

Characterizing Groundwater Aquifers on the Central Coast



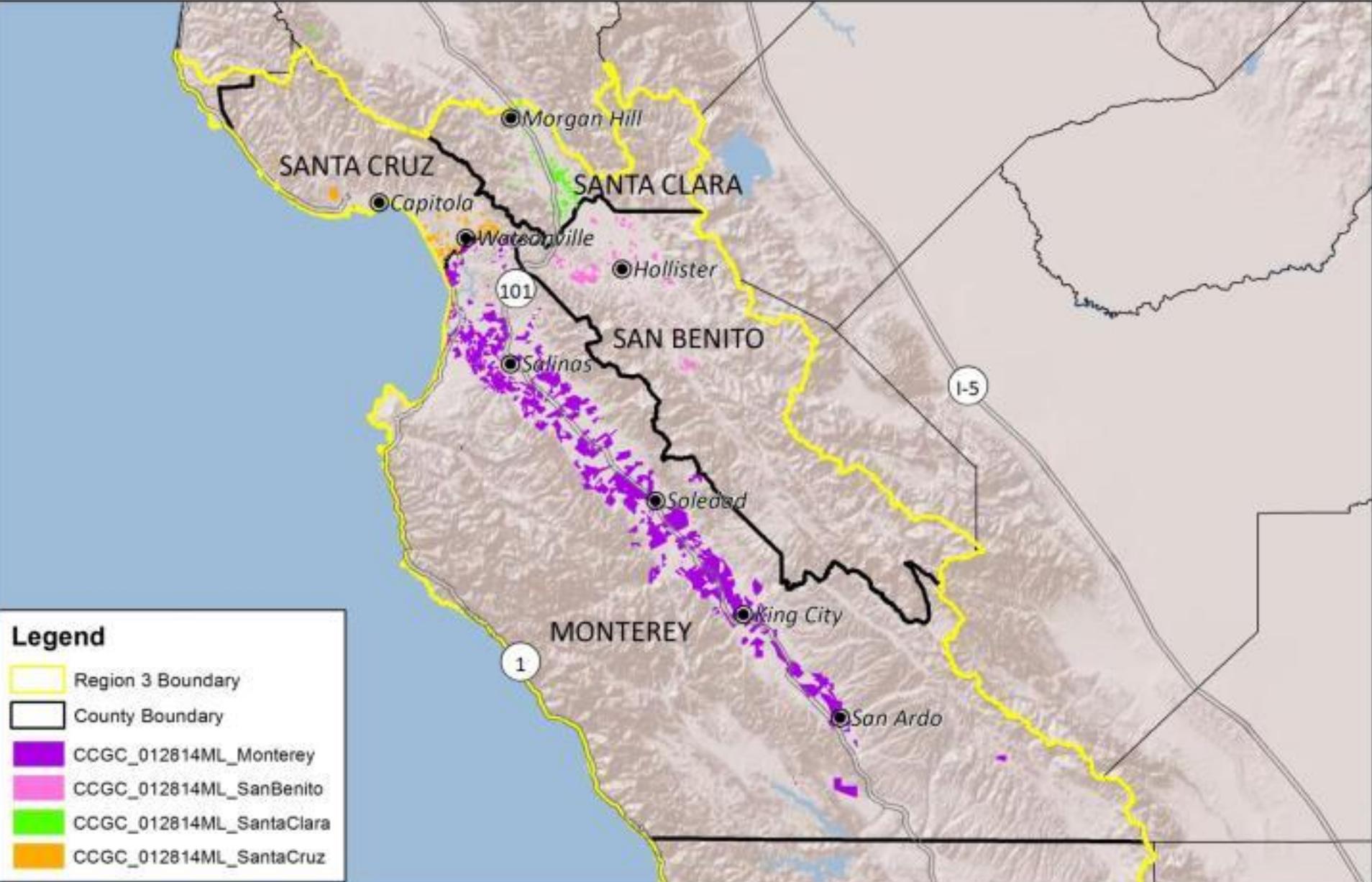
Parry Klassen
Executive Director
Central Coast Groundwater Coalition
March 3, 2014



