Lake Elsinore & Canyon Lake Nutrient TMDLs
Phase 2 Monitoring

Nancy Gardiner
November 18, 2014

HALEY & ALDRICH

Objective of Today's Discussion

- Obtain direction from the TAC so we can prepare the Monitoring Plan and QAPP for the Phase 2 Monitoring Program in the Lakes and Watershed
  - Trends Monitoring (continuation of Phase 1 efforts)
  - Special Studies
- Better understand priorities and schedule for rolling out these activities

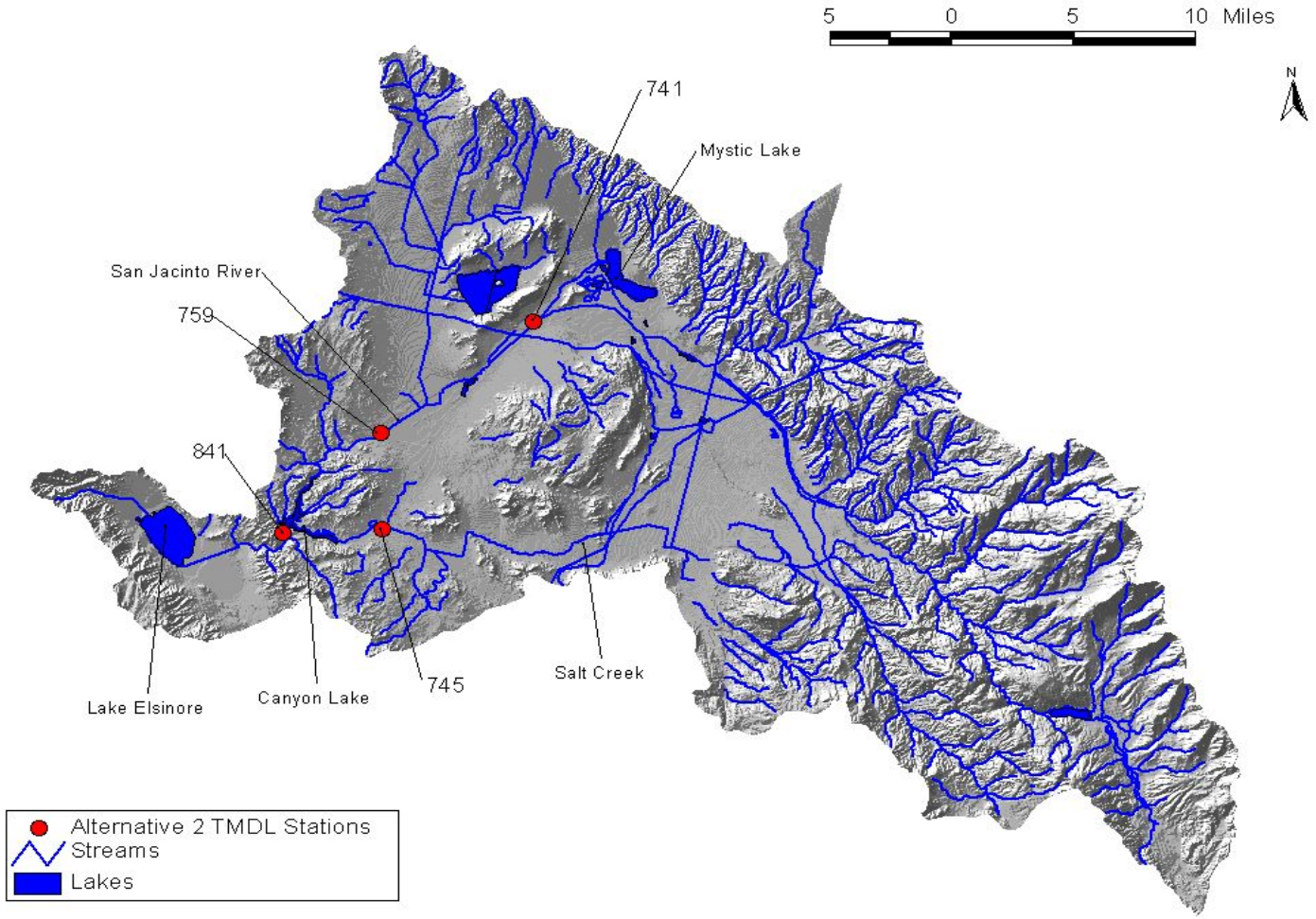
Phase 2 Monitoring: Focus on Two Objectives

- Evaluate status and trends towards achieving response targets and determine how to quantify the amount of influence natural background has on the status and trend (highest priority/easiest)
- Quantify the external pollutant loading originating in the upstream watershed above the lakes

Additional Objectives

- Support stormwater compliance activities by stakeholders in the watershed (MS4 permit)
- Support land use monitoring requirements related to the Conditional Waiver for Agricultural Dischargers (CWAD)

