Ventura Countywide Stormwater Quality Management Program

2015-2016

Permit Year

# Ventura Countywide Stormwater Quality Management Program Annual Report

# Attachment E - TMDL Reports Volume I

Camarillo
County of Ventura
Fillmore
Moorpark
Ojai
Oxnard
Port Hueneme
Santa Paula
Simi Valley
Thousand Oaks
Ventura
Ventura County Watershed Protection District

December 15, 2016

# Memorandum

DATE: March 24, 2016

TO: Stakeholders Implementing TMDLs in the Calleguas Creek Watershed

SUBJECT: Evaluation of Natural Attenuation Rates of Organochlorine Pesticides and PCBs in Calleguas Creek Watershed (OCP/PCB TMDL Special Study #3)

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## Summary

The *Total Maximum Daily Load for Organochlorine Pesticides, Polychlorinated Biphenyls, and Siltation in Calleguas Creek, Its Tributaries, and Mugu Lagoon* (TMDL) was adopted by the Los Angeles Regional Water Quality Control Board (Regional Board) on July 7, 2005 and became effective on March 24, 2006.[1] The TMDL was developed to address impairments to Calleguas Creek and its tributaries caused by organochlorine (OC) pesticides and polychlorinated biphenyls (PCBs) in water, sediment, and fish tissue. These constituents are often referred to as legacy or historic pollutants due to their persistence in the environment despite enactment of regulations to restrict or ban their use. The TMDL established fish tissue concentration targets for total PCBs and a suite of 15 OCPs. Interim and final waste load allocations (WLAs) for POTW effluent and urban discharges, and load allocations (LAs) for agricultural discharges, were established for "Category 1" constituents (chlordane, DDT, DDD, DDE, toxaphene, PCBs and dieldrin).

The TMDL included three required special studies. This memorandum has been prepared to satisfy the requirement for Special Study #3 (Requirement 16 in the implementation schedule). Special Study #3 has a deadline of ten years after the TMDL effective date (i.e., March 24, 2016) and is described in the TMDL as follows:

[1] Resolution No. R4-2005-010

*Evaluate natural attenuation rates and evaluate methods to accelerate organochlorine pesticide and polychlorinated biphenyl attenuation and examine the attainability of wasteload and load allocations in the Calleguas Creek Watershed.*

Submittal of this memorandum to the Regional Board fulfills Requirement 16 of the implementation schedule for the TMDL for the following parties:

- POTWs – Camrosa Water District, Camarillo Sanitary District, Ventura County Waterworks District No. 1, and the Cities of Simi Valley and Thousand Oaks;
- Urban Dischargers – Cities of Simi Valley, Thousand Oaks, Camarillo, Moorpark, and Oxnard, Ventura County Watershed Protection District, and the County of Ventura Public Works Agency;
- Agricultural Dischargers consisting of the entities represented by the Ventura County Agricultural Irrigated Lands Group (VCAILG) within the Calleguas Creek Watershed, a subdivision of the Farm Bureau of Ventura County; and
- Other dischargers consisting of U.S. Department of Navy and Caltrans.

As part of the special study, TMDL compliance monitoring data was examined to determine the degree to which final WLAs and LAs, and TMDL fish tissue targets have already been attained in the watershed. The results indicate that the final sediment allocations have already been attained for almost all combinations of reaches and constituents. However, 4,4´-DDE concentrations in sediment exceeded the final allocation in all reaches as recently as 2013 or 2014, depending on the reach. Final WLAs for all Category 1 constituents have been attained for the three POTWs that discharge to surface water. None of the fish tissue targets for Category 1 constituents are currently met throughout the watershed, with the exception of the target for dieldrin, which has been met since 2008.

The subsequent steps taken for the special study can be summarized as follows: (1) time series analyses were performed to estimate dates by which allocations and fish tissue targets were likely to be met, (2) waterbody/constituent combinations were identified for which attainment of allocations and/or fish tissue targets may occur after the TMDL deadline, and (3) methods for accelerating attenuation in the latter cases were evaluated.

The results of the special study support a prediction that attenuation of OCPs and PCBs is proceeding fast enough to lead to attainment of fish tissue targets (in freshwater reaches) and final sediment allocations by the TMDL deadline in 2026 in most cases. However, additional time may be needed to meet pertinent limits for 4,4'-DDE and toxaphene in fish tissue and sediment in Revolon Slough. Several agricultural sediment management BMPs are not completely adopted at present by growers in Revolon Slough watershed. Increased implementation of these BMPs may be the best route for accelerating attenuation of 4,4'-DDE and toxaphene in the receiving water sediment, but it is likely that additional time will still be needed to meet the limits. Control of sediment in agricultural discharges is more likely to enhance attenuation of 4,4'-DDE and toxaphene than detention basins for urban runoff.

# Background on TMDL Limits

During the development of the TMDL, constituents were assigned to one of two categories based on available monitoring data. Category 1 constituents were those for which exceedances were observed more frequently than allowed based on State Water Resource Control Board (SWRCB) listing guidance.[2] Category 2 constituents were those for which exceedances were within allowable frequencies (and thus would not justify 303(d) listings). Among other limits, the TMDL established fish tissue concentration targets for constituents in both categories (total PCBs and a suite of 15 OCPs). However, the TMDL established interim and final waste load allocations (WLAs) for POTW effluent and urban discharges, and load allocations (LAs) for agricultural discharges, for the Category 1 constituents only:

- chlordane (sum of alpha and gamma-chlordane)
- 4,4′-DDT
- 4,4′-DDD
- 4,4′-DDE
- dieldrin
- PCBs
- toxaphene.

The allocations for urban dischargers and irrigated agriculture were established as concentrations in bottom sediment in receiving waters. The allocations for POTWs were established as concentrations in effluent. The TMDL schedule provided 20 years after the TMDL effective date for attainment of final WLAs and LAs (i.e., March 24, 2026).

The TMDL fish tissue targets for Category 1 constituents are listed in Table 1. The fish tissue targets in the TMDL were derived from California Toxic Rule (CTR) human health criteria and were designed to protect humans from consumption of contaminated fish or other aquatic organisms. USEPA originally developed the CTR criteria for human consumption of fish by (1) determining OCP and PCB concentrations in fish tissue that would be protective of human health assuming a consumption rate of 6.5 g per day, and (2) converting fish tissue concentrations to water column concentrations using bioconcentration factors (BCFs). For the TMDL, BCFs were used to convert CTR human health (consumption) criteria back to fish tissue targets. Consequently, attainment of the fish tissue targets in the TMDL is functionally equivalent to attainment of the CTR water column human health criteria for consumption of aquatic organisms.

[2] State Water Resources Control Board (SWRCB) 2004. Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List. September 30, 2004.

**Table 1. TMDL Fish Tissue Targets for Category 1 Constituents**

| Constituent | Target (ng/g wet weight) |
|---|---|
| 4,4'-DDE | 32 |
| 4,4'-DDD | 45 |
| 4,4'-DDT | 32 |
| Toxaphene | 9.8 |
| Chlordane (alpha + gamma) | 0.83 |
| PCBs (sum of arochlors) | 5.3 |
| Dieldrin | 650 |

WLAs for POTWs were generated using procedures in the State Water Resources Control Board (SWRCB) 2005 Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California (SIP) using CTR criteria for aquatic life and human health. The final WLAs for POTWs were expressed as both daily maximum limits and monthly averages. The monthly averages are lower limits than the daily maxima and were used for data screening in this study; they are presented in Table 2.

**Table 2. Final Monthly Average LAs for POTWs**

| Constituent | LA (ng/L) |
|---|---|
| 4,4'-DDE | 0.59 |
| 4,4'-DDD | 0.84 |
| 4,4'-DDT | 0.59 |
| Toxaphene | 0.16 |
| Chlordane (alpha + gamma) | 0.59 |
| PCBs (sum of arochlors) | 0.17 |
| Dieldrin | 0.14 |

Final sediment-based allocations are presented in Table 3. The technical approach used to develop the TMDL relied on an assumption that the relationship between OCP or PCB concentrations in fish and sediments is linear. The sediment-based allocations were designed by determining for each Category 1 constituent the greater percent reduction in baseline sediment concentrations that would be necessary to result in attainment of either the fish tissue target (based on CTR criteria for protection of human health consumption, as explained above) or water column targets (the latter based on CTR chronic criteria for protection of aquatic life). The resulting sediment-based allocations were thus intended to ensure attainment of the TMDL fish tissue targets, the underlying CTR water column criteria human health (consumption), and the CTR water column criteria for protection of aquatic life (chronic criteria). The reliance on sediment allocations to meet targets in several media is appropriate for the OCPs and PCBs, which are predominantly particle bound in the environment. Owing to the inadequacy of data sets for Category 1 constituents other than 4,4´-DDE at the time of TMDL development, and considering the refractory nature of 4,4´-DDE, the percent reductions were conservatively developed using data for 4,4´-DDE and applied to the baseline concentrations for other constituents to derive their allocations.

**Table 3. Final Sediment WLAs for MS4s and LAs for Agricultural Dischargers (ng/kg)**

| Constituent | Mugu Lagoon | Revolon Slough | Calleguas Creek, Arroyo Las Posas, Arroyo Simi, and Conejo Creek |
|---|---|---|---|
| 4,4'-DDE | 2,200 | 1,400 | 1,400 |
| 4,4'-DDD | 2,000 | 2,000 | 2,000 |
| 4,4'-DDT | 300 | 300 | 300 |
| Toxaphene | 360,000 | 1,000 | 600 |
| Chlordane (alpha + gamma) | 3,300 | 900 | 3,300 |
| PCBs (sum of congeners) | 180,000 | 130,000 | 120,000 |
| Dieldrin | 4,300 | 100 | 200 |

# Sources of Data

Bioaccumulation of legacy pollutants in aquatic organisms, and their predators, is the principal beneficial use impairment addressed by the TMDL. Consequently, the fish tissue targets are the most closely linked to the protection of beneficial uses. Owing to (1) the functional equivalency of the fish tissue targets and pertinent CTR water column criteria, and (2) the design of the sediment-based allocations (designed to result in attainment of fish tissue targets), the time series analyses for this study were conducted using fish tissue and bottom sediment data sets only. POTW effluent data was screened using final monthly average WLAs for effluent, but time series analysis was not conducted. The sources of data used in the study are listed in Table 4. The fish data set includes data considered during the development of the TMDL, plus additional data collected since then, primarily through TMDL compliance monitoring. The distribution of fish tissue samples by individual fish species across time is presented in Table 5.

**Table 4. Sources of Data Used in the Study**

| Monitoring Program/ Data Source | Range of Sample Dates | |
|---|---|---|
| **Fish Tissue** | | |
| Toxic Substances Monitoring Program | 4/30/1985 | 8/9/2000 |
| CCW TMDL Work Plan Monitoring | 12/16/2003 | 8/26/2004 |
| Bay Protection and Toxic Clean Up Program | 10/5/1992 | 10/5/1992 |
| CCW TMDL Monitoring Program | 8/5/2008 | 8/11/2015 |
| **Sediment** | | |
| Toxic Substances Monitoring Program | 6/2/1992 | 6/4/1992 |
| Bay Protection and Toxic Clean Up Program | 6/19/1996 | 2/6/1997 |
| Calleguas Creek Characterization Study | 11/5/1998 | 8/20/2004 |
| Hill Canyon Waste Water Treatment Plant NPDES | 2/1/1993 | 8/2/1995 |
| United States Navy | 1/4/1994 | 1/7/2005 |
| RWQCB Database | 6/18/1996 | 6/19/1996 |

| Monitoring Program/ Data Source | Range of Sample Dates | |
|---|---|---|
| Simi Valley Sanitation Division | 12/6/1993 | 12/6/1993 |
| State Mussel Watch Program | 1/29/1989 | 9/10/1992 |
| CCW TMDL Work Plan Monitoring | 2/25/2004 | 2/26/2004 |
| CCW TMDL Monitoring Program | 8/5/2008 | 8/20/2014 |
| **POTW Effluent** | | |
| CCW TMDL Monitoring Program | 2008 | 2014 |
| NPDES Permit-Related Monitoring | 2008 | 2014 |

## Current Conditions

The reaches contained in the Calleguas Creek watershed are illustrated in Figure 1. Binning data by combining reaches was necessary to conduct several of the analyses. For initial screening and (eventual) time series analysis, fish data was binned into the following three subwatersheds:

- Combined Calleguas Creek Subwatersheds (Reaches 2, 3, 6, 7, 8, 9A, 9B, 10, 11, 12, 13)
- Revolon Slough Subwatershed (Reaches 4, 5)
- Mugu Lagoon (Reach 1)

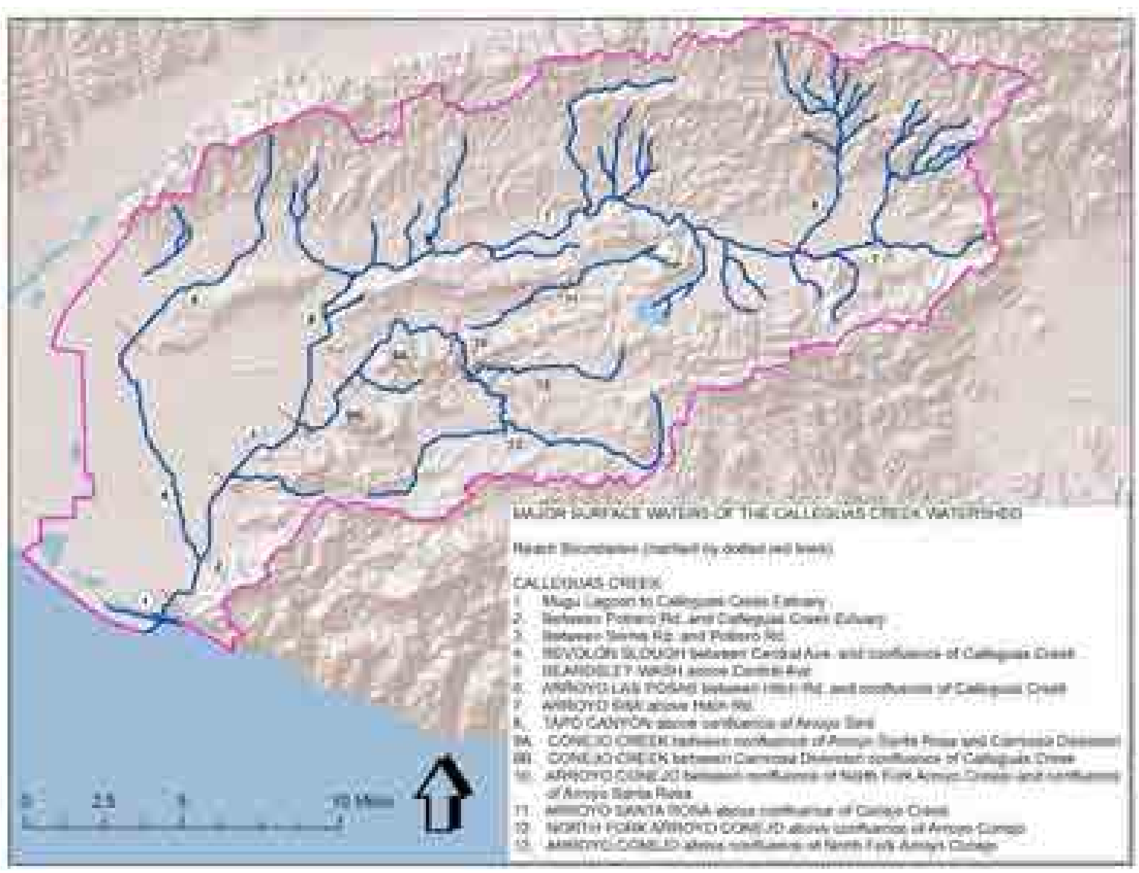


**Figure 1. Reaches in Calleguas Creek Watershed**

**Table 5. Numbers of Fish Tissue Samples in Which One or More TMDL Constituents were Measured, by Year. Sample Sizes are for All Reaches Combined.**

| Species (Common name) | Avail Info. on Tissue Type | Fish Length (mm) | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Freshwater Reaches** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Goldfish** | Fillet [a] | -- | 4 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| | Fillet w/ skin | -- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 8 |
| | Composite, Fillet w/ skin | -- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| | Whole [a] | -- | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | |
| **Fathead Minnow** | Fillet [a] | -- | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | |
| | Whole | -- | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | |
| | Composite, Whole | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 13 |
| | Whole [a] | -- | | | | | | | 1 | 3 | 2 | 2 | | | 3 | | | | | | 1 | | | | | | | | | | | | |
| **Carp** | Composite | -- | | | | | | | | | | | | | | | | | | | | | | | | | | | 6 | 2 | | | |
| | Composite, fillet | -- | | | | | | | | | | | | | | | | | | | | | | | | 3 | | | | | | | |
| | Fillet w/ skin | -- | | | | | | | | | | | | | | | | | | | | | | | | 1 | 8 | | | | | | 8 |
| | Composite, fillet w/skin | -- | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | |
| | Muscle [a] | -- | | | | | | | | | | | | | | | | | | | 1 | 9 | | | | | | | | | | | |
| | Whole | -- | | | | | | | | | | | | | | | | | | | | | | | | | 8 | 1 | | | | | 5 |
| | Composite, whole | -- | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | |
| | Composite, whole | 75-90 | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | |
| **Brown Bullhead** | Fillet [a] | -- | | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | |
| **Bullhead** | Fillet [a] | -- | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Species (Common name) | Avail Info. on Tissue Type | Fish Length (mm) | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| California Killifish | Whole [a] | -- | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | |
| Arroyo Chub | --- | 0-85 | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | |
| | --- | 86-112 | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | |
| | Composite | --- | | | | | | | | | | | | | | | | | | | | | | | | | 9 | | | | | | |
| | Composite | 29-51 | | | | | | | | | | | | | | | | | | | | | | | | | 3 | | | | | | |
| | Composite | 43-60 | | | | | | | | | | | | | | | | | | | | | | | | | 3 | | | | | | |
| | Composite | 53-97 | | | | | | | | | | | | | | | | | | | | | | | | | 3 | | | | | | |
| | Composite | 65-90 | | | | | | | | | | | | | | | | | | | | | | | | | 3 | | | | | | |
| | Whole | -- | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | |
| | Whole [a] | -- | | | | | | | | | | | | | 1 | 1 | 3 | | | 4 | 11 | | | | | | | | | | | |
| | Composite, whole | 50-70 | | | | | | | | | | | | | | | | | | | | | | | 3 | | | | | | | |
| Black Bullhead | Fillet [a] | -- | | | | | | | | | 1 | 2 | | | | | | 1 | | | | | | | | | | | | | | | 1 |
| | Fillet w/ skin | -- | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | 2 |
| | Muscle [a] | -- | | | | | | | | | | | | | | | | | | | 5 | 9 | | | | | | | | | | | |
| | Whole | -- | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | |
| Green Sunfish | Fillet [a] | -- | | | | | | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Muscle [a] | -- | | | | | | | | | | | | | | | | | | | 2 | 6 | | | | | | | | | | | |
| Large Mouth Bass | Composite | -- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | |
| | Whole | -- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 5 |
| Mosquitofish | Whole [a] | -- | | | 1 | | | | 1 | | | | | | | 2 | | | | | | | | | | | | | | | | | |
| | Composite | 130-160 | | | | | | | | | | | | | | | | | | | | | | | | 3 | | | | | | | |
| Arroyo Chub and Fathead Minnow | Mixed Species Composite, whole | -- | | | | | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | |
| Carp and Fathead Minnow | Mixed Species Composite | -- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | |

| Species (Common name) | Avail Info. on Tissue Type | Fish Length (mm) | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Carp, Fathead Minnow, and Green Sunfish | Mixed Species Composite | -- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | |
| Goldfish and Large Mouth Bass | Mixed Species Composite | -- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | |
| **Mugu Lagoon** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bait Fish | Composite, whole | 50-80 | | | | | | | | | | | | | | | | | | | | | | | | 3 | | | | | | | |
| Barred Sandbass | Whole | -- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 6 |
| Topsmelt | Whole [a] | -- | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| | --- | -- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 28 |
| Flat Fish | Fillet | -- | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | |
| Grass Rockfish | Whole | -- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 10 |
| Longjaw Mudsucker | Fillet [a] | -- | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shiner Perch | Fillet [a] | -- | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Whole | -- | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | |
| | [a] | -- | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| Gray Smoothound Shark | | | | | | 1 | 1 | 1 | | 1 | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | |

[a] Data for these samples contained an unexplained field entitled "CompNo" which is populated with up to a double digit number. This may signal that the sample was a composite.

As is evident from Table 5, useful time series can only be constructed for a few species of fish. The record from the pre-TMDL period is sporadic, and it has not been possible to reliably catch fish of any species during successive compliance monitoring events since 2008. Many species of fish appear only once in the record extending up to 2015. A time series including older samples (e.g., 1980s-1990s) and more recent samples (e.g., 2000 and onward) is not available for any of the fish species obtained to date in Mugu Lagoon.

Time series graphs combining the data for all species are provided in Attachment 1 for each (subwatershed) x (constituent) combination.[3] The TMDL tissue target is displayed in each graph as a broken red line. The most recent sampling events for fish conducted through the CCW TMDL Monitoring Program occurred in summer 2015. Further generalizations about the status of fish tissue in 2015 are as follows:

4,4´-DDE: Most fish tissue samples exceeded the TMDL target in all three subwatersheds.

4,4´-DDD: Most samples in Calleguas Creek Subwatershed and Mugu Lagoon were below the TMDL target. Several samples exceeded the target in Revolon Slough subwatershed.

4,4´-DDT: No samples exceeded the target in Calleguas Creek Subwatershed. The majority of samples from Mugu Lagoon were below the target. Several samples exceeded the target in Revolon Slough Subwatershed.

Toxaphene: Most samples exceeded the target in all three subwatersheds.

Chlordane: Most samples exceeded the target in all three subwatersheds.

PCBs: Some samples were below the target in Calleguas Creek subwatershed. Most samples were above the target in Revolon Slough subwatershed and Mugu Lagoon.

Dieldrin: The target was met throughout the watershed.

Sediment monitoring data from the CCW TMDL Monitoring Program (beginning in 2008) was screened to determine if, and where, the final sediment-based allocations have already been attained in the watershed. Results are presented in Table 6. The results indicate that the final sediment allocations have already been attained for almost all combinations of reaches and constituents. PCBs, dieldrin, and chlordane have not been detected in sediment in any of the sampled reaches since 2010 or earlier. Toxaphene has rarely been detected in sediment since the TMDL was adopted, and exceedances of the final sediment allocation for toxaphene in more than one consecutive sampling event have only been documented in Revolon Slough. The final sediment allocation for 4,4´-DDT has been met throughout the watershed except for a recent exceedance in Arroyo Las Posas (preceded by non-detects for several years) and two recent exceedances in Revolon Slough (also preceded by non-detects for several years). The final sediment allocation for 4,4´-DDD has been met throughout the watershed except in Mugu Lagoon. 4,4´-DDE concentrations in sediment exceeded the final allocation in all reaches as recently as 2013 or 2014, depending on the reach.

POTW effluent data collected since 2008 was screened to determine if the final effluent-based WLAs have already been attained for the three POTWs that discharge to surface water. Results

[3] Time series graphs for dieldrin are not presented because there have been no detections in fish tissue since 2008, and no further analysis of dieldrin data was performed after the initial screening.

are presented in Table 7. In brief, except for a few sporadic exceedances, the final POTW WLAs have been met since 2008. For this reason, POTW effluent was not further evaluated in the study.

**Table 6. Year of Most Recent Sediment Sample Exceeding the Final Allocation [a]**

| Reach | Mugu Lagoon | | | | | Revo-lon Slough | Calle-guas Creek | | Conejo Creek | Arroyo Las Posas | Arroyo Simi |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Monitoring Site | 01_BPT_3 | 01_BPT_6 | 01_BPT_14 | 01_BPT_15 | 01_BPT_74 | 04_WOOD | 02_PCH | 03_UNIV | 9B_ADOLF | 06_SOMIS | 07_HITCH |
| 4,4'-DDE | 2014 | 2014 | 2014 | 2014 | 2014 | 2013 | 2014 | 2013 | 2013 | 2014 | 2014 |
| 4,4'-DDD | [b] | 2008 | 2014 | 2008 | 2008 | 2014 | 2008 | [c] | [c] | 2013 | [b] |
| 4,4'-DDT | [b] | 2008 | 2008 | 2008 | 2008 | 2014 | [c] | [b] | [c] | 2014 | 2008 |
| Toxaphene | [c] | [c] | [c] | [c] | [b] | 2013 | [c] | 2013 | 2009 | [c] | [c] |
| Chlordane [d] | [c] | [c] | [c] | [c] | 2008 | 2010 | [c] | [c] | [c] | [c] | [c] |
| PCBs [e] | [c] | [c] | [c] | [c] | [c] | [c] | [c] | [c] | [c] | [c] | [c] |
| Dieldrin | [c] | [c] | [c] | [c] | [c] | [c] | [c] | [c] | [c] | [c] | [c] |

[a] Represents compliance monitoring 2008 through August, 2014. Mugu Lagoon sites were sampled in 2008, 2011, and 2014. Other sites were sampled annually.
[b] Concentrations have been lower than the final WLA/LA in all samples obtained since compliance monitoring began in 2008.
[c] Constituent has not been detected in sediment samples since compliance monitoring began in 2008.
[d] Sum of alpha and gamma chlordane
[e] Sum of congeners

**Table 7. Exceedances of the Final Monthly Average WLA for POTWs [a]**

| | Simi Valley WQCP | | Hill Canyon WWTP | | Camarillo WWTP | |
|---|---|---|---|---|---|---|
| | Exceed-ances (Total Samples) | Most Recent Exceed-ance | Exceed-ances (Total Samples) | Most Recent Exceed-ance | Exceed-ances (Total Samples) | Most Recent Exceed-ance |
| 4,4'-DDE | 3 (25) | 2015 | 0 (28) | --- | 3 (35) | 2012 |
| 4,4'-DDD | 1 (25) | 2010 | 0 (28) | --- | 1 (28) | 2008 |
| 4,4'-DDT | 1 (25) | 2012 | 0 (27) | --- | 1 (35) | 2008 |
| Toxaphene | 1 (25) | 2012 | 0 (28) | --- | 0 (28) | --- |
| Chlordane | 0 (24) | --- | 0 (20) | --- | 0 (24) | --- |
| PCBs [b] | 1 (26) | 2012 | 0 (28) | --- | 0 (28) | --- |
| Dieldrin | 0 (24) | ---- | 0 (28) | --- | 0 (28) | --- |

[a] Represents quarterly monitoring, 2008-2015.
[b] Sum of arochlors

# Approach

An approach was developed to compare estimated time frames of attainment of fish tissue targets with their associated final sediment-based allocations. The approach can be simplified as follows:

Step 1. Consider whether pertinent final limits are already met.

Step 2. Develop approach to compare attenuation rates for fish tissue and sediment where final limits have not already been met.

Step 3. Identify specific statistical trend analyses to perform on fish and/or sediment data.

Step 4. Identify implications for TMDL revision, if any.

At the outset of the study, several scenarios involving attenuation rates were contemplated. Several scenarios are described in Table 8 to illustrate the range of potential study outcomes for individual constituents.

**Table 8. Examples of Potential Outcomes for Individual Constituents and their Implications**

| **Scenario** | | **Implication** |
|---|---|---|
| Scenario 1 | Fish tissue targets have been met. Final WLAs/LAs are already met. | TMDL limits for fish and sediment have been attained early. |
| Scenario 2 | Neither fish tissue targets nor final WLA/LA are met. Available attenuation rates for both media suggest limits will be met by 2026. | TMDL limits for fish and sediment will be likely attained by 2026. |
| Scenario 3 | Fish tissue target is not met but attenuation rates suggest it will be met by 2026. Final WLA/LA already met. | TMDL limits for fish and sediment will be likely attained by 2026. |
| Scenario 4 | Neither fish tissue targets nor final WLA/LA are met. Available attenuation rates for both media suggest limits will be met *after* 2026. | No reason to believe that underlying relationship between sediment and fish tissue is not linear. However, more time is needed for natural attenuation to reach the TMDL limits. |
| Scenario 5 | Fish tissue targets have already been met. Final WLA/LAs have not been met and attenuation rates for sediment suggest final WLA/LA not attainable by 2026. | WLA/LA may be overly conservative. Relationship between sediment and fish tissue concentrations may not be linear. WLA/LAs could be revised upward. |
| Scenario 6 | Fish tissue target is not met and attenuation rates suggest target will not be met by 2026. Final WLA/LA is already met. Constituent still detected in sediment. | WLA/LA for the constituent may be too high. Relationship between sediment and fish tissue concentrations may not be linear. WLA/LAs may need revision (downward) |
| Scenario 7 | Fish tissue target is not met and attenuation rates are unknown or suggest target will not be met by 2026. *Constituent not detected in sediment*. | Attenuation in sediment is complete. No actions available to enhance attenuation rates in fish. |

Following the general approach described above, and using the Current Condition information presented above for fish tissue and sediment data in individual reaches, a specific data analysis approach was developed for each constituent. The specific approaches are explained in detail in Table 9.

**Table 9. Details of Approach Taken to Evaluate Attenuation Rates in Fish and Sediment**

| | Step 1. Consider Whether Pertinent Final Limits are Already Met | | | Step 2. Develop Approach To Compare Attenuation Rates for Fish Tissue and Sediment | Step 3. Identify Specific Statistical Trend Analyses to Perform | |
|---|---|---|---|---|---|---|
| | TMDL Fish Tissue Target already met in all reaches? | Sediment WLA/LA met? (MS4 and Ag) | Effluent WLA met? (POTWs) | | Fish [e] | Sediment |
| **4,4'-DDE** | **No** | **No**<br>exceedances in all reaches as recently as 2013 or 2014, depending on reach | **Mostly** [a] | **Fish Tissue**: Identify fish species for which attenuation curves can be constructed. If possible, predict year of future (or past) attainment of TMDL target.<br>**Sediment**: Construct attenuation curves, if possible, for sediment in reaches not yet meeting the final WLA.<br>**Compare** predictions for attainment of fish target and sediment WLA (in affected reaches) with the TMDL deadline of March 2026. | Attenuation rates evaluated for three species of fish (goldfish, minnows and carp) in two subwatersheds:<br>• Revolon Slough Subwatershed (Reaches 4 & 5)<br>• Calleguas Creek Subwatershed (Reaches 2, 3, 6, 7, 8, 9A, 9B, 10) | Attenuation rates evaluated in all segments |
| **4,4'-DDD** | **No** | **Mostly**<br>one exceedance in Mugu Lagoon in 2014 [b] | **Yes** [c] | | | Attenuation rate evaluated in Mugu Lagoon |
| **4,4'-DDT** | **No** | **Mostly**<br>recent exceedance<br>in Arroyo Las Posas (2014)<br>and Revolon Slough (2013, 2014) | **Yes** [c] | | | Attenuation rates evaluated in Arroyo Las Posas and Revolon Slough |
| **Toxaphene** | **No** | **Mostly**<br>recent exceedances in Revolon Slough in successive years | **Yes** | | | Attenuation rate evaluated in Revolon Slough |
| **Chlordane**<br>**and**<br>**PCBs** | **No** | **Yes**<br>not detected since 2008 | **Yes** [d] | **Fish Tissue**: Identify fish species for which attenuation curves can be constructed. If possible, predict year of future attainment of TMDL target for those species.<br>Determine whether fish tissue likely to meet target by TMDL deadline of March 2026.<br>**Sediment**: No further analysis of sediment data is necessary (Constituents not detected in sediment) | | none |
| **Dieldrin** | **Yes** | **Yes**<br>not detected since 2008 | **Yes**<br>not detected since 2008 | No further analysis necessary | none | none |

[a] Simi and Camarillo POTWs each have 3 exceedances since TMDL adopted, most recently in 2015 (Simi) and 2012 (Camarillo)

[b] One exceedance in Arroyo Las Posas in 2014 was preceded by non detects and samples < WLA going back to 2004. Reach was considered to be meeting the WLA.

[c] One exceedance at Simi WQCP in 2012, none since

[d] One exceedance (of PCB WLA) at Simi WQCP in 2012, none since

[e] Attenuation rates were not sought using data from Mugu Lagoon owing to (1) insufficient data sets for individual species, and (2) uncertain site fidelity for the estuarine and marine species acquired. See text for more detail.

# Calculation of Attenuation Rates

Most of the fish sampled in Mugu Lagoon are not obligate estuarine species. They are primarily marine species that are expected to spend significant amounts of time, or most of their time, outside the lagoon in open coastal habitat (e.g., reefs or kelp beds) and are likely to have large individual geographic ranges. Grass rockfish is the only species recently caught during a sampling event in Mugu Lagoon that is considered to have limited movement after hatching - however, even the grass rockfish is not characteristic of tidal channels or flats, occupies water up to 150 feet deep, and is associated with rocky reefs or kelp forest as adults. Owing to a lack of site fidelity, it is not clear that concentrations of pollutants in fish caught in Mugu Lagoon represent exposure to contaminated sediment in Mugu Lagoon. For this reason, the status of fish tissue from Mugu Lagoon was not expected to yield useful information about the attenuation rate of OCPs and PCBs in the watershed, and calculation of attenuation rates was not attempted with the data sets for any of the individual species from Mugu Lagoon. As previously noted, however, time series graphs including all fish samples from Mugu Lagoon for all of the Category 1 constituents were included in Attachment 1.

Time series for individual species from the freshwater reaches were inspected to identify opportunities to derive attenuation rates using regression. In order to obtain sufficient data to attempt construction of attenuation curves, data for individual species was pooled into two bins, previously defined (Calleguas Creek and Revolon Slough Subwatersheds). Considerations that guided selection of fish species were (1) availability of both older data (i.e., pre-2000) and data from the most recent sampling events (i.e., 2014-2015), and (2) the likelihood of being able to sample the species with reasonable regularity in several reaches over the next decade to provide useful information about TMDL target attainment. The latter consideration ruled out Arroyo Chub from the analysis because it is no longer legal to sample them. Ultimately, the time series for goldfish (*Carassius auratus*) and fathead minnow (*Pimephales promelas*) emerged as the most viable for producing attenuation rates. The time series for common carp (*Cyprinus carpio*) were very short (no pre-2000 samples), but the species was included in regression analysis because it is a bottom feeder recommended by USEPA for use in fish consumption safety screening.[4] Preliminary inspection of data for carp fillets and whole carp indicated that although concentrations of legacy pollutants were higher in whole fish than in fillets (as expected), only the whole fish data were likely to yield information about attenuation rates. Following the specific approaches identified in Table 9, attenuation rates were sought for goldfish (fillets), fathead minnow (whole fish), and carp (whole fish) for every Category 1 constituent except for dieldrin.

For time series evaluations, sediment data was binned into "segments" comprising one or more reaches, as follows:

- Arroyo Las Posas/Simi (Reaches 6, 7)
- Lower Conejo Creek (Reaches 9A, 9B, 10)
- Calleguas Creek (Reaches 2, 3)

[4] USEPA (2000) *Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories. Volume 2. Risk Assessment and Fish Consumption Limits*. Third Edition. EPA 823-B-00-008, November 2000.

- Revolon Slough (Reaches 4, 5)
- Mugu Lagoon (Reach 1)

Attenuation rates for sediment were not sought for every combination of constituent and segment. Instead, current conditions were used to guide selection of a subset of cases for regression, as identified in Table 9. As a result, attenuation rates were sought for the following cases:

4,4'-DDE - all segments

4,4'-DDD - Mugu Lagoon

4,4'-DDT - Arroyo Las Posas/Simi and Revolon Slough

Toxaphene - Revolon Slough

Attenuation rates were sought by fitting an exponential decay function to the data in the following form: [5, 6, 7]

$y=Ae^{rt}$ where

y = concentration in fish tissue or sediment,

A = constant,

r = exponential decay rate, and

t = time.

Because a variety of MDLs were reported in the historic data - often higher in older samples - a very conservative approach was taken by setting non-detects equal to the MDLs. Not all of the cases selected for regression resulted in statistically significant decay rates. The resulting exponential decay functions with statistically significant ($p \leq 0.10$) and borderline significant ($0.10 < p \leq 0.13$) decay rates are presented in Table 10.

Graphs were produced for every case in which regression was performed. The series of graphs for 4,4'-DDE are presented below in Figures 2-6. Graphs for all other cases in which regression was performed (including plain time series plots for cases in which statistically significant decay rates were not obtained) are provided in Attachment 2. In the graphs, the TMDL tissue target or final sediment allocation is represented by a dashed horizontal red line. Detected values are indicated by circles; non-detected samples are represented by crosses. For cases in which regression resulted in a statistically significant decay rate, the attenuation function is displayed on the graph using a blue line. Variation in the scale of the x-axis should be noted. In some cases, the y-axis is displayed using a log scale.

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[5] Statistical analyses were performed in R version 3.1.2. (R Development Core Team, Austria) through the RStudio interface (RStudio Team, Boston, MA)

[6] Prior to regression, sample dates were converted from Gregorian calendar dates (mm-dd-yyyy) to astronomical Julian Day Numbers. Astronomical Julian Date is a continuous series of days and fractions of days since noon Universal Time on January 1, 4713 BCE.

[7] Julian Date Converter, The United States Naval Observatory (USNO). http://aa.usno.navy.mil/data/docs/JulianDate.php

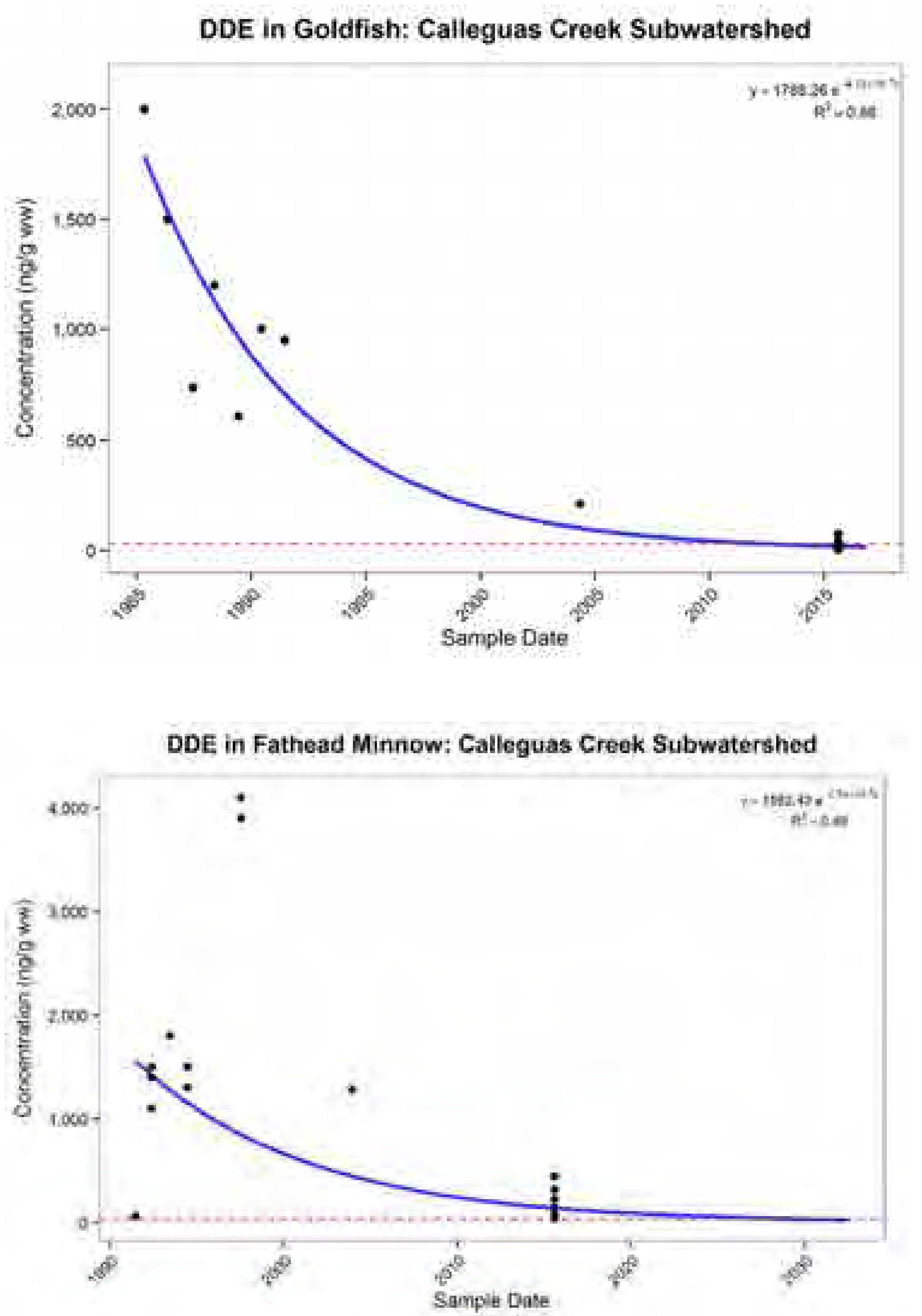
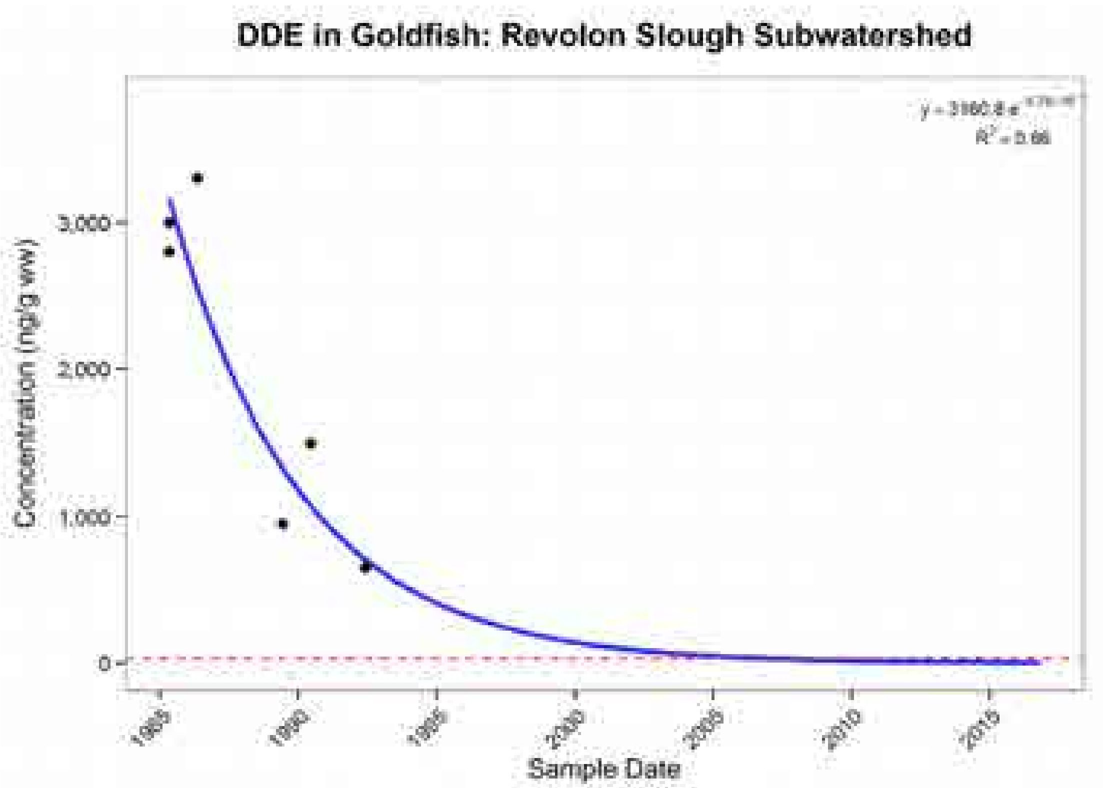



**Figure 2. Attenuation curves for 4,4'-DDE in goldfish (upper panel) and fathead minnow (lower panel) in Calleguas Creek Subwatershed. TMDL target is displayed as a broken red line.**



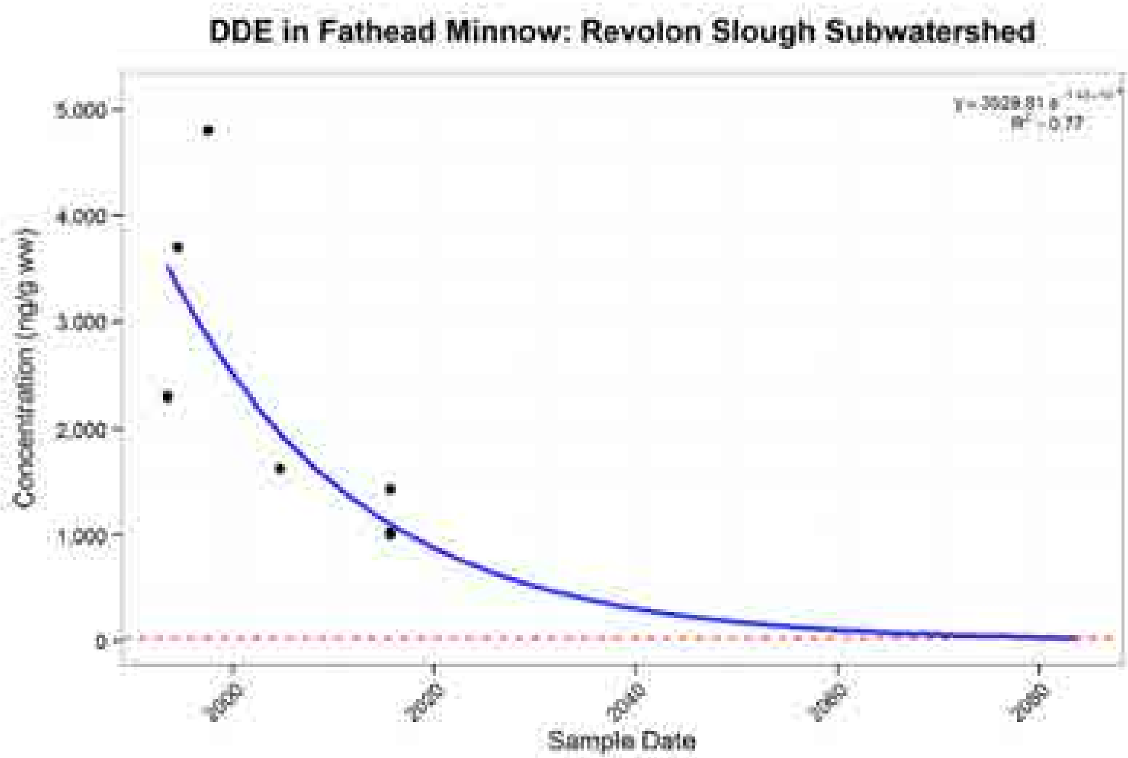




**Figure 3. Attenuation curves for 4,4'-DDE in goldfish (upper panel) and fathead minnow (lower panel) in Revolon Slough Subwatershed. TMDL target is displayed as a broken red line.**

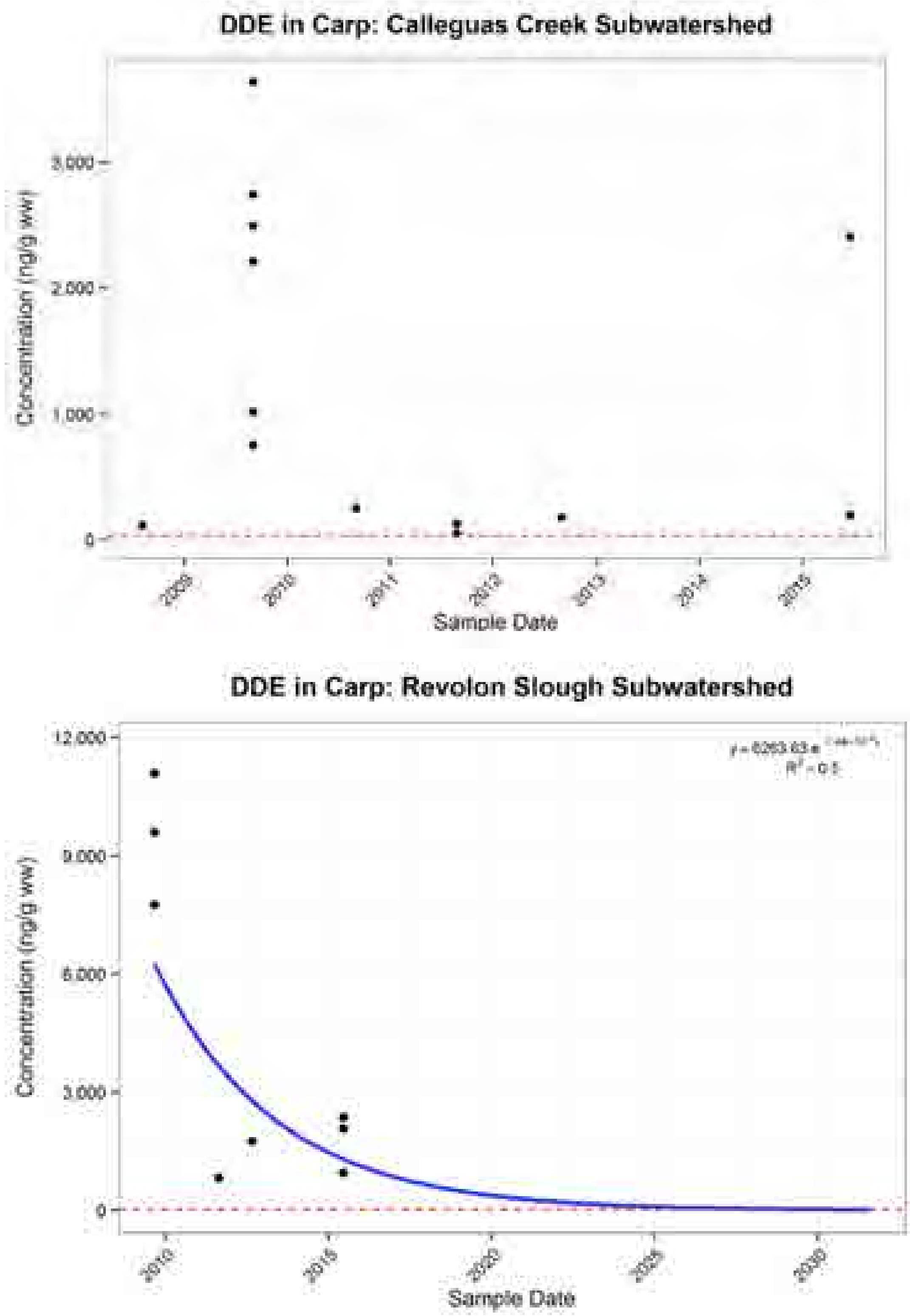



**Figure 4. Time series for 4,4'-DDE in carp in Calleguas Creek subwatershed (upper panel) and Revolon Slough subwatershed (lower panel; with attenuation curve). TMDL target is displayed as a broken red line.**

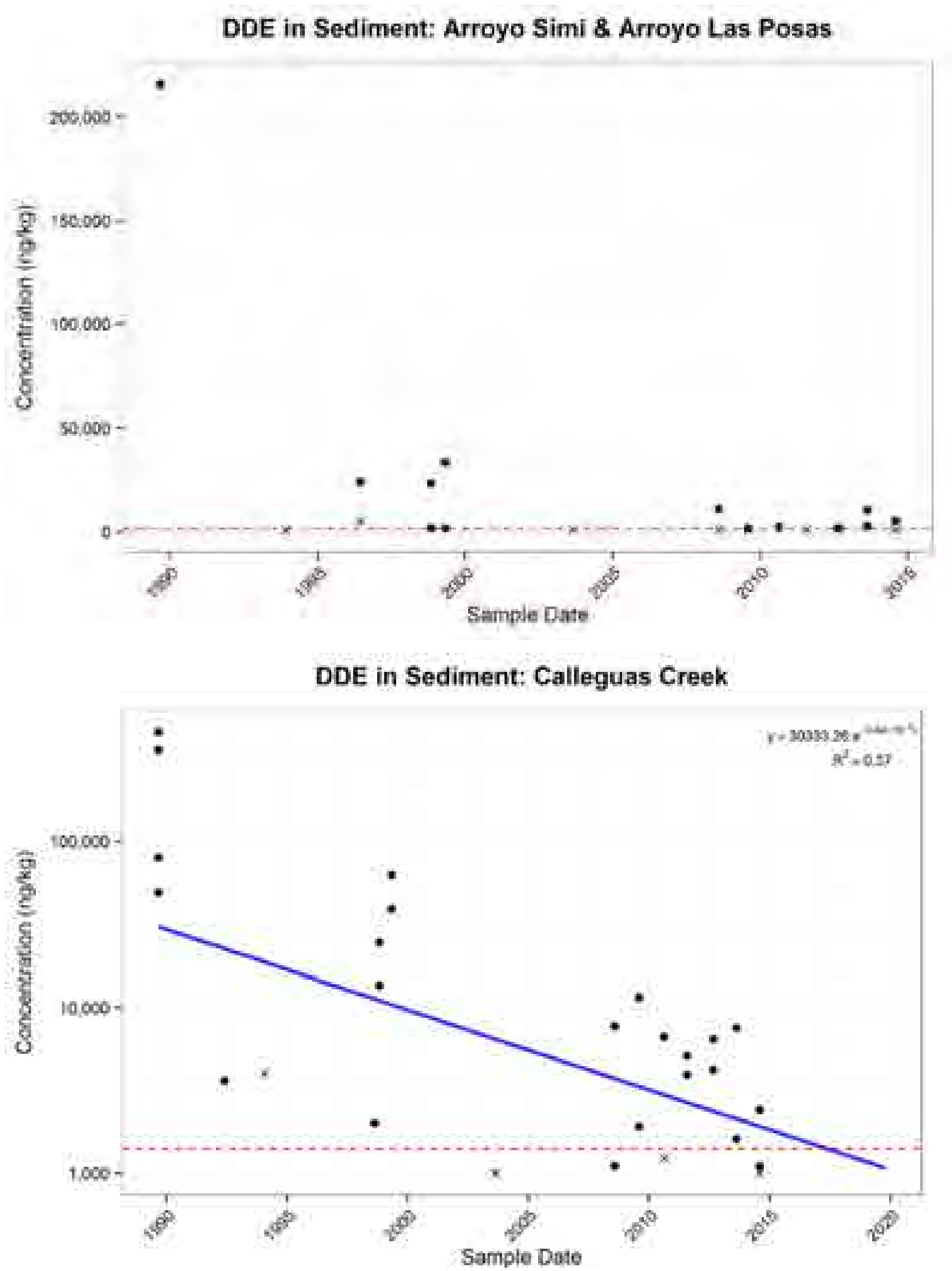



**Figure 5. Time series for 4,4'-DDE in sediment in Arroyo Simi/Las Posas (upper panel) and Calleguas Creek (lower panel; with attenuation curve; note log scale on y-axis). TMDL target is displayed as a broken red line.**

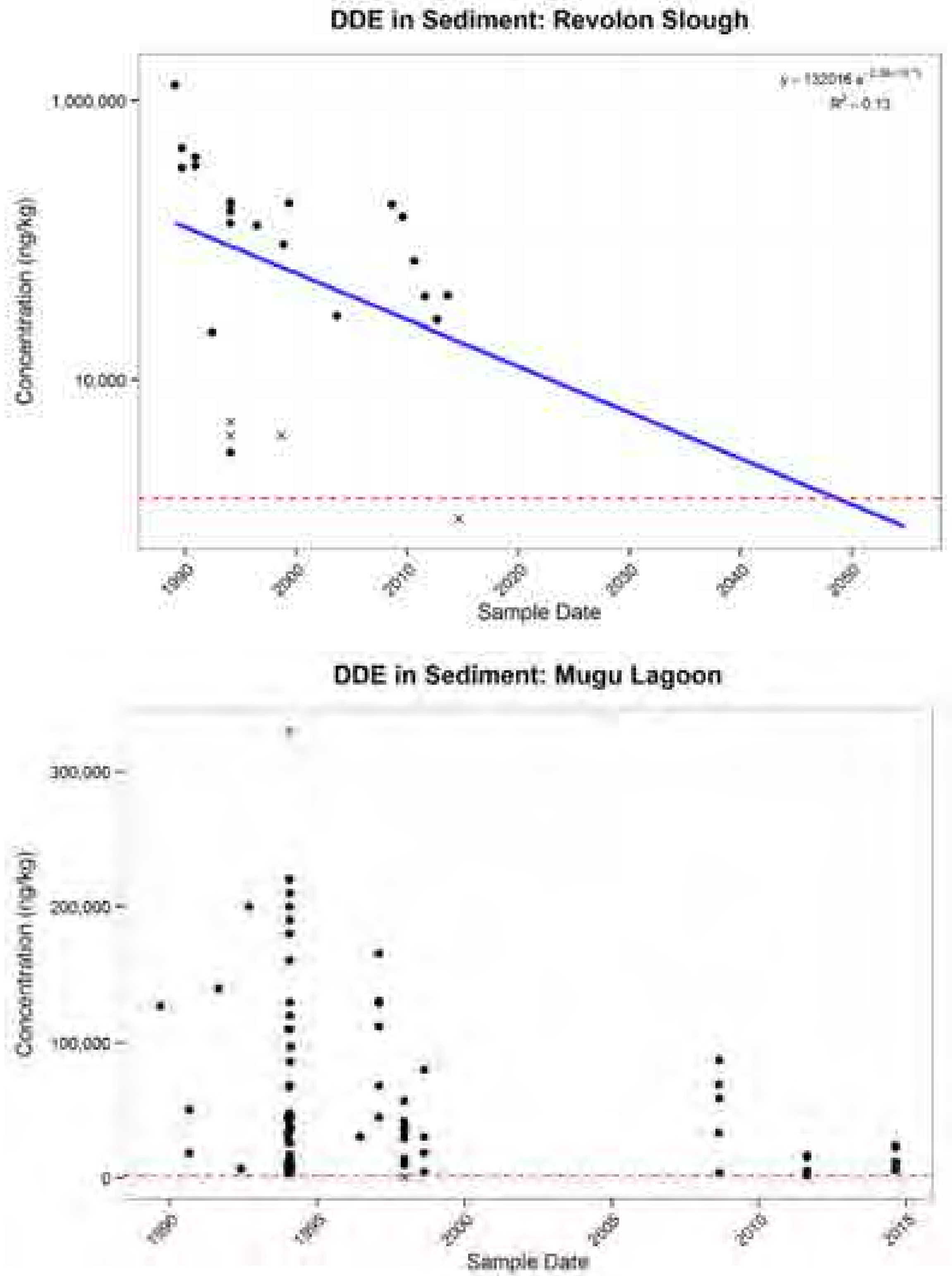



**Figure 6. Time series for 4,4'-DDE in sediment in Revolon Slough (upper panel; note log scale on y-axis) and Mugu Lagoon (lower panel; with attenuation curve;). TMDL target is displayed as a broken red line.**

**Table 10. Exponential Decay Functions for Fish Tissue and Sediment**

| Constituent | Reaches | Matrix | Exponential Decay Function | R2 | X-axis Scalar [a] | P value |
|---|---|---|---|---|---|---|
| 4,4'-DDE | Calleguas Creek Subwatershed | Goldfish | $y = 1{,}788e^{-0.0004122x}$ | 0.88 | JDN-(2,446,186) | < 0.001 |
| | | Fathead Minnow | $y = 1{,}562e^{-0.0002735x}$ | 0.49 | JDN-(2,448,427) | < 0.001 |
| | Revolon Slough Subwatershed | Goldfish | $y = 3{,}161e^{-0.000578x}$ | 0.86 | JDN-(2,446,186) | 0.008 |
| | | Fathead Minnow | $y = 3{,}530e^{-0.000143x}$ | 0.77 | JDN-(2,449,159) | 0.004 |
| | | Carp | $y = 6{,}264e^{-0.000744x}$ | 0.51 | JDN-(2,455,078) | 0.048 |
| | Calleguas Creek | Sediment | $y = 30{,}333e^{-0.000304x}$ | 0.36 | JDN-(2,447,773) | < 0.001 |
| | Lower Conejo Creek | Sediment | $y = 14{,}458e^{-0.000224x}$ | 0.18 | JDN-(2,449,020) | 0.031 |
| | Revolon Slough | Sediment | $y = 132{,}016e^{-0.000209x}$ | 0.13 | JDN-(2,447,556) | 0.078 |
| 4,4'-DDD | Calleguas Creek Subwatershed | Goldfish | $y = 101e^{-0.000346x}$ | 0.82 | JDN-(2,446,186) | < 0.001 |
| | | Fathead Minnow | $y = 99e^{-0.000336x}$ | 0.54 | JDN-(2,448,427) | < 0.001 |
| | Revolon Slough Subwatershed | Goldfish | $y = 361e^{-0.000681x}$ | 0.73 | JDN-(2,446,186) | 0.030 |
| | | Fathead Minnow | $y = 348e^{-0.000187x}$ | 0.80 | JDN-(2,449,159) | 0.003 |
| | Mugu Lagoon | Sediment | $y = 10{,}751e^{-0.000202x}$ | 0.15 | JDN-(2,447,773) | <0.001 |
| 4,4'-DDT | Calleguas Creek Subwatershed | Goldfish | $y = 71e^{-0.000334x}$ | 0.83 | JDN-(2,446,186) | <0.001 |
| | | Fathead Minnow | $y = 95e^{-0.000516x}$ | 0.83 | JDN-(2,448,427) | <0.001 |
| | | Carp | $y = 93e^{-0.001850x}$ | 0.35 | JDN-(2,454,685) | 0.033 |
| | Revolon Slough Subwatershed | Goldfish | $y = 336e^{-0.000483x}$ | 0.50 | JDN-(2,446,186) | 0.119 |
| | | Fathead Minnow | $y = 272e^{-0.000442x}$ | 0.92 | JDN-(2,449,159) | <0.001 |
| | Arroyo Simi/Arroyo Las Posas | Sediment | $y = 4{,}230e^{-0.000166x}$ | 0.16 | JDN-(2,447,773) | 0.037 |
| | Revolon Slough/Beardsley Wash | Sediment | $y = 51{,}534e^{-0.000399x}$ | 0.53 | JDN-(2,449,159) | <0.001 |
| Toxaphene | Calleguas Creek Subwatershed | Goldfish | $y = 406e^{-0.000309x}$ | 0.80 | JDN-(2,446,186) | <0.001 |
| | | Fathead Minnow | $y = 2{,}347e^{-0.000571x}$ | 0.74 | JDN-(2,448,427) | <0.001 |
| | Revolon Slough Subwatershed | Goldfish | $y = 3{,}492e^{-0.000742x}$ | 0.89 | JDN-(2,446,186) | 0.005 |

| Constituent | Reaches | Matrix | Exponential Decay Function | R2 | X-axis Scalar [a] | P value |
|---|---|---|---|---|---|---|
| | | Fathead Minnow | $y = 3{,}135e^{-0.000349\mathbf{x}}$ | 0.34 | JDN-(2,449,159) | 0.131 |
| | | Carp | $y = 9{,}668e^{-0.001269\mathbf{x}}$ | 0.51 | JDN-(2,455,078) | 0.071 |
| | Revolon Slough/Beardsley Wash | Sediment | $y = 206{,}902e^{-0.000269\mathbf{x}}$ | 0.39 | JDN-(2,447,556) | 0.008 |
| Chlordane (alpha + gamma) | Calleguas Creek Subwatershed | Goldfish | $y = 8e^{-0.000154\mathbf{x}}$ | 0.60 | JDN-(2,446,186) | <0.001 |
| | | Fathead Minnow | $y = 23e^{-0.000253\mathbf{x}}$ | 0.57 | JDN-(2,448,427) | <0.001 |
| | | Carp | $y = 25e^{-0.000857\mathbf{x}}$ | 0.22 | JDN-(2,455,078) | 0.123 |
| | Revolon Slough Subwatershed | Goldfish | $y = 69e^{-0.000789\mathbf{x}}$ | 0.87 | JDN-(2,446,186) | 0.007 |
| | | Fathead Minnow | $y = 60e^{-0.000128\mathbf{x}}$ | 0.64 | JDN-(2,449.159) | 0.017 |

[a] JDN refers to astronomical Julian Day number. To avoid rounding errors during regression associated with large x values, each regression was performed after setting the first sample date in each time series, initially expressed as true JDN, to day 0. Consequently the X scalar in the exponential decay functions are equal to true JDN minus the JDN of the first sample date (indicated in parentheses in the table).

# Predictions for Target Attainment

By setting "y" equal to the pertinent TMDL limit and solving for "x", the exponential decay functions in Table 10 were used to estimate the date of attainment of fish tissue targets and sediment allocations. In Table 11, the resulting estimated attainment dates (expressed by year) are combined with pertinent information regarding where and when sediment allocations have already been met. The dates in the tables resulting from decay functions are properly viewed as coarse estimates, and are only used herein to identify cases in which it seems likely that the TMDL target may not be met by the deadline of 2026. Summaries of outcomes for individual constituents are provided below.

### 4,4'-DDE

Statistically significant attenuation curves were obtained for goldfish, fathead minnow, and carp in Revolon Slough subwatershed, and for goldfish and fathead minnow in Calleguas Creek subwatershed. Statistically significant attenuation curves were obtained for sediment in three segments. The results suggest that the TMDL target was already attained by goldfish in both freshwater subwatersheds, but that more time is likely needed after the TMDL deadline for other fish to meet the tissue target and sediment concentrations to meet the final allocation in Revolon Slough. 4,4'-DDD

Statistically significant attenuation curves for goldfish and minnows were obtained in both the Calleguas Creek and Revolon Slough subwatersheds, and suggest that the TMDL target has already been attained or will be attained by the TMDL deadline for those two species. Statistically significant attenuation curves were not obtained for carp, however only 1 out of 10 samples of carp tissue in Calleguas Creek subwatershed, and only 4 out of 9 samples of carp tissue from the Revolon Slough subwatershed, have been above the TMDL target since 2010. Recent data for other fish species shows that the majority of fish sampled in Mugu Lagoon and the Calleguas Creek subwatershed met the DDD target in the most recent (2015) field event (Attachment 1); carp and fathead minnow were the only species caught in Revolon Slough in 2015. The final sediment allocations are already met throughout the watershed except in one segment (Mugu Lagoon). However, the attenuation curve obtained for sediment in Mugu Lagoon suggests that the final WLA/LA will be met by the TMDL deadline. In summary, the results of the time series analysis and other supporting data suggest that the fish tissue target and final sediment allocations will both be met by the TMDL deadline.

### 4,4'-DDT

Statistically significant attenuation curves for goldfish, fathead minnow, and carp were obtained for the Calleguas Creek subwatershed, and for goldfish and fathead minnow in Revolon Slough subwatersheds, and suggest that the TMDL target has already been attained by those species in those reaches. It is not possible to be sure that carp tissue would meet the target by 2026 in Revolon Slough subwatershed, however a downward trend in concentrations is evident from the time series between 2009-2015. As was true for 4,4'-DDD, the majority of samples from other fish species obtained in Mugu Lagoon and Calleguas Creek subwatersheds met the target in the most recent (2015) field event (Attachment 1), and only a few samples of carp and black bullhead exceeded the target in 2015 in Revolon Slough. The final sediment allocations are already met throughout the watershed except in one segment (Revolon Slough). However, the attenuation curve obtained for sediment in Revolon Slough suggests that the final allocations will be met by the TMDL deadline. In summary, the results of the time series analysis, together with other supporting data, suggest that both the fish tissue target and final sediment allocation will be met by the TMDL deadline.

### TOXAPHENE

Statistically significant attenuation curves for goldfish, fathead minnow, and carp were obtained for the Calleguas Creek subwatershed, and for goldfish and fathead minnow in Revolon Slough subwatershed. Statistically significant attenuation curves were obtained for sediment in Revolon Slough (other reaches already meet the final WLA/LA). As was true for 4,4'-DDE, the results suggest that the TMDL target for toxaphene was already attained for goldfish in both freshwater subwatersheds, but that more time is likely needed after the TMDL deadline for other fish to meet the target in Revolon Slough and for sediment concentrations to reach the final allocation in Revolon Slough.

### CHLORDANE

Statistically significant attenuation curves were obtained for goldfish, fathead minnow, and carp in Calleguas Creek subwatershed, and for goldfish and fathead minnow in Revolon Slough subwatershed. The results suggest that time beyond the TMDL deadline might be needed for fathead minnow to reach the target in the freshwater reaches. The particulate fraction (>2 µm) accounts for an average of 97% of total chlordane in water samples,[8] so the exposure pathways for fish and other aquatic organisms are dependent on pollutant mass in sediment. However, chlordane has not been detected in sediment in the watershed (including in Mugu Lagoon) since compliance monitoring began in 2008.

### PCB

Data were insufficient to attempt regression using goldfish and fathead minnow. Regression was performed for carp, but did not yield statistically significant attenuation curves. Consequently, it is not possible to estimate when fish tissue might attain the TMDL target for PCBs. Although fish tissue target has not been met in the watershed, PCBs have not been detected in sediment in the watershed (including in Mugu Lagoon) since compliance monitoring began in 2008. PCBs are not detected in the dissolved fraction (<2 µm) of water column samples in Calleguas Creek watershed,[9] so the only route of potential contamination of fish begins with suspended and bottom sediment. Concentrations of PCBs range higher in fish collected in Mugu Lagoon than in fish collected in the freshwater reaches. Owing to a lack of site fidelity for fish species sampled in Mugu Lagoon, it is possible that fish collected in Mugu Lagoon are accumulating PCBs when outside of the estuary. However, there is no good explanation for the PCB load in fish tissue in the freshwater reaches, given that PCBs have not been detected in sediment in the freshwater reaches for many years.[10]

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[8] Based on 5 monitoring events at 12 monitoring sites during which water samples were fractionated into three particulate classes (2 µm - 64 µm, 64 µm - 2 mm, > 2 mm) and a dissolved fraction (< 2 µm).

[9] Based on 5 monitoring events at 20 monitoring sites during which water samples were fractionated into three particulate classes (2 µm - 64 µm, 64 µm - 2 mm, > 2 mm) and a dissolved fraction (< 2 µm).

[10] The PCB MDLs in use by the CCW TMDL Monitoring Program are significantly lower than the TMDL WLA/LAs.

**Table 11. Time Frames of Attainment of Fish Tissue Targets and Final Sediment Allocations Obtained from Exponential Decay Functions or Monitoring Data**

| | Time Frame for Fish Tissue Target [a] | | | Time Frame for Final Sediment Allocation | | | | |
|---|---|---|---|---|---|---|---|---|
| | Species | Calleguas Creek Subwatershed | Revolon Slough Subwatershed | Arroyo Simi/ Las Posas | Lower Conejo Creek | Calleguas Creek | Revolon Slough | Mugu Lagoon |
| DDE | Goldfish | 2012 | 2007 | [b] | 2016 | 2017 | 2048 | [b] |
| | Fathead Minnow | 2030 | 2083 | | | | | |
| | Carp | [b] | 2029 | | | | | |
| DDD | Goldfish | 1991 | 1993 | no trend analysis/ WLA recently met | ND since 2010 | | no trend analysis/ WLA recently met | 2017 |
| | Fathead Minnow | 1997 | 2023 | | | | | |
| | Carp | [b] | [b] | | | | | |
| DDT | Goldfish | 1991 | 1998 | 2007 | ND since 2008 | | 2018 | no trend analysis/ WLA recently met |
| | Fathead Minnow | 1997 | 2006 | | | | | |
| | Carp | 2010 | [b] | | | | | |
| Toxaphene | Goldfish | 2018 | 2007 | ND since 2008 | no trend analysis/ WLA recently met | | 2039 | ND since 2008 |
| | Fathead Minnow | 2017 | 2038 [d] | | | | | |
| | Carp | [b] | 2024 | | | | | |
| Chlordane | Goldfish | 2025 | 2000 | no trend analysis/ ND since 2008 in most reaches [e] | | | | |
| | Fathead Minnow | 2027 | 2084 | | | | | |
| | Carp | 2025 [d] | [b] | | | | | |
| PCBs | Goldfish | insuff. data | insuff. data | no trend analysis/ ND since 2008 in all reaches | | | | |
| | Fathead Minnow | insuff. data | insuff. data | | | | | |
| | Carp | [b] | [b] | | | | | |

[a] Attenuation rates were not sought using data from Mugu Lagoon owing to (1) insufficient data sets for individual species, and (2) uncertain site fidelity for the estuarine and marine species acquired. See text for more detail.

[b] Although a sharp downward trend is evident in the time series of monitoring data, regression did not yield a statistically significant exponential decay function.

[c] Regression did not yield a statistically significant exponential decay function.

[d] Statistical significance of decay rate was borderline ($0.13 < p < 0.10$).

[e] Most recent sediment concentration exceeding the final WLA in Revolon Slough was observed in 2010. All other reaches have yielded non-detects since 2008.

The outcomes for individual constituents are placed into the context of the anticipated potential data analysis scenarios in Table 12.

**Table 12. Data Analysis Scenarios that Matched Outcomes for Individual Constituents**

| Scenario | | Implication | Applicable Constituent |
|---|---|---|---|
| Scenario 1 | Fish tissue target has been met. Final WLAs/LAs are already met. | TMDL target for fish and sediment allocations have been attained early. | Dieldrin |
| Scenario 2 | Neither fish tissue targets nor final WLA/LA are met. Available attenuation rates for both media suggest these limits will be met by 2026. | TMDL target for fish and sediment allocations will be likely attained by 2026. | • 4,4'-DDD<br>• 4,4'-DDT<br>• 4,4'-DDE (outside of Revolon Slough)<br>• Toxaphene (outside of Revolon Slough) |
| Scenario 4 | Neither fish tissue targets nor final WLA/LA are met. Available attenuation rates for both media suggest these limits will be met *after* 2026. | No evidence that underlying relationship between sediment and fish tissue is not linear. However, more time is likely needed to for natural attenuation to result in attainment of the TMDL target for fish and sediment allocations. | • 4,4'-DDE (in Revolon Slough)<br>• Toxaphene (in Revolon Slough) |
| Scenario 7 | Fish tissue target is not met and attenuation rates are unknown or suggest target will not be met by 2026. *Constituent not detected in sediment*. | Attenuation in sediment is complete. No actions available to enhance attenuation rates in fish. | PCBs<br>Chlordane [a] |

[a] The decay rates for chlordane in fathead minnow suggest the TMDL deadline might not be met by 2026. Other decay rates obtained for chlordane in fish support timely attainment of the tissue target by 2026.

# Evaluation of Methods to Enhance Attenuation

The time series analyses support a prediction that attenuation of OCPs and PCBs is proceeding fast enough to lead to attainment of fish tissue targets (in freshwater reaches) and final sediment allocations by the TMDL deadline in 2026 in most cases. Fish collected in Mugu Lagoon are not appropriate indicators of pollutant concentrations in the sediment in Mugu Lagoon (for reasons explained above), and therefore fish tissue concentrations in Mugu Lagoon are not necessarily addressed by sediment management actions within the watershed. Although most fish samples from Mugu Lagoon still exceeded TMDL targets for 4,4'-DDE, toxaphene, chlordane, and PCBs, in 2015 (see Attachment 1), 4,4'-DDE is the only one of these four constituents that still exceeds the final sediment allocation in Mugu Lagoon. The other three constituents (toxaphene, chlordane, and PBCs) have not been detected in sediment there since 2008, and the time series for 4,4'-DDE in sediment shows marked and steady decline toward the final sediment allocation (see lower panel in Figure 6).