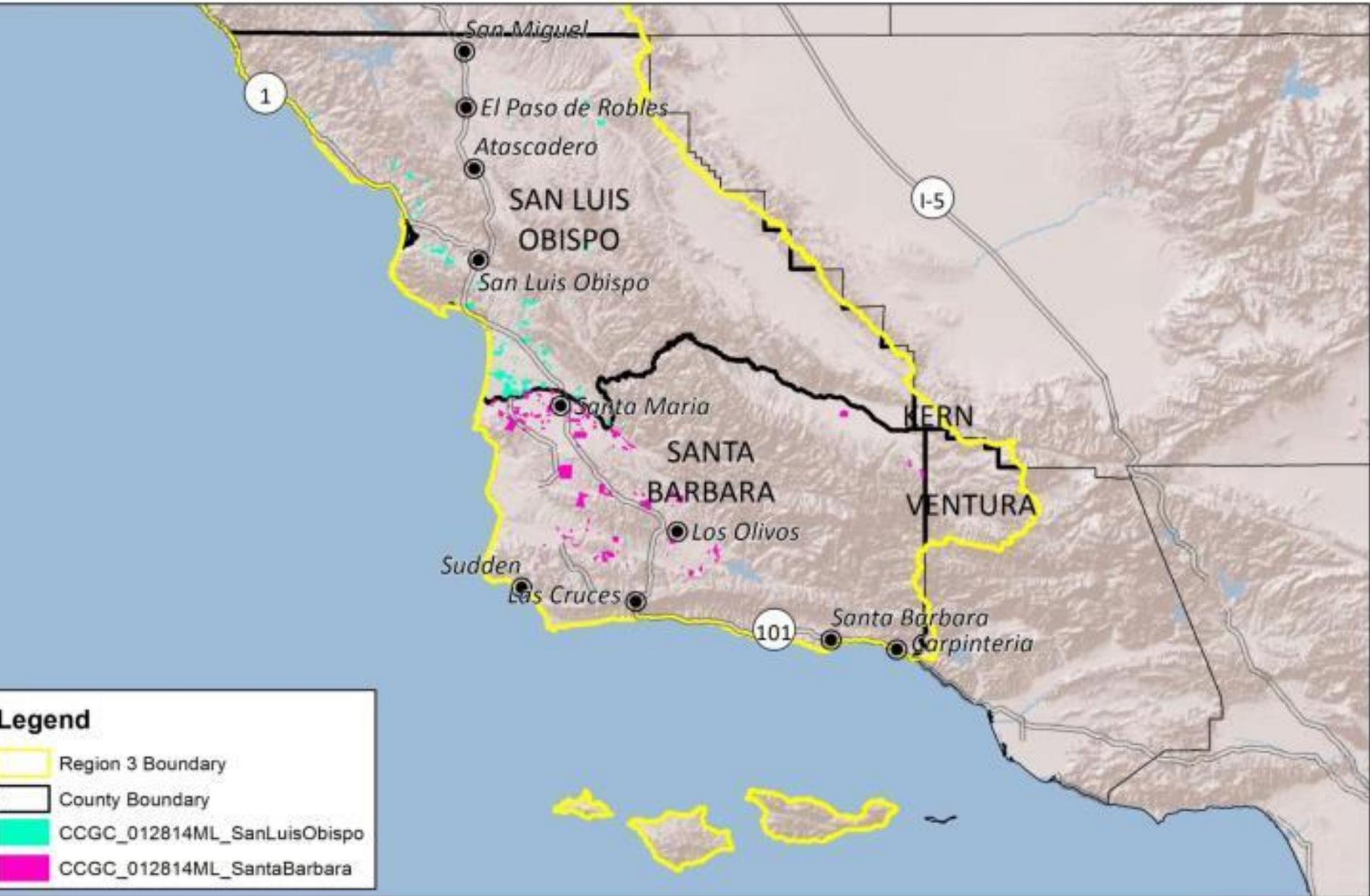


Central Coast Groundwater Coalition Membership Data				
February 28, 2014				
		Memberships	Parcels	Acreage
	Monterey	142	1,206	104,879
	San Benito	43	219	7,762
	Santa Clara	81	275	7,237
	Santa Cruz	81	430	12,063
NORTH NET TOTALS		317	2,130	131,942
	San Luis Obispo	119	366	15,296
	Santa Barbara	148	776	47,019
	Ventura	4	16	537
SOUTH NET TOTALS		248	1,158	62,852
GRAND TOTAL NET		565	3,288	194,794

Member Parcel Locations – Northern Counties



Member Parcel Locations – Southern Counties





CCGC Activities First 6 months

2013

- July 11 Regional Board approved plan
- July 13 CCGC Organization Formed
- Sept 24 State Board expanded eligible counties
- Oct 21 Began sampling Salinas Valley
- Nov 19 Began Sampling in San Luis Obispo/Santa Barbara counties
- Nov 26 Contacted Round 1 members with exceedances



CCGC Activities Next 18 months

2014

- | | |
|-----------|--|
| Jan 31 | Completed South counties individual sampling |
| Feb 18 | Began Pajaro Valley characterization sampling |
| March | Continue nitrate exceedance notifications |
| April | Begin Hollister/Gilroy characterization sampling |
| August | Finish remaining south counties sampling |
| September | All North region sampling to be completed |
| December | All South region sampling to be completed |

2015

- | | |
|-------|--|
| March | Final report for North due to Regional Water Board |
| June | Final Report for South due to Regional Water Board |

Central Coast Plan Approved July 11, 2013

Program Objectives

- Characterize domestic supply groundwater quality
 - Spatial variability
 - Factors affecting concentrations



Collect Existing/New Nitrate Data

- Gather data/information from available sources
- Collect additional water-quality data & well information
- Sample members domestic (some irrigation) wells

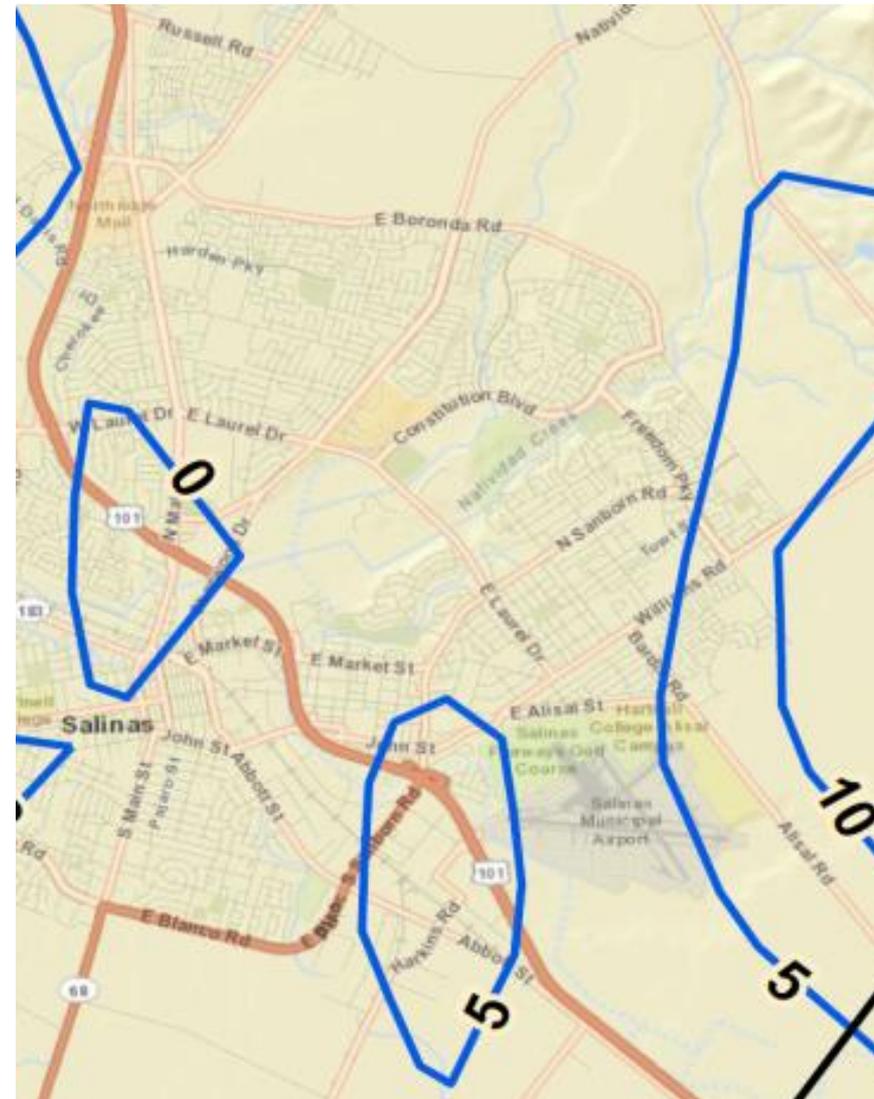
Create public web application that allows display of contours of data by various providers, including Geo Tracker & others



