

Lake Elsinore and Canyon Lake Nutrient TMDL Annual Water Quality Report

Final Report

Prepared For:

Santa Ana Regional Water Quality Control Board

August 8, 2014



Lake Elsinore & San Jacinto Watersheds Authority



City of Lake Elsinore • City of Canyon Lake • County of Riverside
Elsinore Valley Municipal Water District • Santa Ana Watershed Project Authority

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Prepared By:

Lake Elsinore and Canyon Lake Nutrient TMDL Task Force

August 8, 2014

SAWPA/LESJWA

11615 Sterling Avenue
Riverside, CA 92503

MWH

19900 MacArthur Boulevard
Irvine, CA 92612

CSU San Bernardino

5500 University Parkway
San Bernardino, CA 92407

Weston Solutions, Inc.

5817 Dryden Place, Suite 101
Carlsbad, California 92008

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1.0 INTRODUCTION

In 1994, 1998, and again in 2002, Lake Elsinore and Canyon Lake were identified by the California Regional Water Quality Control Board, Santa Ana Region (Regional Board) on its Clean Water Act Section 303(d) list of impaired waterbodies. Impairments identified for these waters included excessive levels of nutrients in both lakes, as well as, organic enrichment/low dissolved oxygen, sedimentation/siltation, and unknown toxicity in Lake Elsinore and high bacterial indicators in Canyon Lake. The Clean Water Act Section 303(d) requires for waters that do not or are not expected to meet water quality standards (beneficial uses, water quality objectives), a Total Daily Maximum Load (TMDL) be implemented. In 2000, the Regional Board initiated the development of TMDLs for nutrients for Lake Elsinore and Canyon Lake.

Since 2000, local stakeholders, in cooperation with the Regional Board, have been working to identify the sources of nutrients impairing each lake, and evaluate the impacts to water quality and beneficial uses incurred from nutrient sources. Stakeholders have participated in watershed-wide annual stormwater quality and flow monitoring supported by Riverside County Flood Control and Water Conservation District (RCFC&WCD), as well as, water quality monitoring of Lake Elsinore and Canyon Lake supported by Elsinore Valley Municipal Water District (EVMWD) and the San Jacinto River Watershed Council (SJRWC). Available grant funding has assisted stakeholders in developing models of the lakes to better understand the lake characteristics, as well as a San Jacinto River Watershed model to simulate the wash off and transport of nutrients to the lakes. In addition, the Lake Elsinore & San Jacinto Watersheds Authority (LESJWA) has performed numerous studies of each lake, and has started to implement projects that are expected to bring about improvements to in-lake water quality.

In 2004, the Regional Board prepared the Lake Elsinore and Canyon Lake Nutrient TMDL Report. This report framed the stakeholders' monitoring and modeling efforts to characterize in-lake water quality, while providing the basis for recommendations to the Regional Board to consider revisions to the Implementation Plan (Chapter 5 of the Water Quality Control Plan, Santa Ana River Basin 1995 by the Regional Board (Basin Plan)) for incorporating the nutrient TMDLs for Canyon Lake and Lake Elsinore. These recommendations outlined in Resolution No. RB8-2004-0037 required stakeholders to develop management plans and to conduct long-term monitoring and implementation programs aimed at reducing nutrient discharges to Lake Elsinore and Canyon Lake.

In December 2004, Resolution No. RB8-2004-0037 amended the Water Quality Control Plan for the Santa Ana River Basin to incorporate Nutrient Total Maximum Daily Loads for Lake Elsinore and Canyon Lake (Lake Elsinore and Canyon Lake TMDL Amendment). The Regional Board adopted the Resolution, and it was subsequently approved by the U.S. Environmental Protection Agency (US EPA) on September 30, 2005. In July 2006, local stakeholders formed a cost sharing partnership, the Lake Elsinore and Canyon Lake Nutrient TMDL Task Force (Task Force)¹.

¹ Lake Elsinore and Canyon Lake TMDL Task Force members include: the County of Riverside, the City of Beaumont, the City of Canyon Lake, the City of Hemet, the City of Lake Elsinore, the City of Moreno Valley, the City of Murrieta, the City of Perris, the City of Riverside, the City of San Jacinto, Riverside County Flood Control and Water Conservation District, Elsinore Valley Municipal Water District, Western Riverside County Agricultural

1.1 TMDL Monitoring and Reporting Requirement

Task 4 of the adopted Lake Elsinore and Canyon Lake TMDL Amendment required stakeholders to prepare and implement a Nutrient Monitoring Program. The program was to include the following:

1. A watershed-wide monitoring program to determine compliance with interim and/or final nitrogen and phosphorus allocations; compliance with the nitrogen and phosphorus TMDL, and load allocations (LAs), including waste load allocations (WLAs).
2. A Lake Elsinore nutrient monitoring program to determine compliance with interim and final nitrogen, phosphorus, chlorophyll *a*, and dissolved oxygen numeric targets. This program will evaluate and determine the relationship between ammonia toxicity and total nitrogen allocation to ensure that the total nitrogen allocation will prevent ammonia toxicity in Lake Elsinore.
3. Canyon Lake nutrient monitoring program to determine compliance with interim and final nitrogen, phosphorus, chlorophyll *a*, and dissolved oxygen numeric targets. The monitoring program will evaluate and determine the relationship between ammonia toxicity and the total nitrogen allocation to ensure that the total nitrogen allocation will prevent ammonia toxicity in Canyon Lake.
4. An annual report summarizing the data collected for the year and evaluating compliance with the TMDL, due August 15 of each year.

This report satisfies the obligation of Task Force stakeholders to submit an annual report summarizing the data collected for the year and evaluates compliance with the TMDL for the Canyon Lake and Lake Elsinore nutrient TMDLs.

1.2 Phased Monitoring Approach

LESJWA, in support of the Task Force, provided funding to meet this requirement by developing a single comprehensive nutrient monitoring plan, The Lake Elsinore and Canyon Lake Nutrient TMDL Monitoring Plan, which may be found at:

http://www.sawpa.org/documents/TMDLmonitoringPlan02_001.pdf

This plan considered a phased monitoring approach, described in the following paragraphs, to account for significant gaps in information required to understand in-lake and watershed processes. Through this phased approach, the Task Force stakeholders were able to develop a priority schedule for addressing data gaps. This enabled stakeholders to focus on the most prominent data gaps and limitations to the nutrient TMDL calculation, while performing an

Coalition acting on behalf of the Agricultural Operators and Dairy Operators in the San Jacinto River Basin, the California Department of Transportation (Caltrans), the California Department of Fish and Game, Eastern Municipal Water District, the U.S. Forest Service in the U.S. Department of Agriculture, March Air Reserve Base – Joint Powers Authority and the U.S. Air Force. Task Force organization and activities are coordinated by the LESJWA.

agreed upon level of monitoring to remain consistent with the Basin Plan requirements to track compliance with TMDLs and associated LAs.

The Lake Elsinore and Canyon Lake Nutrient TMDL Monitoring Plan was approved by the Regional Board in March 2006, and was subsequently implemented by the TMDL Task Force. The Task Force is currently implementing Phase 1 of this approach.

Phase 1 – Intensive Lake Study

Phase 1 focuses on data issues regarding in-lake processes and the “linkage analysis” relating external pollutant loading to in-lake response and associated nutrient concentrations compared to numeric water quality targets. The TMDL calculation was not well understood, but was known to have a direct influence on the assessment of the required external load reductions to the lake. Due to the intricacies involved with this process, Phase 1 was scheduled to occur over a two- to three-year period, depending on the completion of in-lake studies and the amount of data collected. Since the implementation schedule of the Lake Elsinore and Canyon Lake Nutrient TMDL allows for re-evaluation of the TMDL once every three years, it is envisioned that the results of the Phase 1 Monitoring Program will be used to review and revise the Nutrient TMDL.

