

Lake Elsinore In-Lake Nutrient Reduction Alternatives Analysis

Presentation to the TMDL Task Force

June 17, 2024

Presentation by Steve Wolosoff, GEI Consultants



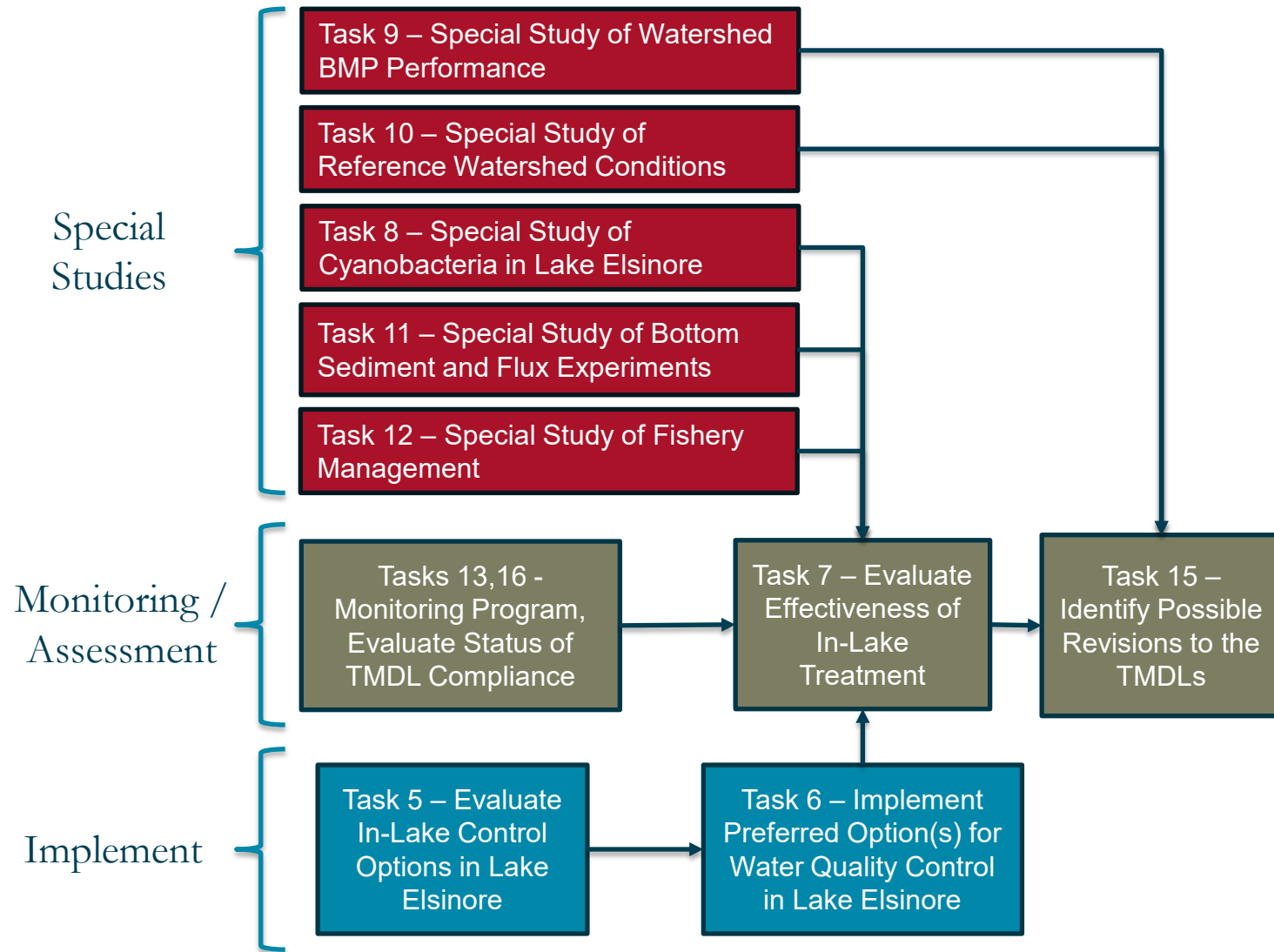
Agenda

- Phase 2 Program of Implementation
- Project Update
 - Condition Assessment
 - Sediment Study
 - Refined Targets
 - Evaluation of Options
- Current Water Quality