The analyses summarized in Table 11 suggest that 4,4'-DDE and toxaphene may not meet pertinent limits for either fish or sediment in Revolon Slough by 2026. Consequently, an evaluation is presented below regarding methods to enhance natural attenuation of 4,4'-DDE and toxaphene in Revolon Slough.

Natural attenuation may be enhanced through methods that will reduce sediment loading in runoff from areas with high soil concentrations of OC pesticides and PCBs, and through removal or immobilization of instream sediment. The principal methods that are available to potentially reduce the contaminant mass in bottom sediment in Revolon Slough include: dredging of the slough, capping of sediments, urban runoff BMPs, and agricultural BMPs that arrest the transport of soil into ditches and receiving water. The likelihood that sediment detention (via basins or distributed agricultural BMPs) will enhance attenuation of legacy pesticides or PCBs depends in part on whether current concentrations are higher in the terrestrial material mobilized during runoff than in the bottom sediments already present in the receiving water.

A special study (HCA Special Study) evaluating the presence of high concentration areas for OCPs and PCBs, and the potential for mitigation actions, was conducted between 2009-2011 as a requirement of the TMDL.[11] As part of the study, sediment was monitored on several dates between 2009-2011 in selected agricultural drains and sediment basins. Several of the monitoring sites were located in the watershed of Revolon Slough or on the Oxnard Plain. In Table 13, concentrations of 4,4'-DDE and toxaphene obtained at these sites during the HCA Special Study are compared to bottom sediment concentrations in the receiving water site in Revolon Slough obtained during the same three years by the CCW TMDL Monitoring Program. Concentrations of 4,4'-DDE and toxaphene in sediment retained in a debris basin in a residential area were lower than those in the receiving water sediment. Concentrations of 4,4'-DDE and toxaphene in sediment lining several of the agricultural drainage ditches were higher than those in the receiving water sediment. This comparison suggests that methods that reduce transport of sediment in agricultural drainage are better suited than urban debris basins and other urban runoff BMPs to accelerate attenuation of these two legacy pesticides in Revolon Slough. As a result, the remainder of the discussion focuses on potential agricultural BMPs.

In connection with its program to comply with the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Agricultural Lands in the Los Angeles Region (Waiver), the Ventura County Agricultural Irrigated Lands Group (VCAILG) regularly surveys its membership on their use of agricultural BMPs. As part of these surveys, respondents are polled on their current and planned new future use of eight sediment management BMPs, which are listed in Table 14. Among other analyses conducted using BMP survey data, responses from individual growers are binned according to the drainage areas of VCAILG monitoring sites. The drainages of five of the VCAILG monitoring sites (05D_SANT_VCWPD, 05D_LAVD, 04D_WOOD, 04D_LAS, 04D_ETTG) fall within the Revolon Slough subwatershed. Metrics that are calculated for binned data include the percent of applicable acreage on which the BMPs are currently in use ("current adoption rate") and the percent of applicable acreage on which the BMPs are planned for new future use ("planned future adoption").

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[11] LWA (2012) Calleguas Creek Watershed OC Pesticides and PCBs TMDL Special Study #2. HCAs and Management Practices. Submitted to the Los Angeles Regional Water Quality Control Board, June 2012.

**Table 13. Comparison of 4,4'-DDE and Toxaphene Concentrations in Sediment Lining a Debris Basin, Agricultural Ditches, and Receiving Water in Revolon Slough Watershed.**

| Data Source | Site Category | Site ID | Description (Lat., Long.) | Median concentration (ng/g) | |
|---|---|---|---|---|---|
| | | | | 4,4'-DDE | Toxaphene |
| HCA Special Study (2009-2011) | Residential Drainage Debris Basin | DB3-01 | W. Camarillo Hills West Branch Debris Basin (34.24, -119.06) | 8.2 | ND |
| | Agricultural Drainage Ditch | 05D_D_AVI | Drain at Aviation Dr. to Revolon Slough (34.21, -119.11) | 21.2 | 174.4 |
| | | 05D_SANT_VCWPD | Santa Clara Drain at VCWPD Gage 781 (34.24, -199.11) | 48.6 | 110.3 |
| | | 04D_ETTG | Discharge to Revolon Slough at Etting Rd. (34.16, -119.09) | 267.2 | 359.1 |
| | | 01T_ODD2_DCH | Duck Pond/Mugu/Oxnard Drain #2 S. of Hueneme Rd (34.14, -119.12) | 89.1 | 242.7 |
| | | 01T_ODD3_ARN_UP | Rio de Santa Clara/Oxnard Drain #3 at Edison Dr. (34.13, -119.17) | 175.4 | 980.0 |
| CCW TMDL Monitoring Program (2009-2011) | Receiving Water | 04_WOOD | Revolon Slough at east side of Wood Road (34.17, -119.11) | 70.4 | 75.2 |

**Table 14. Sediment Management BMPs Included in VCAILG Membership Surveys**

| Survey Question | BMP Description |
|---|---|
| 20 | Long runs of production area are broken up by access roads or buffer strips to reduce sediment movement. |
| 21 | In sloped production areas, one or more of the following management practices is used to minimize erosion: contour farming, contoured buffer strips, terracing |
| 22 | Bare soil is minimized through use of cover crops, mulch, leaving plant debris, or planting subsequent crops, and the soil cover is replenished periodically to maintain effectiveness. |
| 23 | Soil amendments, such as polyacrylamide (PAM), are used to reduce sediment movement and retain water. |
| 24 | Berms, culverts, or flow channels are in place to divert water away from roads. These devices or structures are maintained to preserve their functionality. |
| 25 | Road erosion is minimized by use of any of the following: grading, gravel, grass, mulch, water bars, drains |
| 26 | Non-cropped areas with bare soil are protected from erosion with any of the following: vegetation, mulch, gravel, water diversion |
| 27 | Ditch banks are protected from erosion with vegetation, rock placement or geotextiles. |
| 28 | One or more of the following is in place to treat runoff before it leaves the property: grassed waterways, vegetated filter strips, sediment traps, tailwater recycling systems. |

Metrics from the 2015 survey[12] were averaged for these sites to obtain an indication of sediment BMP trends in the Revolon Slough. Current use of most of the sediment management BMPs in Table 14 is already very high (i.e., in use on almost 100% of applicable acres managed by survey respondents). Three BMPs (listed in Table 15) were identified which are not currently in as wide use by survey respondents, and for which plans for *additional future* use (as percent of applicable acres) is reasonably high (i.e. higher than single digit percents). As is supported by the comparison of concentrations in drainage ditches and receiving water in Table 13, increased use of these BMPs has potential to enhance attenuation of 4,4'-DDE and toxaphene in Revolon Slough.

**Table 15. Sediment BMPs with Highest Rates of Planned New Adoption in Revolon Slough**

| | Percent of Applicable Acres | |
|---|---|---|
| **BMP** | **Current Use** | **Planned Additional Future Use** |
| BMP 23. Soil amendments, such as polyacrylamide (PAM), are used to reduce sediment movement and retain water. | 40% | 25% |
| BMP 27. Ditch banks are protected from erosion with vegetation, rock placement or geotextiles | 79% | 18% |
| BMP 28. One or more of the following is in place to treat runoff before it leaves the property: grassed waterways, vegetated filter strips, sediment traps, tailwater recycling systems | 78% | 14% |

The HCA Special Study report reviewed routine maintenance activities performed by the Ventura County Watershed Protection District at its various facilities that result in disturbance, excavation, on-site relocation, and/or off-site removal of sediment that may contain OC pesticides and PCBs. The maintenance activities that include disturbance of sediments include the following:

- Debris and detention basin cleanout
- Improved and unimproved channel cleanout
- Channel bed and bank repair
- Mechanical weed control via disking and hydro-ax
- Water diversions

The review of flood control practices in the HCA Special Study report identified no substantive changes or additional BMPs that are needed to control sediment discharges from current flood control practices. However, one modification to the current practices was identified that could mitigate the mobilization of legacy pesticides: use of sediment quality data to inform the location or restrict the reuse of sediments (e.g., as construction or agricultural fill) contaminated by OCPs and PCBs.

Attenuation rates may also be accelerated by removing or immobilizing instream sediment containing high concentrations of OC pesticides. Dredging involves the removal of accumulated

[12] See LWA (2015) *Ventura County Agricultural Irrigated Lands Group (VCAILG) Draft 2013-2014 Water Quality Management Plan*. Submitted to the Los Angeles Regional Water Quality Control Board, May 26, 2015.

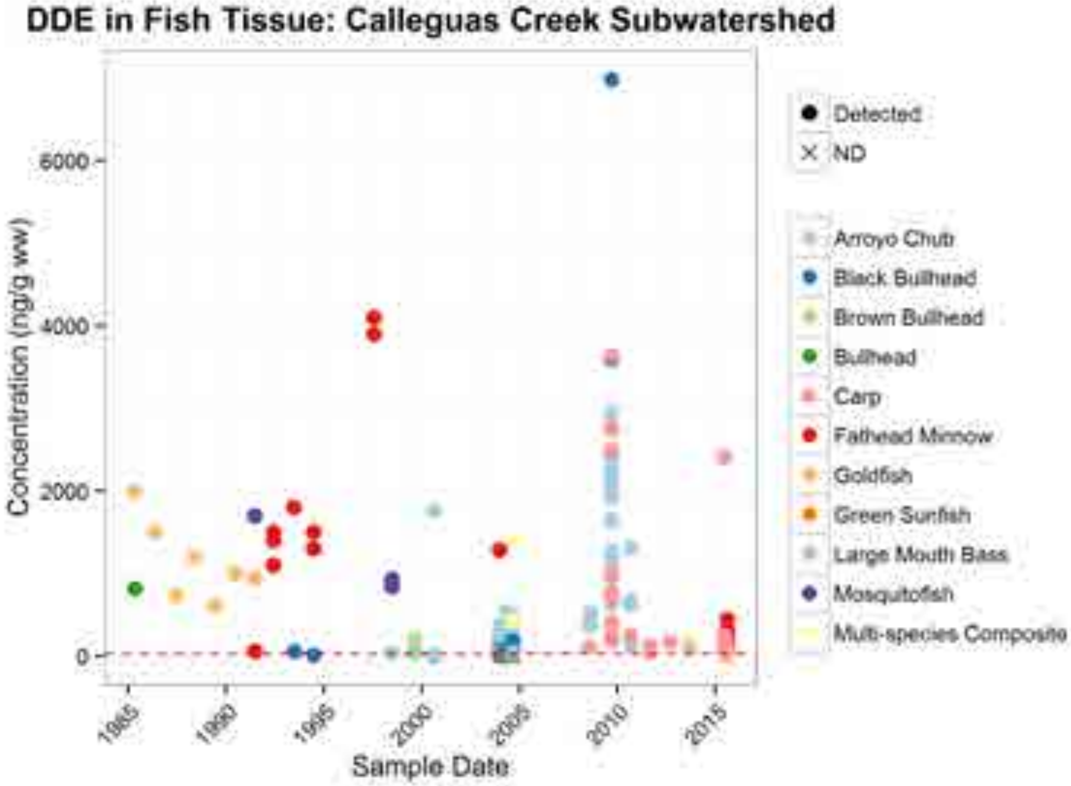
sediments from the creek bottom. Alternatively, sediment capping would involve covering contaminated sediment with another layer of sediment, gravel, or clay. Both sediment capping and dredging present challenges that may hinder their appropriateness for implementation in Revolon Slough. Sediment capping is most effective in large deep waterbodies, such as lakes, where hydrologic conditions do not disturb the capped area. In order for dredging to be effective, dredging to a depth that would ensure removal of all contaminated sediments would be necessary. Additionally, dredging practices must be carefully managed to avoid damage to aquatic life, and short term high turbidity and mobilization of contaminated sediment.

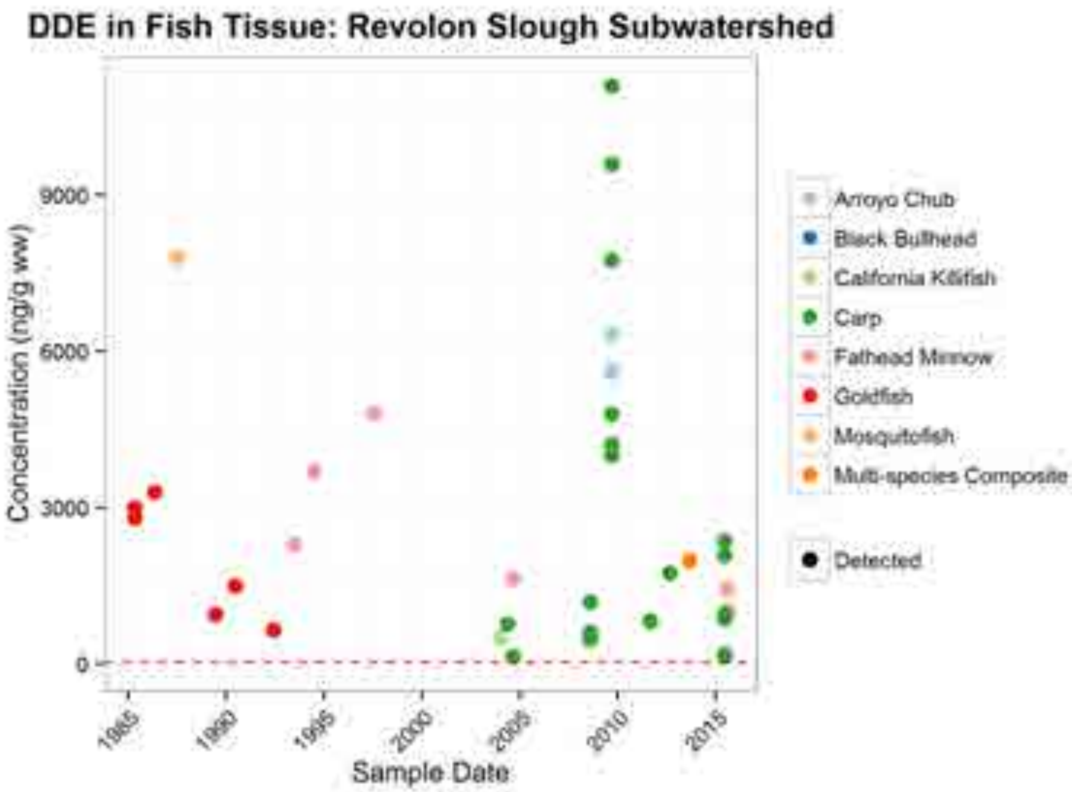
# Conclusions

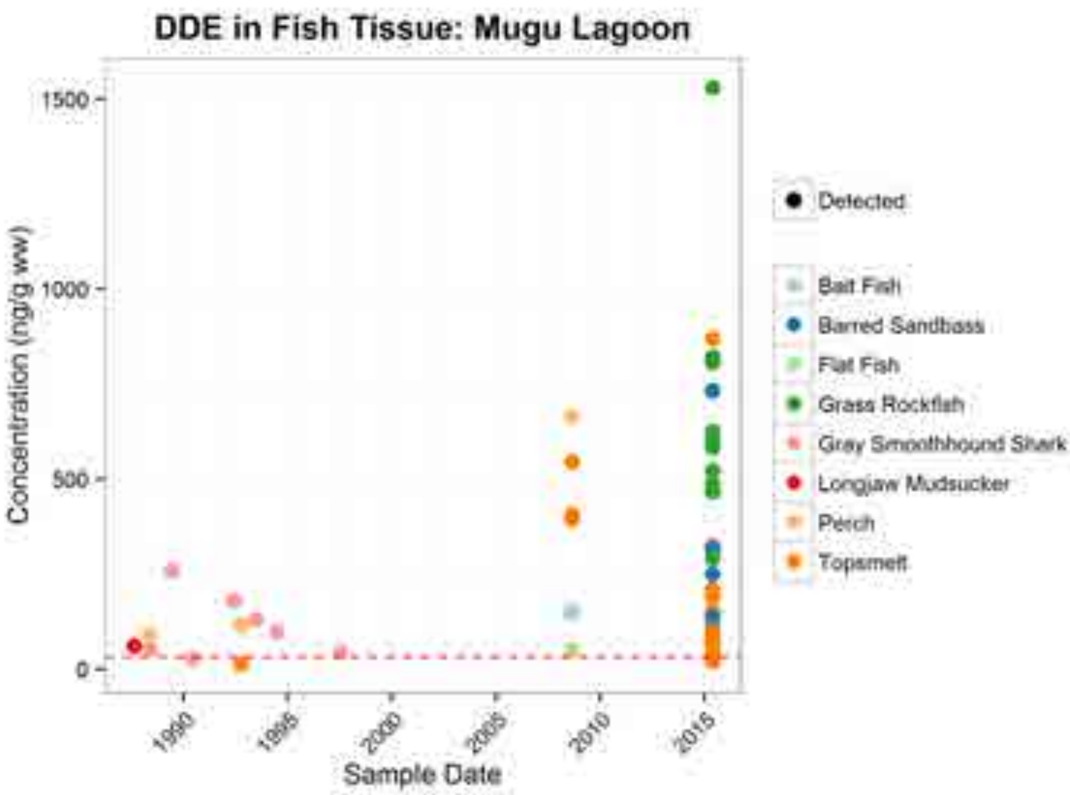
The results of the special study permit several conclusions. In most cases, attenuation of OCPs and PCBs appears to be proceeding fast enough to lead to attainment of fish tissue targets (in freshwater reaches) and final sediment allocations by the TMDL deadline in 2026. However, additional time may be needed to meet pertinent limits for fish tissue or sediment in Revolon Slough for 4,4'-DDE and toxaphene. Several agricultural sediment management BMPs are not completely adopted at present by growers in Revolon Slough watershed. Increased implementation of these BMPs may be the best route for accelerating attenuation of 4,4'-DDE and toxaphene in the receiving water sediment, but it is likely that additional time will still be needed to meet the limits. Control of sediment in agricultural discharges is more likely to enhance attenuation of 4,4'-DDE and toxaphene than detention basins for urban runoff.

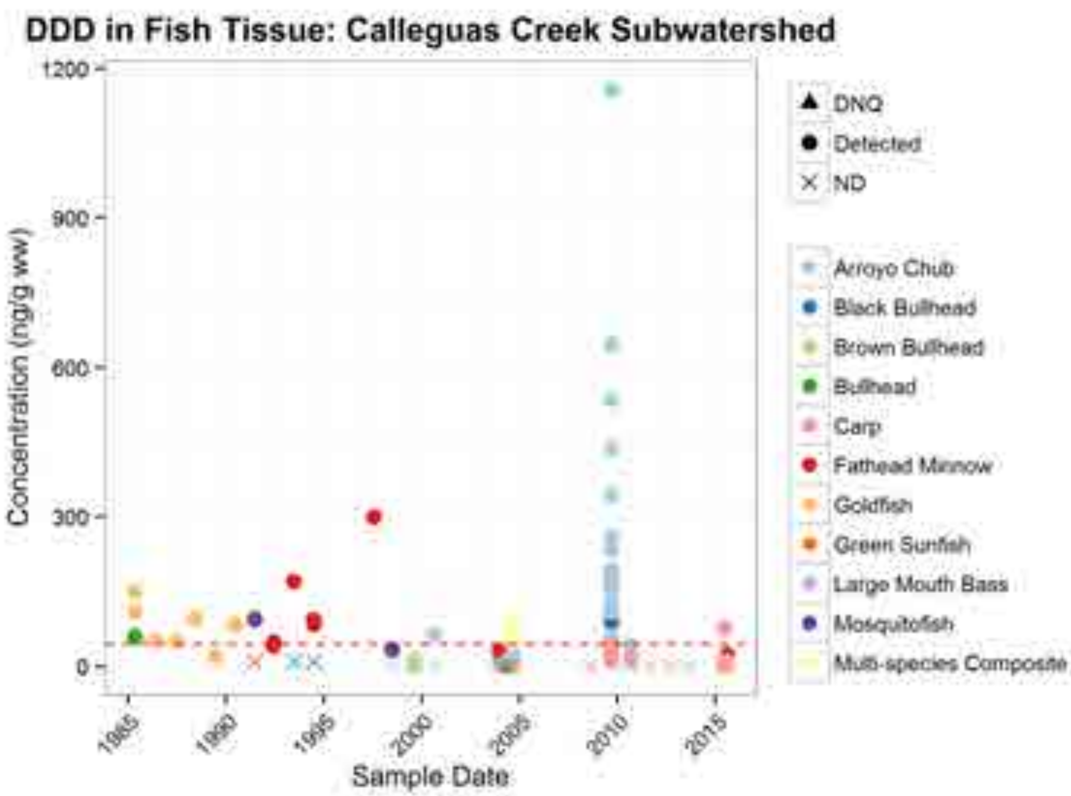
Fish collected in Mugu Lagoon are not obligate estuarine, resident fish and therefore not appropriate indicators of pollutant concentrations in the sediment in Mugu Lagoon. Legacy pollutant concentrations in fish tissue in Mugu Lagoon may not be representative of discharges in the watershed, especially since sediment concentrations in Mugu Lagoon are either already meeting, or near to meeting, applicable final allocations. As a result, fish tissue concentrations in the freshwater reaches may be more appropriate for determining compliance with the TMDL than the fish tissue concentrations in Mugu Lagoon.

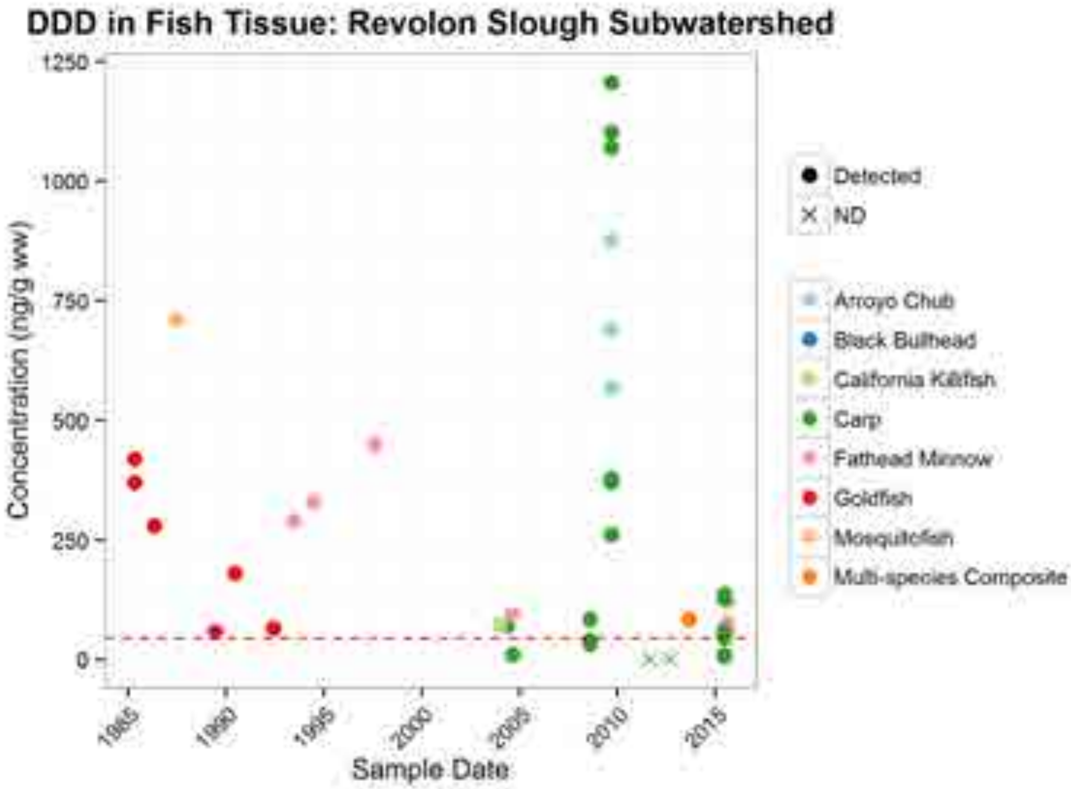
# Attachment 1. Times Series of all Available Fish Tissue Samples for 4,4'-DDT, 4,4'-DDD, 4,4'-DDE, Toxaphene, Chlordane, and PCBs, by Subwatershed

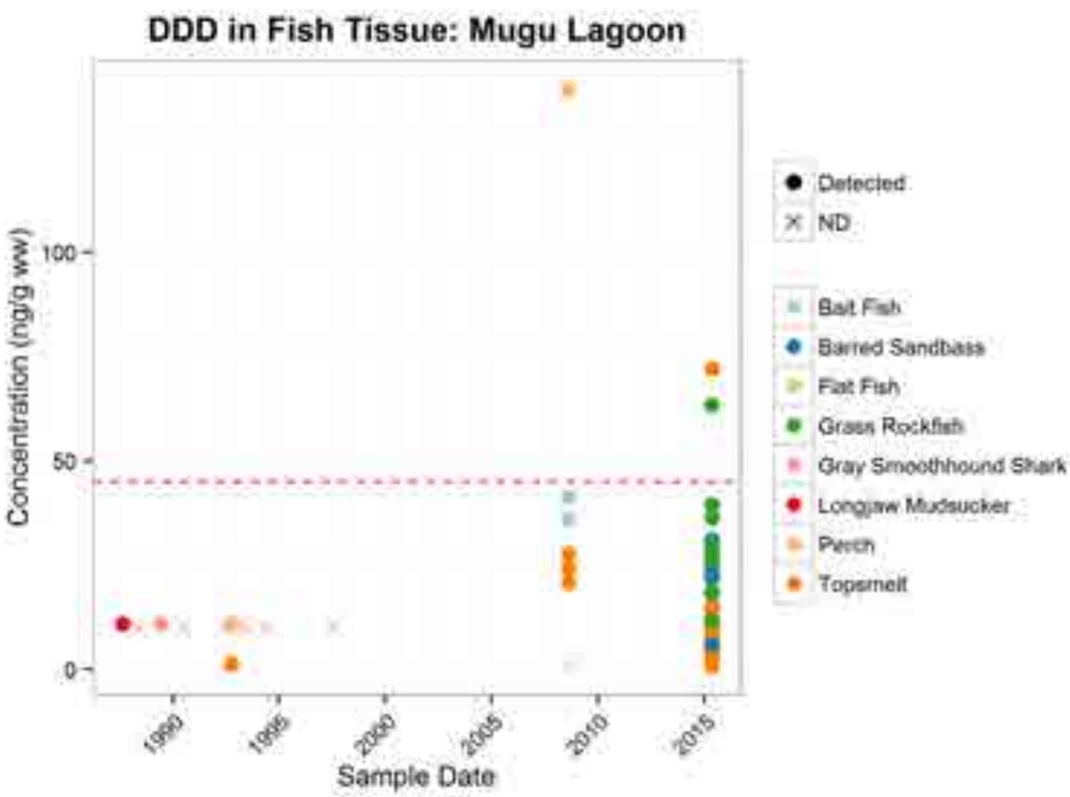

DDE in Fish Tissue: Calleguas Creek Subwatershed
Concentration (ng/g ww)
0
2000
4000
6000
1985
1990
1995
2000
2005
2010
2015
Sample Date
Detected
ND
Arroyo Chub
Black Bullhead
Brown Bullhead
Bullhead
Carp
Fathead Minnow
Goldfish
Green Sunfish
Large Mouth Bass
Mosquitofish
Multi-species Composite


DDE in Fish Tissue: Revolon Slough Subwatershed
Concentration (ng/g ww)
0
3000
6000
9000
1985
1990
1995
2000
2005
2010
2015
Sample Date
Arroyo Chub
Black Bullhead
California Killifish
Carp
Fathead Minnow
Goldfish
Mosquitofish
Multi-species Composite
Detected


DDE in Fish Tissue: Mugu Lagoon
Concentration (ng/g ww)
1500
1000
500
0
1990
1995
2000
2005
2010
2015
Sample Date
Detected
Bait Fish
Barred Sandbass
Flat Fish
Grass Rockfish
Gray Smoothhound Shark
Longjaw Mudsucker
Perch
Topsmelt


DDD in Fish Tissue: Calleguas Creek Subwatershed
Concentration (ng/g ww)
1200
900
600
300
0
1985
1990
1995
2000
2005
2010
2015
Sample Date
DNQ
Detected
ND
Arroyo Chub
Black Bullhead
Brown Bullhead
Bullhead
Carp
Fathead Minnow
Goldfish
Green Sunfish
Large Mouth Bass
Mosquitofish
Multi-species Composite


DDD in Fish Tissue: Revolon Slough Subwatershed
Concentration (ng/g ww)
Sample Date
Detected
ND
Arroyo Chub
Black Bullhead
California Killifish
Carp
Fathead Minnow
Goldfish
Mosquitofish
Multi-species Composite


DDD in Fish Tissue: Mugu Lagoon
Concentration (ng/g ww)
Sample Date
Detected
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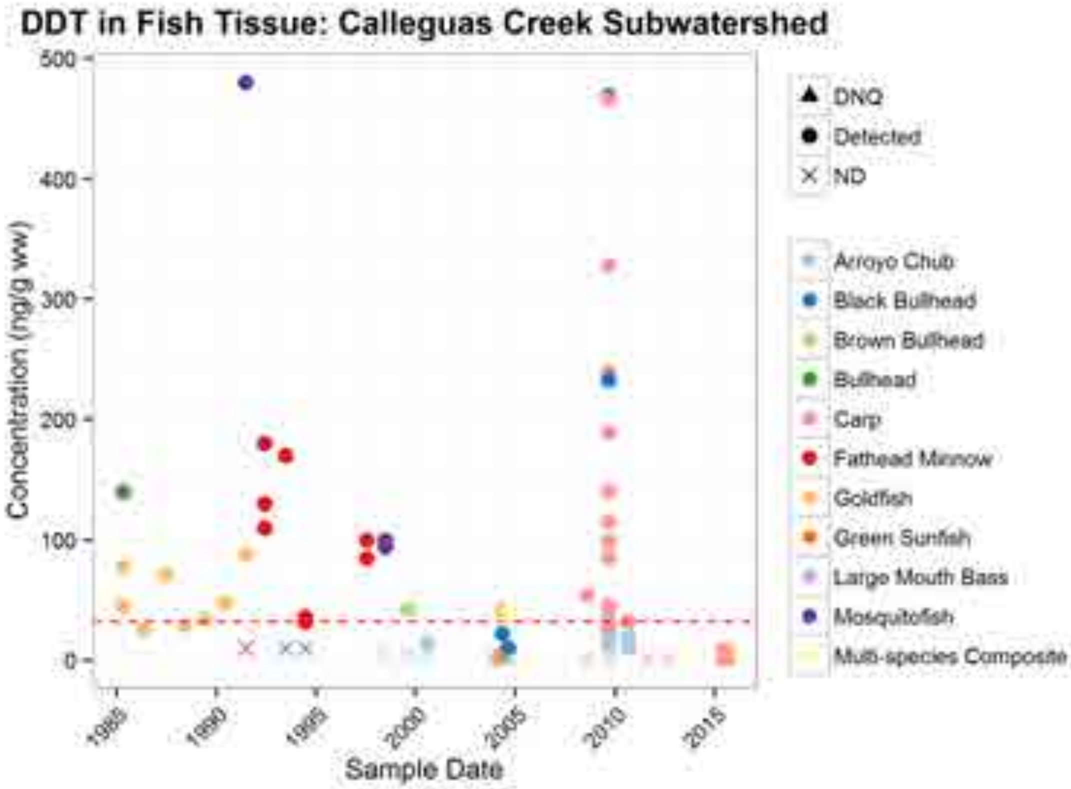
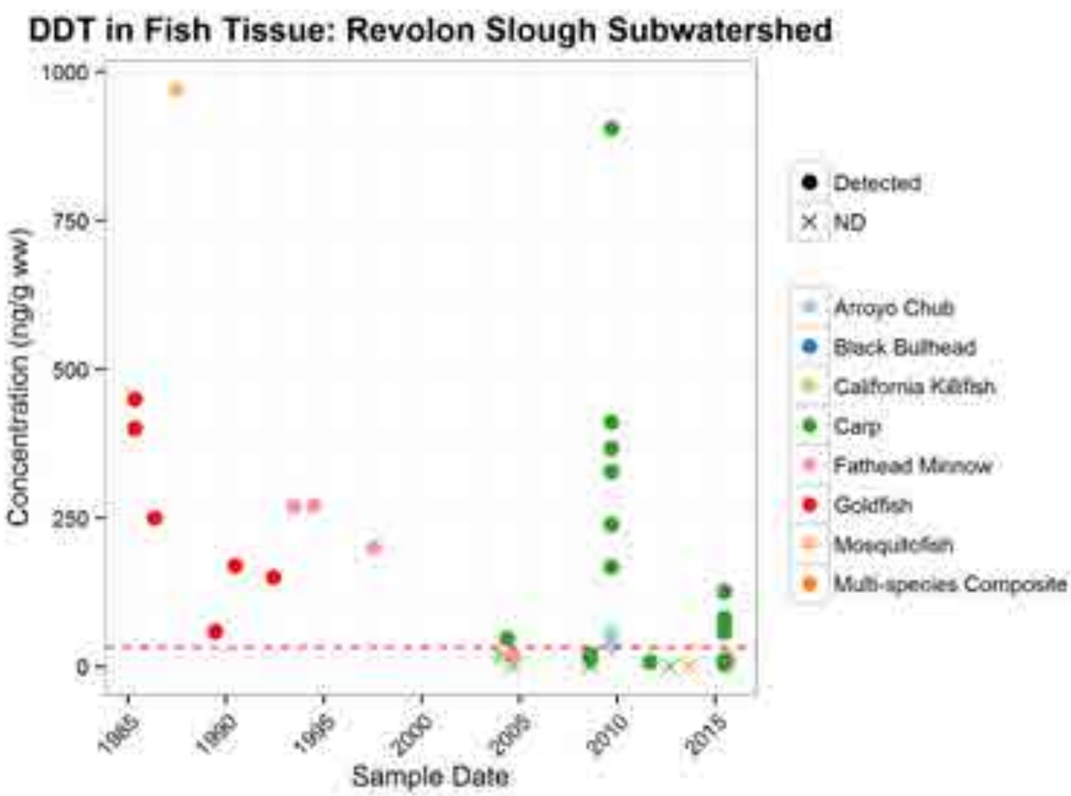
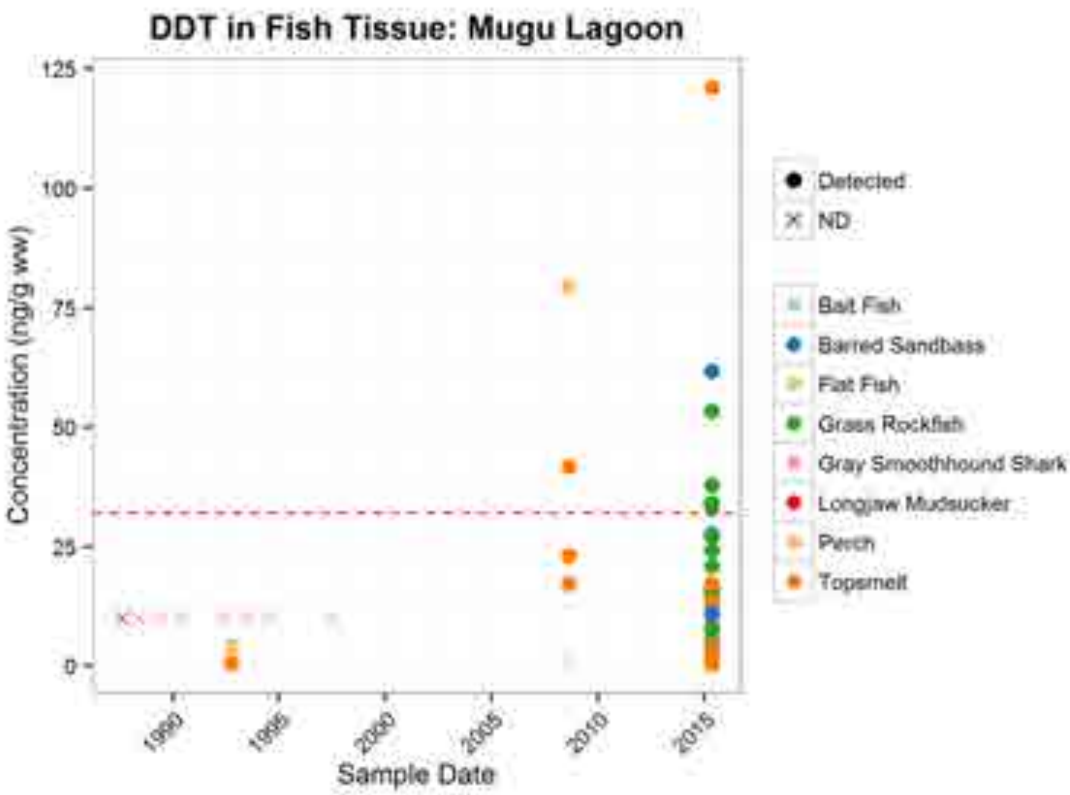
Bait Fish
Barred Sandbass
Flat Fish
Grass Rockfish
Gray Smoothhound Shark
Longjaw Mudsucker
Perch
Topsmelt


DDT in Fish Tissue: Calleguas Creek Subwatershed
Concentration (ng/g ww)
Sample Date
DNQ
Detected
ND
Arroyo Chub
Black Bullhead
Brown Bullhead
Bullhead
Carp
Fathead Minnow
Goldfish
Green Sunfish
Large Mouth Bass
Mosquitofish
Multi-species Composite


DDT in Fish Tissue: Revolon Slough Subwatershed
Concentration (ng/g ww)
Sample Date
Detected
ND
Arroyo Chub
Black Bullhead
California Killifish
Carp
Fathead Minnow
Goldfish
Mosquitofish
Multi-species Composite


DDT in Fish Tissue: Mugu Lagoon
Concentration (ng/g ww)
Sample Date
Detected
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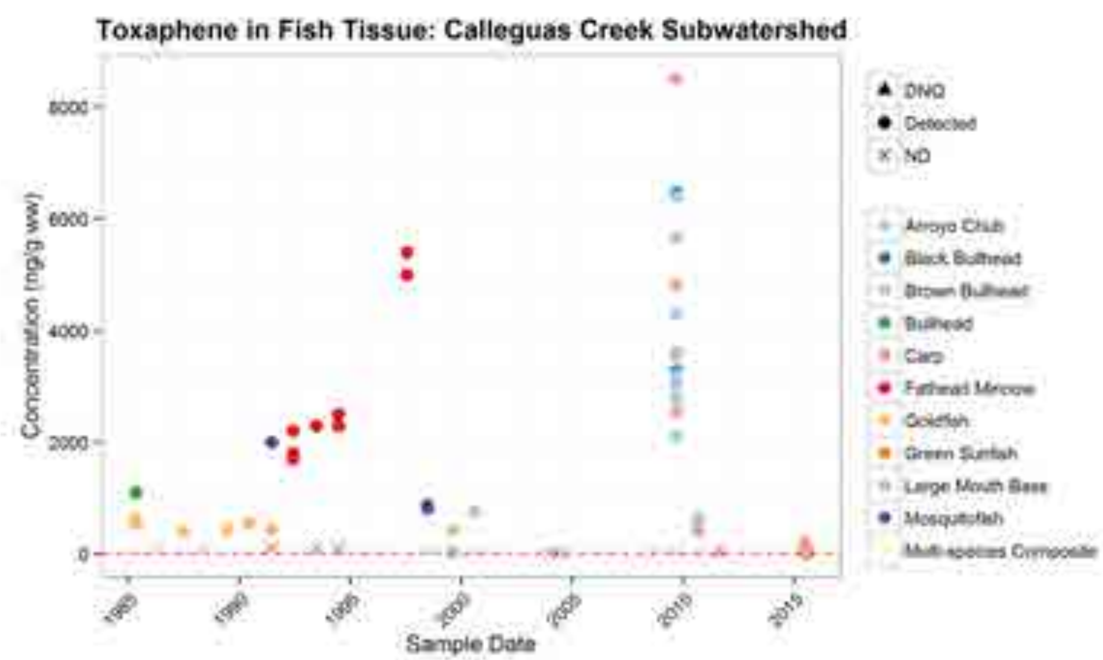
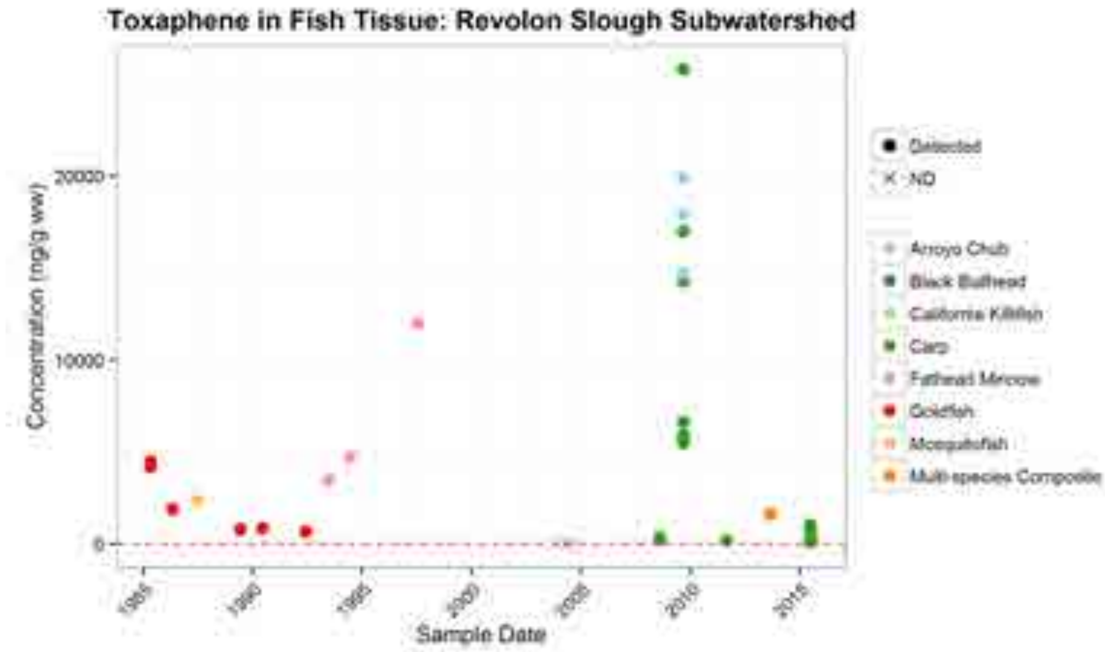
Bait Fish
Barred Sandbass
Flat Fish
Grass Rockfish
Gray Smoothhound Shark
Longjaw Mudsucker
Perch
Topsmelt


Toxaphene in Fish Tissue: Calleguas Creek Subwatershed
Concentration (ng/g ww)
Sample Date
DNQ
Detected
ND
Arroyo Chub
Black Bullhead
Brown Bullhead
Bullhead
Carp
Fathead Minnow
Goldfish
Green Sunfish
Large Mouth Bass
Mosquitofish
Multi-species Composite


Toxaphene in Fish Tissue: Revolon Slough Subwatershed
Concentration (ng/g ww)
20000
10000
0
Sample Date
Detected
ND
Arroyo Chub
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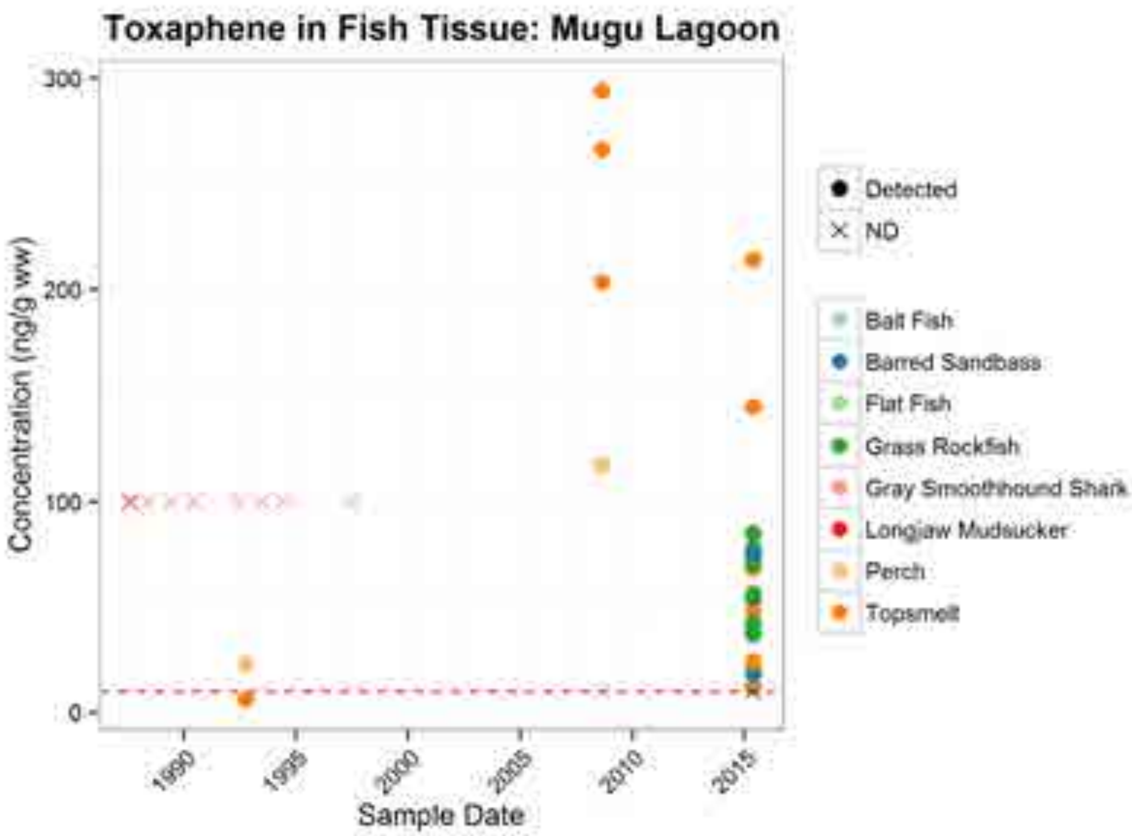
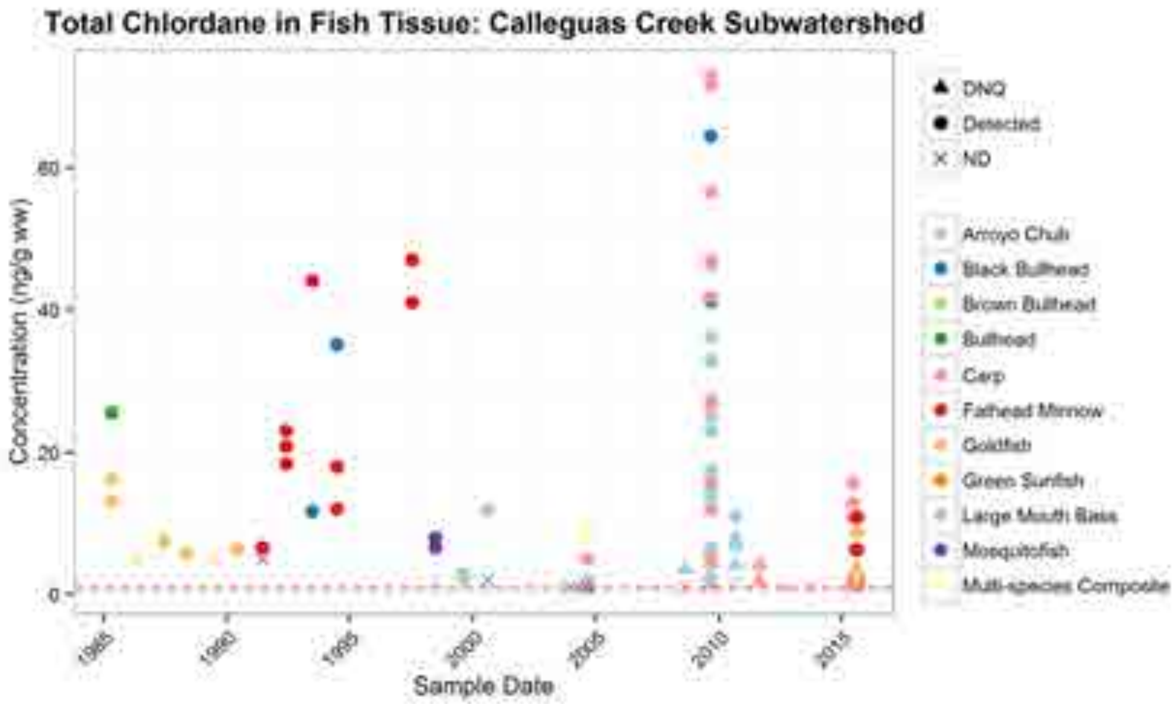
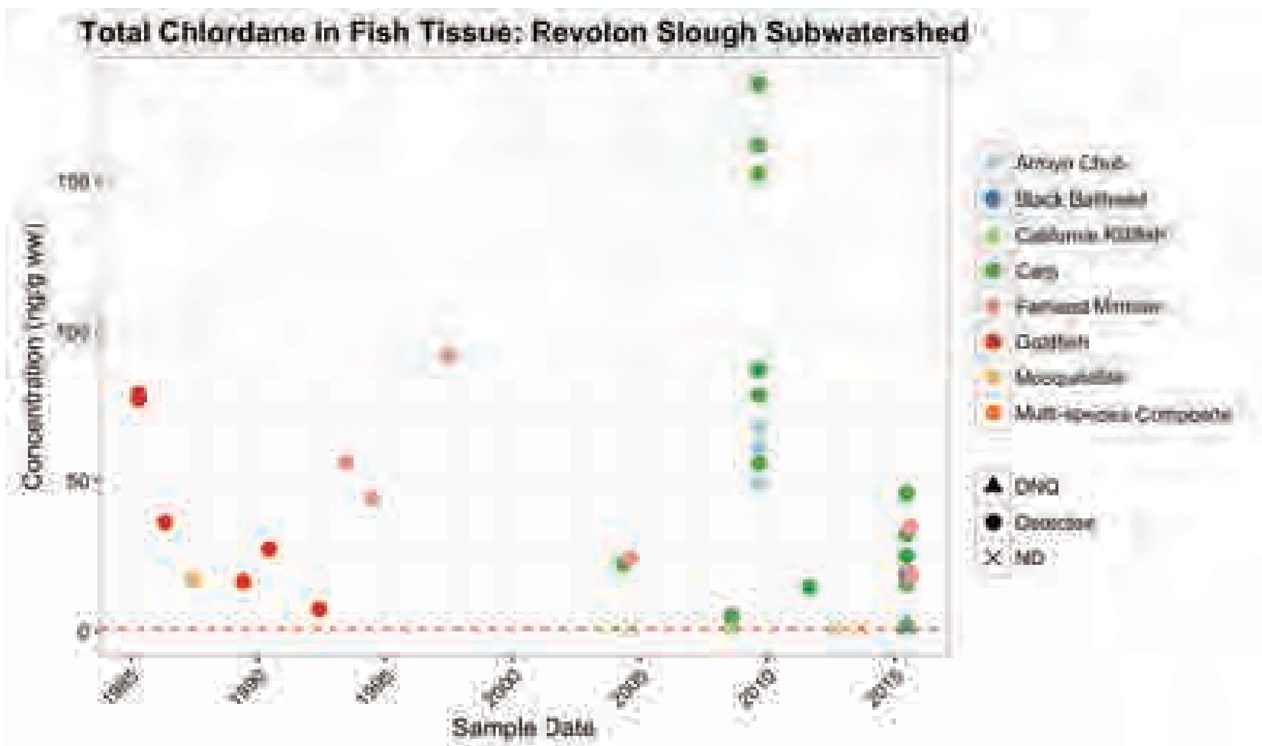
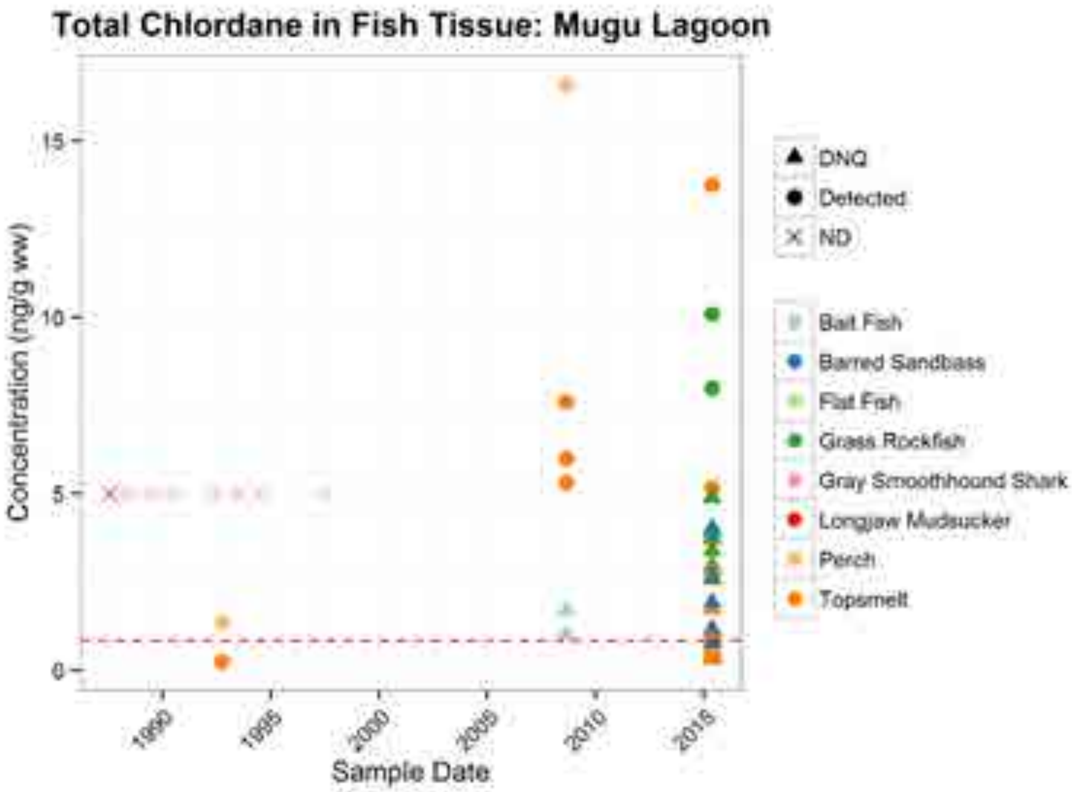
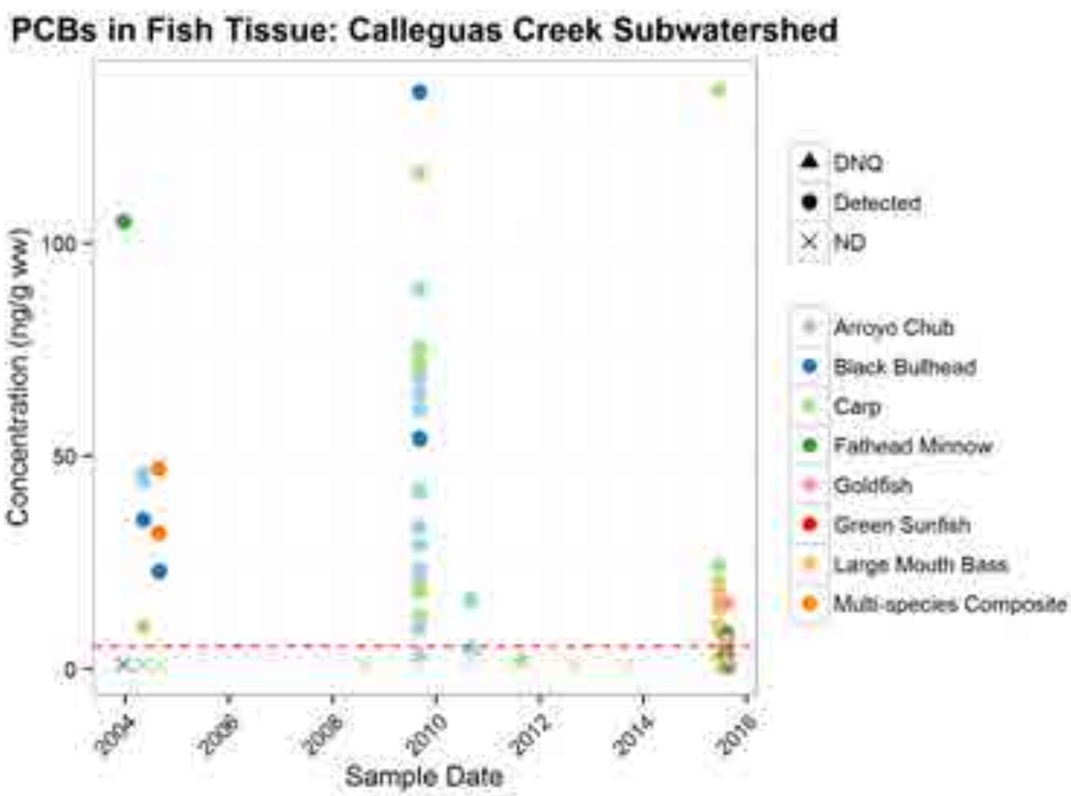
California Killifish
Carp
Fathead Minnow
Goldfish
Mosquitofish
Multi-species Composite

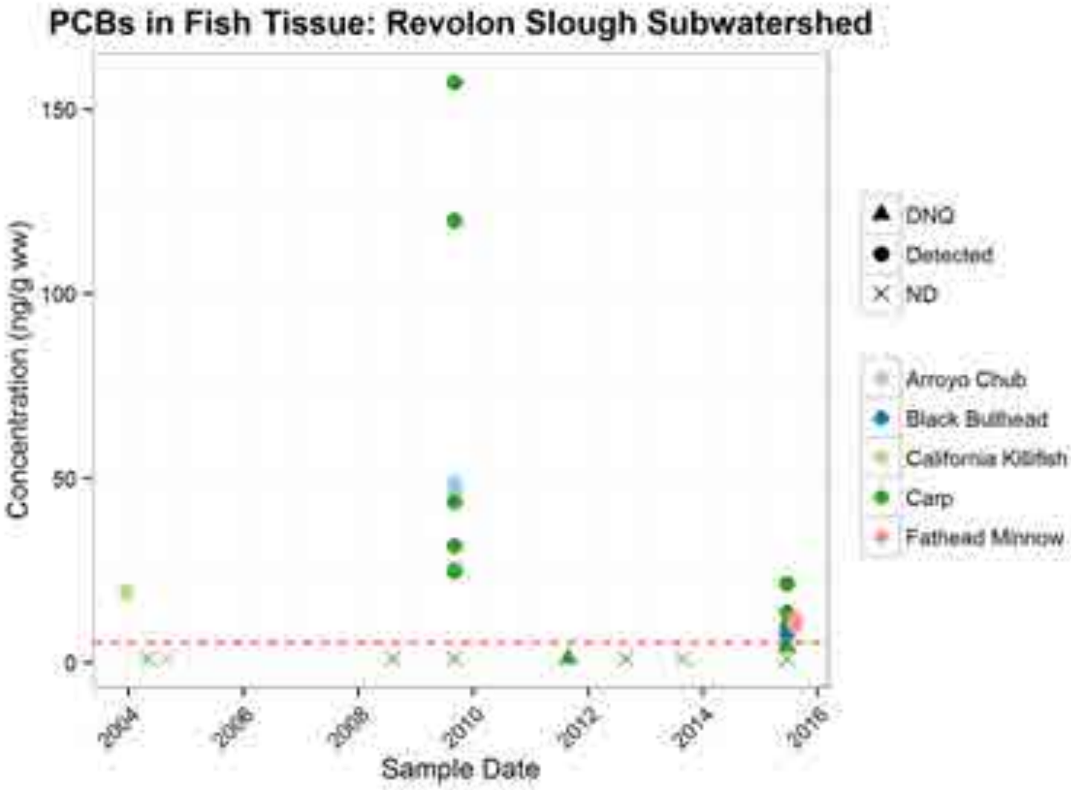

Toxaphene in Fish Tissue: Mugu Lagoon
Concentration (ng/g ww)
300
200
100
0
1990
1995
2000
2005
2010
2015
Sample Date
Detected
ND
Bait Fish
Barred Sandbass
Flat Fish
Grass Rockfish
Gray Smoothhound Shark
Longjaw Mudsucker
Perch
Topsmelt

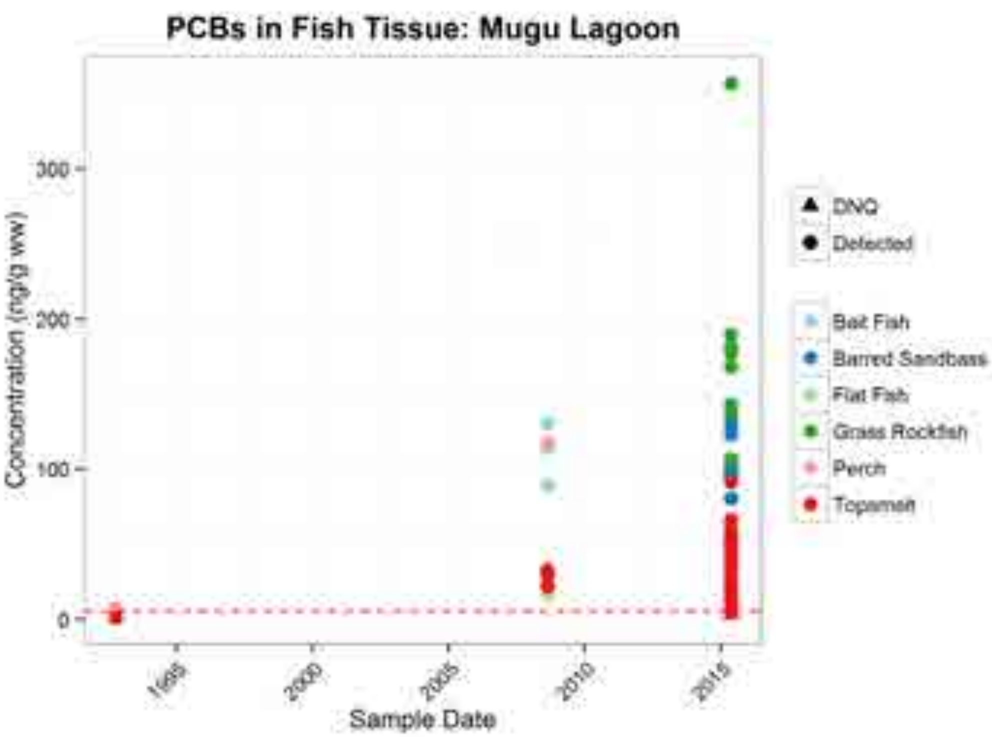

Total Chlordane in Fish Tissue: Calleguas Creek Subwatershed
Concentration (ng/g ww)
Sample Date
DNQ
Detected
ND
Arroyo Chub
Black Bullhead
Brown Bullhead
Bullhead
Carp
Fathead Minnow
Goldfish
Green Sunfish
Large Mouth Bass
Mosquitofish
Multi-species Composite


Total Chlordane in Fish Tissue: Revolon Slough Subwatershed
Concentration (ng/g ww)
Sample Date
Arroyo Chub
Black Bullhead
California Killifish
Carp
Fathead Minnow
Goldfish
Mosquitofish
Multi-species Composite
DNQ
Detected
ND


Total Chlordane in Fish Tissue: Mugu Lagoon
Concentration (ng/g ww)
Sample Date
0
5
10
15
1990
1995
2000
2005
2010
2015
DNQ
Detected
ND
Bait Fish
Barred Sandbass
Flat Fish
Grass Rockfish
Gray Smoothhound Shark
Longjaw Mudsucker
Perch
Topsmelt


PCBs in Fish Tissue: Calleguas Creek Subwatershed
Concentration (ng/g ww)
Sample Date
0
50
100
2004
2006
2008
2010
2012
2014
2016
DNQ
Detected
ND
Arroyo Chub
Black Bullhead
Carp
Fathead Minnow
Goldfish
Green Sunfish
Large Mouth Bass
Multi-species Composite

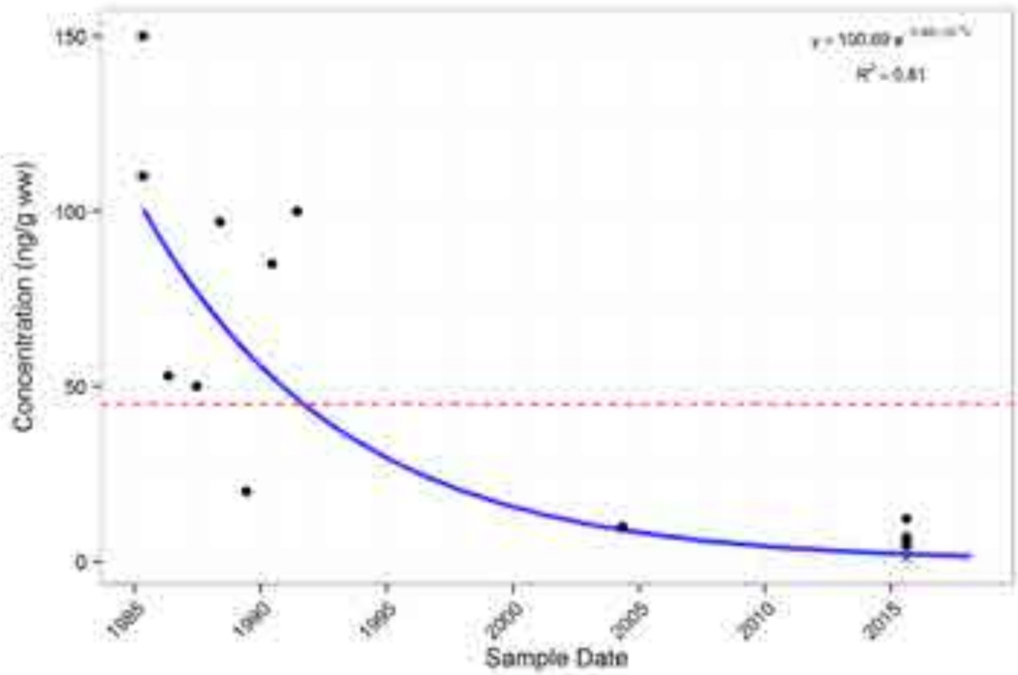

PCBs in Fish Tissue: Revolon Slough Subwatershed
150
100
50
0
Concentration (ng/g ww)
2004
2006
2008
2010
2012
2014
2016
Sample Date
DNQ
Detected
ND
Arroyo Chub
Black Bullhead
California Killifish
Carp
Fathead Minnow


PCBs in Fish Tissue: Mugu Lagoon
300
200
100
0
Concentration (ng/g ww)
1995
2000
2005
2010
2015
Sample Date
DNQ
Detected
Bait Fish
Barred Sandbass
Flat Fish
Grass Rockfish
Perch
Topsmelt

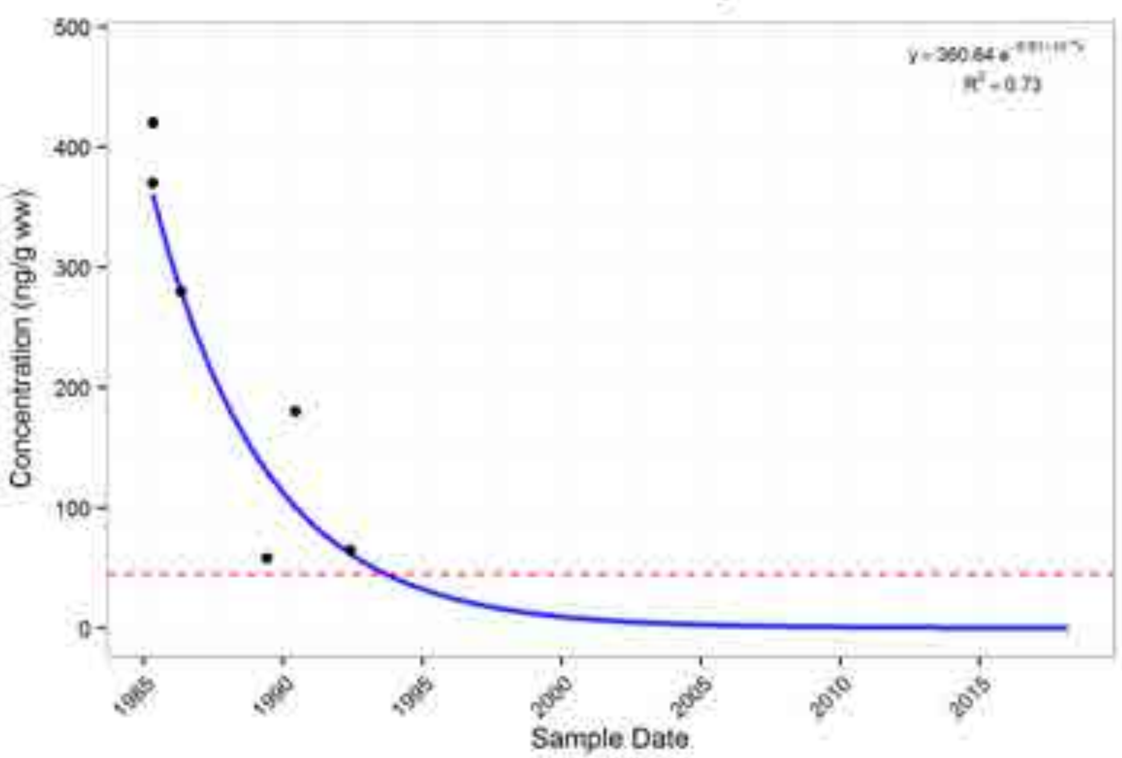
# Attachment 2. Time Series and Exponential Decay Functions for DDD, DDT, Toxaphene, Chlordane, and PCBs

*Note: Fish tissue target or final sediment WLA/LA is plotted as a dashed red line in each graph.*

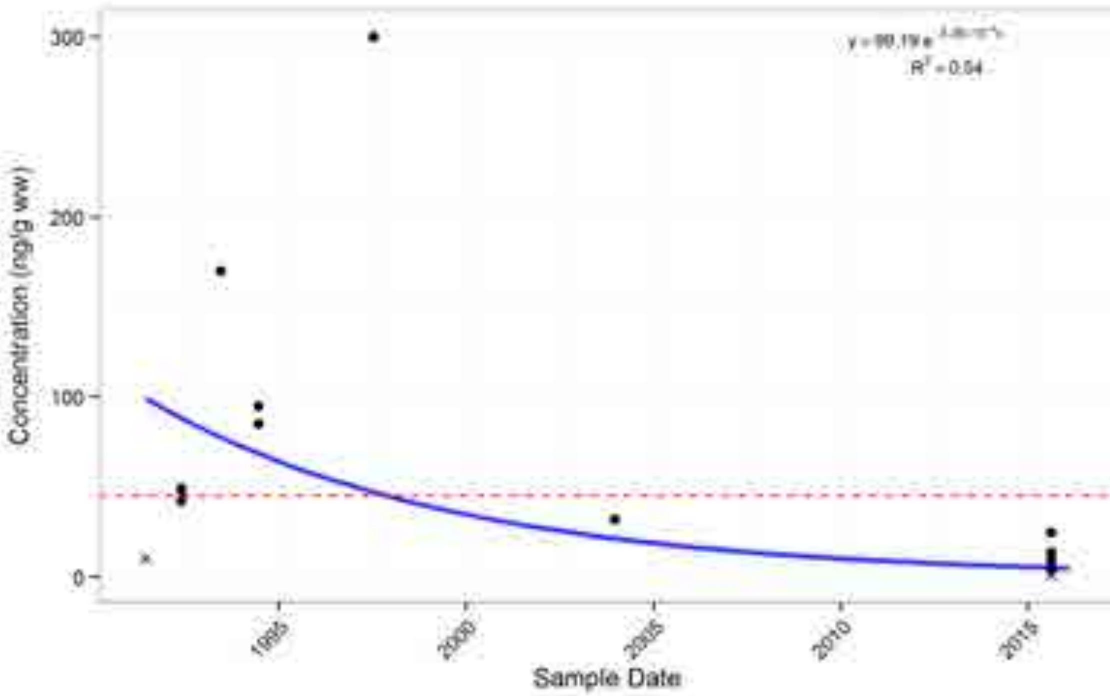
**DDD in Goldfish: Calleguas Creek Subwatershed**



