Watershed Working Group

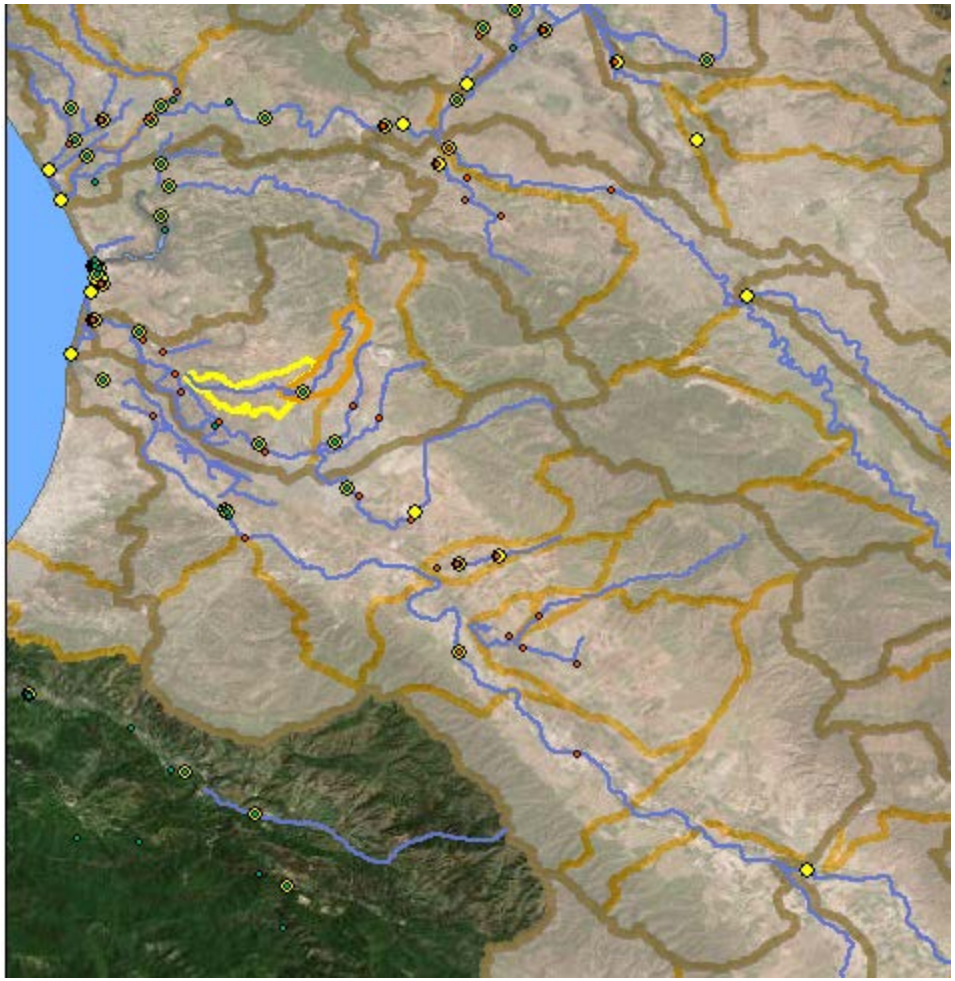
Any collective of people working together in a watershed of any scale toward shared goals.

Desired Meeting Outcomes

- Shared understanding of the current WWG efforts underway and reinforcement between groups.
- Note people/organizations interested in extending efforts to other watersheds, set up collaboration.
- Better understanding of keys to success at each scale and how an undertaking develops and adapts.

Watershed Scales

- Basin: Tembladero Slough
- Watershed: Alisal Slough
- Sub-Watershed Upper Santa Rita Creek

