

TMDL Task Force/Riverside Co MS4 Permit Deliverables Due in FY 2011-12:

Schedule of Deliverables	Status
2011	
<ul style="list-style-type: none"> - Regional Board has deferred the implementation of the Phase-2 Monitoring Program for for 12-24 months. - Task Force will implement revised monitoring plans for Lake Elsinore and Canyon Lake and continue to implement the Phase-1 watershed-wide monitoring program. - Task Force will submit a Comprehensive Nutrient Reduction Plan by the end of the year . 	
Early 2011	
<ul style="list-style-type: none"> - Task Force will calculate load reduction required for each entity named in the TMDL and estimate cost of designing, constructing and operating the Phase 1 and Phase 2 Projects Alternatives. - Extend current O&M Agreement for Lake Elsinore Aeration and Mixing Systems for 12 months (due to expire on June 30, 2011). 	
Spring 2011	
<ul style="list-style-type: none"> - Task Force will estimate nutrient reduction credits available from each of the proposed projects and develop the preliminary CNRP implementation strategy including a draft Pollutant Trading Plan. - Task Force will employ the newly developed spreadsheet tool to calculate individual nutrient loads for each discharging entity named in the TMDL. 	
Due April 30, 2011	
<ul style="list-style-type: none"> - The Task Force will submit an updated QAPP in accordance with the revised monitoring plans submitted to the Regional Board. - Transmit a signed copy of the revised O&M Agreement for Lake Elsinore Aeration and Mixing Systems to the Regional Board. 	<ul style="list-style-type: none"> -Updated QAPP submitted to Regional Board on 4/12/2011 and -Copy of Revised O&M Agreement for Lake Elsinore Aeration and Mixing System submitted to Regional Board on 4/30/2011
Summer 2011	
Task Force will seek financial commitments from those willing to sponsor the Phase 2 projects in return for nutrient reduction credits.	
Due June 30, 2011	
<ul style="list-style-type: none"> - Submit Draft Comprehensive Nutrient Reduction Plan (CNRP) including: <ul style="list-style-type: none"> - a Phase-2 Monitoring Program - b Phase-2 Projects Plans - c Fishery management program (to begin in 2012 at earliest) - O&M Agreement for Lake Elsinore Aeration and Mixing Systems. 	Phase-2 Projects Plan for Lake Elsinore submitted to Regional Board on 6/30/2011
Due August 31, 2011	
- Annual Report: in-lake and watershed monitoring program.	
Due December 31, 2011	
- Submit Comprehensive Nutrient Reduction Plan (CNRP).	

Long Term 2011-2020

It is expected that the Regional Board will review and approve the CNRP sometime during 2012 and that project construction can commence no later than 2013. Beginning in 2011 through 2014 Stakeholders will implement specific Phase-2 nutrient control projects described in CNRP. All Phase 2 projects will be scheduled to be implemented by December 31, 2014 following which, stakeholders will commence collecting the water quality data necessary to assess actual effectiveness and demonstrate compliance with the Response Targets in 2015.

Completing construction of the first Phase 2 Alternative and operating the project in accordance with plans approved by the Regional Board would constitute interim compliance with the technology-based effluent limitations, the narrative water quality objectives, and the related TMDL targets until 2020. Each year, beginning in 2016, the LECL TMDL TF parties will prepare and submit a report to the Regional Board with data to support the claim that continuing operation of all Phase 1 and future Phase 2 projects as needed to achieve full attainment of the TMDL Response Targets by December 31, 2020.

Long Term Monitoring Program

Between FY 2011-2012 and 2014-2015 the watershed-wide monitoring program will be substantially reduced.

The CNRP will include a detailed, long-term monitoring program designed to demonstrate compliance with the TMDL targets.

Long Term Modeling

No future modeling planned as Task Force will devote available resources toward accelerated project implementation through the Comprehensive Nutrient Reduction Plan.

Revised Technical Studies for Canyon Lake & Lake Elsinore

- 1) Estimate the rate at which phosphorus decays to an inert mineral form where it is no longer readily bioavailable to support algae growth in Canyon Lake and Lake Elsinore.

A critical review of most recent research on sediment diagenesis and benthic flux will form the basis for this analysis, and coupled with kinetic modeling of sediment biogeochemical processes after inspection of available sediment and water column data for each of the lakes. The 4x higher Fe and 50% lower CaCO₃ contents in the sediments of Canyon Lake relative to Lake Elsinore (and the general N-limitation in Canyon Lake vs. P-limitation common in Lake Elsinore) indicate that somewhat different biogeochemical processes are occurring in the two lakes.