In December 2010, the Task Force, in consultation with the Regional Board, revised the Phase 1 monitoring program for Lake Elsinore and Canyon Lake. The revised Phase 1 program decreases the number of sample locations in these waterbodies. The watershed monitoring program was not revised.

Through fiscal year 2014-2015 the stakeholders propose to continue the existing Phase I watershed monitoring program. The stakeholders also propose to eliminate existing in-lake monitoring programs through the same period to ensure that resources are dedicated to facilitating and constructing in-lake BMPs. The stakeholders will propose a revised comprehensive watershed and in-lake monitoring program by December 31, 2014 for implementation in fiscal year 2015-2016.

2.0 SAN JACINTO RIVER WATERSHED NUTRIENT TMDL MONITORING PROGRAM

The primary objectives of the Phase 1 San Jacinto River Watershed Monitoring Program are as follows:

1. Determine the total nutrient loads into Lake Elsinore and Canyon Lake from their tributaries (i.e., the San Jacinto River, Salt Creek, and Cottonwood Creek).
2. Determine the total nutrient load from various sources categorized by land use types, namely, agricultural, urban runoff, and open space sources which drain into the above-mentioned tributaries.
3. Provide water quality data for watershed model updates.
4. Provide water quality data to evaluate TMDL compliance with WLAs and LAs.

To achieve these objectives, the Task Force coordinated the yearly goal of sampling at least three qualifying storm events with the collection of at least eight discrete samples across an anticipated storm hydrograph at each monitoring station. In order to coordinate with other monitoring program requirements and to minimize the number of RCFC&WCD staff deployed during sampling events, the sampling activities were coordinated by the consultant Weston Solutions, Inc. (Weston) for the reporting period of July 2013 through June 2014. Laboratory services were provided by Edward S. Babcock and Sons, Inc. (Babcock).

2.1 Summary of 2013-2014 Watershed Monitoring and Nutrient Loads

A summary of the water quality monitoring data for each of the five monitoring locations for the period of July 1, 2013 through June 30, 2014, is presented in Table 2-1 below. A more detailed account, including storm hydrographs and event loads are presented in Section 2.7 for each monitoring location. The complete set of water quality data, including water quality measurements for discrete grab samples is included in Appendix A.

Table 2-1. Summary of 2013-2014 Monitoring

Number and Location Description	Total Annual Flow*(Mgal)	Event Mean Storm Concentration (mg/L)		Estimated Annual Load (kg)	
		Total Nitrogen	Total Phosphorus	Total Nitrogen	Total Phosphorus
Site 3 - Salt Creek at Murrieta Road (USGS 11070465)	410.9	2.7	0.9	4,268	1,409
Site 4 - San Jacinto River at Goetz Road (USGS 11070365)	483.9	1.8	0.6	3,252	1,178
Site 6 - San Jacinto River at Ramona Expressway (USGS 11070210)	0	0	0	-	-
Site 30 - Canyon Lake Spillway (USGS 11070500)	147.5	Not Measured	Not Measured	Not Measured	Not Measured
Site 1 - San Jacinto River at Cranston Guard Station (USGS 11069500)	183.7	Not Measured	Not Measured	Not Measured	Not Measured

* Data presented after 1/8/2014 in this report are provisional.

2.2 Monitoring Strategy

Phase 1 TMDL Monitoring of the San Jacinto Watershed follows the guidelines detailed in the following documents, including the San Jacinto River Watershed Storm Water Sampling Analysis Plan:

<http://www.sawpa.org/wp-content/uploads/2012/05/Final-Sampling-and-Analysis-Plan-08-09.pdf> ;

and the Lake Elsinore and Canyon Lake Nutrient TMDL Monitoring Sampling and Analysis Plan prepared by the U.S. Forest Service (USFS):

<http://www.sawpa.org/wp-content/uploads/2012/05/LECL-Nutrient-TMDL-Monitoring-USFS-SAP1.pdf>

The sampling technique utilizes a fixed station sampling approach. A fixed station sampling approach provides for the collection of samples at regular sites on a continuous basis. It also enables the examination of water quality trends. Weston supported the Task Force effort by coordinating and guiding the Phase 1 San Jacinto Watershed Monitoring Program sampling activities during the 2013-14 monitoring period. Under their direction, samples are collected at the designated monitoring stations throughout the San Jacinto River Watershed, including Lake Elsinore and Canyon Lake.

In addition to this effort, the San Bernardino National Forest (Forest Service), in accordance with their agreement for in-lieu obligations to the Lake Elsinore and Canyon Lake TMDL Task Force, conducted water sampling at the Cranston Guard Station site on the San Jacinto River between 2007 and 2011. This work; however was dependent on sufficient funds being allocated by

Congress to complete the work. In 2012, the Forest Service pulled out of the task force and will no longer provide monitoring at the Cranston site.

2.3 Monitoring Stations and Stream Gauge Locations

To monitor TMDL compliance, five sampling stations were carefully selected to reflect various types of land uses within the watershed. Sampling station locations were deliberately set up to be within the vicinity of United States Geological Survey (USGS) or RCFC&WCD stream gauge stations. The sampling stations are listed in Table 2-2 below and shown on Figure 2-1.

Table 2-2. Phase 1 San Jacinto River Watershed Monitoring Stations

Station ID	USGS Station ID	Agency	Site Number and Location Description
745	11070465	USGS	Site 3 - Salt Creek at Murrieta Road
759	11070365	USGS	Site 4 - San Jacinto River at Goetz Road
741	11070210	USGS	Site 6 - San Jacinto River at Ramona Expressway
841	841 or 11070500	USGS	Site 30 - Canyon Lake Spillway
792	11069500	RCFC&WCD or USGS	Site 1 - San Jacinto River at Cranston Guard Station

