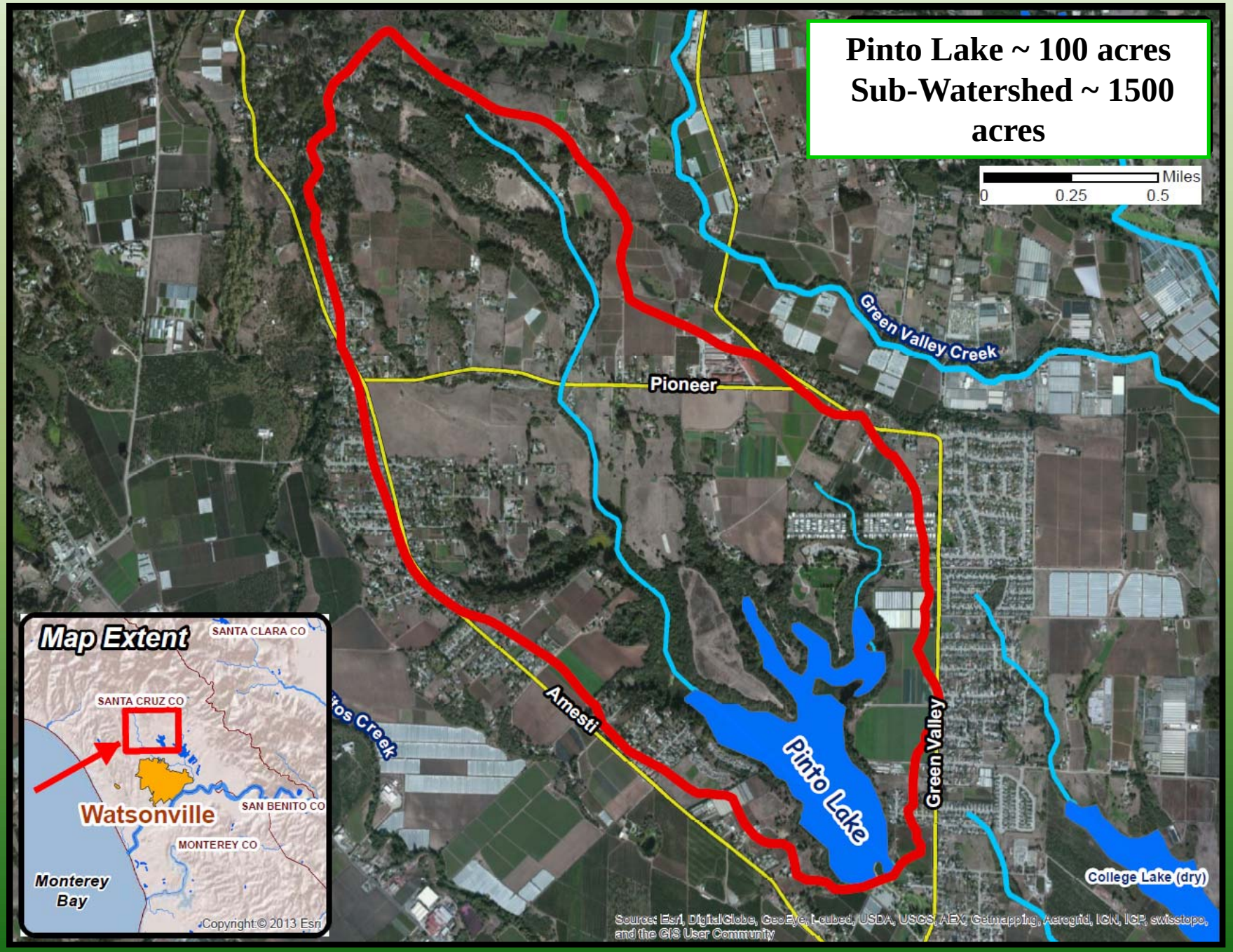
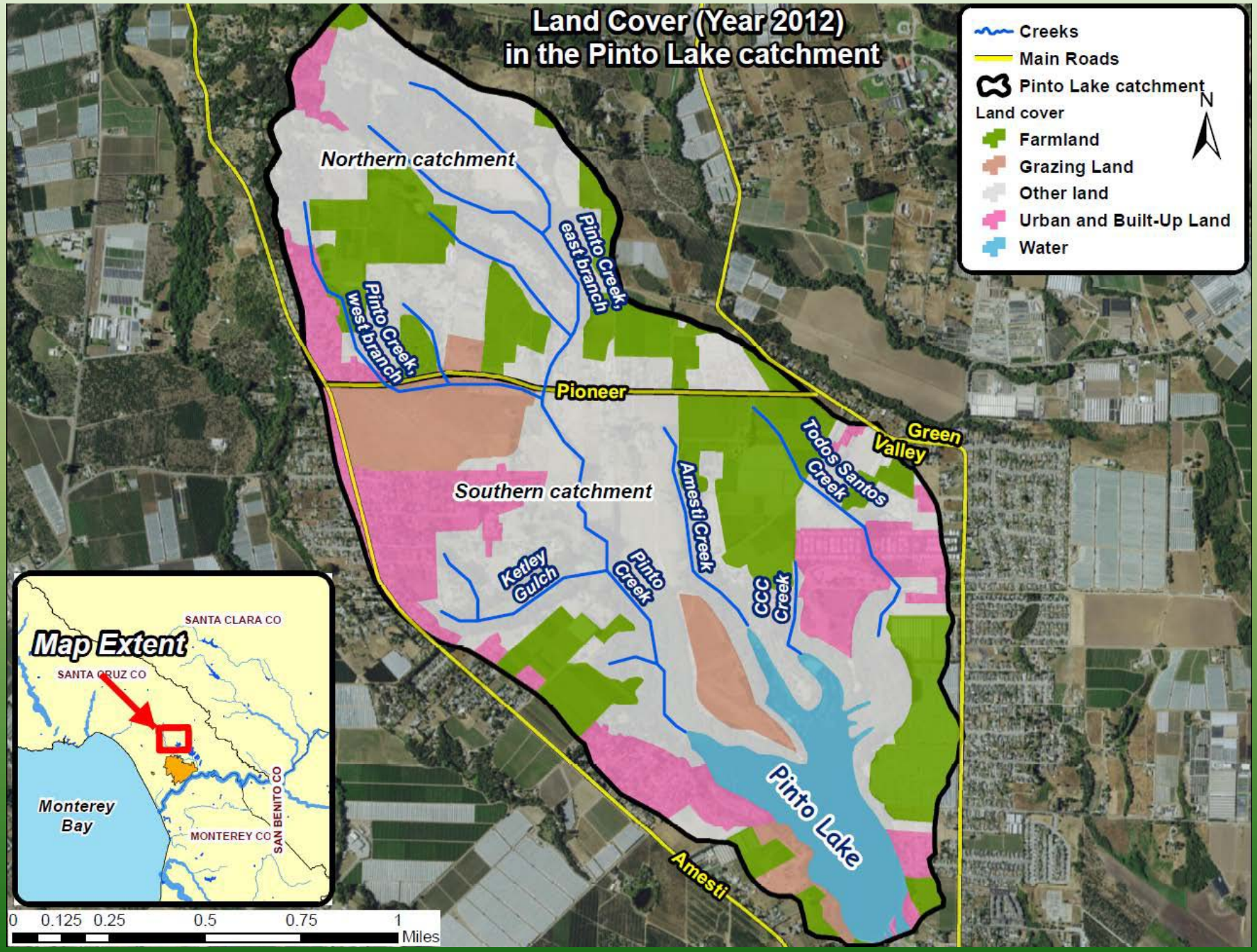
Pinto Lake
Watsonville,
CA