Final Report to Include...

Complete by **March 15, 2015** (north) or **June 30, 2015** (south)

- Contour maps of the concentration of nitrate in all wells sampled
- Accounting of number/percentage of domestic supply wells with nitrate concentrations above primary MCL.
- Distribution of domestic supply wells not regulated by counties
- Depths and screened intervals of those wells to extent known



What Constituents are Monitored?

Constituents to be monitored to characterize drinking water & the shallow aquifers
(*bottom 4 optional per CCGC direction*)

Function	Constituents
Compliance with Conditional Waiver & MRPs¹	pH, SC, TDS, total alkalinity, CA, Mg, Na, K, SO ₄ , Cl, NO ₃ -NO ₂
Potential for denitrification	Oxidation-reduction potential, N ¹⁵ & O ¹⁸ isotopes
Nitrogen source analysis	N ¹⁵ & O ¹⁸ isotopes, pharmaceuticals
Age of water in aquifer	Tritium/H4, chlorofluorocarbons ²
Source of water	Ca, Mg, Na, K, Cl, CO ₃ , SO ₄ , Br, O ¹⁸ , deuterium, N ¹⁵



Aquifer Characterization Describes...

- Recharge rates
- Depth to groundwater
- Flow direction(s)
- Subsurface lithology
- Subsurface cross sections for aquifers where available
- Description of subsurface heterogeneity
- Aquifer water quality – nitrate only
 - Identify gaps in water quality data
 - Cooperative program plan to fill gap.
- Complete by **March 15** or **June 30, 2015**

Future CCGC annual reports provide updates to this characterization.



Implementation Challenges

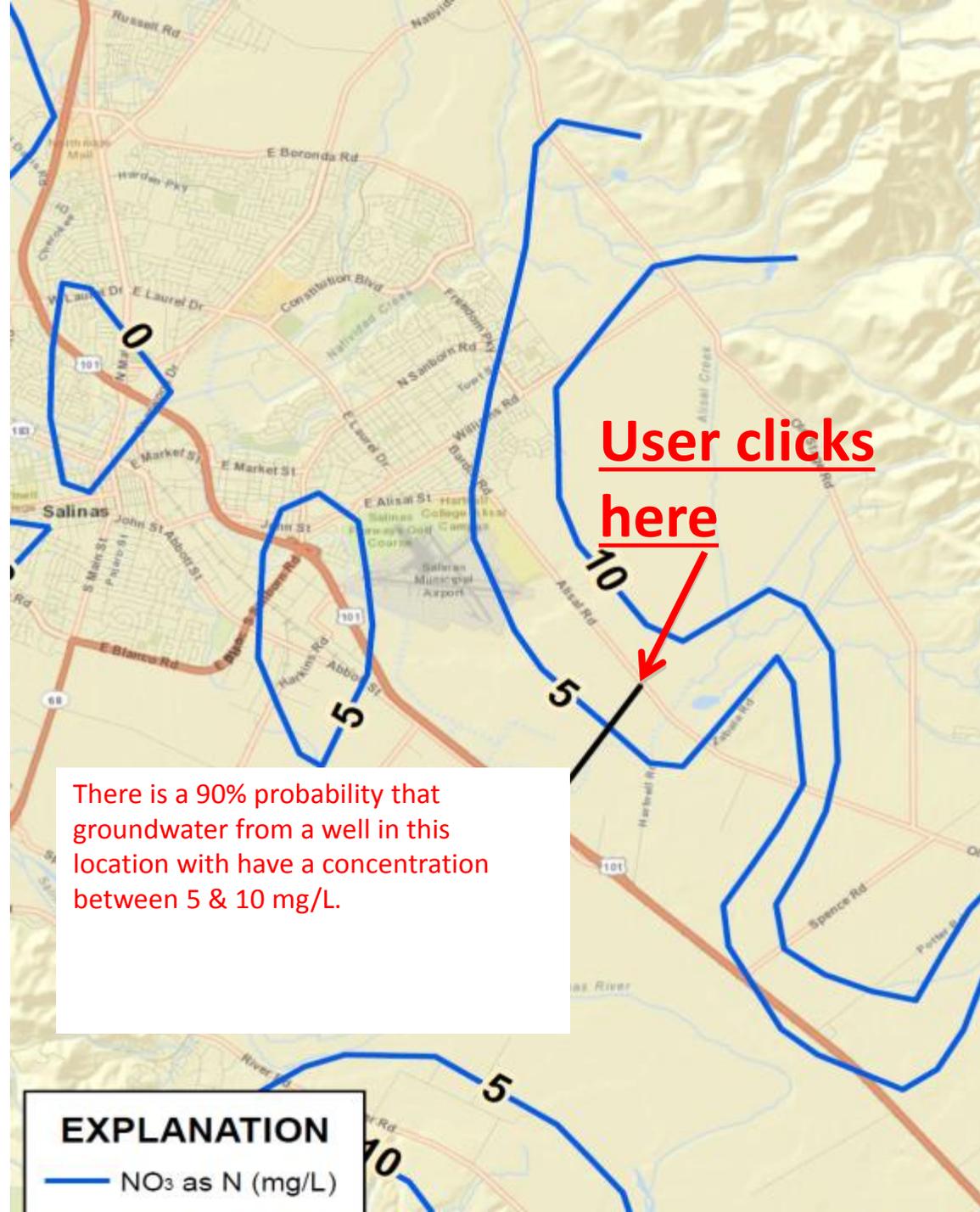
- Recognition that there are domestic water data gaps we may not be able to fill.
 - Looking at all aquifers, based on data available.
 - We are sampling our members in our geographical boundaries, who are in Irrigated Lands Regulatory Program.