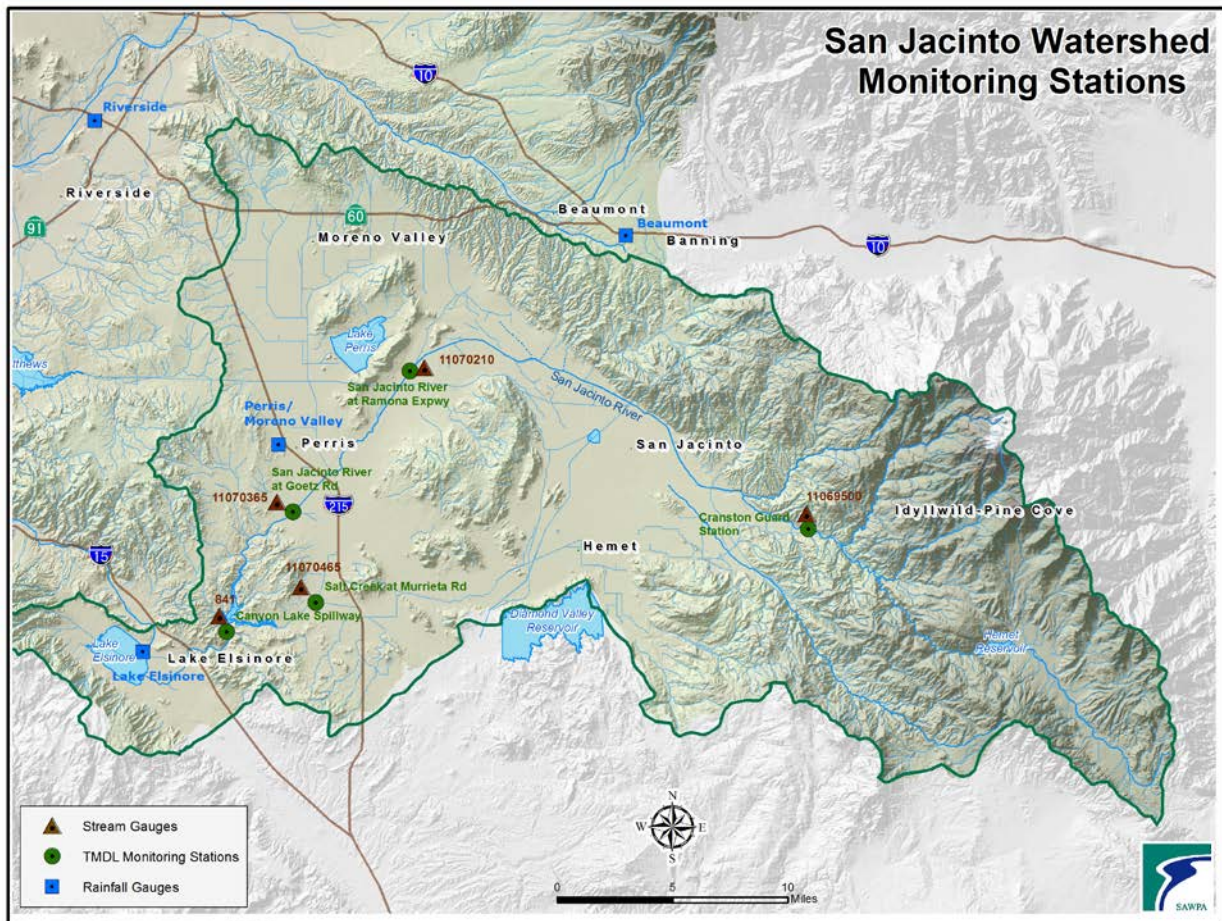


Figure 2-1. Phase I San Jacinto River Watershed Monitoring Stations

2.4 Stream Gauge Records

The USGS and RCFC&WCD monitor stream flow from a number of gauging stations in the San Jacinto River Watershed. Stream gauging stations maintained and operated for Phase 1 of the San Jacinto Watershed Monitoring Program are shown in Figure 2-1 and identified in Table 2-2.

The data record captured per USGS stream gauge is publicly available at the following website:

<http://waterdata.usgs.gov/ca/nwis/current/?type=flow>

A summary of the stream gauge data recorded at each of the stations with measured flow for the monitoring period of July 1, 2013 through June 30, 2014 is presented in Table 2-3 and visually presented in Figure 2-2 through Figure 2-5. The mean monthly flows reported in Table 2-3 characterize the average instantaneous flow rate at the USGS station during both dry and wet weather conditions. The flow data are downloaded from the USGS website and are considered provisional for approximately 6 months. The data were downloaded in August 2014 and the USGS flow data were provisional after January 8, 2014. The provisional data provided by the USGS are subject to change and are not citable until reviewed and approved by the U.S. Geological Survey. The complete set of stream gauge data is included as Appendix A.

Table 2-3. Summary of Stream Gauge Data (July 2013 through June 2014)

July 2013-June 2014 Mean Monthly Flow (cfs)*	Site 3 - Salt Creek at Murrieta Road (11070465)	Site 4 - San Jacinto River at Goetz Road (11070365)	Site 6 - San Jacinto River at Ramona Expressway** (11070210)	Site 30 - Canyon Lake Spillway (11070500)	Site 1 - San Jacinto River at Cranston Guard Station (11069500)
July	0	0	-	0	0
August	0.01	3.79	-	0	0.02
September	0	0.32	-	0	1.89
October	0.09	1.03	-	0.23	0.04
November	0.24	4.89	-	0.53	0.06
December	0.37	0.18	-	0.66	0.08
January	0	0	-	0.64	0.07
February	3.56	3.68	-	2.44	1.17
March	16.59	10.52	-	2.44	5.44
April	0.02	0.29	-	0.60	0.25
May	0	0	-	0.11	0.10
June	0	0	-	0	0.16
Mean Annual Flow (cfs)	1.74	2.05	-	0.67	0.82

* This value characterizes the average instantaneous flow rate at the USGS station during both dry and wet weather conditions in a given month. Flow data after 01/08/2014 are provisional and may be subject to change.