Estimated Cost: \$ 4,320 (4 d x 8h/d x \$135/h)

Completion Date: December 2011

- 2) Evaluate long-term cumulative reduction of phosphorus loads from internal sediments, if a Hypolimnetic Oxygen System (HOS) is installed in Canyon Lake. Estimate the size of HOS required to reduce phosphorus loads from internal sediments sufficiently to ensure compliance with final response target for Chlorophyll-a in Canyon Lake by 2020. Analysis should be similar to that previously performed for Lake Elsinore and should account for any known feedback loop associated with the nutrient cycle. Determine how much (if any) reduction in ammonia and/or nitrogen loads from sediment might be expected to result from construction of a HOS in Canyon Lake. Estimate phosphorus load reduction required in Canyon Lake to assure that the lake remains consistently phosphorus limited.

Calculations similar to those done previously for Lake Elsinore or additional simulations using the DYRESM-CAEDYM model for Canyon Lake will be used to estimate long-term reductions in internal loading from sediments. The higher Fe content in the sediments of Canyon Lake relative to Lake Elsinore indicate that the capacity for binding of P by Fe, under oxic conditions, is likely greater in Canyon Lake, suggesting HOS may be more effective here. While the results of task 1 above will be important for this task, it will be necessary to parameterize and use the existing DYRESM-CAEDYM model for Canyon Lake, or develop a unique model. If so, such a new model will require additional time to develop.

Estimated Cost: \$ 8,640 - \$ 12,960 (8 - 12 d x 8 h/d x \$135/h)

Completion Date: March 2012

- 3) Evaluate long-term cumulative reduction of phosphorus loads from sediment, accounting for the known feedback loop associated with the nutrient cycle, if 100 metric tons of Phoslock or alum was applied annually to Canyon Lake. Iterate

analysis to determine amount of Phoslock or Alum required to meet final response target for Chlorophyll-a by 2020. Determine if Phoslock or Alum applications may result in any measurable reduction in nitrogen loads as a side benefit to suppressing the normal nutrient cycle in Canyon Lake.

The model developed in task 2 should be readily able to evaluate effectiveness of Phoslock or alum.

Estimated Cost: \$ 2,160 (2 d x 8 h/d x \$135/h)

Completion Date: April 2012

- 4) Estimate expected water quality conditions in Canyon Lake and Lake Elsinore under pre-Columbian land use conditions. This analysis should reflect the normal asymmetric manner in which external loads are transported to the lake. We need a simulation study which characterizes the range of expected water quality conditions, including the year to year variations, that were expected to occur prior to human development in the region.

The model from task 2 should be able to assess expected water quality in Canyon Lake under varying hydrologic conditions in pre-Columbian land use. The previously developed model for Lake Elsinore would be useful, although it may be better to develop a DYRESM-CAEDYM model specifically for Lake Elsinore that can be (computationally) hydraulically linked to the DYRESM-CAEDYM model for upstream Canyon Lake. This would best demonstrate the role that Canyon Lake plays in modulating water quality in Lake Elsinore. The advantage of DYRESM-CAEDYM is straightforward predictions of DO, phosphorus, nitrogen and algal response under possible N-, P- or co-limitations. The DYRESM-CAEDYM model developed for Lake Elsinore would also be used in task 5 below.

Estimated Cost \$ 10,800 (10 d x 8 h/d x \$135/h)

Completion Date: May 2012

- 5) Re-run the sensitivity analysis model for Lake Elsinore using a narrower range of parameters that better reflect actual experiences to date. Specifically: 1) assume carp population is reduced by 75%, 2) assume aeration system reduces phosphorus loads from internal sediment by 35%, 3) assume EVMWD is meeting phosphorus limit of 0.5 mg/L, and 4) assume that EVMWD is discharge all of its existing effluent flow to Lake Elsinore (but that no other source of recycled water is available to supplement lake levels).

This could be done relatively quickly using the existing model for Lake Elsinore. It is estimated to take not more than 2 days to re-parameterize the model, run it, and prepare a short summary report.

Additionally, the DYRESM-CAEDYM model for Lake Elsinore developed in task 4 will be used to assess influence of restoration actions on water quality in Lake Elsinore. As indicated above, DYRESM-CAEDYM can readily simulate thermal stratification, DO concentrations, total and dissolved concentrations of N and P, and chlorophyll. (In contrast, the original Lake Elsinore model predicted only total P and total chlorophyll).

