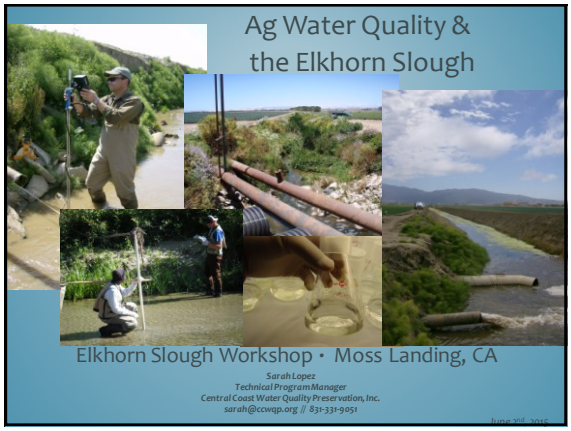
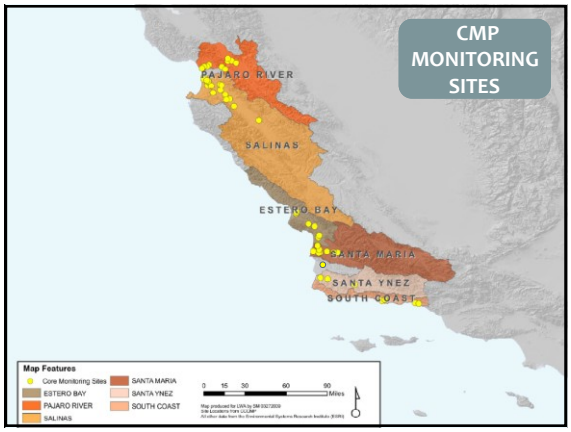


Outline

1. *CMP (Cooperative Monitoring Program) background*
2. *Water quality results around Elkhorn Slough*
3. *Trends*
4. *How do farmers influence trends?*



Monitoring Schedule

Monthly

- **Basic physical/ chemical parameters**
  - Temp, pH, Conductivity, Turbidity, Diss. Oxygen, Stream Flow
- **Nutrients**
  - Nitrate, Ammonia, Ortho-phosphate
  - Total N, Total P

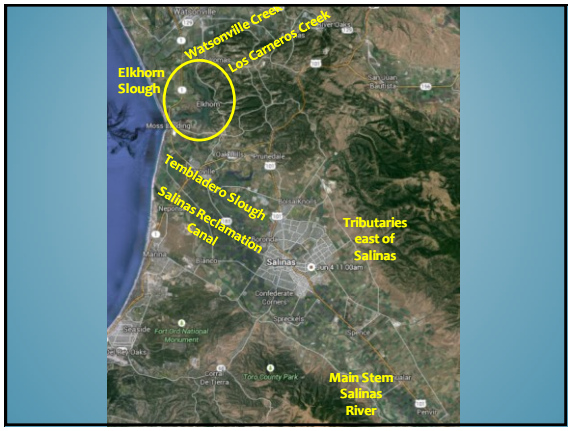
4x/ year (2 wet; 2 dry)

- Toxicity to ***invertebrates*** in water
- Toxicity to ***fish*** in water
- Toxicity to ***algae*** in water

Annually

- Toxicity to invertebrates in sediment

Additional projects conducted periodically to investigate sources/causes of water quality issues observed during routine monitoring. The CMP also performs **Outreach** to growers and other stakeholders.



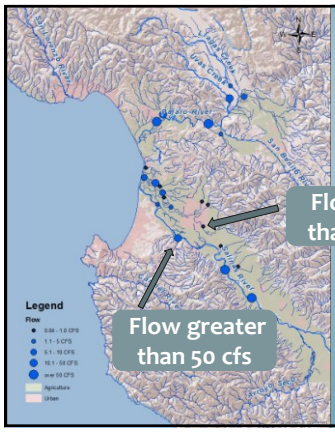
Units of Flow

1 cfs = 450 gpm =

"cubic foot per second" *"gallons per minute"*

About 15-20 garden hoses

Watsonville Creek = 0.5 cfs
Los Carneros Creek = 0.2 cfs
Tembladero Slough = 0.9 cfs
Salinas River at Chualar = dry (>50 cfs in past)
Old Salinas River = 0.4 cfs (-90 to 8 cfs)