**No flow data were reported for Site 6 for the monitoring period.

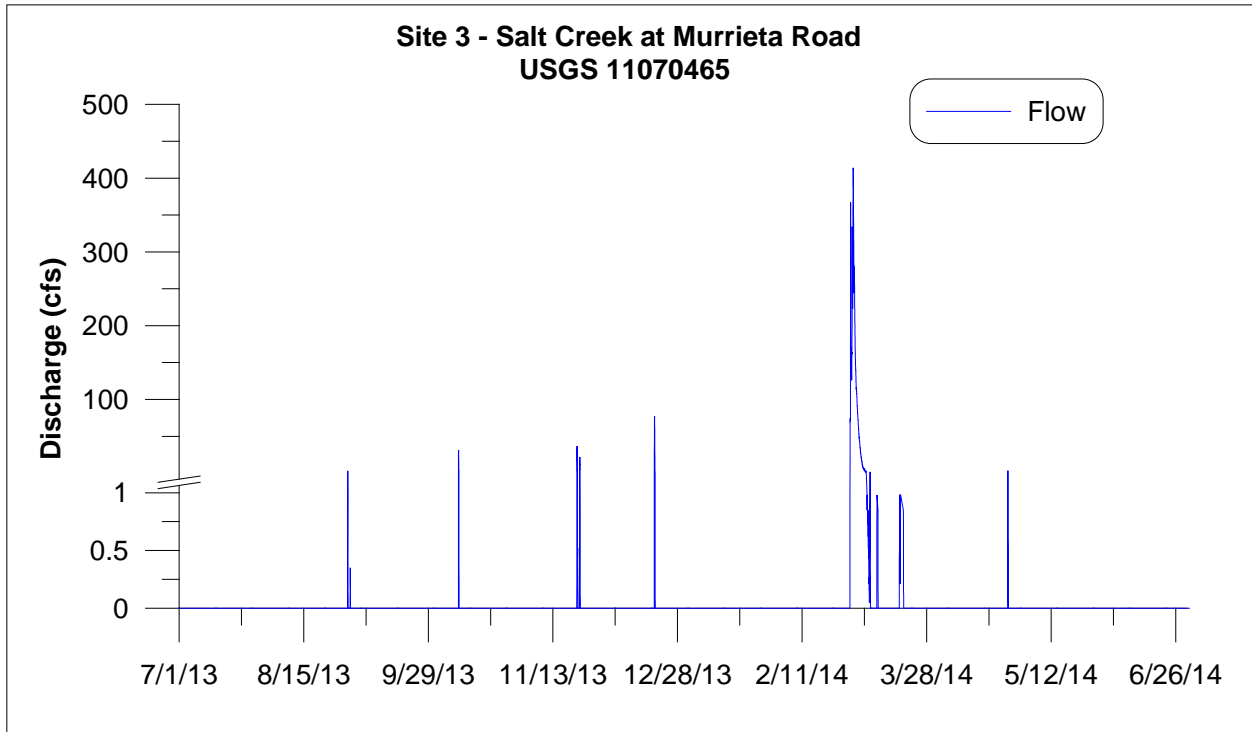


Figure 2-2. Site 3 – Salt Creek at Murrieta Road – Daily Stream Gauge Records

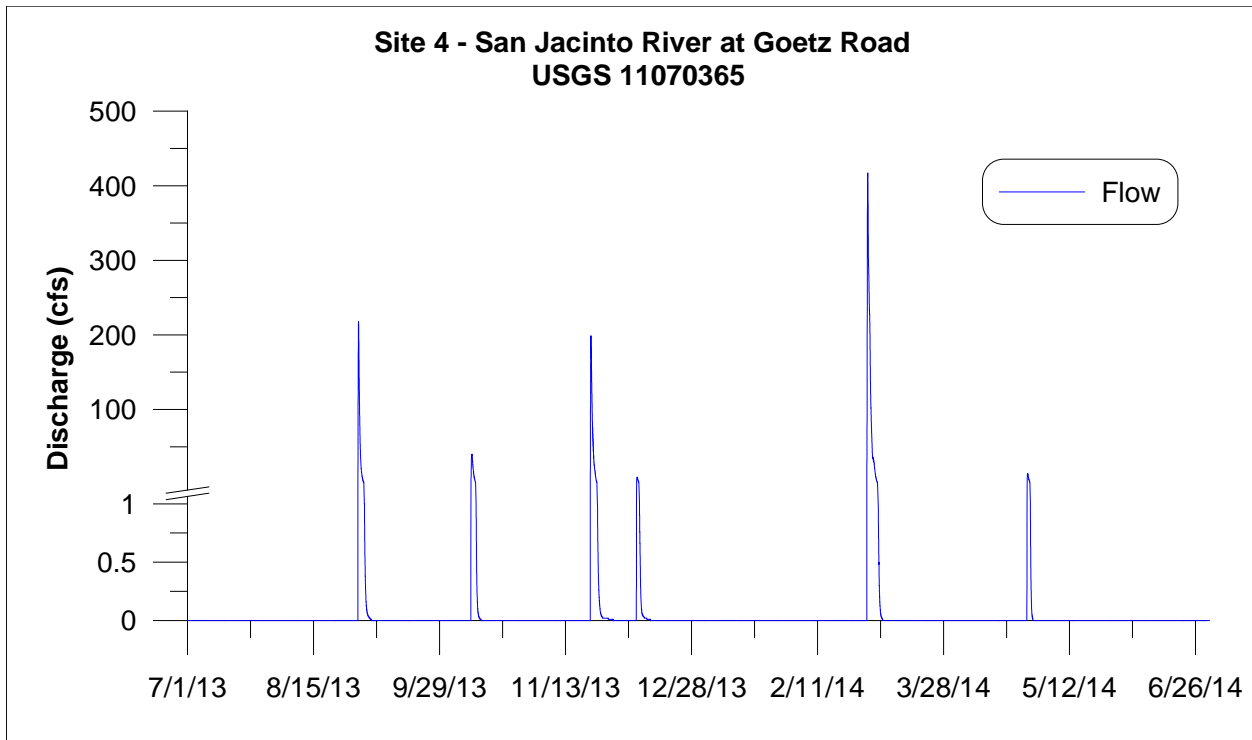


Figure 2-3. Site 4 – San Jacinto River at Goetz Road – Daily Stream Gauge Records

