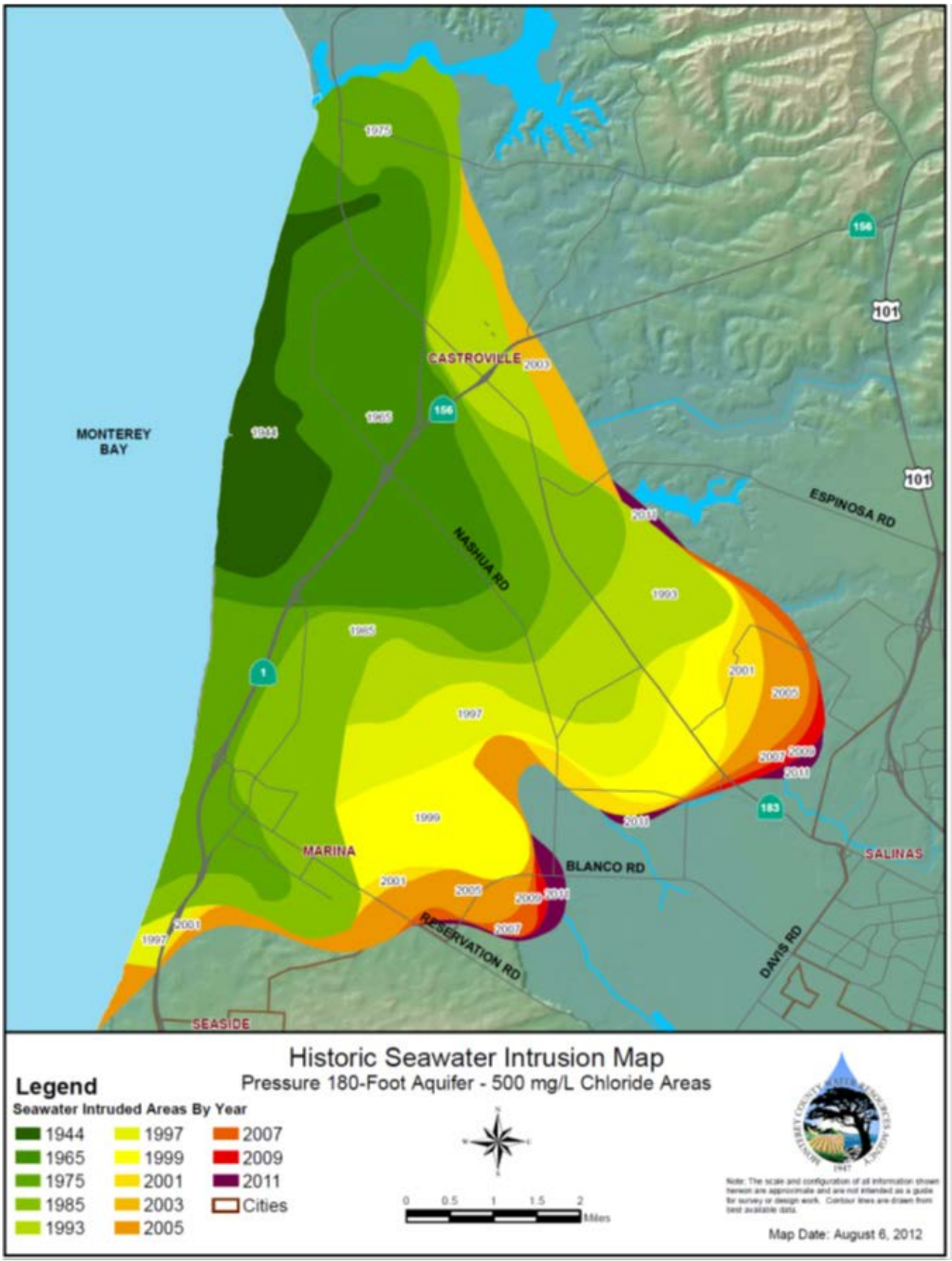
Water in the Salinas Valley –

- Starts as rainwater.
- Captured in reservoirs – San Antonio and Nacimiento
- Discharged through the summer to percolate into groundwater
- Groundwater is pumped for agriculture (90%) and cities (20%)
- Nutrients and pesticides are added and the water is discharged
    - Most percolates
    - Some is discharged as surface water
        - Some percolates
        - Some stays surface water

- Groundwater is pumped for agriculture and cities
- Nutrients and pesticides are added and the water is discharged
    - Most percolates
    - Some is discharged as surface water
        - Some percolates
        - Some stays surface water

Water is continuously cycled between surface and ground water, accumulating new pollutants every cycle.