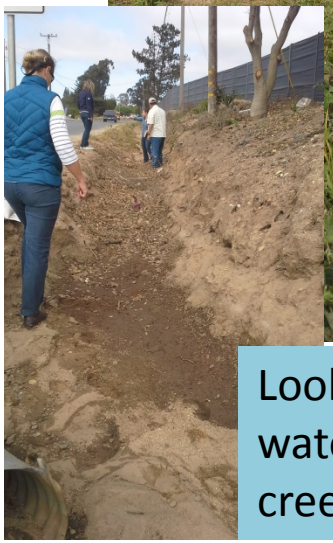


Santa Rita Creek WS
A Work in Progress

It started with a volunteer monitoring program

Volunteers Help Plant

AWQA Partnership



Looked for water inputs to creek

National Marine Sanctuaries ™ Monterey Bay

CCWG central coast wetlands group

RESOURCE CONSERVATION DISTRICT

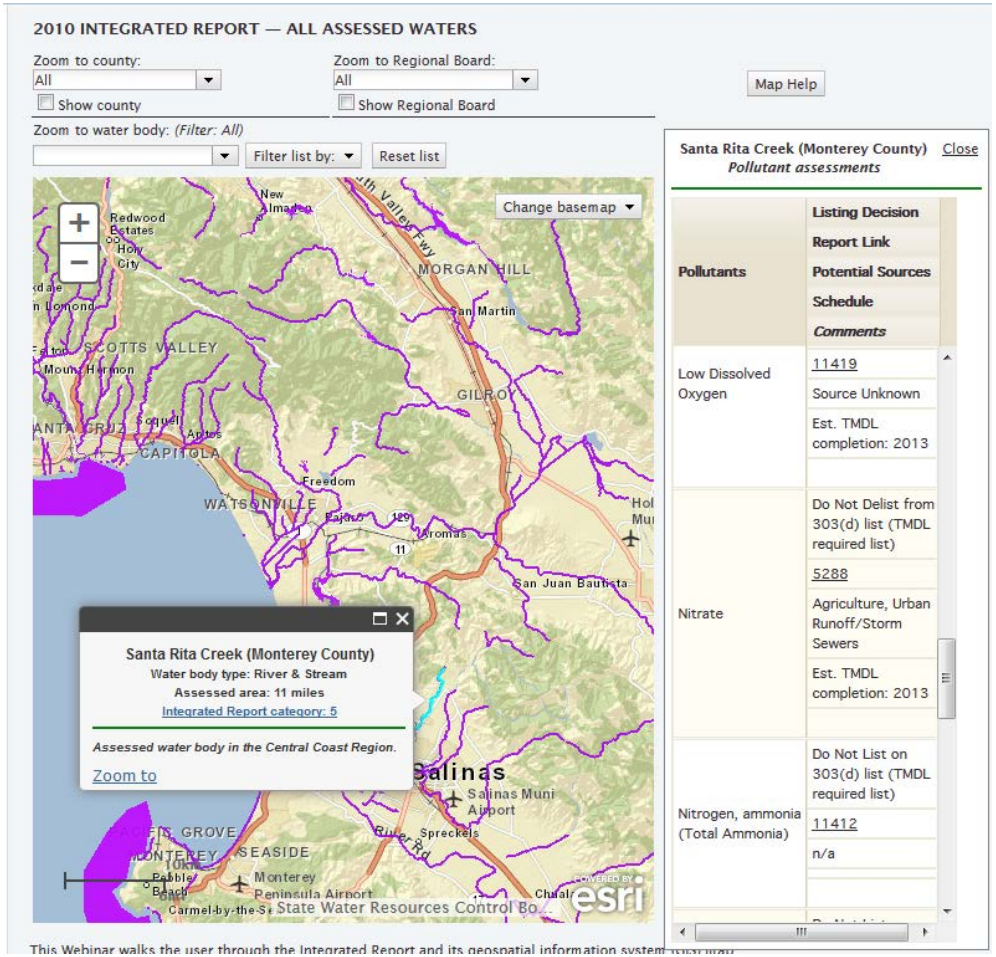
Organizations got an IRWM grant

UCCE & RCD Is Working with Growers

Early Identification of Water Quality Issues

303-D list

Nitrate
Ammonia
Bacteria
Low Dissolved Oxygen
Sodium
Turbidity



Monitoring Data

- Toxicity to invertebrates
- Snapshot Day Data found high nitrate
- CCAMP Data

http://www.waterboards.ca.gov/water_issues/programs/tmdl/

Question

Can we improve Water Quality in Santa Rita Creek through our Actions?