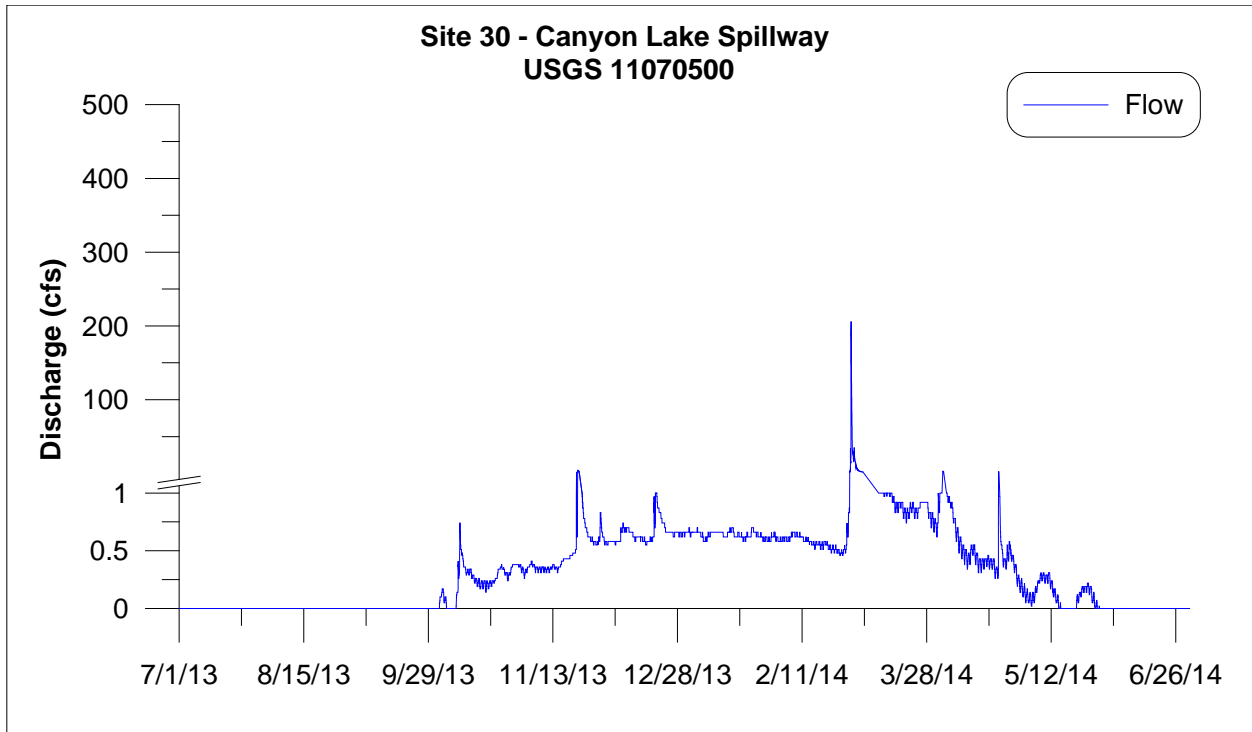


Figure 2-4. Site 30 – Canyon Lake Spillway – Daily Stream Gauge Records

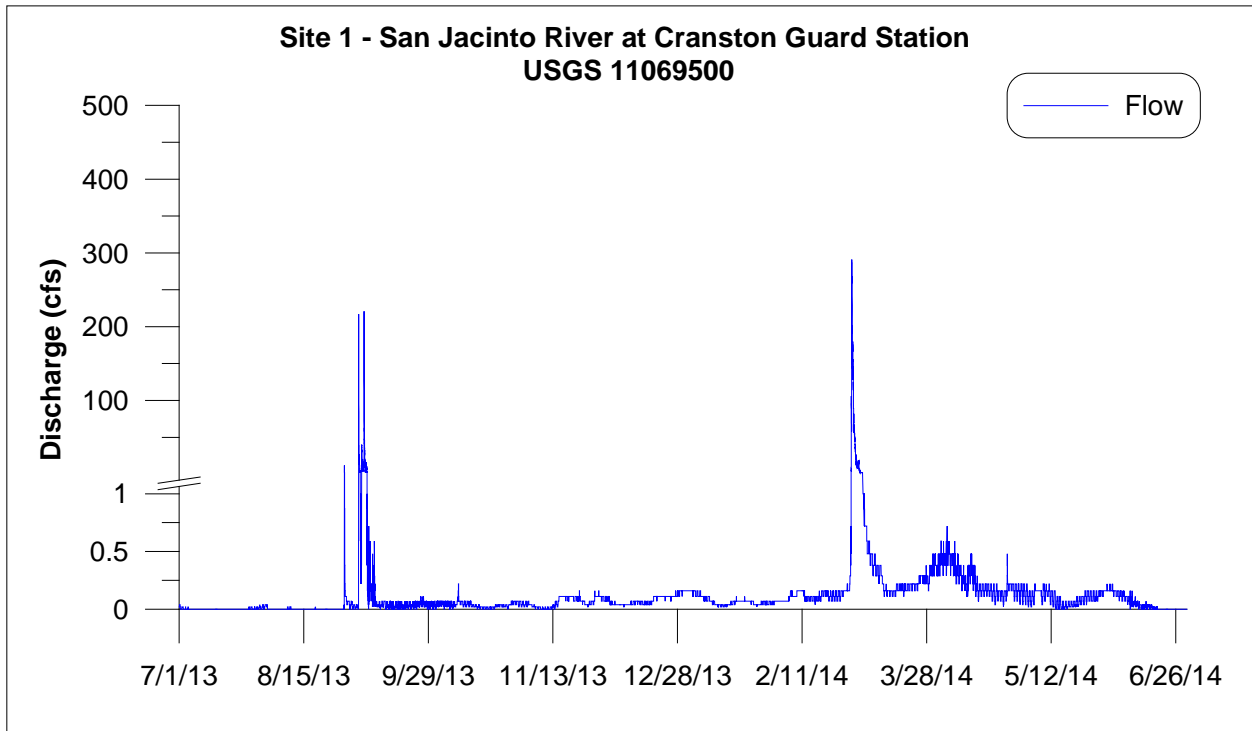


Figure 2-5. Site 1 – San Jacinto River at Cranston Guard Station – Daily Stream Gauge Records

2.5 Sampling Strategy

The sampling strategy is intended to result in the collection of at least eight samples across the entire spectrum of the storm event hydrograph. Eight to twelve representative samples collected during both the rising and falling limbs of the hydrograph are sent to the laboratory for analysis.

The following protocols were applied:

- Sampling commences once flow is established in the channel.
- Automatic samplers are utilized at all stations except San Jacinto River at Ramona Expressway (Station ID 741). The time-based frequency of grab samples is estimated and programmed into the device prior to the storm event, depending on the forecasted size of the storm event. Some of the sampling sites may convey flow for extended periods due to the hydrologic response of large tributary drainage areas, resulting in a lengthy period for the falling limb of the hydrograph. Monitoring at these sites may involve collecting samples over longer intervals, for example, every 12 hours over a period of two days or more, to properly distribute the samples across the storm hydrograph.
- All samples collected from the sampling station at Canyon Lake Spillway (Station ID 841) will only be analyzed if the nearby upstream dam overflows. The dam did not overflow during the 2013-2014 wet weather season.
- All samples collected from the sampling station at San Jacinto River at Ramona Expressway (Station ID 741) will only be analyzed if the upstream Mystic Lake overflows. Mystic Lake did not overflow during the 2013-2014 wet weather season.
- The sampling station at Cranston Guard Station (Station ID 792) is directly handled by the USFS.
- In the event a storm event becomes larger than forecasted, such that too many samples are collected, extra samples can be discarded (e.g., analyze every other sample to recover 8 to 12 samples from across the entire hydrograph).
- Decisions regarding when to begin and stop sampling were made through discussions with staff at the RCFC&WCD.

2.6 San Jacinto Watershed Monitoring Events

The July 2013 through June 2014 reporting period provided one qualifying storm event to fulfill the goal of three events per year.

The storm events on October 9, 2013, November 21, 2013 and December 19, 2013 did not meet the mobilization criteria and therefore no event monitoring was conducted. The mobilization criteria for event monitoring requires a National Weather Service quantitative precipitation forecast greater than an 1.0 inch forecast within 24 hours from November to January, and greater than an 0.5 inch forecast within 24 hours from January to May.

The monitored storm event occurred on February 28, 2014 through March 1, 2014, and the baseflow drawdown continued for nearly a week thereafter. Multiple distinct flow peaks were observed by the USGS gauging station at Salt Creek at Murrieta Road (Station ID 745), with an event peak flow of 414 cubic feet per second (cfs) measured on March 1, 2014. Peak flows of

417 cfs were recorded at San Jacinto River at Goetz Road (Station ID 759) on February 28, 2014. While localized flow was recorded at the USGS gauging station located downstream of the Canyon Lake Spillway (Station ID 841) station, no flows exited Canyon Lake as a result of this storm. The water level in Canyon Lake did not crest the spillway (Appendix B). There were no flows recorded at either the San Jacinto River at Ramona Expressway (Station ID 741).

Another viable storm event meeting the mobilization criteria did not occur during the 2013-2014 wet weather season; thus the second and third monitoring events were not conducted.

2.7 San Jacinto Watershed Annual Water Quality Summary

As described in the previous section, water quality was measured for one storm event at two of the five Phase 1 watershed compliance monitoring locations for the San Jacinto River Watershed. A summary of water quality monitoring data for each of the five monitoring locations for the period July 1, 2013 through June 30, 2014, is presented below. The complete set of water quality data for the period July 2013 through June 2014 is included as Appendix A.

Included with each summary of the monitoring data are the individual event mean concentrations (EMC) for each analyte. Also included are the estimated event loads and annual loads for each analyte.

2.7.1 Summary of Monitoring Data – Salt Creek at Murrieta Road

Water quality was measured for one storm event at the Salt Creek at Murrieta Road (Station ID 745). Data for the EMC of each analyte are presented in Table 2-4. Event and annual loads for each analyte are presented in Table 2-5. A hydrograph with water quality sample times are provided in Figure 2-7 for the monitored storm event. This figure was developed based on flow data provided by the nearby USGS stream gauge (ID# 11070465). Total annual flow at this gauge was estimated at 54,925,065 cubic feet (cf) or 411 million gallons (Mgal).



Figure 2-6. Storm Event at Salt Creek at Murrieta Road (February 28-March 2, 2014)

EMCs for nutrients for the monitored storm event was 2.74 milligrams per liter (mg/L) for total nitrogen, and 0.91 mg/L for total phosphorus. The annual estimated nutrient load was calculated to be 4,268 kg for nitrogen and 1,409 kg for phosphorus.