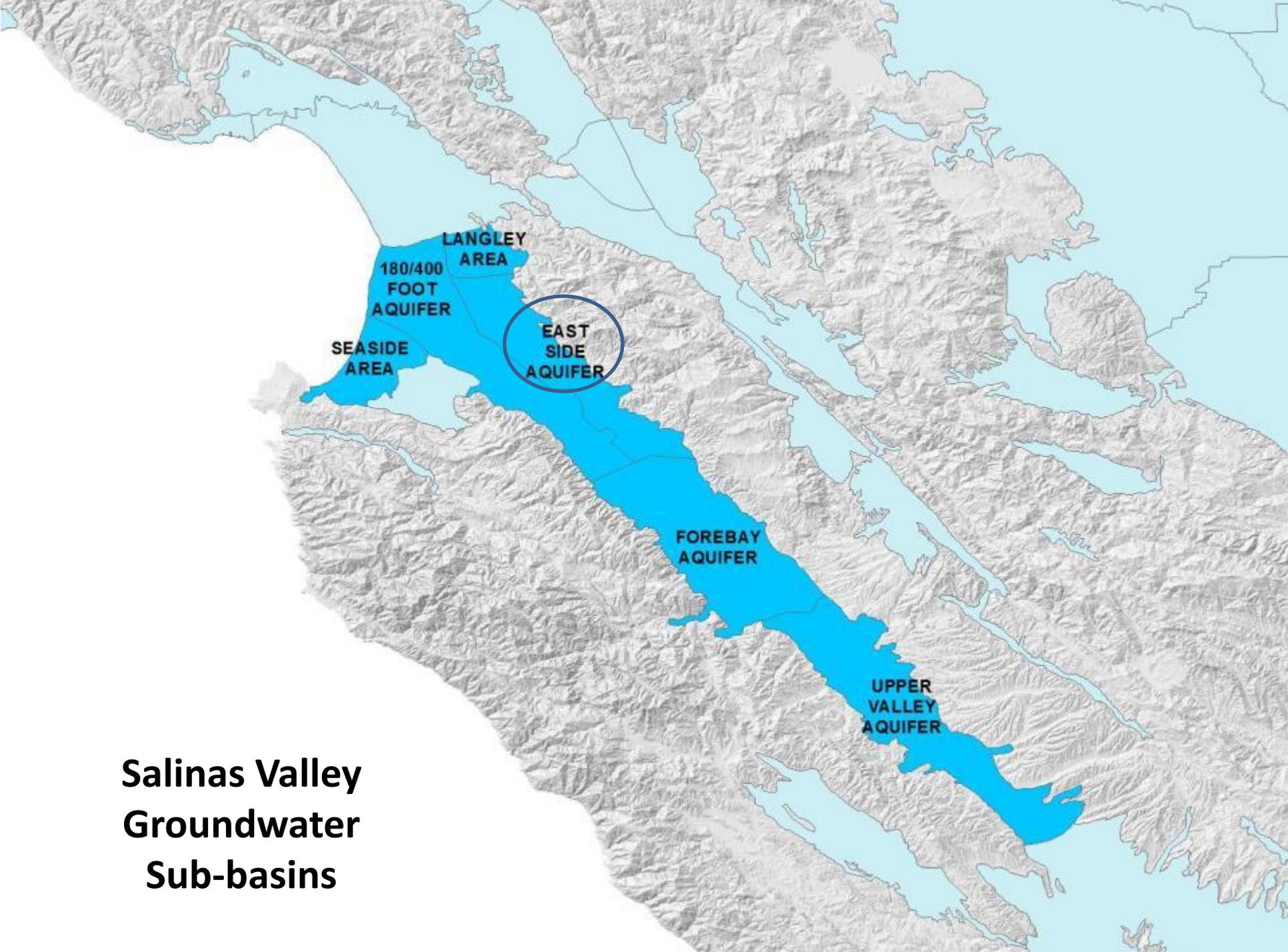


Contour Mapping

Contours provide spatial information about drinking water quality.

Use all data to develop contours of the concentration of nitrate (& other relevant constituents)