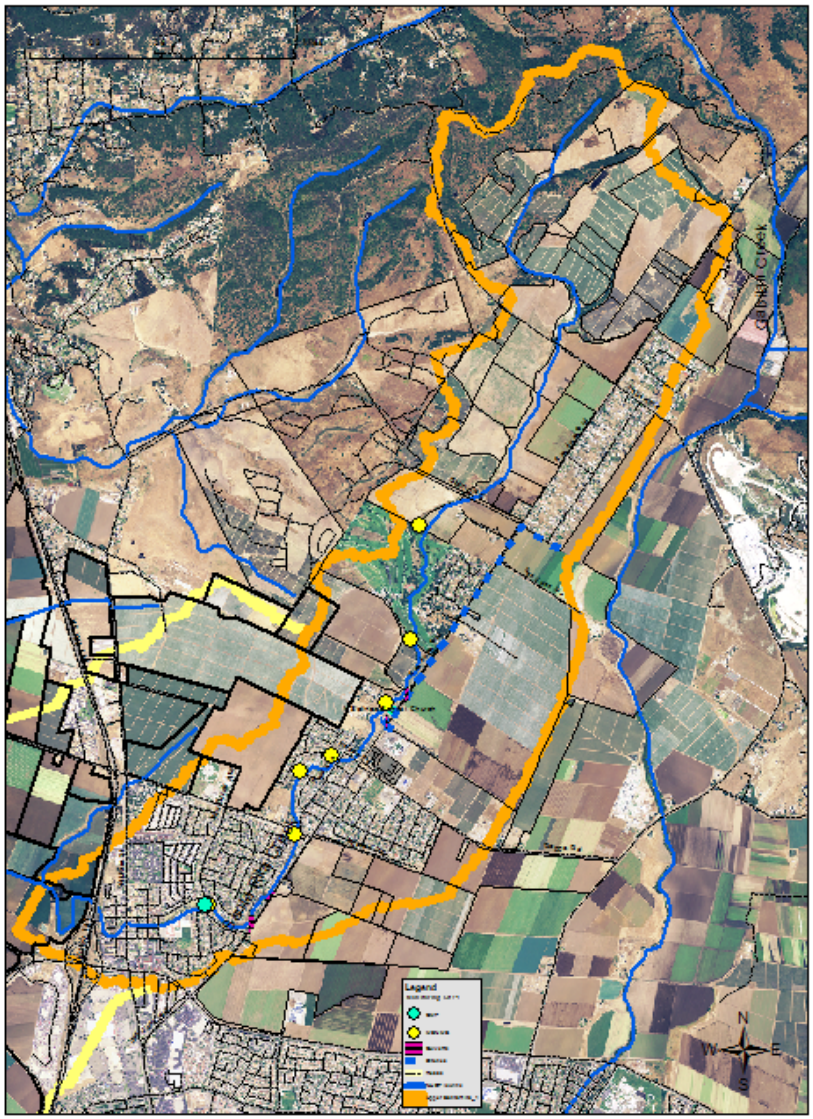
Hopes

- Create a Nicer Environment for the Community near the Ball Field. Foster stewardship.
- Reduce Flooding during storms by reducing sediment in culverts
- Be able to delist Santa Rita Creek from 303-D list for all analytes

Grant Project Goals, Desired Outcomes and Targets

Project Goals	**Desired Outcomes**	**Output Indicators** (measures to effectively track output)	**Outcome Indicators** (measures to evaluate change that is a direct result of the work)	**Measurement Tools and Methods** (must be consistent with Data Management Plan)	**Targets**[1] (measurable targets that are feasible to meet during the life of the Proposal)
Implementation of Erosion Control practices	No impact on Santa Rita Creek from upstream agriculture	Observation of erosion. Volume of sediment leaving strawberry fields	Visible lack of gullies and erosion on roads, furrows and slopes. Drains and ditches below fields lack excessive sedimentation	Visual assessment of rills and sedimentation. Estimation of volume of sediment in field bottom ditches based on sampled cross sections prior to and following winter storm periods.	80% less sediment in participating field bottom drains than estimated for the same fields without treatment
Implementation of Irrigation Management practices	No impact on Santa Rita Creek from upstream agriculture	Volume and timing of applied water. Observation of excessive irrigation tailwater or system leaks.	Applied water compared with estimated demand according to weather, soil, crop data, and irrigation system best practices. Presence/absence of significant leaks or other inefficiencies contributing excessive tailwater	Flow meter readings; recording of irrigation start and end times; CIMIS data incorporated into demand estimation formula; Distribution uniformity evaluations; system efficiency audits; observed leaks	Distribution uniformity and system audit70% for furrow irrigation, 75% for hand-move sprinkler, 80% for solid set sprinkler and 90% for drip irrigation sites
Implementation of Nutrient Management practices	No impact on Santa Rita Creek from upstream agriculture	Pounds of nutrient applied per acre. Load of nitrate and orthophosphate in tail water	Reduced input of fertilizer per acre; Reduced fall applications of nitrogen	Communication with growers and recording of fertilizer applications and timing	20% reduction in pounds of nitrogen applied per acre; 50% of participating growers reducing or eliminating fall nitrogen fertilizer applications
Implementation of Manure Management practices	No impact on Santa Rita Creek from local ranchettes.	Load of nitrogen, sediment, and/or pathogens in drains leaving properties	Reduced pollutant load in water leaving participating ranchettes	Load Reduction Model for participating ranchettes run prior to and post BMP implementation	Estimated load reductions of 80% at participating ranchette sites
Improved Habitat on Santa Rita Creek	Healthy native vegetation on 0.25 miles of creek.	Increased cover of native vegetation, reduction in bare ground and non-native vegetation	Comparison of before and after photos, and pre- and post-project CRAM scores	4 CRAMs conducted at Ferrasci Park before, during and post restoration, CRAMs at two reference sites done before and after implementation Photo Monitoring	Improvements in some metric scores for leading to an improvement in overall CRAM score of 12-15% for the ball field

Santa Rita Creek Upper Subwatershed



Data Sources

National Hydrology Dataset
- NHD Flow Lines
- NHD Catchments

National Agriculture Imagery Program (NAIP)