Table 2-4. Water Quality EMCs at Salt Creek at Murrieta Road

Analyte	Units	EMC Event 1
Ammonia-Nitrogen	mg/L	0.078
Chemical Oxygen Demand	mg/L	72.61
Kjeldahl Nitrogen	mg/L	1.887
Nitrate as N	mg/L	0.826
Nitrite as N	mg/L	0.034
Organic Nitrogen	mg/L	1.813
Ortho Phosphate Phosphorus	mg/L	0.374
Total Dissolved Solids	mg/L	395.972
Total Hardness	mg/L	191.498
Total Nitrogen	mg/L	2.744
Total Phosphorus	mg/L	0.906
Total Suspended Solids	mg/L	323.726

Table 2-5. Water Quality Event and Annual Loads at Salt Creek at Murrieta Road

Analyte	Units	Load Event 1	Annual Load
Ammonia-Nitrogen	Kg	111	121
Chemical Oxygen Demand	Kg	103,962	112,931
Kjeldahl Nitrogen	Kg	2,702	2,935
Nitrate as N	Kg	1,183	1,285
Nitrite as N	Kg	48.7	52.9
Organic Nitrogen	Kg	2,596	2,820
Ortho Phosphate Phosphorus	Kg	536	582
Total Dissolved Solids	Kg	566,945	615,856
Total Hardness	Kg	274,183	297,838
Total Nitrogen	Kg	3,929	4,268
Total Phosphorus	Kg	1,297	1,409
Total Suspended Solids	Kg	463,505	503,493

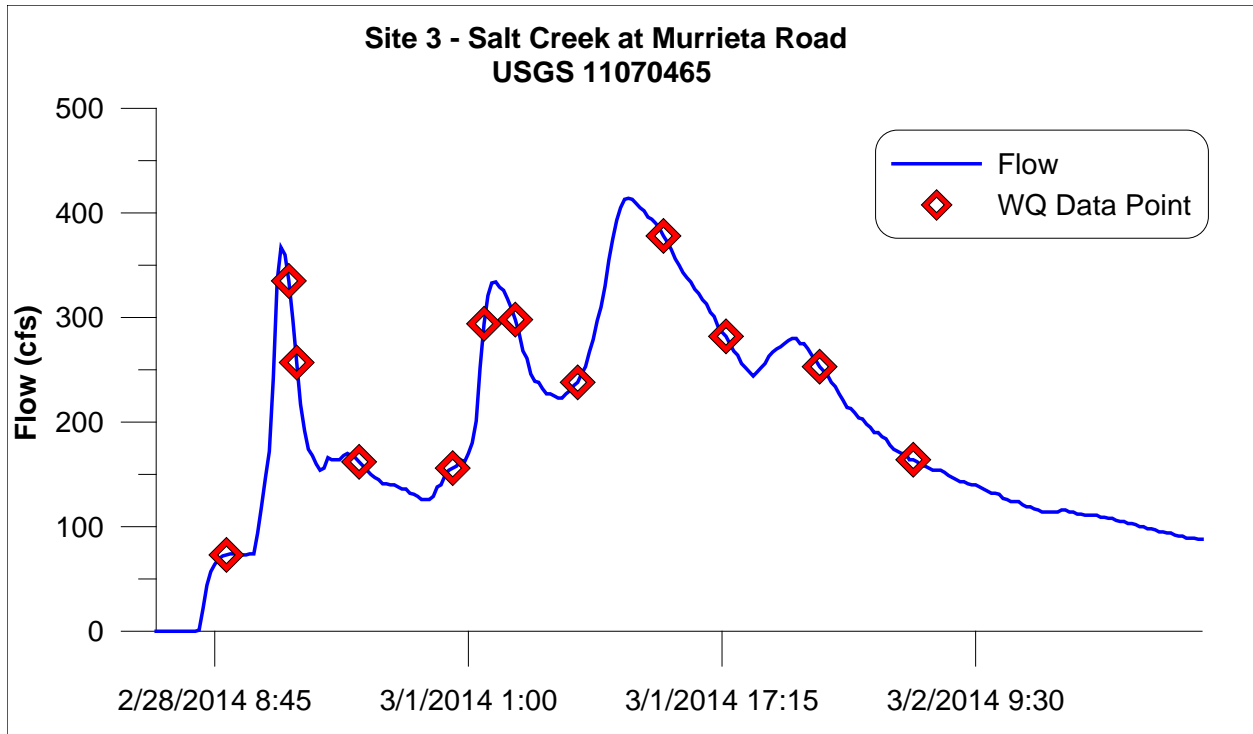


Figure 2-7. Hydrograph of First Storm Event at Salt Creek at Murrieta Road (February 28-March 2, 2014)

2.7.2 Summary of Monitoring Data – San Jacinto River at Goetz Road

Water quality was sampled for two storm events at the San Jacinto River at Goetz Road (Station ID 759). Data for the EMCs of each analyte are presented in Table 2-6. Event and annual loads for each analyte are presented in Table 2-7. Hydrographs with water quality sample times are provided in Figure 2-9. The figures were developed based on flow data provided by the nearby USGS stream gauge (ID# 11070365). Total annual flow at this gauge was estimated at 64,689,804 cf or 484 Mgal.



Figure 2-8. Storm Event at San Jacinto River at Goetz Road (February 28-March 2, 2014)

EMCs for nutrients for the monitored storm event was 1.78 mg/L for total nitrogen and 0.64 mg/L for total phosphorus. The estimated annual nutrient load was calculated to be 3,252 kg for nitrogen and 1,178 kg for phosphorus.

Table 2-6. Water Quality EMCs at San Jacinto River at Goetz Road

Analyte	Units	EMC Event 1
Ammonia-Nitrogen	mg/L	0.037
Chemical Oxygen Demand	mg/L	58.72
Kjeldahl Nitrogen	mg/L	1.14
Nitrate as N	mg/L	0.622
Nitrite as N	mg/L	0.026
Organic Nitrogen	mg/L	1.128
Ortho Phosphate Phosphorus	mg/L	0.218
Total Dissolved Solids	mg/L	144.145
Total Hardness	mg/L	88.64
Total Nitrogen	mg/L	1.775
Total Phosphorus	mg/L	0.643
Total Suspended Solids	mg/L	207.278

Table 2-7. Water Quality Event and Annual Loads at San Jacinto River at Goetz Road

Analyte	Load Units	Load Event 1	Annual Load
Ammonia-Nitrogen	Kg	38.1	66.9
Chemical Oxygen Demand	Kg	61,268	107,564
Kjeldahl Nitrogen	Kg	1,189	2,088
Nitrate as N	Kg	649	1,140
Nitrite as N	Kg	26.7	46.8
Organic Nitrogen	Kg	1,177	2,066
Ortho Phosphate Phosphorus	Kg	227	399
Total Dissolved Solids	Kg	150,400	264,046
Total Hardness	Kg	92,486	162,372
Total Nitrogen	Kg	1,852	3,252
Total Phosphorus	Kg	671	1,178
Total Suspended Solids	Kg	216,273	379,695