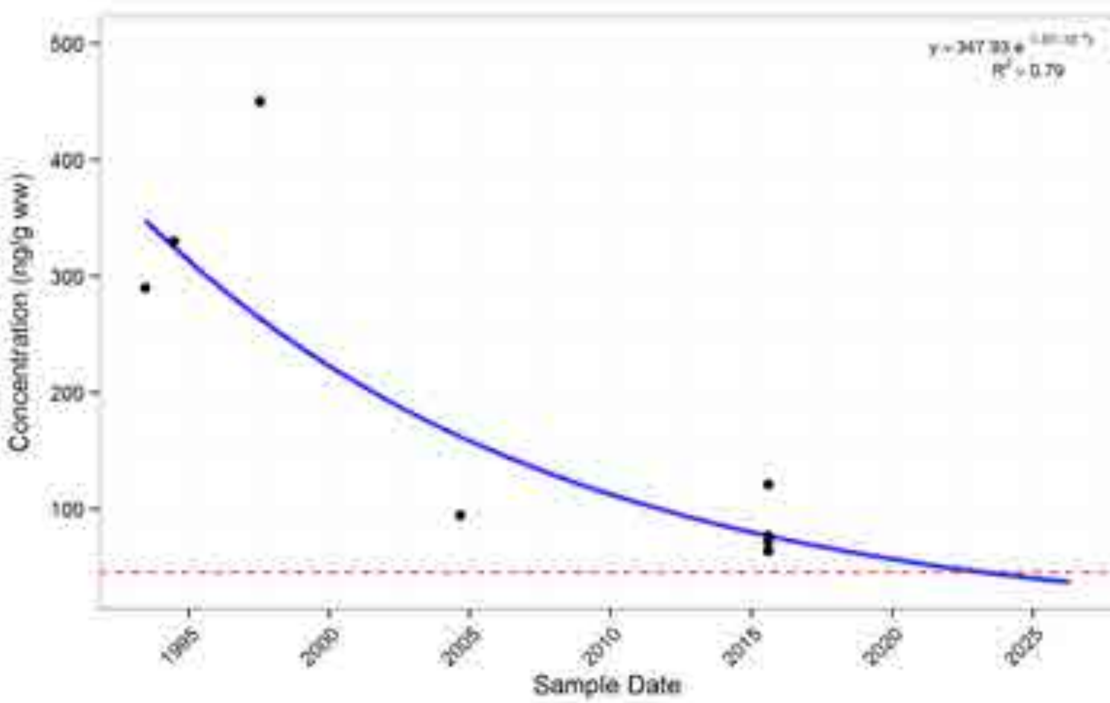

**DDD in Goldfish: Revolon Slough Subwatershed**

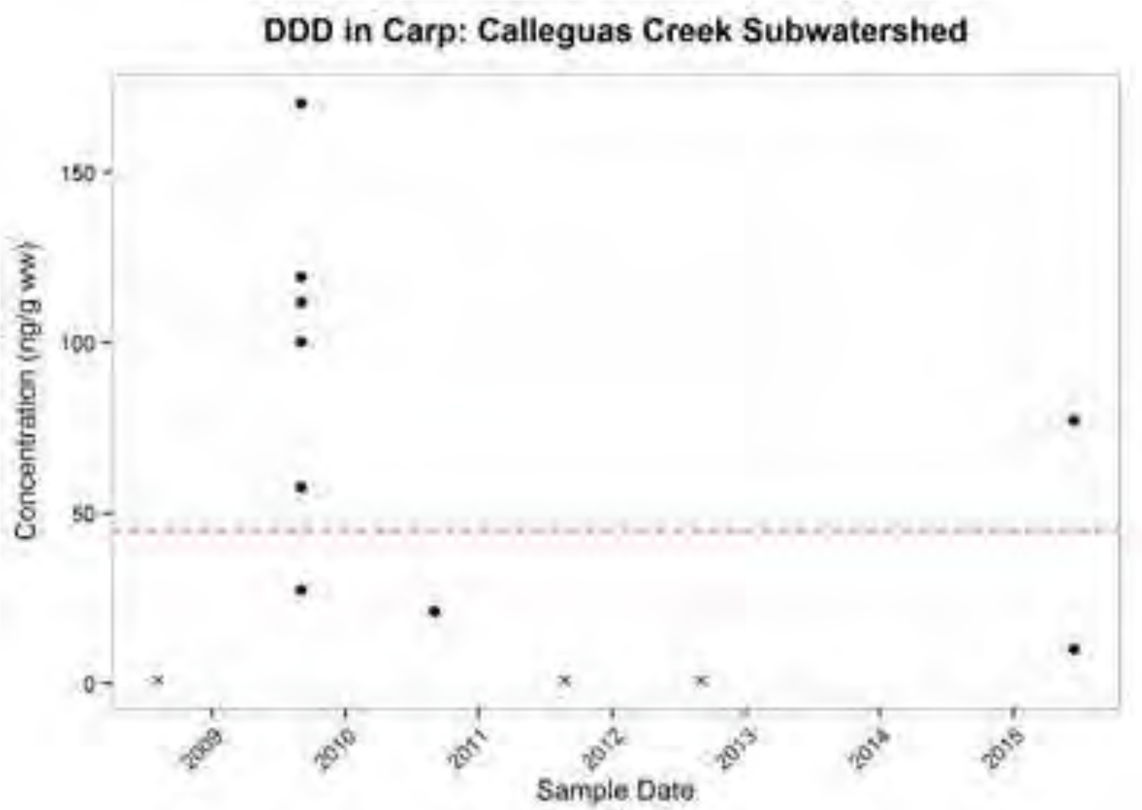


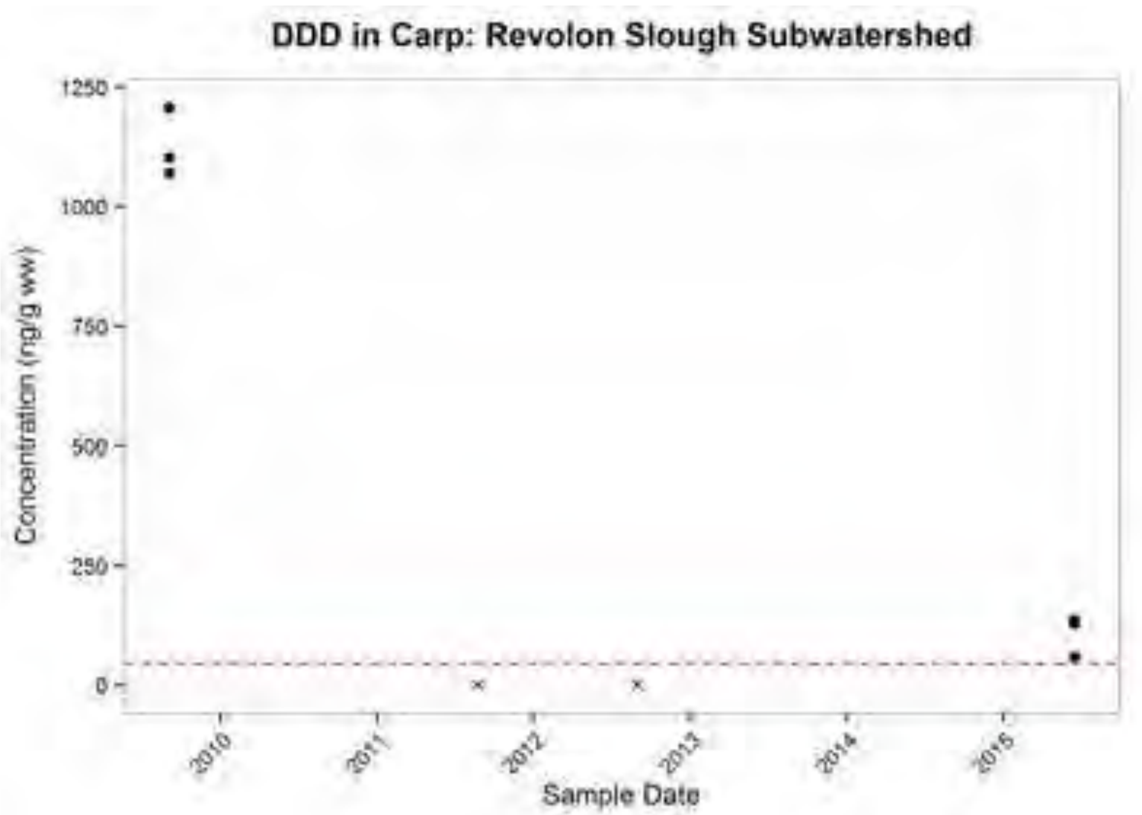
DDD in Fathead Minnow: Calleguas Creek Subwatershed

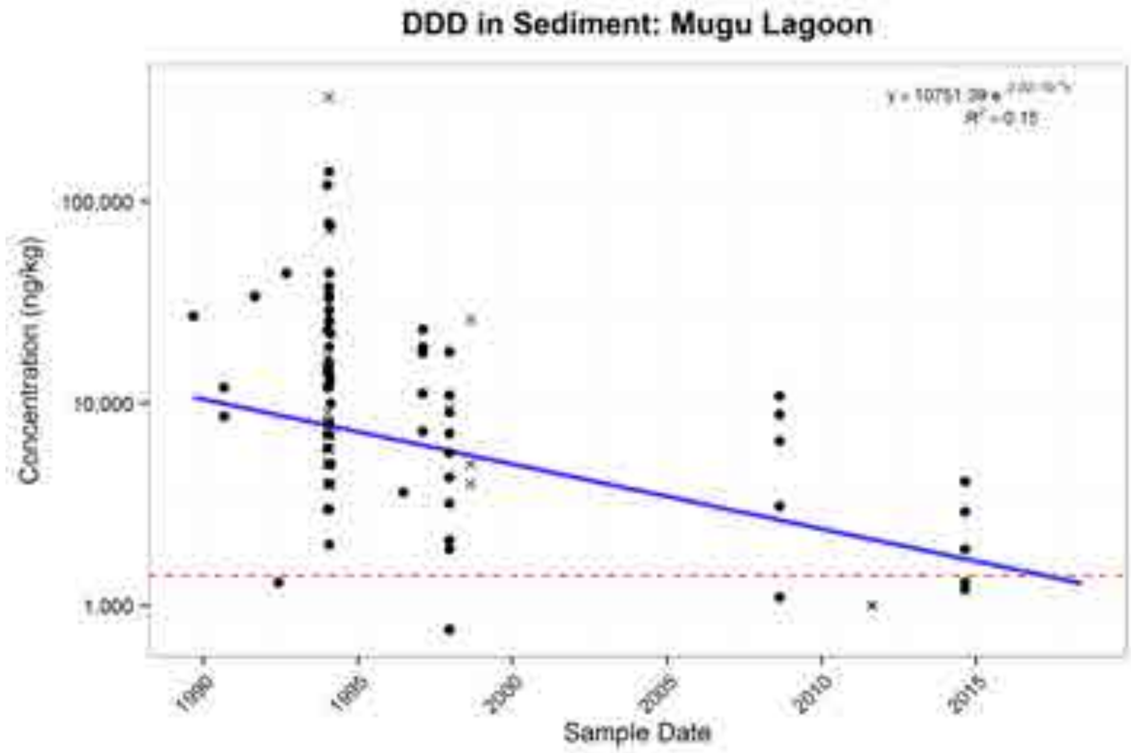


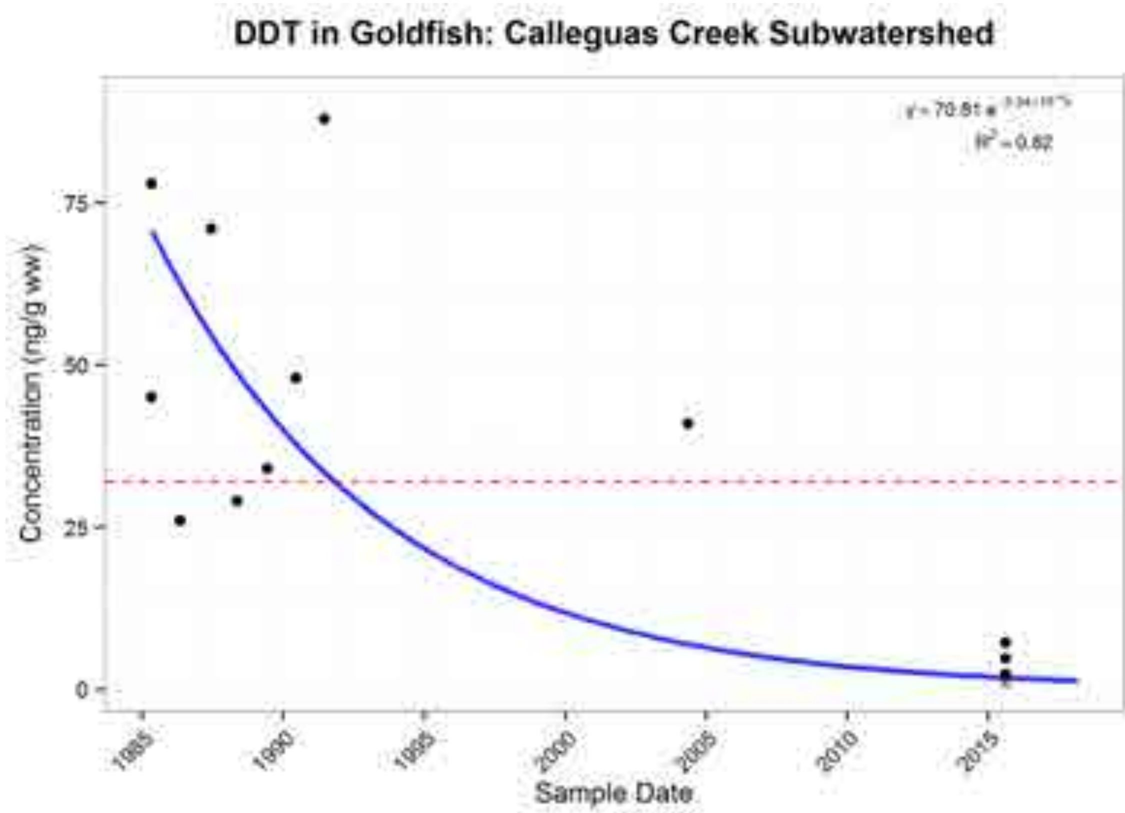

DDD in Fathead Minnow: Revolon Slough Subwatershed



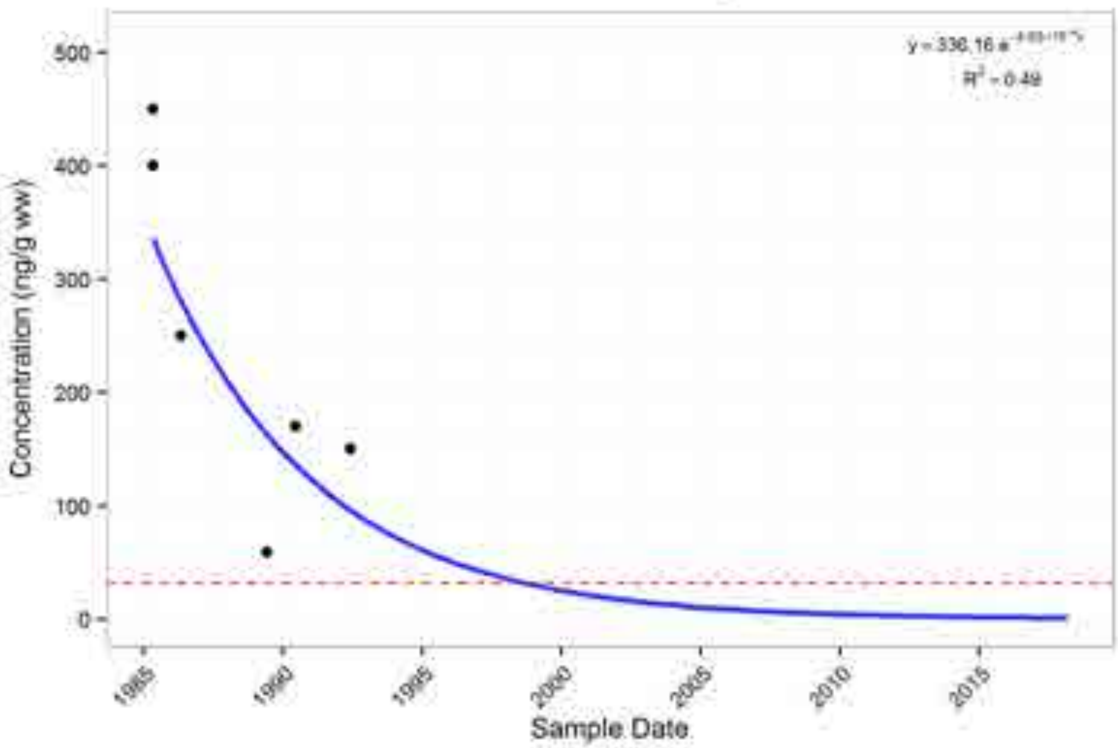

DDD in Carp: Calleguas Creek Subwatershed
Concentration (ng/g ww)
150
100
50
0
2009
2010
2011
2012
2013
2014
2015
Sample Date


DDD in Carp: Revolon Slough Subwatershed
Concentration (ng/g ww)
1250
1000
750
500
250
0
2010
2011
2012
2013
2014
2015
Sample Date

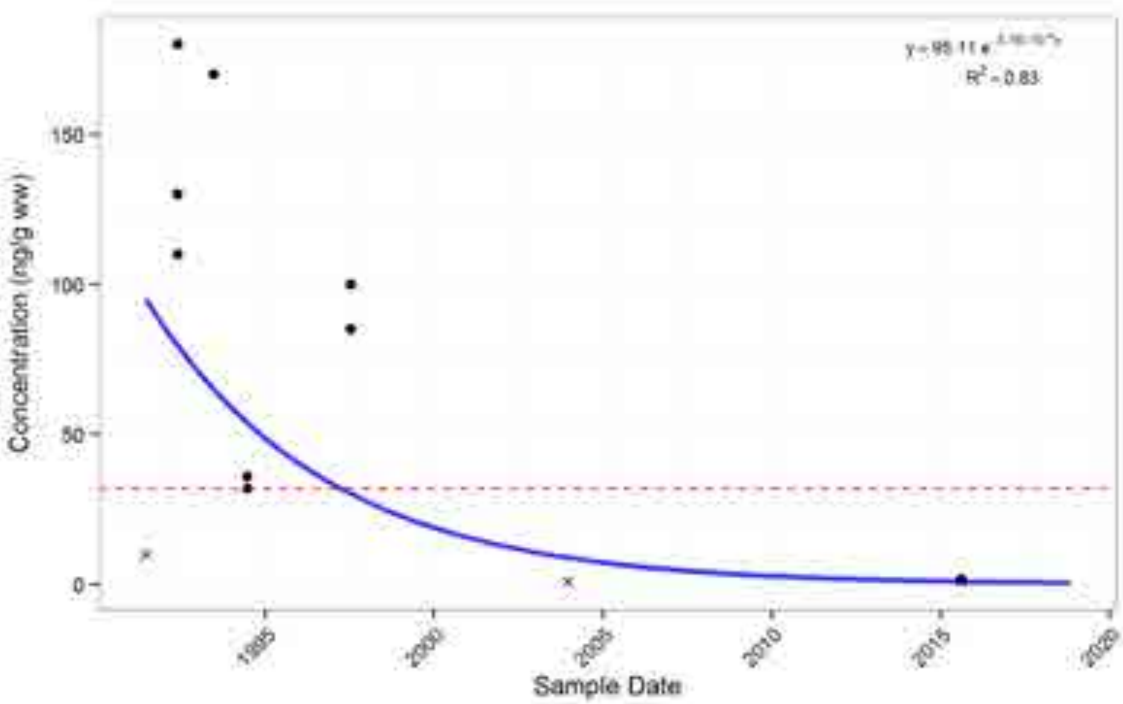

DDD in Sediment: Mugu Lagoon
$R^2 = 0.15$
Concentration (ng/kg)
100,000
10,000
1,000
1990
1995
2000
2005
2010
2015
Sample Date

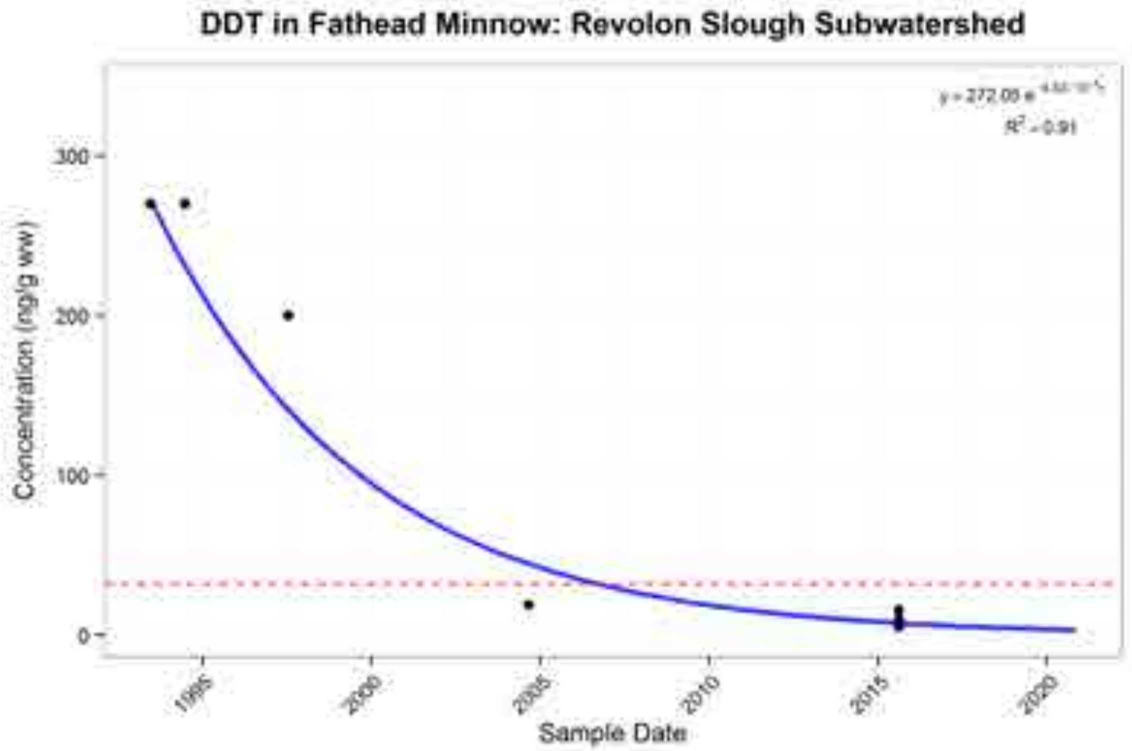

DDT in Goldfish: Calleguas Creek Subwatershed
$R^2 = 0.82$
Concentration (ng/g ww)
75
50
25
0
1985
1990
1995
2000
2005
2010
2015
Sample Date

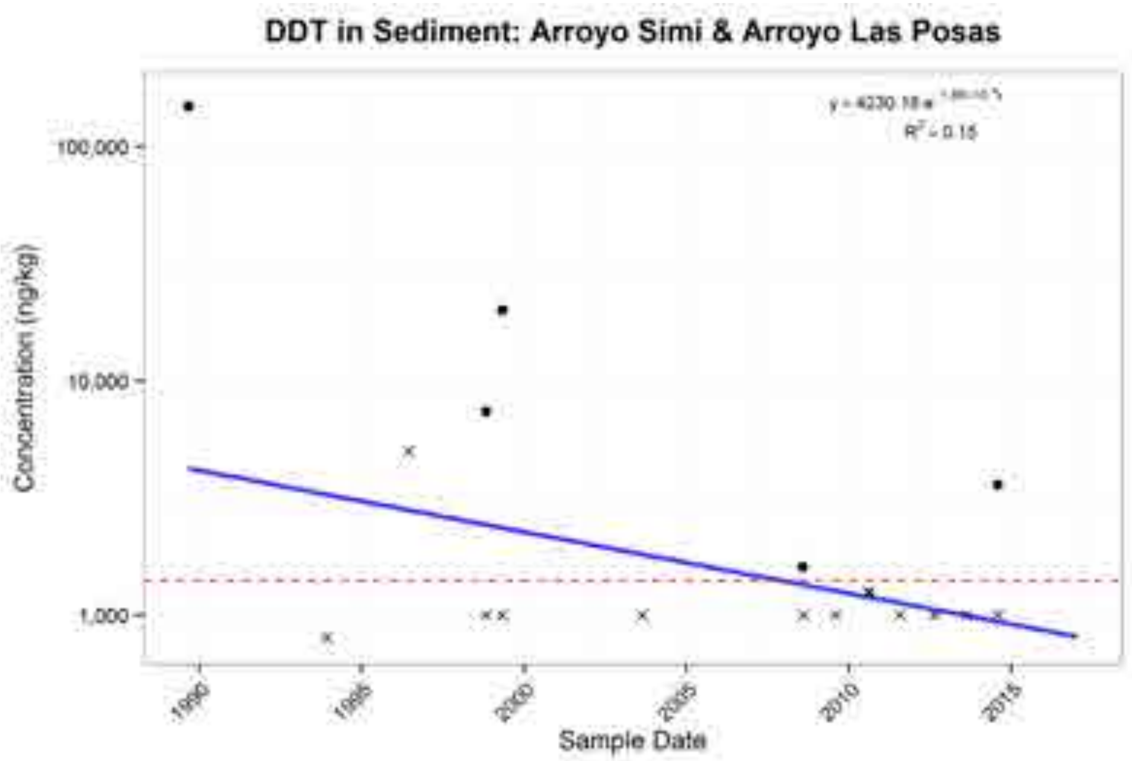
**DDT in Goldfish: Revolon Slough Subwatershed**

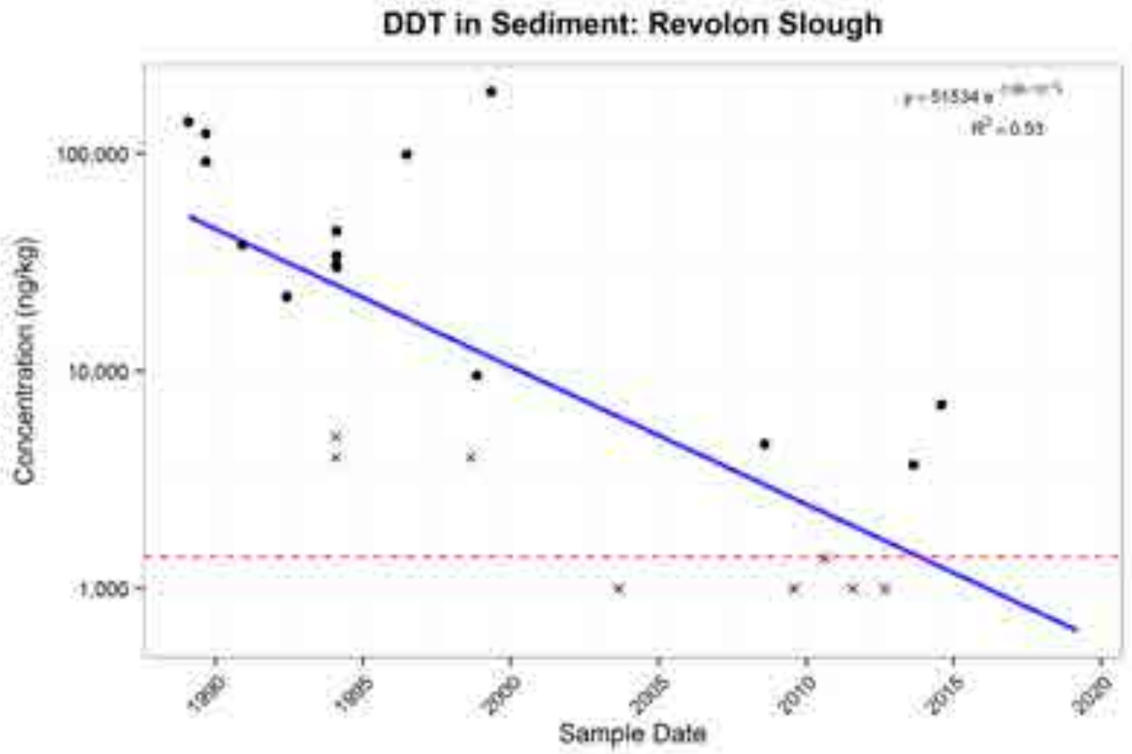


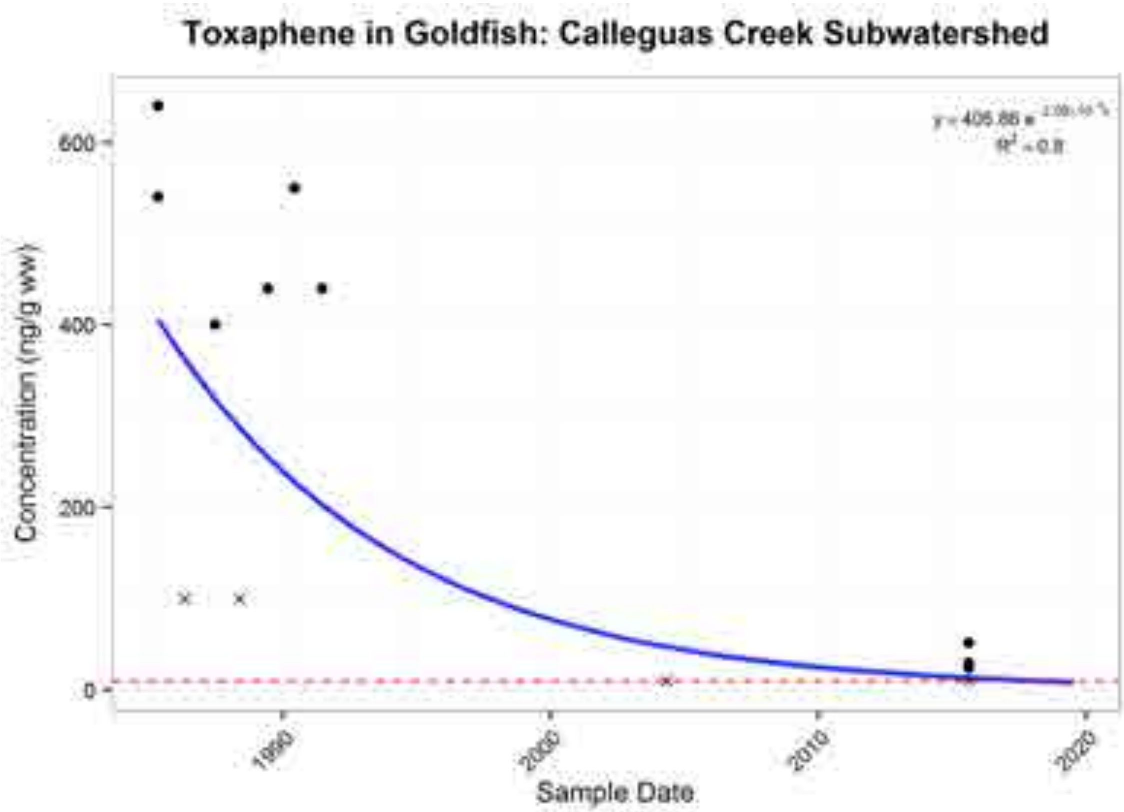

**DDT in Fathead Minnow: Calleguas Creek Subwatershed**

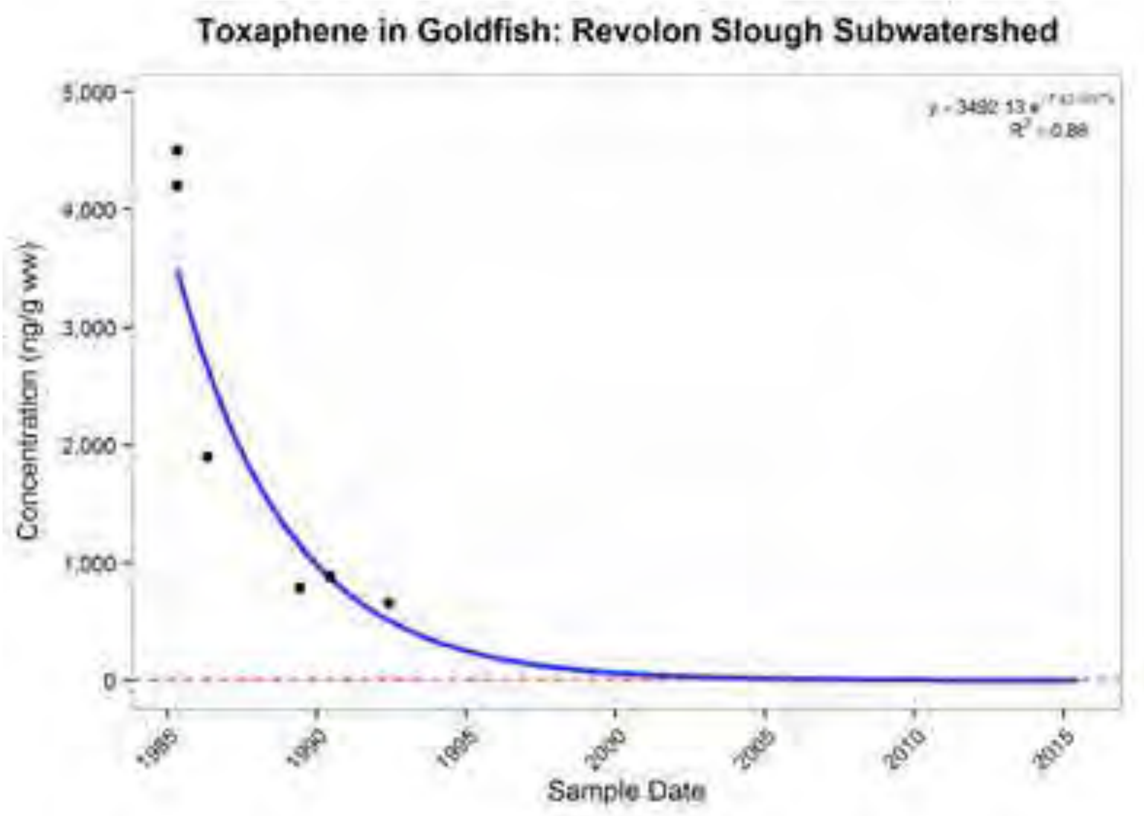



DDT in Fathead Minnow: Revolon Slough Subwatershed
y = 272.05 e
R2 = 0.91
Concentration (ng/g ww)
300
200
100
0
1995
2000
2005
2010
2015
2020
Sample Date

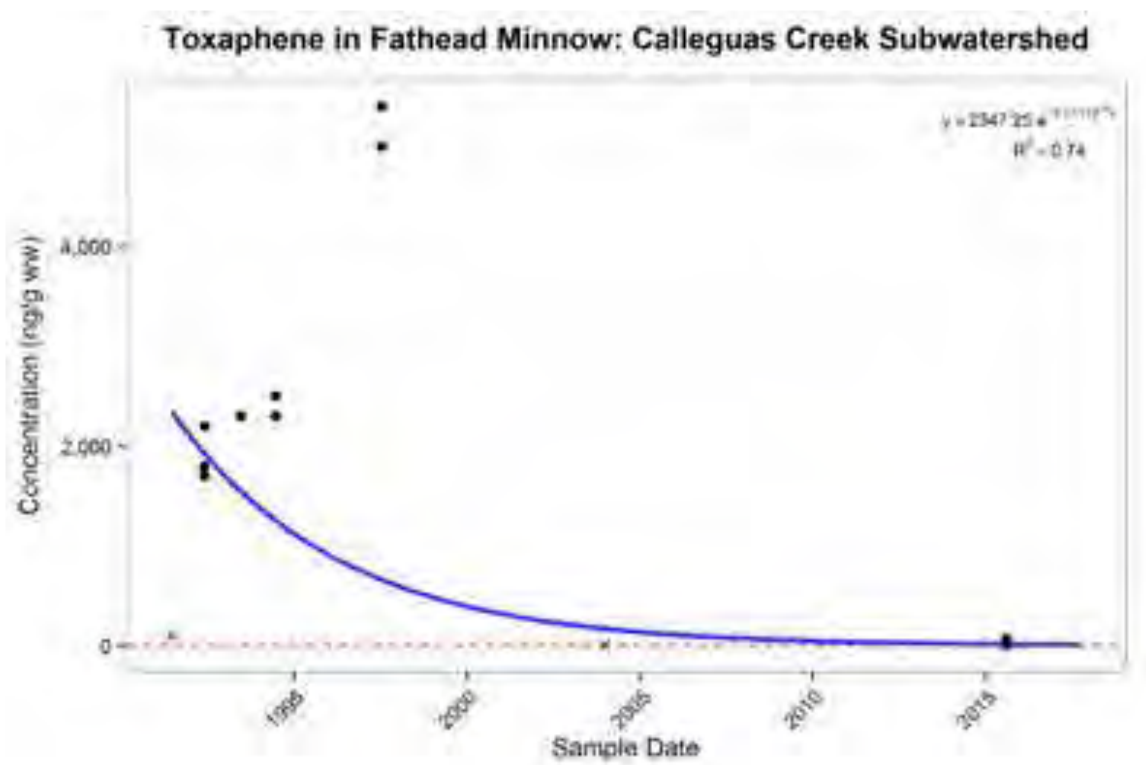

DDT in Sediment: Arroyo Simi & Arroyo Las Posas
y = 4230.18 e
R2 = 0.15
Concentration (ng/kg)
100,000
10,000
1,000
1990
1995
2000
2005
2010
2015
Sample Date


DDT in Sediment: Revolon Slough
R² = 0.53
100,000
10,000
1,000
Concentration (ng/kg)
1990
1995
2000
2005
2010
2015
2020
Sample Date


Toxaphene in Goldfish: Calleguas Creek Subwatershed
y = 406.86 e
R² = 0.8
600
400
200
0
Concentration (ng/g ww)
1990
2000
2010
2020
Sample Date

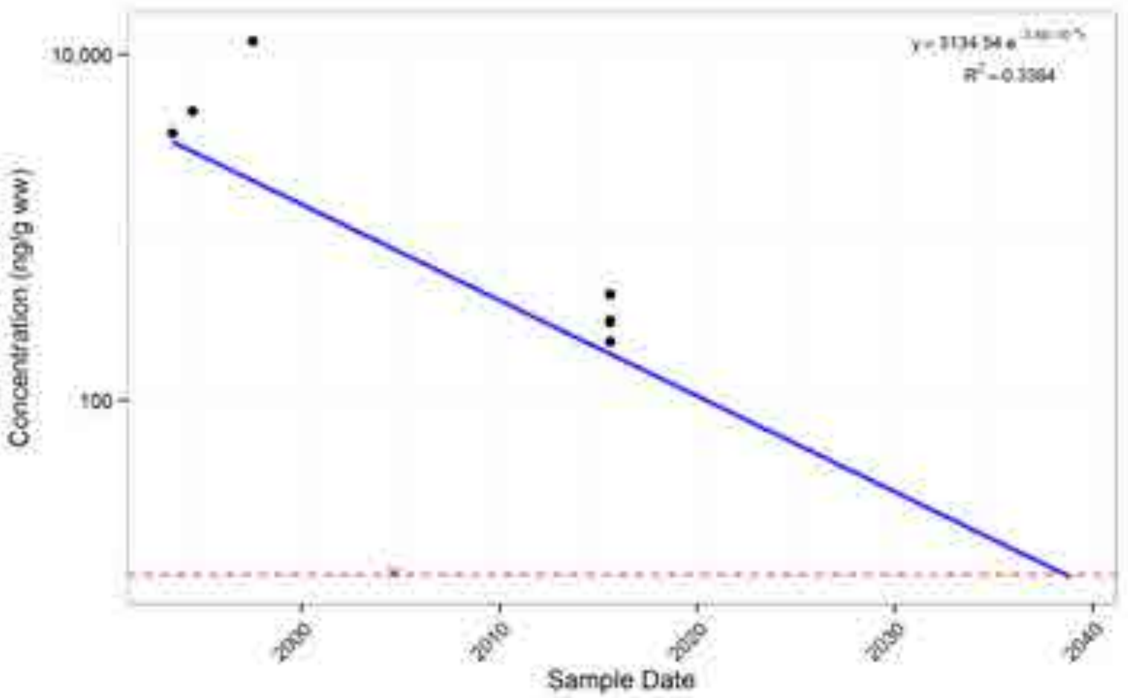


Toxaphene in Goldfish: Revolon Slough Subwatershed
$R^2$ = 0.88
5,000
4,000
3,000
2,000
1,000
0
Concentration (ng/g ww)
1985
1990
1995
2000
2005
2010
2015
Sample Date

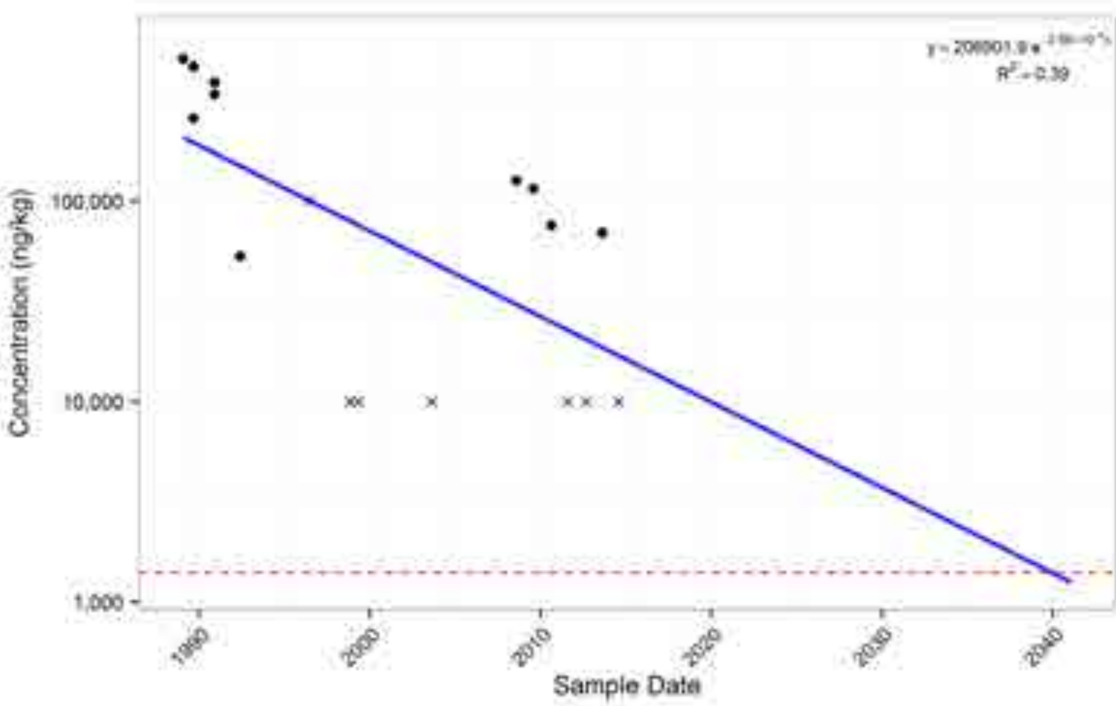



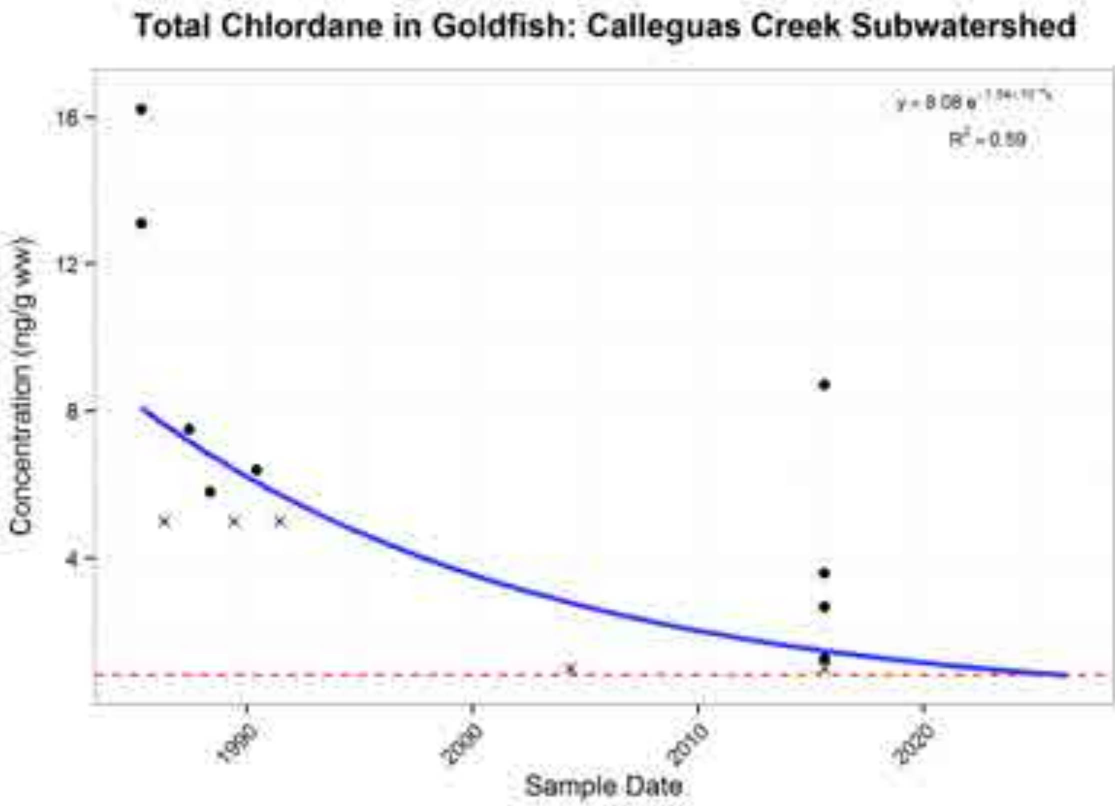
Toxaphene in Fathead Minnow: Calleguas Creek Subwatershed
y = 2347.25
$R^2$ = 0.74
4,000
2,000
0
Concentration (ng/g ww)
1995
2000
2005
2010
2015
Sample Date

**Toxaphene in Fathead Minnow: Revolon Slough Subwatershed**

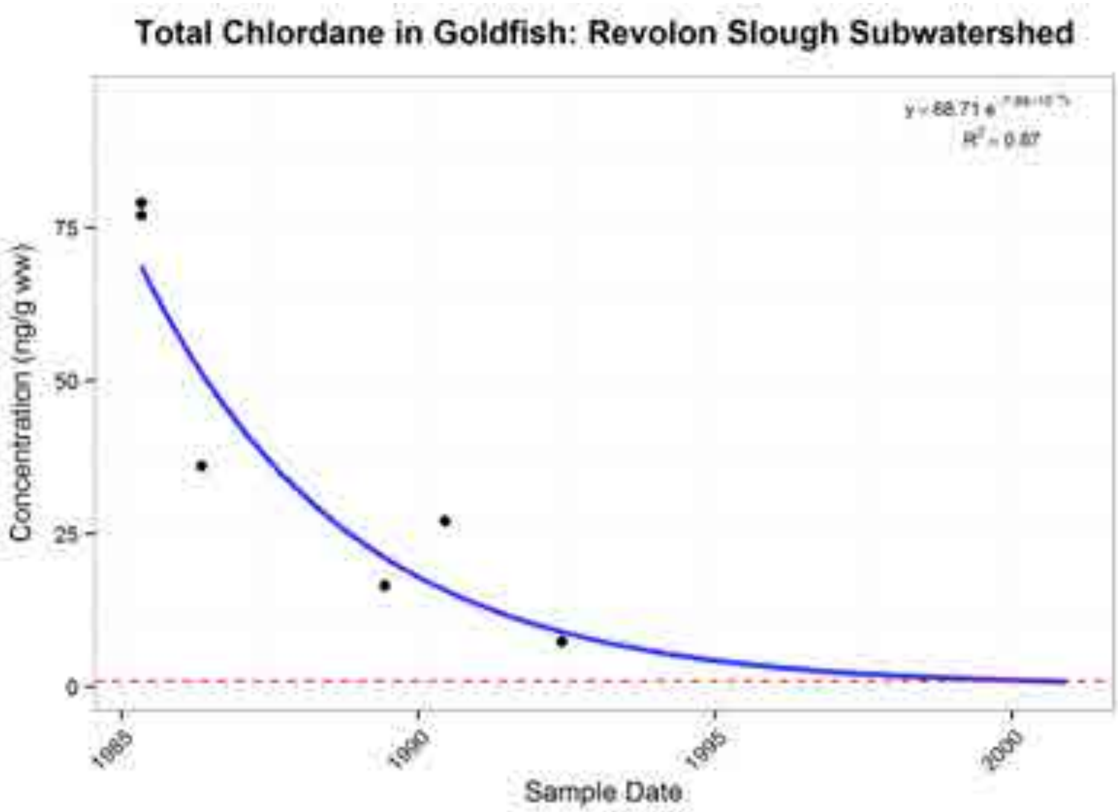



**Toxaphene in Sediment: Revolon Slough**

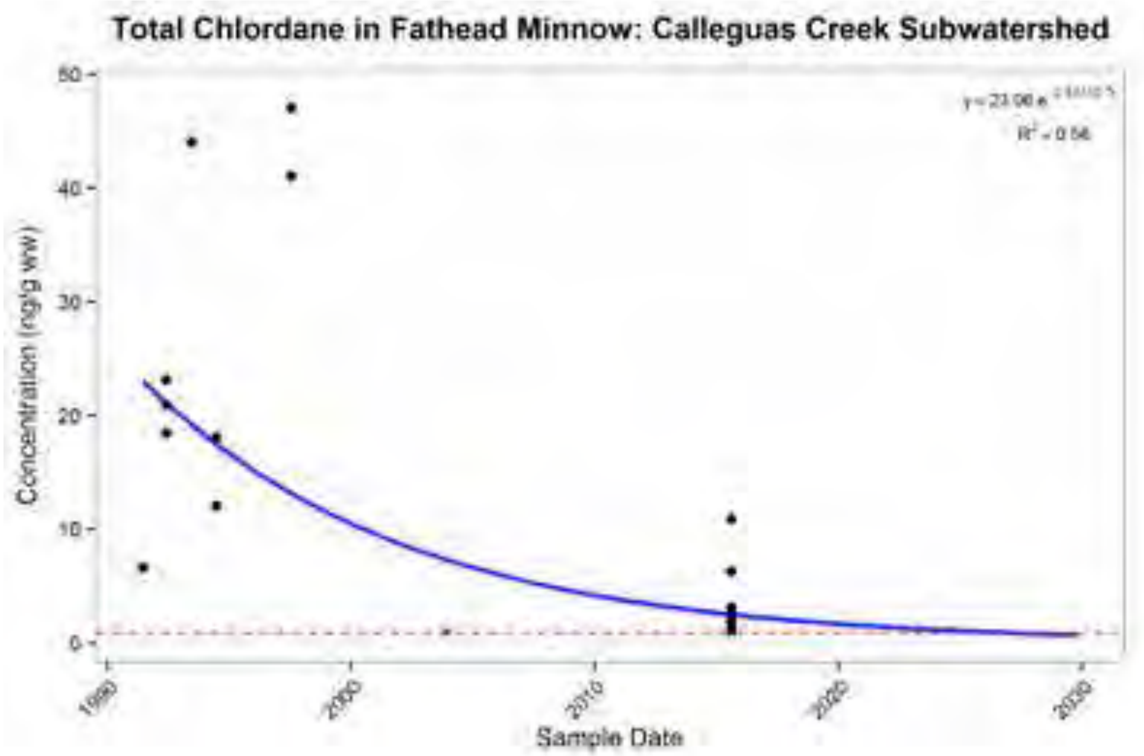


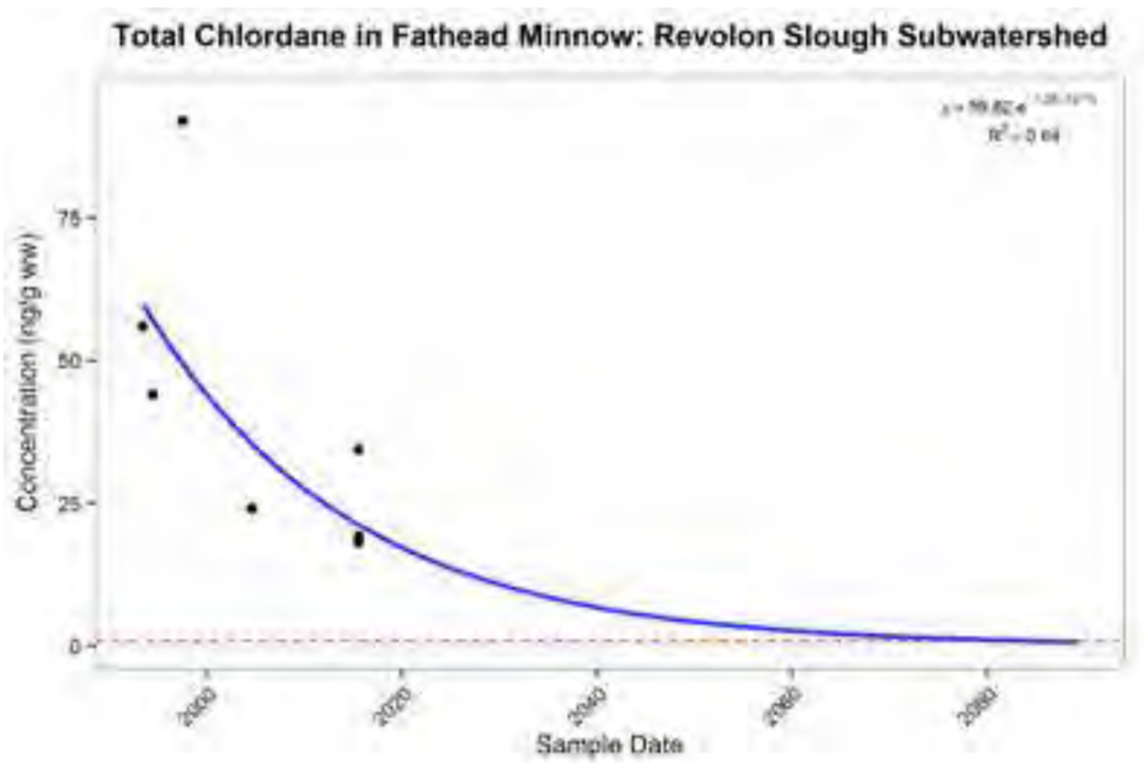


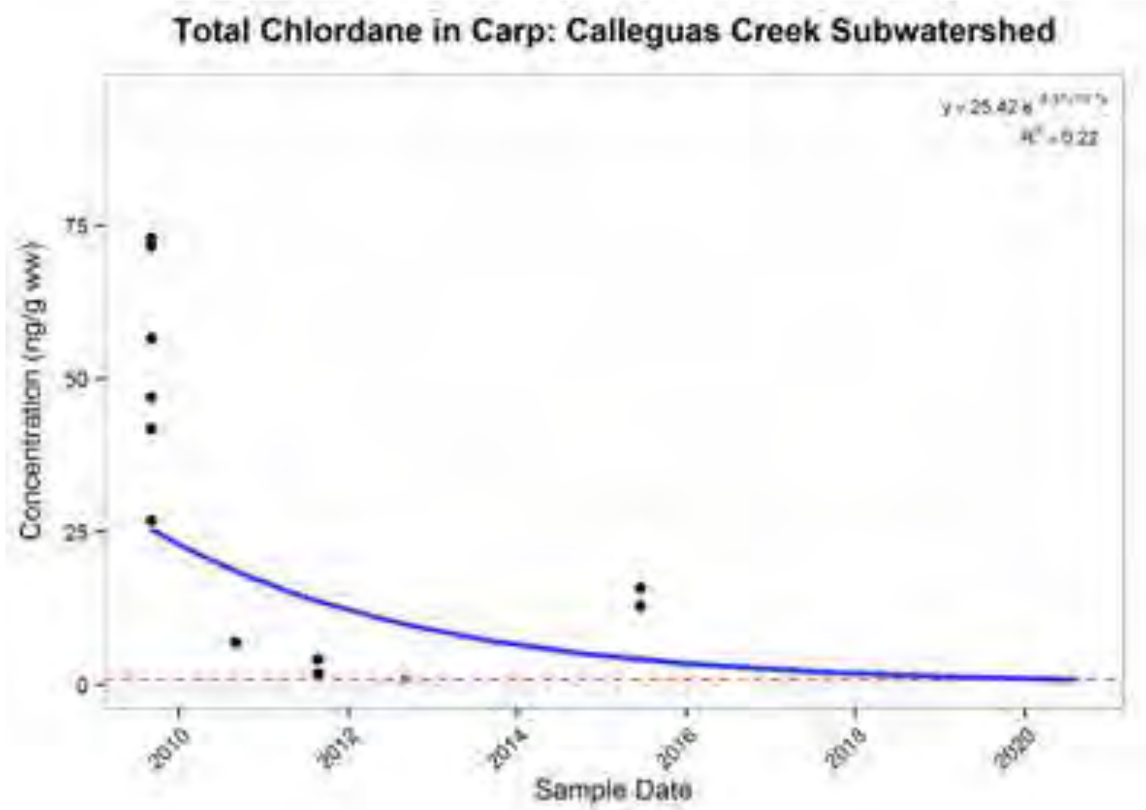
Total Chlordane in Goldfish: Calleguas Creek Subwatershed
$R^2$ = 0.59
Concentration (ng/g ww)
16
12
8
4
1990
2000
2010
2020
Sample Date

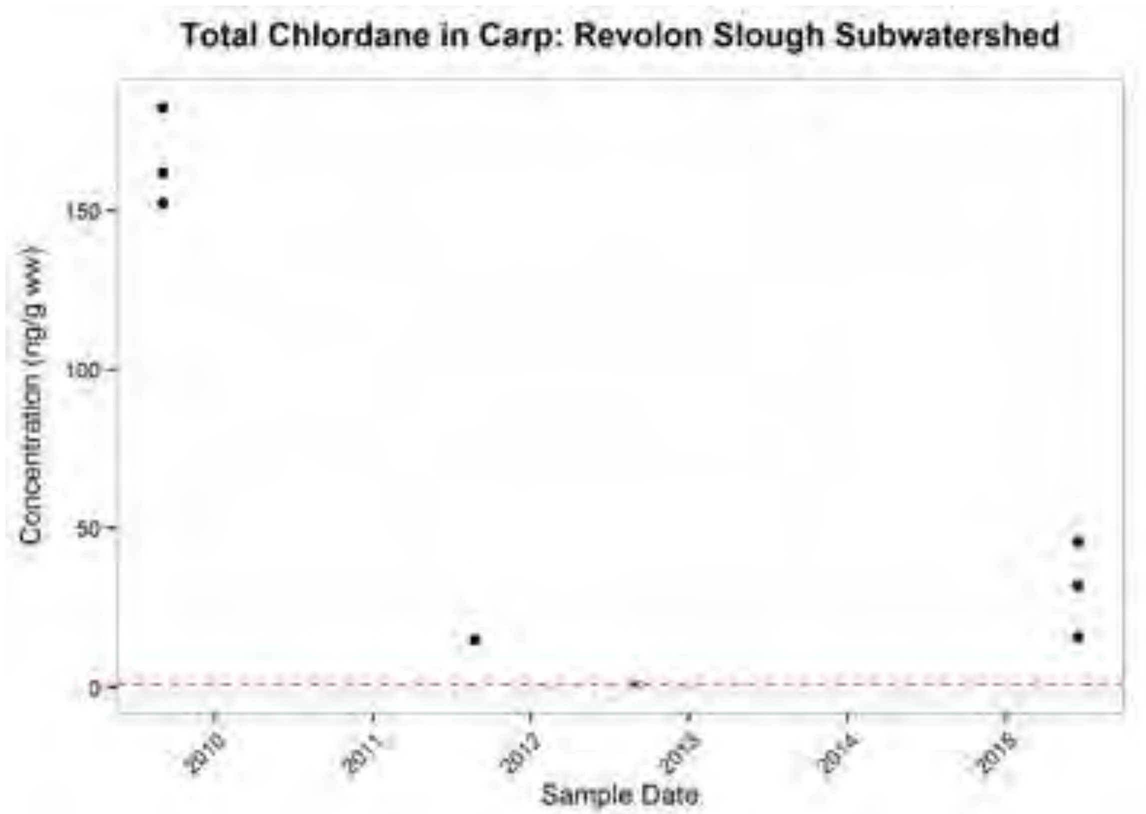



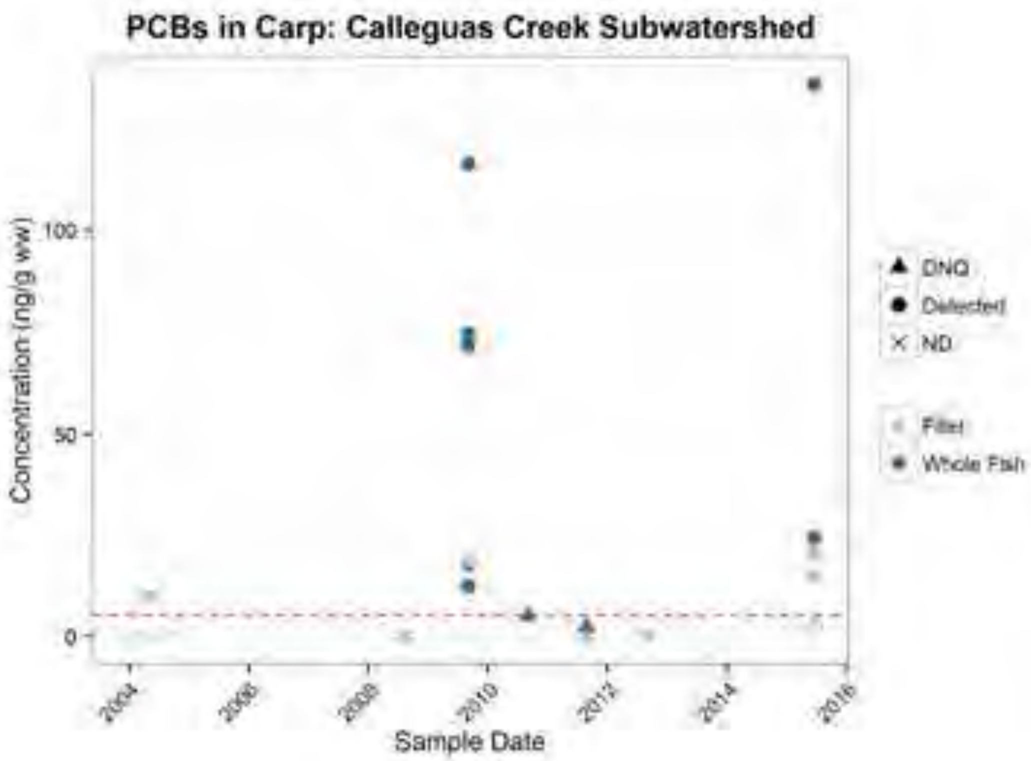
Total Chlordane in Goldfish: Revolon Slough Subwatershed
$R^2$ = 0.87
Concentration (ng/g ww)
75
50
25
0
1985
1990
1995
2000
Sample Date

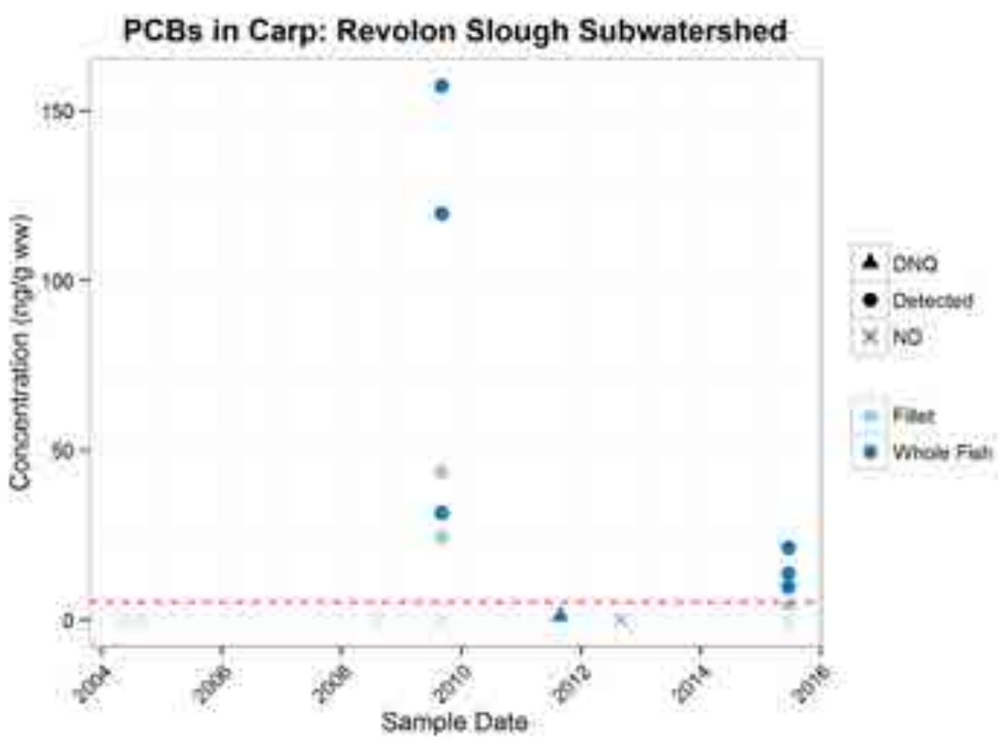

Total Chlordane in Fathead Minnow: Calleguas Creek Subwatershed
Concentration (ng/g ww)
Sample Date
0
10
20
30
40
50
1990
2000
2010
2020
2030


Total Chlordane in Fathead Minnow: Revolon Slough Subwatershed
Concentration (ng/g ww)
Sample Date
0
25
50
75
2000
2020
2040
2060
2080


Total Chlordane in Carp: Calleguas Creek Subwatershed
y = 25.42 e
$R^2$ = 0.22
Concentration (ng/g ww)
75
50
25
0
2010
2012
2014
2016
2018
2020
Sample Date


Total Chlordane in Carp: Revolon Slough Subwatershed
Concentration (ng/g ww)
150
100
50
0
2010
2011
2012
2013
2014
2015
Sample Date


PCBs in Carp: Calleguas Creek Subwatershed
Concentration (ng/g ww)
100
50
0
2004
2006
2008
2010
2012
2014
2016
Sample Date
DNQ
Detected
ND
Fillet
Whole Fish


PCBs in Carp: Revolon Slough Subwatershed
Concentration (ng/g ww)
150
100
50
0
2004
2006
2008
2010
2012
2014
2016
Sample Date
DNQ
Detected
ND
Fillet
Whole Fish

CALLEGUAS CREEK

Watershed Management Plan

A COOPERATIVE STRATEGY FOR
RESOURCE MANAGEMENT & PROTECTION

March 24, 2016

Samuel Unger
California Regional Water Quality Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013

**SUBJECT: Submittal of Calleguas Creek Watershed Organochlorine Pesticides, PCBs, and Siltation TMDL Special Study #3: Evaluation of Natural Attenuation Rates of Organochlorine Pesticides and PCBs in Calleguas Creek Watershed**

Dear Mr. Unger:

On behalf of the Stakeholders Implementing TMDLs in the Calleguas Creek Watershed (Stakeholders), I am pleased to submit a technical memorandum that presents the results of Special Study #3: Evaluation of Natural Attenuation Rates of Organochlorine Pesticides and PCBs in Calleguas Creek Watershed.

The Total Maximum Daily Load for Organochlorine Pesticides, Polychlorinated Biphenyls, and Siltation in Calleguas Creek, Its Tributaries, and Mugu Lagoon (TMDL) was adopted by the Los Angeles Regional Water Quality Control Board on July 7, 2005 and became effective on March 24, 2006 (Order No. R4-2005-010). Special Study #3 has a deadline of ten years after the TMDL effective date (i.e., March 24, 2016) and is described in the TMDL as follows:

*Evaluate natural attenuation rates and evaluate methods to accelerate organochlorine pesticide and polychlorinated biphenyl attenuation and examine the attainability of wasteload and load allocations in the Calleguas Creek Watershed.*

The submittal of the memorandum fulfills Requirement 13 of the implementation schedule for the OCs TMDL for the following Parties:.

- POTWs – Camrosa Water District, Camarillo Sanitary District, Ventura County Waterworks District No. 1, and the Cities of Simi Valley and Thousand Oaks;
- Urban Dischargers – Cities of Simi Valley, Thousand Oaks, Camarillo, Moorpark, and Oxnard, Ventura County Watershed Protection District, and the County of Ventura Public Works Agency;
- Agricultural Dischargers consisting of the entities represented by the Ventura County Agricultural Irrigated Lands Group (VCAILG) within the Calleguas Creek Watershed, a subdivision of the Farm Bureau of Ventura County; and
- Other dischargers consisting of U.S. Department of Navy and Caltrans.

The TMDL established fish tissue concentration targets for total PCBs and a suite of 15 OCPs, and established interim and final waste load allocations (WLAs) for POTW effluent and urban discharges, and load allocations (LAs) for agricultural discharges, for "Category 1" constituents (chlordane, DDT, DDD, DDE, toxaphene, PCBs and dieldrin). The allocations for urban dischargers and irrigated agriculture were established as concentrations in bottom sediment in receiving waters. The allocations for POTWs were established as concentrations in effluent. The TMDL schedule provided 20 years after the TMDL effective date for attainment of final WLAs and LAs (i.e., March 24, 2026).

As part of the special study, TMDL compliance monitoring data was examined to determine the degree to which final WLAs and LAs, and TMDL fish tissue targets have already been attained in the watershed. The results indicate that the final sediment allocations have already been attained for almost all combinations of reaches and constituents. However, 4,4′-DDE concentrations in sediment exceeded the final allocation in all reaches as recently as 2013 or 2014, depending on the reach. Final WLAs for all Category 1 constituents have been attained for the three POTWs that discharge to surface water. None of the fish tissue targets for Category 1 constituents are currently met throughout the watershed, with the exception of the target for dieldrin, which has been met since 2008.

The subsequent steps taken for the special study can be summarized as follows: (1) time series analyses were performed to estimate attainment dates by which final allocations and fish tissue targets were likely to be met for all Category 1 constituents (excluding dieldrin, for which analysis was not necessary), (2) waterbody/constituent combinations were identified for which attainment of final allocations and/or fish tissue targets may occur after the TMDL deadline, and (3) methods for accelerating attenuation in the latter cases were evaluated.

The results of the special study support a prediction that attenuation of OCPs and PCBs is proceeding fast enough to lead to attainment of fish tissue targets (in freshwater reaches) and final sediment allocations by the TMDL deadline in 2026 in most cases. However, additional time may be needed to meet pertinent limits for 4,4'-DDE and toxaphene in fish tissue and sediment in Revolon Slough.

The results of the Special Study #3 can be used to support changes in the implementation schedule in the TMDL, if needed at a future date.

Sincerely,

Lucia McGovern
Chair, Stakeholders Implementing TMDLs in the Calleguas Creek Watershed

DECEMBER 15, 2015

# Calleguas Creek Watershed TMDL Compliance Monitoring Program

# Seventh Year Annual Monitoring Report – July 2014 to June 2015

## Monitoring and Reporting Program for the Nitrogen and Related Effects; Organochlorine Pesticides, Polychlorinated Biphenyls and Siltation; Toxicity; Salts; and Metals and Selenium Total Maximum Daily Loads

*submitted to:*

LOS ANGELES REGIONAL WATER QUALITY CONTROL BOARD

*prepared by:*

LARRY WALKER ASSOCIATES

*on behalf of the:*

STAKEHOLDERS IMPLEMENTING TMDLS IN THE CALLEGUAS CREEK WATERSHED

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| Attachment 4. | Chain-of-Custody Forms |

## Acronyms

| | |
|---|---|
| Ag Waiver | Conditional Waiver for Irrigated Agricultural Lands |
| AMR | Annual Monitoring Report |
| AWQMP | Agriculture Water Quality Management Plan |
| BPAs | Basin Plan Amendments |
| BMP | Best Management Practice |
| Caltrans | California Department of Transportation |
| CCW | Calleguas Creek Watershed |
| CCWTMP | Calleguas Creek Watershed TMDL Compliance Monitoring Program |
| DNQ | Detected Not Quantified |
| EC | Electrical Conductivity |
| EST | Estimated |
| GSQC | General Sediment Quality Constituents |
| GWQC | General Water Quality Constituents |
| LA | Load Allocation |
| MOA | Memorandum of Agreement |
| MDL | Method Detection Limit |
| NA | Not Applicable |
| ND | Not Detected |
| NS | Not Sampled |
| OC | Organochlorine |

| | |
|---|---|
| OP | Organophosphorus |
| PCBs | Polychlorinated Biphenyls |
| POTWs | Publically-Owned Treatment Works |
| QA | Quality Assurance |
| QAPP | Quality Assurance Project Plan |
| QC | Quality Control |
| RL | Reporting Limit |
| SOPs | Standard Operating Procedures |
| TDS | Total Dissolved Solids |
| TIE | Toxicity Identification Evaluation |
| TKN | Total Kjehdahl Nitrogen |
| TMDL | Total Maximum Daily Load |
| TOC | Total Organic Carbon |
| TSS | Total Suspended Solids |
| VCAILG | Ventura County Agricultural Irrigated Lands Group |
| WLA | Wasteload Allocation |

# Executive Summary

The purpose of this annual report is to document the seventh-year monitoring (July 2014 to June 2015) efforts and results of the Calleguas Creek Watershed (CCW) Total Maximum Daily Load (TMDL) Compliance Monitoring Program (CCWTMP) for the five TMDLs covered by the Quality Assurance Project Plan (QAPP). This annual report includes summaries of the sampling events, data summaries, and a compliance comparison.

## TOTAL MAXIMUM DAILY LOADS

There are six TMDLs currently effective and being implemented in the Calleguas Creek Watershed. They include:

- Nitrogen Compounds and Related Effects in Calleguas Creek (Nitrogen or Nutrients TMDL)
- Organochlorine (OC) Pesticides, Polychlorinated Biphenyls (PCBs) and Siltation in Calleguas Creek, its Tributaries, and Mugu Lagoon (OC Pesticides TMDL)
- Toxicity, Chlorpyrifos, and Diazinon in the Calleguas Creek, its Tributaries and Mugu Lagoon (Toxicity TMDL)
- Metals and Selenium in Calleguas Creek, its Tributaries, and Mugu Lagoon (Metals TMDL)
- Revolon Slough and Beardsley Wash Trash TMDL (Trash TMDL)[1]
- Boron, Chloride, Sulfate and TDS (Salts) in the Calleguas Creek, its Tributaries and Mugu Lagoon (Salts TMDL)

To address the monitoring requirements of the TMDLs, the CCWTMP was established and a QAPP developed and approved by the Los Angeles Regional Water Quality Control Board (Regional Water Board) Executive Officer. The QAPP currently addresses monitoring requirements for the Nitrogen, OC Pesticides, Toxicity, Metals, and Salts TMDLs. The Trash TMDL is addressed through a separate monitoring plan and annual monitoring report.

## PROJECT ORGANIZATION

The CCWTMP is a coordinated effort with the various responsible parties that make up the Stakeholders Implementing TMDLs in the Calleguas Creek Watershed (Stakeholders). Stakeholders identified in the TMDLs have developed a Memorandum of Agreement (MOA) that outlines an agreement to implement the CCWTMP.

The stakeholders to the MOA, for which this report fulfills the TMDL monitoring requirements, are as follows:

- **POTWs**: consisting of Camrosa Water District, Camarillo Sanitary District, Ventura County Waterworks District No. 1, and the Cities of Simi Valley and Thousand Oaks;

[1] Information related to the Revolon Slough and Beardsley Wash Trash TMDL is not part of this report. The Trash TMDL annual report was submitted to the Regional Water Board on December 15, 2014.

- **Urban Dischargers**: consisting of the Cities of Simi Valley, Thousand Oaks, Camarillo, Moorpark and Oxnard, Ventura County Watershed Protection District, and the County of Ventura Public Works Agency;
- **Agricultural Dischargers**: consisting of the entities represented by the Ventura County Agricultural Irrigated Lands Group (VCAILG) within the Calleguas Creek Watershed, a subdivision of the Farm Bureau of Ventura County; and
- **Other Dischargers**: consisting of the U.S. Department of Navy and Caltrans.

## MONITORING EVENT SUMMARIES

Sampling events required by the Nitrogen, OC Pesticides, Toxicity, Metals, and Salts TMDLs during the seventh year of TMDL monitoring included four dry-weather events (Events 44, 45, 48, and 49) and two wet weather events (Events 46 and 47). Grab samples for salts were obtained during these events, but were not used directly to determine compliance at receiving water sites.[2] A summary of Events 44 through 49 is included in Table ES-1.

**Table ES - 1. Summary of Year 7 Monitoring Events**

| Event | Type | Date | Mugu Lagoon | | | Freshwater Sites | | |
|---|---|---|---|---|---|---|---|---|
| | | | Water Quality | Sediment Quality & Toxicity | Tissue | Water Quality & Toxicity | Sediment Quality & Toxicity | Tissue |
| 44 | Dry | Aug 2014 | X | X | X | X | X | |
| 45 | Dry | Nov 2014 | X | | | X | | |
| 46 | Wet | Dec 2014 | X | | | X | | |
| 47 | Wet | Dec 2014 | X | | | X | | |
| 48 | Dry | Feb 2015 | X | | | X | | |
| 49 | Dry | May 2015 | X | | X | X | | X[1] |

1. Fish tissue collected in June 2015 as part of Event 49.

## COMPLIANCE SUMMARY

For the most part, the CCW is in compliance with the applicable interim or final waste load allocations (WLAs) and load allocations (LAs) currently in effect for the Nutrients, OC Pesticides, Toxicity, Metals, and Salts TMDLs. The following observations summarize the compliance status with these TMDL allocations:

- One exceedance of the interim WLA for 4,4'-DDT occurred this monitoring year.
- Exceedances of numeric targets for Nitrate-N and Nitrate-N + Nitrite-N were observed in Mugu Lagoon, Revolon Slough, Beardsley Wash, Calleguas Creek, Arroyo Las Posas, and Arroyo Simi. Most of the exceedances occurred during dry events. No exceedances of final nutrient WLAs were measured at any POTW.

[2] Grab samples for salts at receiving water compliance sites are used to develop statistical relationships between specific conductivity (EC) and salt constituents, which are in turn used to convert high-density EC data from continuous monitors in the field to time series of salt concentrations.