Pinto Lake ~ 100 acres
Sub-Watershed ~ 1500 acres
Miles
0
0.25
0.5
Green Valley Creek
Pioneer
Amesti
Pinto Lake
Green Valley
College Lake (dry)
Map Extent
SANTA CLARA CO
SANTA CRUZ CO
Watsonville
SAN BENITO CO
MONTEREY CO
Monterey Bay
Copyright © 2013 Esri
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community


Land Cover (Year 2012)
in the Pinto Lake catchment
Creeks
Main Roads
Pinto Lake catchment
Land cover
Farmland
Grazing Land
Other land
Urban and Built-Up Land
Water
N
Northern catchment
Southern catchment
Pinto Creek, west branch
Pinto Creek, east branch
Pioneer
Green Valley
Todos Santos Creek
Amesti Creek
Ketley Gulch
Pinto Creek
CCC Creek
Pinto Lake
Amesti
Map Extent
SANTA CLARA CO
SANTA CRUZ CO
Monterey Bay
MONTEREY CO
SAN BENITO CO
0 0.125 0.25 0.5 0.75 1
Miles

Pinto Lake Provides Water-Based Recreational Activities To Thousands of Visitors Every Year


Every Summer and Fall, Pinto Lake
develops cyanobacteria blooms, that can
produce toxins

Environmental Impacts at Pinto Lake…

Growers had to abandon use of lake waters as an irrigation source due to algal toxins

Documented cases of wildlife fatalities, including the endangered California southern sea otter.