Monterey County Ranch Maps

Tiger Products Roads

CCAMP Monitoring Sites

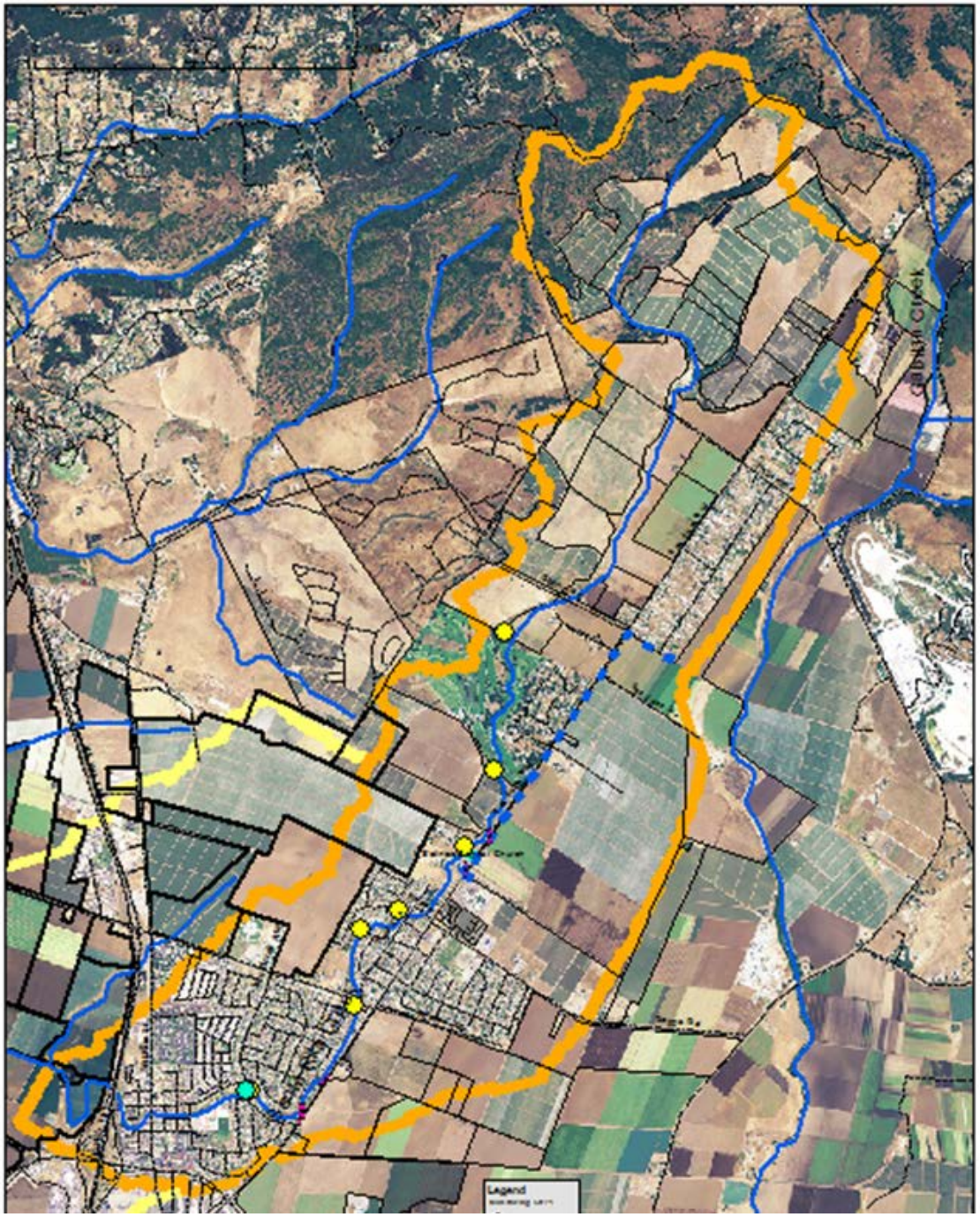
Added:

MBNMS Monitoring Site Lat / Long

Culverts

Ditches

Key Buildings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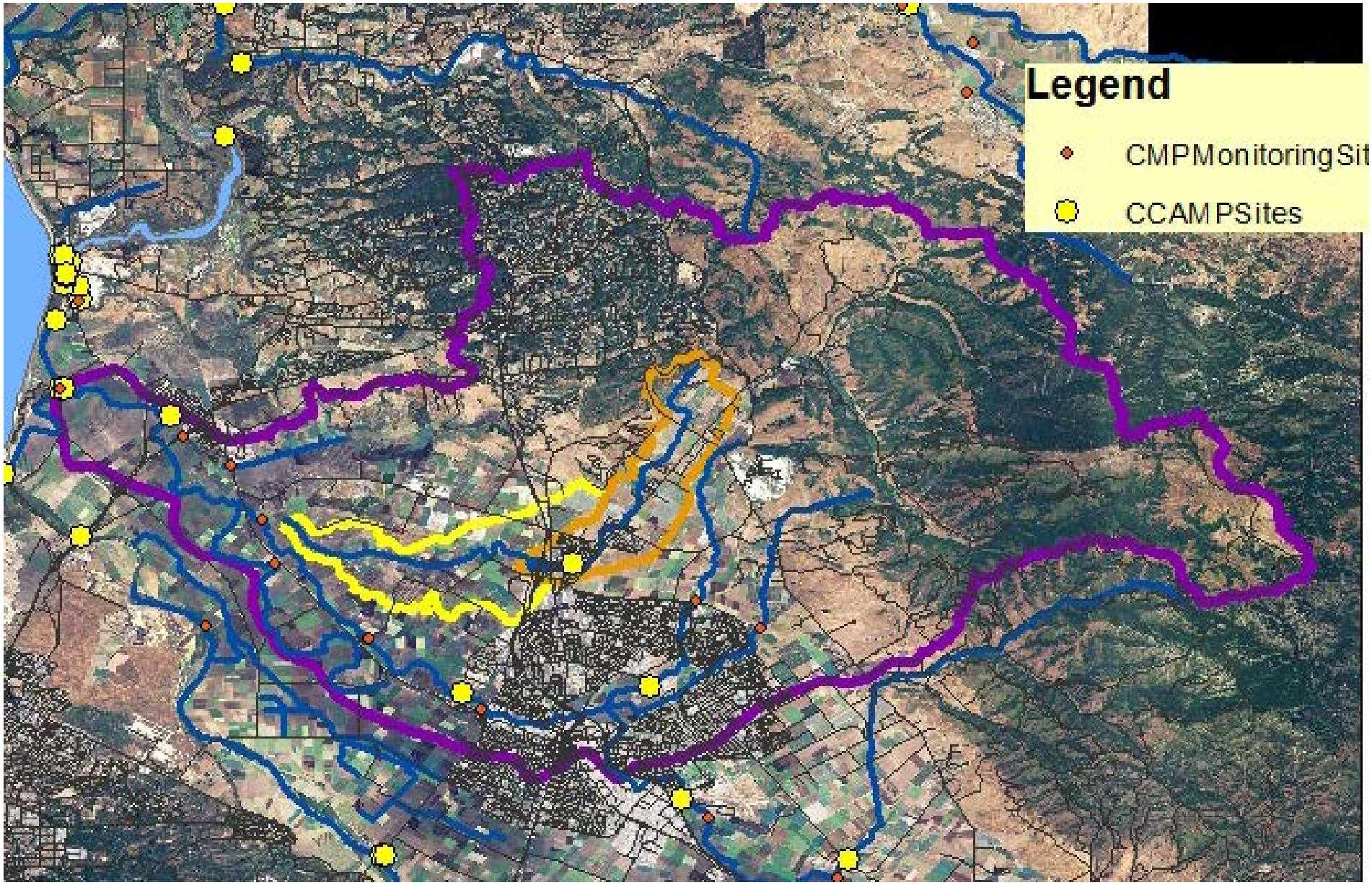