- Four exceedances of the final MS4 WLAs for chlorpyrifos were measured at receiving water sites during the dry weather; however, there were no exceedances of the interim LAs. There were 12 exceedances of the final MS4 chlorpyrifos WLA during wet weather and one instance where the chlorpyrifos concentration was above the final MS4 WLA and the interim LA. In addition, there was one instance where the diazinon final MS4 WLA and interim LA were exceeded during dry weather. There were no exceedances of the final WLAs for chlorpyrifos or diazinon at any POTW.
- Exceedances of both the interim LA and MS4 WLA for total selenium were measured at the 04_WOOD receiving water monitoring station in Revolon Slough during the four dry weather sampling events.
- Toxicity was observed at some locations in the watershed and Toxicity Identification Evaluations (TIEs) were initiated for all samples meeting the requirements in the QAPP. As a result, the Stakeholders are in compliance with the toxicity WLAs and LAs per the requirements of the TMDL.
- In general, receiving water sites were in compliance with interim LAs and MS4 WLAs established by the Salts TMDL; the only exception being exceedances of total dissolved solids, sulfate, and boron measured at 04_WOOD in the Revolon Slough watershed. POTWs are in compliance with interim salts WLAs, with the exception of the Camarillo Water Reclamation Plant (WRP), which experienced exceedances of chloride, sulfate, and total dissolved solids (TDS). The exceedances of interim salts WLAs for the Camarillo WRP have resulted from increased influent salt concentrations due to water conservation and a shift in the composition of the water supplied within the service area. Since the process for addressing salts is a watershed effort involving significant capital investments, the Camarillo WRP has received a time schedule order to adjust the interim limits for TDS and sulfate. During the last monitoring year, application of interim limits for chloride was stayed by State Board Order 2003-0019. As a result, the interim limits in the TMDL are not the currently applicable interim limits for the Camarillo WRP discharge.

## MONITORING PROGRAM CHANGES

A revised QAPP was submitted to the Los Angeles Regional Water Quality Control Board (Regional Water Board) in December 2014. Although official approval of the revised QAPP has not yet been received by the Stakeholders, monitoring for the 2015-2016 monitoring year is being conducted per the revised QAPP under the assumption that no response from the Regional Water Board indicated there were no requested changes to the revised QAPP. The QAPP was updated to incorporate the Salts TMDL monitoring approach. The QAPP was also updated for all constituents to reflect the recommendations identified in prior annual reports and reflect monitoring adjustments that have been implemented due to field conditions.

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# Introduction and Program Background

## INTRODUCTION

In the Calleguas Creek Watershed (CCW), the following six total maximum daily loads (TMDLs) are currently effective and include monitoring requirements in the implementation plans:

- Nitrogen Compounds and Related Effects in Calleguas Creek (Nitrogen or Nutrients TMDL)
- Organochlorine (OC) Pesticides, Polychlorinated Biphenyls (PCBs) and Siltation in Calleguas Creek, its Tributaries, and Mugu Lagoon (OC Pesticides TMDL)
- Toxicity, Chlorpyrifos, and Diazinon in the Calleguas Creek, its Tributaries and Mugu Lagoon (Toxicity TMDL)
- Metals and Selenium in Calleguas Creek, Its Tributaries, and Mugu Lagoon (Metals TMDL)
- Revolon Slough and Beardsley Wash Trash TMDL (Trash TMDL) [1]
- Boron, Chloride, Sulfate and TDS (Salts) in the Calleguas Creek, its Tributaries and Mugu Lagoon (Salts TMDL)

To address the monitoring requirements of the TMDLs, the Calleguas Creek Watershed TMDL Compliance Monitoring Program (CCWTMP) was established and a Quality Assurance Project Plan (QAPP) developed by the Stakeholders Implementing TMDLs in the Calleguas Creek Watershed (Stakeholders) and approved by the Los Angeles Regional Water Quality Control Board (Regional Water Board) Executive Officer.  The QAPP currently addresses monitoring requirements for the Nitrogen, OC Pesticides, Toxicity, Salts, and Metals TMDLs. The Trash TMDL is addressed through a separate monitoring plan and annual monitoring report.

A monitoring approach (Salts Plan) for the Salts TMDL was submitted by the Stakeholders to the Regional Water Board in June 2009, which was conditionally approved in September 2011. Compliance monitoring for the Salts TMDL was required starting September 9, 2012.

The primary purpose of this report is to document the seventh year monitoring efforts (July 2014 to June 2015) and results of the CCWTMP for the five TMDLs included in the QAPP.  The report includes summaries of the sampling events, data summaries, and a compliance comparison.  The report is divided into the following sections:

- Introduction and Program Background
- Monitoring Program Structure
- Monitoring Data Summary
- Compliance Analysis and Discussion
- Revisions and Recommendations

---

[1] Information related to the Revolon Slough and Beardsley Wash Trash TMDL is not part of this report.  The Trash TMDL annual report will be submitted to the Regional Water Board on December 15, 2015.

In addition, there are several appendices included with this report and several attachments (electronic data files) associated with this report, including:

- Appendices (text documents)
  - Appendix A: Monitoring Event Summaries for Toxicity, OC Pesticides, Nutrients, Metals, and Salts TMDLs
  - Appendix B: Calibration Event Summary for Salts TMDL
  - Appendix C: Salts Rating Curves and Surrogate Relationships
  - Appendix D: Toxicity Testing and Toxicity Identification Evaluations Summary
  - Appendix E: Laboratory Quality Assurance/Quality Control Results and Discussion
- Attachments (electronic data files)
  - Attachment 1: Toxicity Data
  - Attachment 2: Monitoring Data
  - Attachment 3: Salts Mean Daily Flows: July 2014 to June 2015
  - Attachment 4: Chain-of-Custody Forms

## PROJECT ORGANIZATION

The CCWTMP is a coordinated effort where the various responsible parties identified in the TMDLs have developed a Memorandum of Agreement (MOA) that outlines an agreement to implement the CCWTMP. The responsible parties identified in the organizational structure have formally joined together to fulfill their monitoring requirements as outlined in the Basin Plan Amendments (BPAs) for the five TMDLs included in the QAPP.

The CCWTMP is intended to fulfill the monitoring requirements for only those stakeholders that are part of the MOA and/or identified by the participants of the MOA. The stakeholders to the MOA for which this report fulfills the TMDL monitoring requirements are as follows:

- **POTWs**: consisting of Camrosa Water District, Camarillo Sanitary District, Ventura County Waterworks District No. 1, and the Cities of Simi Valley and Thousand Oaks;
- **Urban Dischargers**: consisting of the Cities of Simi Valley, Thousand Oaks, Camarillo, Moorpark and Oxnard, Ventura County Watershed Protection District, and the County of Ventura Public Works Agency;
- **Agricultural Dischargers**: consisting of the entities represented by the Ventura County Agricultural Irrigated Lands Group (VCAILG) within the Calleguas Creek Watershed, a subdivision of the Farm Bureau of Ventura County; and
- **Other Dischargers**: consisting of the U.S. Department of the Navy and the California Department of Transportation (Caltrans).

Per the MOA, a Management Committee, consisting of one representative each from the POTWs, Urban Dischargers and Other Dischargers groups, and two representatives from the Agricultural Dischargers group, oversees the CCWTMP and makes decisions to assure the CCWTMP is carried out in a timely, accountable fashion.

Prior to the initiation of the first required sampling event in 2008, the Stakeholders contracted the day-to-day management of the CCWTMP activities and field sampling activities. The following contractors performed the following tasks during the sixth year monitoring effort:

- **General Project Management** - Larry Walker Associates, Inc. (LWA)
- **Field Monitoring Activities**
    - **Mugu Lagoon Water Quality Sampling** - MBC Applied Environmental Sciences (MBC)
    - **Freshwater Water Quality/Sediment Sampling** - Kinnetic Laboratories, Inc. (KLI), Fugro West, Inc. (Fugro), LWA
    - **Freshwater Fish Tissue –** Cardno ENTRIX
    - **Bird Egg Collection –** Naval Base Ventura County Environmental Staff
- **Water, Sediment, and Tissue Chemistry Analysis** - Physis Environmental Laboratories, Inc. (Physis)
- **Salts Chemistry Analysis -** Fruit Growers Laboratory, Inc. (FGL) and Physis
- **Toxicity Analysis** - Pacific Eco Risk Laboratories (PacEco)

The aforementioned contractors performed all the management activities and sampling efforts covered by this annual report. All field contractors are the same as used in last year's sampling efforts. As the monitoring program moves forward this list of contractors may continue to be amended to reflect new contractors hired on to perform required or new duties per the decision of the Stakeholders in the CCW.

## WATERSHED BACKGROUND

Calleguas Creek drains an area of approximately 343 square miles from the Santa Susana Pass in the east to Mugu Lagoon in the southwest. The main surface water system drains from the mountains in the northeast part of the watershed toward the southwest where it flows through the Oxnard Plain before emptying into the Pacific Ocean through Mugu Lagoon. The watershed, which is elongated along an east-west axis, is approximately thirty miles long and fourteen miles wide. The Santa Susana Mountains, South Mountain, and Oak Ridge form the northern boundary of the watershed; the southern boundary is formed by the Simi Hills and Santa Monica Mountains. Figure 1 depicts the CCW and Table 1 presents the reaches of the CCW as identified in the TMDLs covered by the CCWTMP.

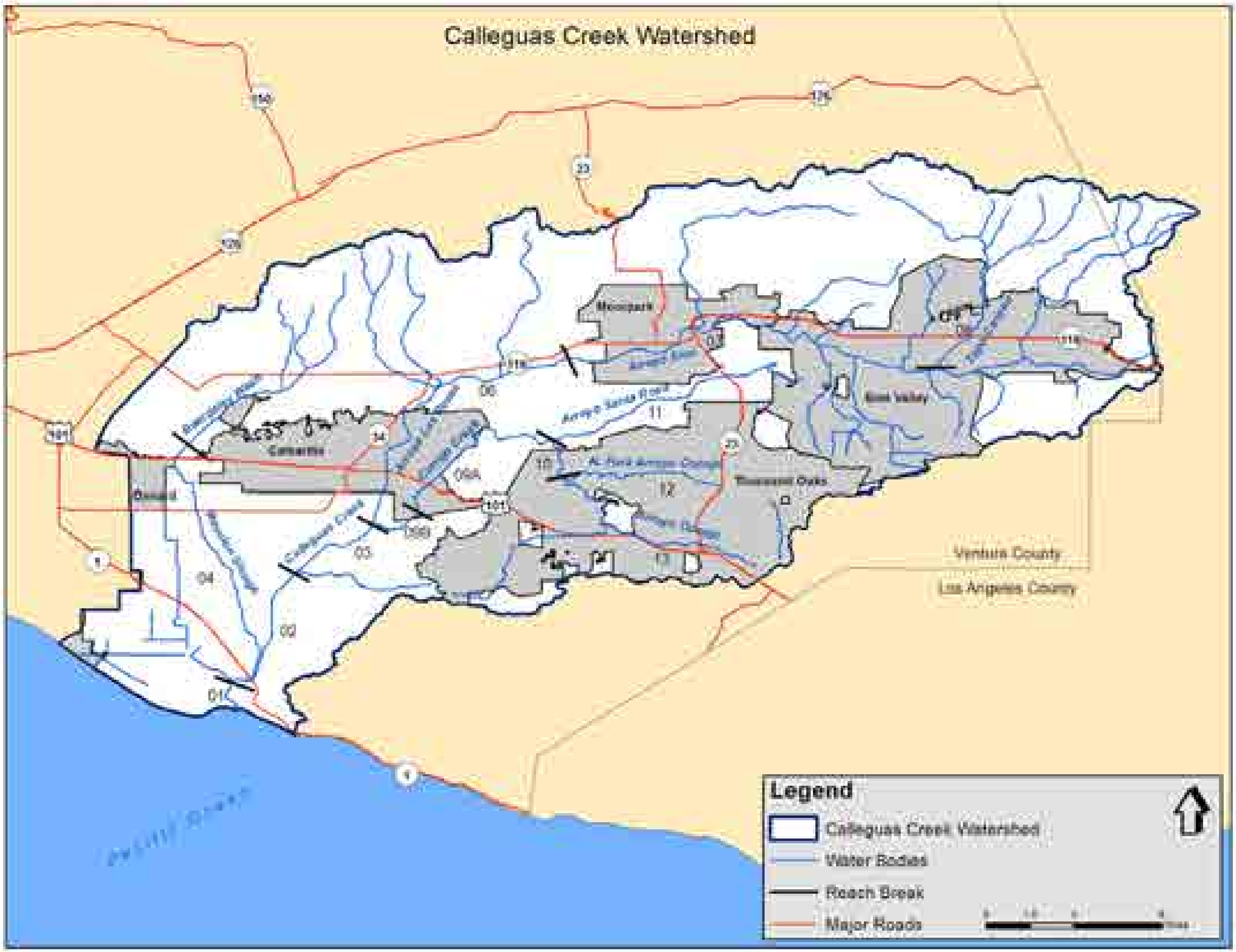



**Figure 1. Calleguas Creek Watershed**

**Table 1. Description of Calleguas Creek Watershed Reaches**

| Reach No. | Reach Name | Subwatershed | Geographic Description |
|---|---|---|---|
| 1 | Mugu Lagoon | Mugu | Lagoon fed by Calleguas Creek |
| 2 | Calleguas Creek (Estuary to Potrero Rd.) | Calleguas | Downstream (south) of Potrero Rd |
| 3 | Calleguas Creek (Potrero Rd. to Conejo Creek) | Calleguas | Potrero Rd. upstream to confluence with Conejo Creek |
| 4 | Revolon Slough | Revolon | Revolon Slough from confluence with Calleguas Creek to Central Ave |
| 5 | Beardsley Channel | Revolon | Revolon Slough upstream of Central Ave. |
| 6 | Arroyo Las Posas | Las Posas | Confluence with Calleguas Creek to Hitch Road |
| 7 | Arroyo Simi | Arroyo Simi | End of Arroyo Las Posas (Hitch Rd) to headwaters in Simi Valley. |
| 8 | Tapo Canyon Creek | Arroyo Simi | Confluence w/ Arroyo Simi up Tapo Canyon to headwaters |
| 9B [1] | Conejo Creek (Camrosa Diversion to Arroyo Santa Rosa) | Conejo | Extends from the confluence with Arroyo Santa Rosa downstream to the Conejo Creek Diversion. |
| 9A [1] | Conejo Creek (Calleguas Creek to Camrosa Diversion) | Conejo | Extends from Conejo Creek Diversion to confluence with Calleguas Creek. |
| 10 | Hill Canyon reach of Conejo Creek | Conejo | Confluence with Arroyo Santa Rosa to confluence with N. Fork; and N. Fork to just above Hill Canyon WTP |
| 11 | Arroyo Santa Rosa | Conejo | Confluence with Conejo Creek to headwaters |
| 12 | North Fork Conejo Creek | Conejo | Confluence with Conejo Creek to headwaters |
| 13 | Arroyo Conejo (South Fork Conejo Creek) | Conejo | Confluence with N. Fork to headwaters —two channels |

1. In the 2012 updates to the Los Angeles Region Basin Plan, the reach designations for 9A and 9B were switched.

## MONITORING QUESTIONS

The purpose of the CCWTMP is to direct the monitoring activities conducted to meet the requirements of the TMDLs effective for the CCW, excluding the Trash TMDL. The goals of the CCWTMP include:

- To determine compliance with numeric targets, waste load and load allocations, and interim load reduction milestones.
- To test for sediment toxicity at sediment monitoring stations.
- To identify causes of unknown toxicity.
- To generate additional land use runoff data to better understand pollutant sources and proportional contributions from various land use types.

- To monitor the effect of implementation actions by urban, POTW, and agricultural dischargers on in-stream water, sediment, fish tissue quality, and watershed balances (salts).
- To implement the program consistent with other regulatory actions within the CCW.

In addition, the CCWTMP is intended to answer the following monitoring questions to meet the goals of the program:

- Are numeric targets and allocations met at the locations indicated in the TMDLs?
- Are conditions improving?
- What is the contribution of constituents of concern from various land use types?

## MONITORING PROGRAM DESCRIPTION

The CCWTMP was developed to address all necessary TMDL monitoring requirements and answer the monitoring questions mentioned previously using the following monitoring elements.

### Required Monitoring Elements

The following environmental monitoring elements are required by the TMDLs' BPAs and are included in the CCWTMP:

- General water and sediment quality constituents;
- Water column and sediment toxicity;
- Metals and selenium in water, sediment, fish tissue, and bird eggs;
- Organic compounds in water, sediment, and fish tissue; and,
- Nitrogen and phosphorus compounds in water.
- Continuous salt concentrations and flow (the latter only at Salts TMDL receiving water compliance sites)

Table 2 lists the constituents for which analyses are conducted. Table 2 also provides a summary of sampled constituent groups and sampling frequency. The QAPP outlines, in detail, the justification of the process design, specific methodologies (both field and analytical), and quality assurance/quality control (QA/QC) procedures.

**Table 2. Constituents and Monitoring Frequency for CCWTMP (varies by site)**

| Constituent | Frequency |
|---|---|
| ***Chronic Aquatic Toxicity*** | Quarterly + Two wet events |
| ***General Water Quality Constituents (GWQC)*** | Quarterly based on location + Two wet events |
| Flow, pH, Temperature, Dissolved Oxygen, Conductivity, Total Suspended Solids (TSS), Hardness (at freshwater sites where metals samples are collected), and Dissolved Organic Carbon (at saltwater sites where metals samples are collected) | |
| ***Nutrients*** | Quarterly + Two wet events |
| Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Organic Nitrogen, Total Kjehdahl Nitrogen (TKN), Total Phosphorus, Orthophosphate-P | |
| ***Organic Constituents In Water*** | Quarterly + Two wet events |
| OC Pesticides [1] and PCBs [2], OP [3], Triazine [4], and Pyrethroid [5] Pesticides | |
| ***Metals and Selenium In Water*** [6] | Quarterly + Two wet events [7] |
| Copper, Mercury, Nickel, Zinc, and Selenium [8] | |
| ***Salts*** | |
| Electrical Conductivity (EC) and Discharge | Receiving water: Continuous (via in-situ sensors for EC and depth) plus monthly grabs for EC and discharge for sensor calibration |
| Total Dissolved Solids (TDS), Sulfate, Chloride, Boron | Receiving water: Continuous (derived from EC/salt relationships)<br>Other sites: Quarterly + Two wet events |
| ***Chronic Sediment Toxicity*** | Annually<br>(Every three years in Lagoon) |
| ***General Sediment Quality Constituents (GSQC)*** | Annually<br>(Every three years in Lagoon) |
| Total Ammonia, Percent Moisture, Grain Size Analysis, Total Organic Carbon (TOC) | |
| ***Organic Constituents In Sediment*** | Annually<br>(Every three years in Lagoon) |
| OC Pesticides[1] and PCBs[2], OP Pesticides[3], and Pyrethroids[5] | |

**Table 2. Constituents and Monitoring Frequency for CCWTMP (varies by site) - continued**

| | |
|---|---|
| ***Additional Constituents For Mugu Lagoon Sediment*** | Every three years |
| Metals[9] | |
| ***Tissue*** | Annually (Every three years in Lagoon) |
| Percent Lipids, OC Pesticides[1] and PCBs[10], OP Pesticides[3], and Metals[11] | |

1. OC Pesticides considered: aldrin, alpha-BHC, beta-BHC, gamma-BHC (lindane), delta-BHC, chlordane-alpha, chlordane-gamma, 2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, dieldrin, endosulfan I and II, endosulfan sulfate, endrin, endrin aldehyde, endrin ketone, and toxaphene
2. PCBs in water and sediment considered: Aroclors identified in the CTR (1016, 1221, 1232, 1242, 1248, 1254, and 1260).
3. OP Pesticides considered: chlorpyrifos, diazinon, and malathion. Chlorpyrifos is the only OP pesticide that will be measured in tissue, as it is the only OP listed in tissue.
4. Triazine Pesticides considered: atrazine, prometryn, and simazine. Analysis of triazines ceased during year 3 following the recommendation being included in the Revisions and Recommendations section of both the year 1 and year 2 annual reports.
5. Pyrethroid Pesticides considered: bifenthrin, cyfluthrin, cypermethrin, deltamethrin, and permethrin
6. Copper, mercury, nickel, selenium and zinc will be measured as dissolved and total recoverable.
7. Per the Metals TMDL BPA requires that "In-stream water column samples will be collected monthly for analysis of general water quality constituents (GWQC) and, copper, mercury, nickel, selenium, and zinc for the first year. After the first year, the Executive Officer will review the monitoring report and revise the monitoring frequency as appropriate." Monthly monitoring will be suspended until such time as the Executive Officer has reviewed the monitoring report and considered revisions to the monitoring frequency. Until the Executive Officer has considered the frequency, metals will be collected quarterly in conjunction with the other TMDLs.
8. Monitoring at sites in Mugu Lagoon other than at the Ronald Reagan Bridge for metals is an optional element.
9. Includes arsenic, cadmium, copper, lead, mercury, nickel, selenium and zinc. Arsenic, lead, and cadmium are included in addition to constituents required in the Metals TMDL as they have been found in previous sediment studies conducted in Mugu Lagoon to exceed guideline values used to interpret the relationship between sediment chemistry and biological impacts.
10. PCBs in tissue considered: individual congers.
11. Mercury and Selenium will be measured in fish tissue and bird eggs.

## Optional Monitoring Elements

The QAPP outlines the optional monitoring efforts, all of which are considered above and beyond what is necessary to meet the requirements of the BPAs and answer the monitoring questions.

Table 3 lists the constituents and analyses that are considered optional for the CCWTMP. Monitoring for the constituents and conducting the analyses are not BPA requirements but are important to meeting general program goals and answering program questions. Table 3 also provides a general sampling frequency for each constituent group.

**Table 3. Optional Constituents and Monitoring Frequency for CCWTMP (varies by site)**

| Constituent | Frequency |
|---|---|
| ***Organic Constituents in Water – Grain Size Fractions*** [1] | One wet event annually |
| OC Pesticides and PCBs, OP, Triazine [2], and Pyrethroid Pesticides | |
| ***Organic Constituents in Sediment – Grain Size Fractions*** [1] | Annually (Every three years in Mugu Lagoon) |
| OC Pesticides and PCBs, OP, Triazine [2], and Pyrethroid Pesticides | |
| ***Additional Constituents for Mugu Lagoon Sediment*** | Every three years [3] |
| Macrobenthic community assessment | |
| Sediment Toxicity – Embryo *Mytilus edulis* or *Crassostrea gigas* | |

1. Please see Table 2 for a list of individual constituents in each suite.
2. Analysis of triazines ceased during year three following the recommendation being included in the Revisions and Recommendations section of both the year one and year two annual reports.
3. Mugu Lagoon assessments were conducted during the first and fourth years of monitoring.

## Special Studies

The Nitrogen, Toxicity, OC Pesticides, Salts, and Metals TMDL Implementation Plans identify required and optional special studies to investigate a range of issues. No specific special studies results are incorporated into this annual report summary at this time as the results of all special studies conducted to date have been submitted as separate reports. Data gathered during special study specific sampling may also be utilized to further answer not only the special studies questions, but also be applied to the overall CCWTMP goals and questions identified previously in this report.

# Monitoring Program Structure

As outlined previously, the CCWTMP covers a broad range of TMDL monitoring requirements, including both required and optional efforts. The overall structure of these requirements per each event can be broken down into two categories: (1) compliance monitoring and (2) investigation monitoring. Compliance monitoring sites are typically located in receiving water bodies where 303(d) listings occur, and are considered points of compliance measurements. The investigational sites are located throughout the watershed, and include monitoring of drain outfalls. The purpose of these sites is not to measure compliance, but to assist with evaluating land use-specific contributions of various constituents to the watershed.

The CCWTMP effort is also divided into two monitoring efforts: (1) dry weather monitoring and (2) wet weather storm water monitoring. The following sections describe, in detail, the basis for each monitoring effort, starting with the definitions of the compliance monitoring sites and investigation monitoring sites. Specific monitoring efforts associated with each sample site are included, including the frequency of sampling by site for both dry weather and wet weather events. The sampling frequency and the constituents monitored for at the sites covered by the CCWTMP vary. A more detailed description of each topic covered can be found in the appropriate element of the QAPP, including standard operating procedures (SOPs) for field collection and sample handing techniques, and analytical procedures and protocols including minimum detection limit (MDL) and reporting limit (RL) requirements.

## COMPLIANCE MONITORING

### Compliance Monitoring for Toxicity, OC Pesticides, Metals, Nitrogen, and Salts TMDLs

For compliance monitoring to address the Toxicity, OC Pesticides, Metals and Nitrogen TMDLs, dry weather in-stream water column samples were collected quarterly for water column toxicity, general water quality constituents (GWQC), target organic constituents, metals, and nutrients. Target organic constituents for the OC Pesticides TMDL include the OC Pesticides and PCBs listed as a footnote in Table 2. Target organic constituents for the Toxicity TMDL include the OP and pyrethroid pesticides listed as a footnote in Table 2. Target metals for the Metals and Selenium TMDL are listed as a footnote in Table 2.

In-stream water column samples to measure compliance for the Toxicity, OC Pesticides, and Metals TMDLs are generally collected at the base of each of the subwatersheds used to assign waste load and load allocations, per the BPAs.[1] In-stream water column samples to measure compliance for the Nitrogen TMDL are generally collected at the base of each listed reach. Toxicity Identification Evaluations (TIEs) are conducted on toxic samples as outlined in the Toxicity Testing and TIE section of the QAPP and results of these are discussed in the Toxicity Testing and TIE Evaluations Summary section of this report.

In-stream water column grab samples for salts were also collected quarterly during dry weather and twice during wet weather at the base of each of the subwatersheds specified in the Salts

[1] The QAPP includes an optional metals monitoring element to monitor additional sites in Mugu Lagoon.

TMDL.[2] The grab sample results are used to develop statistical relationships between salt constituents and EC. These relationships are used to convert high frequency EC-sensor data to time-series of salt concentrations. Compliance with interim dry weather salt allocations is determined using monthly mean salt concentrations for dry weather developed from the time-series of data.

Additionally, POTW effluent was monitored for compliance with the effluent limits presented in the Toxicity, OC Pesticides, Metals, and Salts TMDL BPAs. Currently, POTWs collect data required by each of their individual monitoring requirements. For additional TMDL constituents not currently sampled by the plants, CCWTMP crews perform sampling as necessary (efforts vary by plant and constituent group). All CCWTMP-required data for POTWs are compiled in this report.

All efforts are made to include two wet weather water sampling events for compliance monitoring for the OC Pesticides, Toxicity, Metals, and Salts TMDLs during targeted storm events between October and April. Two wet weather events were completed in December 2014.

Streambed sediment samples, collected annually in the freshwater portion of the watershed, were collected during the first event of this monitoring year and analyzed for sediment toxicity, general sediment quality constituents (GSQC), and target organics. Sediment samples in Mugu Lagoon are collected every three years per the approved QAPP. Sediment samples were collected during year seven and the data are presented in this report.

Similar to the sediment sampling frequency, fish tissue samples were collected in the freshwater portions of the watershed in June 2015, and will continue to be collected annually for the CCWTMP. In addition, fish tissue and mussel samples were collected in Mugu Lagoon during year seven and the data are presented in this report.

## INVESTIGATION MONITORING

Investigation monitoring focuses on identifying the contribution of constituents of concern from various land uses in the watershed and areas where toxicity has been observed to occur in the past that are not addressed by compliance monitoring. These sites are meant to compliment compliance monitoring efforts, fill data gaps where identified, and assist in identification of sources of constituents that may be leading to non-compliant conditions. The following describes the various types of investigation sites sampled during this reporting period.

### Land Use Discharge Investigation

Land use discharge samples are generally collected concurrently (on the same day when possible) with compliance monitoring at representative agricultural and urban discharge sites generally located in each of the subwatersheds and analyzed for selected GWQC, metals, and target organic constituents (constituents monitored per site varies based upon sub-watershed).

[2] The goal is to sample two wet weather events per monitoring year; however, only one storm was predicted that met the thresholds for monitoring.

## Toxicity Investigation

As significant mortality had not occurred at the two sediment toxicity investigation sites during the first three years of the CCWTMP, ceasing investigation monitoring was recommended in the third year annual report. Toxicity testing at the investigation sites ceased until event 38, when it was resumed to support delisting of the identified reaches. The normal annual sampling frequency for this investigation is provided in Table 6.

Sediment toxicity investigation monitoring for delisting occurred during Event 44. Water column toxicity sampling occurred during all events. In addition, the year-seven samples were analyzed for a suite of constituents (general chemistry, general nutrients, metals, PCBs, OC pesticides, OP pesticides, and pyrethroid pesticides), particle size distribution, and total organic carbon.

## SAMPLING SITES

The QAPP details the justification and rationale for each of the sites sampled via the CCWTMP. Information on compliance monitoring sites, land use sites, and sample collection frequency is presented in Table 4 and Table 5 below. The general locations of the receiving water compliance monitoring sites (excluding Mugu Lagoon) for water, sediment, and fish tissue are presented in Figure 2 through Figure 4. The POTW effluent discharge sites are presented in Figure 5. The sampling sites in each figure are designated by sampled constituent group. The compliance monitoring sampling zones for sediment sampling and tissue sampling in Mugu Lagoon are shown in Figure 6 and Figure 7, respectively.

The non-Mugu Lagoon water and sediment toxicity investigation sampling sites coincide with current and previous sampling programs in the CCW. Water and sediment toxicity investigation sampling sites and sampling frequency are presented in Table 6, while the general locations of the water and sediment toxicity investigation sampling sites in the CCW are presented in Figure 8. Land use monitoring sites are shown in Figure 9.

The salt monitoring sites correspond with compliance sites or land use sites used for monitoring related to other TMDLs (Figure 2) with two exceptions:

1. One of the salt compliance points is only used for salt monitoring (Conejo Creek at Baron Brothers Nursery).
2. The continuous monitoring equipment (and the location of salt grab samples) for the Simi subwatershed was installed just downstream of the Tierra Rejada bridge, and is referred to as “07_TIERRA”.

The CCWTMP efforts summarized in the annual report correspond to the sites and locations listed below. As this program progresses, the number and location of sites may be revised if existing sites become inaccessible, if it is determined that alternative locations are needed, or if the number of land use stations needed to appropriately characterize discharges needs modification.

**Table 4. CCWTMP Compliance Monitoring and Nutrient Investigation Sites Annual Sampling Frequency**

| Sub-Wat. | Site Id | Reach | Site Location | GPS Coordinates | | Water [1, 2] | | | | | | Sediment | | | Tissue [3] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Lat | Long | Tox | Pests/ PCBs | Nut | Metal | Salts | GWQC | Tox | Pests /PCBs | Metal | Pests/ PCBs | Metal [4] |
| Mugu Lagoon | 01_RR_BR | 1 | Ronald Reagan St Bridge | 34.1090 | -119.0916 | 6 | 6 | 6 | 6 | NA | 6 | NA | NA | NA | NA | NA |
| | 01_BPT_3 | 1 | Located In Eastern Arm | General site locations are provided as each site represents a generalized sample collection zone in which a sample will be collected. | | NA | NA | NA | NA | NA | NA | Once Every Three Years | | | | |
| | 01_BPT_6 | 1 | Located In Eastern Part Of Western Arm | | | NA | NA | NA | NA | NA | NA | | | | | |
| | 01_BPT_14 | 1 | Located In The Central Part Of The Western Arm | | | NA | NA | NA | NA | NA | NA | | | | | |
| | 01_BPT_15 | 1 | Located Between Estuary and Mouth of Lagoon | | | NA | NA | NA | NA | NA | NA | | | | | |
| | 01_SG_74 | 1 | Located In Western Part of Central Lagoon | | | NA | NA | NA | NA | NA | NA | | | | | |
| | Central Lagoon | 1 | Sampled In Central Lagoon | | | NA | NA | NA | NA | NA | NA | | | | Once Every Three Years | |
| | Western Arm | 1 | Sampled In Western Arm Of The Lagoon | | | NA | NA | NA | NA | NA | NA | | | | | |
| Revolon Slough | 04_WOOD [5] | 4 | Revolon Slough East Side Of Wood Road | 34.1698 | -119.0958 | 6 | 6 | 6 | 6 | 6 | 6 | 1 | 1 | NA | 1 | 1 |
| | 05_CENTR | 5 | Beardsley Wash at Central Avenue | 34.2300 | -119.1128 | NA | NA | 6 | NA | NA | 6 | NA | NA | NA | NA | NA |
| Calleguas | 02_PCH | 2 | Calleguas Creek NE Side of Hwy 1 Bridge | 34.1119 | -119.0818 | NA | NA | 4 | NA | NA | 4 | NA | NA | NA | NA | NA |
| | 03_UNIV | 3 | Calleguas Creek At Camarillo Street | 34.1795 | -119.0399 | 6 | 6 | 6 | 6 | 6 | 6 | 1 | 1 | NA | 1 | NA |
| | 03D_CAMR [6] | 3 | Camrosa Water Reclamation Plant | 34.1679 | -119.0530 | 4 | 4 | 4 | 4 | 4 | 4 | NA | NA | NA | NA | NA |
| | 9A_HOWAR [7] | 9B [7] | Conejo Creek At Howard Road Bridge | 34.1931 | -119.0025 | NA | NA | 6 | NA | 6 | NA | NA | NA | NA | NA | NA |
| | 9AD_CAMA [7] | 9B [7] | Camarillo Water Reclamation Plant | 34.1938 | -119.0017 | 4 | 4 | 4 | 4 | 4 | 4 | NA | NA | NA | NA | NA |
| Conejo | 9B_ADOLF [7] | 9A [7] | Conejo Creek At Adolfo Road | 34.2137 | -118.9894 | 6 | 6 | 6 | NA | NA | 6 | NA | 1 | NA | 1 | NA |

| Sub-Wat. | Site Id | Reach | Site Location | GPS Coordinates | | Water [1, 2] | | | | | | Sediment | | | Tissue [3] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Lat | Long | Tox | Pests/ PCBs | Nut | Metal | Salts | GWQC | Tox | Pests /PCBs | Metal | Pests/ PCBs | Metal [4] |
| Conejo | 10_GATE | 10 | Conejo Creek Hill Canyon Below N Fork | 34.2178 | -118.9281 | NA | NA | 6 | NA | NA | 6 | NA | NA | NA | NA | NA |
| | 10D_HILL | 10 | Hill Canyon Wastewater Treatment Plant | 34.2113 | -118.9218 | 4 | 4 | 4 | 4 | 4 | 4 | NA | NA | NA | NA | NA |
| | 12_PARK | 12 | Conejo Creek North Fork above Hill Canyon | 34.2144 | -118.915 | NA | NA | 4 | NA | NA | 4 | NA | NA | NA | NA | NA |
| | 13_BELT | 13 | Conejo Creek S Fork Behind Belt Press Building | 34.2078 | -118.9194 | NA | NA | 4 | NA | NA | 4 | NA | NA | NA | NA | NA |
| | 9B_BARON [7] | 9A [7] | Conejo Creek at Baron Brothers Nursery | 34.2365 | -118.9643 | NA | NA | NA | NA | 6 | NA | NA | NA | NA | NA | NA |
| Las Posas | 06_SOMIS | 6 | Arroyo Las Posas Off Somis Road | 34.2540 | -118.9925 | 6 | 6 | 6 | NA | NA | 6 | NA | 1 | NA | 1 | NA |
| | 06D_MOOR [6] | 6 | Ventura County Wastewater Treatment Plant | 34.2697 | -118.9357 | 4 | 4 | 4 | 4 | 4 | 4 | NA | NA | NA | NA | NA |
| Arroyo Simi | 07_HITCH | 7 | Arroyo Simi East Of Hitch Boulevard | 34.2716 | -118.9234 | 6 | 6 | 6 | NA | NA | 6 | NA | 1 | NA | 1 | NA |
| | 07_TIERRA | 7 | Arroyo Simi downstream from Tierra Rejada Blvd. | 34.2701 | -118.9058 | NA | NA | NA | NA | 6 | NA | NA | NA | NA | NA | NA |
| | 07_MADER | 7 | Arroyo Simi at Madera Ave. | 34.2778 | -118.7958 | NA | NA | 6 | NA | NA | 6 | NA | NA | NA | NA | NA |
| | 07D_SIMI | 7 | Simi Valley Water Quality Control Plant | 34.2848 | -118.8128 | 4 | 4 | 4 | 4 | 4 | 4 | NA | NA | NA | NA | NA |

NA – Not Analyzed
Tox – Samples will be analyzed for toxicity and OP and pyrethroid pesticides as listed in Table 2. Toxicity in water will not be analyzed at 01_RR_BR or at the POTWs.
Pests/PCBs – Samples will be analyzed for OC pesticides and PCBs as listed in Table 2. Chlorpyrifos will be analyzed in tissue at 04_WOOD as it is on the 303(d) list for this reach.
Nut – Samples will be analyzed for Nutrients as listed in Table 2.
Metal – Samples will be analyzed for Metals as listed in Table 2.
GWQC – Samples will be analyzed for General Water Quality Constituents as listed in Table 2.

1. Sites listed for 6 sampling events per monitoring year refers to 4 quarterly dry events and the attempt to sample 2 additional wet events..
2. Grab samples for salts at compliance sites are not directly used to determine compliance with salts WQOs, but are used to develop statistical relationships between EC and salt constituents (Appendix C).
3. Tissue samples will be collected in the same location as water and sediment samples. Samples may be collected elsewhere if no fish are found at pre-established sample stations.
4. Bird egg samples will be collected and analyzed for mercury and selenium in the Mugu Lagoon subwatershed.
5. TIEs will not be performed at 04_WOOD.
6. The Camrosa Water Reclamation Plant and the Ventura County Wastewater Treatment Plant are not currently discharging. However, these sites are included in case they must be sampled at a later date.
7. In the 2012 updates to the Los Angeles Region Basin Plan, the reach designations for 9A and 9B were switched. For consistency with the TMDLs and historic site naming conventions, the site names in the annual monitoring reports maintain the original reach designations.

**Table 5. CCWTMP Land Use Monitoring Sites and Sample Frequency**

| Sub-Wat. | Site ID | Reach | Site Type [1] | Site Location | GPS Coordinates | | Pests/ PCBs | Nutrients | Metal | Salts | GWQC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Lat | Long | | | | | |
| Mugu Lagoon | 01T_ODD2_DCH | 1 | Ag | Duck Pond/Mugu/Oxnard Drain #2 S. of Hueneme Rd | 34.1395 | -119.1185 | 6 | 6 | 6 | NA | 6 |
| Revolon Slough | 04D_WOOD | 4 | Ag | Agricultural Drain on E. Side of Wood Rd N. of Revolon | 34.1708 | -119.0963 | 6 | 6 | 6 | 6 | 6 |
| | 05D_SANT_ VCWPD | 5 | Ag | Santa Clara Drain at VCWPD Gage 781 prior to confluence with Beardsley Channel | 34.2426 | -119.1137 | 6 | 6 | 6 | NA | 6 |
| | 04D_VENTURA | 4 | Urban | Camarilo Hills Drain at Ventura Blvd and Las Posas Rd at VCWPD Gage 835 | 34.2162 | -119.0685 | 6 | NA | 6 | 6 | 6 |
| Calleguas | 02D_BROOM | 2 | Ag | Discharge to Calleguas Creek at Broome Ranch Rd. | 34.1433 | -119.0713 | 6 | 6 | 6 | NA | 6 |
| Conejo | 9BD_GERRY [2] | 9A [2] | Ag | Drainage ditch crossing Santa Rosa Rd at Gerry Rd | 34.2358 | -118.9446 | 6 | 6 | 6 | 6 | 6 |
| | 9BD_ADOLF [2] | 9A [2] | Urban | Urban storm drain passing under N. side of Adolfo Rd approximately 300 meters from Reach 9B | 34.2148 | -118.9951 | 6 | NA | 6 | 6 | 6 |
| | 13_SB_HILL | 13 | Urban | South Branch Arroyo Conejo on S. Side of W Hillcrest | 34.1849 | -118.9075 | 6 | NA | NA | 6 | 6 |
| Las Posas | 06T_FC_BR | 6 | Ag | Fox Canyon at Bradley Rd - just north of Hwy 118 | 34.2646 | -119.0111 | 6 | 6 | NA | NA | 6 |
| Arroyo Simi | 07D_HITCH_ LEVEE_2 | 7 | Ag | 2nd corrugated pipe discharging on north side of Arroyo Simi flood control levee off of Hitch Blvd just beyond 1st power pole. | 34.2716 | -118.9219 | 6 | 6 | NA | 6 | 6 |
| | 07D_CTP | 7 | Urban | Flood control channel in Country Trail Park | 34.2646 | -118.9075 | 6 | NA | NA | 6 | 6 |
| | 07T_DC_H | 7 | Urban | Dry Canyon at Heywood Street | 34.2683 | -118.7600 | 6 | NA | NA | NA | 6 |

Ag = Agricultural Land Use Site    Urban = Urban Land Use Site    NA – Not Analyzed

1. Specific constituents analyzed under each category are listed in Table 2.
2. In the 2012 updates to the Los Angeles Region Basin Plan, the reach designations for 9A and 9B were switched. For consistency with the TMDLs and historic site naming conventions, the site names in the annual monitoring reports maintain the original reach designations.

**Table 6. Toxicity Investigation Monitoring Sites and Sampling Frequency**

| Subwatershed | Site ID | Reach | Site Location | GPS Coordinates Lat | GPS Coordinates Long | Tox | Pests/PCBs | GWQC |
|---|---|---|---|---|---|---|---|---|
| ***Sediment Toxicity Investigation*** [1] | | | | | | | | |
| Calleguas | 02_PCH | 2 | Calleguas Creek Northeast Side Of Highway 1 Bridge | 34.1119 | -119.0818 | 1 | 1 | 1 |
| Calleguas | 9A_HOWAR [2] | 9B [2] | Conejo Creek At Howard Road Bridge | 34.1931 | -119.0025 | 1 | 1 | 1 |
| ***Water Toxicity Investigation*** [1, 3] | | | | | | | | |
| Conejo | 10_GATE | 10 | Conejo Creek Hill Canyon Below North Fork Of Conejo Creek | 34.2178 | -118.9281 | 5 | 5 | 5 |
| Conejo | 13_BELT | 13 | Conejo Creek South Fork Behind Hill Canyon Belt Press Building | 34.2078 | -118.9194 | 4 | 4 | 4 |

Tox – Samples will be analyzed for toxicity, OP, and pyrethroid pesticides in water and toxicity, OP, and pyrethroid pesticides in sediment as listed in Table 2.
Pests/PCBs – Samples will be analyzed for OC pesticides and PCBs as listed in Table 2.
GWQC – Samples will be analyzed for General Water Quality Constituents as listed in Table 2.

1. This table depicts the normal toxicity investigation sampling frequency. During year 5, this investigation was put on hold and then re-started as described in text.
2. In the 2012 updates to the Los Angeles Region Basin Plan, the reach designations for 9A and 9B were switched. For consistency with the TMDLs and historic site naming conventions, the site names in the annual monitoring reports maintain the original reach designations.
3. Includes two wet events per site; except during years when there is insufficient rainfall to trigger sampling.

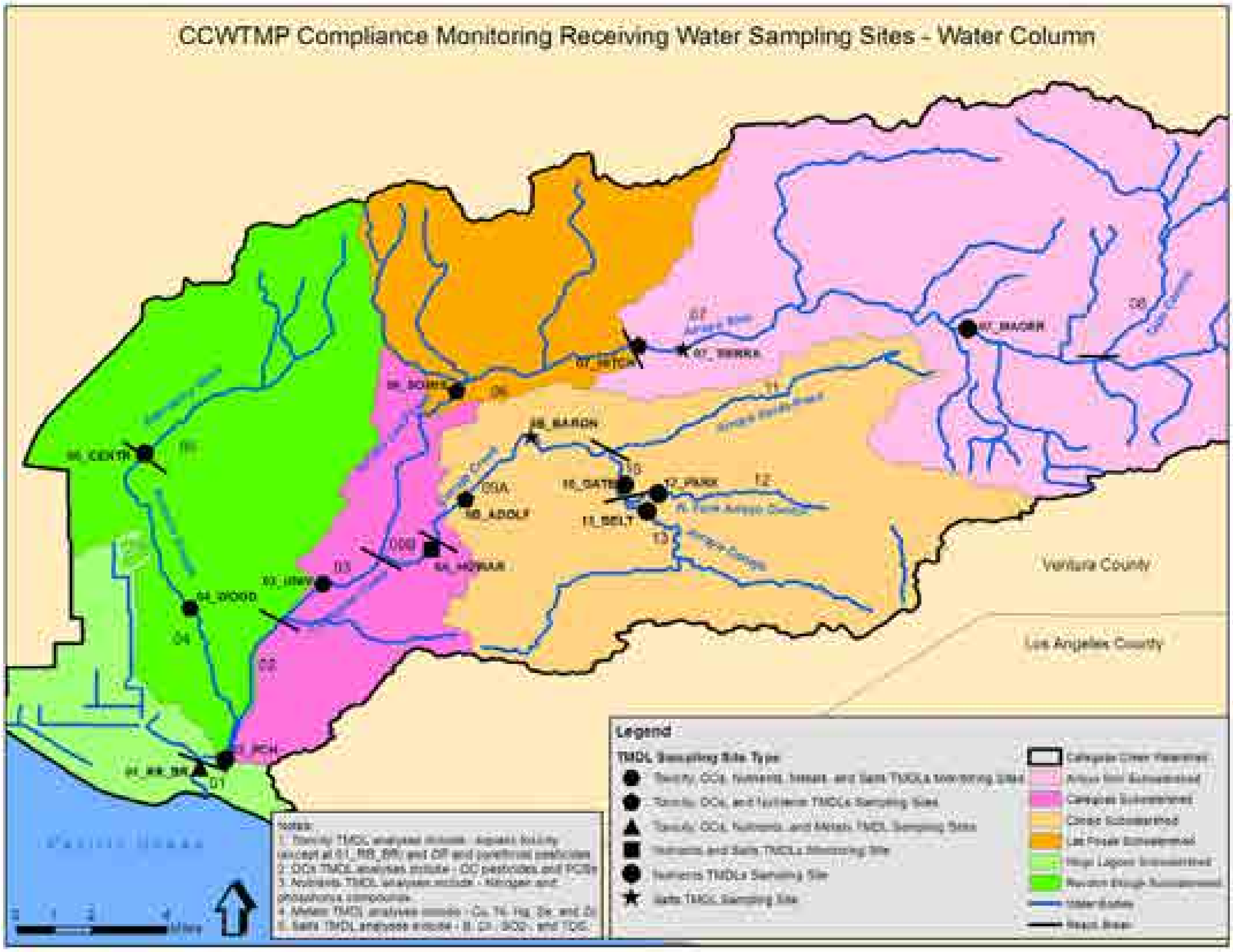



**Figure 2. CCWTMP Compliance Monitoring Sampling Sites – Receiving Water**

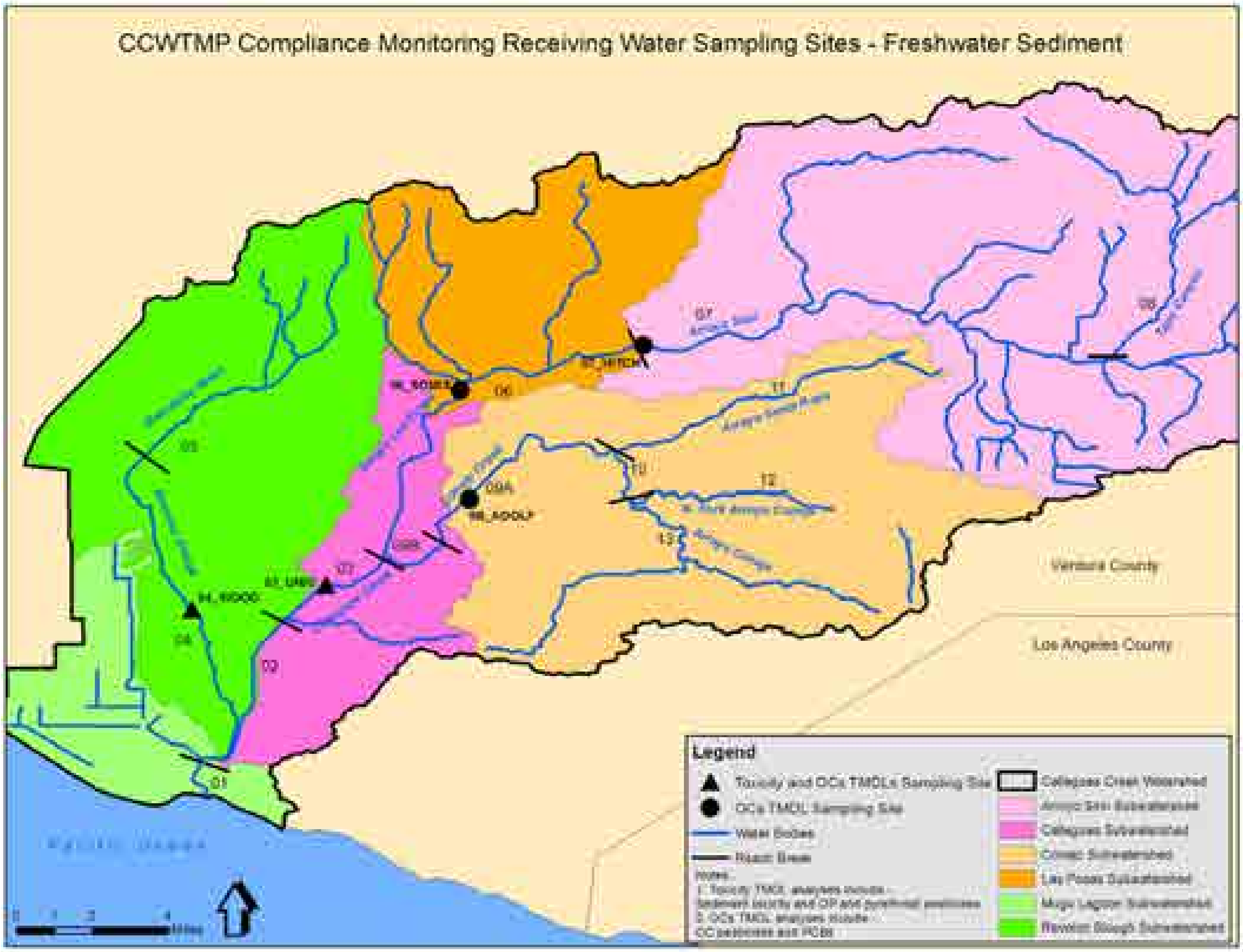



**Figure 3. CCWMTP Compliance Monitoring Receiving Water Sampling Sites – Freshwater Sediment**

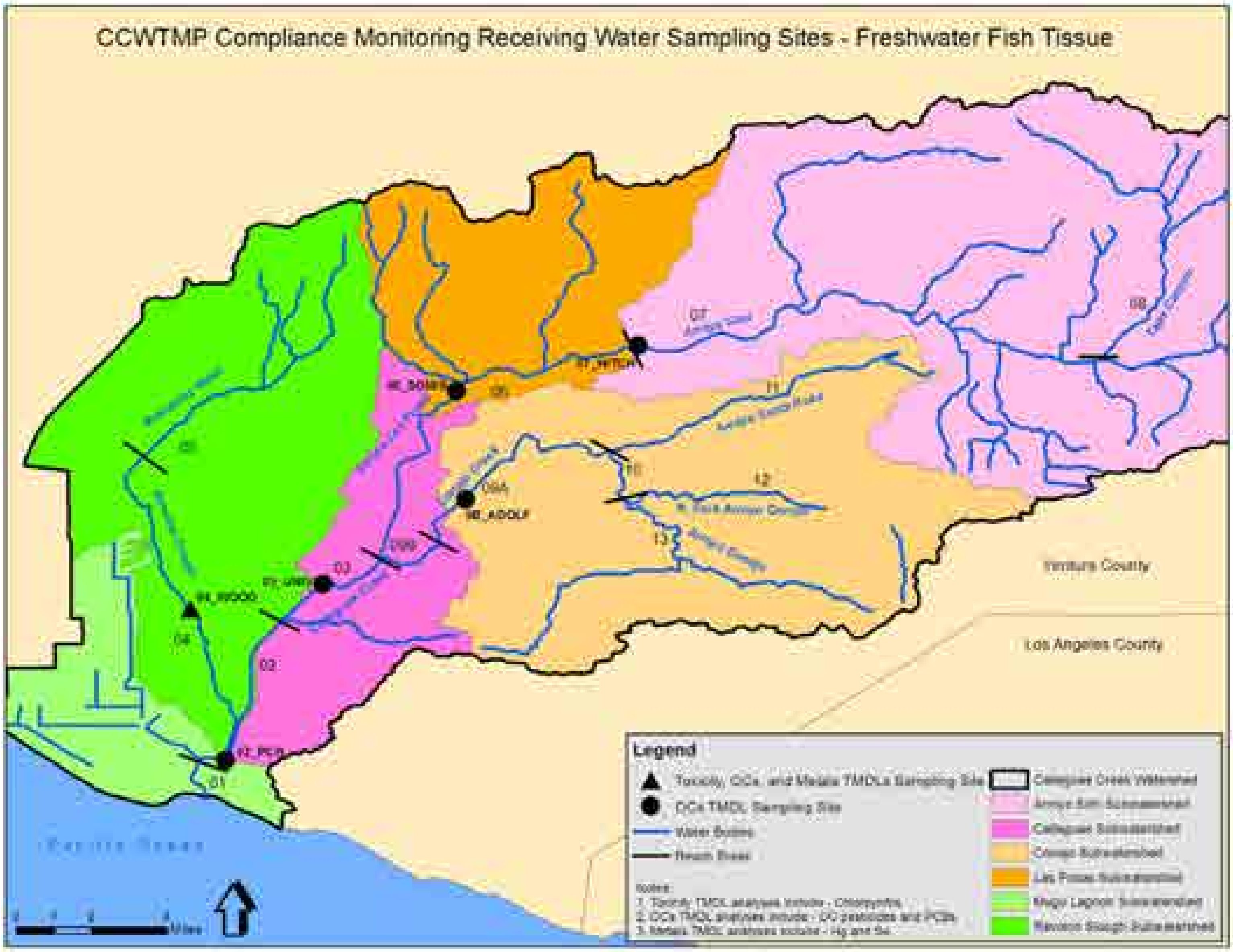



**Figure 4. CCWMTP Compliance Monitoring Sampling Sites – Freshwater Fish Tissue**

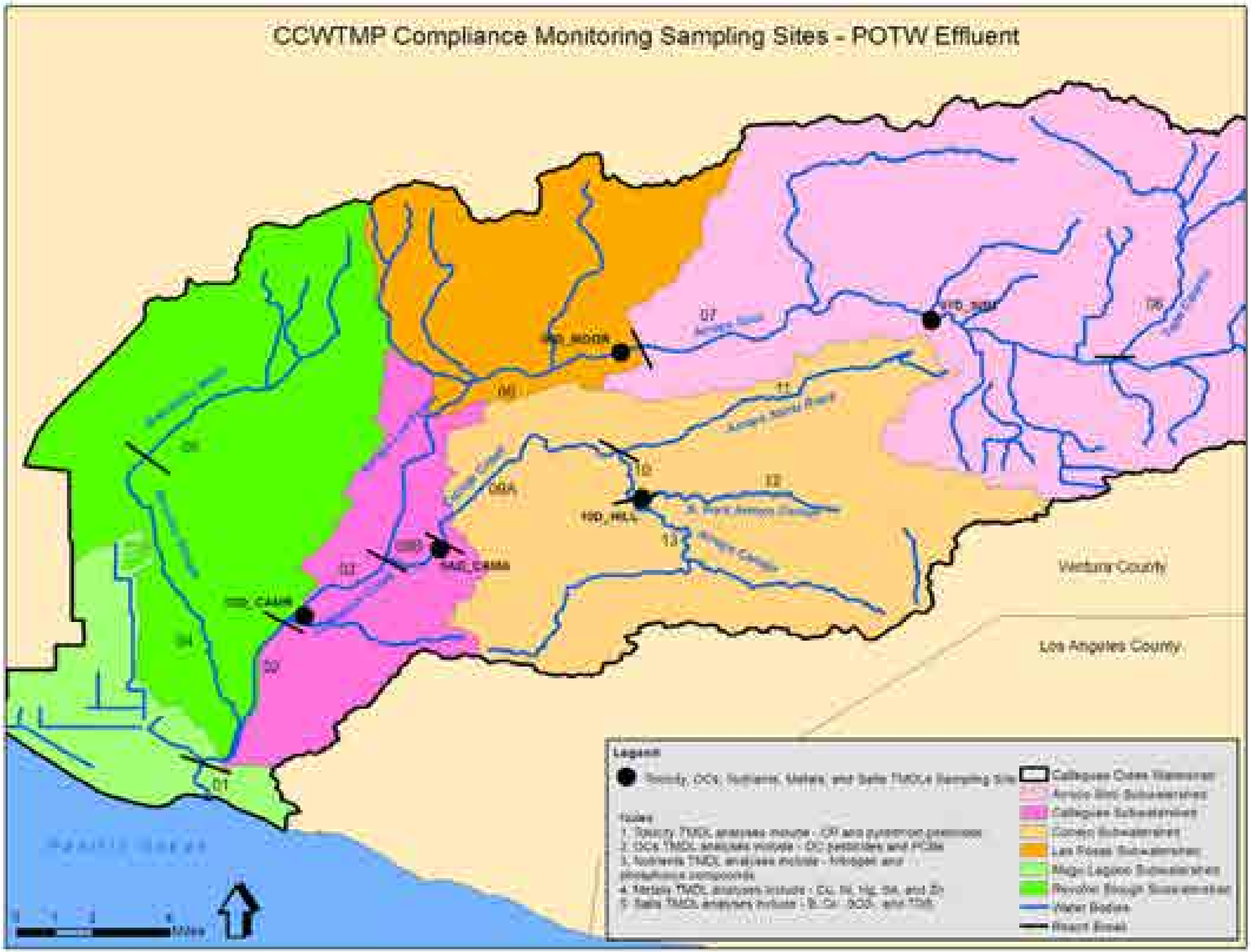



**Figure 5. CCWMTP Compliance Monitoring Sampling Sites – POTW Effluent**

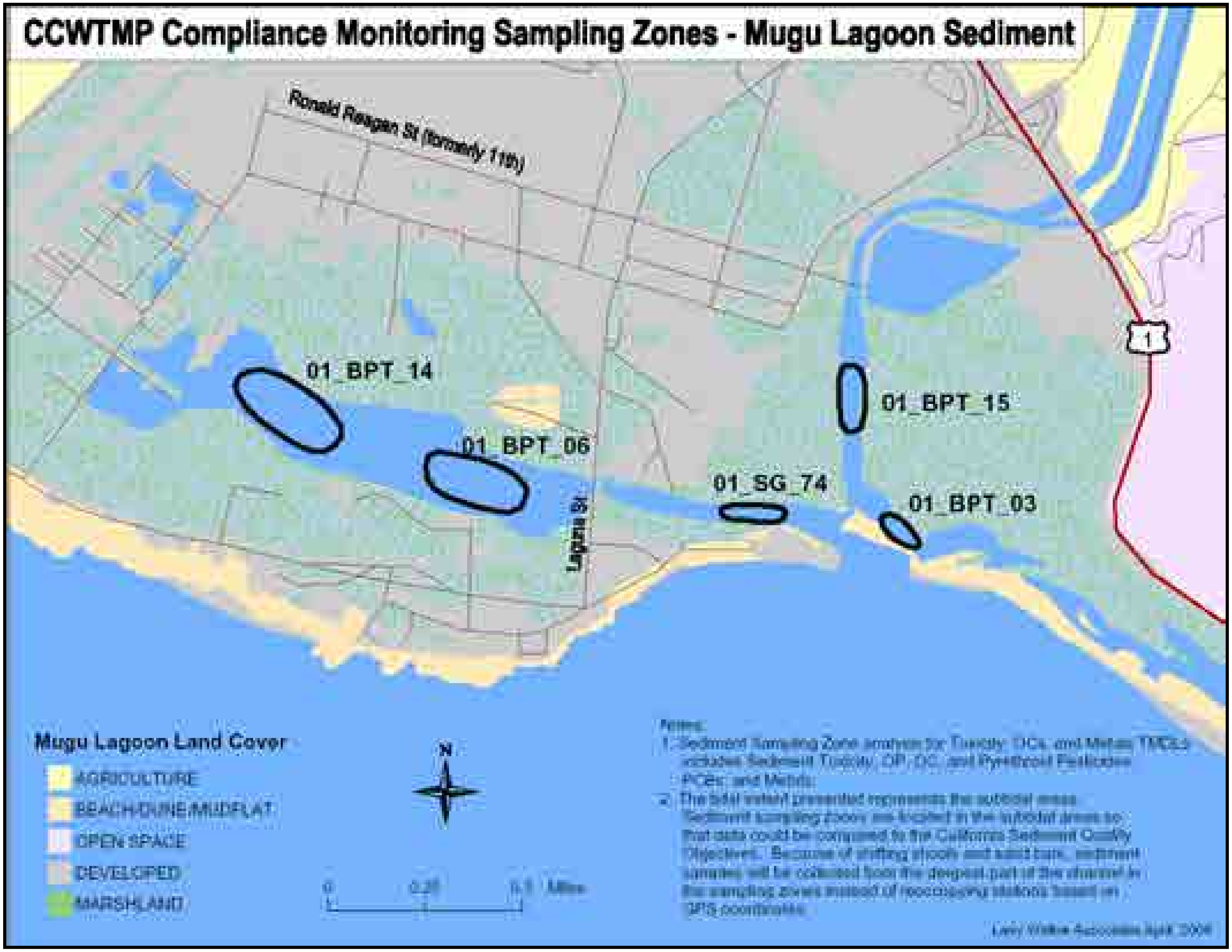



**Figure 6. CCWMTP Compliance Monitoring Sampling Zones – Mugu Lagoon Sediment**


**Figure 7. CCWTMP Compliance Monitoring Sampling Zones – Mugu Lagoon Tissue**

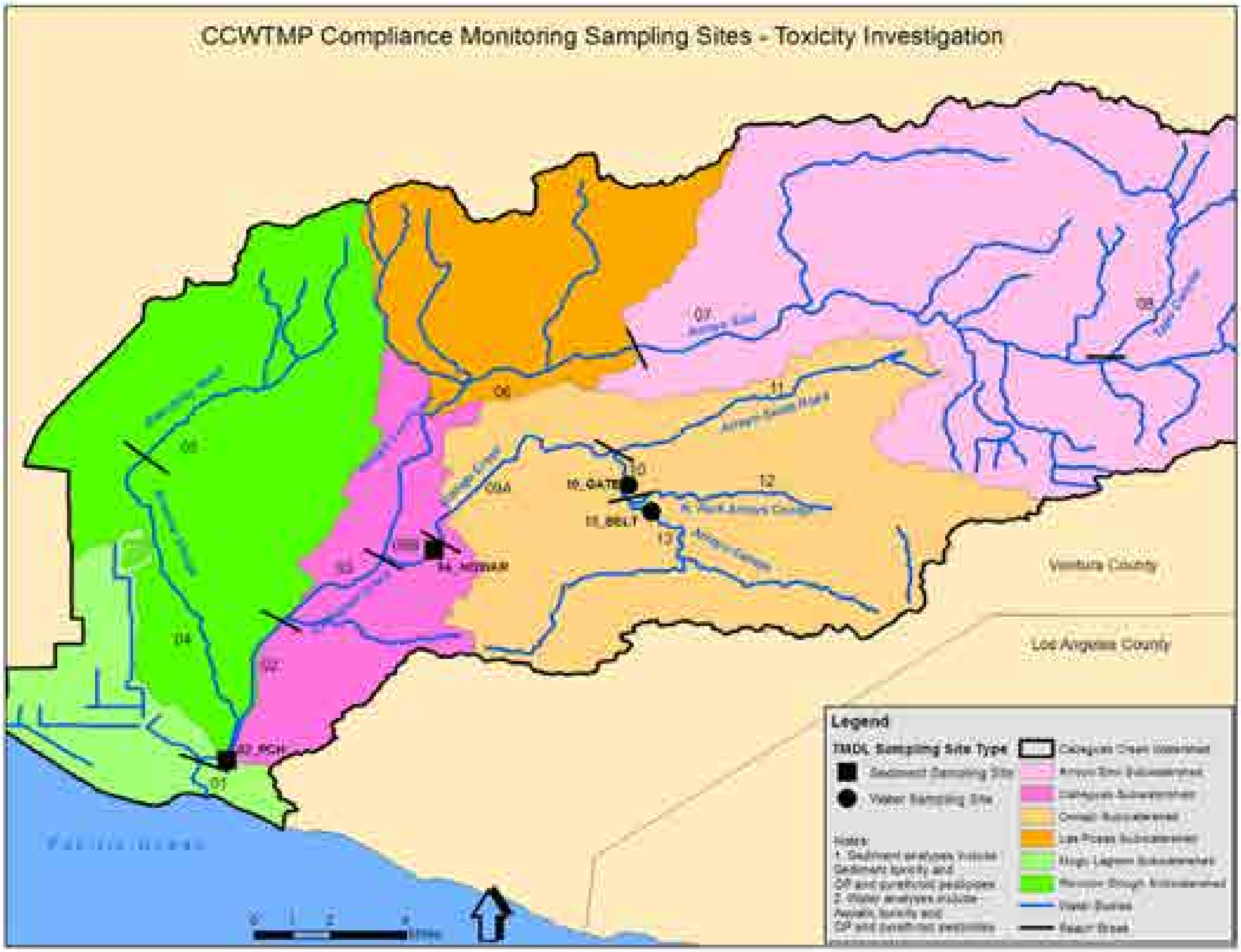



**Figure 8. CCWTMP Toxicity Investigation Receiving Water Sampling Sites – Water and Sediment**

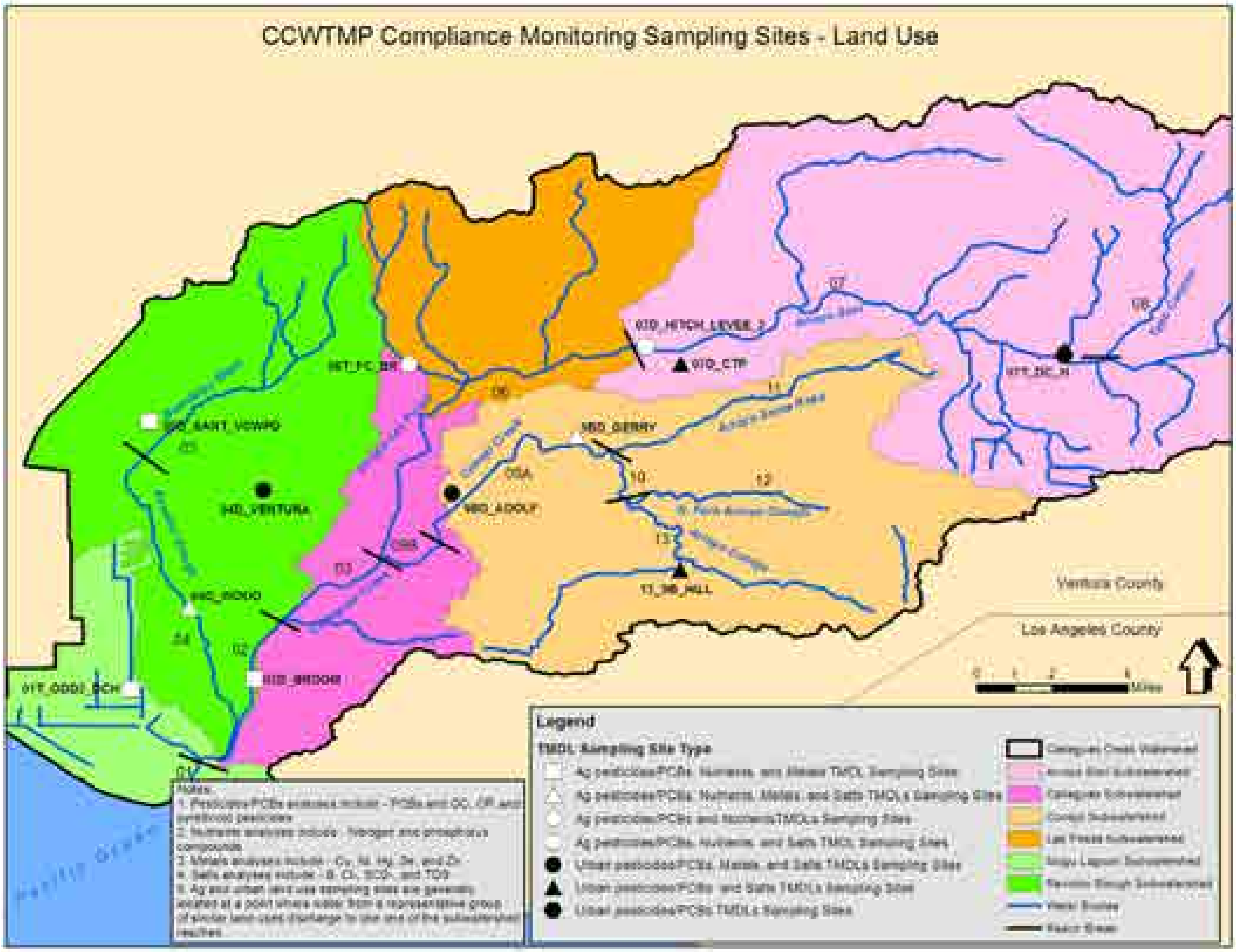



**Figure 9. CCWTMP Land Use Sampling Sites**

# Monitoring Data Summary

To summarize the CCW TMDL monitoring data, box plots have been created for site and constituent combinations representing the data gathered over the entire monitoring program. The data presented includes all constituents with TMDL limits for water or sediment at the sites where the constituents were analyzed. Where TMDL limits are effective, those thresholds have been identified for the sites where they apply. As appropriate, data for constituents with specific dry or wet weather limits are presented separately. Data collected during year seven, which is the reporting period for this document, have been overlain on the box plots as circles. The box plots include all of the data collected during this program (2008-2015). This was done to allow for easy comparison between recent data and what have been collected overall. The seventh year data are presented in tabular form below each box plot. Each figure of box plots presents data from either receiving water sites or land use sites. The receiving water sites are color coded by subwatershed as shown in Table 7. Land use and POTW sites are displayed together and grouped by type as presented in Table 8.

Fish tissue data are not displayed as box plots. Fish tissue data are presented in tables due to the small number of samples and to preserve the species information associated with each sample.

Toxicity data and TIE results are summarized in Appendix D. Summaries of the 2014-15 monitoring events are included as Appendix A.

Some TMDL constituents were never, or rarely detected (less than 2 percent detection rate) and therefore, did not warrant a data summary. The constituents, which were never detected, include:

**In Water:**

- Endosulfan II
- Endrin

**In Sediment:**

- Endrin
- BHC, gamma

Rarely detected constituents in water are as follows:

- Aldrin (four detects, none this year)
- Dieldrin (six detects, three this year)
- Endosulfan I (three detects, none this year)
- BHC, gamma (three detects, none this year)
- Total PCBs (five detects, three this year)

Rarely detected constituents in sediment are as follows:

- Dieldrin (one detect, none this year)

**Table 7. Receiving Water Sites Color Coded by Subwatershed**

| Subwatershed | Reach | Site ID |
|---|---|---|
| Mugu Lagoon | Reach 1 | 01_BPT_14 |
| | | 01_BPT_15 |
| | | 01_BPT_3 |
| | | 01_BPT_6 |
| | | 01_RR_BR |
| | | 01_SG_74 |
| Calleguas | Reach 2 | 02_PCH |
| | Reach 3 | 03_UNIV |
| | Reach 9B[1] | 9A_HOWAR |
| Revolon Slough | Reach 4 | 04_WOOD |
| | Reach 5 | 05_CENTR |
| Las Posas | Reach 6 | 06_SOMIS |
| Arroyo Simi | Reach 7 | 07_HITCH |
| | | 07_MADER |
| | | 07_TIERRA |
| Conejo | Reach 9A[1] | 9B_ADOLF |
| | Reach 9A[1] | 9B_BARON |
| | Reach 10 | 10_GATE |
| | Reach 12 | 12_PARK |
| | Reach 13 | 13_BELT |

1. In the 2012 updates to the Los Angeles Region Basin Plan, the reach designations for 9A and 9B were switched. For consistency with the TMDLs and historic site naming conventions, the site names in the annual monitoring reports maintain the original reach designations.

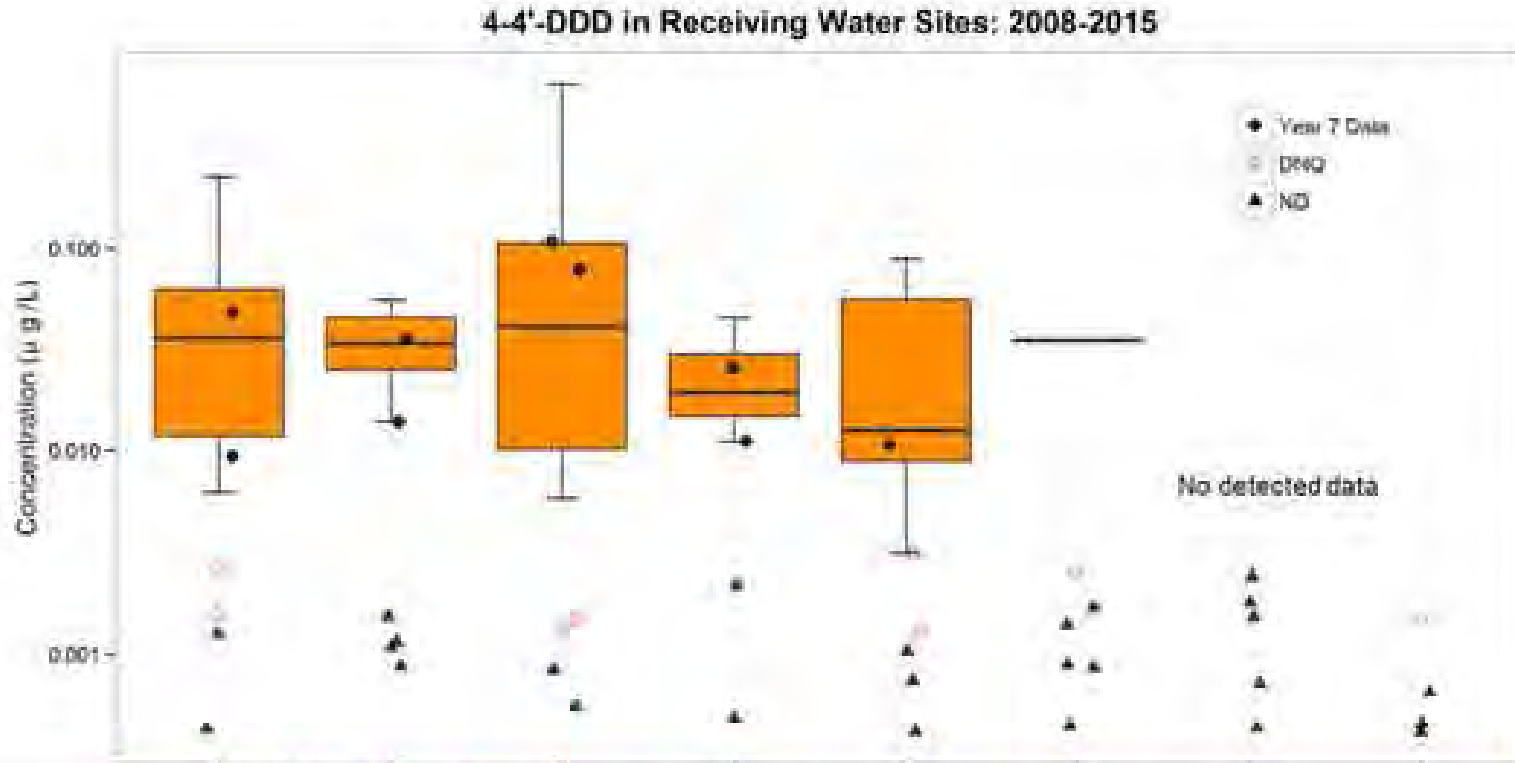
**Table 8. Land Use and POTW Sites Color Coded by Type**

| | |
|---|---|
| **Urban Land Use (MS4) Sites:** | |
| Reach 4 | 04D_VENTURA |
| Reach 7 | 07D_CTP |
| Reach 7 | 07T_DC_H |
| Reach 9A [1] | 9BD_ADOLF [1] |
| Reach 13 | 13_SB_HILL |
| **Ag Land Use Sites:** | |
| Reach 1 | 01T_ODD2_DCH |
| Reach 2 | 02D_BROOM |
| Reach 4 | 04D_WOOD |
| Reach 5 | 05D_SANT_VCWPD |
| Reach 6 | 06T_FC_BR |
| Reach 7 | 07D_HITCH_LEVEE_2 |
| Reach 9A [1] | 9BD_GERRY [1] |
| **POTW Sites:** | |
| Reach 7 | 07D_SIMI |
| Reach 9B [1] | 9AD_CAMA [1] |
| Reach 10 | 10D_HILL |

1. In the 2012 updates to the Los Angeles Region Basin Plan, the reach designations for 9A and 9B were switched. For consistency with the TMDLs and historic site naming conventions, the site names in the annual monitoring reports maintain the original reach designations.