Phase 2 Program of Implementation

- Current study satisfies Tasks 5 and 11
- Lake Elsinore in-lake project implementation to begin 2025
- Iterative adaptive approach to both project implementation and science driven regulation



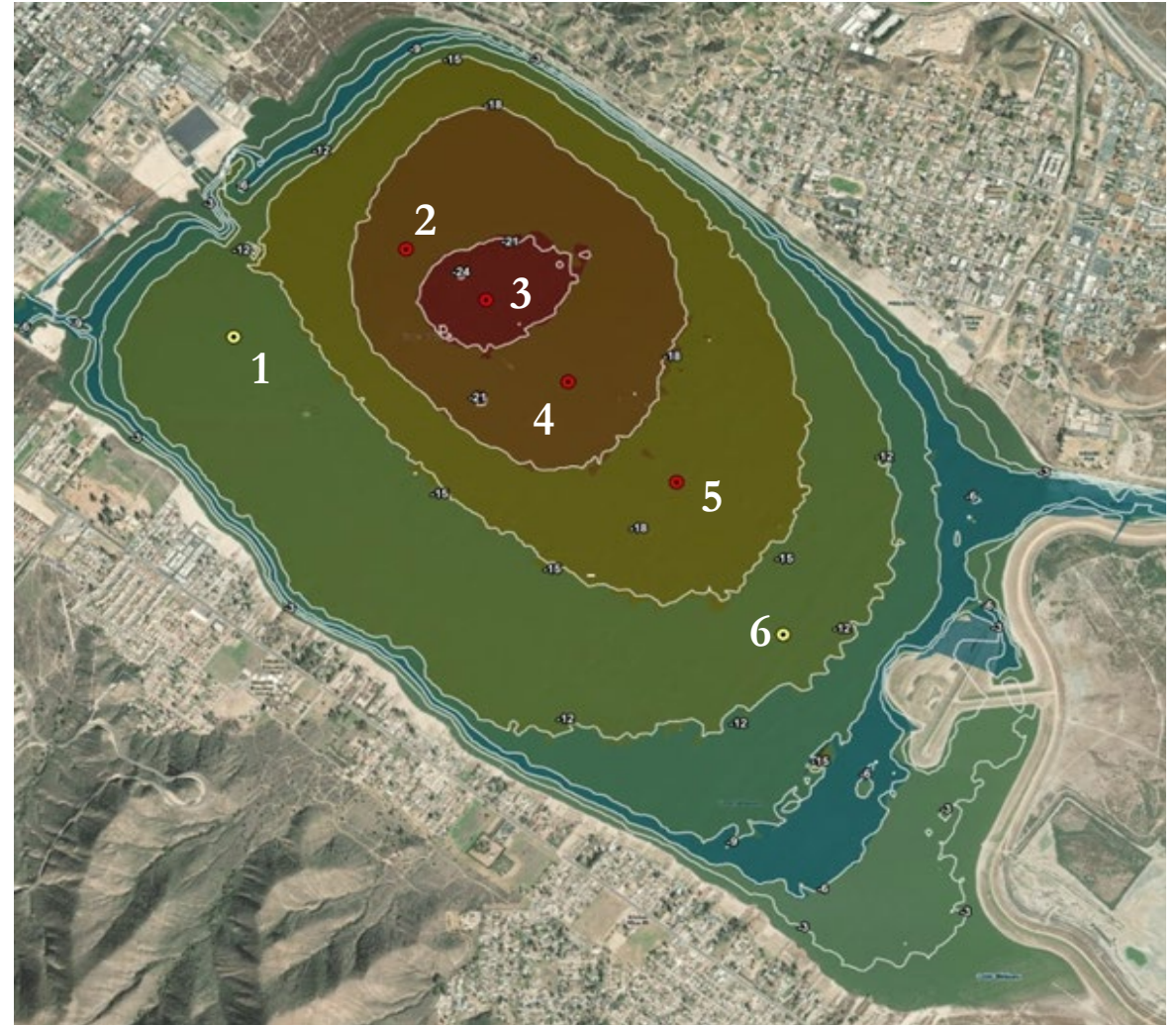
LEAMS Condition Assessment

- Field visit conducted on June 12
- System is functioning and has plenty of useful life remaining
- Option to use existing compressors for oxygen generation will be evaluated



Sediment Study

- Cores are prepped
- Sampling to occur in late June / early July