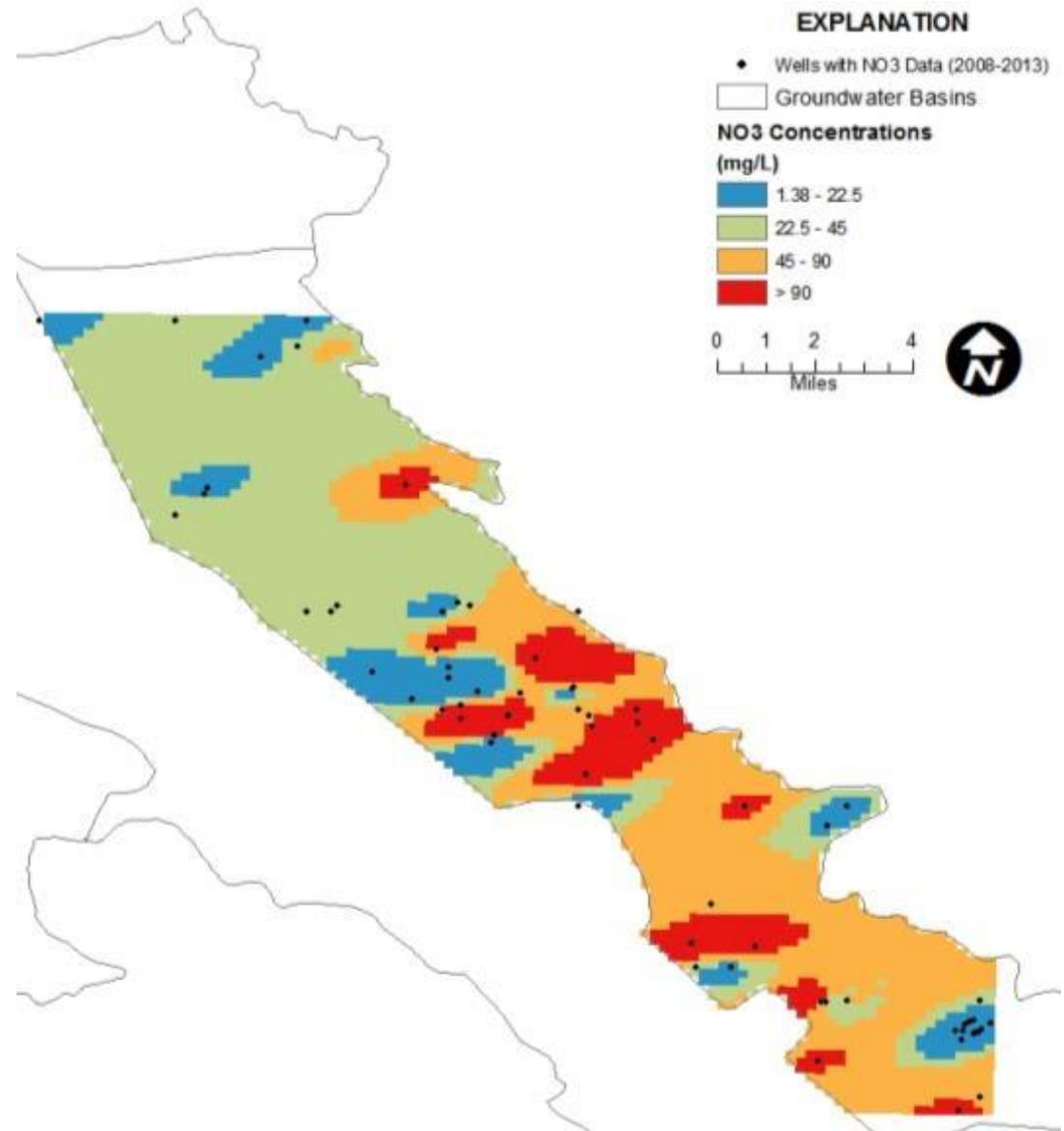




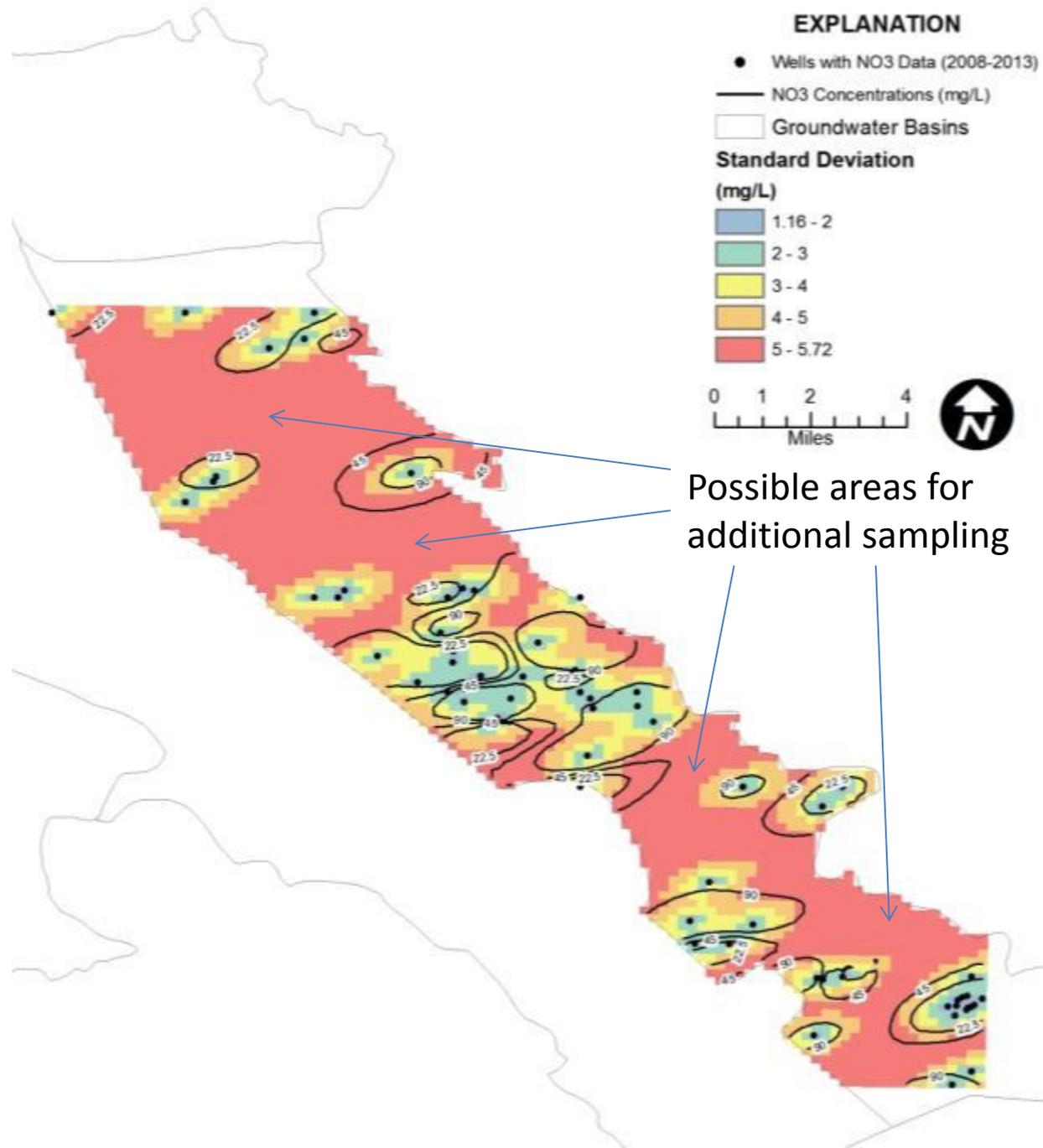
**Salinas Valley
Groundwater
Sub-basins**