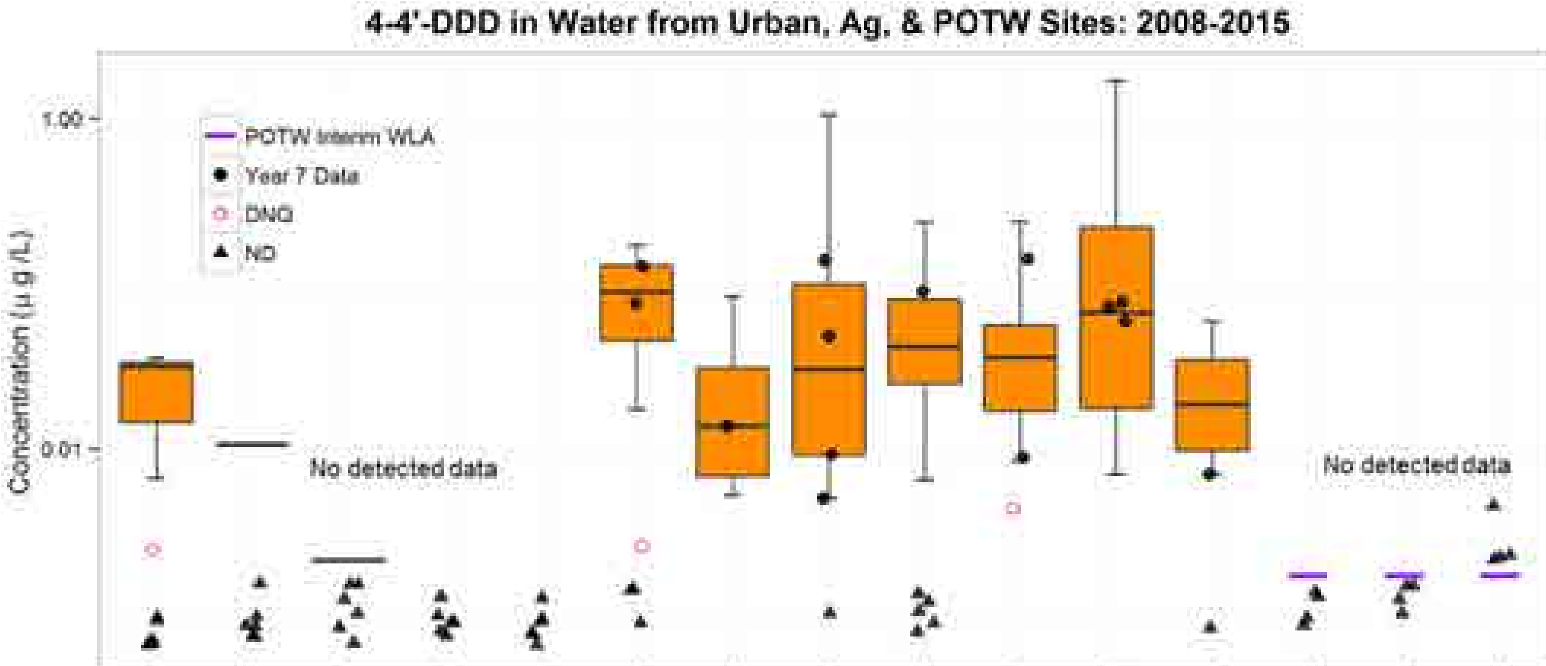
## OC PESTICIDES TMDL DATA SUMMARY

The following figures present OC pesticides data in both water and sediment. Presently, only the POTWs have effective final limits in water, but data for all sites is provided since the TMDL specifies final targets for OC pesticides in water. Effective interim allocations for agriculture and waste load allocations for urban dischargers are provided in the appropriate OC pesticides in sediment figures. Bolded values in the tables within each figure indicate the concentration was above the applicable limits for that constituent. Italicized values in the tables within each figure indicate the concentration was detected but not quantifiable (DNQ). Values in the tables within each figure with a "<" preceding it, indicate the constituent was not detected (ND) at MDL for that constituent. Values identified as "--" in the tables indicate no samples were collected at those sites for those events.



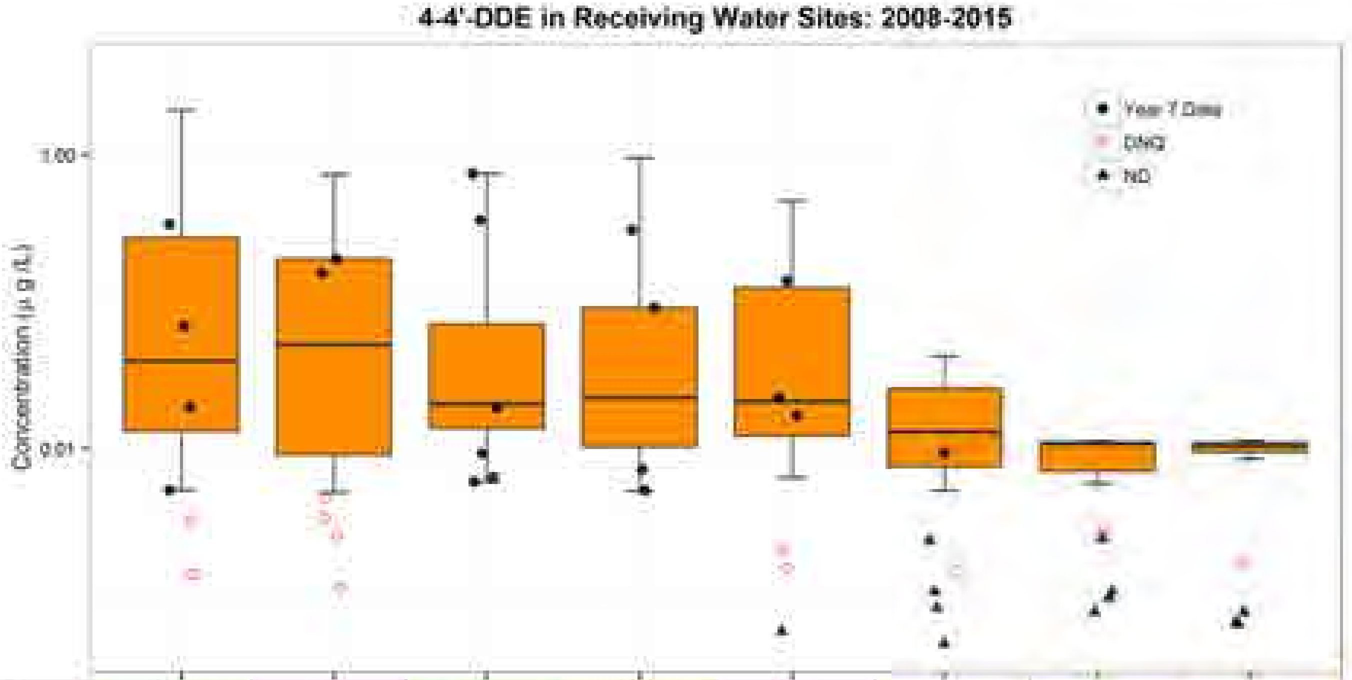

| Date | Type | Event | 01_RR_BR | 03_UNIV | 04_WOOD | 06_SOMIS | 07_HITCH | 9B_ADOLF | 10_GATE | 13_BELT |
|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | *0.0016* | <0.001 | *0.0013* | – | *0.0013* | <0.001 | <0.001 | <0.001 |
| Nov-14 | Dry | 45 | *0.0027* | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | – |
| Dec-14 | Storm | 46 | 0.0092 | 0.0139 | 0.1058 | 0.0259 | 0.0105 | <0.001 | <0.001 | <0.001 |
| Dec-14 | Storm | 47 | 0.0488 | 0.0351 | 0.0785 | 0.011 | *0.0031* | *0.0025* | <0.001 | *0.0015* |
| Feb-15 | Dry | 48 | <0.001 | <0.001 | *0.0015* | <0.001 | <0.001 | <0.001 | – | <0.001 |
| May-15 | Dry | 49 | <0.001 | <0.001 | <0.001 | – | <0.001 | <0.001 | <0.001 | – |

**Figure 10. 4,4'-DDD Water Column Concentrations in Receiving Water Sites: 2008-2015**



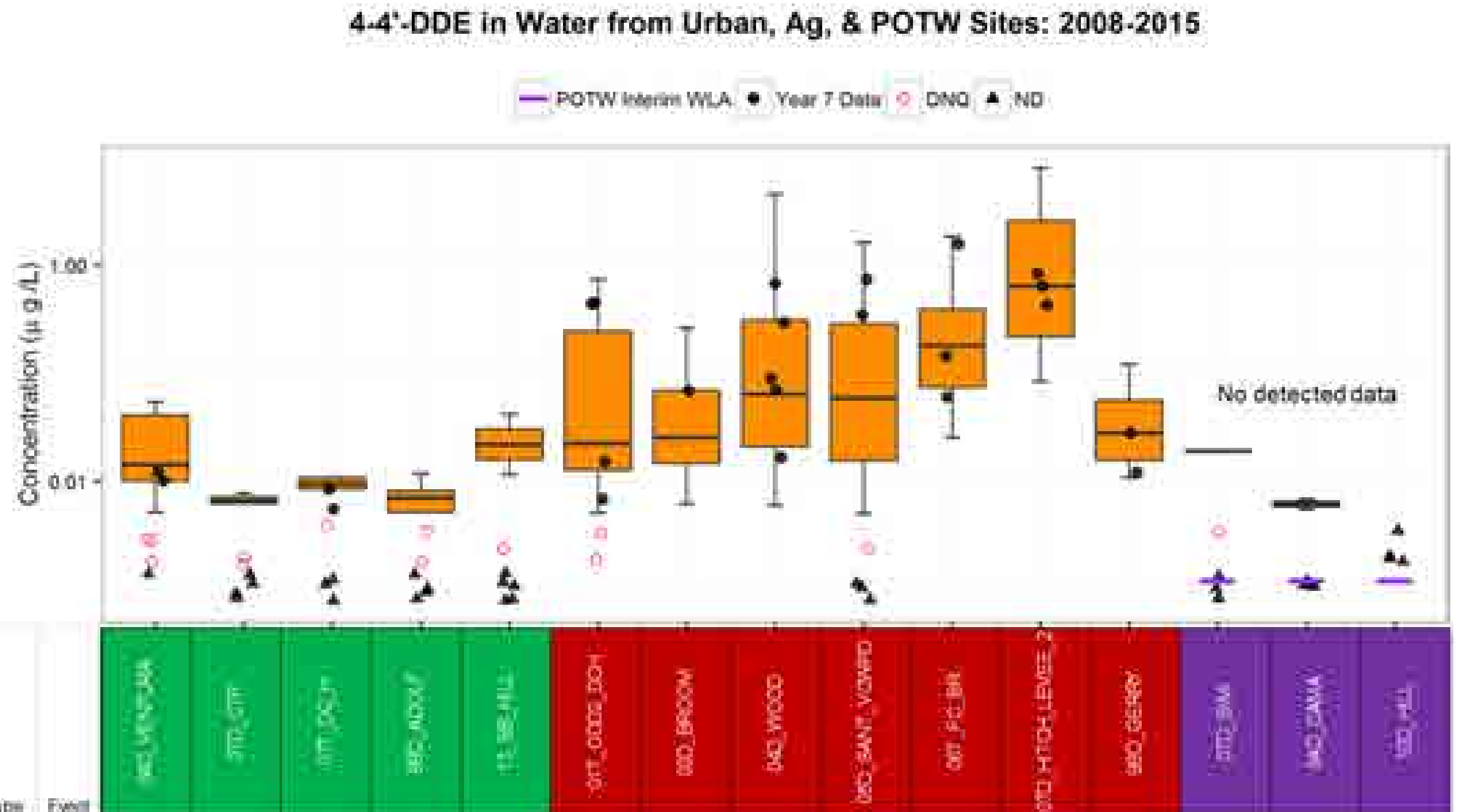

| Date | Type | Event | 04D_VENTURA | 07D_CTP | 03T_DC_H | 9BD_ADOLF | 11_SB_HILL | 01T_ODD2_DCH | 02D_BROOM | 04D_WOOD | 05D_SANT_VCWPD | 06T_FC_BR | 07D_HITCH_LEVEE_2 | 9BD_GERRY | 03D_SIM | 9AD_CAMA | 10D_HILL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | – | – | <0.001 | – | 0.0772 | – | <0.001 | <0.001 | <0.003 |
| Nov-14 | Dry | 45 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.0026 | – | <0.001 | <0.001 | – | – | – | <0.001 | <0.001 | <0.003 |
| Dec-14 | Storm | 46 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.0766 | – | 0.0479 | <0.001 | 0.141 | 0.0587 | <0.001 | – | – | – |
| Dec-14 | Storm | 47 | 0.0024 | <0.001 | <0.001 | <0.001 | <0.001 | 0.127 | 0.0130 | 0.1375 | 0.0899 | 0.0089 | 0.0726 | 0.007 | – | – | – |
| Feb-15 | Dry | 48 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | – | 0.005 | <0.001 | 0.0047 | – | – | <0.001 | <0.001 | <0.003 |
| May-15 | Dry | 49 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | – | 0.0093 | <0.001 | – | – | – | <0.001 | <0.001 | <0.003 |

**Figure 11. 4,4'-DDD Water Column Concentrations in Urban, Ag, and POTW Sites: 2008-2015**



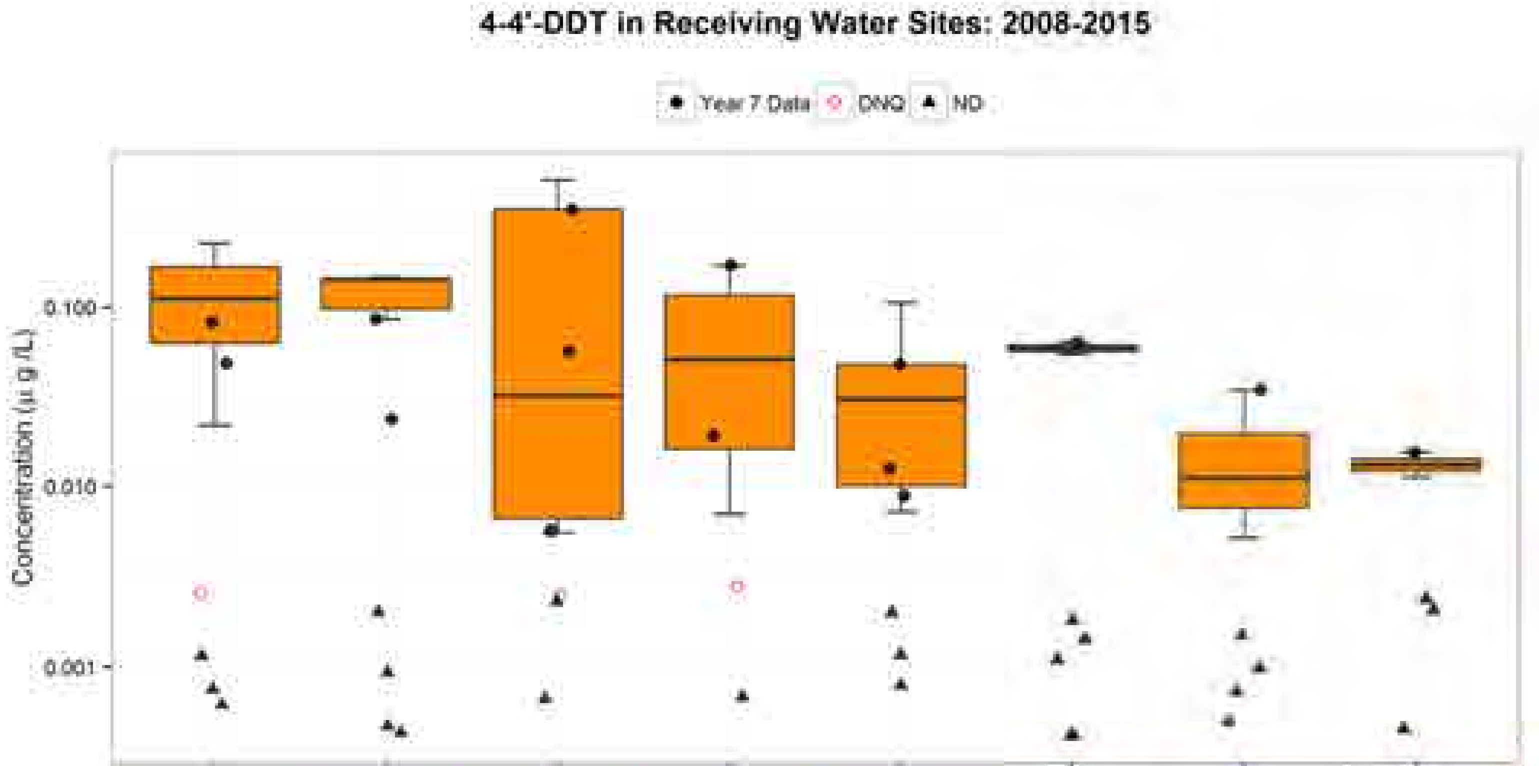

| Date | Type | Event | 01_RR_BR | 03_UNIV | 04_WOOD | 06_SOMIS | 07_HITCH | 9B_ADOLF | 10_GATE | 13_BELT |
|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 0.0052 | *0.0011* | 0.0059 | -- | 0.0167 | *0.0015* | <0.001 | <0.001 |
| Nov-14 | Dry | 45 | 0.0191 | *0.0045* | 0.0189 | 0.0072 | *0.0021* | <0.001 | <0.001 | -- |
| Dec-14 | Storm | 46 | 0.0682 | 0.1555 | 0.7411 | 0.306 | 0.139 | <0.001 | <0.001 | <0.001 |
| Dec-14 | Storm | 47 | 0.3358 | 0.1951 | 0.3585 | 0.0908 | 0.0221 | *0.0092* | *0.0027* | *0.0017* |
| Feb-15 | Dry | 48 | *0.0014* | *0.0025* | 0.0092 | 0.0052 | *<0.0015* | <0.001 | -- | <0.001 |
| May-15 | Dry | 49 | *0.0032* | *0.0034* | 0.0063 | -- | <0.001 | <0.001 | <0.001 | -- |

**Figure 12. 4,4'-DDE Water Column Concentrations in Receiving Water Sites: 2008-2015**



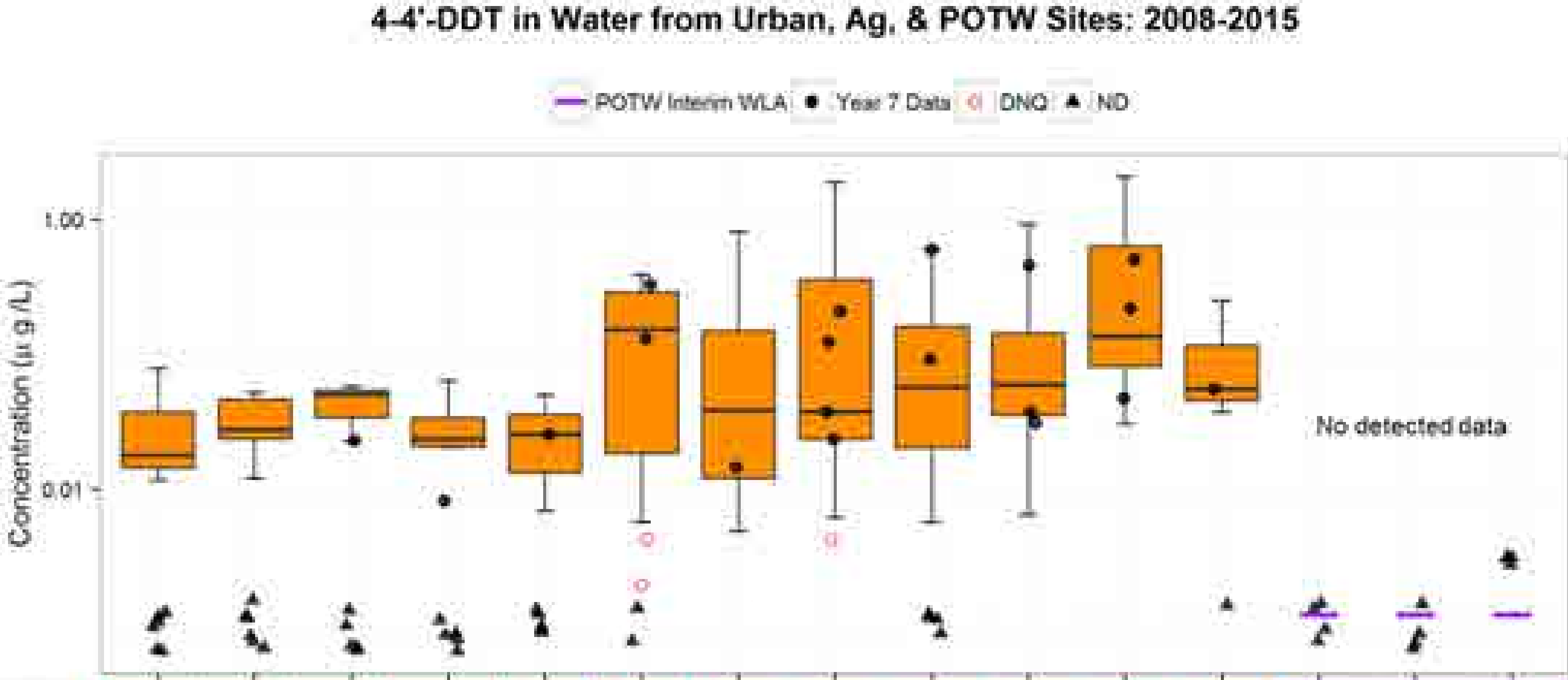

| Date | Type | Event | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 0.0018 | <0.001 | 0.004 | 0.0018 | <0.001 | 0.0033 | -- | -- | <0.001 | -- | 0.0299 | -- | <0.001 | <0.001 | <0.0025 |
| Nov-14 | Dry | 45 | <0.001 | <0.001 | 0.0085 | <0.001 | <0.001 | 0.015 | -- | 0.0166 | <0.001 | -- | -- | -- | <0.001 | <0.001 | <0.0025 |
| Dec-14 | Storm | 46 | 0.0124 | <0.001 | <0.001 | <0.001 | <0.001 | 0.4199 | -- | 0.2966 | 0.731 | 1.583 | 0.107 | 0.028 | -- | -- | -- |
| Dec-14 | Storm | 47 | 0.0101 | 0.002 | 0.0056 | 0.0035 | 0.0024 | 0.4528 | 0.0089 | 0.0815 | 0.3456 | 0.0607 | 0.429 | 0.0122 | -- | -- | -- |
| Feb-15 | Dry | 48 | 0.0028 | 0.0017 | <0.001 | <0.001 | <0.001 | 0.0069 | -- | 0.0706 | <0.001 | 0.1456 | -- | -- | 0.0034 | <0.001 | <0.0025 |
| Mar-15 | Dry | 49 | 0.0029 | <0.001 | <0.001 | <0.001 | <0.001 | 0.0019 | -- | 0.0897 | 0.0024 | -- | -- | -- | <0.001 | <0.001 | <0.0025 |

**Figure 13. 4,4'-DDE Water Column Concentrations in Urban, Ag, and POTW Sites: 2008-2015**



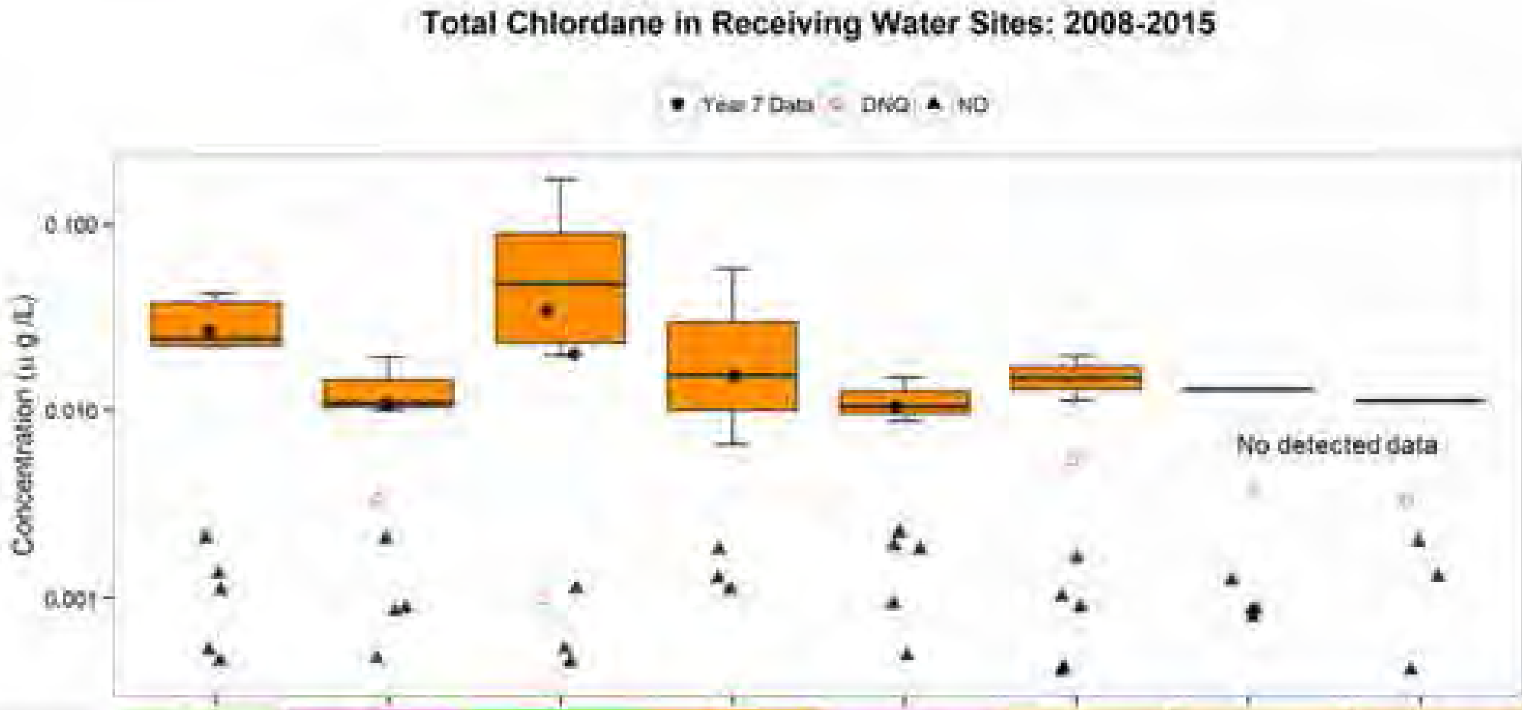

| Date | Type | Event | 01_RR_BR | 03_UNIV | 04_WOOD | 06_SOMIS | 07_HITCH | 09_ADOLF | 10_GATE | 13_BELT |
|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | <0.001 | <0.001 | <0.001 | – | 0.0088 | <0.001 | <0.001 | <0.001 |
| Nov-14 | Dry | 45 | *0.0026* | <0.001 | 0.0057 | *0.0026* | <0.001 | <0.001 | <0.001 | – |
| Dec-14 | Storm | 46 | 0.0487 | 0.0856 | 0.351 | 0.171 | 0.0479 | <0.001 | <0.001 | <0.001 |
| Dec-14 | Storm | 47 | 0.0827 | 0.0235 | 0.0569 | 0.0192 | 0.0125 | 0.0641 | 0.0346 | 0.0156 |
| Feb-15 | Dry | 48 | <0.001 | <0.001 | *0.0025* | <0.001 | <0.001 | <0.001 | – | <0.001 |
| May-15 | Dry | 49 | <0.001 | <0.001 | <0.001 | – | <0.001 | <0.001 | <0.001 | – |

**Figure 14. 4,4'-DDT Water Column Concentrations in Receiving Water Sites: 2008-2015**



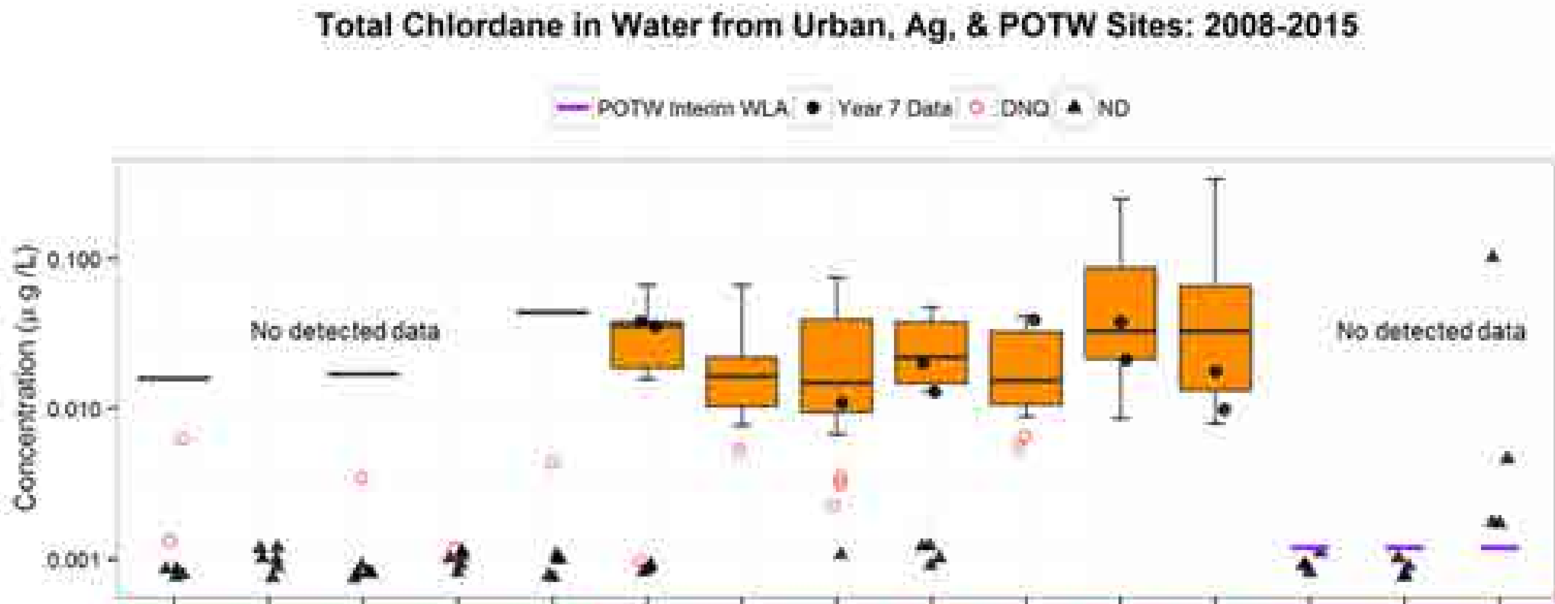

| Date | Type | Event | 04D_VENTURA | [illegible] | [illegible] | [illegible] | [illegible] | 01T_ODD2_DCH | 02D_BROOM | 04D_WOOD | 05D_SANT_VCWPD | 06T_FC_BR | [illegible]_HTCH_LEVEE_2 | 9BD_GERRY | [illegible] | 9AD_CAMA | 10D_HILL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | -- | -- | <0.001 | -- | 0.5043 | -- | <0.001 | <0.001 | <0.0031 |
| Nov-14 | Dry | 45 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.0044 | -- | 0.0043 | <0.001 | -- | -- | -- | <0.001 | <0.001 | <0.0031 |
| Dec-14 | Storm | 46 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.3296 | -- | 0.1226 | 0.596 | 0.452 | 0.218 | <0.001 | -- | -- | -- |
| Dec-14 | Storm | 47 | <0.001 | <0.001 | 0.0229 | 0.0082 | 0.0255 | 0.13 | 0.0145 | 0.2089 | 0.091 | 0.0309 | 0.0468 | 0.0549 | -- | -- | -- |
| Feb-15 | Dry | 48 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | -- | 0.0073 | <0.001 | 0.0072 | -- | -- | <0.001 | <0.001 | <0.0031 |
| May-15 | Dry | 49 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.002 | -- | 0.0234 | <0.001 | -- | -- | -- | <0.001 | <0.001 | <0.0031 |

**Figure 15. 4,4'-DDT Water Column Concentrations in Urban, Ag, and POTW Sites: 2008-2015**



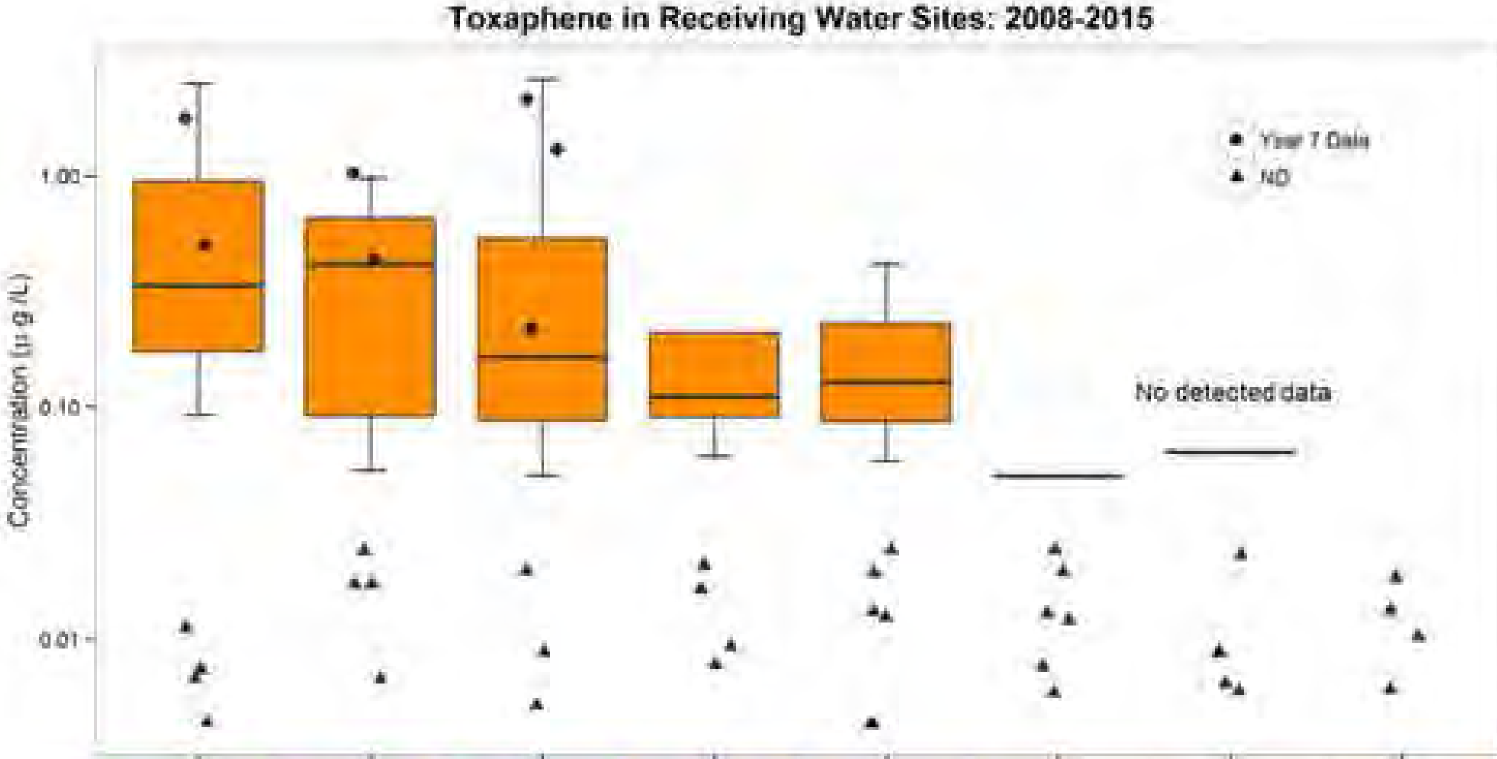

| Date | Type | Event | 01_RR_BR | 03_UNIV | 04_WOOD | 06_SOMIS | 07_HITCH | 9B_ADOLF | 10_GATE | 13_BELT |
|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | <0.001 | <0.001 | <0.001 | – | <0.001 | <0.001 | <0.001 | <0.001 |
| Nov-14 | Dry | 45 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | – |
| Dec-14 | Storm | 46 | <0.001 | *0.0034* | 0.0342 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Dec-14 | Storm | 47 | 0.0267 | 0.011 | 0.0199 | 0.0155 | 0.0106 | *0.0055* | *0.0038* | *0.0033* |
| Feb-15 | Dry | 48 | <0.001 | <0.001 | *0.001* | <0.001 | <0.001 | <0.001 | – | <0.001 |
| May-15 | Dry | 49 | <0.001 | <0.001 | <0.001 | – | <0.001 | <0.001 | <0.001 | – |

**Figure 16. Total Chlordane Water Column Concentrations in Receiving Water Sites: 2008-2015**



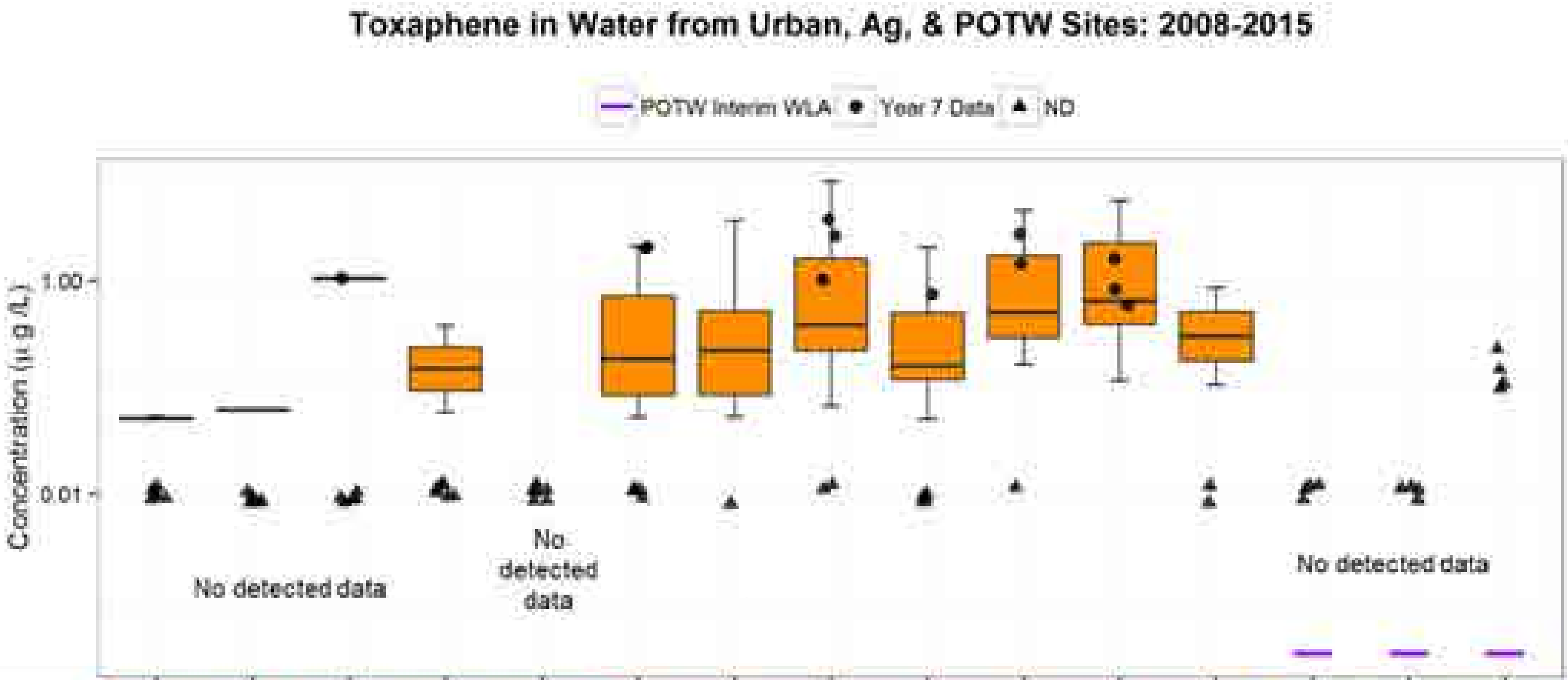

| Date | Type | Event | 04D_VENTURA | 07D_CTP | 05T_OC_H | 9BD_ADOLF | 13_BE_HILL | 01T_ODD3_EDI | 02D_BROOM | 04D_WOOD | 05D_SANT_VCWPD | 06T_FC_BR | 07D_HITCH_LEVEE_2 | 9BD_GERRY | 07D_SIMI | 04D_CAMA | 10D_HILL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | – | – | <0.001 | – | 0.0379 | – | <0.001 | <0.001 | <0.0021 |
| Nov-14 | Dry | 45 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | – | <0.001 | <0.001 | – | – | – | <0.001 | <0.001 | <0.0021 |
| Dec-14 | Storm | 46 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.0355 | – | 0.0071 | 0.0129 | 0.0397 | – | 0.0098 | – | – | – |
| Dec-14 | Storm | 47 | 0.0061 | <0.001 | 0.0035 | 0.0012 | 0.0043 | 0.0381 | 0.0053 | 0.0109 | 0.0201 | 0.0067 | 0.0209 | 0.0176 | – | – | – |
| Feb-15 | Dry | 48 | 0.0013 | <0.001 | <0.001 | <0.001 | <0.001 | 0.001 | – | 0.0035 | <0.001 | 0.0057 | – | – | <0.001 | <0.001 | <0.0044 |
| May-15 | Dry | 49 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | – | 0.0023 | <0.001 | – | – | – | <0.001 | <0.001 | <0.08 |

**Figure 17. Total Chlordane Water Column Concentrations in Urban, Ag, and POTW Sites: 2008-2015**




| Date | Type | Event | 01_RR_BR | 03_UNIV | 04_WOOD | 06_SOMIS | 07_HITCH | 9B_ADOLF | 10_GATE | 13_BELT |
|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | <0.01 | <0.01 | <0.01 | – | <0.01 | <0.01 | <0.01 | <0.01 |
| Nov-14 | Dry | 45 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | – |
| Dec-14 | Storm | 46 | 0.5212 | 0.9754 | 2.239 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Dec-14 | Storm | 47 | 1.7187 | 0.4119 | 1.216 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Feb-15 | Dry | 48 | <0.01 | <0.01 | 0.213 | <0.01 | <0.01 | <0.01 | – | <0.01 |
| May-15 | Dry | 49 | <0.01 | <0.01 | <0.01 | – | <0.01 | <0.01 | <0.01 | – |

**Figure 18. Toxaphene Water Column Concentrations in Receiving Water Sites: 2008-2015**




| Date | Type | Event | 04D_VENTURA | 07D_CTP | 07T_DC_H | 9BD_ADOLF | 11_SB_HILL | 01T_ODD3_DCH | 02D_BROOM | 04D_WOOD | 05D_SANT_VCWPD | 06T_FC_BR | 07D_HITCH_LEVEE_2 | 9BD_GERRY | 02D_SIM | 03D_CAMA | 10D_HILL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | -- | -- | <0.01 | -- | 0.8295 | -- | <0.01 | <0.01 | <0.12 |
| Nov-14 | Dry | 45 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | -- | <0.01 | <0.01 | -- | -- | -- | <0.01 | <0.01 | <0.12 |
| Dec-14 | Storm | 46 | <0.01 | <0.01 | 1.0402 | <0.01 | <0.01 | 2.0203 | -- | 2.6375 | <0.01 | 2.7328 | 1.5838 | <0.01 | -- | -- | -- |
| Dec-14 | Storm | 47 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 2.0647 | <0.01 | 3.7562 | 0.7465 | <0.01 | 0.5825 | <0.01 | -- | -- | -- |
| Feb-15 | Dry | 48 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | -- | 1.0061 | <0.01 | 1.4438 | -- | -- | <0.01 | <0.01 | <0.21 |
| May-15 | Dry | 49 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | -- | <0.01 | <0.01 | -- | -- | -- | <0.01 | <0.01 | <0.12 |

**Figure 19. Toxaphene Water Column Concentrations in Urban, Ag, and POTW Sites: 2008-2015**

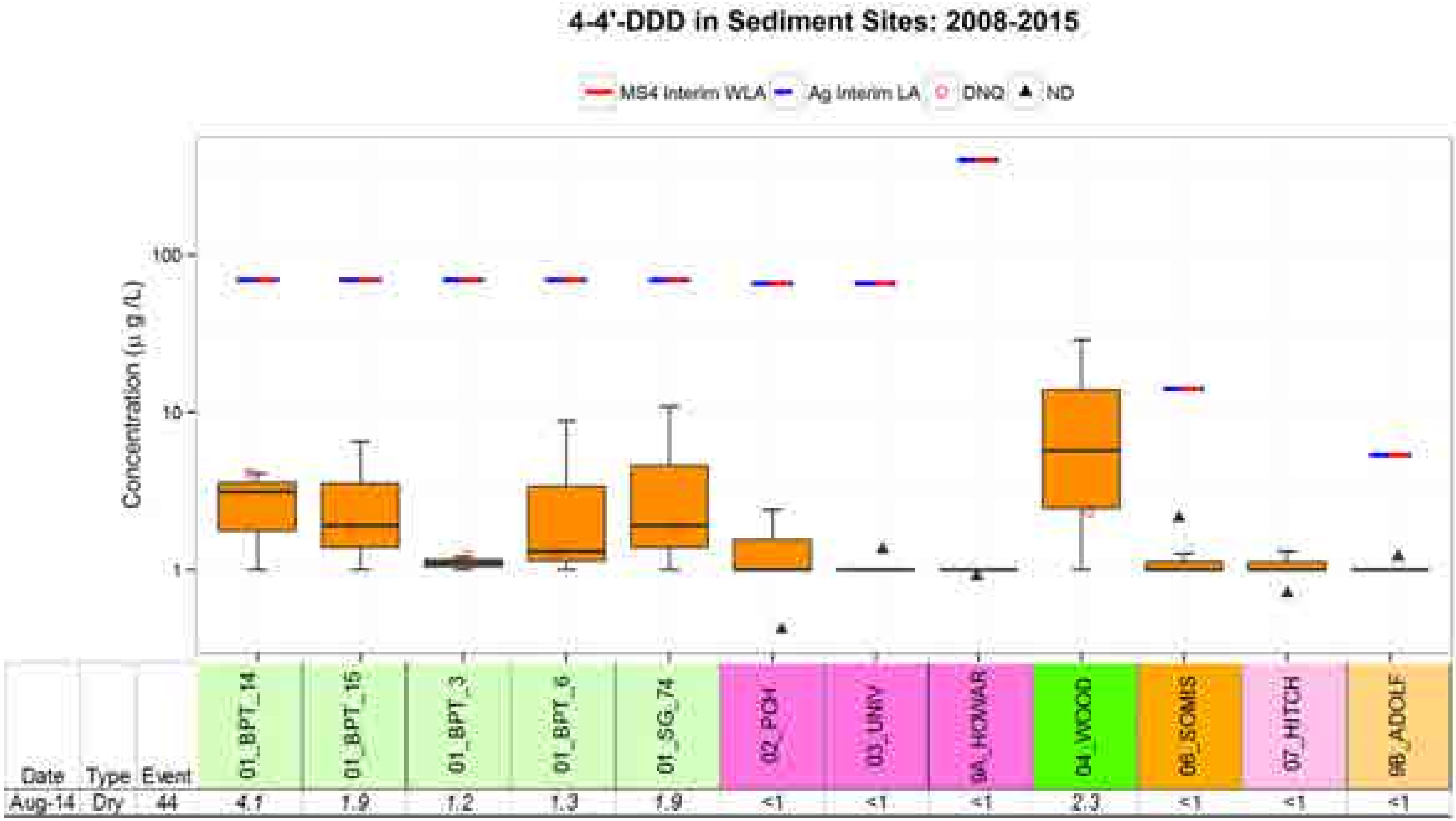



**Figure 20. 4,4'-DDD Sediment Concentrations in Receiving Water Sites: 2008-2015**

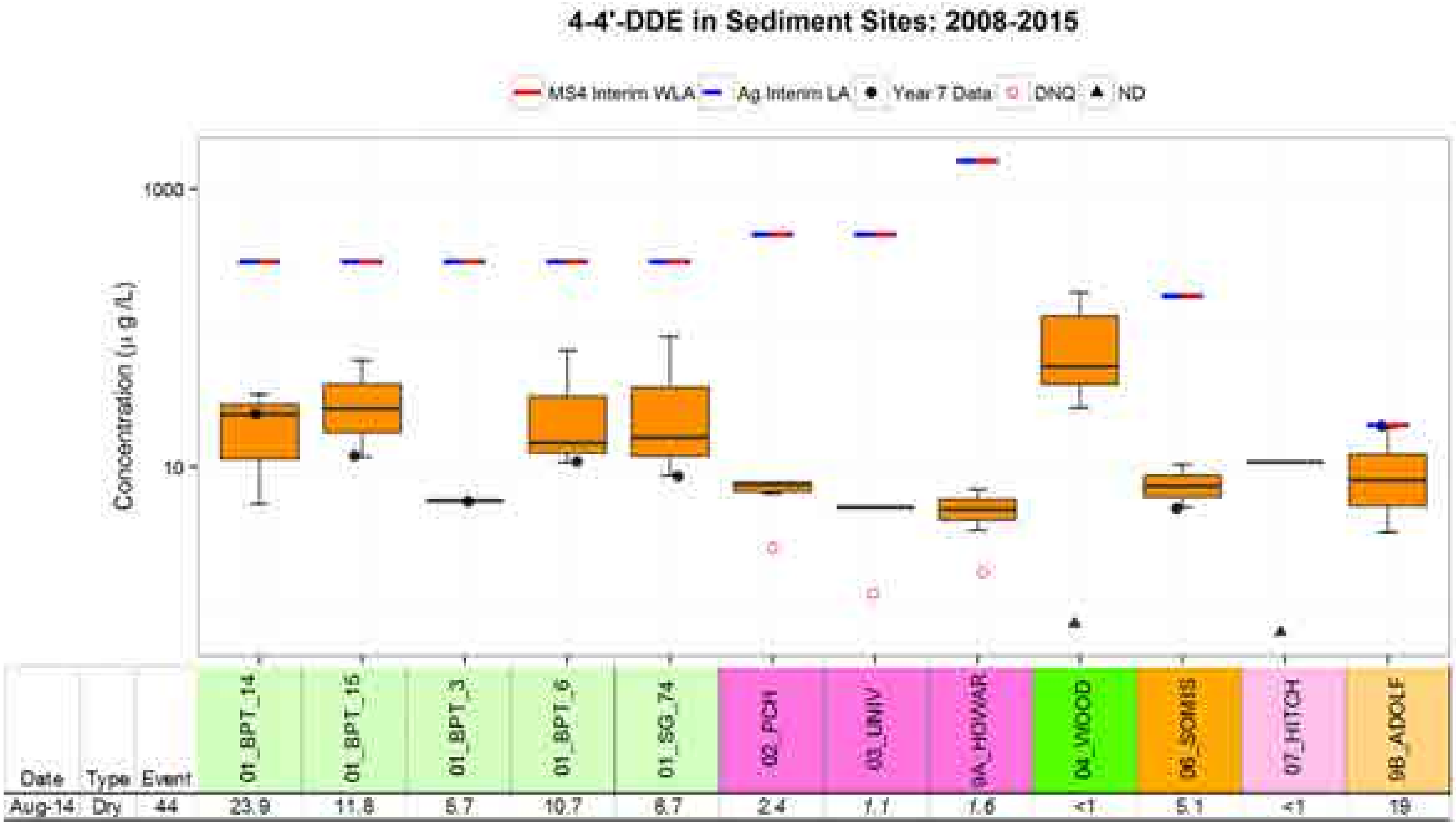



**Figure 21. 4,4'-DDE Sediment Concentrations in Receiving Water Sites: 2008-2015**

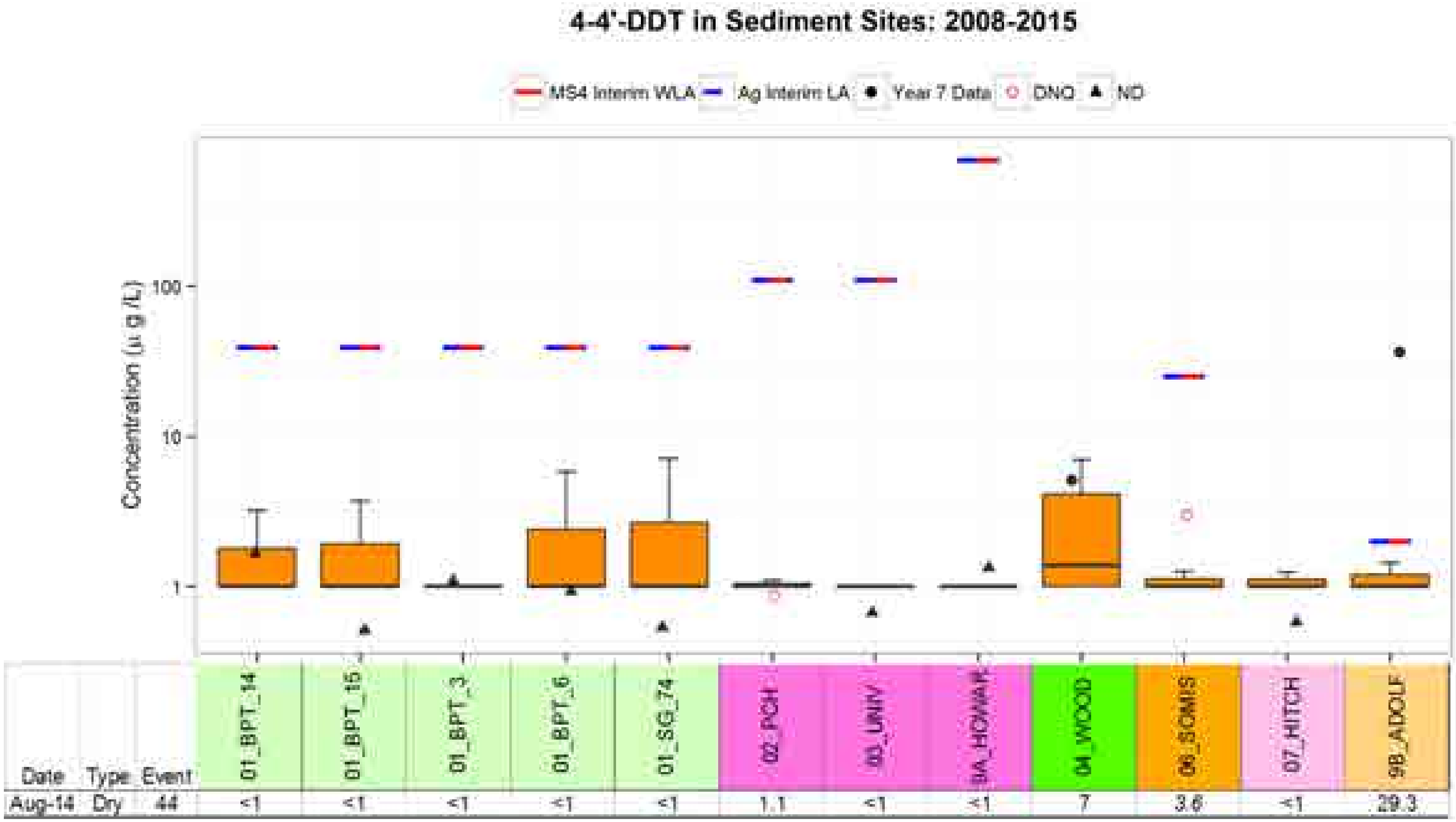



**Figure 22. 4,4'-DDT Sediment Concentrations in Receiving Water Sites: 2008-2015**

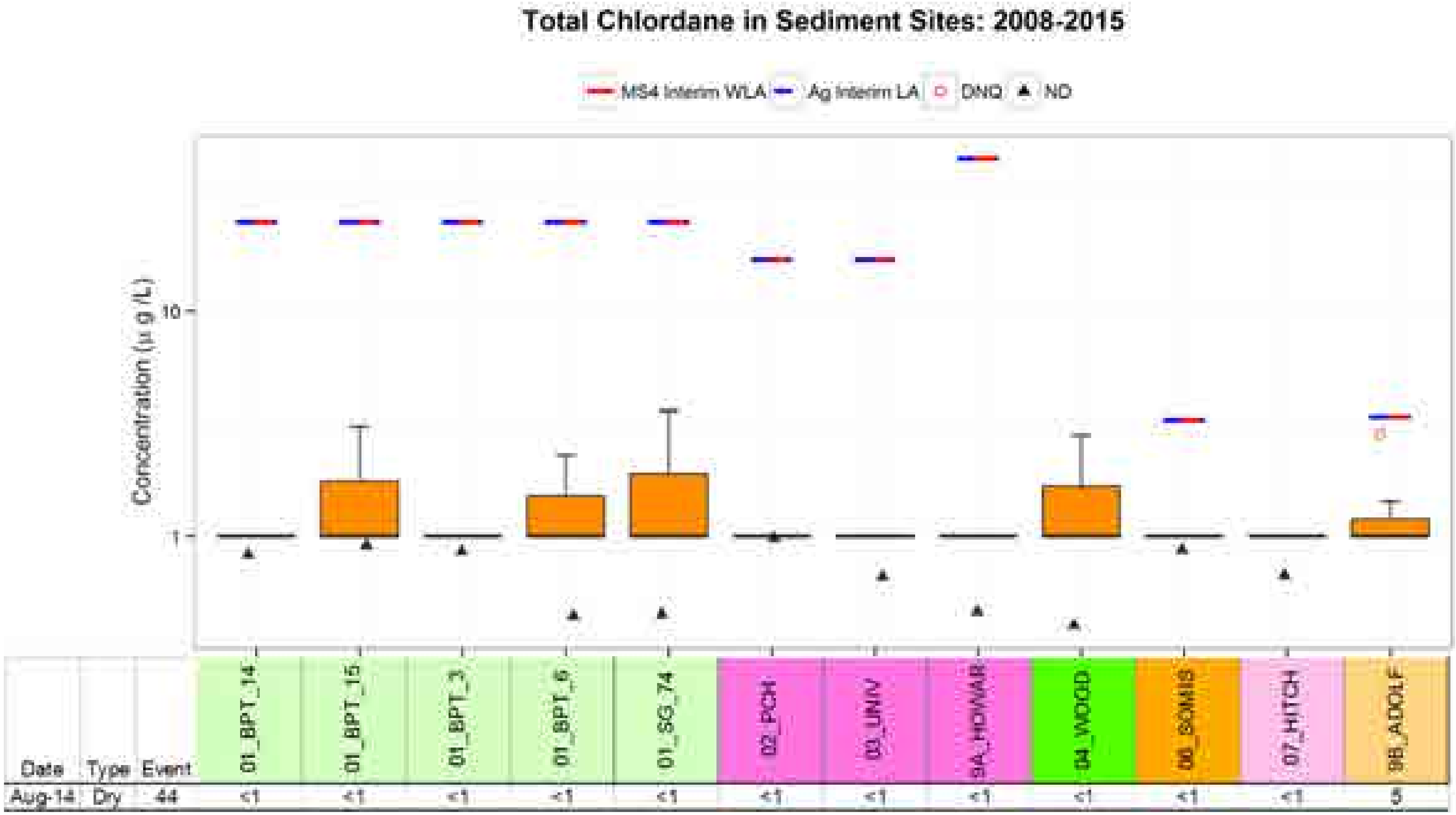



**Figure 23. Total Chlordane Sediment Concentrations in Receiving Water Sites: 2008-2015**

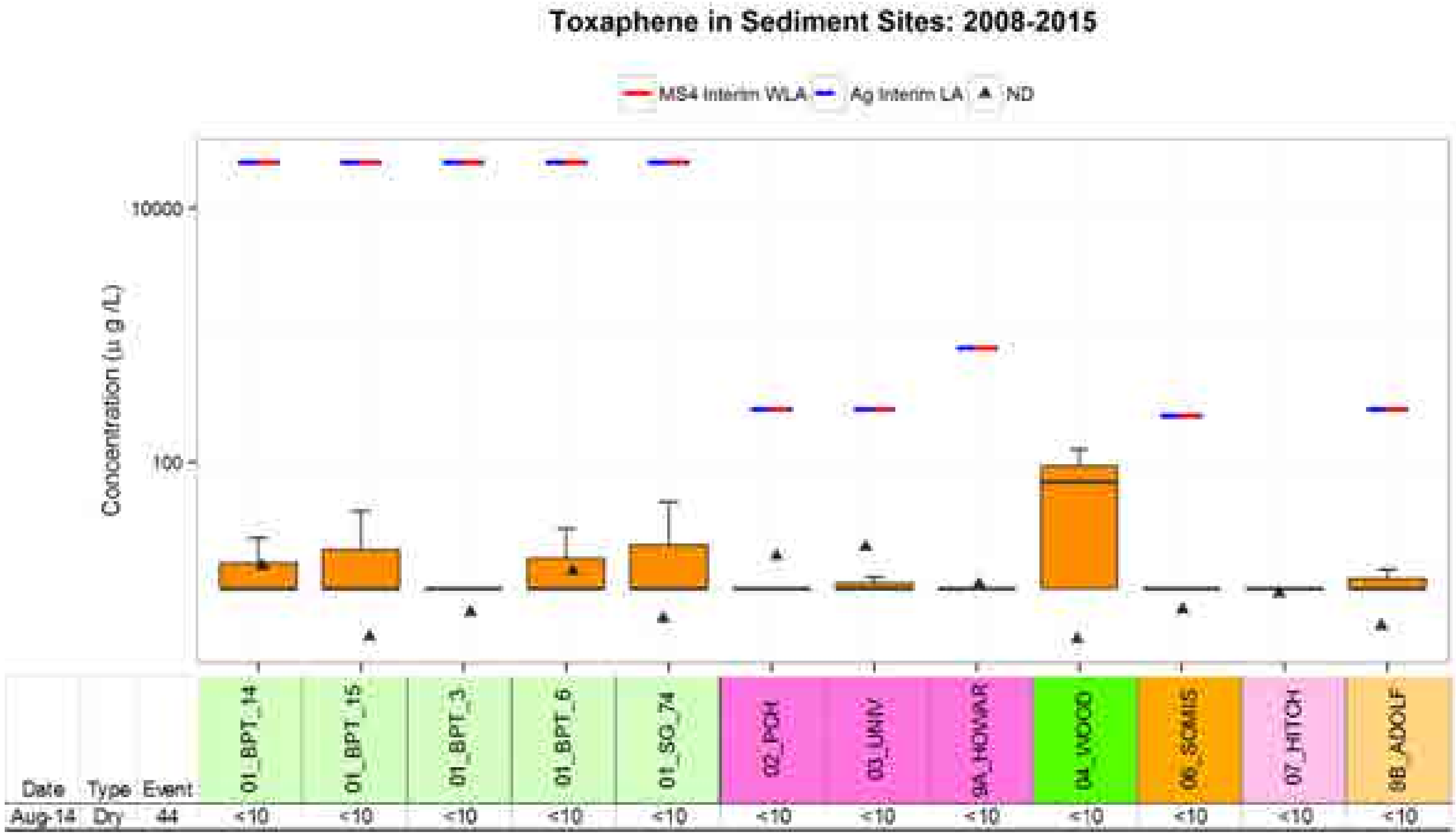
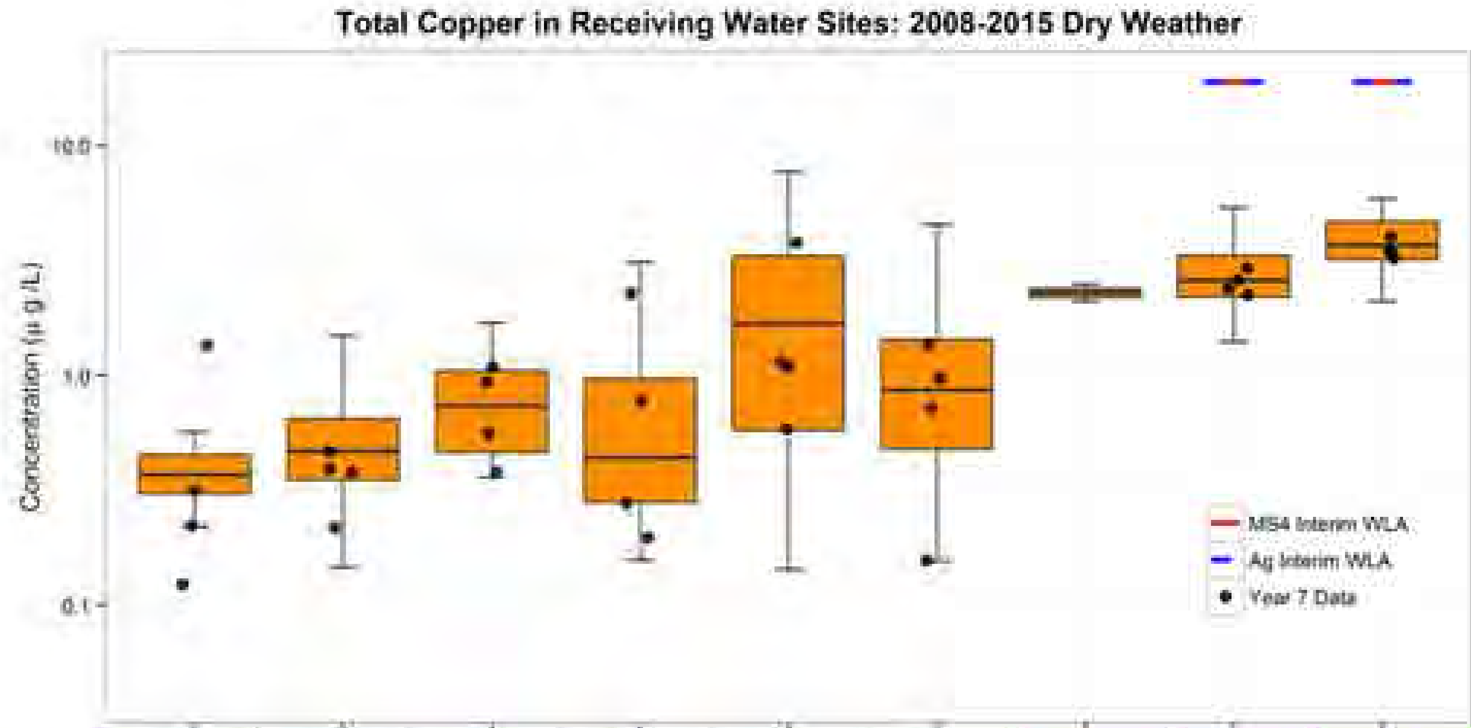



**Figure 24. Toxaphene Sediment Concentrations in Receiving Water Sites: 2008-2015**

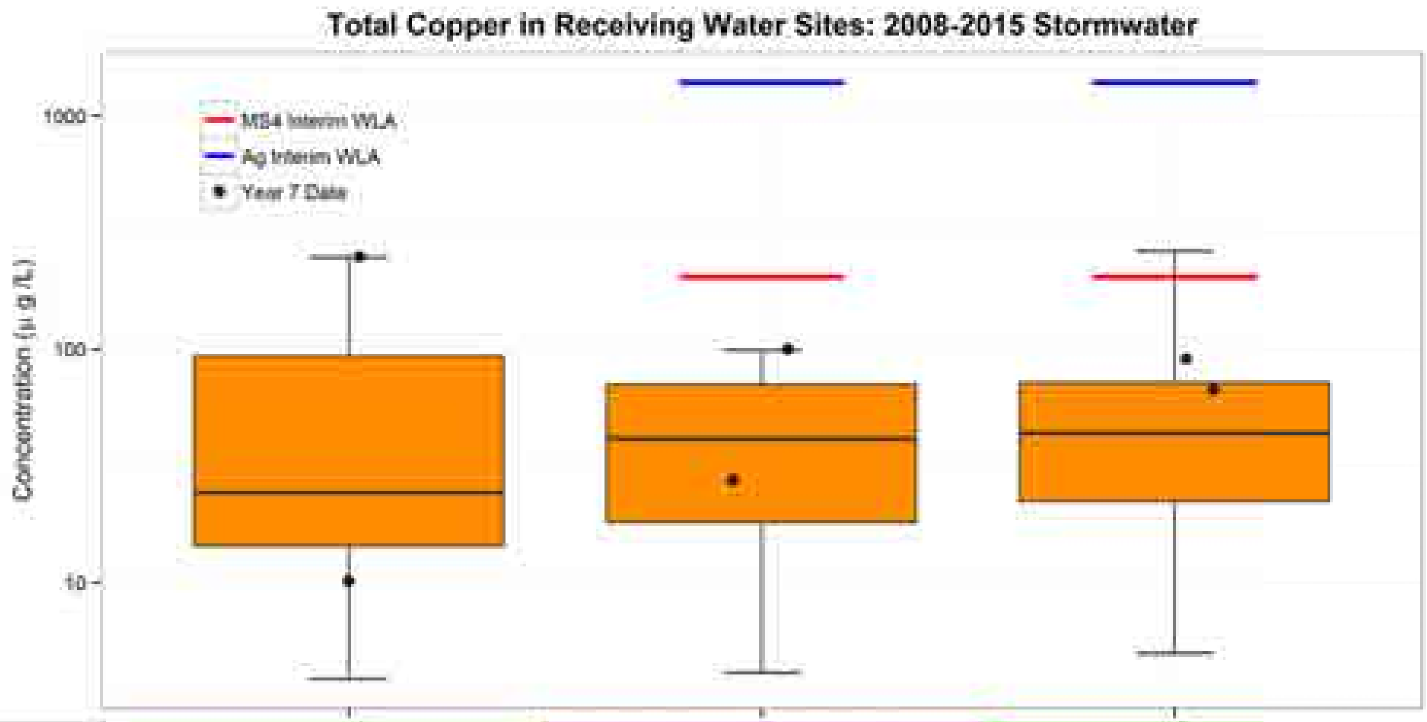
## METALS TMDL DATA SUMMARY

The following figures present metals water quality data from receiving water, agricultural, urban, and POTW monitoring sites. Currently effective total metals interim load allocations and waste load allocations differ for wet and dry weather, therefore the data for each of these conditions is provided separately. Interim POTW waste load allocations for total mercury are in load form and are therefore calculated and presented in the compliance section of the report. The Metals TMDL specifies final targets for both dissolved copper and zinc. Dissolved concentrations for these two metals have been plotted for reference. Bolded values in the tables within each figure indicate the concentration was above the applicable limits for that constituent. Italicized values in the tables within each figure indicate the concentration was DNQ. Values in the tables within each figure with a "<" preceding them, indicate the constituent was ND at the MDL for that constituent. Values identified as "--" in the tables indicate no samples were collected at those sites for those events.