Fish kill due to low dissolved oxygen

Dr. M. Miller examining sea otter poisoned by cyanotoxins

City of Watsonville staff retrieving bird (coot) poisoned by cyanotoxins

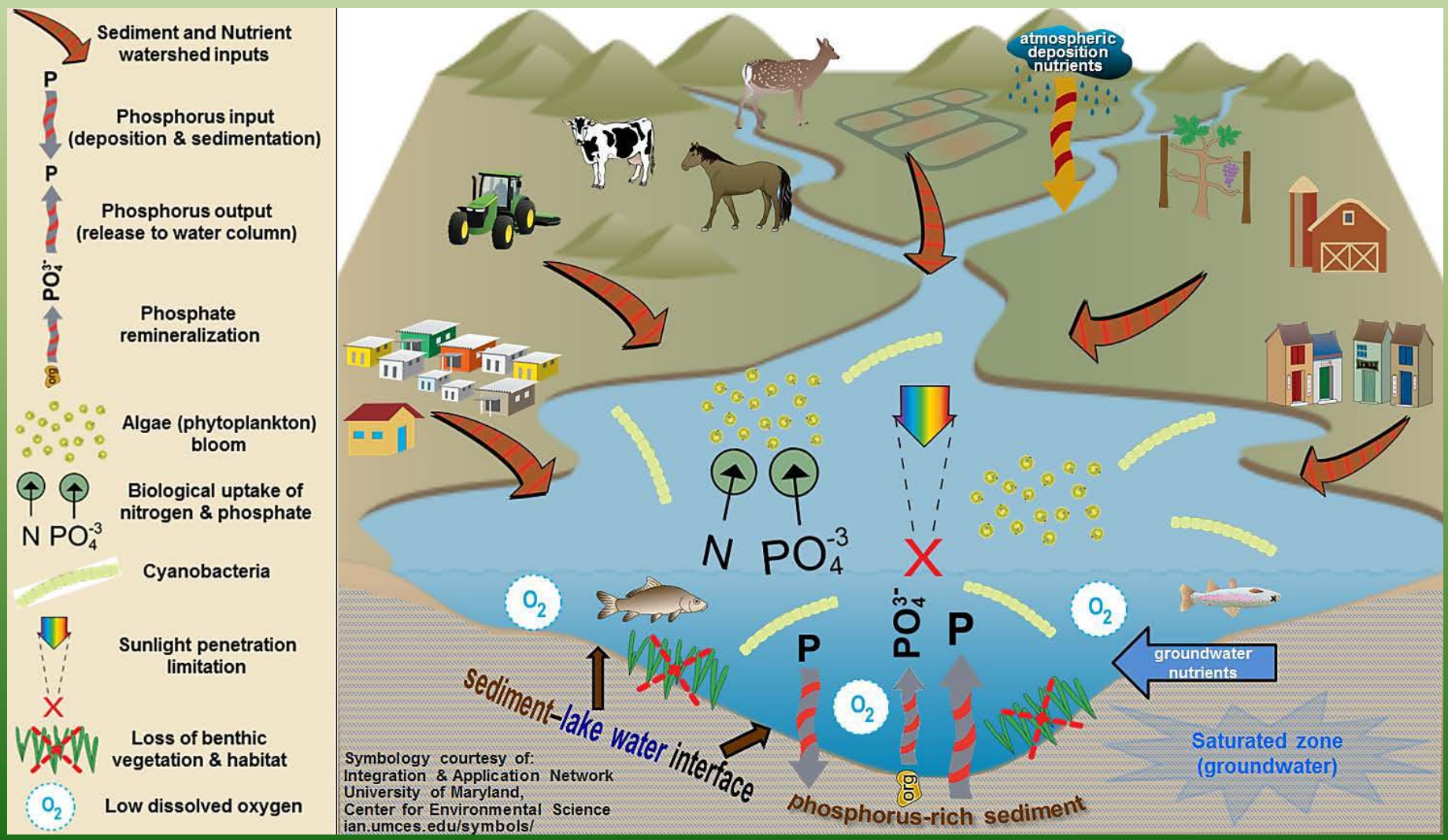
Anecdotal reporting of skin-rashes and flu-like symptoms in humans

2,000,000+ ppb

Scum Mats Can Concentrate Toxins At Shoreline

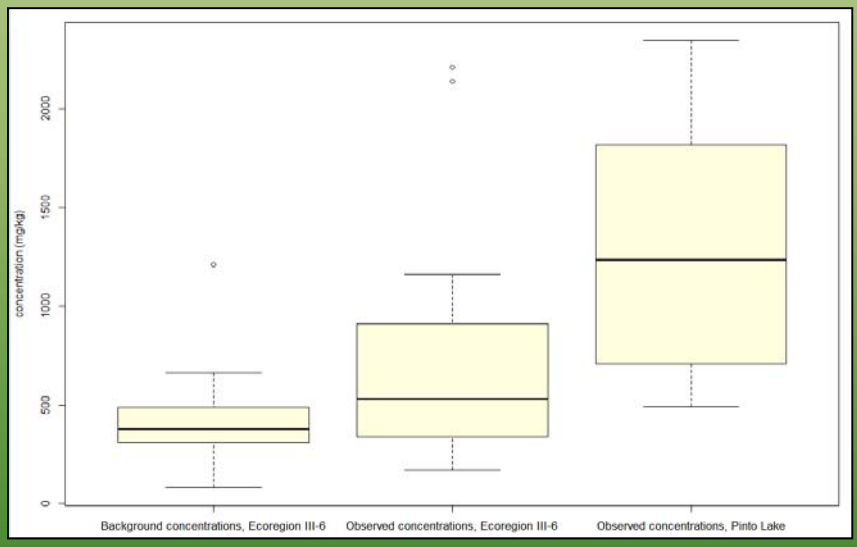
What Causes These Blooms?