Legend
CMPMonitoringSit
CCAMPSites

All Sites Recent Water Quality Results

In December, two days after rain, all MBNMS sites were monitored, shown from upstream to downstream.

Nitrate as N (WQO = 1)			
309-SRITA-33	12/18/2014	24.4	mg/L
309-SRITA-38	12/18/2014	23.3	mg/L
309-SRITA-39	12/18/2014	23.0	mg/L
309-SRITA-32	12/18/2014	23.8	mg/L
309-SRITA-37	12/18/2014	20.7	mg/L
309-SRITA-34	12/18/2014	20.2	mg/L
309-SRITA-35	12/18/2014	19.1	mg/L
OrthoPhosphate as P (WQO = 0.12)			
309-SRITA-33	12/18/2014	1.6	mg/L
309-SRITA-38	12/18/2014	0.5	mg/L
309-SRITA-39	12/18/2014	1.4	mg/L
309-SRITA-32	12/18/2014	ND	mg/L
309-SRITA-37	12/18/2014	1.7	mg/L
309-SRITA-34	12/18/2014	1.7	mg/L
309-SRITA-35	12/18/2014	1.5	mg/L
Suspended Solids,Total (WQO = 500)			
309-SRITA-33	12/18/2014	62	mg/L
309-SRITA-38	12/18/2014	15	mg/L
309-SRITA-39	12/18/2014	20	mg/L
309-SRITA-32	12/18/2014	22	mg/L
309-SRITA-37	12/18/2014	66	mg/L
309-SRITA-34	12/18/2014	24	mg/L
309-SRITA-35	12/18/2014	67	mg/L

Results from Van Buren Bridge

Nitrate (mg/L)					
Org	**Site ID**	**Date Range**	**Min**	**Max**	**Mean**
MBNMS*	309-SRITA-35	9/5/14 to 2/23/15	2.10	19.10	6.35
CCAMP*	309RTA	1/12/2012 to 12/11/2012	1.00	27.00	8.00
CMP	309RTA	1/8/2014 to 12/3/2014	2.29	10.10	5.65
OrthoPhosphate as P					
MBNMS	309-SRITA-35	9/5/14 to 2/23/15	ND	1.50	0.40
CCAMP	309RTA	1/12/2012 to 12/11/2012	0.16	0.68	0.39
CMP	309RTA	1/8/2014 to 12/3/2014	0.39	1.12	0.64
Ammonia as N					
MBNMS	309-SRITA-35	9/5/14 to 2/23/15			
CCAMP	309RTA	1/12/2012 to 12/11/2012	0.03	4.30	0.71
CMP	309RTA	1/8/2014 to 12/3/2014	0.04	0.09	0.05
Total Suspended Solids					
MBNMS	309-SRITA-35	9/5/14 to 2/23/15	5.00	67.00	30.33
CCAMP	309RTA	1/12/2012 to 12/11/2012	3.80	1200.00	316.49
CMP	309RTA	1/8/2014 to 12/3/2014	364.00	1300.00	662.18

- 2006 CCAMP data nitrate max value was 64 mg/L and mean was 9.5 mg/L.
- 2006 MBNMS data nitrate values were similar to recent data.

Understanding Contributions Ditches and Culverts

Ditches can carry water to a different monitoring point that the traditional watershed runoff approach.