Existing Model for Lake Elsinore

Estimated Cost: \$ 2,160 (2 d x 8 h/d x \$135/h)
 Completion Date: December 31, 2011

DYRESM-CAEDYM model for Lake Elsinore

Estimated Cost: \$ 4,320 (4 d x 8 h/d x \$135/h)
 Completion Date: June 2012

Deliverables

Reports will be prepared for each task and submitted to LESJWA at completion following the schedule provided below.

Schedule

Task	--- 2011 ---		----- 2012 -----					
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1. Available P decay rate	XXXXX							
2. P load reductions from HOS			XXXXXXXXXXXX					
3. Phoslock, alum treatment					XXX			
4. Pre-Columbian water quality						XXXXXXXXXX		
5. Restoration effectiveness		XX						XXX

Total Cost

The estimated itemized and total costs for the project is summarized below:

Task	Cost
1. Available P decay rate	\$ 4,320
2. P load reductions from HOS	\$ 8,640 - \$12,960
3. Phoslock, alum treatment	\$ 2,160
4. Pre-Columbian water quality	\$10,800
5. Restoration effectiveness	\$ 6,480
<i>Total</i>	\$32,400 - \$36,720

FY 2012-13 Budget: Lake Elsinore & Canyon Lake TMDL Task Force

Summary Task Force Expenditures

Budget
2012-13

Task Force Regulatory/Administrative Expenses

1. Task Force Administration (1/2 of past annual costs)		
Task Force Administrator		\$ 50,000
Annual Water Quality Reporting and Database Management		
Amend Task Force Agreement		
Grant Preparation		
2. TMDL Compliance Expert		
Risk Sciences		\$ 50,000
3. TMDL Compliance Monitoring		
Watershed-wide Nutrient Monitoring Program		
Watershed-wide Nutrient Monitoring (Weston Solutions)		\$ 70,000
Wet Year Watershed-wide Nutrient Monitoring (RCFC&WCD)		RCFC&WCD credit
Lab Analysis, Watershed-wide Monitoring (RCFC&WCD)		RCFC&WCD credit
Stream gauge O&M (RCFC&WCD)		RCFC&WCD credit
Lake Elsinore Nutrient Monitoring Program		
Lake Elsinore Nutrient Monitoring & Lab Analysis (1/2 of past annual costs) (EVMWD)		EVMWD credit
Canyon Lake Nutrient Monitoring Program		
Canyon Lake Nutrient Monitoring & Lab Analysis (1/2 of past annual costs) (EVMWD)		\$ 65,000
Contingency (approximately 10% of direct stakeholder expenses)		\$ 23,500
TMDL Task Force Regulatory/Administrative Budget		\$ 258,500

TMDL Implementation Project Expenses

1. Pollutant trading Program Administration (LESJWA)		
2. Lake Elsinore Project Alternatives		
Aeration & Destratification System O&M		
Fishery Management O&M		
3. Canyon Lake Project Alternatives		
Hypolimnetic Oxygenation System		
CEQA / Permitting		\$ 60,000
Detailed Design (15% of construction cost)		\$ 300,000
Costruction		
O&M		
Project Administration (10% of budgeted expenses)		\$ 36,000
Chemical Additions		
TMDL Task Force Implementation Budget		\$ 396,000

Stakeholder Funding \$ Credits

1. MS4 Funding Credits (RCFC&WCD)		\$ 79,000
Stream gauge O&M		\$ 64,000
Lab Analysis, Watershed-wide Monitoring		\$ 15,000
Wet Year Watershed-wide Monitoring (weather dependant, funded by contingency)		\$ -
2. Lk Elsinore Comp Water Mgt Agrmt Funding Credits (EVMWD)		\$ 65,000
Lake Elsinore Nutrient Monitoring (1/2 of past annual costs)		\$ 65,000
3. Agricultural & Dairy Operator Funding Credits		\$ -
		\$ -
Total Stakeholder Credits		\$ 144,000

In-Kind Services Share (no Funding \$ Credit)

Phase 2 - Stream Gauge O&M (RCFC&WCD)		\$ 77,000
Storm water data collection at the Cranston gage station (USFS)		\$ 10,000
Total Stakeholder In-Kind Services		\$ 87,000