- *Warm Water*
- *Sunlight*
- *Excess Nutrients*

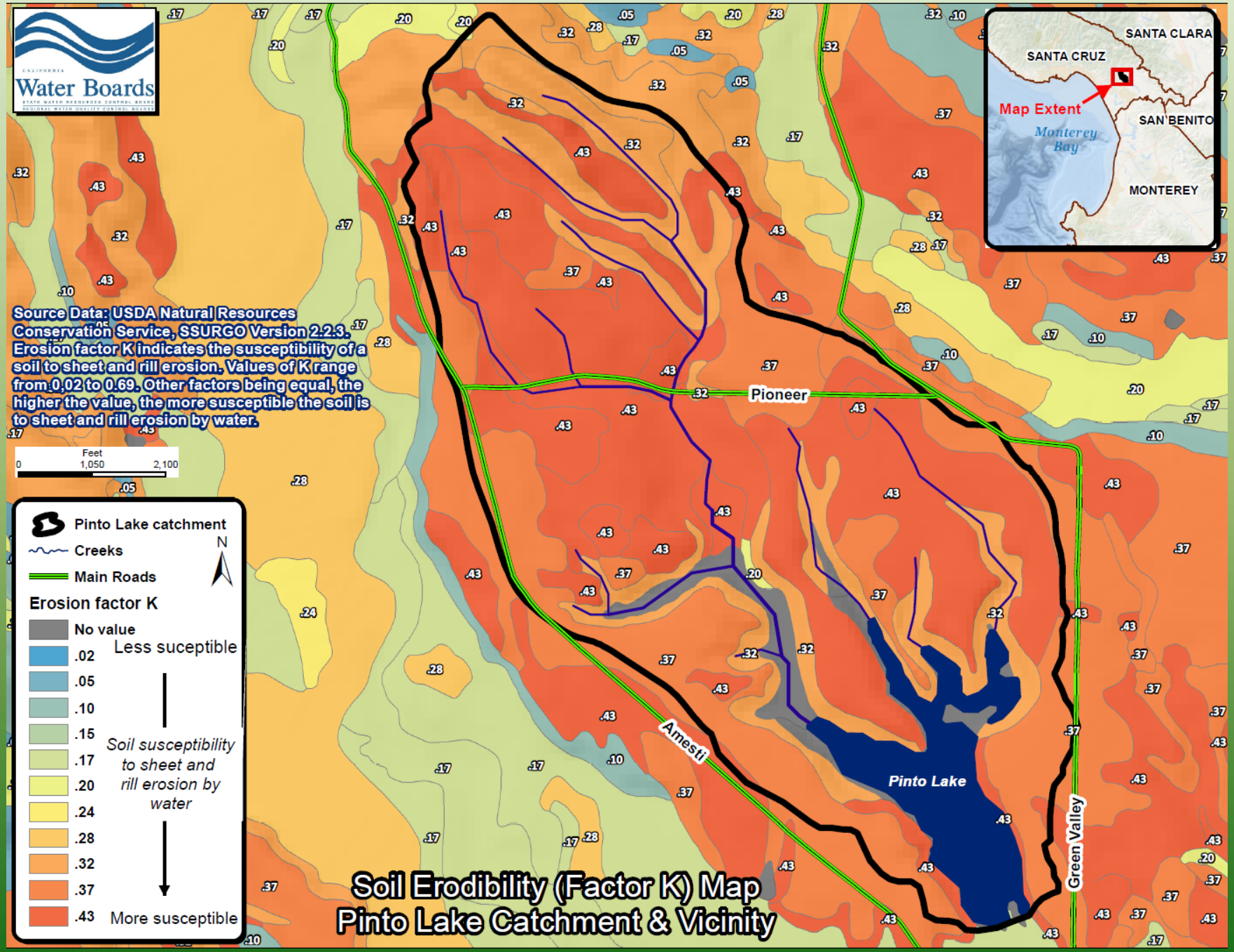

Sediment and Nutrient watershed inputs
P
Phosphorus input (deposition & sedimentation)
P
Phosphorus output (release to water column)
PO4 3-
org
Phosphate remineralization
Algae (phytoplankton) bloom
N PO4-3
Biological uptake of nitrogen & phosphate
Cyanobacteria
Sunlight penetration limitation
X
Loss of benthic vegetation & habitat
O2
Low dissolved oxygen
atmospheric deposition nutrients
N PO4-3
X
O2
O2
O2
P
PO4 3-
P
org
groundwater nutrients
Sediment–lake water interface
phosphorus-rich sediment
Saturated zone (groundwater)
Symbology courtesy of:
Integration & Application Network
University of Maryland,
Center for Environmental Science
ian.umces.edu/symbols/

Where Do the Nutrients Come From?

