

# Clear Lake Nutrient TMDL and Watershed Challenges

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# Tribal Environmental Protection Programs

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- ▶ Tribes have collected and provided US EPA with Clear Lake data since the 1990's
- ▶ Protection of natural resources to continue use for food, ceremony, recreation and water quality
- ▶ Reducing disproportionate impact of pollution on sensitive populations



# Sources of Nutrients = Nutrient Management

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## ▶ Phosphorus

- ▶ Soils from erosion
- ▶ Dirt roads
- ▶ Stormwater runoff
- ▶ Leaching septic tanks
- ▶ fertilizers

## ▶ Nitrogen

- ▶ Sewer spills
- ▶ Leaching septic tanks
- ▶ Stormwater runoff





# Tule Replanting and Restoration Efforts

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- ▶ Easily accessible materials
- ▶ Restoring the 85% of the marshlands lost, to reduce sediment loading to lake



# Stormwater Management

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- ▶ Cleaning drains monthly
- ▶ Installation of nutrient buffer pond for housing subdivision
- ▶ Stormwater monitoring during rainy season
- ▶ Taking corrective action for elevated stormwater contaminants



# Clear Lake Data Exchange

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- ▶ <http://www.bvrancheria.com/water-quality-dashboard>



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- ▶ Lack of nutrient management provides food for cyanobacteria blooms, leading to impairment of additional uses of Clear Lake



# Clear Lake Cyanotoxin Monitoring Program

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- ▶ To determine impacts of cyanobacteria and cyanotoxins
- ▶ To inform the Tribal community and public about toxin levels so they can make educated decisions about use of the lake



# 2018 Monitoring Locations



# 2018 Monitoring Program

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- ▶ Taking water samples at 23 sites including Blue Lakes
- ▶ Field data measurements
- ▶ Cyanobacteria cell identification
- ▶ Cyanotoxin analyses based on cell ID and ELISA kits
- ▶ Use of information for health based decisions and lake management
- ▶ Fish tissue cyanotoxin
- ▶ Data documentation



# Clear Lake Cyanobacteria Task Force

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- ▶ Tribes
- ▶ Lake County Water Resources
- ▶ Lake County Environmental Health
- ▶ Lake County Public Health
- ▶ US EPA, Region 9 Water Programs and Tribal Programs
- ▶ State Water Resources Control Board
- ▶ California Office of Environmental Health Hazard Assessment
- ▶ California Department of Public Health
- ▶ Cal EPA
- ▶ Central Valley Regional Water Quality Control Board



# Summary of Cyanotoxin Results

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- ▶ Toxin: microcystin (hepatotoxin)
- ▶ Highest Level: 17,000 ug/L
- ▶ Locations of lake with cyanotoxin dominance: Oaks and Lower arms
- ▶ Fish and shellfish with cyanotoxins



# Nutrient Management is Key

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- ▶ Delays to prioritize nutrient management
- ▶ Delays to measure nutrient loading
- ▶ Impairments continue:
  - ▶ Drinking water
  - ▶ Traditional uses of Clear Lake
  - ▶ Recreation
  - ▶ Fisheries



# Questions?

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