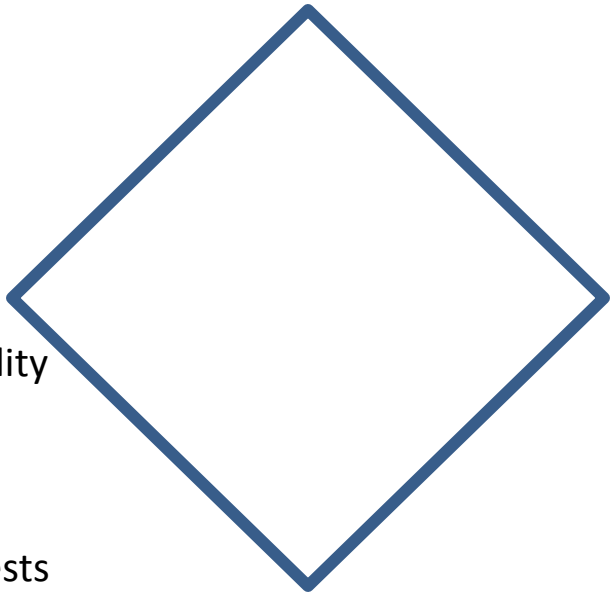
Instruments

- Camera or Phone for photos
- Map of Watershed
- Nitrate Test Strips
- Water Sample Bottle
- Shovel
- Investigative Mindset realizing this is a single event
- Other WQ measurement tools
- Water Quality Data
- Best Management Practices relevant to specific Issues
- Restoration and Inclusion of the Community
- Outreach to Build Stewardship
- Explore all contributions: Urban, Ag, Ranchette