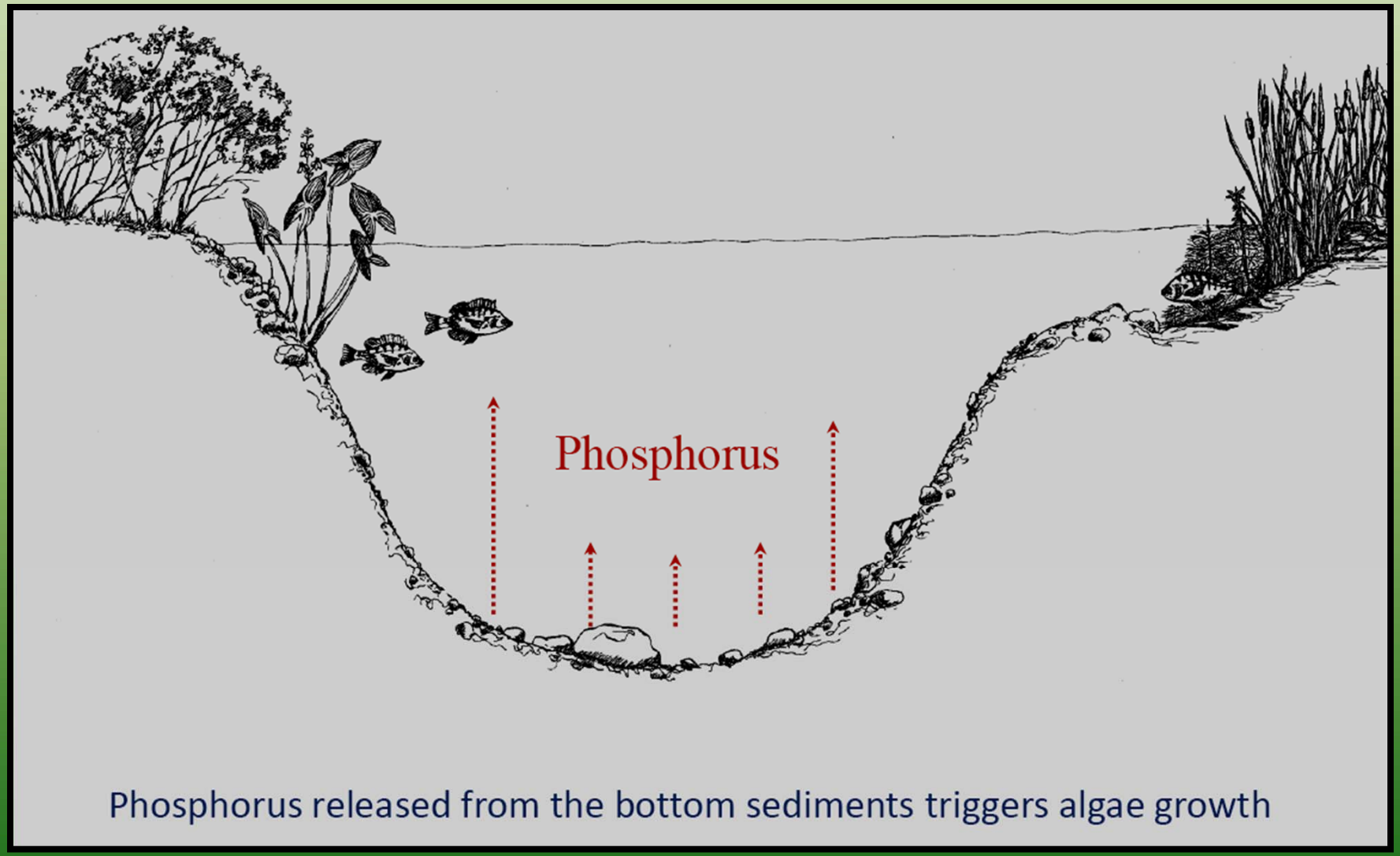
Highly erodible, phosphate-rich soils



Phosphorus concentrations in California soil – background, all observed, and Pinto Lake


Water Boards
SANTA CLARA
SANTA CRUZ
Map Extent
SAN BENITO
Monterey Bay
MONTEREY
Source Data: USDA Natural Resources Conservation Service, SSURGO Version 2.2.3. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.
Feet
0
1,050
2,100
Pinto Lake catchment
Creeks
Main Roads
N
Erosion factor K
No value
.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
Less suceptible
Soil susceptibility to sheet and rill erosion by water
More susceptible
Pioneer
Amesti
Pinto Lake
Green Valley
Soil Erodibility (Factor K) Map
Pinto Lake Catchment & Vicinity

Lake Sediments



Agricultural Operations

Septic Systems and Greywater

Protecting Public Health

City of Watsonville Approach To Human Health Protection

Microcystin > 0.8 ppb (OEHHA Rec exposure limit):

- Bilingual warning posters regarding human and animal health risks
- Concession staff routinely communicate this information to the public

City of Watsonville
Waiver, Release of Liability, Assumption of Risk Agreement

I herby waive, release and discharge any and all claims for damages for bodily injury, personal injury, death, or property damage which I may have or which may hereafter accrue as a result of recreational activities at Pinto Lake.