Detailed Stakeholder Contributions

Budget
2012-13

Stakeholder Allocation

MS4 Co-Permittees (Total)	\$ 155,100
Riverside County	\$ 12,925
City of Beaumont	\$ 12,925
City of Canyon Lake	\$ 12,925
City of Hemet	\$ 12,925
City of Lake Elsinore	\$ 12,925
City of Moreno Valley	\$ 12,925
City of Murrieta	\$ 12,925
City of Perris	\$ 12,925
City of Riverside	\$ 12,925
City of San Jacinto	\$ 12,925
City of Menifee	\$ 12,925
City of Wildomar	\$ 12,925
Elsinore Valley Municipal Water District (EVMWD)	\$ 12,925
San Jacinto Agricultural Operators	\$ 12,925
San Jacinto Dairy & CAFO Operators	\$ 12,925
CALTRANS - freeway	\$ 12,925
CA DF&G - San Jacinto Wetlands	\$ 12,925
US Forest Service (USFS)	-NA-
Eastern Municipal Water District	\$ 12,925
March Air Reserve Base Joint Powers Authority	\$ 12,925
US Air Force (March Air Reserve Base)	\$ 12,925
Total Funding Required	\$ 258,500

Task Force Administration

- Organize and facilitate TMDL TASK FORCE and TAC meetings,
- Perform secretarial, clerical and administrative services, including providing meeting summaries to TMDL TASK FORCE members,
- Manage TMDL TASK FORCE funds and prepare annual reports of TMDL TASK FORCE assets and expenditures,
- Serve as the contracting party, for the benefit of the TMDL TASK FORCE, for contracts with all consultants, contractors, vendors and other entities,
- Seek funding grants to assist with achieving goals and objectives of the TMDL TASK FORCE.
- Coordinate with other agencies and organizations as necessary to facilitate TMDL TASK FORCE work.
- Administer the preparation of quarterly and annual reports, as required by the TMDL Implementation Plan, and submit them as required by the TMDL Implementation Plan on behalf of the TMDL TASK FORCE.

TMDL Compliance Expert

- Support stakeholders as a Regulatory Strategist and Compliance Expert .
- Develop implementation strategy to address TMDL compliance with nutrient targets
- Plan and prepare Basin Plan Amendment for TMDL
- Sub-contract out pollutant trading agreement preparation by consultant

Lake Elsinore and Canyon Lake Nutrient TMDL Task Force

Task Force Budget Alternatives

Task Force Agreement Model

- **Budget shall not exceed \$800,000**
- **Pro Rata Shares:**
 - **28.50%** MS4 CO-permittees
 - **17.97%** Riverside County
 - **2.13%** City of Beaumont
 - **1.85%** City of Canyon Lake
 - **12.39%** City of Hemet
 - **6.59%** City of Lake Elsinore
 - **28.68%** City of Moreno Valley
 - **0.36%** City of Murrieta
 - **9.05%** City of Perris
 - **1.62%** City of Riverside
 - **6.08%** City of San Jacinto
 - **11.7%** City of Menifee
 - **2.11%** City of Wildomar
 - **28.50%** San Jacinto Agricultural Operators
 - **28.50%** Lake Elsinore Comprehensive Water Management Agreement
 - **14.25%** Elsinore Valley Municipal Water District
 - **14.25%** City of Lake Elsinore
 - **5.00%** San Jacinto Dairy & CAFO Operators
 - **\$10,000** CALTRANS – freeway
 - **\$10,000** CA DF&G - San Jacinto Wetlands
 - **\$10,000** US Forest Service (USFS)
 - **\$10,000** Eastern Municipal Water District
 - **\$10,000** March Air Reserve Base Joint Powers Authority
 - **\$10,000** US Air Force (March Air Reserve Base)

Alternative A – Equal Share Fixed Monitoring/Administrative Costs and Variable Share for Project Implementation Costs

Fixed - Monitoring/Administrative Budget (shall not exceed \$400,000)

- Includes Annual Compliance Monitoring, Regulatory Compliance, Reporting, and Administration.
- Pro Rata Cost Shares:
 - Equal Share - Named Parties contributing > 5% of nutrient load.
 - \$10,000 - Named Parties contributing < 5% of nutrient load.

Variable - Implementation Project Budget

- Includes Permitting, CEQA, Design, Management, Construction, and O&M costs for BMP Implementation Projects.
- Pro Rata Cost Shares:
 - Based upon participation in project through direct funding of parties Pollutant Trading Agreement.