Watershed-Wide Monitoring Sites



Watershed-Wide Monitoring

- Historical monitoring during storm events (3/year) at 3 sites:
  - San Jacinto River @ Goetz Road
  - Salt Creek @ Murrieta Road
  - San Jacinto River below Railroad Canyon (Canyon Lake) Dam (when dam is spilling)
- Fourth site (San Jacinto River @ Ramona Expressway) is located below Mystic Lake and almost never flows

Watershed-Wide Monitoring Sites

- Collect samples during 3 storm events/year
- Additional proposed sampling
  - 3 Dry-Weather Events (if feasible) at historical locations
- Additional proposed stations
  - Cranston Guard Station (formerly sampled by the USFS – proposed by RCFC&WCD)
  - Hemet Channel (near confluence with San Jacinto River – proposed by WRCAC)

In-Lake Monitoring Sites

- Lake Elsinore
  - 2 mid-lake monitoring sites, monthly sample collection (e.g., at existing EVMWD locations)
  - Additional sondes (e.g., for DO, conductivity)
- Canyon Lake
  - 2 locations, monthly sample colllection (one in main body, one in East Bay)
  - Add sondes?

Candidate Special Studies: Lake Elsinore

- Annual Zooplankton Study
  - Mid-summer field survey to better understand relationship between zooplankton population and salinity concentration
- Zooplankton Salinity Tolerance Study
  - Laboratory study to develop mathematical relationship between salinity concentration and zooplankton reproduction rate

Candidate Special Studies: Lake Elsinore

- Characterize TP Flux from Lake Bottom Sediments
  - Build on prior studies by Dr. Michael Anderson
  - Conduct lab study to evaluate effectiveness of aeration treatment by testing sediment cores to measure post-treatment TP flux with baseline
- Seasonal Satellite Monitoring for Chlorophyll-a
  - Contract with Blue Water Satellite to conduct monthly satellite mapping (summer only)

Candidate Special Studies: Canyon Lake

- Monthly Satellite Monitoring for Chlorophyll-a
  - Contract with Blue Water Satellite to conduct monthly satellite mapping (year-round and prior to/following treatments such as alum)
- Monitor TP from Lake Bottom Sediments
  - Similar to special study proposed for Lake Elsinore

Other Potential Special Studies

- Evaluate Wildfires as a Source of Nutrients
  - Monitor water quality immediately downstream of the burn area and compare results with historical data
- Evaluate Use of Satellite Imagery for Phosphorous and Other Constituents
  - Conduct a pilot study using this new technology

Study Questions

- How do you define the “summer” compliance period (for purposes of demonstrating compliance with response targets)?
- What is the appropriate averaging method and time period to calculate annual average concentrations (e.g., of Chlorophyll-a)?
- What is the appropriate number and location of compliance monitoring stations?
- What are the appropriate depth increments for calculating depth-integrated averages?

Study Questions, cont.

- Can a volume-weighted average be used?
- What does it mean to be “compliant” with the TMDL and its response targets?
- Since algae can be mobilized by wind, what does it mean to be “compliant” when some parts of the lake have no algae, while other parts have a lot due to prevailing wind conditions?

Study Questions, cont.

- How do you resolve the difference between 10-year rolling averages and seasonal response targets?
- Can remote sensing (e.g., satellite imagery) be used as a defensible monitoring technology for demonstrating compliance with Chlorophyll-a and Phosphorous targets?
- What is the appropriate level of frequency and resolution for satellite imagery?

Watershed-Wide Monitoring: Possible Changes

- Continue to monitor historical locations
- Possible additional monitoring locations
  - Background or reference location (e.g., Cranston Guard Station)
  - Additional site along Salt Creek (downstream of Hemet Channel confluence)
- Conduct monitoring during dry weather at the 3 historical sites

In-Lake Monitoring

- Historical sampling at 3 locations in Lake Elsinore and 4 locations in Canyon Lake (2000-2012)
  - Surface
  - Within water column
  - Depth-integrated
- In-lake monitoring suspended in 2012 to redirect resources toward BMP implementation

In-Lake Monitoring: Possible Changes

- Lake Elsinore: 2 mid-lake monitoring sites, monthly sampling
  - Chlorophyll-a
  - Total Phosphorous (TP) – depth-integrated and averaged
  - Total Nitrogen (TN) – depth-integrated and averaged
- Consider automated sondes to collect data on dissolved oxygen (daily average) and conductivity (weekly average)
- No near-term monitoring for ammonia (2014-19)

In-Lake Monitoring: Possible Changes

- Canyon Lake: 2 monitoring locations – one in main body of lake and other in the East Bay
  - Chlorophyll-a (monthly depth-integrated, both locations)
  - Dissolved oxygen (monthly, depth-integrated, main body only)
  - Total and dissolved Phosphorous (monthly, depth-integrated, both location, photic zone)
- No near-term monitoring for ammonia or TN

Performance-Based Monitoring

- Alternative to compliance with numeric effluent limitations
- Evaluate BMP performance as a means of demonstrating progress toward attainment of TMDL targets

Alum application	Stormwater diversion
Aerator operation	Onsite retention
Axial mixers	Future agricultural BMPs
Carp removal	