In the Salinas Valley – and many agricultural areas – there is no difference between ground and surface water.



Historic Seawater Intrusion Map

Pressure 180-Foot Aquifer - 500 mg/L Chloride Areas

Legend

Seawater Intruded Areas By Year

1944	1997	2007
1965	1999	2009
1975	2001	2011
1985	2003	Cities
1993	2005	

0 0.5 1 1.5 2 Miles

Note: The scale and configuration of all information shown hereon are approximate and are not intended as a guide for survey or design work. Contour lines are drawn from best available data.

Map Date: August 6, 2012

What is added?

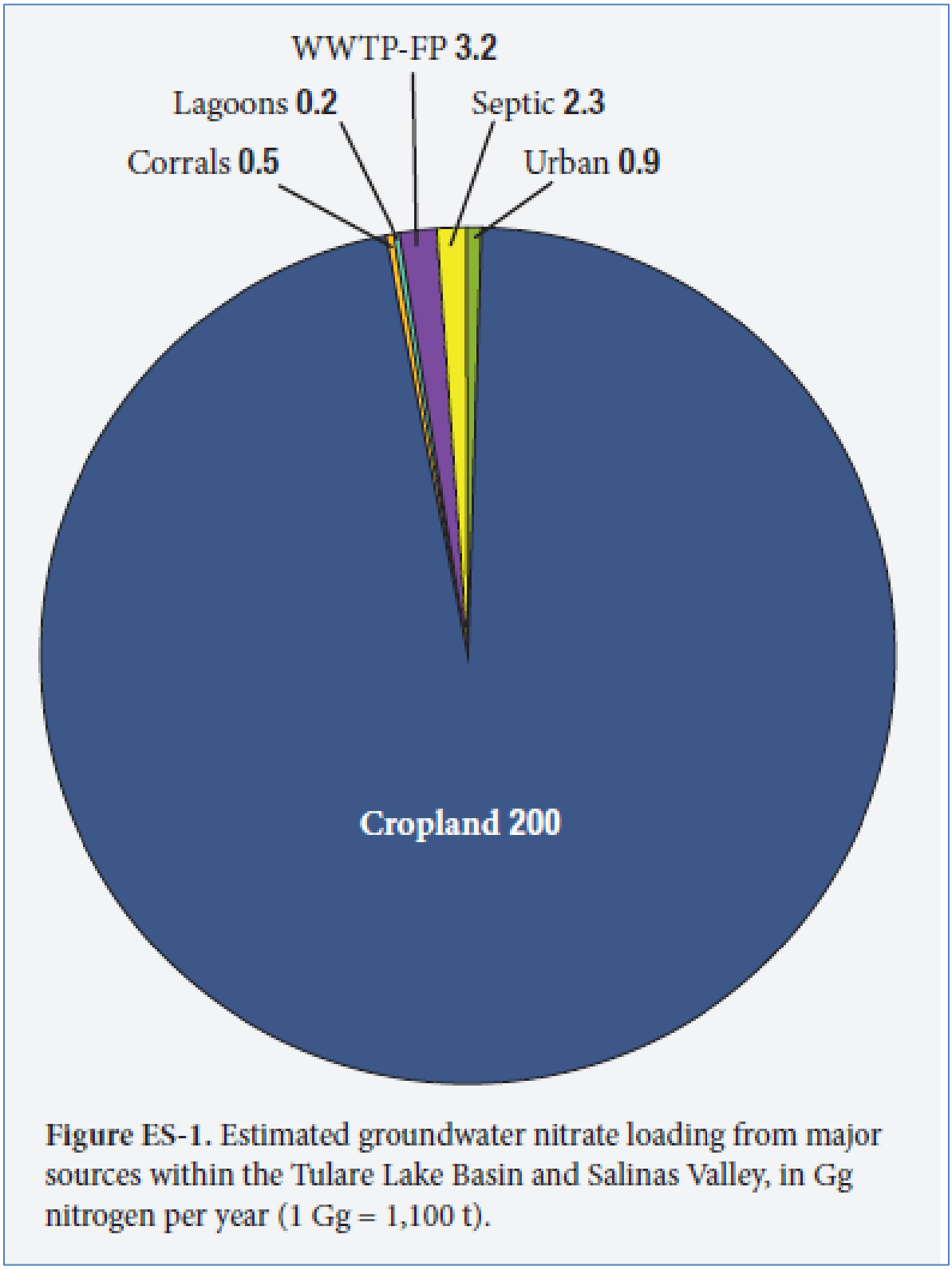
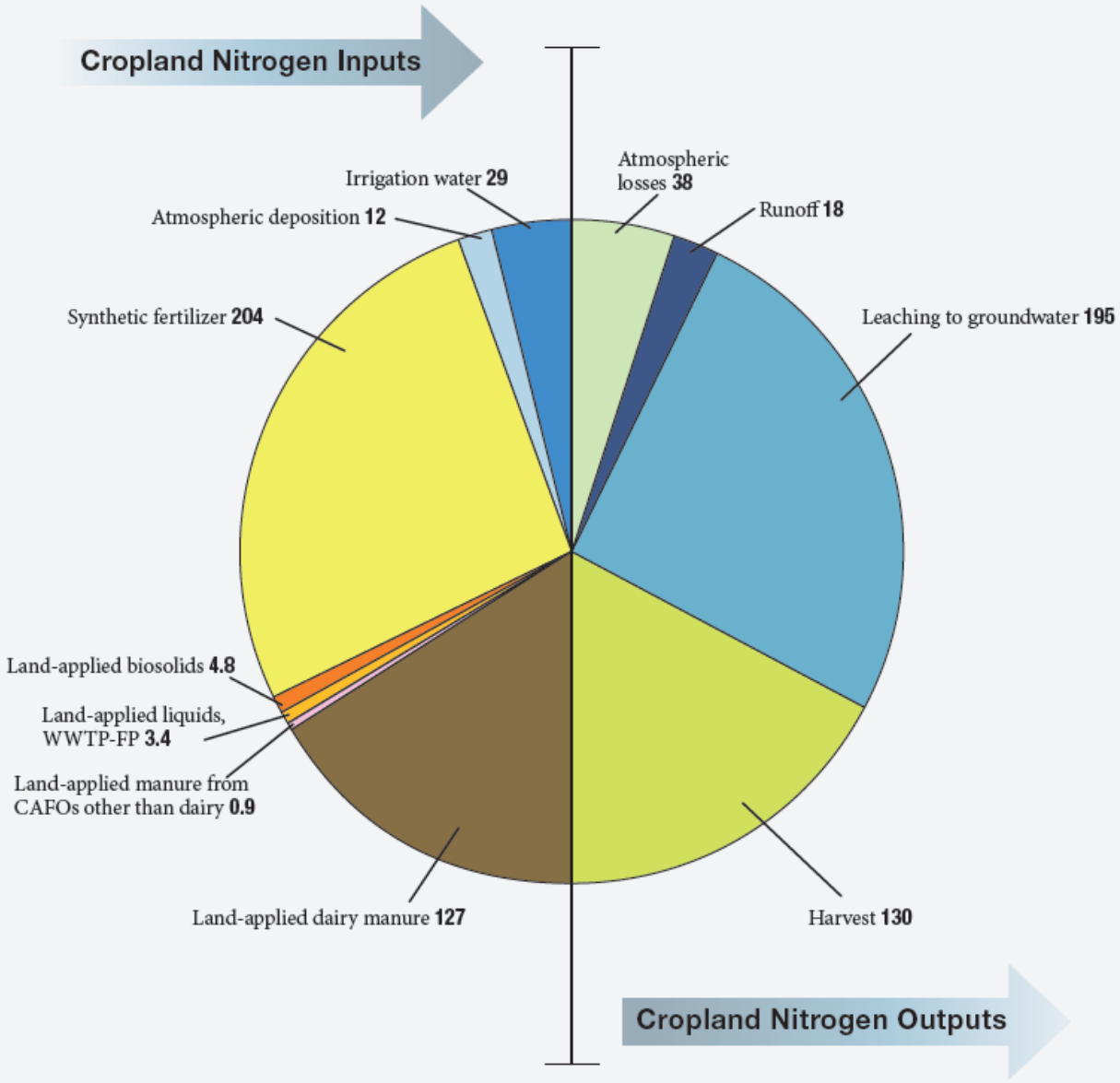