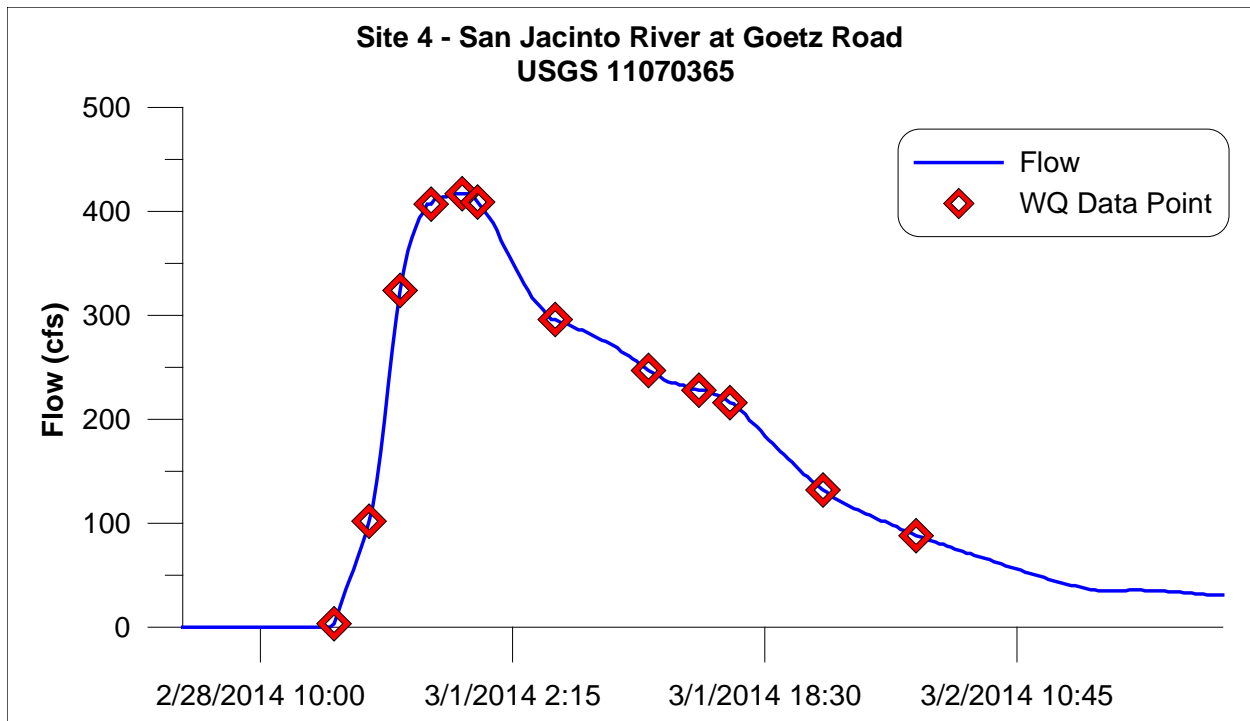


Figure 2-9. Hydrograph of First Storm Event at San Jacinto River at Goetz Road (February 28-March 2, 2014)

2.7.3 Summary of Monitoring Data – San Jacinto River at Ramona Expressway

There were no flows at the San Jacinto River at Ramona Expressway (Station ID 741); thus, no samples were collected during the 2013-2014 monitoring year.

2.7.4 Summary of Monitoring Data – Cranston Guard Station

The United States Forest Service (USFS) storm sampling only occurs if the Cranston gauge station reaches 300 cfs, as per the direction of the County Flood Control District. Levels below 300 cfs infiltrate prior to reaching the Mystic Lake area, and therefore, are less of an influence on nutrient loading to Canyon Lake and Lake Elsinore. During the reporting period, there were no flows at the Cranston Guard Station (Station ID 792) which exceeded 300 cfs; thus, no samples were collected during the 2013-2014 monitoring year.

2.7.5 Summary of Monitoring Data – Canyon Lake Spillway

There was no dam spillage (Figure 2-10 and Appendix B) and no flows at the Canyon Lake Spillway (Station ID 841); thus, no samples were collected during the 2013-2014 monitoring year.

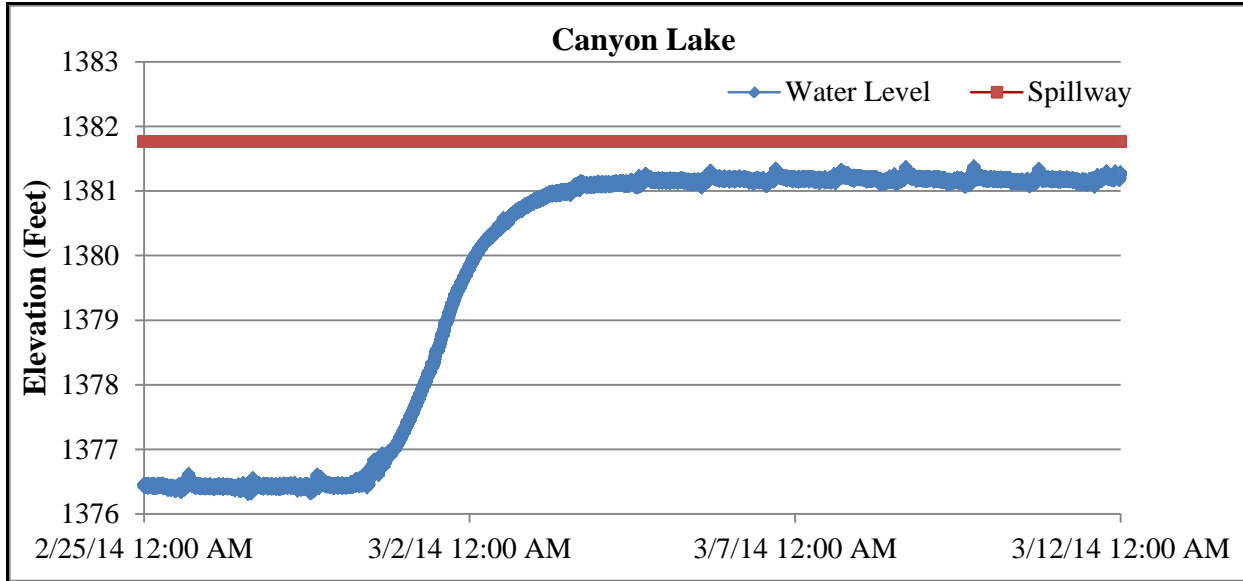


Figure 2-10. Canyon Lake Water Level Elevation and Spillway Elevation (February 25-March 15, 2014)

2.8 San Jacinto Watershed Rainfall Records

The RCFC&WCD maintains rainfall records for rain gauges located within or near the San Jacinto Watershed as shown in Table 2-8.

Table 2-8. San Jacinto River Watershed Rainfall Gauges

Station ID	Station Description
152	Perris
248	Winchester
67	Lake Elsinore
186	Hemet / San Jacinto
155	Perris / Moreno Valley – Pigeon Pass

Rainfall data recorded at these five stations for the period July 1, 2013, through June 30, 2014, are summarized in Table 2-9. The complete set of rainfall gauge data is included as Appendix A.

Table 2-9. Summary Rainfall Data (July 2013 to June 2014)

Monthly Rainfall (inches)	Perris	Winchester	Elsinore	San Jacinto	Pigeon Pass
Jul	0.01	0.05	0.02	0.01	0.32
Aug	0.00	0.02	0.00	0.18	0.13
Sep	0.18	0.00	0.01	0.06	0.01
Oct	0.42	0.49	0.28	0.76	0.72

Table 2-9. Summary Rainfall Data (July 2013 to June 2014)

Monthly Rainfall (inches)	Perris	Winchester	Elsinore	San Jacinto	Pigeon Pass
Nov	0.39	0.74	0.53	0.54	2.40
Dec	0.43	0.61	0.43	0.49	0.39
Jan	0.00	0.00	0.13	0.02	0
Feb	0.43	0.65	0.81	0.54	0.57
Mar	1.39	2.61	1.83	3.09	2.17
Apr	0.35	0.40	0.54	0.62	1.56
May	0.00	0.00	0.00	0.00	0.00
Jun	0.00	0.00	0.00	0.00	0.00
Annual Rainfall (Inches)	3.6	5.57	4.58	6.31	8.27

3.0 LAKE ELSINORE NUTRIENT TMDL MONITORING PROGRAM

Elsinore Valley Municipal Water District (EVMWD) supports the Task Force effort by conducting the Phase 1 Lake Elsinore Monitoring Program sampling and analysis. This work is performed in coordination with EVMWD's NPDES compliance program (Order No. R8-2013-0017 for NPDES No. CA8000027 for the Regional Water Reclamation Plant, Lake Elsinore, Riverside County approved October 1, 2013).