- Estimate oxygen demand for sizing oxygenation systems
- Estimate reduced flux for use in projection of offsets



Refined Load Reduction Targets

- Offset demand for all external loads to meet revised TMDLs
- Project sized to achieve these estimated annual load reductions

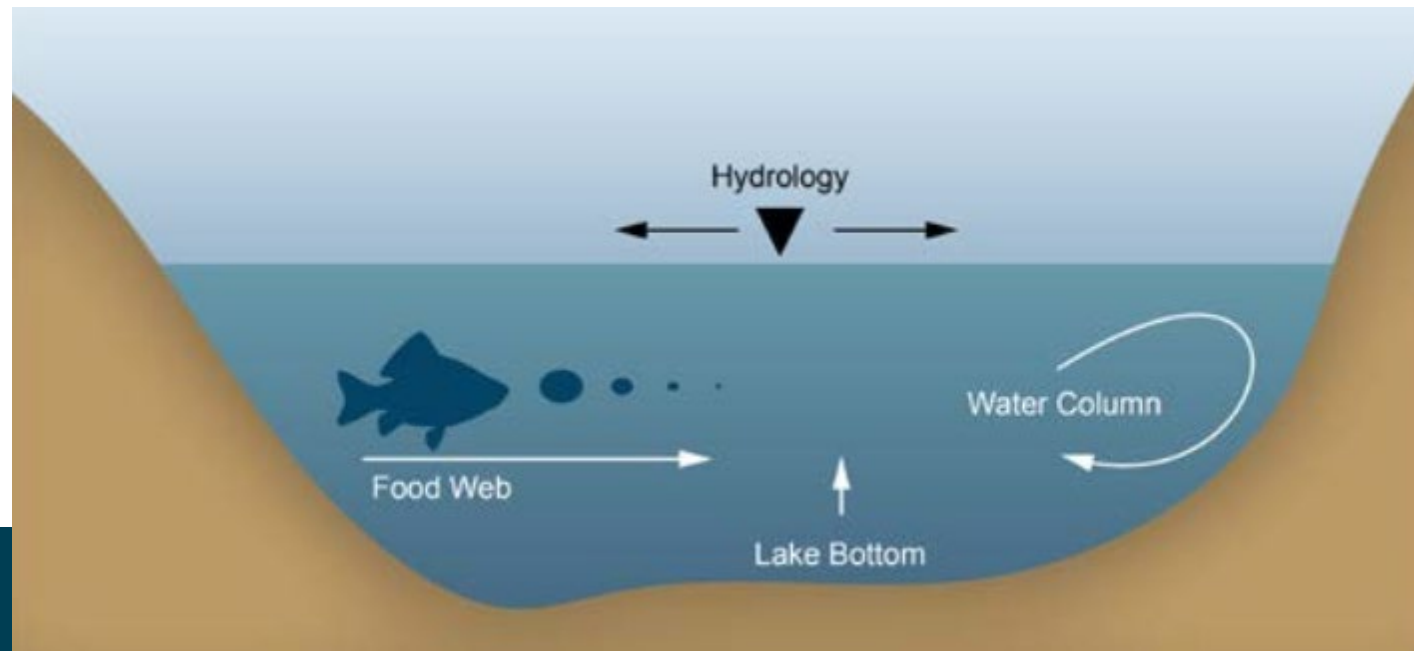
Loading (kg/yr)	TP		TN	
	Interim	Final	Interim	Final
Estimated Existing Load (All Sources)	10,000	10,000	95,000	95,000
External Allocations (Draft TMDL Revision)	6,600	3,300	19,000	14,000
Load Reduction to Meet Future TMDLs	3,400	6,700	76,000	81,000