East Side Sub-basin Nitrates

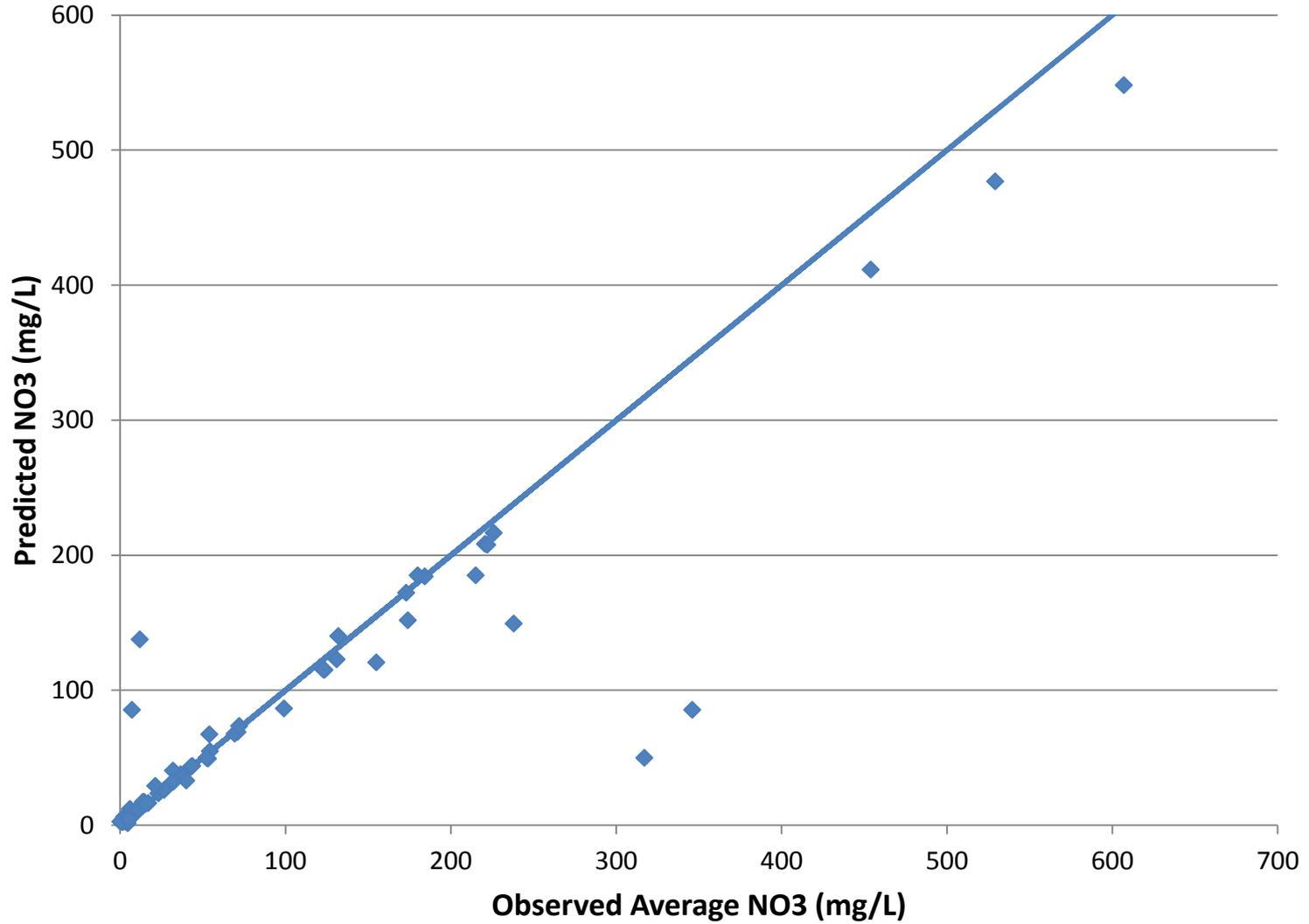
- 79 wells sampled (includes GAMA Geotracker, eNOI, USGS, CCGC)
- Used averages for wells with multiple samples
- Excluded wells in urban Salinas area