Phosphorus Trading Strategy for Canyon Lake

Phosphorus Source	Existing TP Load ¹	TMDL Allocation	Expected TMDL Reduction (%Δ)	Estimated CNRP Reduction (%Δ)	Projected Net Load
Internal Sediment	4,625 kg/yr	4,625 kg/yr	0 kg/yr (0%)	-1,880 kg/yr (-41%)	2,745 kg/yr
Atmospheric Deposition	221 kg/yr	221 kg/yr	0 kg/yr (0%)	0 kg/yr (0%)	221 kg/yr
Supplemental Water	48 kg/yr	48 kg/yr	0 kg/yr (0%)	0 kg/yr (0%)	48 kg/yr
Open/Forest	2,144 kg/yr	2,037 kg/yr	-107 kg/yr (-5%)	-107 kg/yr (-5%)	2,037 kg/yr
Urban Runoff ²	1,142 kg/yr	306 kg/yr	-836 kg/yr (-73%)	-163 kg/yr (-%)	979 kg/yr
Septics ³	518 kg/yr	139 kg/yr	-379 kg/yr (-73%)	0 kg/yr (0%)	518 kg/yr
Agriculture	4,414 kg/yr	1,183 kg/yr	-3,231 kg/yr (-73%)	-3,231 kg/yr (-73%)	1,183 kg/yr
CAFO ⁴	494 kg/yr	132 kg/yr	-362 kg/yr (-73%)	-469 kg/yr (-95%)	25 kg/yr
TOTAL	13,606 kg/yr	8,691 kg/yr	-4,915 kg/yr (-36%)	-5,850 kg/yr (-43%)	7,781 kg/yr



DRAFT: 11/15/2011

¹ Existing TP loads and allocations are based on the TMDL adopted by the Regional Board in 2005.

² Existing and planned BMPs expected to reduce TP loads in urban runoff by approximately 163 kg/yr.

³ Conservative assumption that septic loads will not be reduced until these areas are sewered by one of the wastewater treatment agencies.

⁴ CAFO's presumed to meet TMDL allocation through attrition and by meeting existing NPDES permit requirements prohibiting most discharges.



Nitrogen Trading Strategy for Canyon Lake

Nitrogen Source	Existing TN Load ⁵	TMDL Allocation	Expected TMDL Reduction (%Δ)	Estimated CNRP Reduction (%Δ)	Projected Net Load
Internal Sediment	13,549 kg/yr	13,549 kg/yr	0 kg/yr (0%)	-3,000 kg/yr (-22%)	10,549 kg/yr
Atmospheric Deposition	1,918 kg/yr	1,918 kg/yr	0 kg/yr (0%)	0 kg/yr (0%)	1,918 kg/yr
Supplemental Water	366 kg/yr	366 kg/yr	0 kg/yr (0%)	0 kg/yr (0%)	366 kg/yr
Open/Forest	3,587 kg/yr	3,587 kg/yr	0 kg/yr (0%)	0 kg/yr (0%)	3,587 kg/yr
Urban Runoff ⁶	5,794 kg/yr	3,974 kg/yr	-1,820 kg/yr (-31%)	-1,140 kg/yr (-20%)	4,654 kg/yr
Septics ⁷	7,071 kg/yr	4,850 kg/yr	-2,221 kg/yr (-31%)	-366 kg/yr (-5%)	6,705 kg/yr
Agriculture	11,057 kg/yr	7,583 kg/yr	-3,474 kg/yr (-31%)	-3,474 kg/yr (-31%)	7,583 kg/yr
CAFO ⁸	2,783 kg/yr	1,908 kg/yr	-875 kg/yr (-31%)	-2,645 kg/yr (-95%)	139 kg/yr
TOTAL	46,125 kg/yr	37,735 kg/yr	-8,390 kg/yr (-18%)	10,625 kg/yr (-23%)	35,501 kg/yr



DRAFT: 11/15/2011

⁵ Existing TN loads and allocations are based on the TMDL adopted by the Regional Board in 2005.

⁶ Existing and planned BMPs expected to reduce TN loads in urban runoff by approximately 1,140 kg/yr.

⁷ Conservative assumption that septic loads will not be reduced until these areas are sewered by one of the wastewater treatment agencies.

⁸ CAFO's presumed to meet TMDL allocation through attrition and by meeting existing NPDES permit requirements prohibiting most discharges.