- 24-41 percent of current internal TP load
- 41-44 percent of current internal TN load



List of Options

- Oxygenation (4 options)
- Recirculating treatment (2 options)
- Chemical addition (2 options)



Preliminary Alternatives Evaluation Criteria

- Alternative Effectiveness
 - Reduction of TP (estimated annual reduction as a percent of Final Target ~ 7,000 kg/yr)
 - Reduction of TN (estimated annual reduction as a percent of Final Target ~ 81,000 kg/yr)
- Cost-Benefit Analysis (30-year lifecycle)
 - Total Project Capital Cost at Full Buildout
 - Total Annual O&M Costs
 - Cost per unit reduction in TP
 - Cost per unit reduction in TN



Preliminary Alternatives Evaluation Criteria

- **Technical Feasibility**
 - Technical Reliability – proven effectiveness
 - Implementation Ramp-Up Time
 - Implementation Complexity – ease of installation, operation and maintenance
 - Scalability – ability to expand or modify as needed
- **Funding and Financial Viability**
 - Availability of Grants and Funding – Opportunities for federal, state and local funding
 - Budget Impacts – Effect on municipal budgets and potential for cost sharing with stakeholders



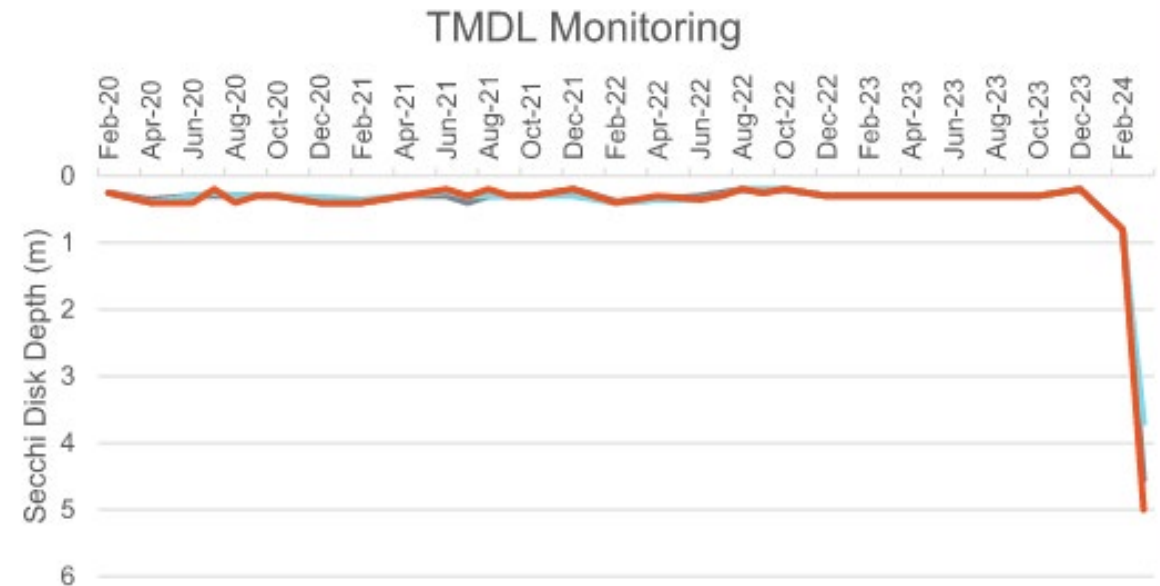
Preliminary Alternatives Evaluation Criteria

- Social Impact
 - Community Acceptance and Support
 - Recreational Impacts/Benefits
 - Educational Value
- Regulatory Permitting and Compliance
 - Permitting Requirements
 - Compliance with Environmental Regulations