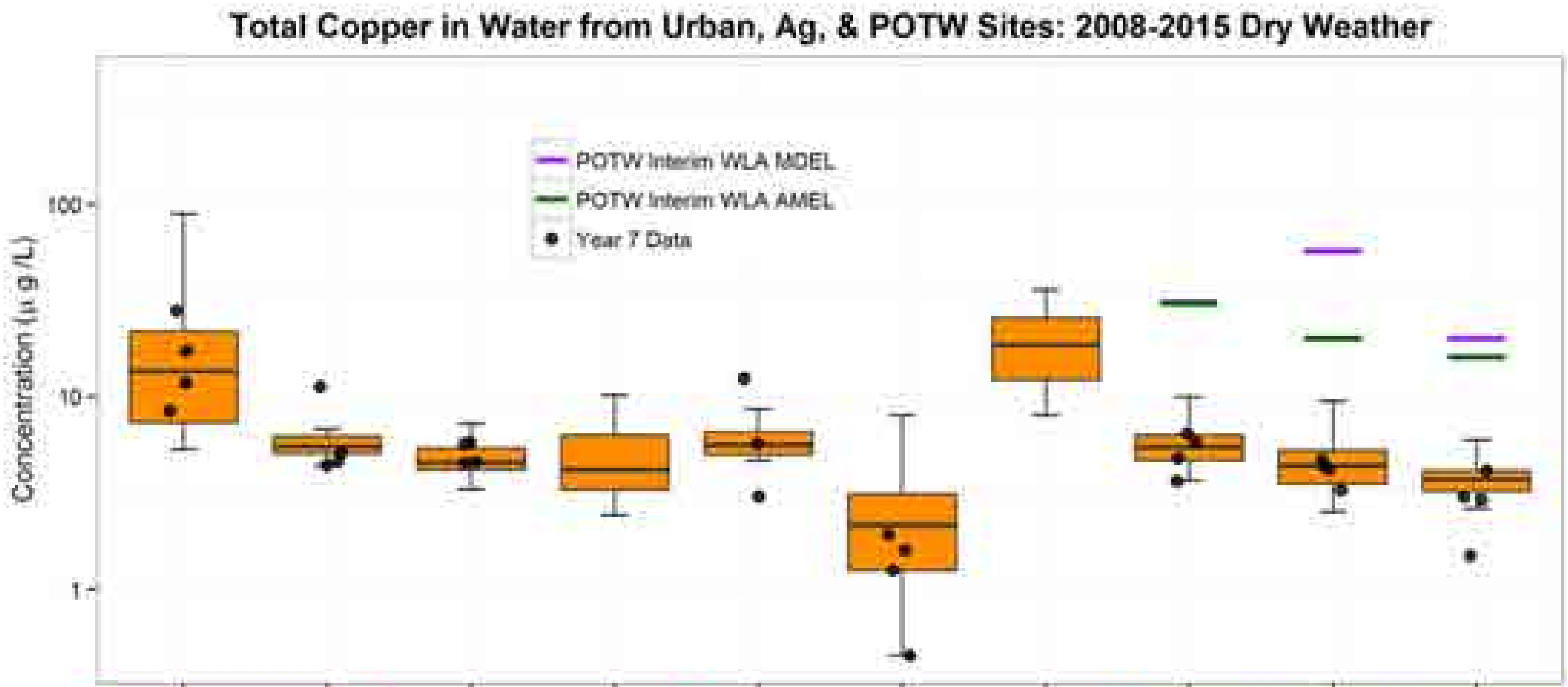

| Date | Type | Event | 01_BPT_3 | 01_BPT_6 | 01_BPT_14 | 01_BPT_15 | 01_RR_BR | 01_SG_74 | 02-PCH | 03_UNIV | 04_WOOD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 0.317 | 0.380 | 0.940 | 0.780 | 1.085 | 0.719 | – | 2.254 | 3.484 |
| Nov-14 | Dry | 45 | 1.351 | 0.467 | 1.087 | 2.282 | 3.794 | 0.971 | – | 2.396 | 4.014 |
| Feb-15 | Dry | 48 | 0.123 | 0.218 | 0.379 | 0.197 | 0.585 | 0.156 | – | 2.612 | 3.459 |
| May-15 | Dry | 49 | 0.221 | 0.394 | 0.560 | 0.278 | 1.152 | 1.370 | – | 2.933 | 3.232 |

**Figure 25. Total Copper Dry Weather Concentrations in Receiving Water Sites: 2008-2015**



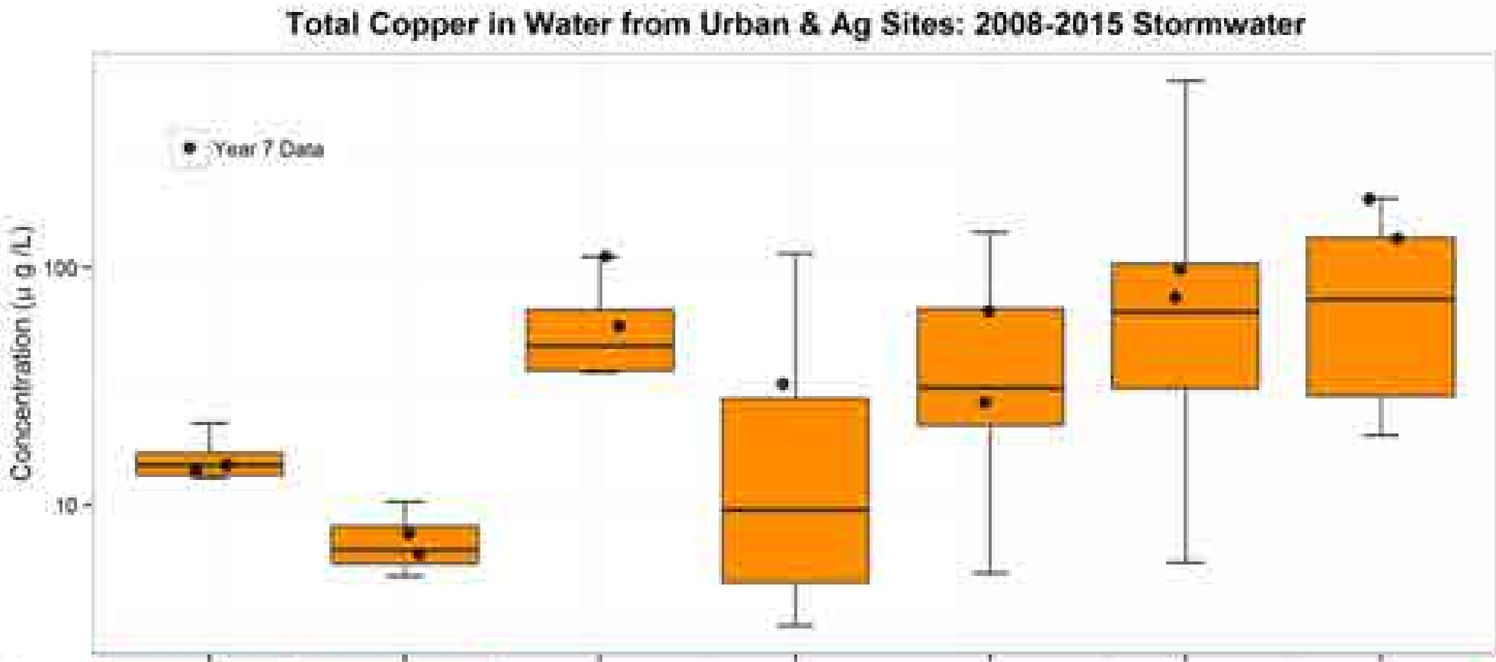

| Date | Type | Event | 01_RR_BR | 03_UNIV | 04_WOOD |
|---|---|---|---|---|---|
| Dec-14 | Storm | 46 | 10.449 | 27.021 | 66.260 |
| Dec-14 | Storm | 47 | 247.046 | 99.093 | 90.214 |

**Figure 26. Total Copper Stormwater Concentrations in Receiving Water Sites: 2008-2015**



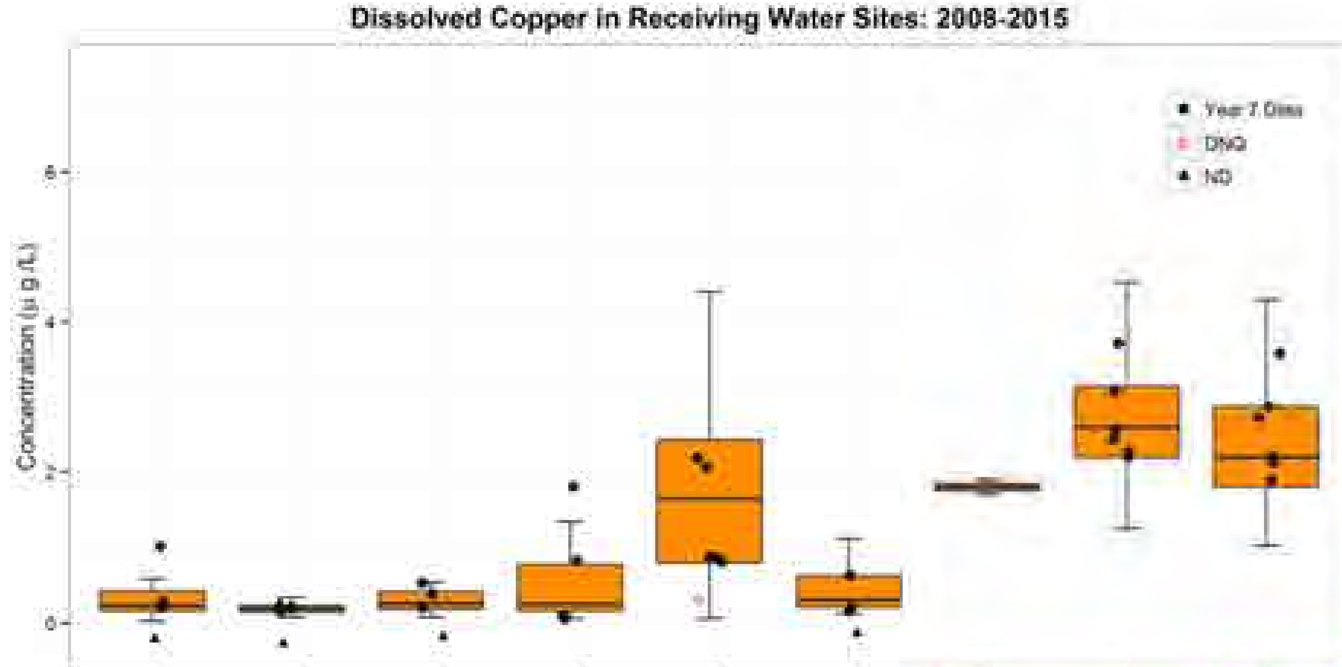

| Date | Type | Event | [illegible] | 9BD_ADOLF | 06T_COCO_SCH | 03D_BROOM | 04D_WOOD | 05D_SANT_VCWPD | 9BD_GERRY | 07D_SIMI | 9AD_CAMA | 10D_HILL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 11.772 | 11.272 | 5.652 | – | – | 1.263 | – | 6.378 | 4.659 | 2.9 |
| Nov-14 | Dry | 45 | 17.151 | 4.566 | 5.708 | – | 3.007 | 1.097 | – | 5.714 | 4.343 | 1.5 |
| Feb-15 | Dry | 48 | 27.884 | 5.065 | 4.497 | – | 12.399 | 0.454 | – | 3.622 | 3.242 | 3.0 |
| May-15 | Dry | 49 | 8.413 | 4.372 | 4.551 | – | 5.668 | 1.928 | – | 4.756 | 4.166 | 4.1 |

**Figure 27. Total Copper Dry Weather Concentrations in Urban, Ag, and POTW Sites: 2008-2015**



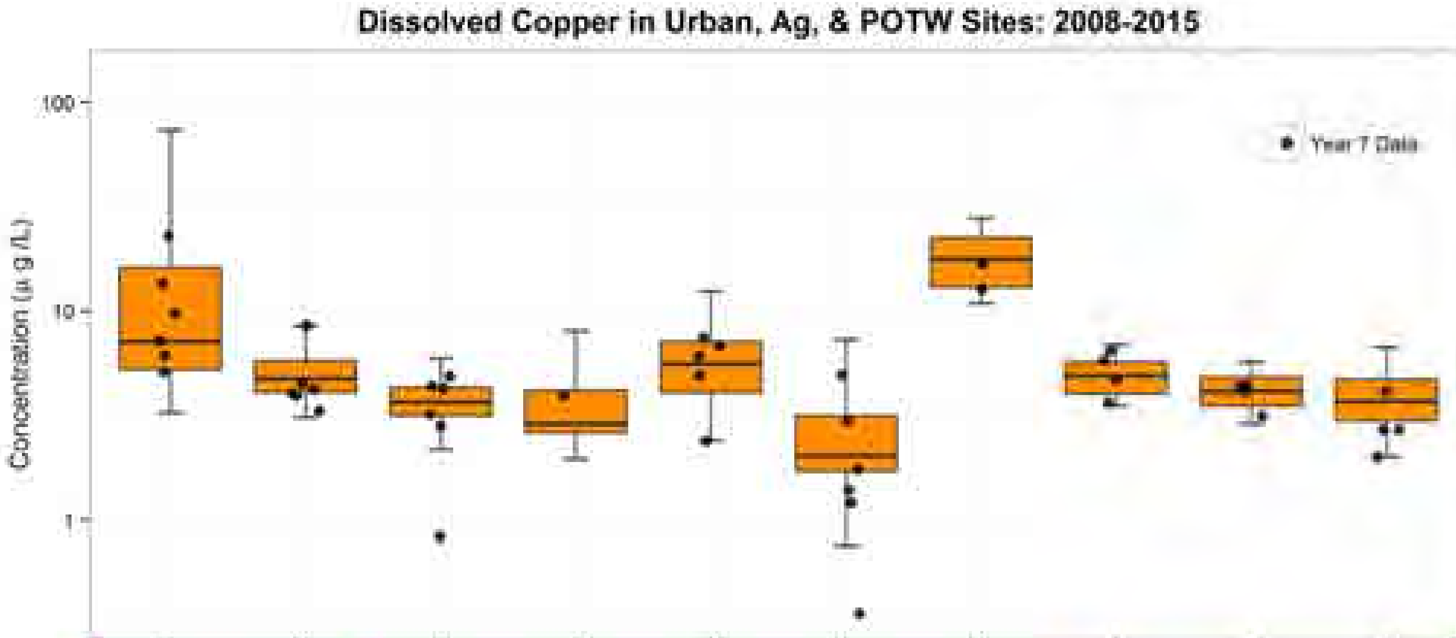

| Date | Type | Event | 04D_VENTURA | 9BD_ADOLF | 01T_ODD2_DCH | 02D_BROOM | 04D_WOOD | 05D_SANT_VCWPD | 9BD_GERRY |
|---|---|---|---|---|---|---|---|---|---|
| Dec-14 | Storm | 46 | 14.211 | 6.219 | 57.557 | -- | 26.928 | 74.053 | 195.157 |
| Dec-14 | Storm | 47 | 14.710 | 7.487 | 110.919 | 32.210 | 65.235 | 98.181 | 131.883 |

**Figure 28. Total Copper Wet Weather Concentrations in Urban and Ag Sites: 2008-2014**



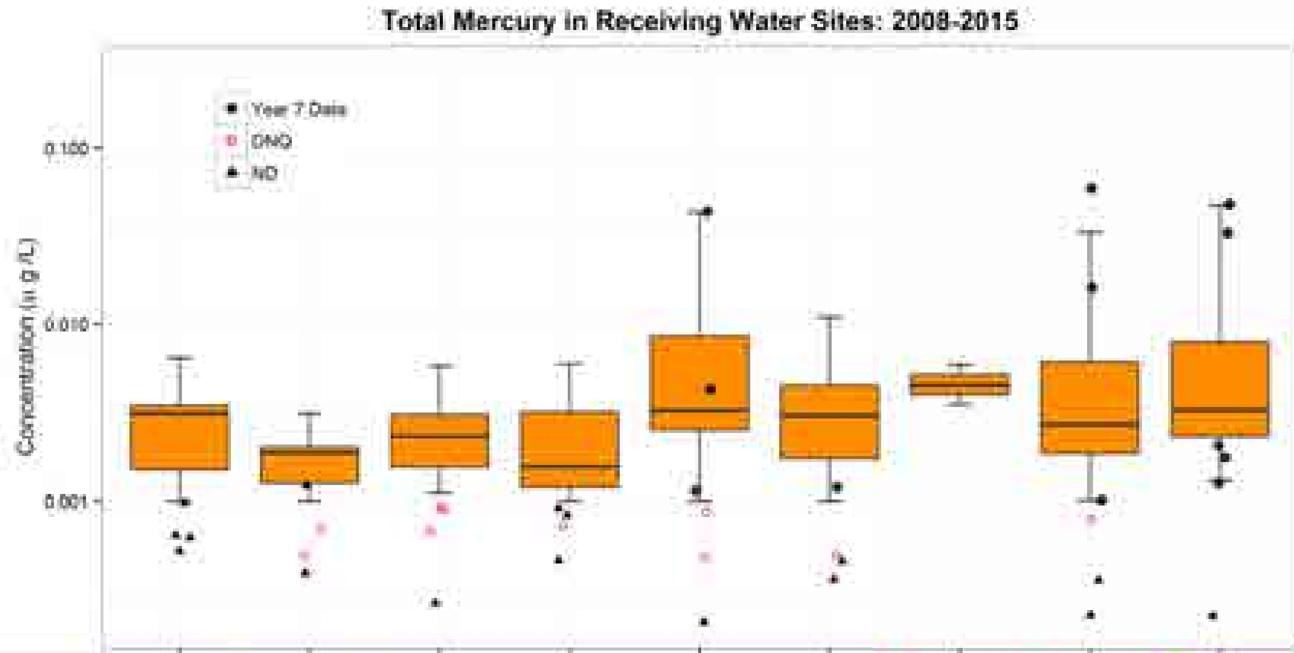

| Date | Type | Event | 01_BPT_3 | 01_BPT_6 | 01_BPT_14 | 01_BPT_15 | 01_RR_BR | 01_SG_74 | 02-PCH | 03_UNIV | 04_WOOD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 0.286 | 0.212 | 0.390 | 0.835 | 0.817 | 0.216 | -- | 2.207 | 2.871 |
| Nov-14 | Dry | 45 | 1.017 | 0.160 | 0.537 | 1.800 | 2.058 | 0.636 | -- | 2.272 | 2.131 |
| Dec-14 | Storm | 46 | -- | -- | -- | -- | 0.884 | -- | -- | 3.711 | 2.727 |
| Dec-14 | Storm | 47 | -- | -- | -- | -- | 2.184 | -- | -- | 3.075 | 3.581 |
| Feb-15 | Dry | 48 | <0.005 | <0.005 | <0.005 | <0.059 | *0.005* | <0.005 | -- | 2.441 | 2.201 |
| May-15 | Dry | 49 | 0.204 | <0.005 | 0.208 | 0.102 | 0.865 | 0.160 | -- | 2.567 | 1.888 |

**Figure 29. Dissolved Copper Concentrations in Receiving Water Sites: 2008-2015**



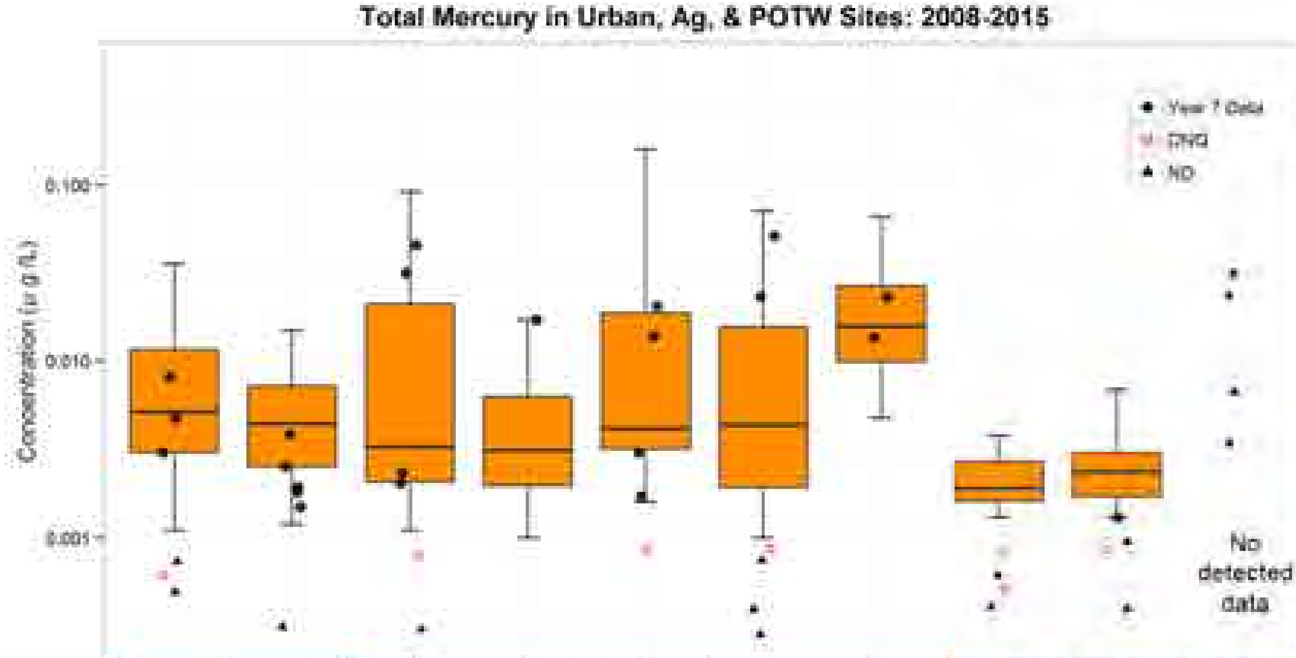

| Date | Type | Event | 04D_VENTURA | 9BD_ADOLF | 01T_ODD2_DCH | 02D_BROOM | 04D_WOOD | 05D_SANT_VCWPD | 9BD_GERRY | 07D_SIMI | 9AD_CAMA | 10D_HILL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 9.740 | 8.500 | 4.878 | -- | -- | 1.207 | -- | 6.430 | 4.36 | 2.7 |
| Nov-14 | Dry | 45 | 13.469 | 4.211 | 4.262 | -- | 2.386 | 1.387 | -- | 5.815 | 4.42 | 2.0 |
| Dec-14 | Storm | 46 | 5.085 | 3.931 | 0.836 | -- | 6.040 | 2.980 | 16.712 | -- | -- | -- |
| Dec-14 | Storm | 47 | 6.118 | 3.308 | 2.818 | 3.918 | 6.766 | 4.939 | 12.671 | -- | -- | -- |
| Feb-15 | Dry | 48 | 22.843 | 4.479 | 3.206 | -- | 7.439 | 0.360 | -- | 3.642 | 3.16 | 2.7 |
| May-15 | Dry | 49 | 7.219 | 4.010 | 4.375 | -- | 4.892 | 1.742 | -- | 4.706 | 4.10 | 4.1 |

**Figure 30. Dissolved Copper Concentrations in Urban, Ag, and POTW Sites: 2008-2015**



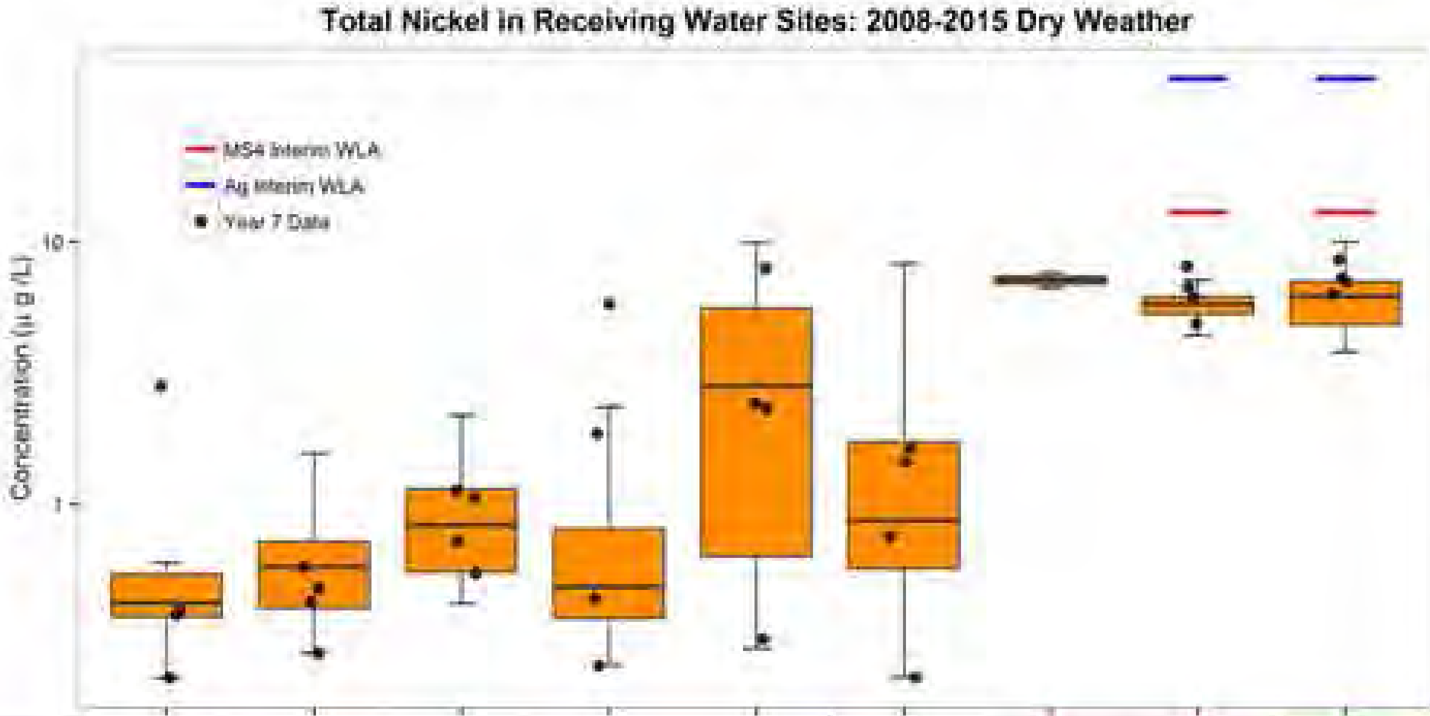

| Date | Type | Event | 01_BPT_3 | 01_BPT_6 | 01_BPT_14 | 01_BPT_15 | 01_RR_BR | 01_SG_74 | 02-PCH | 03_UNIV | 04_WOOD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | <0.0005 | *0.0007* | *0.0009* | *0.0007* | 0.0011 | 0.0012 | -- | <0.0005 | 0.0013 |
| Nov-14 | Dry | 45 | <0.0005 | <0.0005 | *0.0009* | <0.0005 | *0.0009* | <0.0005 | -- | *0.0008* | 0.0017 |
| Dec-14 | Storm | 46 | -- | -- | -- | -- | 0.0043 | -- | -- | 0.0164 | 0.0471 |
| Dec-14 | Storm | 47 | -- | -- | -- | -- | 0.0431 | -- | -- | 0.0603 | 0.0339 |
| Feb-15 | Dry | 48 | <0.0005 | *0.0005* | *0.0007* | <0.0005 | *0.0005* | *0.0005* | -- | 0.0010 | 0.0021 |
| May-15 | Dry | 49 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | -- | <0.0005 | <0.0005 |

**Figure 31. Total Mercury Concentrations in Receiving Water Sites: 2008-2015**



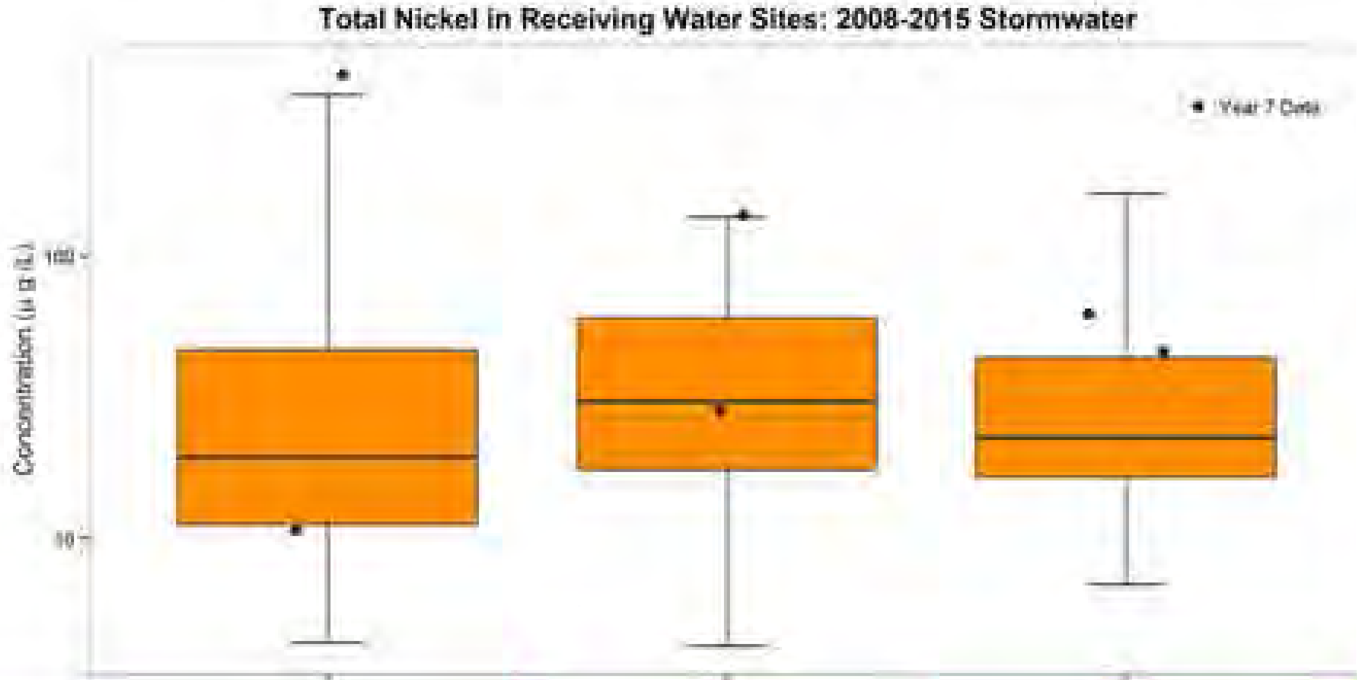

| Date | Type | Event | 04D_VENTURA | 9BD_ADOLF | 01T_ODD2_DCH | 02D_BROOM | 04D_WOOD | 05D_SANT_VCWPD | 9BD_GERRY | 07D_SIMI | 9AD_CAMA | 10D_HILL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | *0.0006* | 0.0015 | *0.0008* | -- | -- | <0.0005 | -- | *0.0005* | 0.0013 | <0.0039 |
| Nov-14 | Dry | 45 | <0.0005 | 0.0019 | 0.0023 | -- | 0.0017 | <0.0005 | -- | <0.0005 | <0.0005 | <0.0039 |
| Dec-14 | Storm | 46 | 0.0081 | 0.0038 | 0.0314 | -- | 0.0138 | 0.0512 | 0.0229 | -- | -- | -- |
| Dec-14 | Storm | 47 | 0.0047 | 0.0025 | 0.0455 | 0.0171 | 0.0204 | 0.0231 | 0.0136 | -- | -- | -- |
| Feb-15 | Dry | 48 | 0.0030 | 0.0018 | 0.0020 | -- | 0.0030 | *0.0009* | -- | *0.0008* | *0.0009* | <0.025 |
| May-15 | Dry | 49 | <0.0005 | <0.0005 | <0.0005 | -- | *0.0009* | <0.0005 | -- | <0.0005 | <0.0005 | <0.025 |

**Figure 32. Total Mercury Concentrations in Urban and Ag Sites: 2008-2015**



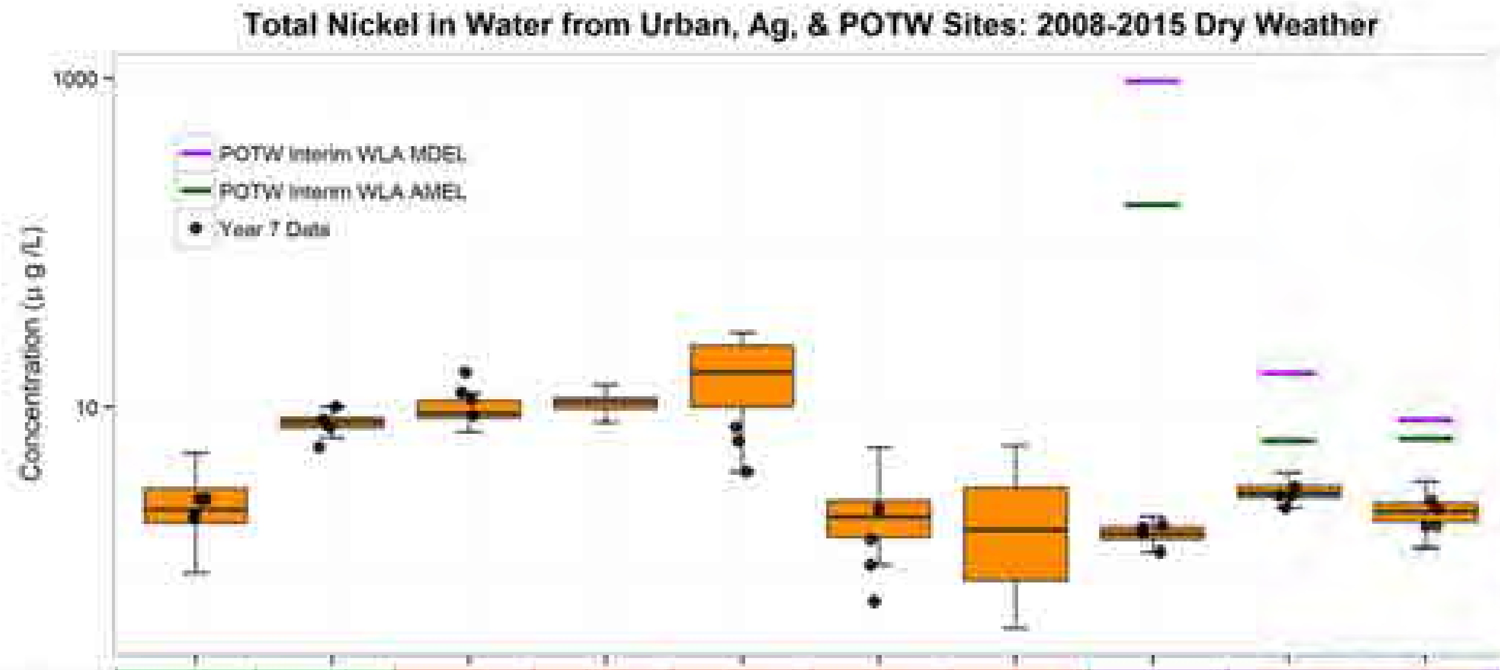

| Date | Type | Event | 01_BPT_3 | 01_BPT_6 | 01_BPT_14 | 01_BPT_15 | 01_RR_BR | 01_SG_74 | 02-PCH | 03_UNIV | 04_WOOD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 0.375 | 0.475 | 1.127 | 1.855 | 2.309 | 0.750 | – | 6.700 | 7.290 |
| Nov-14 | Dry | 45 | 2.817 | 0.571 | 1.056 | 5.767 | 7.881 | 1.622 | – | 8.050 | 8.600 |
| Feb-15 | Dry | 48 | 0.216 | 0.268 | 0.540 | 0.241 | 0.303 | 0.217 | – | 4.860 | 7.060 |
| May-15 | Dry | 49 | 0.391 | 0.423 | 0.720 | 0.432 | 2.430 | 1.443 | – | 6.120 | 6.330 |

**Figure 33. Total Nickel Dry Weather Concentrations in Receiving Water Sites: 2008-2015**



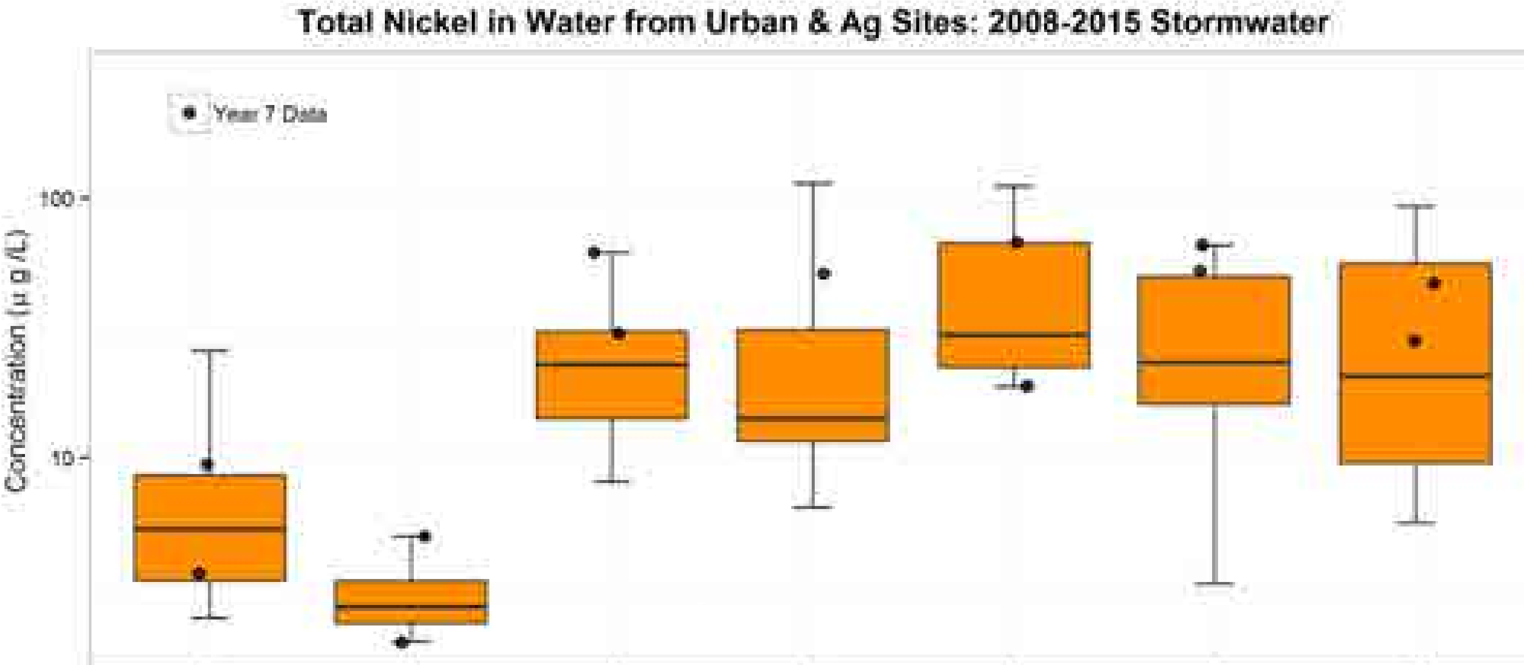

| Date | Type | Event | 01_RR_BR | 03_UNIV | 04_WOOD |
|---|---|---|---|---|---|
| Dec-14 | Storm | 46 | 9.545 | 27.160 | 42.490 |
| Dec-14 | Storm | 47 | 374.100 | 137.270 | 72.740 |

**Figure 34. Total Nickel Stormwater Concentrations in Receiving Water Sites: 2008-2015**



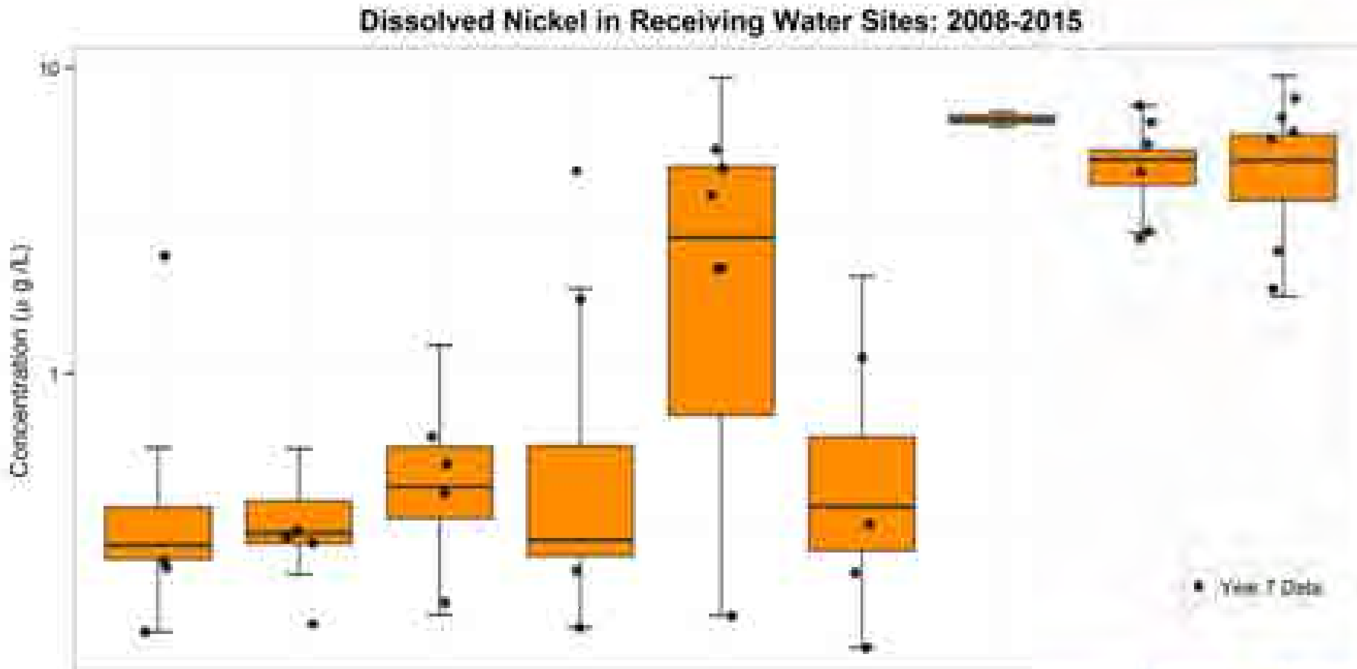

| Date | Type | Event | 04D_VENTURA | 9BD_ADOLF | 01T_ODD2_DCH | 02D_BROOM | 04D_WOOD | 05D_SANT_VCWPD | 9BD_GERRY | 07D_SIMI | 9AD_CAMA | 10D_HILL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 2.74 | 9.99 | 16.22 | -- | -- | 1.12 | -- | 1.85 | 3.25 | 2.40 |
| Nov-14 | Dry | 45 | 2.20 | 5.67 | 12.18 | -- | 4.03 | 1.56 | -- | 1.70 | 2.86 | 2.70 |
| Feb-15 | Dry | 48 | 2.74 | 7.49 | 8.88 | -- | 6.20 | 0.67 | -- | 1.33 | 2.44 | 1.90 |
| May-15 | Dry | 49 | 2.09 | 8.41 | 11.06 | -- | 7.56 | 2.40 | -- | 1.93 | 2.89 | 1.90 |

**Figure 35. Total Nickel Dry Weather Concentrations in Urban, Ag, and POTW Sites: 2008-2015**



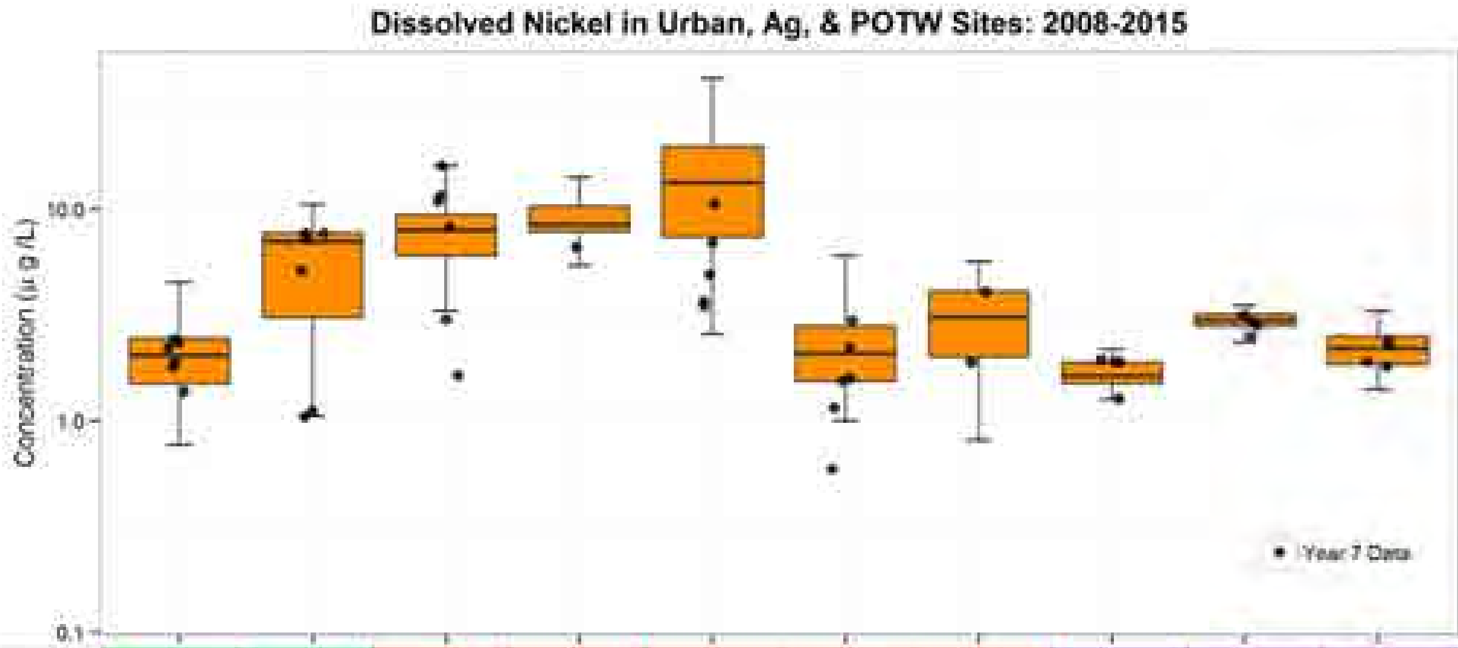

| Date | Type | Event | 04D_VENTURA | 9BD_ADOLF | 01T_ODD2_DCH | 02D_BROOM | 04D_WOOD | 05D_SANT_VCWPD | 9BD_GERRY |
|---|---|---|---|---|---|---|---|---|---|
| Dec-14 | Storm | 46 | 3.56 | 1.95 | 29.93 | – | 18.72 | 52.46 | 27.93 |
| Dec-14 | Storm | 47 | 9.33 | 4.96 | 61.49 | 51.41 | 67.50 | 65.45 | 46.91 |

**Figure 36. Total Nickel Stormwater Concentrations in Urban and Ag Sites: 2008-2015**



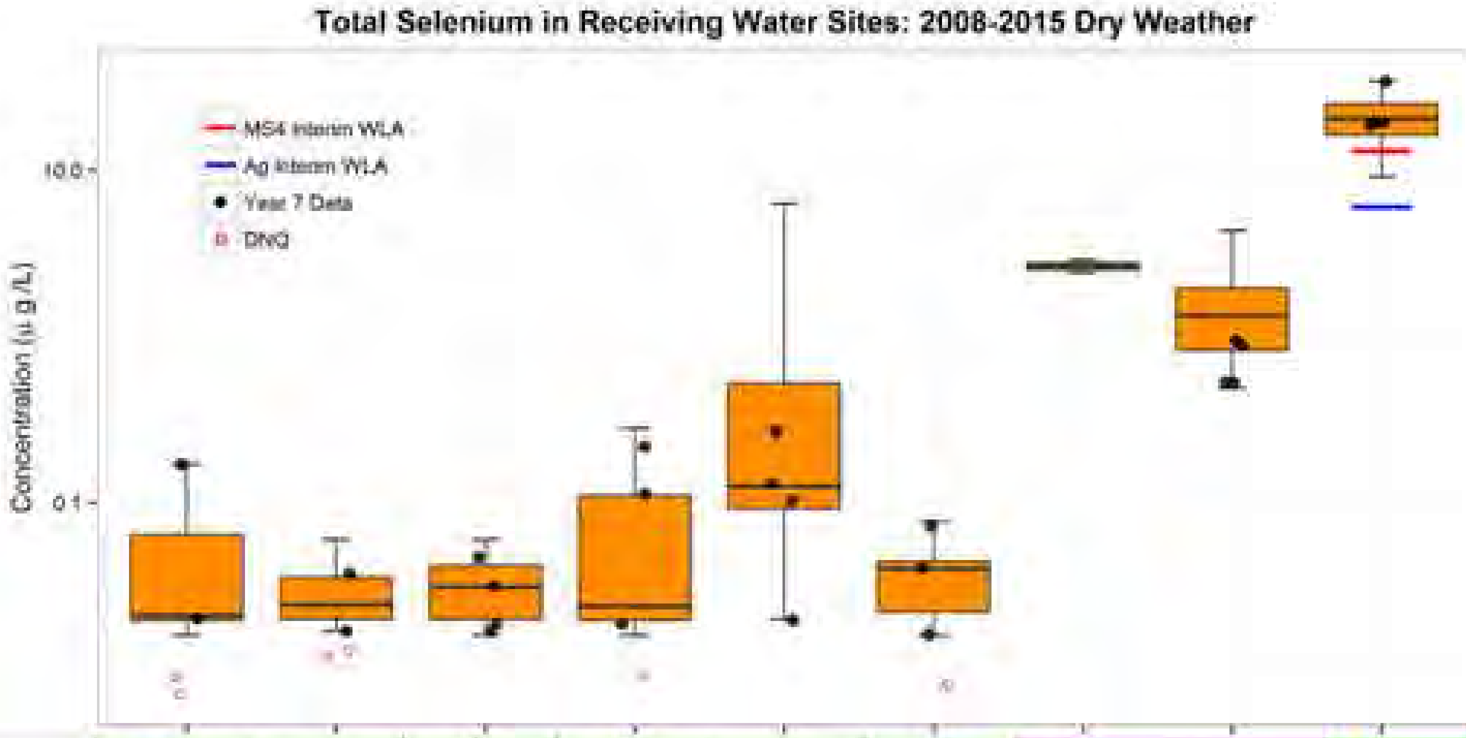

| Date | Type | Event | 01_BPT_3 | 01_BPT_6 | 01_BPT_14 | 01_BPT_15 | 01_RR_BR | 01_SG_74 | 02_PCH | 03_UNIV | 04_WOOD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 0.233 | 0.281 | 0.620 | 1.748 | 2.204 | 0.225 | -- | 6.65 | 6.90 |
| Nov-14 | Dry | 45 | 2.431 | 0.294 | 0.505 | 4.592 | 5.422 | 1.129 | -- | 7.55 | 7.96 |
| Dec-14 | Storm | 46 | -- | -- | -- | -- | 4.676 | -- | -- | 2.77 | 2.52 |
| Dec-14 | Storm | 47 | -- | -- | -- | -- | 3.840 | -- | -- | 2.93 | 1.90 |
| Feb-15 | Dry | 48 | 0.144 | 0.153 | 0.180 | 0.149 | 0.163 | 0.128 | -- | 4.57 | 6.19 |
| May-15 | Dry | 49 | 0.246 | 0.306 | 0.405 | 0.228 | 2.205 | 0.321 | -- | 5.61 | 5.82 |

**Figure 37. Dissolved Nickel Concentrations in Receiving Water Sites: 2008-2015**



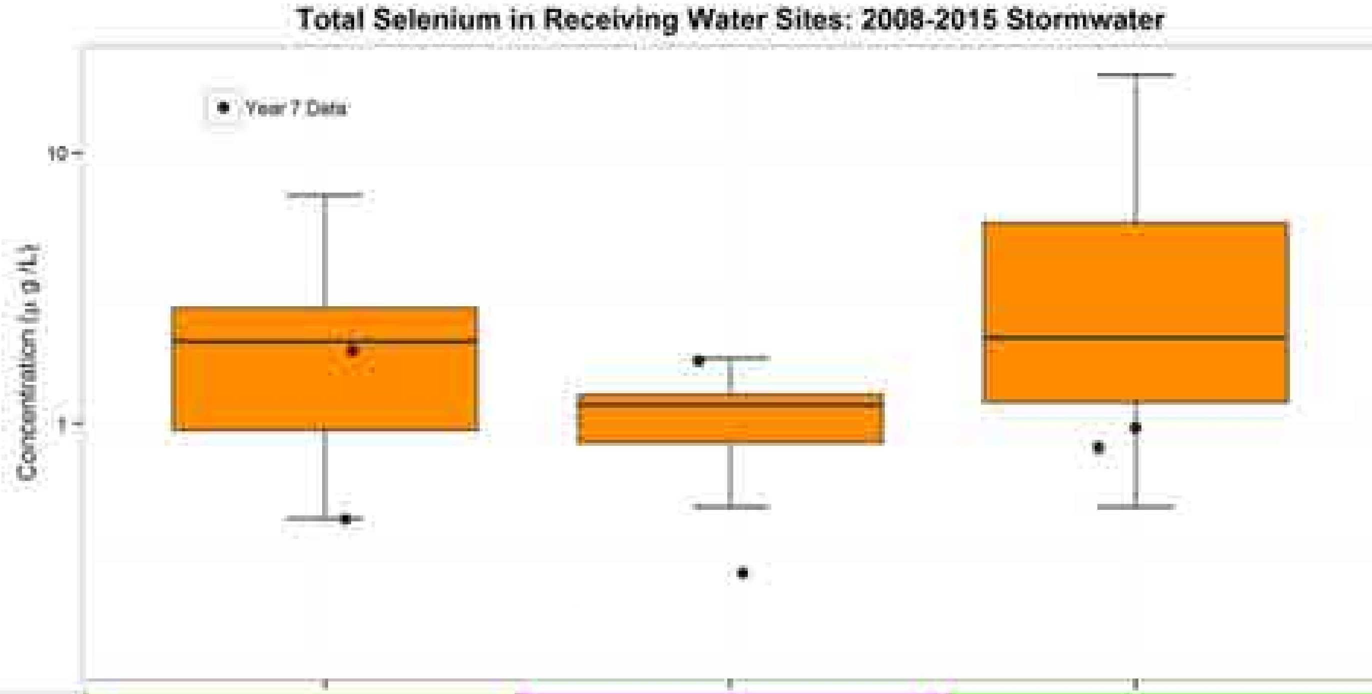

| Date | Type | Event | 04D_VENTURA | 9BD_ADOLF | 01T_ODD2_DCH | 02D_BROOM | 04D_WOOD | 05D_SANT_VCWPD | 9BD_GERRY | 07D_SIMI | 9AD_CAMA | 10D_HILL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 2.33 | 7.65 | 16.04 | -- | -- | 1.15 | -- | 1.94 | 3.16 | 2.40 |
| Nov-14 | Dry | 45 | 1.89 | 5.12 | 11.53 | -- | 3.68 | 1.54 | -- | 1.89 | 2.94 | 1.90 |
| Dec-14 | Storm | 46 | 1.37 | 1.11 | 3.01 | -- | 4.90 | 2.97 | 4.05 | -- | -- | -- |
| Dec-14 | Storm | 47 | 1.80 | 1.05 | 1.64 | 6.59 | 10.54 | 1.58 | 1.89 | -- | -- | -- |
| Feb-15 | Dry | 48 | 2.43 | 7.22 | 8.20 | -- | 3.48 | 0.59 | -- | 1.27 | 2.50 | 1.80 |
| May-15 | Dry | 49 | 2.21 | 7.68 | 10.86 | -- | 6.94 | 2.22 | -- | 1.90 | 2.81 | 2.30 |

**Figure 38. Dissolved Nickel Concentrations in Urban, Ag, and POTW Sites: 2008-2015**



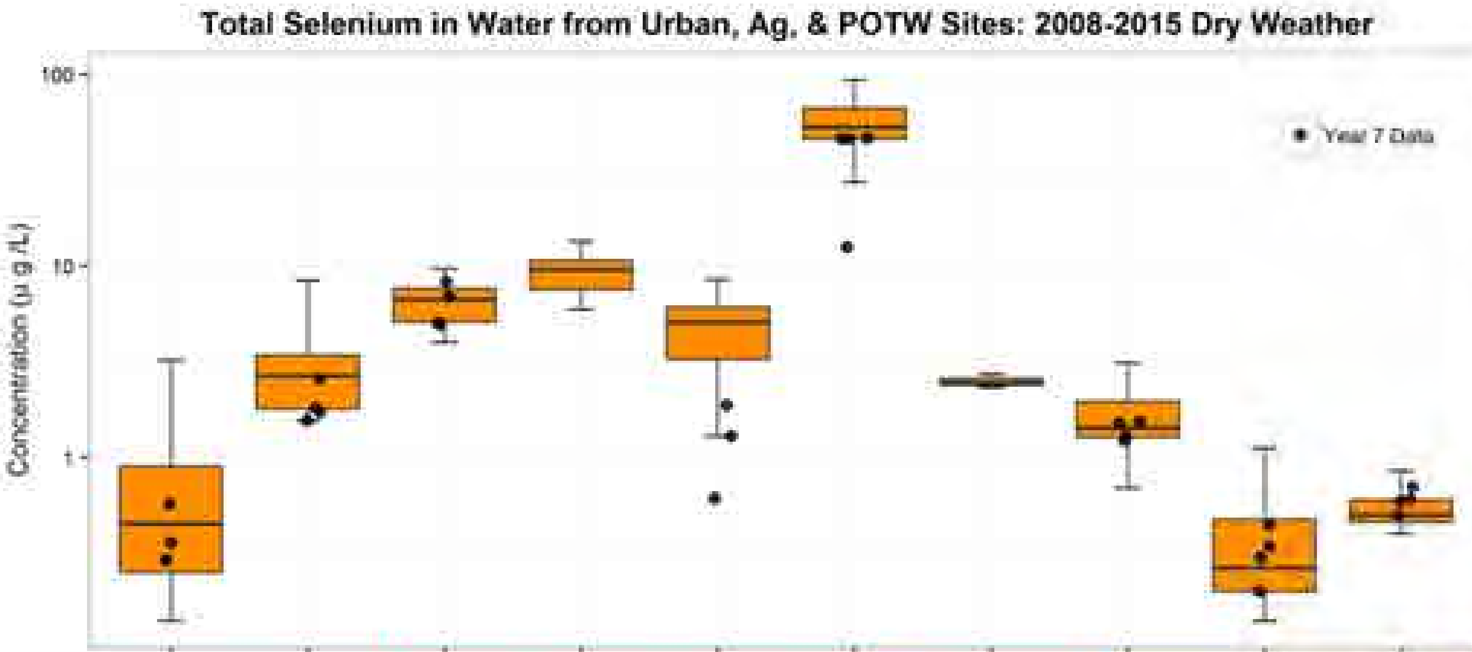

| Date | Type | Event | 01_BPT_3 | 01_BPT_6 | 01_BPT_14 | 01_BPT_15 | 01_RR_BR | 01_SG_74 | 02-PCH | 03_UNIV | 04_WOOD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | *0.009* | *0.013* | 0.046 | 0.113 | 0.130 | 0.016 | – | 0.540 | 34.100 |
| Nov-14 | Dry | 45 | 0.171 | 0.038 | 0.019 | 0.213 | 0.270 | 0.074 | – | 0.540 | 19.460 |
| Feb-15 | Dry | 48 | *0.007* | *0.012* | 0.017 | *0.009* | 0.020 | *0.008* | – | 0.870 | 19.460 |
| May-15 | Dry | 49 | 0.020 | 0.017 | 0.031 | 0.019 | 0.102 | 0.041 | – | 0.940 | 18.490 |

**Figure 39. Total Selenium Dry Weather Concentrations in Receiving Water Sites: 2008-2015**



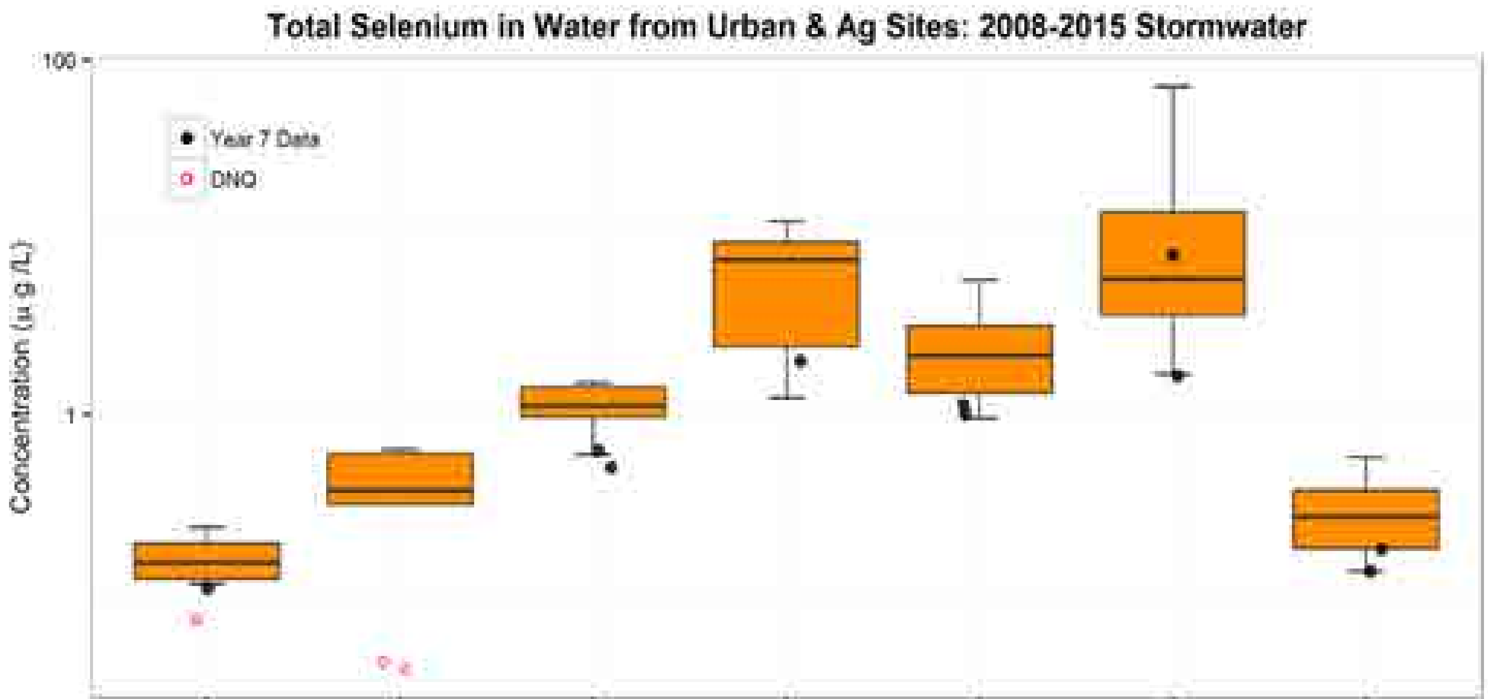

| Date | Type | Event | 01_RR_BR | 03_UNIV | 04_WOOD |
|---|---|---|---|---|---|
| Dec-14 | Storm | 46 | 0.450 | 0.290 | 0.800 |
| Dec-14 | Storm | 47 | 1.890 | 1.740 | 0.940 |

**Figure 40. Total Selenium Stormwater Concentration in Receiving Water Sites: 2008-2015**



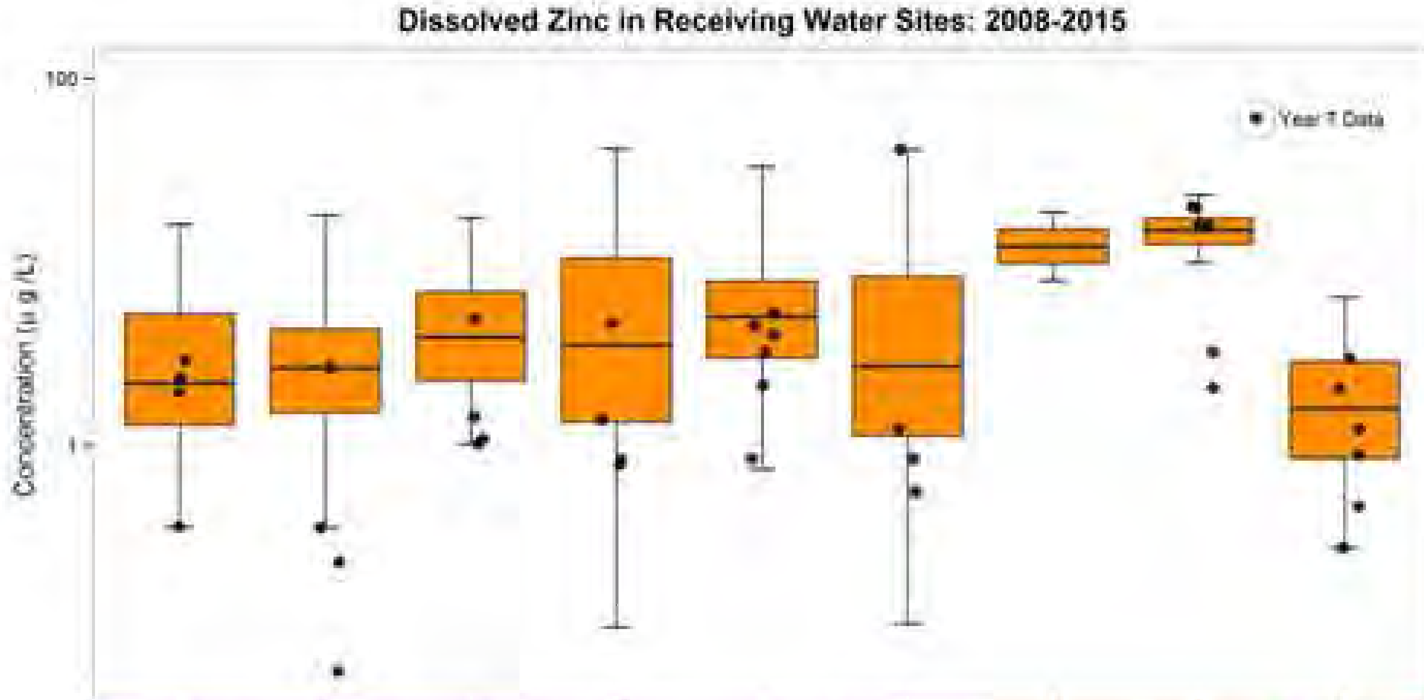

| Date | Type | Event | 04D_VENTURA | 9BD_ADOLF | 01T_ODD2_DCH | 02D_BROOM | 04D_WOOD | 05D_SANT_VCWPD | 9BD_GERRY | 07D_SIMI | 9AD_CAMA | 10D_HILL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 0.29 | 1.55 | 5.05 | -- | -- | 46.00 | -- | 1.29 | 0.30 | 0.50 |
| Nov-14 | Dry | 45 | 0.36 | 1.81 | 8.20 | -- | 1.87 | 46.23 | -- | 1.22 | 0.34 | 0.70 |
| Feb-15 | Dry | 48 | 0.29 | 2.57 | 4.89 | -- | 1.29 | 12.46 | -- | 1.51 | 0.20 | 0.59 |
| May-15 | Dry | 49 | 0.57 | 1.72 | 6.92 | -- | 0.61 | 45.74 | -- | 1.54 | 0.44 | 0.60 |

**Figure 41. Total Selenium Dry Weather Concentrations in Urban, Ag, and POTW Sites: 2008-2015**



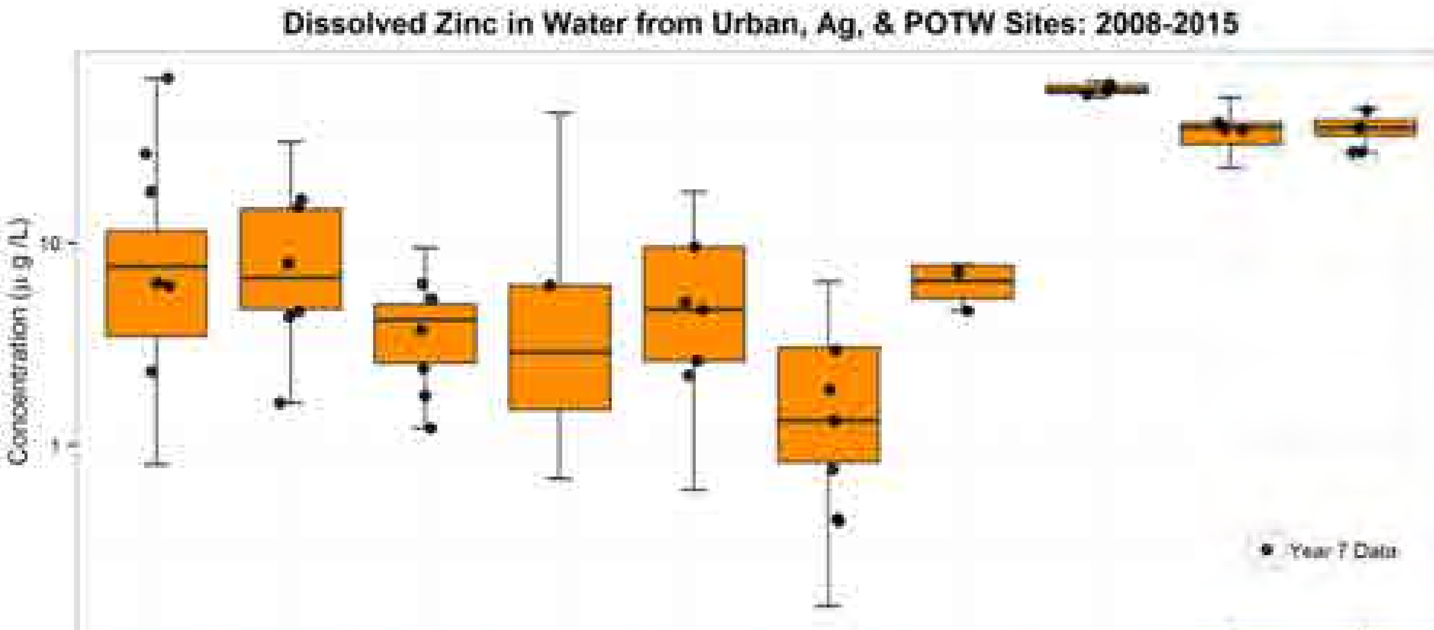

| Date | Type | Event | 04D_VENTURA | 9BD_ADOLF | 01T_ODD2_DCH | 02D_BROOM | 04D_WOOD | 05D_SANT_VCWPD | 9BD_GERRY |
|---|---|---|---|---|---|---|---|---|---|
| Dec-14 | Storm | 46 | *0.07* | *0.04* | 0.51 | -- | 0.95 | 7.70 | 0.13 |
| Dec-14 | Storm | 47 | 0.11 | *0.04* | 0.59 | 1.93 | 1.10 | 1.69 | 0.18 |

**Figure 42. Total Selenium Stormwater Concentrations in Urban and Ag Sites: 2008-2015**




| Date | Type | Event | 01_BPT_3 | 01_BPT_6 | 01_BPT_14 | 01_BPT_15 | 01_RR_BR | 01_SG_74 | 02-PCH | 03_UNIV | 04_WOOD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 2.900 | 0.234 | 1.023 | 0.838 | 2.145 | 0.848 | -- | 19.600 | 2.050 |
| Nov-14 | Dry | 45 | 1.965 | 0.061 | 1.093 | 4.672 | 4.488 | 0.563 | -- | 15.840 | 0.900 |
| Dec-14 | Storm | 46 | -- | -- | -- | -- | 4.012 | -- | -- | 3.240 | 1.230 |
| Dec-14 | Storm | 47 | -- | -- | -- | -- | 5.270 | -- | -- | 2.060 | 2.990 |
| Feb-15 | Dry | 48 | 0.363 | 2.653 | 4.865 | 1.383 | 0.851 | 1.245 | -- | 19.940 | 0.470 |
| May-15 | Dry | 49 | 2.347 | 0.358 | 1.435 | 0.793 | 3.257 | 40.804 | -- | 15.770 | 0.280 |

**Figure 43. Dissolved Zinc Concentrations in Receiving Water Sites: 2008-2015**

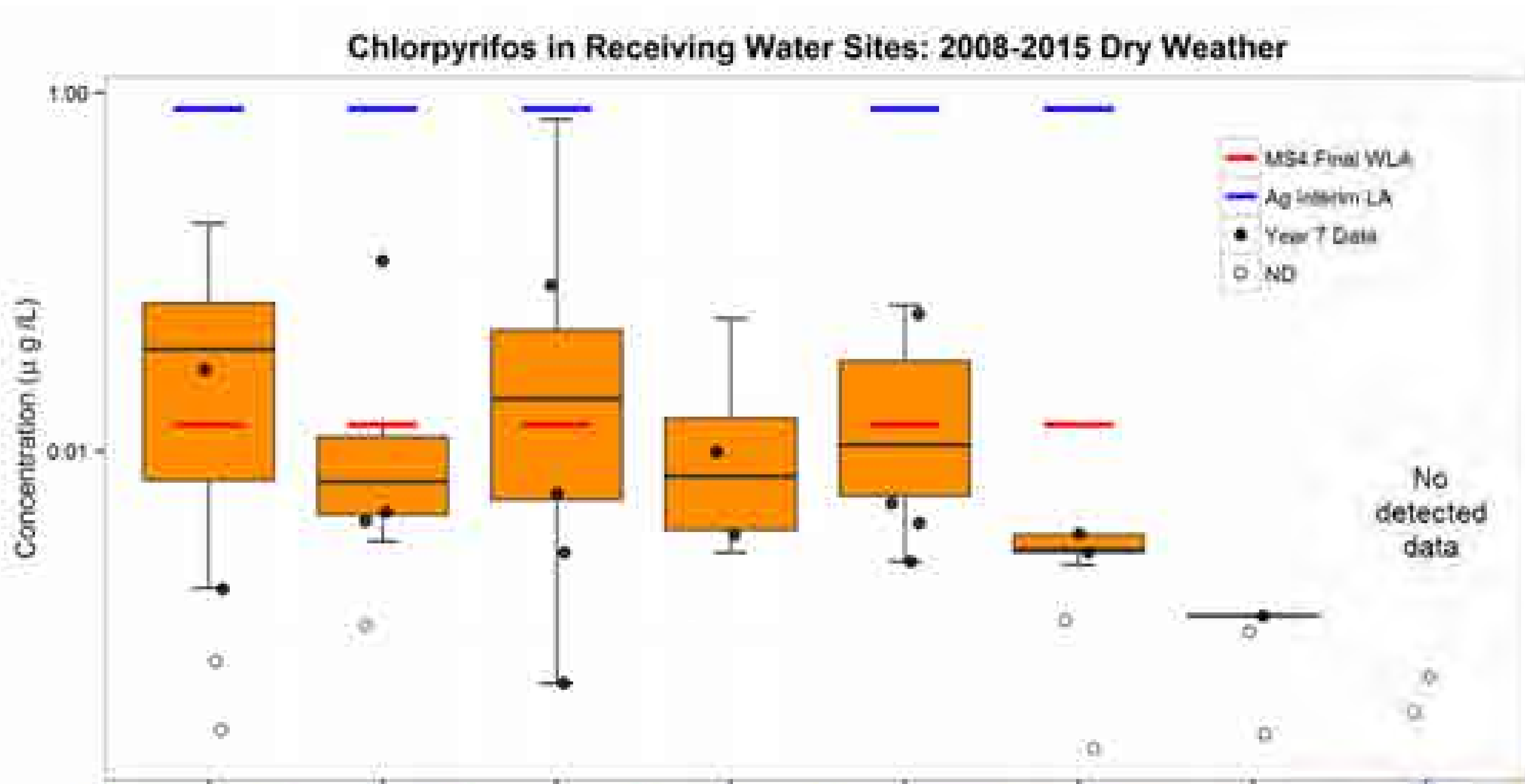



| Date | Type | Event | 04D_VENTURA | 9BD_ADOLF | 01T_ODD2_DCH | 02D_BROOM | 04D_WOOD | 05D_SANT_VCWPD | 9BD_GERRY | 07D_SIMI | 9AD_CAMA | 10D_HILL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 6.28 | 14.96 | 5.26 | -- | -- | 1.32 | -- | 60.74 | 35.96 | 45 |
| Nov-14 | Dry | 45 | 6.11 | 1.61 | 2.39 | -- | 2.20 | 0.76 | -- | 56.59 | 37.83 | 37 |
| Dec-14 | Storm | 46 | 27.57 | 16.38 | 1.21 | -- | 5.10 | 1.88 | 7.16 | -- | -- | -- |
| Dec-14 | Storm | 47 | 17.91 | 4.59 | 3.71 | 6.16 | 4.67 | 2.95 | 4.62 | -- | -- | -- |
| Feb-15 | Dry | 48 | 65.21 | 4.31 | 1.75 | -- | 9.53 | 0.43 | -- | 56.55 | 39.30 | 28 |
| May-15 | Dry | 49 | 2.31 | 7.95 | 6.27 | -- | 2.60 | 0.42 | -- | 54.09 | 36.31 | 28 |

**Figure 44. Dissolved Zinc Concentrations in Urban, Ag, and POTW Sites: 2008-2015**

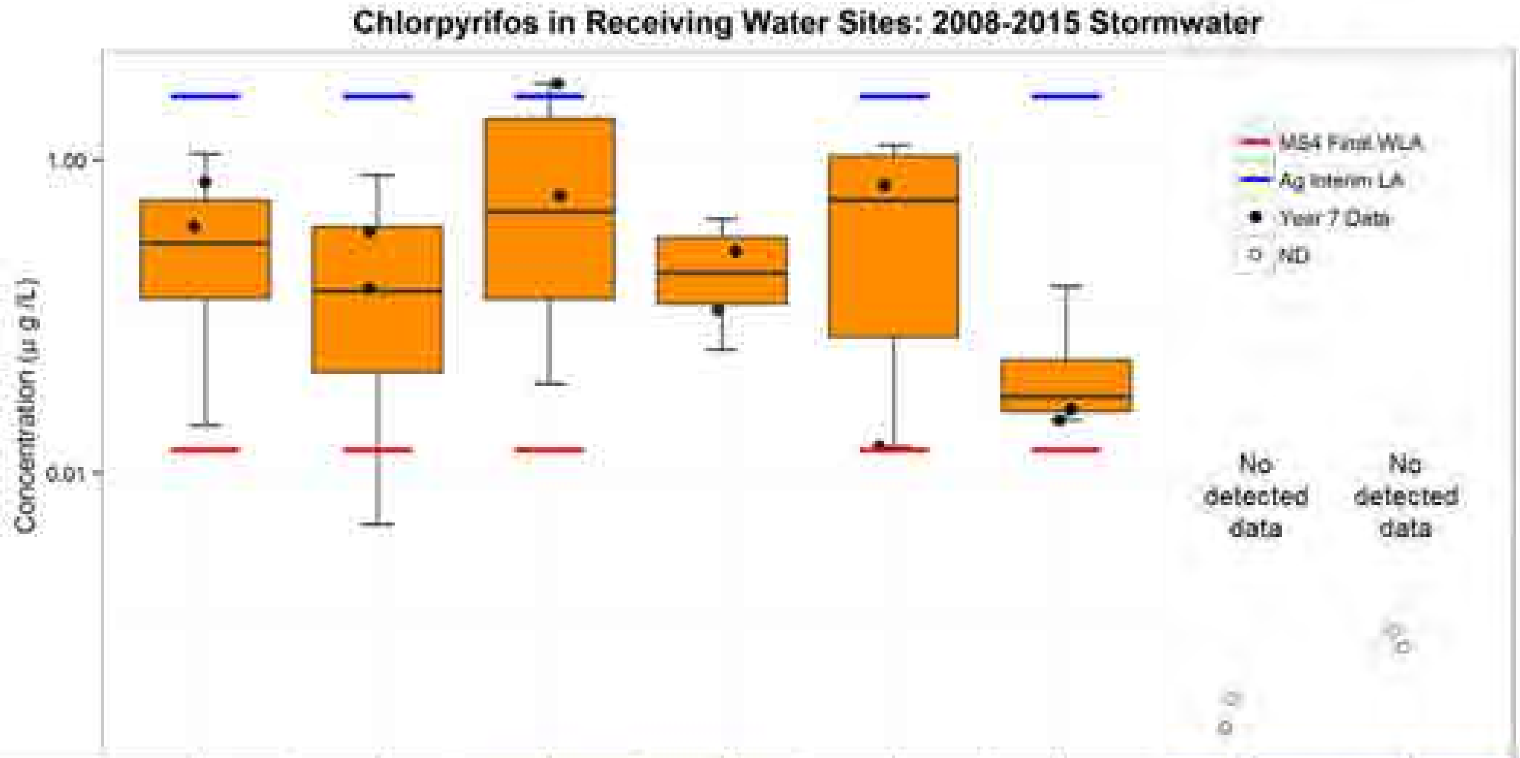
## TOXICITY TMDL

For the Toxicity TMDL, urban dischargers' and POTWs' final WLAs are effective as well as interim LAs for agricultural dischargers. The compliance points for these allocations are in the receiving waters at the base of the subwatersheds and are shown on the box plots for the appropriate site locations. Data for chlorpyrifos and diazinon has been separated into dry weather and stormwater since the allocations differ for the two conditions. Bolded values in the tables within each figure indicate the concentration was above the applicable limits for that constituent. Italicized values in the tables within each figure indicate the concentration was DNQ. Values in the tables within each figure with a "<" preceding them, indicate the constituent was ND at the MDL for that constituent. Values identified as "--" in the tables indicate no samples were collected at those sites for those events.



