

Projected 3 Year Budget: Lake Elsinore & Canyon Lake TMDL Task Force

Summary Task Force Expenditures

Approved Budget 2013-14 Draft Budget 2014-15 Draft Budget 2015-16 Draft Budget 2016-17

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Part A: Task Force Regulatory/Administrative Budget

| | | | | |
|---|-------------------|-------------------|-------------------|-------------------|
| 1. Task Force Administration | \$ 50,000 | \$ 80,000 | \$ 80,000 | \$ 80,000 |
| Task Force Administrator (LESJWA) | | | | |
| Annual Water Quality Reporting and Database Management | | | | |
| Grant Preparation/Administration | | | | |
| 2. TMDL Compliance Expert | \$ 50,000 | \$ 50,000 | \$ 50,000 | \$ 50,000 |
| Risk Sciences | | | | |
| 3. Update of Watershed and In-Lake Nutrient Monitoring Program Plans | \$ - | \$ 40,000 | \$ - | \$ - |
| Watershed Monitoring | \$ - | \$ 20,000 | \$ - | \$ - |
| in-lake Monitoring | \$ - | \$ 20,000 | \$ - | \$ - |
| 4. Update of Watershed and In-Lake Nutrient Models | \$ - | \$ 175,000 | \$ 175,000 | \$ - |
| Watershed Modeling | \$ - | \$ 100,000 | \$ 100,000 | \$ - |
| in-lake Modeling | \$ - | \$ 75,000 | \$ 75,000 | \$ - |
| 5. Review and Revision of Water Quality Objectives | \$ 50,000 | \$ - | \$ - | \$ - |
| Revise Water Quality Targets | \$ 50,000 | \$ - | \$ - | \$ - |
| 6. Revise TMDL | \$ - | \$ - | \$ - | \$ 100,000 |
| 7. Contingency (10% of budgeted project expenses) | \$ 15,000 | \$ 34,500 | \$ 30,500 | \$ 13,000 |
| TMDL Task Force Regulatory/Administrative Budget | \$ 165,000 | \$ 379,500 | \$ 335,500 | \$ 243,000 |

Part B: TMDL Implementation Project Budget

| | | | | |
|---|-------------------|-------------------|-------------------|-------------------|
| 1. TMDL Compliance Monitoring | | | | |
| <i>Watershed-wide Nutrient Monitoring Program</i> | \$ 85,000 | \$ 85,000 | \$ 85,000 | \$ 85,000 |
| Watershed-wide Nutrient Monitoring & Report Preparation (Weston Solutions) | \$ 70,000 | \$ 70,000 | \$ 70,000 | \$ 70,000 |
| Wet Year Watershed-wide Monitoring (weather dependant) (RCFC&WCD) | \$ - | \$ - | \$ - | \$ - |
| Lab Analysis, Watershed-wide Monitoring (RCFC&WCD) | \$ 15,000 | \$ 15,000 | \$ 15,000 | \$ 15,000 |
| Stream gauge O&M (RCFC&WCD) | \$ - | \$ - | \$ - | \$ - |
| <i>Lake Elsinore Nutrient Monitoring Program</i> | \$ - | \$ - | \$ 100,000 | \$ 100,000 |
| Lake Elsinore Nutrient Monitoring & Lab Analysis (EVMWD) | \$ - | \$ - | \$ 100,000 | \$ 100,000 |
| <i>Canyon Lake Nutrient Monitoring Program</i> | \$ - | \$ - | \$ - | \$ - |
| Canyon Lake Nutrient Monitoring & Lab Analysis (EVMWD) | \$ - | \$ - | \$ - | \$ - |
| 2. Lake Elsinore Project Alternatives | | | | |
| <i>Aeration & Destratification System O&M (to be handled by separate agreement)</i> | \$ - | \$ - | \$ - | \$ - |
| O&M | \$ - | \$ - | \$ - | \$ - |
| Project Administration (10% of budgeted expenses) | \$ - | \$ - | \$ - | \$ - |
| <i>Fishery Management O&M</i> | \$ - | \$ - | \$ - | \$ - |
| Carp Removal Program | \$ - | \$ - | \$ - | \$ - |
| Project Administration (10% of budgeted expenses) | \$ - | \$ - | \$ - | \$ - |
| 3. Canyon Lake Project Alternatives | \$ 330,000 | \$ 245,392 | \$ 249,814 | \$ 253,000 |
| Chemical Additions - Alum Dosing (2 applications annually) | \$ 270,000 | \$ 187,840 | \$ 188,590 | \$ 190,000 |
| Consulting Support | \$ 30,000 | \$ - | \$ - | \$ - |
| O&M Agreement | \$ - | \$ - | \$ - | \$ - |
| Detailed Design | \$ - | \$ - | \$ - | \$ - |
| Construction | \$ - | \$ - | \$ - | \$ - |
| Effectiveness Monitoring | | \$ 35,244 | \$ 38,514 | \$ 40,000 |
| O&M | \$ - | \$ - | \$ - | \$ - |
| Project Administration (10% of budgeted expenses) | \$ 30,000 | \$ 22,308 | \$ 22,710 | \$ 23,000 |
| TMDL Task Force Implementation Budget | \$ 415,000 | \$ 330,392 | \$ 434,814 | \$ 438,000 |