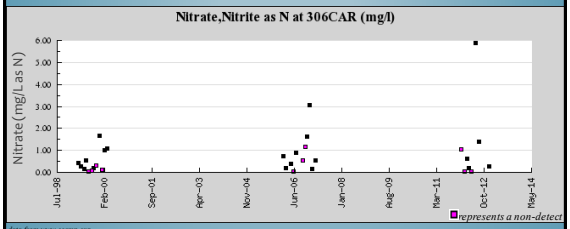


Flow less than 1 cfs

Flow greater than 50 cfs

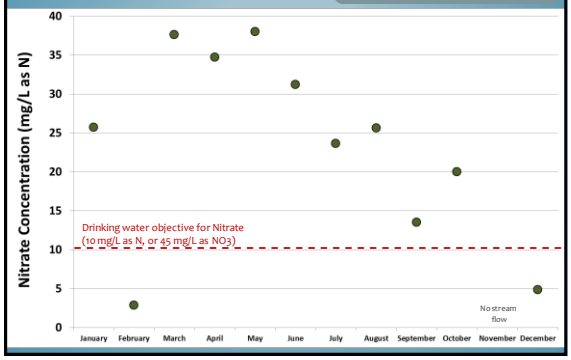
Reduced nutrient loading from high-concentration/ low-flow tributaries improves water chemistry for aquatic life in mainstem rivers with larger, diluting base flows

Nitrate in Los Carneros Creek

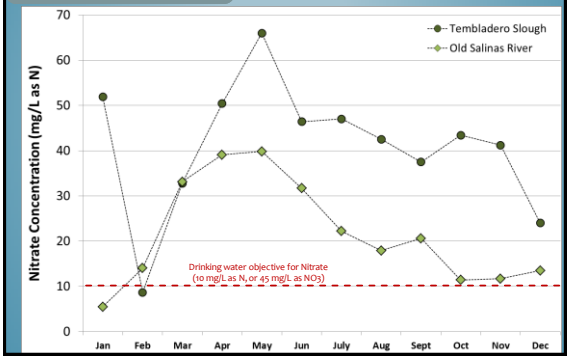


- Data from the Water Board's CCAMP program
- 2012 results do not reflect the full year of monitoring (more to come!)
- "High" values around 3-6 mg/L; Ag/urban discharges can be 20-80 mg/L
- High values may be getting higher; majority of results appear relatively constant

Nitrate in Watsonville Creek

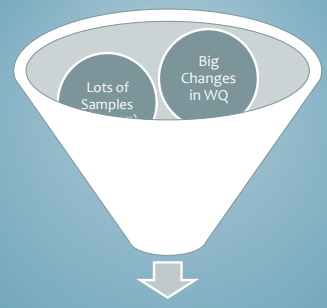


Nitrate in Tembladero Slough & Old Salinas River



Turbidity also matters

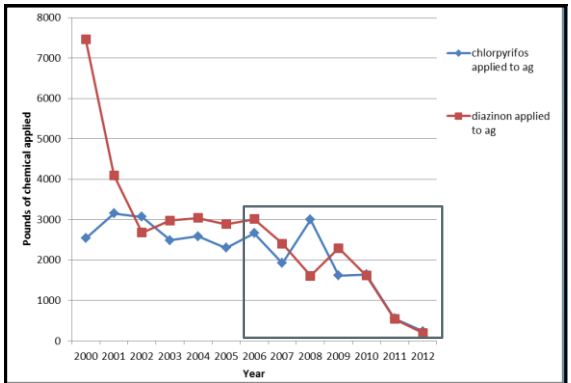
- *Turbidity is an indicator of eroded soil or churned up sediment*
  - *"Clear water" has Turbidity <5 NTU*
  - *Water with 10's to 100's of NTU's looks cloudy*
  - *Water with 1000's of NTU's looks like chocolate milk*
- *Turbidity in and of itself affects aquatic life*
- *Eroded soils can carry adsorbed nutrients (e.g. Phosphate) and pesticides (e.g. Pyrethroids)*
- *Watsonville Creek typically has low Turbidity, except in very high flow conditions*
- *Carneros Creek, Tembladero Slough and Old Salinas River Channel have moderate to high Turbidity*