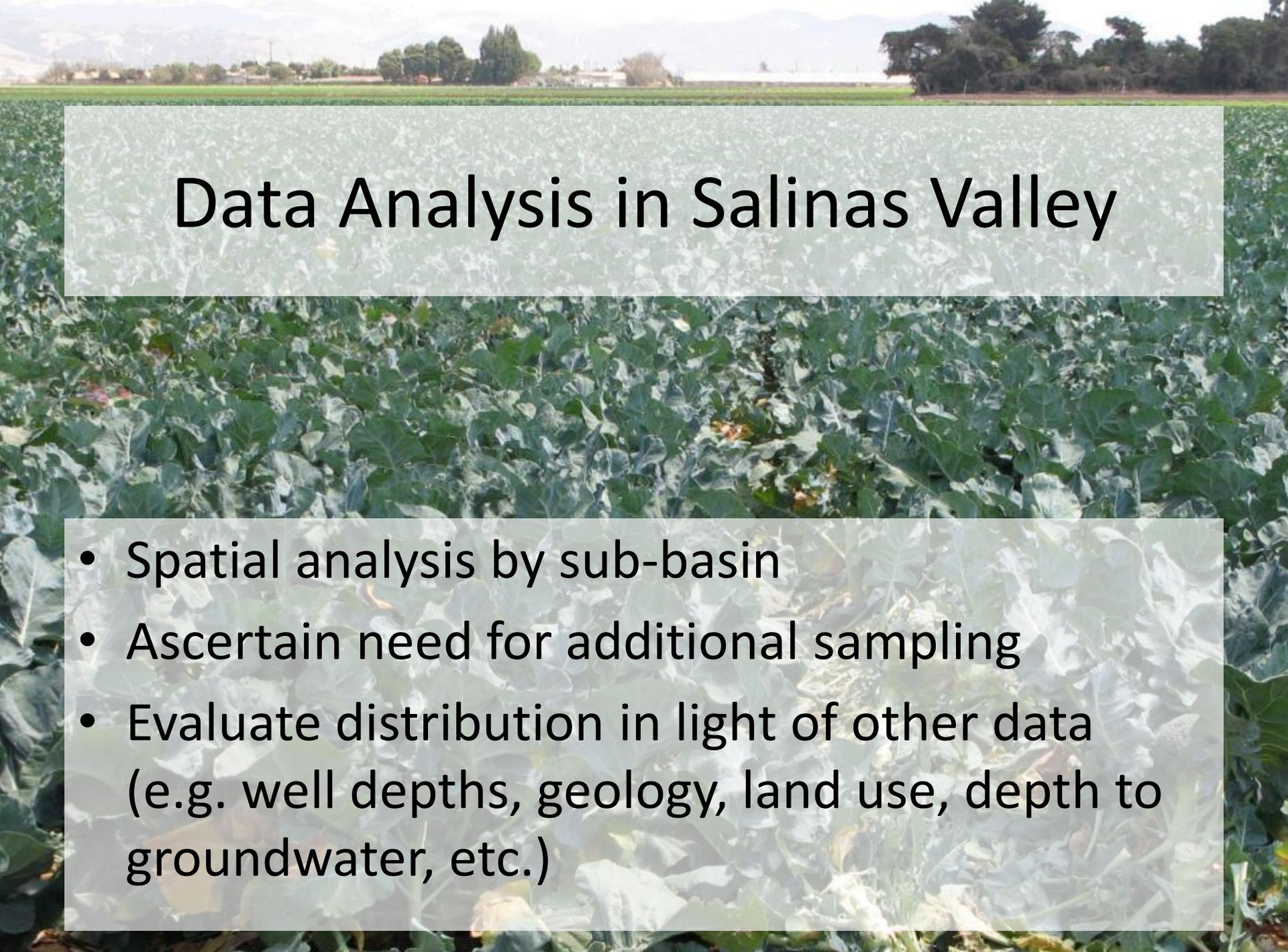


East Side Standard Deviation of Estimates



East Side Predicted vs. Observed





Data Analysis in Salinas Valley

- Spatial analysis by sub-basin
- Ascertain need for additional sampling
- Evaluate distribution in light of other data (e.g. well depths, geology, land use, depth to groundwater, etc.)