This release is intended to discharge, in advance, the City of Watsonville, its officers, officials, employees, agents, and volunteers from and against any and all liability arising out of, or connected in any way with all recreation activity in Pinto Lake, even though that liability may arise out of negligence on the part of the City of Watsonville its officers, officials, employees, agents, and volunteers.

I understand that Pinto Lake frequently experiences blooms of blue-green algae. Contact or ingestion of blue-green algae can cause rashes, skin and eye irritation, allergic reactions, gastrointestinal upset, and other effects. At high levels, exposure can result in serious illness or death.

Knowing the risks involved, nevertheless, I hereby agree to assume any and all risks of injury or death and to release the City of Watsonville, its officers, officials, employees, agents, and volunteers, who through negligence or any other act or omission might otherwise be liable to me. I further understand and agree that this waiver, release, and assumption of risks is to be binding to my heirs and assigns.

I further agree to indemnify, defend and hold the City of Watsonville its officers, officials, employees, agents, and volunteers harmless from any loss, liability, claim, damage, or expense which may incur as a result of recreational activities at Pinto Lake.

I HAVE READ THIS RELEASE OF LIABILITY AND ASSUMPTION OF RISK AGREEMENT. I FULLY UNDERSTAND ITS TERMS. I UNDERSTAND THAT I HAVE GIVEN UP SUBSTANTIAL RIGHTS BY SIGNING IT, AND I SIGN IT FREELY AND VOLUNTARILY WITHOUT ANY INDUCEMENT

Name:_____

Address:_____

_____

Home Phone:_____**Cell Phone:**_____

Emergency Contact & Phone:_____

Date Signed:_____

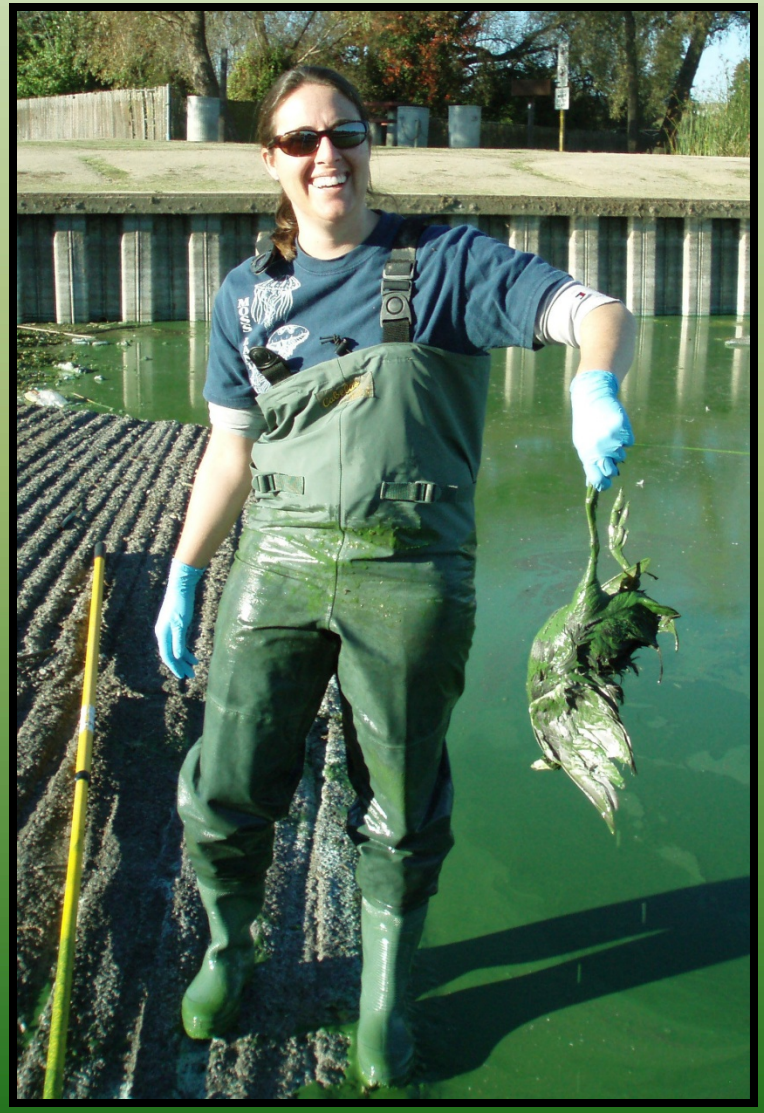
Signature of Participant:_____

Signature of Parent or Legal Guardian _____

When testing shows toxin levels above 80 ppb:

- Boaters read and sign bilingual waiver detailing health risks
- Concession staff notify all parents and pet owners to keep children/animals away from the water
- When scums present, use simple barriers (warning tape or construction fencing) to discourage access to impacted areas

Plans, Actions and Next Steps



What Is the Water Board Doing?