Overall Activity Approach

Direction

Stakeholder Involvement



Grounds

- Water Quality Issues
- Actions to Improve
- Joint Interests

Goals

- Hopes
  - Delist 303D
  - Reduce Flooding
  - Improve WQ
- Outcomes

Instruments

Maps, photos, BMPS, Ongoing Monitoring

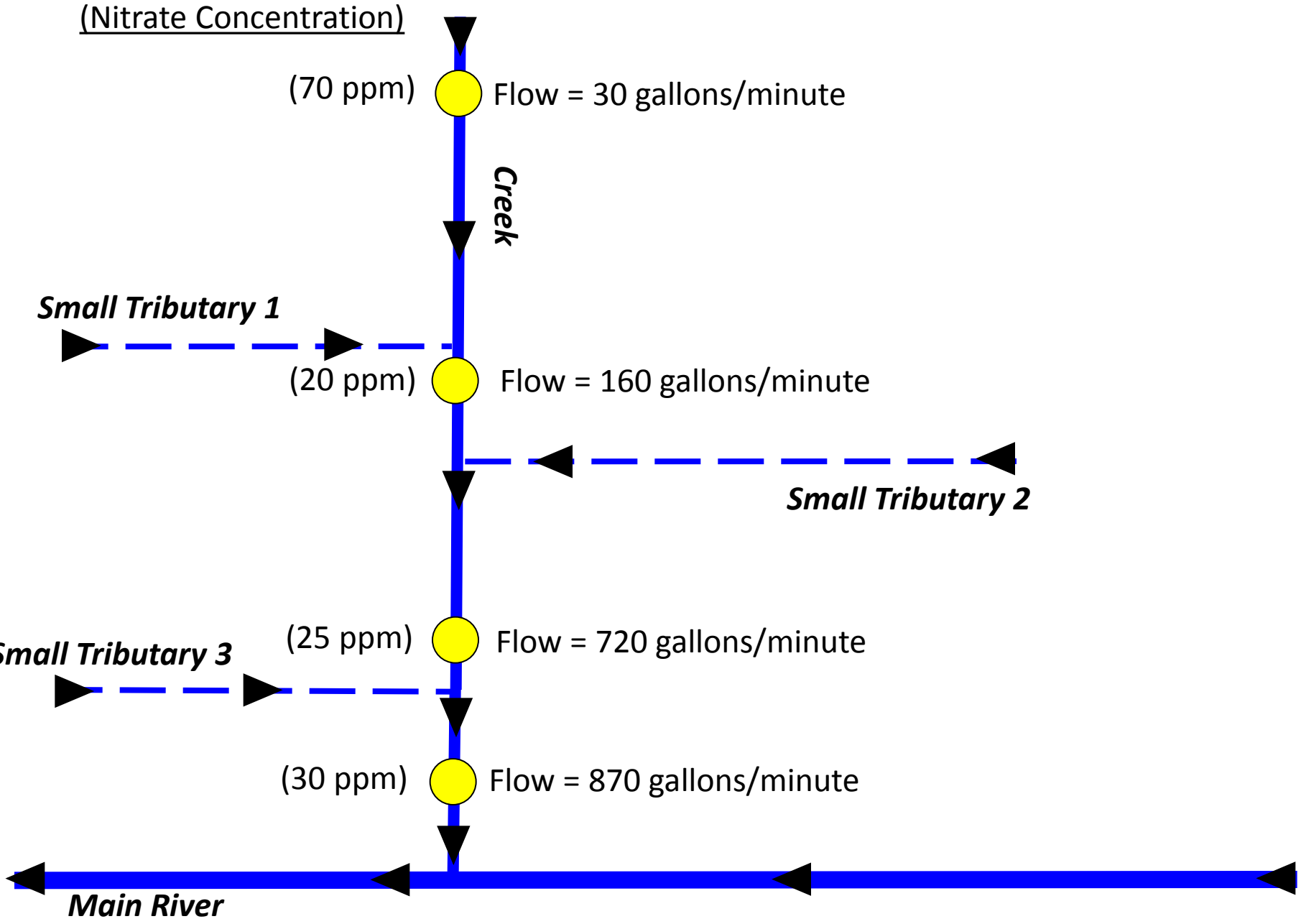
CMP Data & Outreach

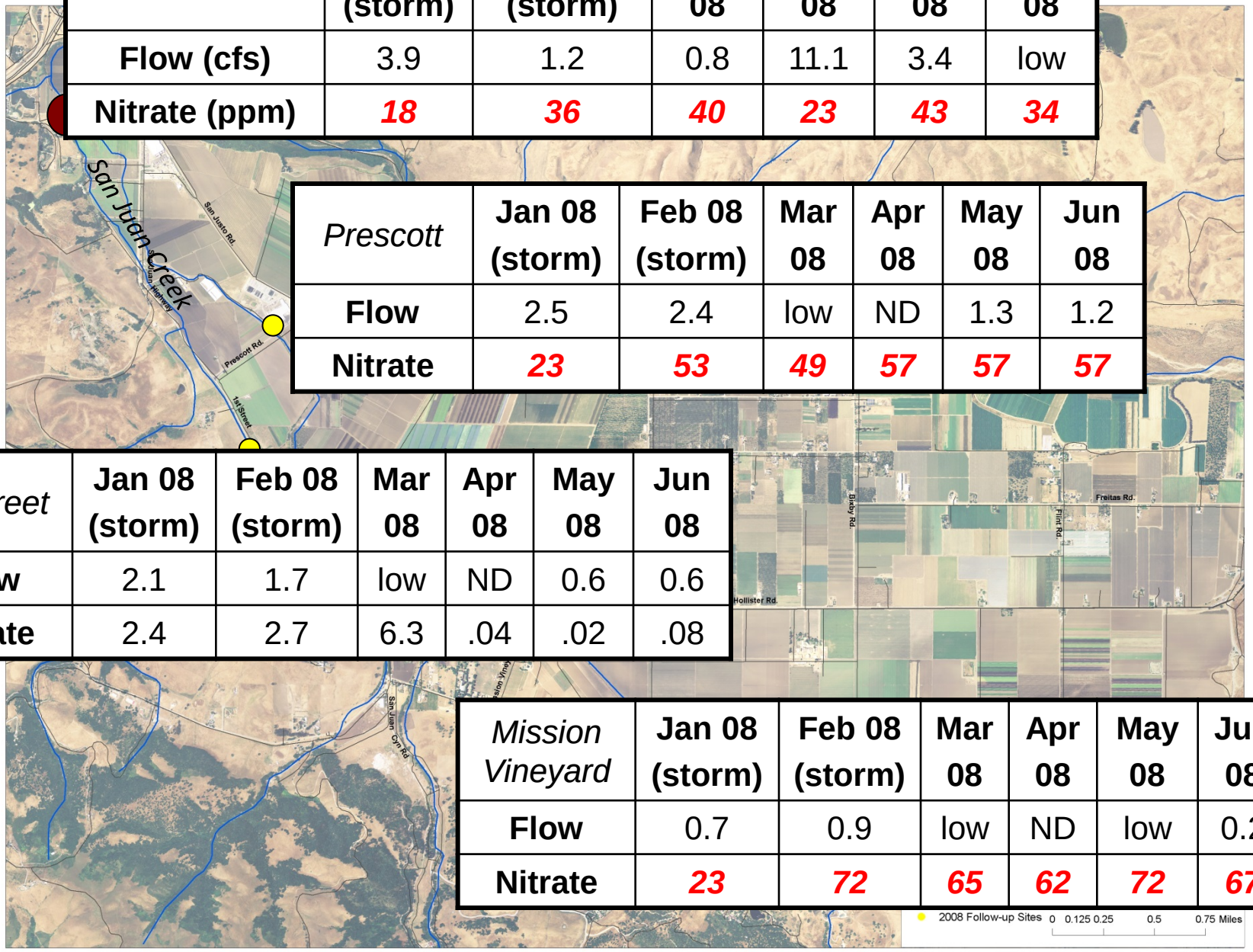
- CMP monitors impaired ag watersheds
- Quarterly formatted raw data submittals to Regional Water Quality Control Board
- Annual narrative reports (also to RWQCB)
- Sub-regional data summaries/presentations for growers
  - Hosted by Farm Bureau, AWQC, corporate
  - Discuss status and trends of local water bodies, in ag context
- Individual farm outreach
  - Custom data report specific to single watershed
  - Confidential on-farm sampling
- Watershed focused outreach

CMP Approach to Watershed Outreach

- Focus on single water body, hydrologically defined
  - Only includes growers with ranches draining to the monitoring point
- Repeated field trips for visual observation and quick-testing to locate sub-watershed areas that drive patterns in CMP data (tribs, ditches, drains)
- Contact current or master lease holders for contributing ranches
  - Advise grower of ranch's role in CMP results
  - Farm-level sampling to determine "within farm" sources
  - Refer to technical advisor if applicable