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Prop 84 Round 2 IRWM Funding

| | | | | |
|---|----------------------|----------------------|----------------------|----------------------|
| Canyon Lake Hybrid Treatment process - Phase 1 | Draft Budget 2014-15 | Draft Budget 2014-15 | Draft Budget 2015-16 | Draft Budget 2016-17 |
| | \$ 125,000 | \$ 245,392 | \$ 129,608 | \$ - |
| Total Grant Funding | \$ 125,000 | \$ 245,392 | \$ 129,608 | \$ - |

TMDL Task Force Budget : \$ 455,000 \$ 464,500 \$ 640,707 \$ 681,000



Navigating a Mid-Course Correction for the Nutrient TMDL in Lake Elsinore and Canyon Lake

Background

- 1) EPA approved the TMDL in fall of 2005 (8 years ago).
- 2) Task Force organized in 2006 and agreement was signed in spring of 2007
- 3) Lake Elsinore Sediment Nutrient Reduction Plan approved in Nov., 2007.
- 4) Aeration Project commenced operations in 2008.
- 5) Updated watershed runoff models in 2010.
- 6) Deferred TMDL revision; reallocated monitoring funds to mitigation projects 2012-2014.
- 7) Comprehensive Nutrient Reduction Plan approved in summer of 2013.
- 8) Alum applications initiated in fall of 2013.

Key Deadlines

- 1) MS4 Report of Waste Discharge (RoWD) due in June of 2014
- 2) MS4 Permits expire in January of 2015
- 3) Conditional Waiver issued to agricultural operators (likely in 2014-15)
- 4) TMDL Interim Response Targets (DO & Chl-a) must be met by Dec., 2015

Attainment Assessment

| 2015 Interim Targets | Canyon Lake | Lake Elsinore |
|-------------------------------|---------------------|----------------------|
| Chlorophyll-a ¹ | Probable Attainment | Attainment Unlikely |
| Dissolved Oxygen ² | Probable Attainment | Probable Attainment |

Compliance Assessment

| 2020 TMDL Requirements³ | Canyon Lake | Lake Elsinore |
|---|--------------------|----------------------|
| Total Phosphorous | | |
| Total Nitrogen | | |

¹ The summer average must be ≤ 40 ug/L in Lake Elsinore; the annual average must be ≤ 40 ug/L in Canyon Lake.

² In Lake Elsinore the depth average must be ≥ 5 mg/L; in Canyon Lake DO must be ≥ 5 mg/L above the thermocline.

³ Load Allocations and Waste Load Allocations are all expressed as 10-year rolling averages.