- **Total Maximum Daily Load (TMDL) For Pinto Lake's Watershed**
  This will provide a regulatory framework for addressing nutrients from the watershed
- **Funding through grants**

What is in a TMDL Study?....

TMDL study: a planning tool to restore clean water.

- **Identify Probable Sources**
- **Identify Waterbody Loading Capacity (TMDL)**
- **Identify Pollution Reductions Needed**
- **Develop Plan to Achieve Reductions & Restore Clean Water**

Proactive Local Staff

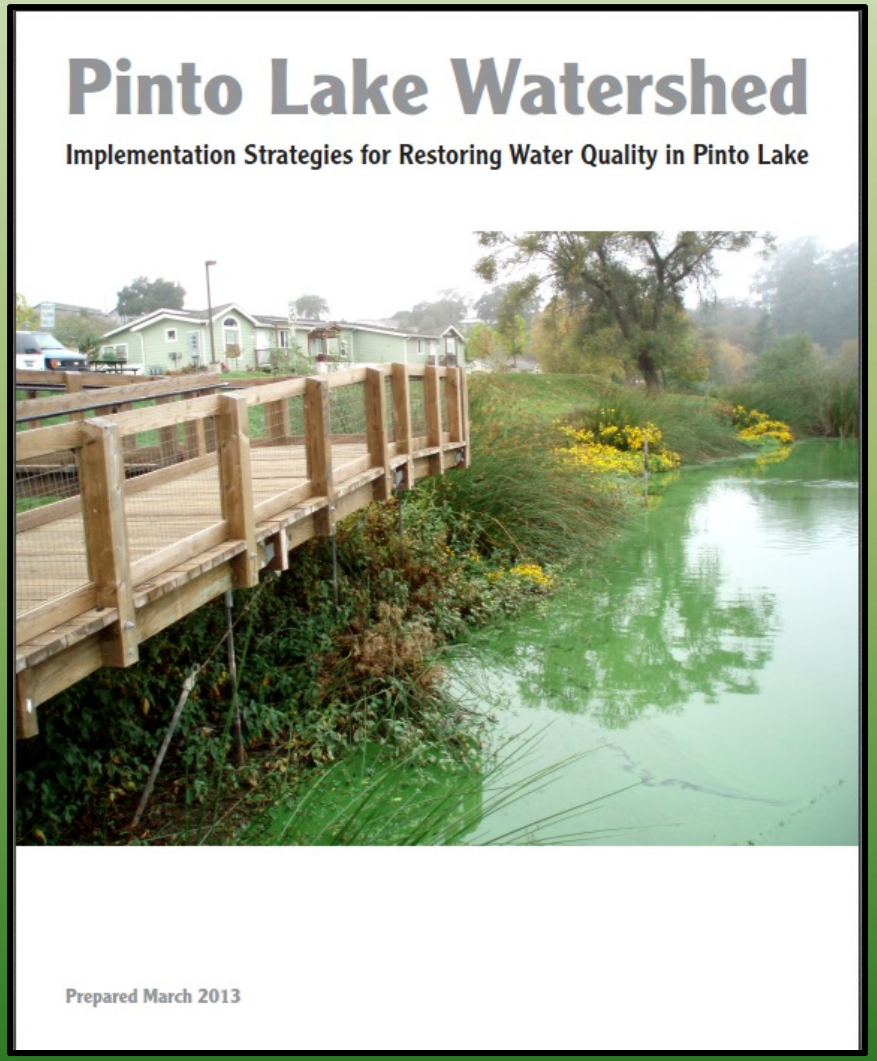
- Advocated for Water Board to list the lake as impaired and to prioritize it highly for action
- Applied for and acquired almost a million dollars in grant funding
  - 319(h) planning grant – investigating the nutrients and conditions driving the blooms
  - Cleanup and Abatement Fund – treatment technologies
  - Coastal Conservancy – Electrofishing
  - 319(h) implementation grant – alum treatment and sediment basin development
- AB300 – Interagency task force
- Legislator involvement

Pinto Lake 319 (h) Planning Grant

Goal: Monitored spatial and temporal variation in cyanobacteria development across Pinto Lake in association with environmental factors.

Management Measures Identified:

1. Carp Removal
2. Outreach to stakeholders
3. Lake and watershed treatment options



Options evaluated for controlling nutrients in the lake

After evaluating lake treatment options through a Prop 84 planning grant, alum treatment and sediment and nutrient BMPs were chosen as most appropriate treatments.