Figure ES-1. Estimated groundwater nitrate loading from major sources within the Tulare Lake Basin and Salinas Valley, in Gg nitrogen per year (1 Gg = 1,100 t).



Note: No mass balance was performed on 0.17 million ha (0.4 million ac) of nitrogen-fixing alfalfa, which is estimated to contribute an additional 5 Gg N/yr to groundwater. Groundwater nitrate loading from all non-cropland sources is about 8 Gg N/yr.

Figure ES-2. Overview of cropland input and output (Gg N/yr) in the study area (Tulare Lake Basin and Salinas Valley) in 2005. The left half of the pie chart represents total nitrogen inputs to 1.27 million ha (3.12 million ac) of cropland, not including alfalfa. The right half of the pie chart represents total nitrogen outputs with leaching to groundwater estimated by difference between the known inputs and the known outputs. Source: Viers et al. 2012.

Average Diazinon Agricultural Use, Summer (June - August), 2003-2007.
Use is in pounds of active ingredient. Source: DPR

Problem exacerbated by 2006 *E. coli* outbreak and National Flood Insurance Program.


12.06.2008

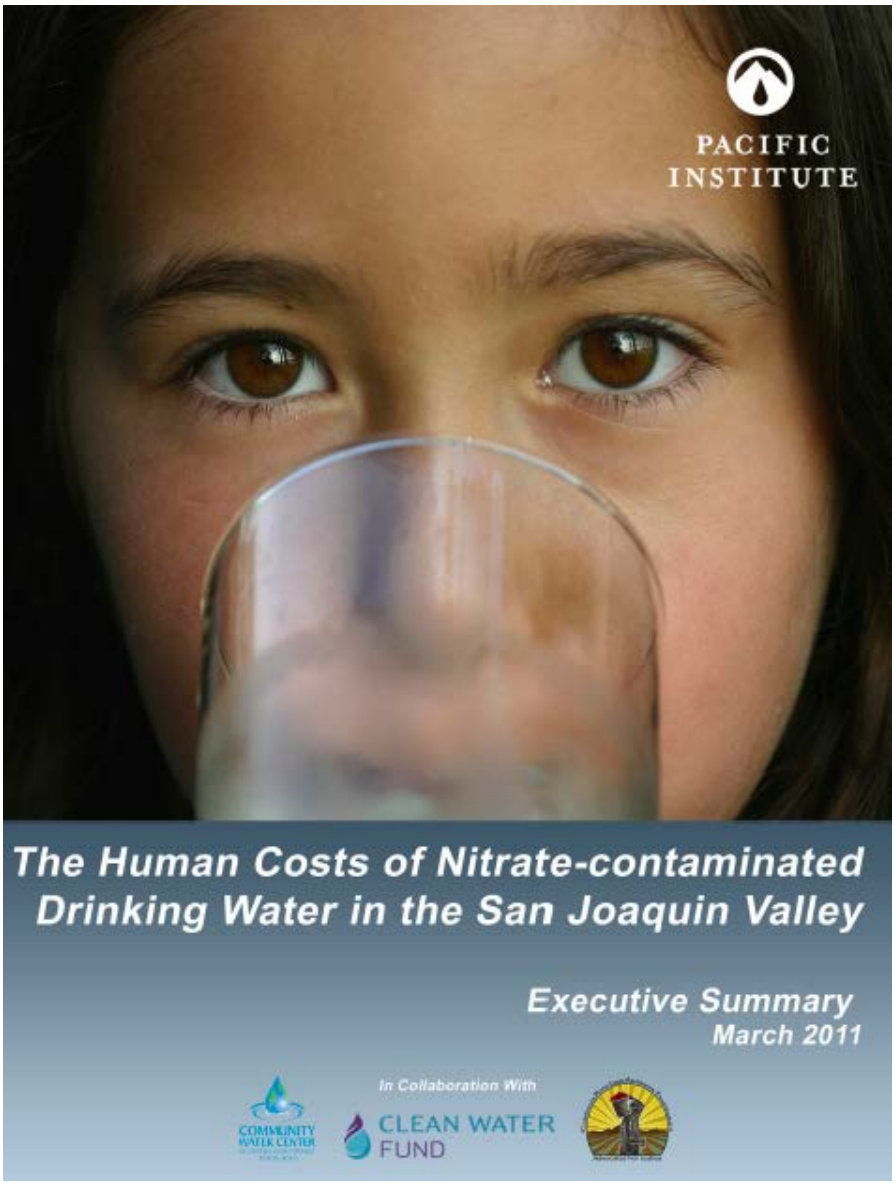

11.18.2008

What's the result?

“Ocean discharge of freshwater microcystins was confirmed for three nutrient-impaired rivers flowing into the Monterey Bay National Marine Sanctuary… Deaths of 21 southern sea otters, a federally listed threatened species, were linked to microcystin intoxication.”

Miller MA, Kudela RM, Mekebri A, Crane D, Oates SC, et al. (2010) Evidence for a Novel Marine Harmful Algal Bloom: Cyanotoxin (Microcystin) Transfer from Land to Sea Otters. PLoS ONE 5(9): e12576. doi:10.1371/journal.pone.0012576

“We have seen a 30- to 100-fold increase in domoic acid (an algal toxin) in water samples in the last decade or so,” said Clarissa Anderson, a biological oceanographer at UC Santa Cruz who recently won a California Sea Grant Focus Award to study the blooms. “We think that the toxicity of these blooms is related to agricultural runoff,” Anderson said. “We are especially interested in “first-flush” storms in the beginning of the rainy season in fall.”