Key Tasks

- 1) Estimate new external nutrient loads (2011-2013) to calculate 10-year rolling average.**
- 2) Clarify specific methods to evaluate attainment of TMDL Response Targets**
 - A) Define "summer" compliance period (and first summer of compliance)
 - B) Define averaging method and period
 - C) Define number and location of compliance monitoring stations
 - D) Define depth increments for depth averages
 - E) Consider a volume-weighted average
- 3) Develop and implement metrics to demonstrate project effectiveness.**
 - A) Aeration/mixing system
 - B) Fishery management (carp reduction, fish stocking)
 - C) Recycled water
 - D) Alum application
 - E) Other BMPs
- 4) Update Lake Models**
 - A) Asymmetric nutrient loading
 - B) Asymmetric lake levels
 - C) Extended decay coefficient
 - D) Salinity limitations on zooplankton
 - E) Long-term model evaluation (40-50 years)
- 5) Update Watershed Models used in Waste Load Allocation and Load Allocation**
 - A) Adjust loading estimates for subsidence in Mystic Lake
 - B) Correct land use(s)
 - C) Reassess role of sediment transport and particulate loads
 - D) Evaluate effect of urbanization (w/ LID and on-site retention requirements)
- 6) Update TMDL**
 - A) Revise and refine dissolved oxygen targets (spatial and temporal averaging)
 - B) Establish exceedance frequency for asymmetric natural background loads
 - C) Authorize in-lake treatment as reasonable compliance alternative
 - D) Authorize exception for nutrient loads from ag lands <20 acres
 - E) Develop Zero-Based Nutrient Budgets for WLA and LA
 - F) Consider site-specific objective for chlorophyll-a based on salinity limitations
 - G) Authorize use of performance-based effluent limits for implementation
 - H) Develop compliance "credit" for participation in recycled water project
 - I) Define attainment of Response Targets as functionally-equivalent compliance with Causal Targets, WLA and LA
 - J) Implementation Plan for Phase-II Project(s) in Lake Elsinore

MEMORANDUM



MWH

To: Rick Whetsel, LESJWA
From: Sarah Garber, MWH
Subject: Canyon Lake Alum Treatment Effectiveness
Water Quality Monitoring – Initial Results

Date: October 22, 2013
Reference: 10503347

Water quality monitoring on Canyon Lake for the Alum Treatment program was conducted by California State University San Bernardino (CSUSB) starting in September 2013. The field program is supervised by Dr. James Noblet. The student sampling crew includes:

- Ingrid Williams - Laboratory Analyst and junior Chemistry major
- Emmett Campbell - Senior Laboratory Analyst and senior Biochemistry major
- Crystal Carver Steil - Laboratory Analyst and senior Chemistry major
- Steve Merrill – Laboratory Analyst and sophomore Biochemistry major

Pre-alum treatment monitoring was conducted on Canyon Lake on September 17, 2013. Alum application was conducted from September 23rd to 27th. Post-alum treatment water quality sampling occurred on October 1st, October 8th, and October 15th. Water quality sampling stations are:

- CL7 - deepest part of the lake near the dam
- CL8 - mid-lake, main body of lake
- CL9 - shallow site in the East Bay
- CL10 - shallow site without thermal stratification in the East Bay

Sample analysis is ongoing for most laboratory parameters. **Table 1** summarizes pre- and post-alum treatment results by station for select parameters.

**Table 1
Canyon Lake Water Quality Pre- and Post-Alum Treatment – Initial Results
(average values for Integrated samples)**

| Monitoring Station | Turbidity (NTU) | | NH4-N (mg/L) | | SRP (µg/L) | |
|--------------------|-----------------|---------|--------------|---------|------------|---------|
| | Pre Tx | Post Tx | Pre Tx | Post Tx | Pre Tx | Post Tx |
| CL7 | 6.1 | 5.7 | 2.13 | 1.75 | 691 | 519 |
| CL8 | 7.0 | 5.2 | 0.31 | 0.01 | 191 | 31.1 |
| CL9 | 11.7 | 16.0 | 1.89 | <0.01 | 487 | 14.7 |
| CL10 | 17.0 | 23.7 | 0.04 | <0.01 | 26.7 | 14.3 |

Notes:

NH4-N – ammonia nitrogen

SRP – soluble reactive phosphorus

Turbidity values are averages of data from throughout the water column.

Pre-alum treatment values are data from a single date: September 17, 2013.

Post-alum treatment values are based on the average of integrated sample results from October 1st and 8th for NH4-N, and are data from October 1st for SRP.

Method detection limit for NH4-N is 0.01 mg/L.

Observations

Available data for the four sampling dates indicate:

- Thermocline observed at station C7 (at 7 to 8 meters depth) and at station C8 (at 5 to 6 meters depth).
- Anoxic conditions in the hypolimnion at C7 and C8.
- Dissolved oxygen in epilimnion ranged from 2.47 to 10.25 mg/L in the main body of the lake (C7 and C8).
- Dissolved oxygen in the East Bay ranged from 0.25 to 16.80 (C9 and C10).
- Observed pH values ranged from 6.94 to 8.85 and generally decreased with depth at all stations.

Upcoming Sampling

The next sampling event will be after fall turnover (anticipated to be in early November). A report summarizing data from the one pre-treatment and four post-treatment sampling events will be prepared upon receipt of final laboratory data. The report is anticipated to be available in mid-December 2013.