Recent Water Quality Improvement

- Water level rise of 5 feet following 2023/24 wet season
- Reduction in TDS to <1500 mg/L TDS
- Large bodied zooplankton population growth
- Notable water quality improvement (chl-a <10 ug/L, secchi depth > 5 meters in March - April)



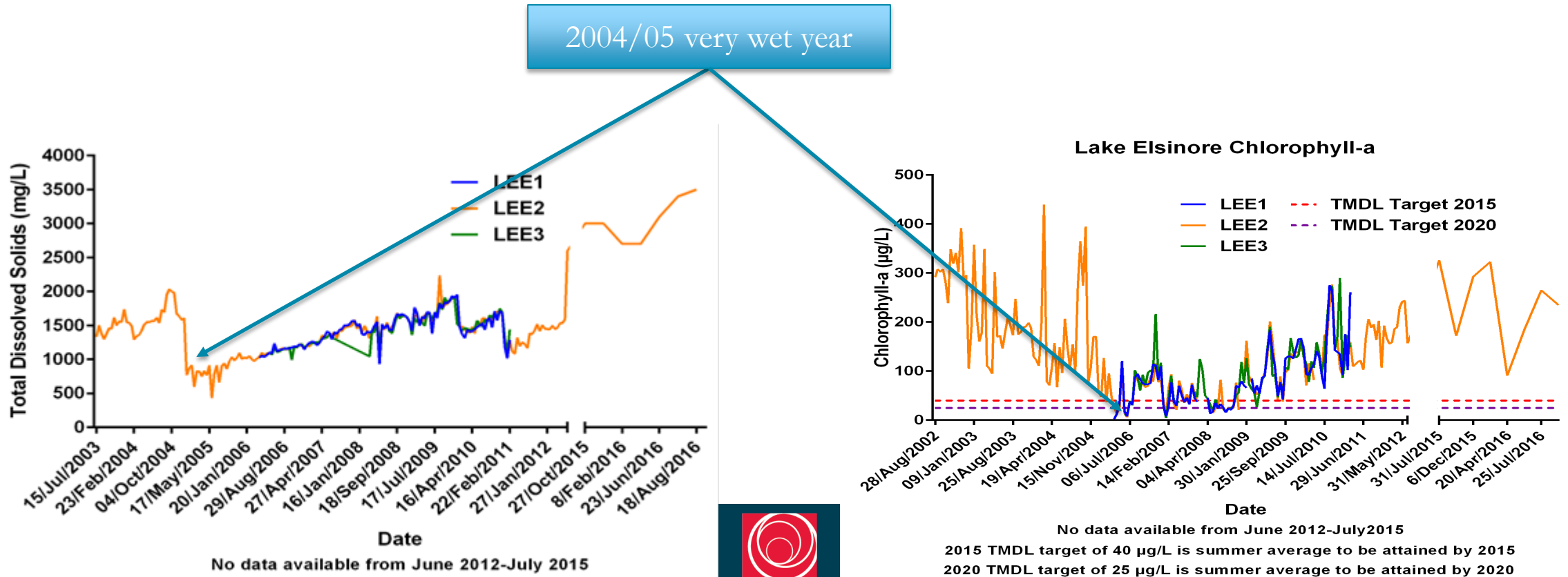
Recent Water Quality - Drivers

- Operation of nanobubble pilot begins Feb 6
 - Addition of ~1,000 lbs/day into lake to test for localized benefit
 - Lakewide sediment oxygen demand ~15,000 lbs/day
- Recycled water deliveries for Lake Elsinore ceased on Feb 9
 - Reduced bioavailable nutrients
- Increased zooplankton grazing pressure
 - Measured zooplankton biomass sufficient to account for reduction in algae
- Temporal dynamic as shown by harmful algae bloom on May 17



Historical Water Quality

- Other similar hydrologic condition for Lake Elsinore in spring 2005



Q&A

- Seeking insight from stakeholder throughout the project
- Next Meeting to provide update on sediment study and hydrodynamic simulations