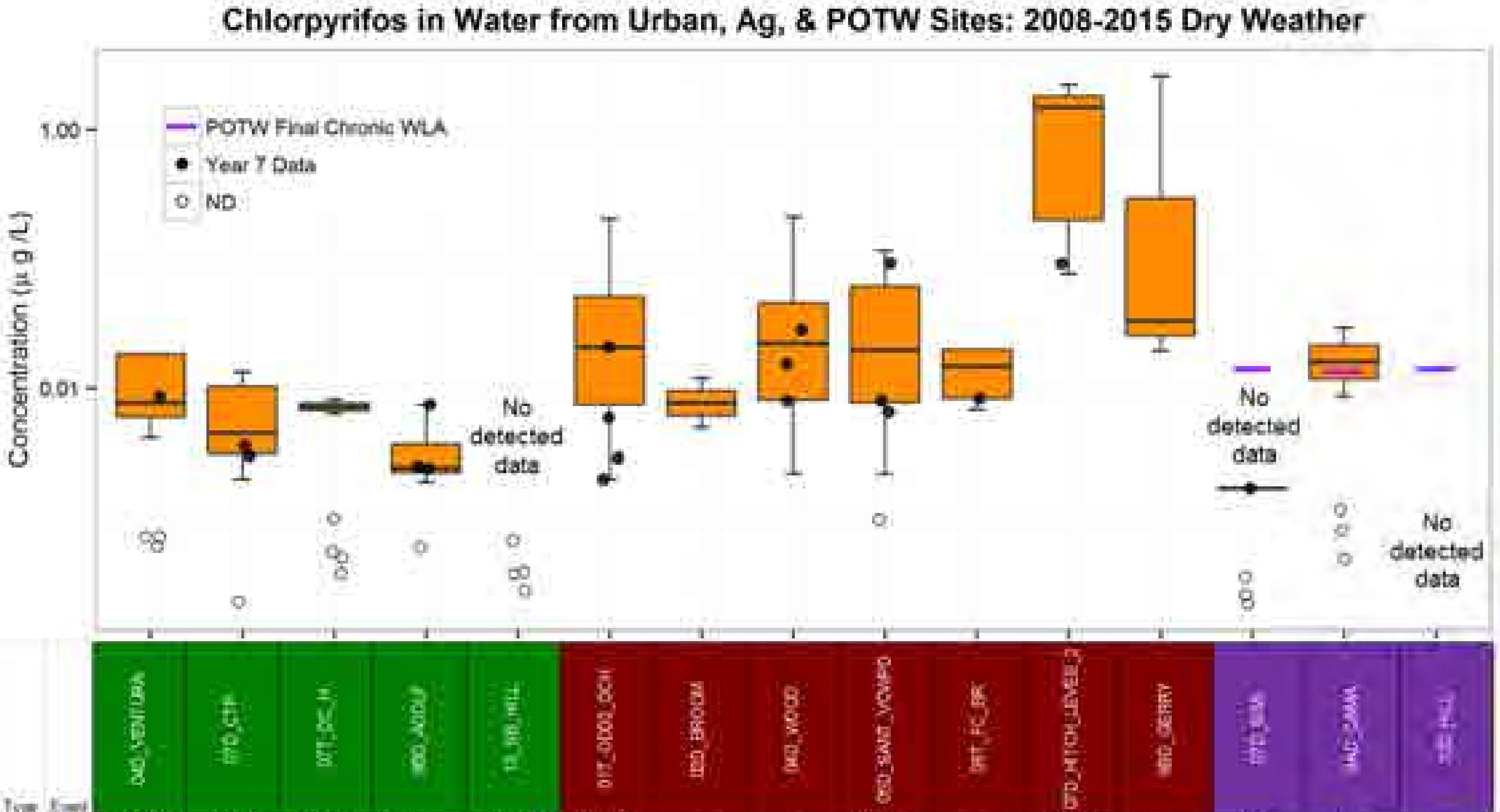

| Date | Type | Event | 01_RR_BR | 03_UNIV | 04_WOOD | 06_SOMIS | 07_HITCH | 9B_ADOLF | 10_GATE | 13_BELT |
|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 0.0017 | <0.0005 | 0.0005 | -- | 0.0579 | <0.0005 | 0.0012 | <0.0005 |
| Nov-14 | Dry | 45 | 0.0284 | 0.114 | 0.0838 | 0.0099 | 0.0024 | 0.0034 | <0.0005 | -- |
| Feb-15 | Dry | 48 | <0.0005 | 0.004 | 0.0058 | 0.0034 | 0.0051 | <0.0005 | -- | <0.0005 |
| May-15 | Dry | 49 | <0.0005 | 0.0045 | 0.0027 | -- | 0.0039 | 0.0027 | <0.0005 | -- |

**Figure 45. Chlorpyrifos Dry Weather Concentrations in Receiving Water Sites: 2008-2015**



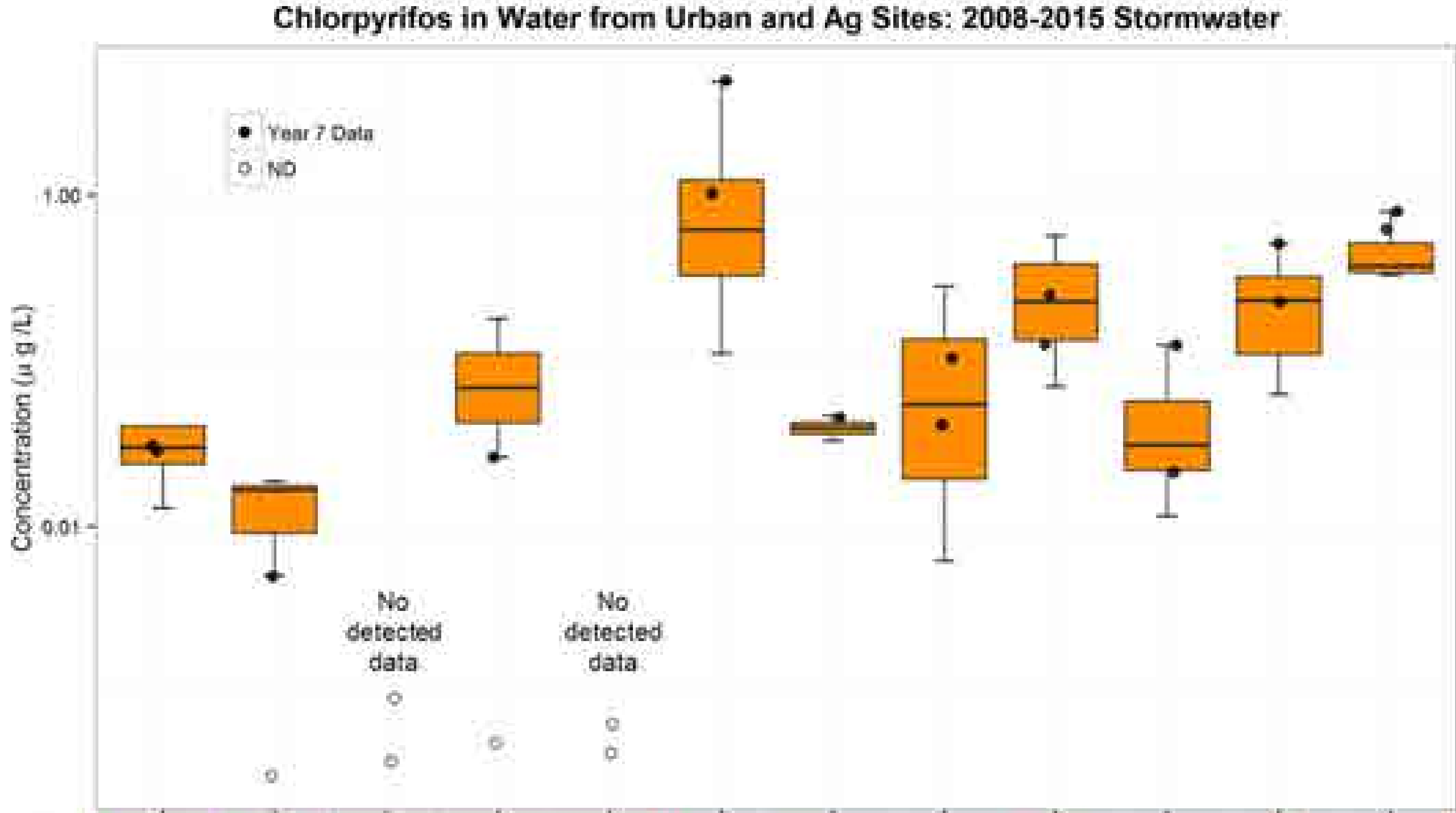

| Date | Type | Event | 01_RR_BR | 03_UNIV | 04_WOOD | 06_SOMIS | 07_HITCH | 9B_ADOLF | 10_GATE | 13_BELT |
|---|---|---|---|---|---|---|---|---|---|---|
| Dec-14 | Storm | 46 | 0.7197 | 0.348 | 3.0816 | 0.263 | 0.7 | 0.0218 | <0.0005 | <0.0005 |
| Dec-14 | Storm | 47 | 0.3812 | 0.1521 | 0.5934 | 0.1105 | 0.0147 | 0.0258 | <0.0005 | <0.0005 |

**Figure 46. Chlorpyrifos Stormwater Concentrations in Receiving Water Sites: 2008-2015**



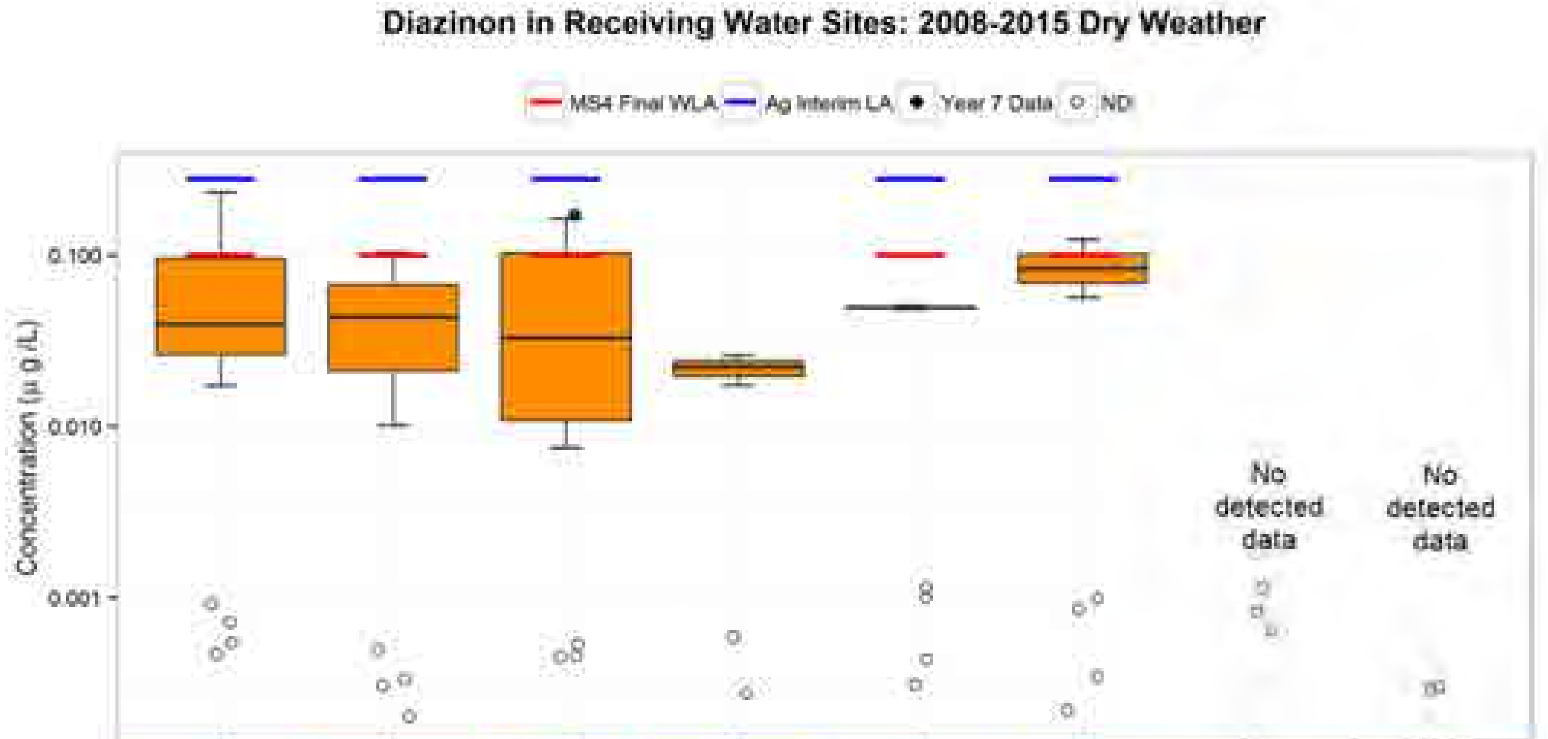

| Date | Type | Event | 04D_VENTURA | 07D_CTP | 07T_DC_H | 05D_ARDU | 13_SB_HILL | 01T_ODD3_DCH | 02D_BROOM | 04D_WOOD | 05D_SANT_VCWPD | 09T_FC_BR | OFD_HITCH_LEVEE_2 | 06D_GERRY | 07D_SIMI | 04D_CAM | 00D_HILL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | <0.0005 | 0.0036 | <0.0005 | <0.0006 | <0.0005 | 0.0629 | -- | -- | 0.0079 | -- | 0.0911 | -- | 0.0017 | <0.0005 | -- |
| Nov-14 | Dry | 45 | 0.0066 | 0.007 | <0.0005 | 0.0074 | <0.0005 | 0.0059 | -- | 0.0281 | 0.0922 | -- | -- | -- | <0.0005 | <0.0005 | -- |
| Feb-15 | Dry | 48 | <0.0005 | <0.0005 | <0.0005 | 0.0025 | <0.0005 | 0.0206 | -- | 0.0163 | <0.0005 | 0.0083 | -- | -- | <0.0050 | <0.0005 | -- |
| May-15 | Dry | 49 | <0.0005 | 0.0036 | <0.0005 | 0.0024 | <0.0005 | 0.002 | -- | 0.0079 | 0.0065 | -- | -- | -- | <0.0050 | 0.0020 | -- |

**Figure 47. Chlorpyrifos Dry Weather Concentrations in Urban, Ag, and POTW Sites: 2008-2015**



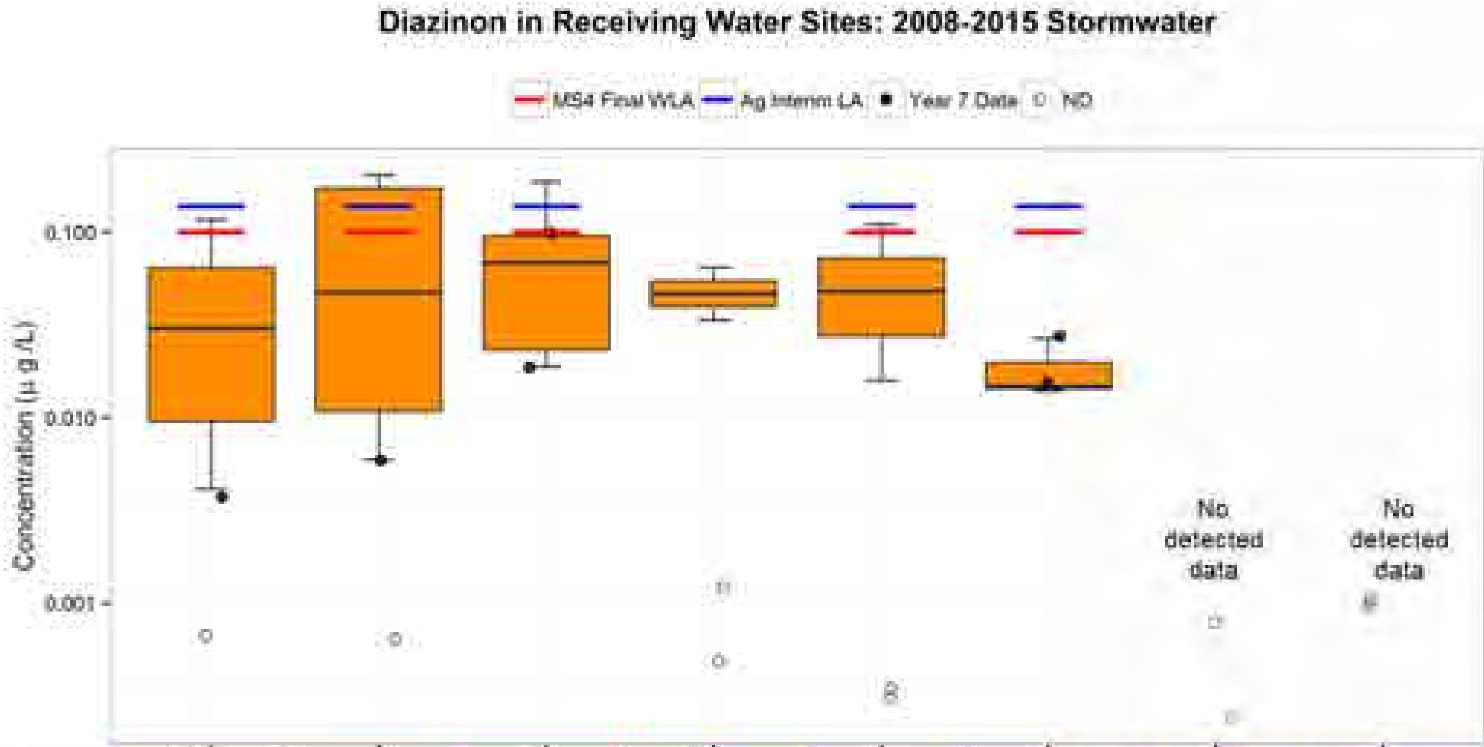

| Date | Type | Event | 04D_VENTURA | 03D_CTP | 07T_DC_H | 9BD_ACCU | 13_SB_HIL | 01T_ODD2_DCH | 02D_BROOM | 04D_WOOD | 05D_SANT_VCWPD | 06T_FC_BR | 07D_HITCH_LEVEE_2 | 9BD_GERRY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dec-14 | Storm | 46 | 0.0304 | <0.0005 | <0.0005 | 0.0258 | <0.0005 | 4.8718 | - | 0.0388 | 0.123 | 0.123 | 0.502 | 0.794 |
| Dec-14 | Storm | 47 | 0.0286 | 0.0051 | <0.0005 | <0.0005 | <0.0005 | 1.0218 | 0.0401 | 0.1047 | 0.2544 | 0.0206 | 0.2298 | 0.6047 |

**Figure 48. Chlorpyrifos Stormwater Concentrations in Urban and Ag Sites: 2008-2015**




| Date | Type | Event | 01_RR_BR | 03_UNIV | 04_WOOD | 06_SOMIS | 07_HITCH | 9B_ADOLF | 10_GATE | 13_BELT |
|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | <0.0005 | <0.0005 | <0.0005 | – | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Nov-14 | Dry | 45 | <0.0005 | <0.0005 | 0.1626 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | – |
| Feb-15 | Dry | 48 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | – | <0.0005 |
| May-15 | Dry | 49 | <0.0005 | <0.0005 | <0.0005 | – | <0.0005 | <0.0005 | <0.0005 | – |

**Figure 49. Diazinon Dry Weather Concentrations in Receiving Water Sites: 2008-2015**




| Date | Type | Event | 01_RR_BR | 03_UNIV | 04_WOOD | 06_SOMIS | 07_HITCH | 9B_ADOLF | 10_GATE | 13_BELT |
|---|---|---|---|---|---|---|---|---|---|---|
| Dec-14 | Storm | 46 | 0.0041 | 0.0059 | 0.0188 | <0.0005 | <0.0005 | 0.0267 | <0.0005 | <0.0005 |
| Dec-14 | Storm | 47 | <0.0005 | <0.0005 | 0.0956 | <0.0005 | <0.0005 | 0.0139 | <0.0005 | <0.0005 |

**Figure 50. Diazinon Stormwater Concentrations in Receiving Water Sites: 2008-2015**

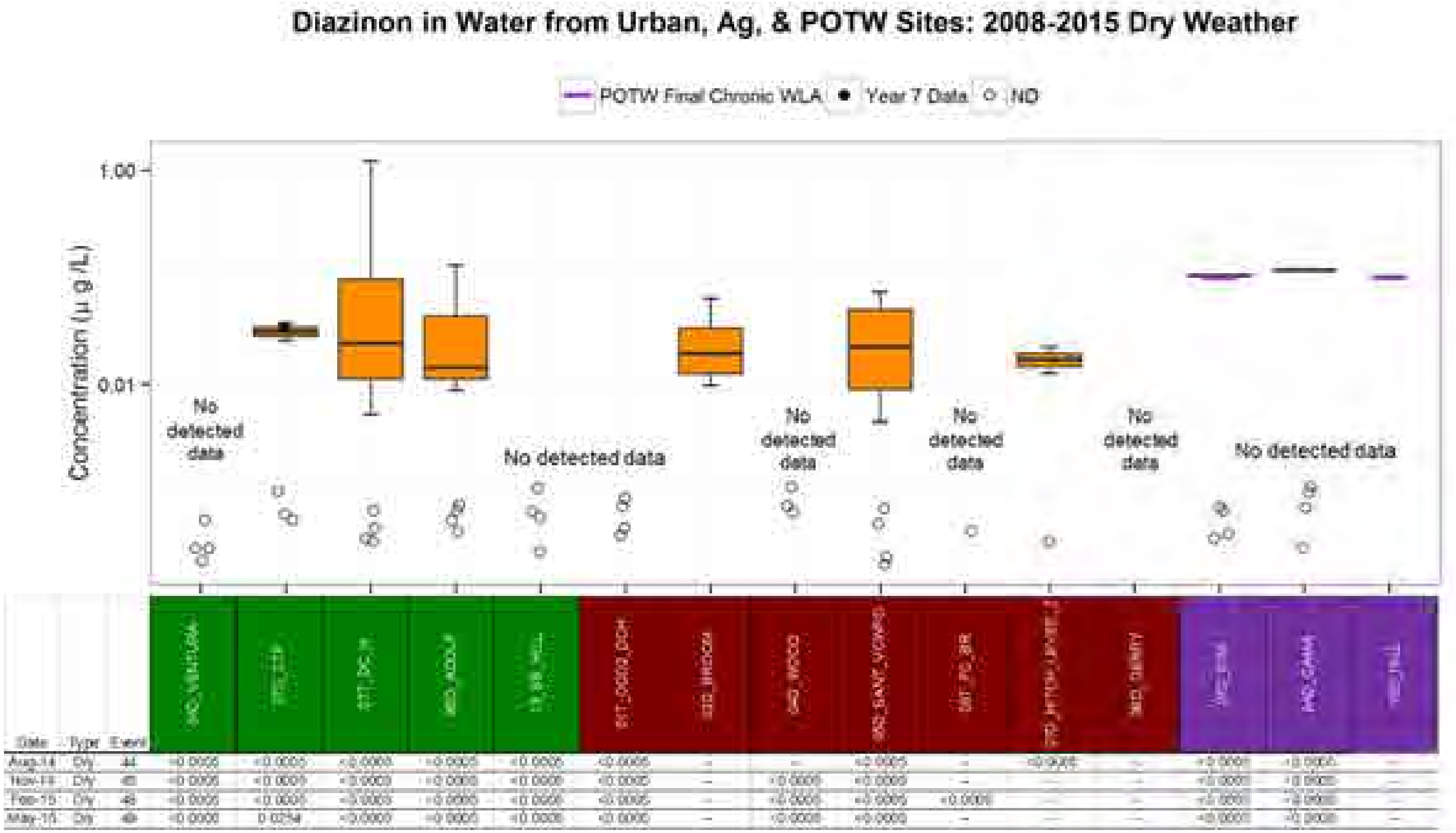
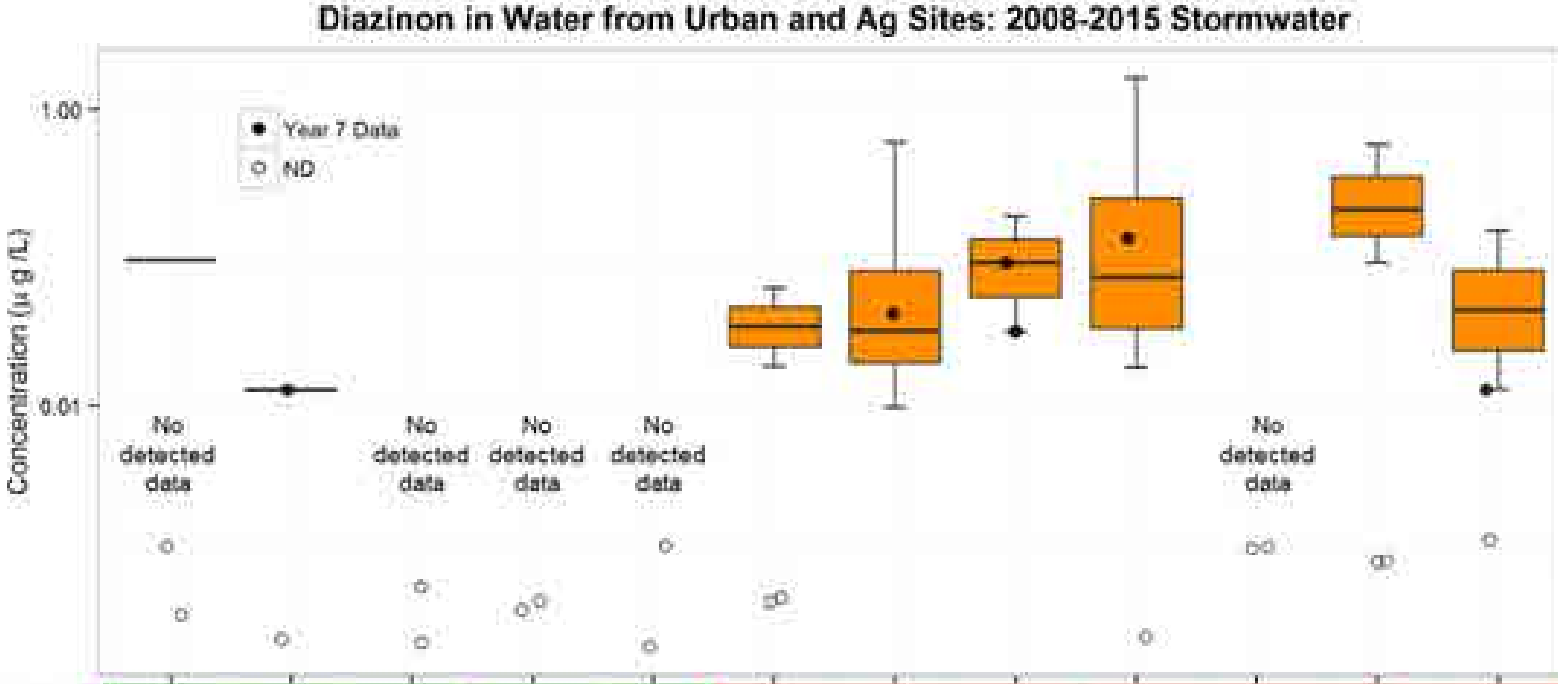



**Figure 51. Diazinon Dry Weather Concentrations in Urban, Ag, and POTW Sites: 2008-2015**

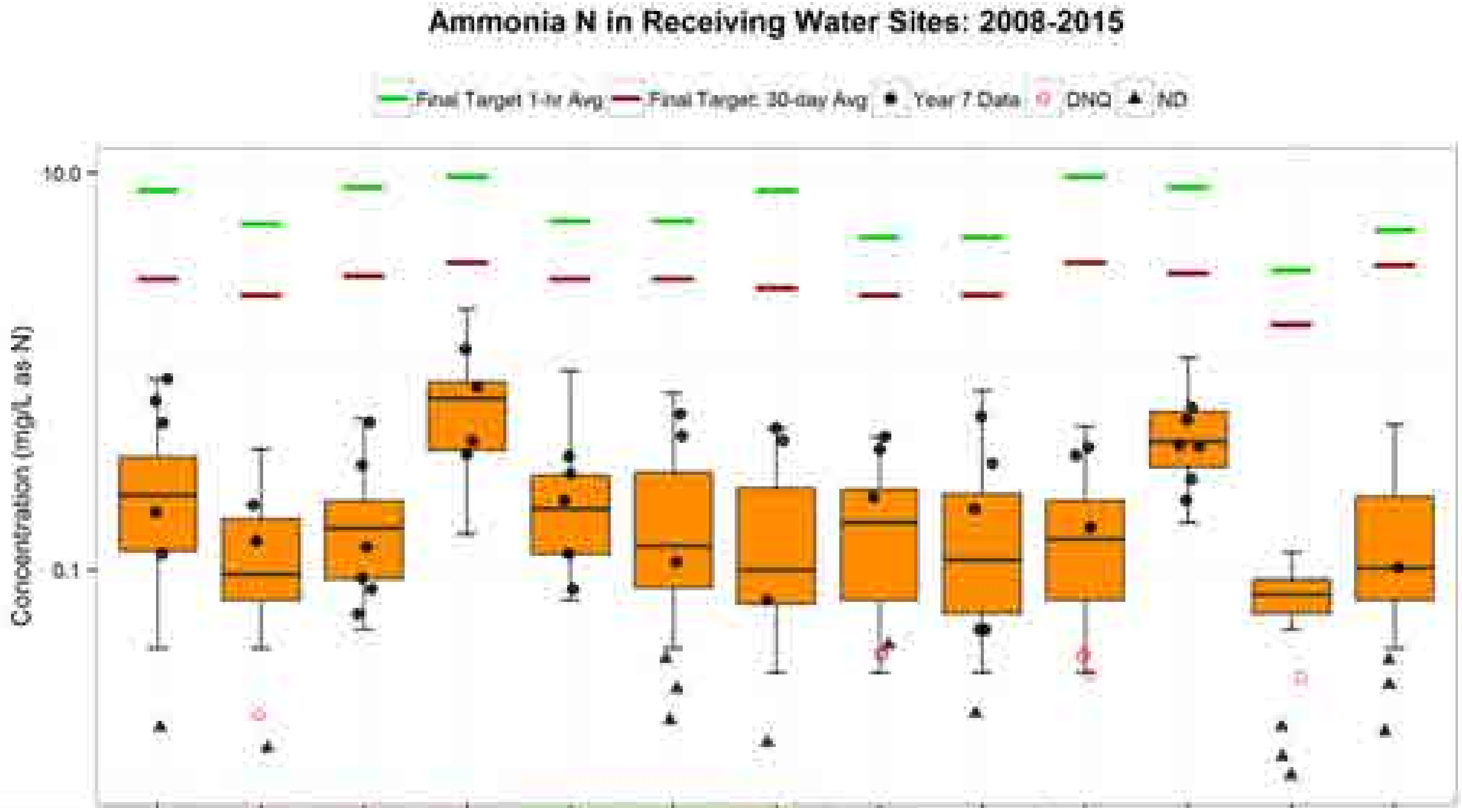



| Date | Type | Event | 04D_VENTURA | 07D_CTP | 9TT_JOC_H | 9BD_ADOLF | 13_SE_HILL | 01T_ODD2_DCH | 02D_BROOM | 04D_WOOD | 05D_SANT_VCWPD | 06T_FC_BR | 07D_HITCH_LEVEE_2 | 9BD_GERRY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dec-14 | Storm | 46 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | – | 0.0316 | <0.0005 | <0.0005 | <0.0005 | 0.0129 |
| Dec-14 | Storm | 47 | <0.0005 | 0.0128 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | 0.0419 | 0.0925 | 0.1346 | <0.0005 | <0.0005 | <0.0005 |

**Figure 52. Diazinon Stormwater Concentrations in Urban and Ag Sites: 2008-2015**

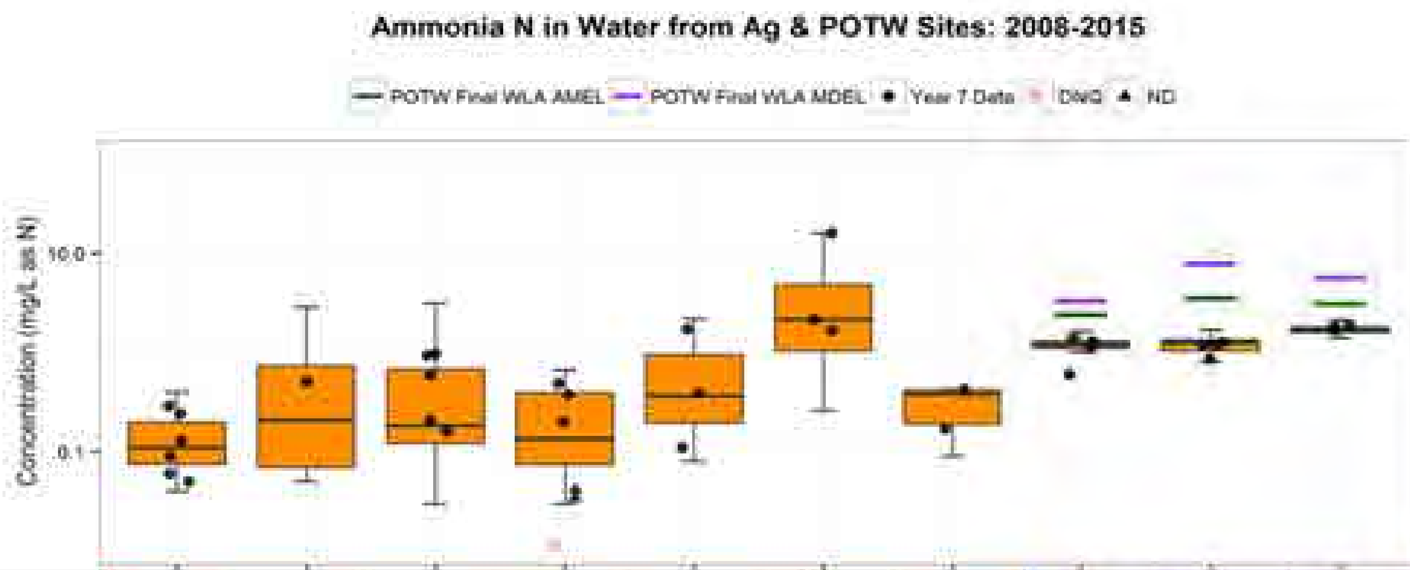
## NUTRIENTS TMDL

Final targets and allocations are effective for the Nutrients TMDL. The applicable targets for each monitoring site are presented in the figures below. Bolded values in the tables within each figure indicate the concentration was above the applicable limits for that constituent. Italicized values in the tables within each figure indicate the concentration was DNQ. Values in the tables within each figure with a "<" preceding them, indicate the constituent was ND at the MDL for that constituent. Values identified as "--" in the tables indicate no samples were collected at those sites for those events.



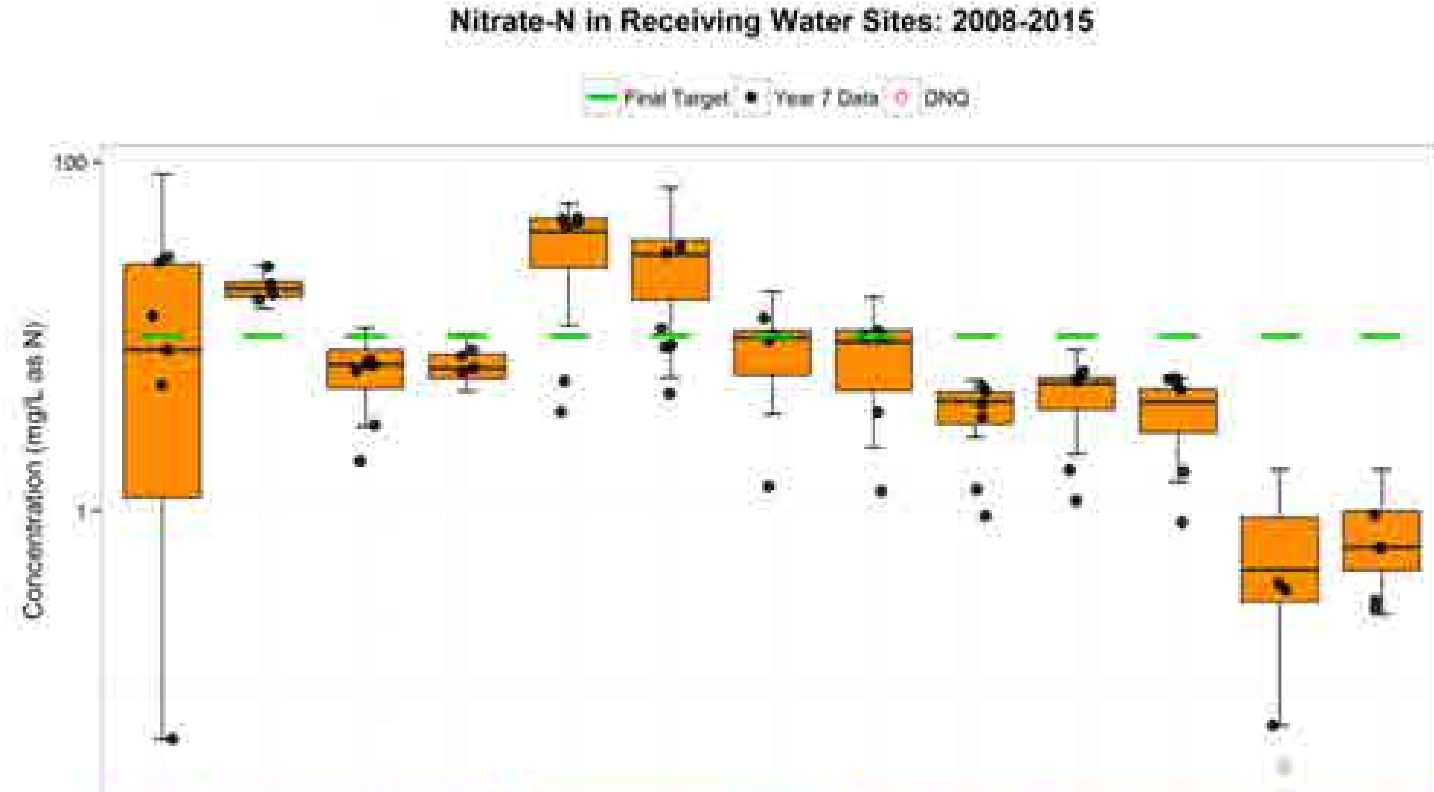

| Date | Type | Event | 01_RR_BR | 02_FCH | 03_UNIV | 9A_HOWAR | 04_WOOD | 05_CENTR | 06_SOMIS | 07_HITCH | 07_MADER | 9B_ADOLF | 10_GATE | 12_PARK | 13_BELT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 0.19 | <0.02 | 0.06 | 0.63 | 0.12 | <0.02 | — | 0.23 | <0.02 | 0.04 | 0.22 | <0.02 | <0.02 |
| Nov-14 | Dry | 45 | 0.7 | 0.21 | 0.09 | 1.28 | 0.22 | 0.11 | 0.07 | 0.04 | 0.2 | 0.16 | 0.65 | 0.03 | 0.1 |
| Dec-14 | Storm | 46 | 0.54 | — | 0.33 | — | 0.37 | 0.47 | 0.44 | 0.4 | 0.58 | 0.37 | 0.42 | — | — |
| Dec-14 | Storm | 47 | 0.91 | — | 0.55 | — | 0.3 | 0.6 | 0.51 | 0.46 | 0.34 | 0.41 | 0.28 | — | — |
| Feb-15 | Dry | 48 | <0.02 | 0.02 | 0.13 | 0.44 | 0.08 | <0.02 | <0.02 | <0.02 | 0.05 | 0.03 | 0.56 | <0.02 | <0.02 |
| May-15 | Dry | 49 | 0.12 | 0.14 | 0.08 | 0.38 | 0.12 | <0.02 | — | 0.04 | 0.05 | 0.04 | 0.41 | <0.02 | <0.02 |

**Figure 53. Ammonia-N Concentrations in Receiving Water Sites: 2008-2015**



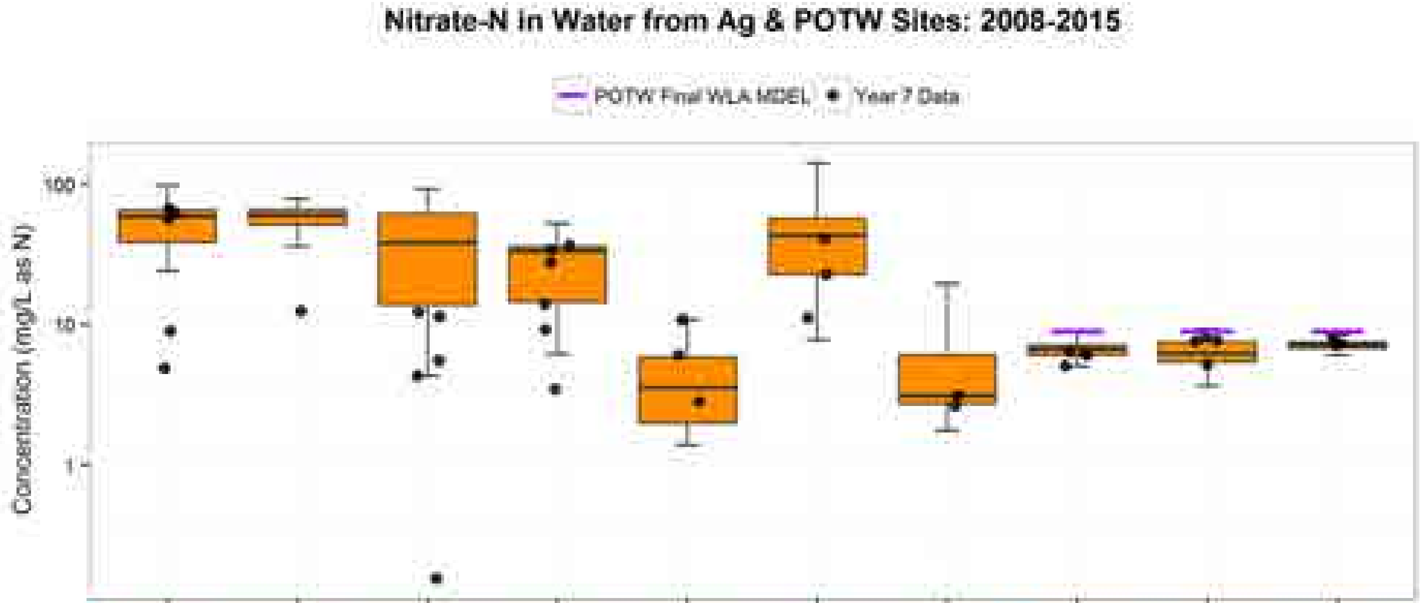

| Date | Type | Event | 01T_ODD2_DCH | 02D_BROOM | 04D_WOOD | 05D_SANT_VCWPD | 06T_FC_BR | 07D_HITCH_LEVEE_2 | 9BD_GERRY | 07D_SIMI | 9AD_CAMA | 10D_HILL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 0.06 | – | -- | <0.02 | – | 15.9 | – | 1.3 | 1.18 | 1.8 |
| Nov-14 | Dry | 45 | 0.05 | – | 0.97 | 0.2 | – | – | – | 1.1 | 1.19 | 1.9 |
| Dec-14 | Storm | 46 | 0.29 | – | 0.93 | 0.49 | 0.39 | 2.14 | 0.43 | – | – | – |
| Dec-14 | Storm | 47 | 0.24 | 0.51 | 0.58 | 0.38 | 1.72 | 1.66 | 0.17 | – | – | – |
| Feb-15 | Dry | 48 | 0.13 | – | 0.16 | <0.02 | 0.11 | – | – | 0.6 | 1.27 | 1.7 |
| May-15 | Dry | 49 | 0.09 | – | 0.21 | *0.02* | – | – | – | 1.4 | 0.87 | 1.7 |

**Figure 54. Ammonia-N Concentrations in Ag and POTW Sites: 2008-2015**



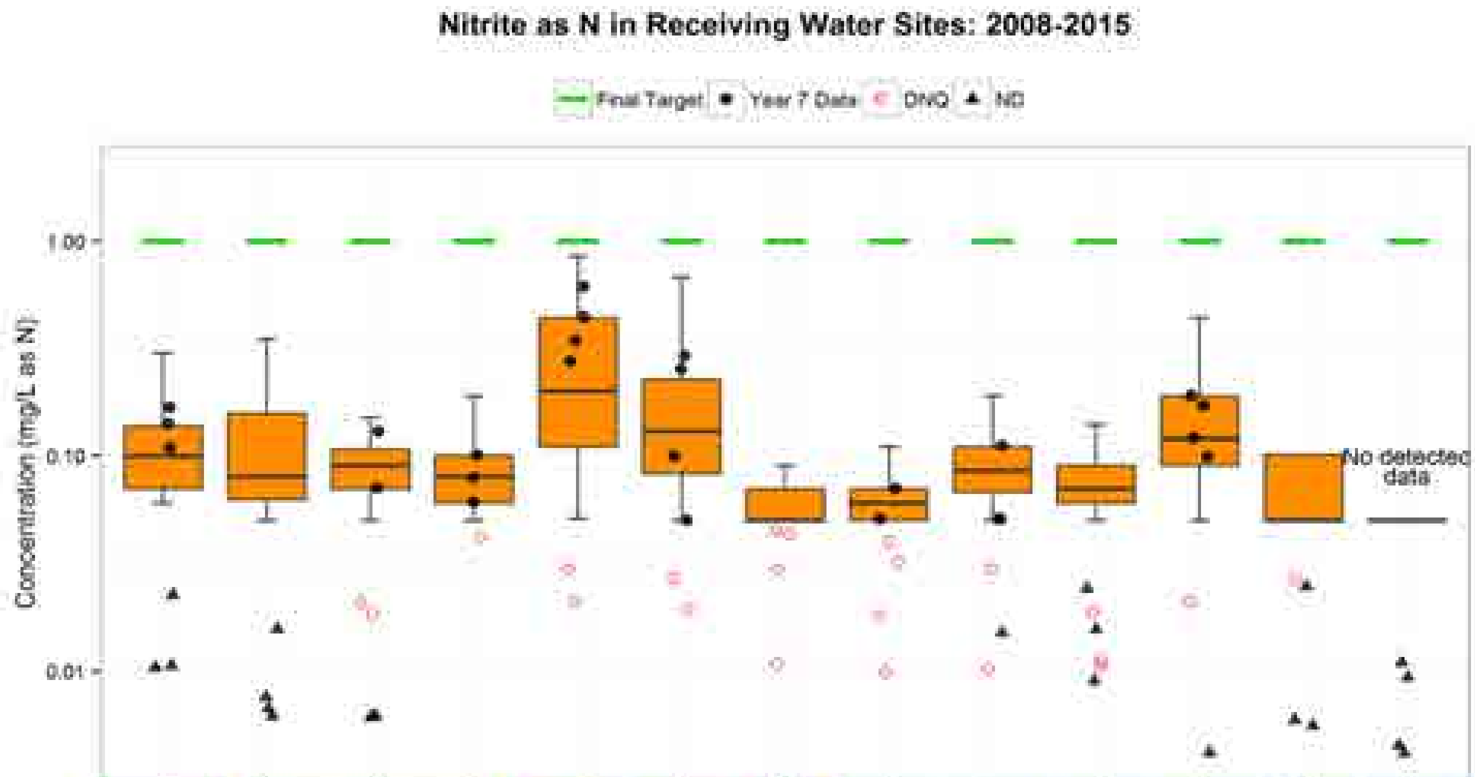

| Date | Type | Event | 01_RR_BR | 02_PCH | 03_UNIV | 3A_HOWAR | 04_WOOD | 05_CENTR | 06_SOMIS | 07_HITCH | 07_MADER | 9B_ADOLF | 10_GATE | 12_PARK | 13_BELT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 8.35 | 25.02 | 6.82 | 7.73 | 46.9 | 32.4 | -- | 10.09 | 4.1 | 5.63 | 5.09 | 0.02 | 0.31 |
| Nov-14 | Dry | 45 | 26.65 | 19.87 | 7.31 | 8.31 | 47.33 | 8.68 | 12.72 | 9.86 | 4.79 | 6.29 | 5.75 | 0.39 | 0.95 |
| Dec-14 | Storm | 46 | 28.51 | -- | 3.1 | -- | 5.56 | 8.89 | 9.49 | 3.67 | 0.93 | 1.14 | 0.86 | -- | -- |
| Dec-14 | Storm | 47 | 5.25 | -- | 1.92 | -- | 3.71 | 4.68 | 1.38 | 1.29 | 1.32 | 1.71 | 1.08 | -- | -- |
| Feb-15 | Dry | 48 | 0.05 | 17.36 | 6.4 | 6.25 | 42.65 | 11.08 | 10.1 | 10.77 | 3.44 | 5.56 | 4.94 | 0.36 | 0.61 |
| May-15 | Dry | 49 | 13.11 | 16.23 | 6.64 | 6.54 | 44.6 | 29.9 | -- | 9.92 | 5.15 | 5.76 | 5.24 | 0.06 | 0.28 |

**Figure 55. Nitrate-N Concentrations in Receiving Water Sites: 2008-2015**



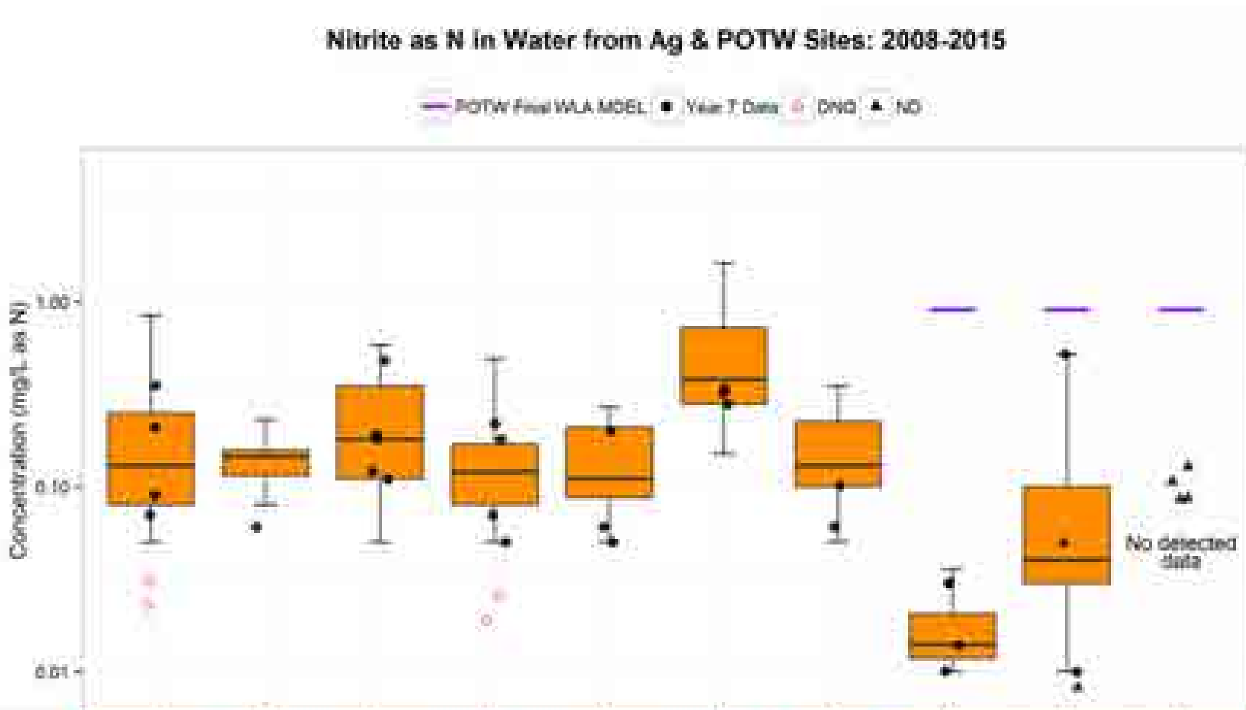

| Date | Type | Event | 01T_ODD2_DCH | 02D_BROOM | 04D_WOOD | 05D_SANT_VCWPD | 06T_FC_BR | 07D_HITCH_LEVEE_2 | 9BD_GERRY | 07D_SIMI | 9AD_CAMA | 10D_HILL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 62.5 | -- | -- | 27.75 | -- | 41.18 | -- | 6.4 | 8.13 | 7.2 |
| Nov-14 | Dry | 45 | 63.18 | -- | 5.56 | 34.28 | -- | -- | -- | 5.1 | 7.6 | 7.3 |
| Dec-14 | Storm | 46 | 9.04 | -- | 12.25 | 13.97 | 10.87 | 22.86 | 3.14 | -- | -- | -- |
| Dec-14 | Storm | 47 | 4.9 | 12.5 | 11.45 | 3.47 | 2.85 | 11.27 | 2.84 | -- | -- | -- |
| Feb-15 | Dry | 48 | 56.25 | -- | 4.34 | 9.23 | 6.09 | -- | -- | 6.1 | 5.23 | 8 |
| May-15 | Dry | 49 | 66.95 | -- | 0.16 | 36.96 | -- | -- | -- | 6.3 | 7.74 | 7.4 |

**Figure 56. Nitrate-N Concentrations in Ag and POTW Sites: 2008-2015**



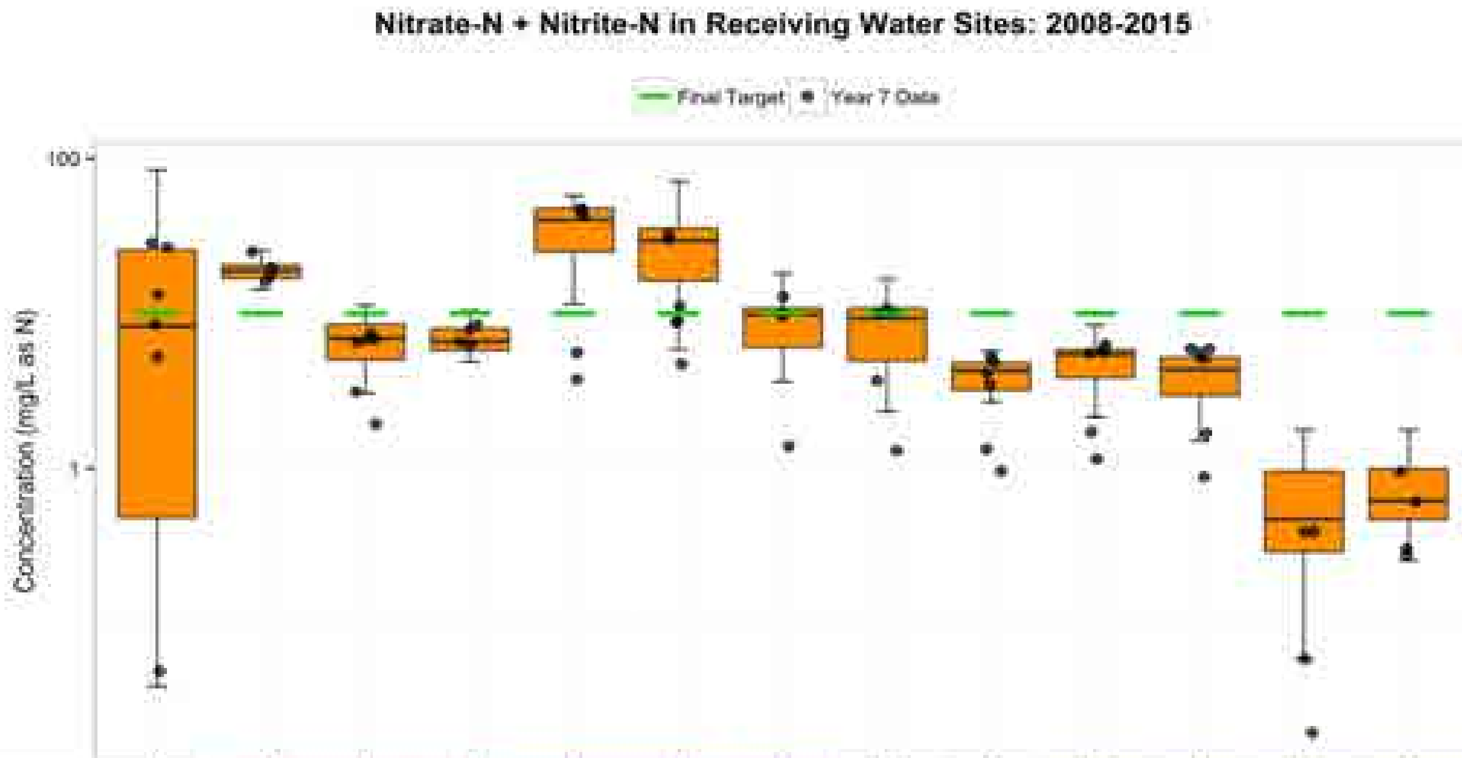

| Date | Type | Event | 01_RR_BR | 02_PCH | 03_UNIV | 9A_HOWAR | 04_WOOD | 05_CENTR | 06_SUSIE | 07_HITCH | 07_MADER | 08_ADOLF | 10_GATE | 12_PARK | 13_BELT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 0.17 | <0.01 | <0.01 | 0.08 | 0.61 | 0.29 | – | 0.07 | <0.01 | <0.01 | 0.17 | <0.01 | <0.01 |
| Nov-14 | Dry | 45 | 0.11 | <0.01 | 0.13 | 0.1 | 0.28 | 0.05 | 0.03 | 0.03 | 0.05 | 0.02 | 0.19 | <0.01 | <0.01 |
| Dec-14 | Storm | 46 | <0.01 | – | 0.02 | – | 0.02 | 0.02 | 0.04 | 0.02 | 0.03 | 0.01 | 0.02 | – | – |
| Dec-14 | Storm | 47 | <0.01 | – | 0.02 | – | 0.03 | 0.03 | 0.01 | 0.01 | 0.01 | 0.01 | <0.01 | – | – |
| Feb-15 | Dry | 48 | <0.01 | <0.01 | 0.07 | 0.04 | 0.34 | 0.1 | 0.04 | 0.04 | 0.05 | <0.01 | 0.12 | 0.03 | <0.01 |
| May-15 | Dry | 49 | 0.14 | <0.01 | <0.01 | 0.06 | 0.44 | 0.25 | – | 0.05 | 0.11 | <0.01 | 0.1 | <0.01 | <0.01 |

**Figure 57. Nitrite-N Concentrations in Receiving Water Sites: 2008-2015**



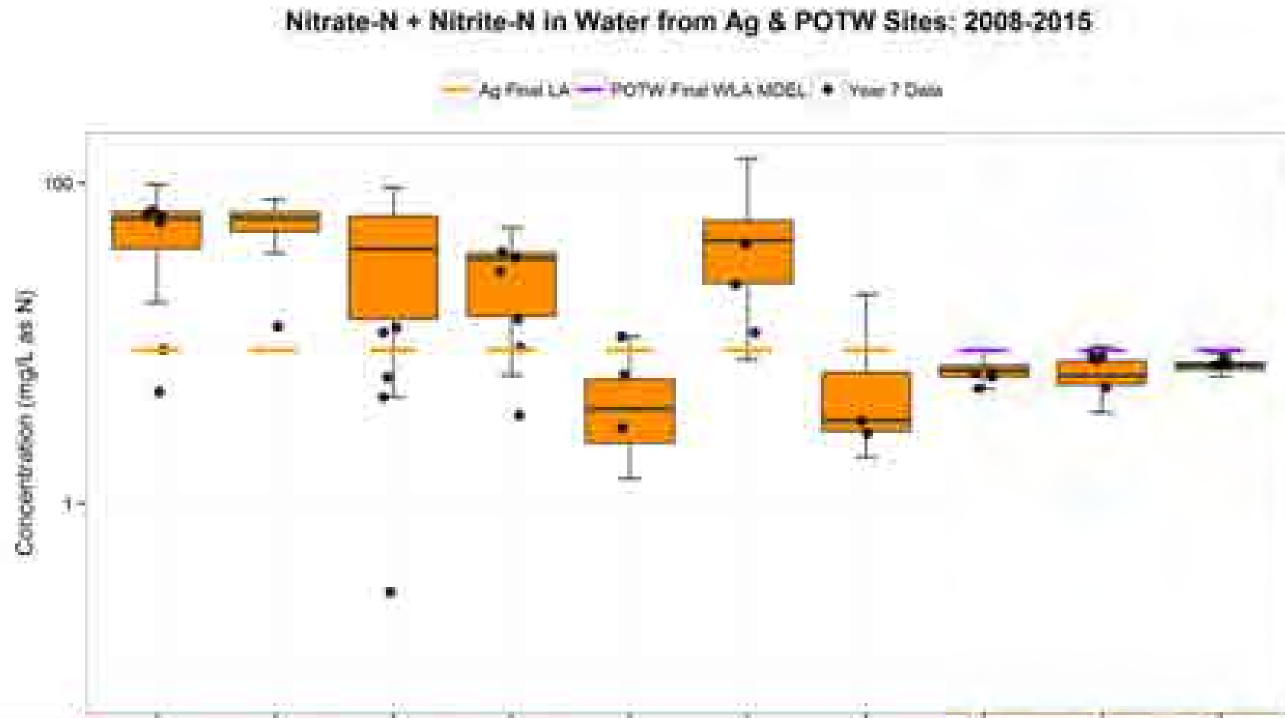

| Date | Type | Event | 01T_ODD2_DCH | 02D_BROOM | 04D_WOOD | 05D_SANT_VCWPD | 06T_FC_BR | 07D_HITCH_LEVEE_2 | 9BD_GERRY | 07D_SIMI | 9AD_CAMA | 10D_HILL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 0.21 | -- | -- | 0.18 | -- | 0.32 | -- | 0.014 | <0.01 | <0.1 |
| Nov-14 | Dry | 45 | 0.07 | -- | 0.48 | 0.07 | -- | -- | -- | 0.03 | 0.52 | <0.1 |
| Dec-14 | Storm | 46 | *0.03* | -- | 0.18 | *0.02* | 0.05 | 0.34 | 0.1 | -- | -- | -- |
| Dec-14 | Storm | 47 | *0.02* | 0.06 | 0.11 | *0.03* | 0.06 | 0.28 | 0.06 | -- | -- | -- |
| Feb-15 | Dry | 48 | 0.09 | -- | 0.19 | 0.05 | 0.2 | -- | -- | 0.01 | 0.05 | <0.1 |
| May-15 | Dry | 49 | 0.35 | -- | 0.12 | 0.22 | -- | -- | -- | 0.03 | <0.01 | <0.1 |

**Figure 58. Nitrite-N Concentrations in Ag and POTW Sites: 2008-2015**




| Date | Type | Event | 01_RR_BR | 02_PCH | 03_UNIV | 9A_HOWAR | 04_WOOD | 05_CENTR | 06_SOMIS | 07_HITCH | 07_MADER | 9B_ADOLF | 10_GATE | 12_PARK | 13_BELT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 8.52 | 25.02 | 6.82 | 7.01 | 47.51 | 32.69 | -- | 10.16 | 4.1 | 5.63 | 5.86 | 0.02 | 0.31 |
| Nov-14 | Dry | 45 | 26.76 | 19.87 | 7.44 | 6.41 | 47.61 | 8.73 | 12.75 | 9.89 | 4.84 | 6.31 | 5.94 | 0.39 | 0.95 |
| Dec-14 | Storm | 46 | 28.51 | -- | 3.12 | -- | 5.58 | 8.91 | 9.53 | 3.69 | 0.96 | 1.15 | 0.88 | -- | -- |
| Dec-14 | Storm | 47 | 5.25 | -- | 1.94 | -- | 3.74 | 4.71 | 1.39 | 1.3 | 1.33 | 1.72 | 1.68 | -- | -- |
| Feb-15 | Dry | 48 | 0.05 | 17.36 | 6.47 | 6.29 | 42.99 | 11.18 | 10.14 | 10.01 | 3.49 | 5.56 | 5.06 | 0.39 | 0.61 |
| May-15 | Dry | 49 | 13.25 | 16.23 | 6.84 | 6.6 | 45.04 | 30.15 | -- | 9.97 | 5.26 | 5.76 | 5.34 | 0.06 | 0.28 |

**Figure 59. Nitrate-N + Nitrite-N Concentrations in Receiving Water Sites: 2008-2015**

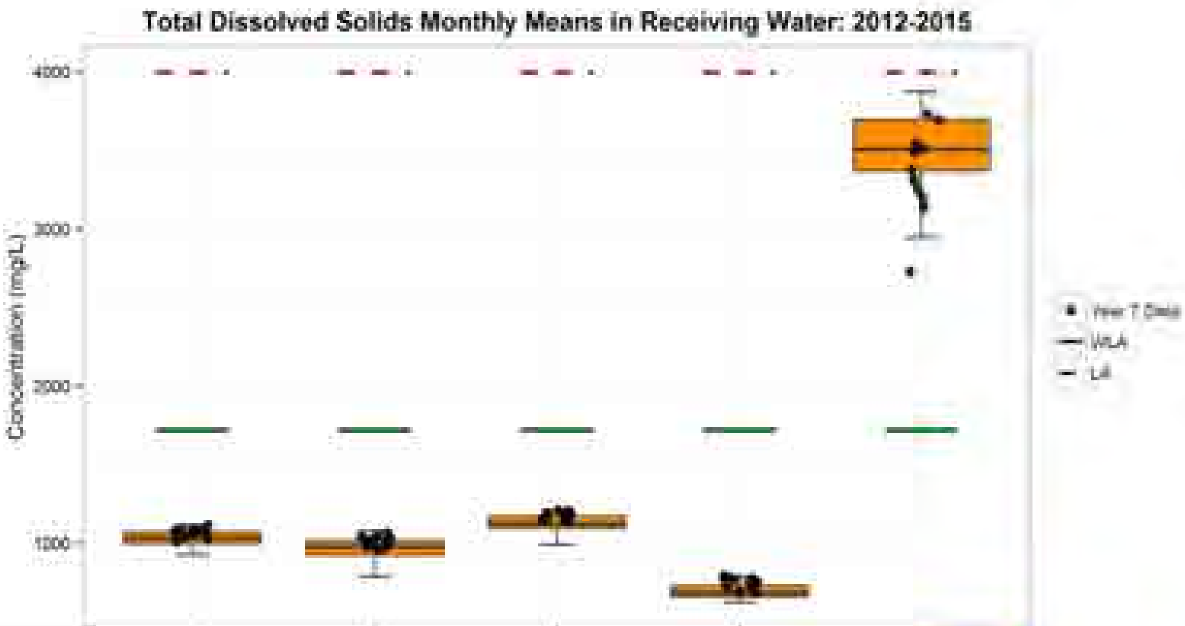



| Date | Type | Event | 01T_ODD2_DCH | 02D_BROOM | 04D_WOOD | 05D_SANT_VCWPD | 06T_FC_BR | 07D_HITCH_LEVEE_2 | 08D_GERRY | 09D_SMI | 09AD_CAMA | 10D_HILL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 44 | 62.71 | -- | -- | 27.93 | -- | 41.48 | -- | 6.414 | 8.12 | 7.2 |
| Nov-14 | Dry | 45 | 63.25 | -- | 6.04 | 34.35 | -- | -- | -- | 6.13 | 8.12 | 7.3 |
| Dec-14 | Storm | 46 | 9.04 | -- | 12.43 | 13.99 | 10.92 | 23.2 | 3.24 | -- | -- | -- |
| Dec-14 | Storm | 47 | 4.9 | 12.56 | 11.56 | 3.5 | 2.91 | 11.55 | 2.7 | -- | -- | -- |
| Feb-15 | Dry | 48 | 56.34 | -- | 4.53 | 9.28 | 6.29 | -- | -- | 6.11 | 5.23 | 8 |
| May-15 | Dry | 49 | 67.3 | -- | 0.28 | 37.18 | -- | -- | -- | 6.33 | 7.74 | 7.4 |

**Figure 60. Nitrate-N + Nitrite-N Concentrations in Ag and POTW Sites: 2008-2015**

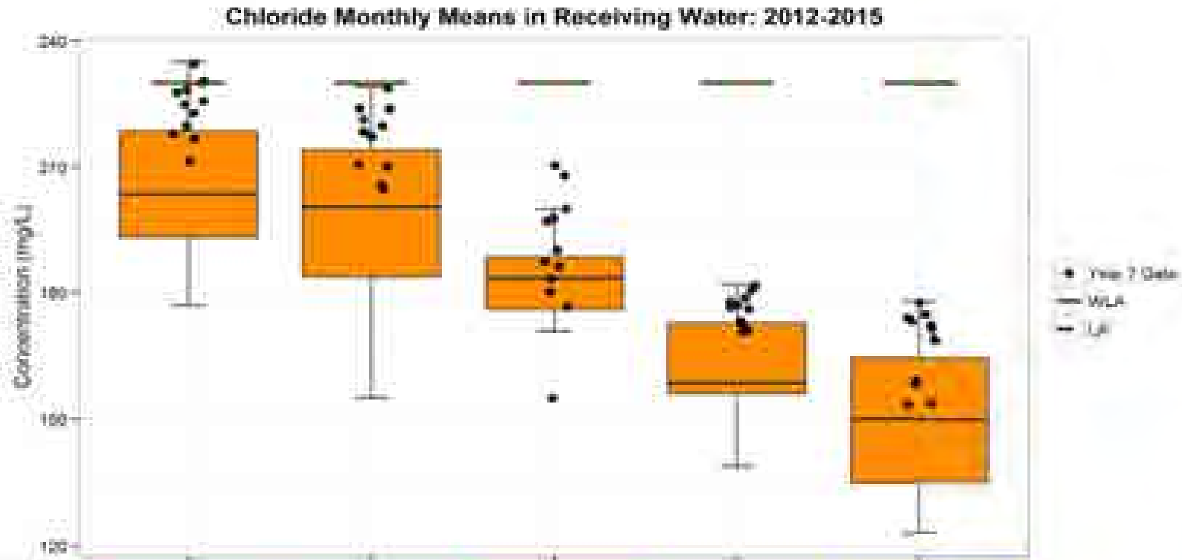
## SALTS TMDL

For the Salts TMDL, compliance with interim dry weather salt allocations is determined using monthly mean salt concentrations for dry weather developed from the time-series of data collected at receiving water sites. Bolded values in the tables within each figure indicate the concentration was above the interim MS4 WLA and the interim LA for that constituent. Italicized values in the tables within each figure indicate the concentration was above the interim MS4 WLA for that constituent.