Learning the Watershed Loading Pattern





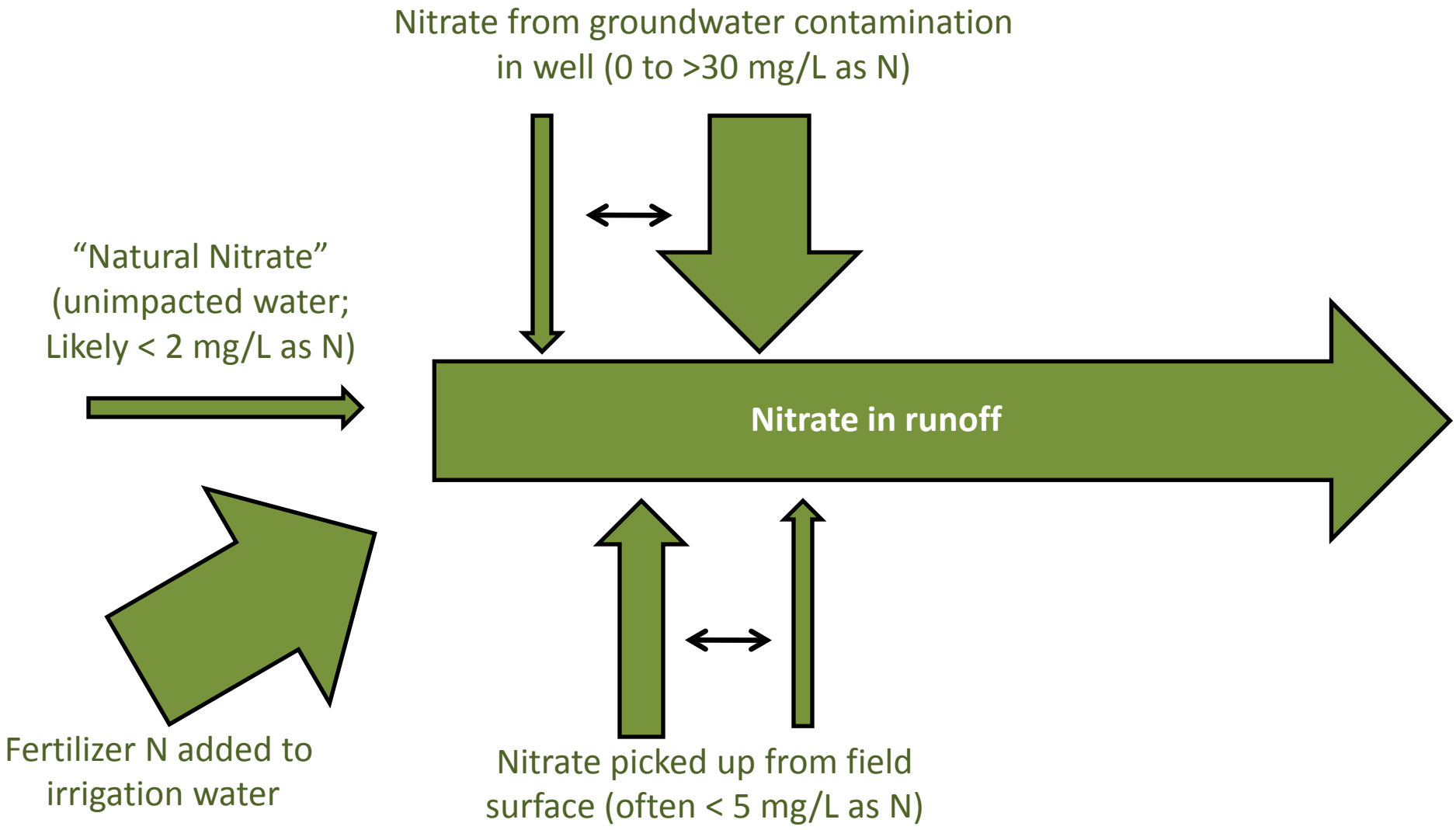
Anzar	Jan 08 (storm)	Feb 08 (storm)	Mar 08	Apr 08	May 08	Jun 08
Flow (cfs)	3.9	1.2	0.8	11.1	3.4	low
Nitrate (ppm)	***18***	***36***	***40***	***23***	***43***	***34***

Prescott	Jan 08 (storm)	Feb 08 (storm)	Mar 08	Apr 08	May 08	Jun 08
Flow	2.5	2.4	low	ND	1.3	1.2
Nitrate	***23***	***53***	***49***	***57***	***57***	***57***

1st Street	Jan 08 (storm)	Feb 08 (storm)	Mar 08	Apr 08	May 08	Jun 08
Flow	2.1	1.7	low	ND	0.6	0.6
Nitrate	2.4	2.7	6.3	.04	.02	.08

Mission Vineyard	Jan 08 (storm)	Feb 08 (storm)	Mar 08	Apr 08	May 08	Jun 08
Flow	0.7	0.9	low	ND	low	0.2
Nitrate	***23***	***72***	***65***	***62***	***72***	***67***

"Upstream Monitoring" Results for San Juan Creek


Nitrate from groundwater contamination in well (0 to >30 mg/L as N)
"Natural Nitrate" (unimpacted water; Likely < 2 mg/L as N)
Nitrate in runoff
Fertilizer N added to irrigation water
Nitrate picked up from field surface (often < 5 mg/L as N)

Sampling to determine "within-farm sources"