EVMWD's NPDES compliance monitoring program for Lake Elsinore was initiated in April 2006. The Lake Elsinore TMDL compliance monitoring was not conducted for the July 2013 to June 2014 period. On October 26, 2012 the Regional Board issued a resolution (Resolution No. R8-2012-0052) granting the Task Force a temporary suspension of TMDL in-lake Canyon Lake and Lake Elsinore monitoring programs to achieve cost savings that will be applied to implementing on-the-ground projects aimed at reducing nutrient impacts in Canyon Lake and Lake Elsinore.

4.0 CANYON LAKE NUTRIENT TMDL MONITORING PROGRAM

EVMWD supports the Task Force effort by conducting the Phase 1 Canyon Lake Monitoring Program sampling and analysis. The Canyon Lake monitoring was not conducted for the July 2013 to June 2014 period. On October 26, 2012 the Regional Board issued a resolution (Resolution No. R8-2012-0052) granting the Task Force a temporary suspension of TMDL in-lake Canyon Lake and Lake Elsinore monitoring programs to achieve cost savings that will be applied to implementing on-the-ground projects aimed at reducing nutrient impacts in Canyon Lake and Lake Elsinore.

5.0 DATA MANAGEMENT

LESJWA, on behalf of the Task Force, oversees the management and storage of water quality samples and field analysis data for projects associated with the Lake Elsinore and Canyon Lake Nutrient TMDLs following the guidelines established in the Lake Elsinore, Canyon Lake and San Jacinto Watershed Monitoring Quality Assurance Protection Plan (QAPP; <http://www.sawpa.org/tmdl-monitoring-plan-and-qapp/>)

5.1 Management of TMDL Data

Persons responsible for maintaining records for the individual components of the “The Lake Elsinore and Canyon Lake Nutrient TMDL Monitoring Plan” are as follows.

The San Jacinto Watershed Quality Assurance Manager, (Steve Clark, RCFC&WCD) maintains all San Jacinto Watershed-wide Nutrient TMDL Monitoring Program sample collection records, sample transport records, chain-of-custody and field analyses forms, and all records submitted by contract laboratories associated with the San Jacinto Watershed nutrient TMDL monitoring program.

The Lake Elsinore Quality Assurance Manager, (Sarah Garber, MWH) maintains all Lake Elsinore Nutrient Monitoring Program sample collection records, sample transport records, chain-of-custody and field analyses forms, and all records submitted by contract laboratories associated with the Lake Elsinore in-lake nutrient monitoring program.

The Canyon Lake Quality Assurance Manager, (Dr. James Noblet, CSUSB) maintains all Canyon Lake Nutrient Monitoring Program sample collection records, sample transport records, chain of custody and field analyses forms, and all records submitted by contract laboratories associated with the Canyon Lake nutrient monitoring program collected from July 2008 – present.

Each laboratory contracted by the Task Force has appointed a Quality Assurance Manager to maintain the laboratory’s records.

LESJWA oversees the actions of these persons and will maintain the Lake Elsinore and Canyon Lake Nutrient TMDL database, which includes all sample analyses results that have passed all QA processes as defined in the QAPP. LESJWA will also arbitrate any issues relative to records retention and any decisions to discard records.

All records are passed to the Santa Ana Regional Water Quality Control Board as required by in the Lake Elsinore, Canyon Lake and San Jacinto Watershed Monitoring QAPP. Copies of the chemical monitoring records are maintained by the appropriate Program Quality Assurance Manager and each laboratory contracted by the Task Force for five years after project completion then discarded, except for the database, which are maintained by LESJWA without discarding. Copies of other monitoring records are being maintained by the appropriate Program Quality Assurance Manager for five years after project completion then discarded.

5.2 Storage of TMDL Data

LESJWA has an existing database of laboratory and field measurement data from previous studies. This database, along with all future data, is maintained by LESJWA under the direction of LESJWA. Beginning in June 2007, all laboratory and field measurement data submitted to LESJWA for inclusion in the Santa Ana Watershed Data Management System (SAWDMS) database follow the guidelines and formats established by the Surface Water Ambient Monitoring Program (SWAMP) (<http://www.waterboards.ca.gov/swamp/qapp.html>).

Data are transmitted to LESJWA in a standard electronic format and uploaded to the database through batch set electronic means. All contract laboratories maintain a record of transferred records and will periodically assess their record of transferred records against those actually held by the Task Force. Prior to upload, QA/QC tools are used to check new data against existing data in the database for completeness, validity of analytical methods, validity of sample locations, validity of sample dates, and data outliers. Data not passing QA/QC tests are returned to the originating laboratory or generator for clarification and/or correction. When all data within a batch set have passed QA/QC, the data are uploaded to the database. A unique batch number, date loaded, originating laboratory and the person who loaded the data are recorded in the database so that data can be identified and removed in the future if necessary.

The Task Force's database is backed up using built-in software backup procedures. In addition, all data files are backed up on tape on a weekly basis as part of LESJWA's SOP for disaster recovery. Backup tapes are kept for a minimum of four weeks before they are written over. Tapes are rotated off-site for separate storage on a monthly (or more frequent) basis, in accordance with SAWPA Information Systems SOPs. Each back up session validates whether the files on tape are accurate copies of the original. The Task Force also maintains an access log showing who accessed the database, when, and what was done during the session. All changes to the database are stored in a transaction database with the possibility of rollback, if necessary.

Data are stored on a Windows 2003 Server with a 2Ghz + CPU and 2Gb RAM with a failsafe RAID 5 configuration. The server checks for operating system updates daily and downloads and installs patches and service packs as necessary. The current server is two years old, and as per LESJWA's policy, will be replaced after a maximum of 4 years of service. The server is also protected with Norton Anti-Virus software which is updated daily. The database software is Microsoft Access 2003. The database is modeled after the SWAMP Template provided by the State Water Resources Control Board and Moss Landing Marine Laboratories. The database is backed up on a weekly basis according to LESJWA's SOP for disaster recovery.

TMDL data are uploaded to the database quarterly to twice per year. Data can be exported to a SWAMP compatible data exchange format using pre-made queries in the database. The exported data are sent to the SWRCB IM Coordinator for processing into the SWAMP database.

5.2.1 California Environmental Data Exchange Network

Weston uploads the water quality data collected under the San Jacinto River Watershed Nutrient TMDL Monitoring Program to the California Environmental Data Exchange Network (CEDEN). The water quality data is first formatted into CEDEN templates and then submitted through online data submission/checker programs to the Regional Data Centers (RDC). The

submission/checker programs ensure data integrity and comparability with other data sets. Once the data has passed through all the checks, it is uploaded into the centralized CEDEN database by the RDC. SAWPA has a direct link to the CEDEN database whereby the TMDL data uploaded by Weston is pushed out on a daily basis to a SQL Server database residing at SAWPA. The data can therefore be quickly accessed by SAWPA and stakeholders.

CEDEN is a central location to find and share information about California's water bodies, including streams, lakes, rivers, and the coastal ocean. Many groups in California monitor water quality, aquatic habitat, and wildlife health to ensure good stewardship of our ecological resources. CEDEN aggregates this data and makes it accessible to environmental managers and the public. To find out more about CEDEN or to download the water quality data collected under the San Jacinto River Watershed Nutrient TMDL Monitoring Program, go to www.ceden.org.

APPENDIX A

July 1, 2013 – June 30, 2014 Data

1. Rainfall Gauge Data
2. Stream Gauge Data
3. Laboratory Water Quality Data
4. Field Water Quality Data

APPENDIX B

Canyon Lake Levels