In California's Tulare Lake Basin and Salinas Valley, roughly 254,000 people are currently at risk for nitrate contamination of their drinking water. Of these, 220,000 are connected to community public (>14 connections) or state small water systems (5–14 connections), and 34,000 are served by private domestic wells or other systems smaller than the threshold for state or county regulation and which are largely unmonitored.

Over 1.3 million people are financially susceptible because nitrate in raw source water exceeds the MCL, requiring actions by drinking water systems.

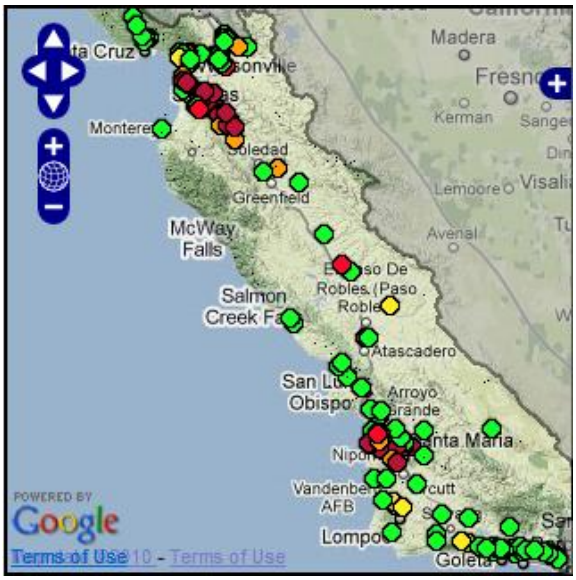


Figure 1 Central Coast. Toxicity in water.

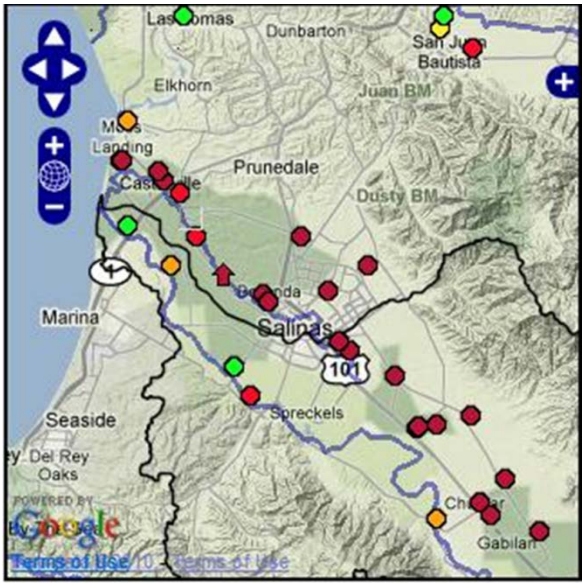


Figure 2. Detail of lower Salinas Valley. Toxicity in water

Figure 3. Nitrate as N. Lower Salinas.

What can be done?

- Source Control. Ag Order.
  - Eliminate toxic discharges of agricultural pesticides to surface waters and groundwater
  - Reduce nutrient discharges to surface waters to meet nutrient standards
  - Reduce nutrient discharges to groundwater to meet groundwater standards
  - Minimize sediment discharges from agriculture lands
  - Protect aquatic habitat (riparian areas and wetlands) and their buffer zones (Source: Roger Briggs 2008 charge to Ag Advisory Committee)

  - Reporting and monitoring
    - Receiving water monitoring will not be adequate to demonstrate efficacy of conditional waiver within the term (5 years) of the permit)
    - Individual monitoring
  - Public reporting.

- Treatment. Water handling agencies – including irrigation districts -- have a public trust responsibilities
  - Become good partners with lead agencies (RWQCB, SWRCB)
  - Any agency moving water or collecting waste water has a responsibility to protect public trust resources
    - Treat the water
    - Place discharge restrictions on what comes into their system
    - Must comply with Basin Plan, RWQCB and SWRCB discharge requirements.

- Preserve, enhance, and restore natural treatment systems
  - Slow sediment transport (including chemicals adhering to the particles.
  - Slow transmission of pathogens
  - Restore anaerobic denitrification processes
  - Invest in high resolution aerial digital photography.
    - Partner with the Department of Fish and Wildlife
  - DFW 1600 permits
  - 404 Dredge and fill permits
  - ***401 Certifications***