More Data, More Trends

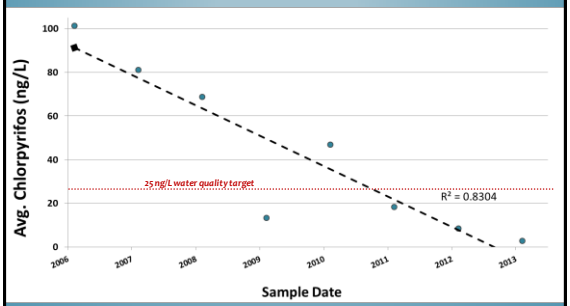
- *Every year we detect more trends, from about 20% of possible trends after the first five year waiver period, to just over 30% in 2013*
- *As of 2013, 70% of CMP sites showed declining trends in Stream Flow*
- *22% of sites showed increasing trends in Nitrate; all but 1 had declining Stream Flow*
- *28% of sites showed decreasing trends in Nitrate; often associated with declining Stream Flow as well*
- *36% of sites showed decreasing trends in Turbidity (eroded soil); only 1 increasing trend*

How do farmers influence trends?



Graph from CCRWQCB Draft Final Project Report for Pajaro Chlorpyrifos & Diazinon TMDL, 2013

Annual Chlorpyrifos Monitoring Averages in Agricultural Watersheds of California's Central Coast, 2006-2013

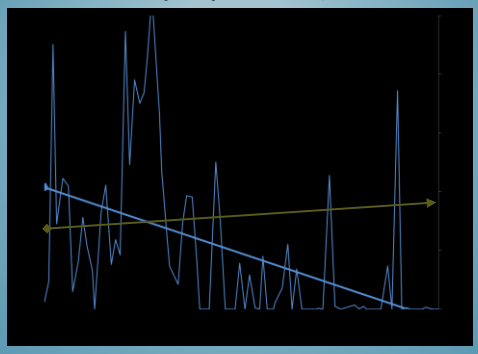


How do farmers influence trends?

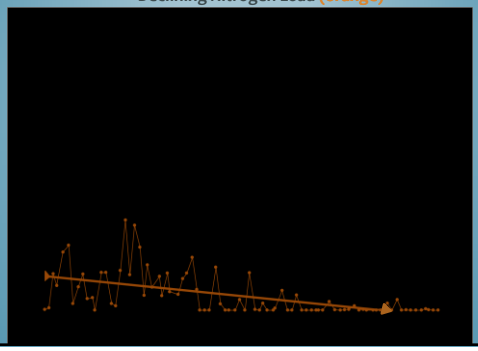
A farmer's ability to influence water quality downstream depends on several factors

1) *Whether or not the farm discharges to the location in which water quality is measured;*
2) *How much water the farm discharges relative to other contributors;*
3) *How concentrated the nutrients, sediment, or pest control materials are in the farm's discharge relative to other contributors;*
4) *Whether or not the stream has "base flow" (and how much);*
5) *Whether or not the farmer is in immediate control of the sources of nutrients, soil, or pest control materials in his water;*
6) *Whether or not available management actions will change the discharge water quality to a meaningful degree*

Nitrate Concentration and Stream Flow in Quail Creek, Monthly Samples from 2005 - 2011



Quail Creek Trends:
Increasing Nitrate Concentration (green)
Declining Stream Flow (blue)
Declining Nitrogen Load (orange)



Farmers *DO* influence trends

… but very few "off the shelf" solutions are available, it takes a lot of data to show the changes, and the changes don't always look the way we expect them to look.

It's a tricky business.