Alum binds phosphorus at the sediment water interface

Controlling Nutrients From The Watershed

NRCS EQUIP grants and Ag extension outreach:

- Soil management and erosion control
- Fertilizer management and Irrigation runoff control

Deal with problematic septic systems/greywater disposal
Evaluate sewering as an alternative

Carp Removal

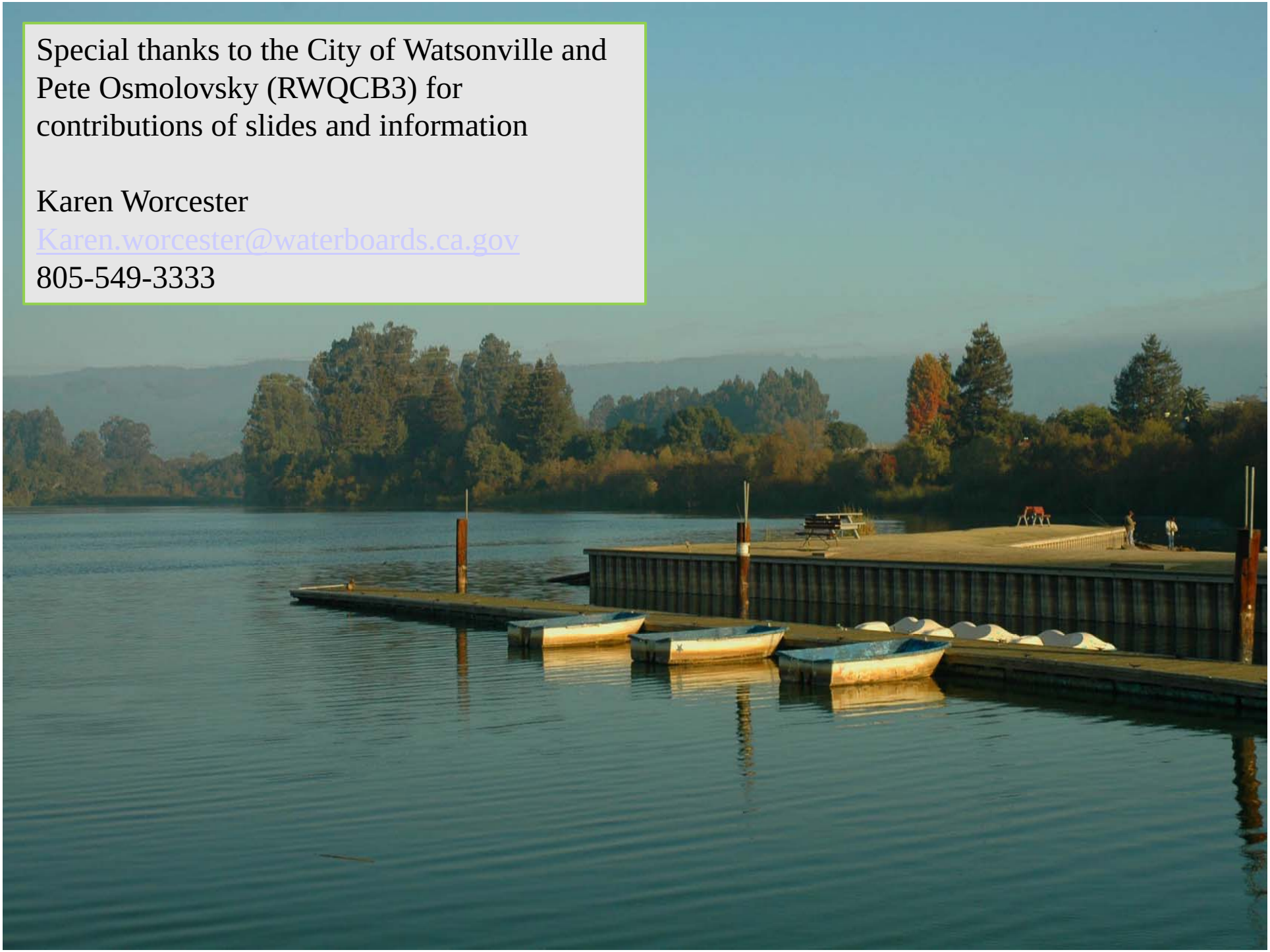
City of Watsonville's Carp-A-Geddon Project – 500 lbs. removed

State Coastal Conservancy Carp Removal Project – 3300 lbs. removed

Next Steps

- Utilize 319 (h) Implementation Funds to:
  1. Treat Pinto Lake using alum
  2. Treat ephemeral streams entering the lake via sediment basins
  3. Work collaboratively with stakeholders to manage watershed nutrients
  4. Monitor for success

- Provide Outreach to Residents/Property Owners
- Conduct Regular Testing of Microcystins and Evaluate Health Risk
- Work with Local Growers (through SCCRCD) to Implement Erosion Control and Nutrient Management



Special thanks to the City of Watsonville and Pete Osmolovsky (RWQCB3) for contributions of slides and information

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