefit”





# Discretionary Authority

## Traditional Regulation

- Prohibition
- Permits
- Basin Planning

OR

## Anti-deg/Max Benefit

- BPTC
- Maximum Benefit
  - *Criteria dependent on situation*
  - Actual Use Protection
  - Maximize water use
  - Longterm improvement

# Alternative: Distinguish between shallow and deep groundwater