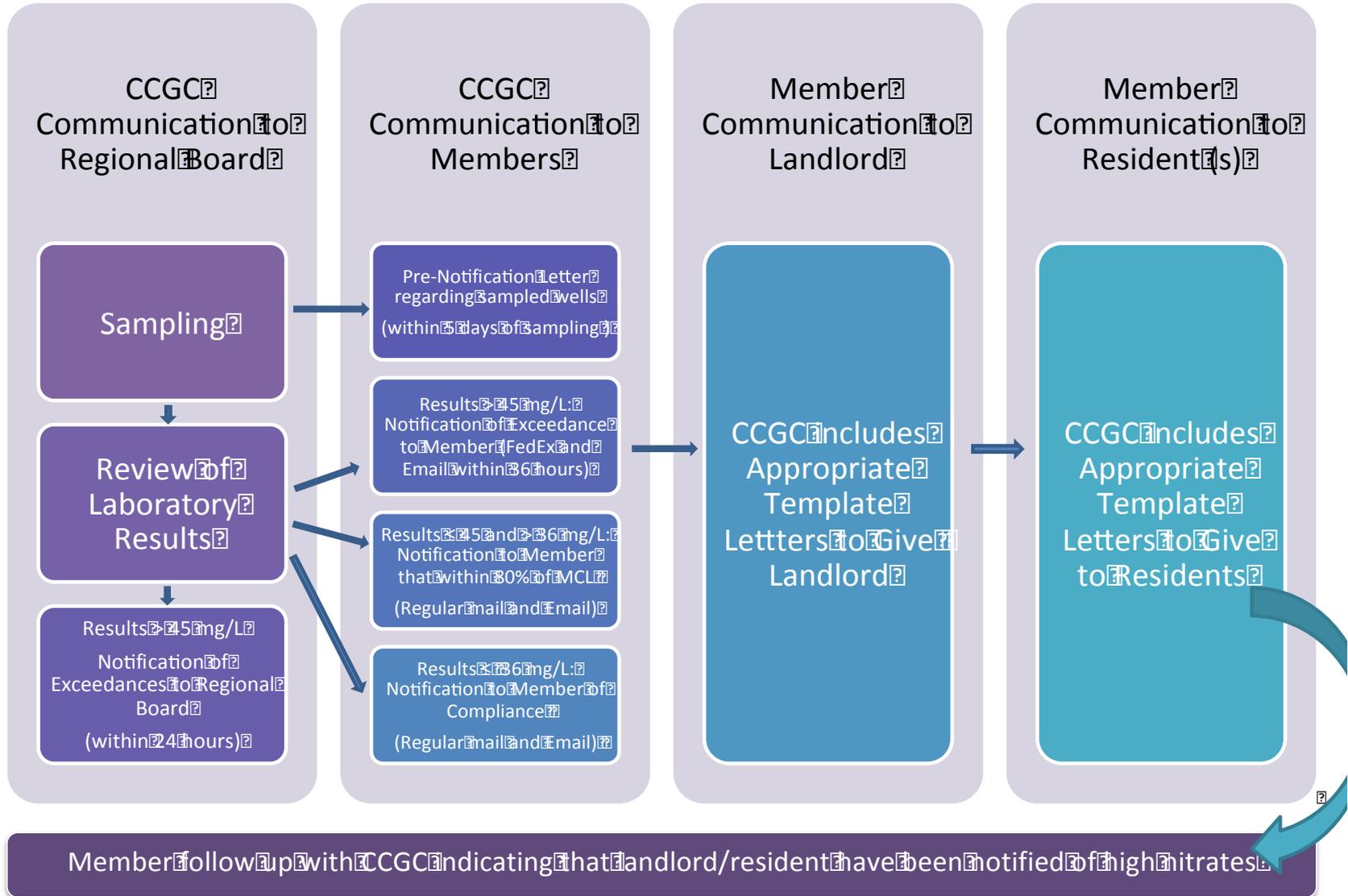
Salinas Valley Next Steps

- Use similar approach for other sub-basins
- Compile lists for additional sampling
- Interpret distributions in light of other chemical data (major ions, age dating, nitrate isotopes) and geohydrology, soils, land use, etc.
- Technical memorandum due April 30.

Groundwater Sampling Summary

- 653 wells sampled in 4 months
 - Extensive monitoring network throughout Central Coast region
- Developed notification system for effective communication
 1. Receive Results
 2. Notification to Growers and RB staff
 3. Follow up response from growers of voluntary actions
- Growers are taking appropriate actions to ensure that residents on properties have clean domestic water

SOP Notification Flowchart



Voluntary efforts of growers contacted after the initial round of well sampling

Round 1:

Replacement Water Response Summary



Summary of Member Responses

	Members	Wells
Total Number of Exceedances	17	33
Number of Responses	17	33
Responses Pending	0	0

Summary of Member Actions

Action Taken	Number of Wells
Bottled Water Provided	24
Not Used for Drinking	4
RO Unit Installed	2
Filtration System Added	3
Not responded	0
Grand Total	33

Parry Klassen

Central Coast Groundwater Coalition

Questions?



Southern Counties Individual Sampling

- Over 500 domestic and production wells sampled in December and January
- One crew working this week to finish sampling a total of approximately 530 wells

Sampled for

- Nitrate
- Major ions (calcium, magnesium, potassium, sodium, chloride, bicarbonate, sulfate)
- Field parameters (pH, electrical conductivity, dissolved oxygen, oxidation-reduction potential, temperature)

Round 2: Individual Monitoring Results

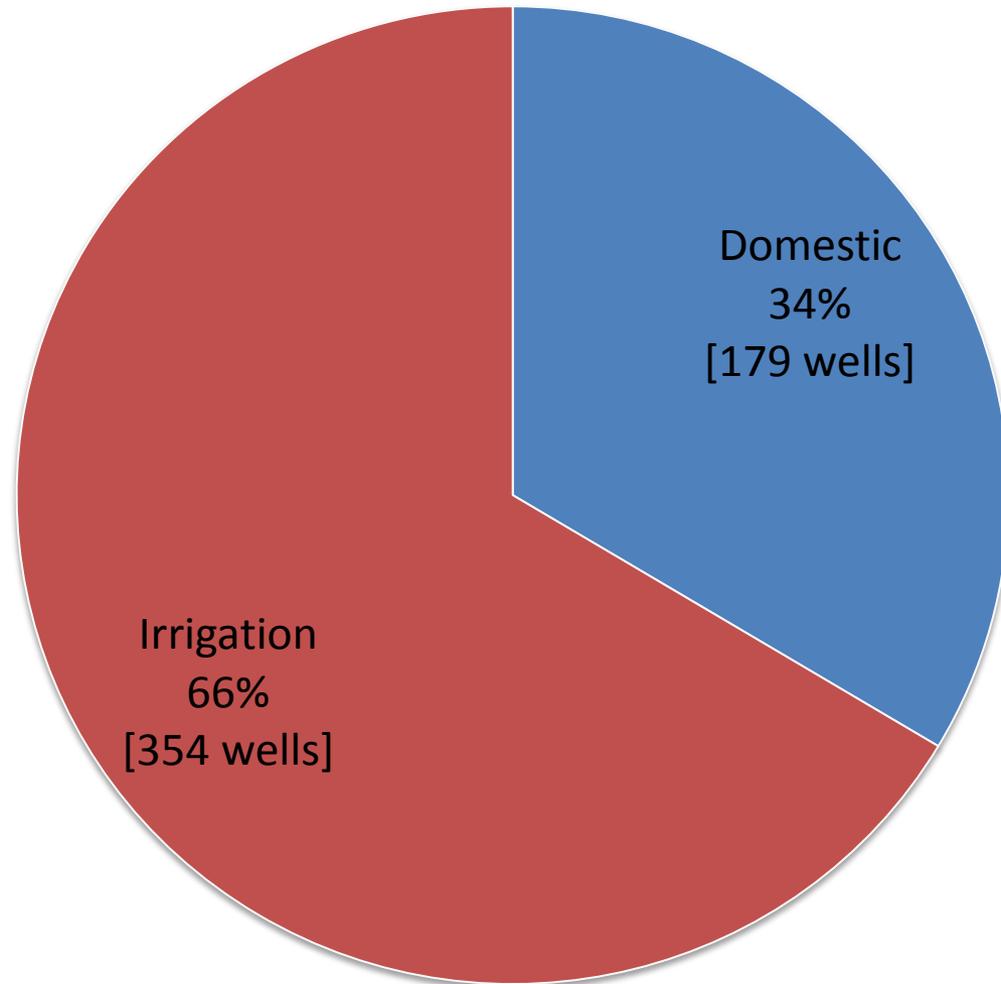
San Luis Obispo/Santa Barbara Counties

	Domestic	Irrigation
Greater Than MCL	4	7
Less Than MCL		12
Within 80% of MCL	0	
Less Than 80% of MCL	7	
Total Count	11	19

Exceedance notifications mailed January 27

Type of Wells Sampled

South Counties 11/19/13-1/31/14



Domestic Well Results

South Counties 11/19/13-1/10/14