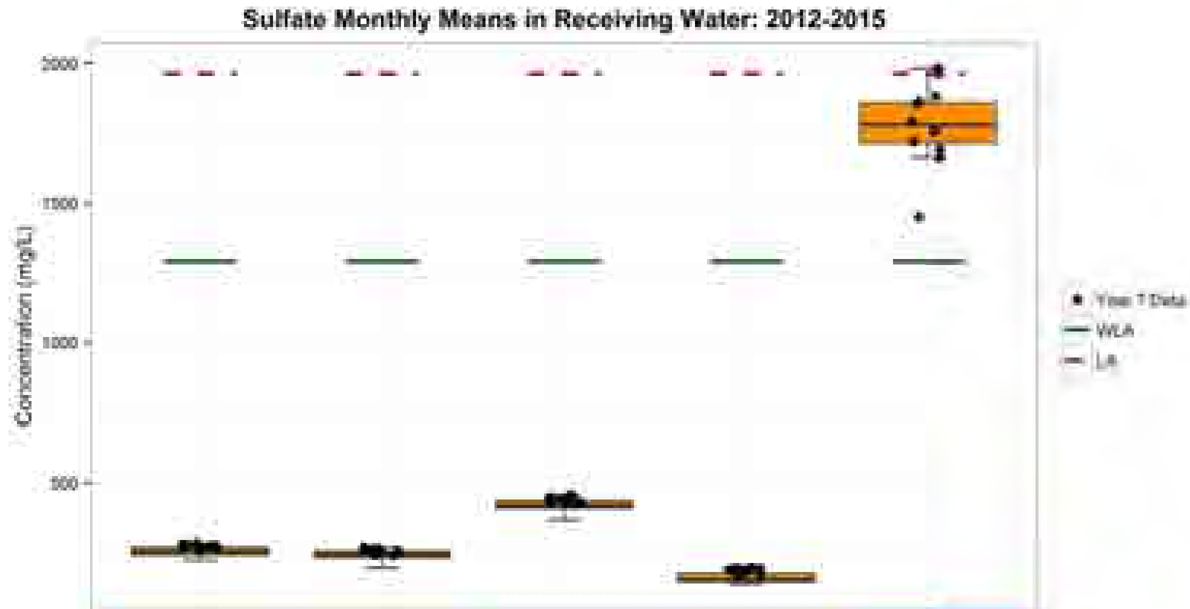

| Date | 03_UNIV | 9A_HOWAR | 07_TIERRA | 9B_BARON | 04_WOOD |
|---|---|---|---|---|---|
| Jul-14 | 1031 | 957 | 1152 | 689 | 3730 |
| Aug-14 | 1070 | 1014 | 1145 | 707 | 3544 |
| Sep-14 | 1081 | 1012 | 1141 | 687 | 3489 |
| Oct-14 | 1090 | 1041 | 1138 | 711 | 2727 |
| Nov-14 | 1114 | 1063 | 1151 | 750 | 3297 |
| Dec-14 | 1008 | 964 | 1209 | 789 | 3510 |
| Jan-15 | 1039 | 979 | 1189 | 777 | 3374 |
| Feb-15 | 1049 | 985 | 1177 | 766 | 3316 |
| Mar-15 | 1061 | 1015 | 1174 | 763 | 3237 |
| Apr-15 | 1082 | 1028 | 1179 | 768 | 3132 |
| May-15 | 1093 | 1040 | 1184 | 773 | 3188 |
| Jun-15 | 1073 | 1024 | 1202 | 752 | 3692 |

**Figure 61. TDS Monthly Means for Receiving Water Sites Collected During Dry Weather**



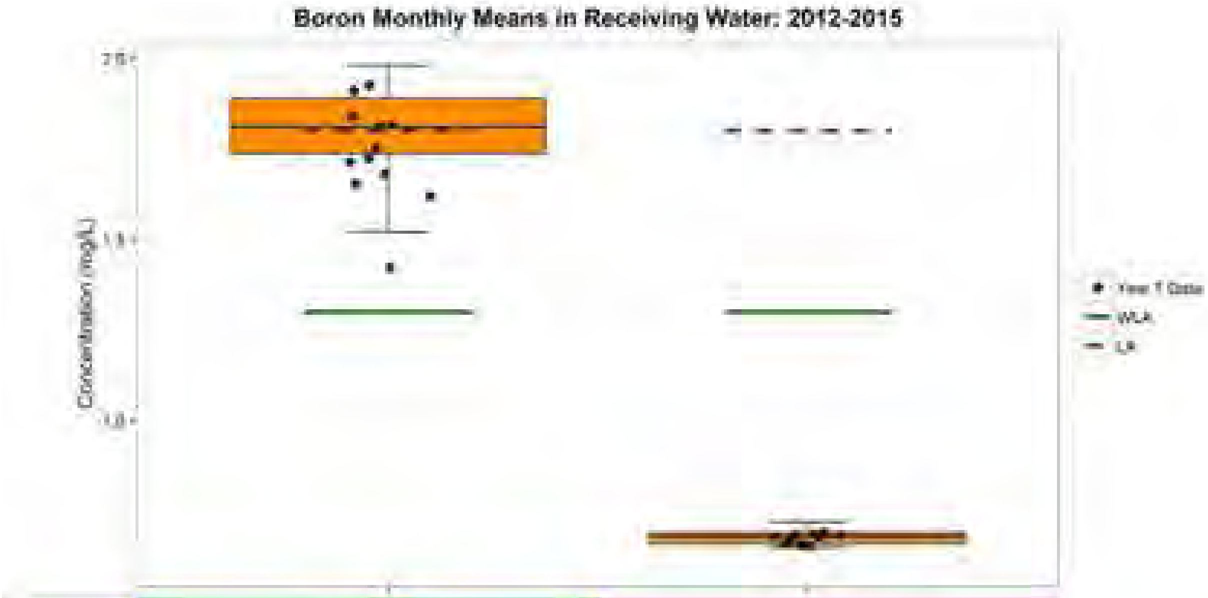

| Date | 03_UNIV | 9A_HOWAR | 04_WOOD | 07_TIERRA | 9B_BARON |
|---|---|---|---|---|---|
| Jul-14 | 217 | 205 | 210 | 173 | 154 |
| Aug-14 | 225 | 218 | 200 | 172 | 158 |
| Sep-14 | 228 | 217 | 197 | 171 | 153 |
| Oct-14 | 230 | 224 | 155 | 171 | 159 |
| Nov-14 | 235 | 229 | 186 | 173 | 169 |
| Dec-14 | 211 | 206 | 198 | 182 | 178 |
| Jan-15 | 218 | 210 | 190 | 179 | 175 |
| Feb-15 | 220 | 211 | 187 | 177 | 172 |
| Mar-15 | 223 | 218 | 183 | 176 | 172 |
| Apr-15 | 228 | 221 | 177 | 177 | 173 |
| May-15 | 230 | 224 | 180 | 178 | 174 |
| Jun-15 | 226 | 220 | 208 | 181 | 169 |

**Figure 62. Chloride Monthly Means for Receiving Water Sites Collected During Dry Weather**



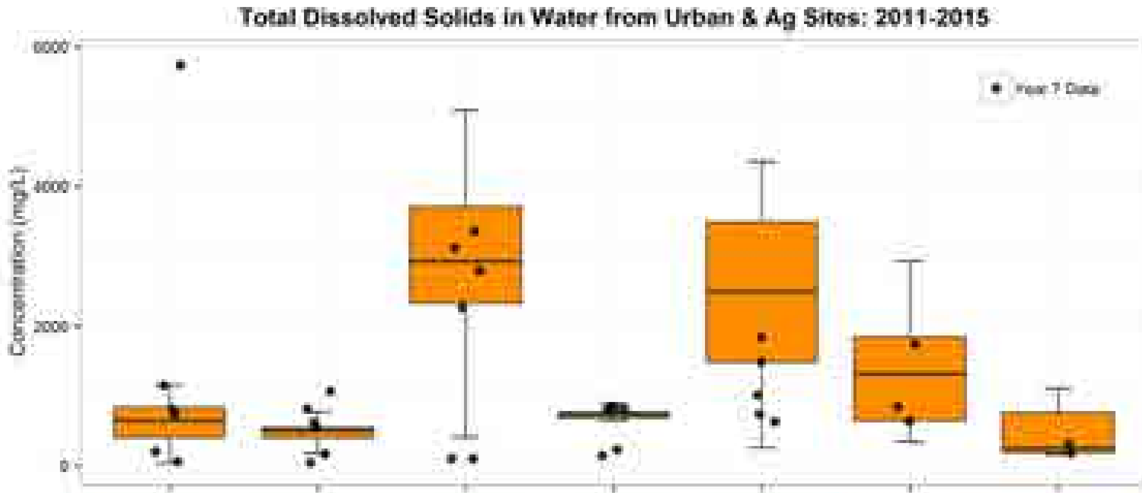

| Date | 03_UNIV | 9A_HOWAR | 07_TIERRA | 9B_BARON | 04_WOOD |
|---|---|---|---|---|---|
| Jul-14 | 264 | 240 | 433 | 171 | 1982 |
| Aug-14 | 274 | 255 | 430 | 176 | 1883 |
| Sep-14 | 276 | 255 | 429 | 171 | 1854 |
| Oct-14 | 278 | 262 | 427 | 177 | 1449 |
| Nov-14 | 284 | 268 | 433 | 187 | 1752 |
| Dec-14 | 258 | 242 | 455 | 197 | 1665 |
| Jan-15 | 266 | 246 | 448 | 194 | 1793 |
| Feb-15 | 268 | 248 | 443 | 191 | 1762 |
| Mar-15 | 272 | 255 | 442 | 190 | 1720 |
| Apr-15 | 276 | 259 | 444 | 191 | 1664 |
| May-15 | 279 | 262 | 445 | 192 | 1694 |
| Jun-15 | 274 | 258 | 452 | 187 | 1962 |

**Figure 63. Sulfate Monthly Means for Receiving Water Sites Collected During Dry Weather**



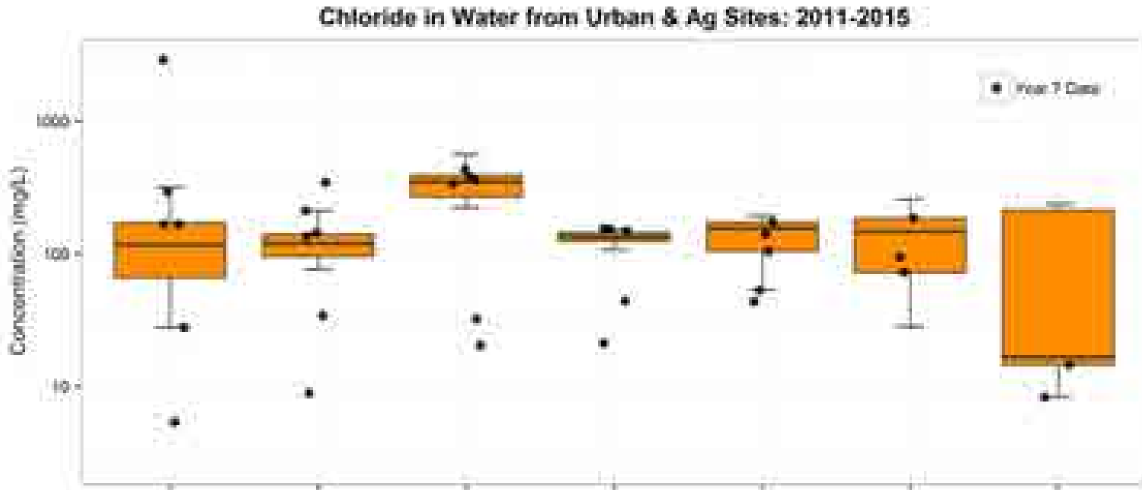

| Date | 04_WOOD | 07_TIERRA |
|---|---|---|
| Jul-14 | **1.93** | 0.66 |
| Aug-14 | **1.84** | 0.66 |
| Sep-14 | **1.81** | 0.66 |
| Oct-14 | *1.42* | 0.65 |
| Nov-14 | *1.71* | 0.66 |
| Dec-14 | **1.82** | 0.69 |
| Jan-15 | *1.75* | 0.68 |
| Feb-15 | *1.72* | 0.68 |
| Mar-15 | *1.68* | 0.67 |
| Apr-15 | *1.62* | 0.68 |
| May-15 | *1.65* | 0.68 |
| Jun-15 | **1.91** | 0.69 |

**Figure 64. Boron Monthly Means for Receiving Water Sites Collected During Dry Weather**




| Date | Type | 9BD_VENTURA | 07D_CTP | 9BD_ADOLF | 11_BB_HILL | 9BD_WOOD | 07D_HITCH_LEVEE_2 | 9BD_GERRY |
|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 730 | 550 | 2260 | 840 | – | 1740 | – |
| Nov-14 | Dry | 800 | 1060 | 2790 | 800 | 1480 | – | – |
| Dec-14 | Storm | 60 | 40 | 100 | 140 | 730 | 840 | 300 |
| Dec-14 | Storm | 200 | 170 | 100 | 230 | 620 | 640 | 170 |
| Feb-15 | Dry | 1150 | 610 | 3350 | 800 | 1010 | – | – |
| May-15 | Dry | 5740 | 810 | 3120 | 840 | 1830 | – | – |

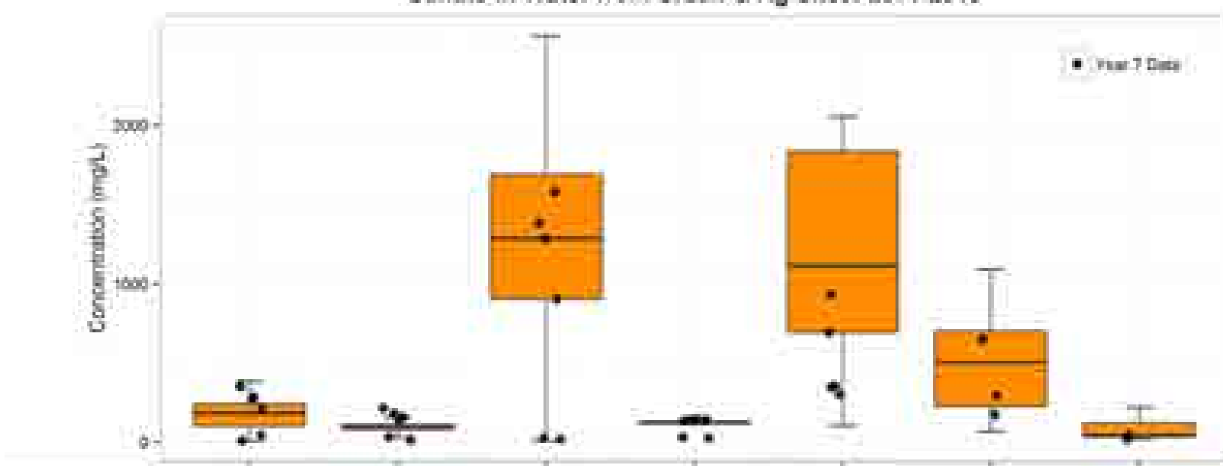
**Figure 65. Total Dissolved Solids in Water from Urban and Ag Sites: 2011-2015**




| Date | Type | 06D_VENTURA | 07D_CTP | 9BD_ADOLF | 13_SB_HILL | 06D_WOOD | 07D_HITCH_LEVEE_2 | 9BD_GERRY |
|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 165.25 | 134.65 | 334.5 | 151.25 | -- | 183.75 | -- |
| Nov-14 | Dry | 166 | 344 | 430 | 154 | 104 | -- | -- |
| Dec-14 | Storm | 5.34 | 8.82 | 32.12 | 21.15 | 52.92 | 94.25 | 14.44 |
| Dec-14 | Storm | 27.68 | 34.17 | 20.24 | 43.72 | 43.39 | 72.36 | 8.24 |
| Feb-15 | Dry | 292.2 | 143.4 | 376.4 | 148.6 | 139 | -- | -- |
| May-15 | Dry | 2887 | 210.3 | 356.8 | 152.4 | 171.9 | -- | -- |

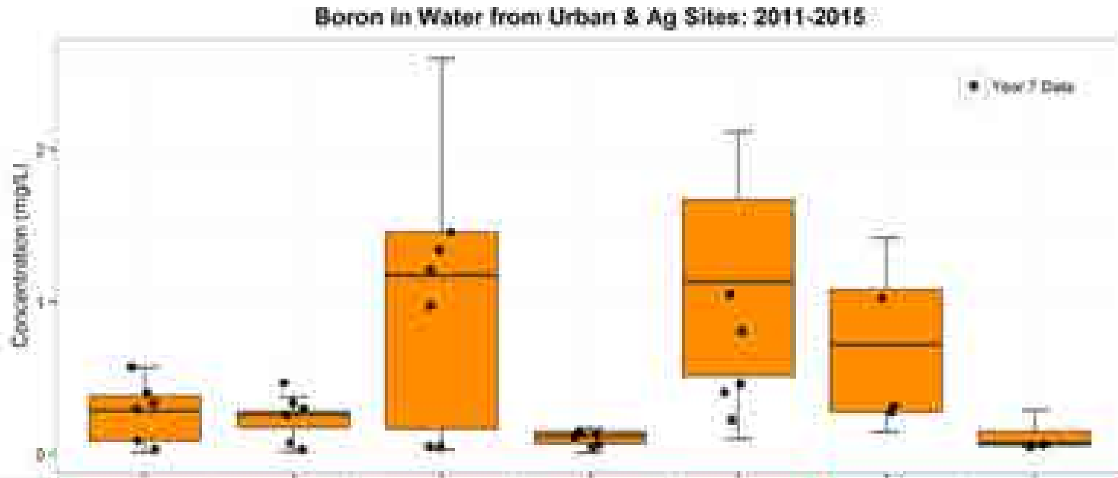
**Figure 66. Chloride in Water from Urban & Ag Sites: 2011-2015**

Sulfate in Water from Urban & Ag Sites: 2011-2015



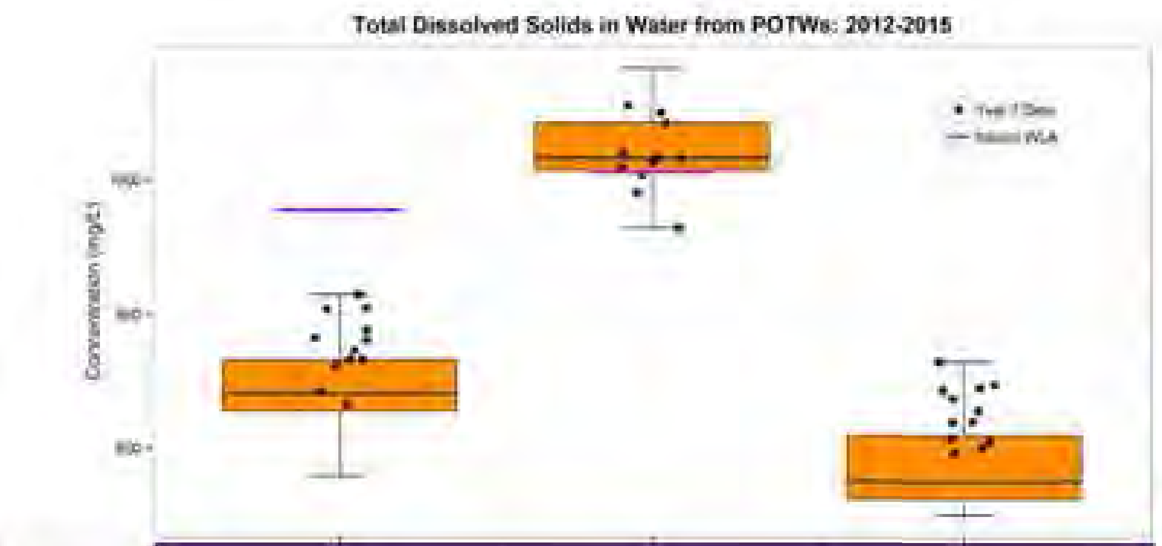

| Date | Type | 04D_VENTURA | 07D_CTP | 9BD_ADOLF | 13_SB_HILL | 04D_WOOD | 07D_HITCH_LEVEE_2 | 9BD_GERRY |
|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 210.4 | 135.04 | 900.1 | 135.64 | -- | 640.3 | -- |
| Nov-14 | Dry | 271 | 179 | 1281 | 135 | 688 | -- | -- |
| Dec-14 | Storm | 6.68 | 8.68 | 17.48 | 22.56 | 352.28 | 287.1 | 34.01 |
| Dec-14 | Storm | 43.7 | 30.62 | 22.14 | 31.22 | 299.78 | 163.94 | 11.08 |
| Feb-15 | Dry | 281.3 | 155.8 | 1578 | 138 | 344.1 | -- | -- |
| May-15 | Dry | 348.8 | 213 | 1379.5 | 145.1 | 926.4 | -- | -- |

**Figure 67. Sulfate in Water from Urban & Ag Sites: 2011-2015**



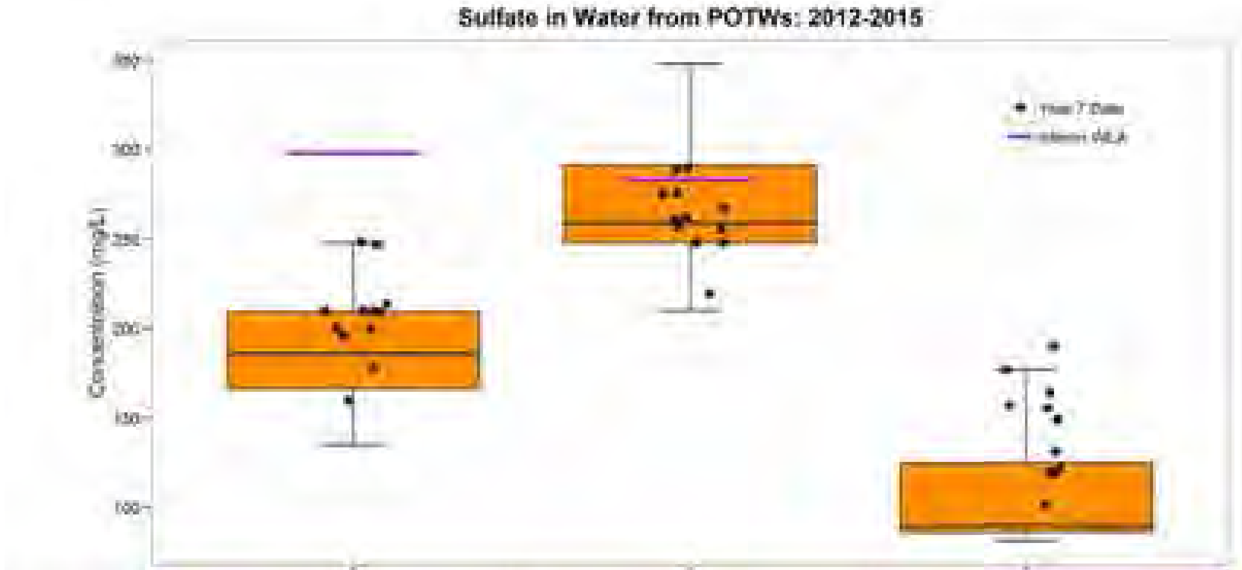

| Date | Type | 04D_VENTURA | 07D_CTP | 9BD_ADOLF | 15_SB_HILL | 04D_WOOD | 07D_HITCH_LEVEE_2 | 9BD_GERRY |
|---|---|---|---|---|---|---|---|---|
| Aug-14 | Dry | 0.2981 | 0.2988 | 0.9709 | 0.1275 | – | 1.024 | – |
| Nov-14 | Dry | 0.3333 | 0.3347 | 1.2051 | 0.1369 | 0.8041 | – | – |
| Dec-14 | Storm | 0.0292 | 0.0296 | 0.0492 | 0.0452 | 0.4056 | 0.3144 | 0.0603 |
| Dec-14 | Storm | 0.0859 | 0.0742 | 0.0473 | 0.0619 | 0.2219 | 0.275 | 0.048 |
| Feb-15 | Dry | 0.5703 | 0.2584 | 1.4597 | 0.1074 | 0.4619 | – | – |
| May-15 | Dry | 0.3998 | 0.4674 | 1.3406 | 0.1328 | 1.0471 | – | – |

**Figure 68. Boron in Water from Urban & Ag Sites: 2011-2015**



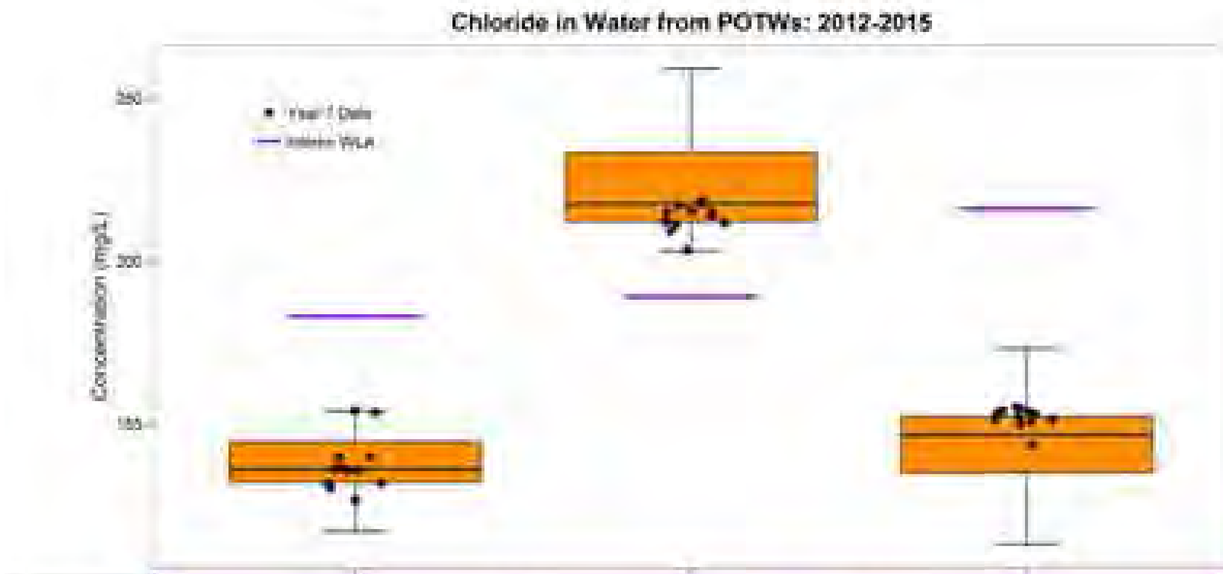

| Date | 07D_SIMI | 9AD_CAMA | 10D_HILL |
|---|---|---|---|
| Jul-14 | 732 | **1032** | 602 |
| Aug-14 | 776 | **1110** | 615 |
| Sep-14 | 666 | **1084** | 610 |
| Oct-14 | 684 | **1040** | 593 |
| Nov-14 | 746 | **1026** | 656 |
| Dec-14 | 784 | **1018** | 894 |
| Jan-15 | 722 | **1026** | 640 |
| Feb-15 | 761 | **1032** | 639 |
| Mar-15 | 808 | 1008 | 686 |
| Apr-15 | 809 | 980 | 674 |
| May-15 | 829 | **1100** | 729 |
| Jun-15 | 732 | 928 | 690 |

**Figure 69. TDS in Water from POTW Sites: 2012-2015**



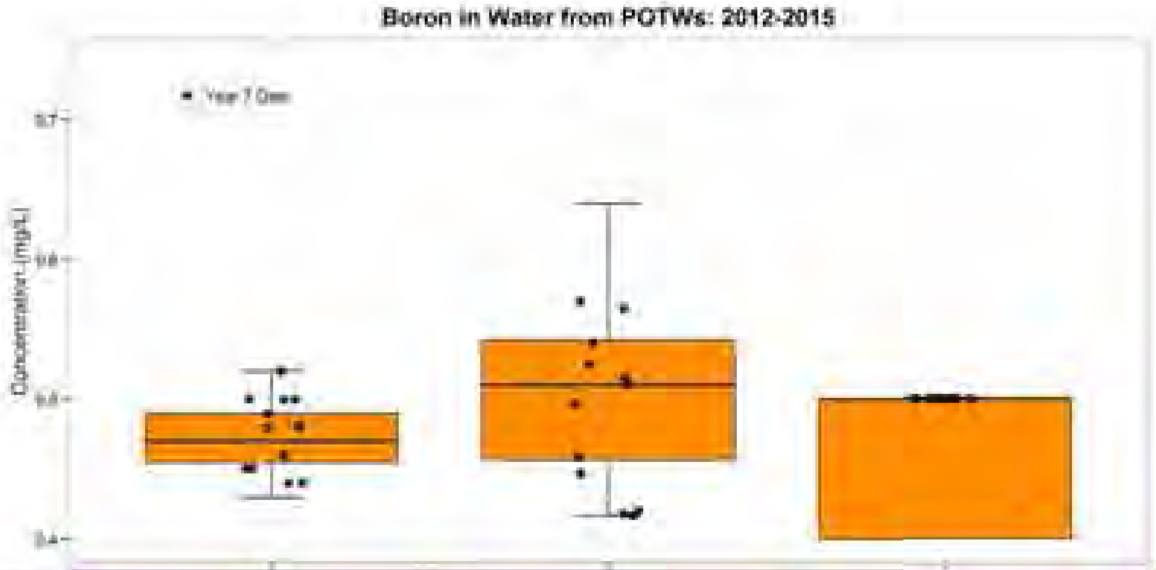

| Date | 07D_SIMI | 9AD_CAMA | 10D_HILL |
|---|---|---|---|
| Jul-14 | 200 | 220 | 119 |
| Aug-14 | 196 | 275 | 119 |
| Sep-14 | 178 | 276 | 122 |
| Oct-14 | 160 | 262 | 101 |
| Nov-14 | 209 | 267 | 149 |
| Dec-14 | 214 | 248 | 177 |
| Jan-15 | 210 | 256 | 149 |
| Feb-15 | 210 | 248 | 131 |
| Mar-15 | 210 | 261 | 157 |
| Apr-15 | 248 | 257 | 155 |
| May-15 | 247 | **290** | 190 |
| Jun-15 | 200 | **289** | 164 |

**Figure 70. Sulfate in Water from POTW Sites: 2012-2015**




| Date | 07D_SIMI | 9AD_CAMA | 10D_HILL |
|---|---|---|---|
| Jul-14 | 136 | **215** | 151 |
| Aug-14 | 132 | **218** | 152 |
| Sep-14 | 127 | **217** | 143 |
| Oct-14 | 132 | **212** | 154 |
| Nov-14 | 136 | **214** | 151 |
| Dec-14 | 136 | **203** | 151 |
| Jan-15 | 140 | **212** | 150 |
| Feb-15 | 140 | **211** | 156 |
| Mar-15 | 130 | **209** | 153 |
| Apr-15 | 154 | **215** | 155 |
| May-15 | 153 | **215** | 154 |
| Jun-15 | 136 | **218** | 153 |

**Figure 71. Chloride in Water from POTW Sites: 2012-2015**




| Date | 07D_SIMI | 9AD_CAMA | 10D_HILL |
|---|---|---|---|
| Jul-14 | 0.44 | 0.418 | 0.5 |
| Aug-14 | 0.5 | 0.496 | 0.5 |
| Sep-14 | 0.52 | 0.525 | 0.5 |
| Oct-14 | 0.5 | 0.565 | 0.5 |
| Nov-14 | 0.48 | 0.51 | 0.5 |
| Dec-14 | 0.49 | 0.515 | 0.5 |
| Jan-15 | 0.45 | 0.459 | 0.5 |
| Feb-15 | 0.46 | 0.42 | 0.5 |
| Mar-15 | 0.49 | 0.417 | 0.5 |
| Apr-15 | 0.45 | 0.54 | 0.5 |
| May-15 | 0.5 | 0.57 | 0.5 |
| Jun-15 | 0.44 | 0.447 | 0.5 |

**Figure 72. Boron in Water from POTW Sites: 2012-2015**

## TISSUE DATA

Tissue data is provided in the following tables for both Mugu Lagoon and freshwater monitoring locations. Tissue samples are only collected in Mugu Lagoon every three years; therefore data from monitoring years one, four, and seven are reported. For all tables, only those constituents that have been detected in at least one sample are included.

### Mugu Lagoon Tissue Data

**Table 9. Mugu Lagoon – Central Lagoon Tissue Data [1, 2]**

| Date | Tissue Sample Type | | Lipids | OC Pesticides | | | | | | | | | | PCBs | Metals | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Percent Lipids | Chlordane-alpha | Chlordane-gamma | 2,4'-DDD | 2,4'-DDE | 2,4'-DDT | 4,4'-DDD | 4,4'-DDE | 4,4'-DDT | Toxaphene | | Arochlor 1254 | Total Mercury | Total Selenium |
| | | | % | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | | ng/g | µg/g | µg/g |
| 8/21/2008 | Composite Mussel Sample | | 0.9 | -- | -- | 7.5 | -- | ND | 13.4 | 125 | ND | 94.4 | | ND | ND | 0.4 |
| 8/21/2008 | Whole Fish Compo-site | Top Smelt (*Atherinops affinis*) | 4.1 | -- | -- | ND | -- | 11.7 | 20.9 | 406 | 41.7 | 294 | | ND | 0.02 | 0.6 |
| 8/18/2011 | Composite Mussel Sample | | 1.7 | -- | -- | DNQ | -- | 9.4 | ND | 118 | ND | DNQ | | ND | 0.0039 | 0.8 |
| 5/14/2015 | Whole Fish Sample #1 | Top Smelt *(Atherinops affinis)* | 6.3 | 8.3 | DNQ | DNQ | DNQ | 14.6 | 45.5 | 537.5 | 72.2 | ND | | ND | 0.05 | 2.9 |
| | Whole Fish Sample #2 | Top Smelt *(Atherinops affinis)* | 7.6 | DNQ | ND | DNQ | DNQ | 15.2 | 31 | 435.9 | 24.8 | ND | | ND | 0.05 | 1.9 |
| | Whole Fish Sample #3 | Top Smelt *(Atherinops affinis)* | 9.2 | ND | ND | DNQ | ND | 7.7 | DNQ | 74.1 | ND | ND | | ND | 0.07 | 1.9 |

| Date | Tissue Sample Type | | Lipids | OC Pesticides | | | | | | | | | PCBs | Metals | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Percent Lipids | Chlordane-alpha | Chlordane-gamma | 2,4'-DDD | 2,4'-DDE | 2,4'-DDT | 4,4'-DDD | 4,4'-DDE | 4,4'-DDT | Toxaphene | Arochlor 1254 | Total Mercury | Total Selenium |
| | | | % | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | µg/g | µg/g |
| 5/14/2015 | Whole Fish Sample #4 | Top Smelt *(Atherinops affinis)* | 6.4 | 39.1 | 18.2 | 9.2 | 22.3 | 32.5 | 300.3 | 3620.4 | 504.7 | 891.9 | ND | 0.07 | 4.4 |
| | Whole Fish Sample #5 | Top Smelt *(Atherinops affinis)* | 7.0 | ND | ND | ND | DNQ | 6.9 | DNQ | 109.4 | DNQ | ND | ND | 0.06 | 2.4 |
| | Whole Fish Sample #6 | Top Smelt *(Atherinops affinis)* | 6.5 | 5.2 | DNQ | DNQ | DNQ | DNQ | 44.1 | 536.7 | 51.3 | 92.1 | ND | 0.04 | 2.7 |
| | Whole Fish Sample #7 | Grass Rockfish (*Sebastes rastrelliger)* | 12.2 | 31.8 | 8.9 | DNQ | 20.5 | 11.6 | 255.9 | 6170.6 | 215.3 | 227.9 | ND | 0.3 | 2. 7 |
| | Whole Fish Sample #8 | Grass Rockfish *(Sebastes rastrelliger)* | 7.9 | 15.6 | DNQ | ND | 9.5 | 5.4 | 122.7 | 3367.4 | 155 | 152.1 | ND | 0.3 | 2.5 |
| | Whole Fish Sample #9 | Grass Rockfish *(Sebastes rastrelliger)* | 8.4 | 11.9 | DNQ | DNQ | 8.2 | ND | 83.7 | 2626.1 | 94.5 | ND | ND | 0.3 | 2.6 |
| | Whole Fish Sample #10 | Grass Rockfish *(Sebastes rastrelliger)* | 16.3 | 24.4 | 7.3 | 5.5 | 15.2 | 13.6 | 156.5 | 3203.8 | 131.2 | 168.8 | ND | 0.3 | 2.6 |
| | Whole Fish Sample #11 | Grass Rockfish *(Sebastes rastrelliger)* | 18.3 | ND | ND | ND | DNQ | 19.1 | 44.9 | 1099.6 | 28.3 | ND | ND | 1.1 | 2.0 |

| Date | Tissue Sample Type | | Lipids | OC Pesticides | | | | | | | | | PCBs | Metals | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Percent Lipids | Chlordane -alpha | Arochlor 1254 | 2,4'-DDD | 2,4'-DDE | 2,4'-DDT | 4,4'-DDD | 4,4'-DDE | 4,4'-DDT | Toxaphene | Arochlor 1254 | Total Mercury | Total Selenium |
| | | | % | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | µg/g | µg/g |
| 5/14/2015 | Whole Fish Sample #12 | Barred Sandbass (*Paralabrax nebulifer*) | 17.3 | 14.3 | ND | ND | 6.3 | 6.9 | 82.4 | 2632.9 | 221.9 | 273.96 | ND | 0.3 | 2.5 |
| | Whole Fish Sample #13 | Barred Sandbass *(Paralabrax nebulifer*) | 9.9 | ND | ND | ND | DNQ | 6.5 | 24.5 | 566.1 | 46.1 | ND | ND | 0.3 | 2.1 |

1. Only constituents with detected values are included in the table.
2. Units are in wet weight with the exception of 2015 data, which the lab reported in dry weight.

**Table 10. Mugu Lagoon – Western Arm Tissue Data [1, 2]**

| Date | Tissue Sample Type | | Lipids | OC Pesticides | | | | | | | | | PCBs | Metals | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Percent Lipids | Chlordane-alpha | Chlordane-gamma | 2,4'-DDD | 2,4'-DDE | 2,4'-DDT | 4,4'-DDD | 4,4'-DDE | 4,4'-DDT | Toxaphene | Aroclor 1254 | Total Mercury | Total Selenium |
| | | | % | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | µg/g | µg/g |
| 8/19/2008 | Composite Mussel Sample | | 1.2 | ND | ND | ND | ND | ND | 6.6 | 44 | ND | ND | ND | DNQ | 0.4 |
| 8/19/2008 | Composite Bait Fish Sample | Top Smelt *(Atherinops affinis)* | 1.9 | ND | ND | ND | ND | ND | 26.8 | 147 | ND | ND | ND | DNQ | 0.5 |
| 8/19/2008 | Flat Fish Fillet Sample | Diamond Turbot *(Hypsopsetta guttulata)* | 0.4 | ND | ND | ND | ND | ND | ND | 51 | ND | ND | ND | DNQ | 0.9 |
| 8/19/2008 | Whole Perch Fish Sample | Shiner Surfperch *(Cymatogaster aggregate)* | 2.8 | 12.7 | DNQ | 9.2 | ND | ND | 139 | 664 | 79.4 | 117 | 55 | DNQ | 0.5 |
| 8/18/2011 | Composite Mussel Sample | | 1 | ND | ND | DNQ | DNQ | DNQ | ND | 105 | ND | ND | ND | 0.01 | 0.5 |
| 5/14/2015 | Whole Fish Sample #1 | Top Smelt (Atherinops affinis) | 4.4 | 12.4 | 8.8 | DNQ | 9.9 | ND | 102 | 1325.4 | 34.3 | 280.5 | ND | 0.05 | 3 |
| | Whole Fish Sample #2 | Top Smelt (Atherinops affinis) | 5.1 | ND | ND | DNQ | 6.9 | DNQ | 28.1 | 350.8 | DNQ | ND | ND | 0.06 | 1.8 |
| | Whole Fish Sample #3 | Top Smelt (Atherinops affinis) | 3.9 | DNQ | ND | DNQ | 6 | ND | 23 | 479.5 | DNQ | ND | ND | 0.06 | 1.9 |
| | Whole Fish Sample #4 | Top Smelt (Atherinops affinis) | 3.3 | DNQ | ND | DNQ | 5.3 | ND | 17.2 | 325.3 | DNQ | ND | ND | 0.1 | 1.6 |

| Date | Tissue Sample Type | | Lipids | OC Pesticides | | | | | | | | | PCBs | Metals | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Percent Lipids | Chlordane-alpha | Chlordane-gamma | 2,4'-DDD | 2,4'-DDE | 2,4'-DDT | 4,4'-DDD | 4,4'-DDE | 4,4'-DDT | Toxaphene | Aroclor 1254 | Total Mercury | Total Selenium |
| | | | % | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | µg/g | µg/g |
| 5/14/2015 | Whole Fish Sample #5 | Top Smelt (Atherinops affinis) | 3.7 | DNQ | ND | DNQ | 5.2 | ND | 27.5 | 342.6 | 5.4 | ND | ND | 0.09 | 1.5 |
| | Whole Fish Sample #6 | Top Smelt (Atherinops affinis) | 6.4 | DNQ | DNQ | 15.6 | 12.7 | 17.4 | 10.5 | 279.4 | 5.7 | ND | ND | 0.07 | 2.1 |
| | Whole Fish Sample #7 | Top Smelt (Atherinops affinis) | 2.7 | DNQ | ND | DNQ | DNQ | ND | 19.1 | 591 | 6.9 | ND | ND | 0.08 | 1.7 |
| | Whole Fish Sample #8 | Top Smelt (Atherinops affinis) | 6.8 | ND | ND | 18.8 | 13.7 | 10.1 | 16.1 | 88.4 | DNQ | ND | ND | 0.07 | 1.8 |
| | Whole Fish Sample #9 | Top Smelt (Atherinops affinis) | 3.6 | 8.5 | DNQ | DNQ | 5 | DNQ | 63.2 | 1300.9 | 69.8 | 157.1 | ND | 0.07 | 3.9 |
| | Whole Fish Sample #10 | Top Smelt (Atherinops affinis) | 7.3 | DNQ | ND | DNQ | DNQ | ND | 14.7 | 250.9 | 9.9 | 86.8 | ND | 0.1 | 1.7 |
| | Whole Fish Sample #11 | Top Smelt (Atherinops affinis) | 3.6 | DNQ | ND | DNQ | DNQ | DNQ | 20.3 | 377 | 5.3 | ND | ND | 0.07 | 1.9 |
| | Whole Fish Sample #12 | Top Smelt (Atherinops affinis) | 4.6 | DNQ | DNQ | DNQ | DNQ | DNQ | 22.4 | 271.7 | 6.2 | ND | ND | 0.06 | 2.1 |
| | Whole Fish Sample #13 | Top Smelt (Atherinops affinis) | 3.1 | ND | ND | ND | DNQ | ND | 12.8 | 193.7 | DNQ | ND | ND | 0.06 | 1.5 |

| Date | Tissue Sample Type | | Lipids | OC Pesticides | | | | | | | | | PCBs | Metals | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Percent Lipids | Chlordane-alpha | Chlordane-gamma | 2,4'-DDD | 2,4'-DDE | 2,4'-DDT | 4,4'-DDD | 4,4'-DDE | 4,4'-DDT | Toxaphene | Aroclor 1254 | Total Mercury | Total Selenium |
| | | | % | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | µg/g | µg/g |
| 5/14/2015 | Whole Fish Sample #14 | Top Smelt (Atherinops affinis) | 2.9 | DNQ | ND | DNQ | DNQ | ND | 43.1 | 890.9 | 0.5 | 101.4 | ND | 0.07 | 1.6 |
| | Whole Fish Sample #15 | Top Smelt (Atherinops affinis) | 4.9 | DNQ | DNQ | DNQ | 6.4 | ND | 40.5 | 553.1 | 25 | ND | ND | 0.05 | 2 |
| | Whole Fish Sample #16 | Top Smelt (Atherinops affinis) | 2.9 | DNQ | ND | DNQ | DNQ | ND | 13.3 | 332.2 | DNQ | ND | ND | 0.07 | 1.9 |
| | Whole Fish Sample #17 | Top Smelt (Atherinops affinis) | 3.5 | DNQ | ND | ND | 5 | ND | 19.6 | 278 | 12 | ND | ND | 0.07 | 1.6 |
| | Whole Fish Sample #18 | Top Smelt (Atherinops affinis) | 4. 5 | DNQ | ND | DNQ | DNQ | ND | 24.9 | 562.1 | 23 | 50.3 | ND | 0.06 | 2.1 |
| | Whole Fish Sample #19 | Top Smelt (Atherinops affinis) | 3.9 | ND | DNQ | DNQ | DNQ | ND | 26.3 | 480.2 | 9 | ND | ND | 0.07 | 1.9 |
| | Whole Fish Sample #20 | Top Smelt (Atherinops affinis) | 4.9 | 9.5 | 5.1 | DNQ | DNQ | ND | 57 | 753.7 | 57.2 | 570.4 | ND | 0.04 | 4.6 |
| | Whole Fish Sample #21 | Top Smelt (Atherinops affinis) | 8.7 | 6.4 | DNQ | 7.1 | 6.7 | 33.4 | 42 | 295.7 | 23.6 | 194.8 | ND | 0.07 | 2.3 |

| Date | Tissue Sample Type | | Lipids | OC Pesticides | | | | | | | | | PCBs | Metals | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Percent Lipids | Chlordane-alpha | Chlordane-gamma | 2,4'-DDD | 2,4'-DDE | 2,4'-DDT | 4,4'-DDD | 4,4'-DDE | 4,4'-DDT | Toxaphene | Aroclor 1254 | Total Mercury | Total Selenium |
| | | | % | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | µg/g | µg/g |
| 5/14/2015 | Whole Fish Sample #22 | Top Smelt (Atherinops affinis) | 3.9 | ND | ND | DNQ | DNQ | ND | 19.9 | 329.8 | 18.3 | ND | ND | 0.09 | 1.9 |
| | Whole Fish Sample #23 | Barred Sandbass (*Paralabrax nebulifer*) | 15.3 | DNQ | DNQ | 12.8 | 9.7 | 16.7 | 99.6 | 1787.8 | 21.1 | ND | ND | 1 | 1.6 |
| | Whole Fish Sample #24 | Barred Sandbass (Paralabrax nebulifer) | 8.1 | ND | DNQ | DNQ | DNQ | 12.5 | 29.2 | 1062.3 | 45.3 | 78.21 | ND | 0.1 | 1.9 |
| | Whole Fish Sample #25 | Barred Sandbass (Paralabrax nebulifer) | 9.8 | ND | DNQ | DNQ | DNQ | 13.2 | 30.8 | 1257.6 | 63.6 | 153.64 | ND | 0.2 | 1.9 |
| | Whole Fish Sample #26 | Barred Sandbass (Paralabrax nebulifer) | 19.7 | DNQ | 8.5 | 5.1 | DNQ | 37.5 | 116.6 | 1808.5 | 103.5 | 269.34 | ND | 0.2 | 1.6 |
| | Whole Fish Sample #27 | Barred Sandbass (Paralabrax nebulifer) | 15.4 | ND | 8 | 6 | DNQ | 31.4 | 76.5 | 2508.2 | 44.7 | 226.74 | ND | 1.3 | 1.7 |
| | Whole Fish Sample #28 | Grass Rockfish (Sebastes rastrelliger) | 19.2 | 12 | DNQ | DNQ | 9.4 | 6.7 | 87 | 1925.2 | 96.3 | 337.37 | ND | 0.3 | 2.5 |
| | Whole Fish Sample #29 | Grass Rockfish (Sebastes rastrelliger) | 20.5 | 10.4 | DNQ | DNQ | 12.8 | 7.3 | 111 | 2209.3 | 72.8 | 298.54 | ND | 0.2 | 2.2 |

| Date | Tissue Sample Type | | Lipids | OC Pesticides | | | | | | | | | PCBs | Metals | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Percent Lipids | Chlordane-alpha | Chlordane-gamma | 2,4'-DDD | 2,4'-DDE | 2,4'-DDT | 4,4'-DDD | 4,4'-DDE | 4,4'-DDT | Toxaphene | Aroclor 1254 | Total Mercury | Total Selenium |
| | | | % | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | µg/g | µg/g |
| 5/14/2015 | Whole Fish Sample #30 | Grass Rockfish (Sebastes rastrelliger) | 25.8 | 8.8 | DNQ | DNQ | 22 | 11.1 | 119.7 | 2017.8 | 65 | 322.1 | ND | 0.2 | 1.8 |
| | Whole Fish Sample #31 | Grass Rockfish (Sebastes rastrelliger) | 18.9 | 15.1 | DNQ | 7.2 | 11.3 | 17.2 | 117.5 | 2374.4 | 108.4 | 309.7 | ND | 0.3 | 2.3 |
| | Whole Fish Sample #32 | Grass Rockfish (Sebastes rastrelliger) | 17.7 | 9.9 | DNQ | 5.8 | 18 | 7.4 | 124.9 | 2150.2 | 117.4 | ND | ND | 0.2 | 2 |

1. Only constituents with detected values are included in the table.
2. Units are in wet weight with the exception of 2015 data, which the lab reported in dry weight.

## Freshwater Tissue Data

**Table 11. Calleguas Creek – Camarillo Street CSUCI (03_UNIV) Fish Tissue Data Years 1-7 [1]**

| Date | Fish | | Lipids | OC Pesticides [2] | | | | | | | | | PCBs [2] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Percent Lipids | Chlordane -alpha | Chlordane -gamma | 2,4'-DDD | 2,4'-DDE | 2,4'-DDT | 4,4'-DDD | 4,4'-DDE | 4,4'-DDT | Toxaphene | Aroclor 1254 |
| | | | % | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g |
| 8/6/08 | Arroyo Chub | Whole Fish | 4.7 | DNQ | ND | ND | 6.6 | ND | ND | 373 | ND | ND | ND |
| 9/3/09 | Arroyo Chub | Comp. #1 | 4.2 | 25 | 11 | 24 | 38 | 97 | 127 | 2422 | 13 | 6397 | 54 |
| 9/3/09 | Arroyo Chub | Comp. #2 | 5.7 | 20 | 13 | 28 | 38 | 102 | 116 | 2782 | 20 | 5675 | 55 |
| 9/3/09 | Arroyo Chub | Comp. #3 | 6 | 32 | 15 | 31 | 45 | 117 | 175 | 2951 | 18 | 4300 | 56 |
| 9/3/09 | Black Bullhead | Carcass | 2.5 | 43 | 22 | 22 | 13 | ND | 184 | 6980 | 469 | 6469 | 55 |
| 9/3/09 | Black Bullhead | Fillet w/ Skin | 1.3 | 29 | 13 | 12 | ND | ND | 90 | 3603 | 233 | 3283 | 32 |
| 9/3/09 | Common Carp | Carcass #1 | 4 | 32 | 15 | 25 | 17 | 29 | 100 | 2209 | 240 | 4805 | ND |
| 9/3/09 | Common Carp | Carcass #2 | 4.3 | 37 | 19 | 24 | DNQ | 16 | 112 | 2492 | 328 | 8510 | 21 |
| 9/3/09 | Common Carp | Carcass #3 | 4.7 | 47 | 25 | 26 | 22 | 31 | 119 | 2744 | 466 | ND | ND |
| 9/3/09 | Common Carp | Fillet w/ Skin #1 | 1.5 | 5.5 | ND | DNQ | ND | 10 | 21 | 413 | 46 | ND | ND |
| 9/3/09 | Common Carp | Fillet w/ Skin #2 | 1.6 | 12 | DNQ | 13 | ND | 21 | 25 | 708 | 115 | ND | ND |
| 9/3/09 | Common Carp | Fillet w/ Skin #3 | 1.9 | 7.5 | DNQ | 18 | ND | 33 | 45 | 772 | 140 | ND | ND |
| 9/3/10 | Arroyo Chub | 0-85 mm | 4.3 | DNQ | DNQ | ND | DNQ | DNQ | DNQ | 167 | 16 | ND | ND |
| 9/3/10 | Arroyo Chub | 86-112 mm | 7 | DNQ | DNQ | DNQ | 12 | 30 | 44 | 1300 | 20 | 646 | ND |
| 9/3/10 | Common Carp | | 4.3 | DNQ | DNQ | DNQ | ND | DNQ | 21 | 247 | 32 | 403 | ND |
| 8/25/11 | Common Carp | | 1.9 | DNQ | ND | DNQ | ND | 8.5 | ND | 125 | ND | DNQ | ND |
| 8/30/12 | Common Carp | | 1.5 | ND | ND | ND | ND | ND | ND | 175 | ND | ND | ND |
| 8/27/13 | Whole Fish Composite Fathead Minnow Green Sunfish Common Carp | | 3 | ND | ND | ND | ND | ND | ND | 200.5 | ND | ND | ND |

| Date | Fish | | Lipids Percent Lipids % | OC Pesticides [2] Chlordane -alpha ng/g | Chlordane -gamma ng/g | 2,4'-DDD ng/g | 2,4'-DDE ng/g | 2,4'-DDT ng/g | 4,4'-DDD ng/g | 4,4'-DDE ng/g | 4,4'-DDT ng/g | Toxaphene ng/g | PCBs [2] Aroclor 1254 ng/g |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5/14/15 | Common Carp | Whole Fish | 5.1 | 37 | 9.5 | 19.2 | 20.3 | 103.1 | 227.5 | 7093.5 | 26.5 | 623.4 | 505.4 |
| | | Filet w/o skin #1 | 2.4 | ND | ND | DNQ | DNQ | 6.1 | 15.6 | 901.7 | ND | 128.7 | DNQ |
| | | Filet w/o skin #2 | 1.3 | ND | ND | ND | ND | DNQ | DNQ | 330.6 | ND | 93.19 | ND |

1. Only constituents with detected values are included in the table.
2. Units are in wet weight with the exception of 2015 data, which the lab reported in dry weight.

**Table 12. Conejo Creek – Adolfo Road (9B_ADOLF) Fish Tissue Data Years 1 – 7 [1, 2]**

| Date | Fish | | Lipids | OC Pesticides [3] | | | | | | | | | PCBs [3] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Percent Lipids | Chlordane -alpha | Chlordane -gamma | 2,4'-DDD | 2,4'-DDE | 2,4'-DDT | 4,4'-DDD | 4,4'-DDE | 4,4'-DDT | Toxaphene | Aroclor 1254 |
| | | | % | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g |
| 8/6/08 | Common Carp | | 3.5 | ND | ND | ND | ND | ND | ND | 111 | 54 | ND | ND |
| 9/3/09 | Arroyo chub | Comp. #1 | 8.6 | 19 | 8.2 | 10 | 22 | 54 | 47 | 694 | 14 | 3611 | ND |
| 9/3/09 | Arroyo chub | Comp. #2 | 9.5 | 18 | 5.2 | 15 | 15 | 40 | 37 | 646 | 21 | 3213 | 56 |
| 9/3/09 | Arroyo chub | Comp. #3 | 8.4 | 18 | 6.8 | 16 | 21 | 43 | 61 | 629 | ND | 2766 | 67 |
| 9/3/09 | Common Carp | Carcass #1 | 2.5 | 21 | 6.0 | 15 | ND | ND | 27 | 754 | ND | ND | 54 |
| 9/3/09 | Common Carp | Fillet w/ Skin #1 | 0.8 | ND | ND | ND | ND | ND | 10 | 190 | ND | ND | ND |
| 9/3/09 | Common Carp | Carcass #2 | 4.8 | 49 | 24 | 18 | ND | ND | 170 | 3643 | 99 | 3566 | 93 |
| 9/3/09 | Common Carp | Fillet w/ Skin #2 | 1.6 | 10 | 5.4 | 8.6 | ND | ND | 43 | 1019 | 30 | ND | 26 |
| 9/3/09 | Common Carp | Carcass Comp. #3 | 4 | 27 | 15 | 19 | 12 | 131 | 58 | 1019 | 190 | 2544 | 70 |
| 9/3/09 | Common Carp | Fillet Comp. w/ Skin #3 | 1.8 | DNQ | ND | 25 | ND | 57 | 37 | 274 | 86 | ND | ND |
| 9/3/10 | Arroyo chub | 0-85 mm | 4.9 | DNQ | ND | DNQ | DNQ | 11 | 21 | 626 | 17 | 487 | ND |
| 9/3/10 | Arroyo chub | 86-112 mm | 6.6 | DNQ | DNQ | ND | DNQ | DNQ | DNQ | 137 | 14 | ND | ND |
| 8/25/11 | Common carp | | 2.4 | DNQ | DNQ | ND | ND | DNQ | ND | 49 | ND | DNQ | ND |
| 8/27/13 | Largemouth Bass | | 1.3 | ND | ND | ND | ND | ND | ND | 85.7 | ND | ND | ND |
| 5/14/15 | Common Carp | Whole Fish | 13.4 | 31.2 | 13.7 | 15.9 | ND | 20.5 | 35.2 | 678.1 | DNQ | 347.68 | 106.9 |
| 5/14/15 | Common Carp | Filet w/o skin #1 | 9.8 | 22.9 | 10.9 | 12.4 | 10.2 | 7.4 | 35.2 | 350.5 | 10.6 | 452.86 | 58.5 |
| 5/14/15 | Common Carp | Filet w/o skin #2 | 4.8 | 8 | DNQ | DNQ | DNQ | 5.2 | 12.2 | 635.7 | ND | 185.91 | 99.6 |

1. Only constituents with detected values are included in the table.
2. No fish were caught at this site during year five.
3. Units are wet weight with the exception of 2015 data, which the lab reported in dry weight.

**Table 13. Arroyo Simi – Hitch Boulevard (07_HITCH) Fish Tissue Data Years 1 – 7 [1, 2]**

| Date | Fish | | | Lipids | OC Pesticides [3] | | | | | | | | PCBs [3] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Percent Lipids | Chlordane -alpha | Chlordane -gamma | 2,4'-DDD | 2,4'-DDE | 2,4'-DDT | 4,4'-DDD | 4,4'-DDE | 4,4'-DDT | Aroclor 1254 |
| | | | | % | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g |
| 8/6/08 | Arroyo Chub | Composite | | 8.3 | ND | ND | ND | DNQ | ND | ND | 521 | ND | ND |
| 9/3/09 | Arroyo Chub | Composite #1 | 43-60mm | 9.5 | DNQ | ND | 20 | ND | 52 | 233 | 955 | ND | ND |
| 9/3/09 | Arroyo Chub | Composite #1 | 65-90mm | 10.6 | ND | ND | 5.3 | DNQ | 12 | 15.8 | 365 | ND | ND |
| 9/3/09 | Arroyo Chub | Composite #2 | 43-60mm | 9.7 | DNQ | ND | 33 | ND | 749 | 437 | 1183 | ND | ND |
| 9/3/09 | Arroyo Chub | Composite #2 | 65-90mm | 10.5 | DNQ | ND | 32 | 14.6 | 74 | 195 | 1648 | 26 | 28 |
| 9/3/09 | Arroyo Chub | Composite #3 | 43-60mm | 8.3 | DNQ | ND | 26 | ND | 45 | 343 | 967 | ND | ND |
| 9/3/09 | Arroyo Chub | Composite #3 | 65-90mm | 11.3 | 6.6 | ND | 27 | ND | 57 | 110 | 1275 | 38 | ND |
| 9/3/10 | Arroyo Chub | | | 7.8 | ND | ND | DNQ | DNQ | 19 | 19.2 | 673 | DNQ | ND |
| 8/28/13 | Whole Fish Composite Largemouth Bass Goldfish | | | 11.9 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 5/14/15 | Largemouth Bass | Whole fish #1 | | 14.5 | 20.3 | DNQ | ND | ND | ND | ND | 315.1 | ND | 85.8 |
| 5/14/15 | Largemouth Bass | Whole fish #2 | | 11.8 | ND | ND | ND | ND | ND | ND | 254.4 | ND | 22.2 |
| 5/14/15 | Largemouth Bass | Whole fish #3 | | 14.9 | DNQ | ND | ND | ND | 5.1 | 11.8 | 574.1 | 20.6 | 33.7 |
| 5/14/15 | Largemouth Bass | Whole fish #4 | | 7.8 | DNQ | ND | ND | ND | ND | ND | 328.9 | ND | 53.1 |
| 5/14/15 | Largemouth Bass | Whole fish #5 | | 14.7 | 7.2 | ND | ND | ND | 5.6 | 10.1 | 398.7 | 15.8 | 71.9 |

1. Only constituents with detected values are included in the table.
2. No fish were caught at this site during years 4 or 5.
3. Units are wet weight with the exception of 2015 data, which the lab reported in dry weight.

**Table 14. Arroyo Las Posas – Somis Road (06_SOMIS) Fish Tissue Data Years 1 – 7 [1, 2]**

| Date | Fish | | | Lipids | OC Pesticides [3] | | | | | | | | PCBs [3] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Percent Lipids | Chlordane -alpha | Chlordane -gamma | 2,4'-DDD | 2,4'-DDE | 2,4'-DDT | 4,4'-DDD | 4,4'-DDE | Toxaphene | Aroclor 1254 |
| | | | | % | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g |
| 8/6/08 | Arroyo Chub | Composite | | 2.7 | ND | ND | ND | ND | ND | ND | 492 | ND | ND |
| 9/3/09 | Arroyo Chub | Composite #1 | 29-51mm | 6.7 | 11 | DNQ | 37 | ND | ND | 646 | 1918 | ND | 34 |
| 9/3/09 | Arroyo Chub | Composite #1 | 53-97mm | 4.6 | DNQ | ND | 62 | ND | ND | 535 | 1967 | 2821 | 36 |
| 9/3/09 | Arroyo Chub | Composite #2 | 29-51mm | 6.8 | 9.0 | DNQ | 55 | ND | ND | 1158 | 2203 | ND | 31 |
| 9/3/09 | Arroyo Chub | Composite #2 | 53-97mm | 6.2 | 12 | 5.9 | 28 | 16 | 43 | 128 | 2313 | 3054 | 44 |
| 9/3/09 | Arroyo Chub | Composite #3 | 29-51mm | 5.7 | 10 | DNQ | 30 | 11 | 122 | 157 | 2124 | ND | 56 |
| 9/3/09 | Arroyo Chub | Composite #3 | 53-97mm | 5.3 | 10 | DNQ | 12 | ND | 36 | 258 | 2258 | 2103 | 32 |

1. Only constituents with detected values are included in the table.
2. No fish were caught at this site during years 3, 4, 5, 6, or 7.
3. Units are wet weight with the exception of 2015 data, which the lab reported in dry weight.

**Table 15. Revolon Slough – Wood Road (04_WOOD) Fish Tissue Data Years 1 – 7 [1, 2]**

| Date | Fish | | Lipids | OC Pesticides [3] | | | | | | | | | PCBs [3] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Percent Lipids | Chlordane -alpha | Chlordane -gamma | 2,4'-DDD | 2,4'-DDE | 2,4'-DDT | 4,4'-DDD | 4,4'-DDE | 4,4'-DDT | Toxaphene | Aroclor 1254 |
| | | | % | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g | ng/g |
| 8/7/08 | Common Carp | Comp. Fillet, no skin | 3 | ND | ND | 27 | ND | 14 | 85 | 1194 | 21 | 349 | ND |
| 8/7/08 | Common Carp | Comp. Fillet w/ skin | 2.1 | 5.3 | ND | 18 | 7.4 | DNQ | 40 | 615 | 13 | 259 | ND |
| 9/3/09 | Common Carp | Carcass | 12.1 | 91 | 62 | 129 | 25 | ND | 1210 | 11100 | 904 | 25800 | 28 |
| 9/3/09 | Common Carp | Fillet w/ Skin #1 | 2.8 | 35 | 21 | 55 | 17 | ND | 262 | 4210 | 328 | 6630 | ND |
| 9/3/09 | Common Carp | Carcass | 9.6 | 102 | 60 | 205 | 76 | ND | 1070 | 9590 | 367 | 17000 | 51 |
| 9/3/09 | Common Carp | Fillet w/ Skin #2 | 3.3 | 47 | 31 | 110 | 31 | ND | 371 | 4790 | 168 | 5930 | DNQ |
| 9/3/09 | Common Carp | Carcass | 9 | 117 | 66 | 185 | 64 | ND | 1100 | 7750 | 411 | 14300 | 54 |
| 9/3/09 | Common Carp | Fillet w/ Skin #3 | 2.7 | 54 | 33 | 77 | 39 | 50 | 378 | 4000 | 239 | 5480 | 20 |
| 9/3/09 | Arroyo Chub | Comp. #1 | 8.7 | 41 | 27 | 133 | 77 | 191 | 878 | 6320 | 57 | 14700 | 24 |
| 9/3/09 | Arroyo Chub | Comp. #1 | 9 | 38 | 24 | 82 | 73 | 222 | 689 | 5630 | 36 | 19900 | DNQ |
| 9/3/09 | Arroyo Chub | Comp. #2 | 6.9 | 33 | 16 | 88 | 65 | 168 | 568 | 5580 | 52 | 17900 | ND |
| 8/25/11 | Common carp | | 2.6 | 9.3 | 5.5 | 15 | DNQ | 67 | ND | 819 | 8.5 | 206 | ND |
| 9/4/12 | Common carp | | 5.6 | ND | ND | ND | ND | 116 | ND | 1750 | ND | ND | ND |
| 8/27/13 | Whole Fish Composite Common carp Fathead Minnow | | 6.3 | ND | ND | ND | ND | ND | 84.3 | 1984.1 | ND | 1611.1 | ND |

| Date | Fish | | Lipids Percent Lipids % | OC Pesticides[3] Chlordane -alpha ng/g | Chlordane -gamma ng/g | 2,4'-DDD ng/g | 2,4'-DDE ng/g | 2,4'-DDT ng/g | 4,4'-DDD ng/g | 4,4'-DDE ng/g | 4,4'-DDT ng/g | Toxaphene ng/g | PCBs[3] Aroclor 1254 ng/g |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5/14/15 | Common Carp | Whole Fish #1 | 13.6 | 50.1 | 24.2 | 76.2 | 35.1 | 61.4 | 277.1 | 4474.4 | 294.5 | 3534.4 | 57.4 |
| | | Whole Fish #2 | 15.6 | 136.5 | 66.7 | 139.3 | 40.9 | 91.4 | 608 | 10502.1 | 560.4 | 4699.7 | 119.1 |
| | | Whole Fish #3 | 16.9 | 89.9 | 42.4 | 57.7 | ND | 67.4 | 534.5 | 8634.2 | 316.4 | 4147.6 | 72.7 |
| | | Fillet w/o skin #1 | 11.5 | 60.6 | 31 | 74.6 | 26.3 | 41.4 | 171.8 | 3492.5 | 217.5 | 3116.8 | 20.4 |
| | | Filet w/o skin #2 | 3.2 | DNQ | DNQ | 7.5 | ND | 13.7 | 37.3 | 632.7 | 41 | 728.3 | ND |
| | | Filet w/o skin #3 | 3.1 | DNQ | DNQ | DNQ | ND | 12.7 | 28.3 | 669.7 | 36.9 | 472.1 | ND |
| | | Filet w/o skin #4 | 2.6 | DNQ | DNQ | 9.4 | 6.6 | 14 | 29.4 | 724.4 | 18.5 | 472.9 | ND |
| | Bullhead | Whole Fish | 12.4 | 56 | 26.8 | 45.1 | ND | 80.5 | 270 | 3880.8 | 360.8 | 4567.3 | 42.9 |
| | | Filet w/o skin #1 | 2.8 | ND | ND | ND | ND | 18.3 | 39.8 | 810.7 | 40.8 | 736.6 | ND |
| | | Filet w/o skin #2 | 6.2 | ND | ND | ND | ND | 22.5 | 40.5 | 749.4 | 30.5 | 635.9 | ND |

1. Only constituents with detected values are included in the table.
2. No fish were caught at this site during year 3.
3. Units are wet weight with the exception of 2015 data, which the lab reported in dry weight.

**Table 16. Revolon Slough – Wood Road (04_WOOD) Metals Fish Tissue Data Years 1 – 7 [1, 2]**

| Date | Fish | | Lipids Percent Lipids % | Metals [3] Total Mercury µg/g | Total Selenium µg/g |
|---|---|---|---|---|---|
| 8/7/08 | Common Carp | Comp. Fillet, no skin | 3 | DNQ | 1.3 |
| 8/7/08 | Common Carp | Comp. Fillet w/ skin | 2.1 | DNQ | 2.3 |
| 9/3/09 | Common Carp | Carcass #1 | 12.1 | DNQ | 1.5 |
| 9/3/09 | Common Carp | Fillet w/ Skin #1 | 2.8 | DNQ | 1.6 |
| 9/3/09 | Common Carp | Carcass #2 | 9.6 | DNQ | 1.9 |
| 9/3/09 | Common Carp | Fillet w/ Skin #2 | 3.3 | DNQ | 2.1 |
| 9/3/09 | Common Carp | Carcass #3 | 9 | DNQ | 1.4 |
| 9/3/09 | Common Carp | Fillet w/ Skin #3 | 2.7 | 0.02 | 1.7 |
| 9/3/09 | Arroyo Chub | Comp. #1 | 8.7 | 0.02 | 1.6 |
| 9/3/09 | Arroyo Chub | Comp. #1 | 9 | 0.02 | 1.8 |
| 9/3/09 | Arroyo Chub | Comp. #2 | 6.9 | 0.02 | 1.4 |
| 8/25/11 | Common carp | | 2.6 | 0.004 | 2.7 |
| 9/4/12 | Common carp | | 5.6 | 0.011 | 1.9 |
| 8/27/13 | Whole Fish Composite<br>Common carp<br>Fathead Minnow | | 6.3 | 0.01 | 1.9 |

| Date | Fish | | Lipids<br>Percent Lipids<br>% | Metals [3]<br>Total Mercury<br>µg/g | <br>Total Selenium<br>µg/g |
|---|---|---|---|---|---|
| 5/14/15 | Common Carp | Whole Fish #1 | 13.6 | 0.1 | 6.5 |
| | | Whole Fish #2 | 15.6 | 0.1 | 5.3 |
| | | Whole Fish #3 | 16.9 | 0.1 | 4.8 |
| | | Fillet w/o skin #1 | 11.5 | 0.1 | 4.8 |
| | | Filet w/o skin #2 | 3.2 | 0.1 | 5.3 |
| | | Filet w/o skin #3 | 3.1 | 0.1 | 5.9 |
| | | Filet w/o skin #4 | 2.6 | 0.1 | 5.5 |
| | Bullhead | Whole Fish | 12.4 | 0.1 | 7.9 |
| | | Filet w/o skin #1 | 2.8 | 0.1 | 5.9 |
| | | Filet w/o skin #2 | 6.2 | 0.2 | 5.1 |

1. Only constituents with detected values are included in the table.
2. No fish were caught at this site during year 3.
3. Units are wet weight with the exception of 2015 data, which the lab reported in dry weight.

## TOXICITY DATA

The following is a summary of the toxicity results to date for water column and sediment at the freshwater and estuarine sampling sites. Table 17 displays significant water column mortality test results for seven years of CCWTMP events, including both dry and storm (bolded text) events. Significant mortality found in freshwater sediments is shown in Table 18 and significant mortality at the estuarine sites is shown in Table 19.

Toxicity was frequently identified at the 04_WOOD site during the first two monitoring years in water column samples and in each of the four sediment samples. The Stakeholders have chosen to invest resources into source control efforts to address sources potentially contributing to the toxicity issue. This is being accomplished through the implementation of the Agricultural Water Quality Management Plan (AWQMP) developed by the Ventura County Agricultural Irrigated Lands Group (VCAILG) as part of the Conditional Waiver for Irrigated Agricultural Lands (Ag Waiver).

During dry weather water column sampling, toxicity has been identified historically at all sampled sites except 13_BELT. There were three occurrences of dry weather water column toxicity during the seventh year of monitoring. Toxicity has been identified during wet weather monitoring at all sites, except for 10_GATE and 13_BELT. Wet weather toxicity occurred during both storm events for this year of monitoring (Event 46 and Event 47).

Water column TIEs have been initiated as described previously, and outcomes of these efforts have had limited success in identifying the true cause of toxicity. While not identifying the specific constituents causing toxicity, the TIEs have identified:

- Organic compounds are likely contributors to ambient water toxicity.
- Compounds similar to organophosphorus (OP) pesticides are continually being identified as possible contributors to the observed toxicity.

The results of future CCWTMP toxicity testing will continue to assist in the identification of when and where conditions are toxic in the Calleguas Creek watershed, and help the stakeholders better target areas in the watershed that show continual toxicity and focus limited resources to address the problems.

The majority of the freshwater toxicity occurrences during year seven were at the 04_WOOD site (five of the eight occurrences). The others were during wet Event 46 at the 03_UNIV, 06_SOMIS, and 07_HITCH sites.

In year seven, fresh water sediment toxicity testing was performed during Event 44 for 04_WOOD, 02_PCH, 03_UNIV, and 9A_HOWAR. Statistically significant acute toxicity was observed for *Hyalella azteca* at 04_WOOD and 03_UNIV, but no toxicity was observed for the remaining sites. Follow-up toxicity investigation was not conducted at the 04_WOOD and 03_UNIV sites as TIEs are not performed at 04_WOOD due to the reason stated above and there was less than a 20 percent reduction in survival for the 03_UNIV site compared to the sample control.

Mugu Lagoon sediment toxicity testing was also conducted during Event 44 at the 01_BPT_03, 01_BPT_06, 01_BPT_14, 01_BPT_15, and 01_BPT_74 sites. No survival toxicity was observed for *Eohaustorius estuaries* during year seven lagoon sediment toxicity testing.

**Table 17. Water Column Toxicity for All Monitoring Events and Sites**
(Significant mortality denoted by “X”, bolded events are wet weather events)

| CCWMTP Year | Event | Site ID | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 04_WOOD | 9B_ADOLF | 03_UNIV | 10_GATE | 06_SOMIS | 13_BELT | 07_HITCH |
| Year 1 | 1 | X | | | | | | |
| | 2 | X | | | | | | |
| | **3** | **X** | **X** | **X** | | | | **X** |
| | 4 | X | | | | | | |
| | **5** | **X** | | | | | | **X** |
| | 6 | | | | | | | |
| Year 2 | 9 | | | | | | | |
| | 12 | X | | | | | | |
| | **14** | **X** | | **X** | | **X** | | |
| | **16** | **X** | | **X** | | | | **X** |
| | 17 | | | | | | | |
| | 20 | | | X | | | | |
| Year 3 | 22 | | | | | | | |
| | 23 | | | | | | | |
| | **24** | **X** | | | | | | |
| | 25 | | | | | | | |
| | **26** | **X** | | | | | | **X** |
| | 27 | | | | | | | |
| Year 4 | 28 | | | | | X | | |
| | 29 | | X | | X | | | |
| | **30** | **X** | | | | | | |
| | 31 | | | | | | | |
| | **32** | | | **X** | | | | |
| | 33 | | | | | | | |
| Year 5[1] | 34 | | | | | | | |
| | 35 | | | | | | | |
| | **36** | **X**[2] | | | | | | |
| | 37 | | | X[3] | | | | |
| | 38 | | | | | | | |
| Year 6 | 39 | X[2] | | | | | | |
| | 40 | | | | [4] | | | |
| | 41 | | [6] | [6] | [6] | [6] | [5] | [6] |
| | **42** | | | | | | | |
| | 43 | | | | | | | |
| Year 7 | 44 | X[2] | | [7] | | [8] | | |
| | 45 | X[2] | | | | | [9] | |
| | **46** | **X**[2] | | **X**[10] | | **X**[11] | | **X**[10] |
| | **47** | **X**[2] | | | | | | |
| | 48 | | | | | | | |
| | 49 | X[2] | | | | [12] | [12] | |

1. 10_GATE and 13_BELT are also toxicity investigation monitoring sites. During year 5 these sites were only sampled during event 38.
2. A TIE was not initiated at this site. TIEs conducted during previous monitoring years identified organic compounds such as pesticides as the likely cause of the toxicity. TIEs have been suspended while efforts are taken to reduce the source of the toxicity.

3. A Phase I TIE was conducted for this site. While the TIE did not conclusively identify a source of toxicity, the results were indicative of organic compounds. The corresponding water quality sample detected the OP pesticide chlorpyrifos at a concentration of 0.083 µg/L. This level is above the wasteload allocation for stormwater discharges but below the agricultural discharger's interim load allocation and above the final numeric target.
4. Toxicity testing was not performed at the 10_GATE site for Event 40.
5. Toxicity testing was not performed at the 10_BELT site for Event 41.
6. Successful toxicity testing for sites with conductivity less than 3000 µS/cm could not be completed for Event 41 due to a decline in the *C. dubia* laboratory culture. Sites include: 9B_ADOLF, 03_UNIV, 10_GATE, 06_SOMIS, and 07_HITCH.
7. An initial and a follow-up Phase I TIE was conducted for this site. Though the acute and chronic results of the toxicity test was not significantly different than that of the laboratory, the testing of this site did result in a greater than 50% mortality, triggering the initial and follow-up Phase I TIE. The initial TIE did not conclusively determine the source of toxicity, but did suggest that multiple co-occurring contaminants may have been responsible for the toxicity. The follow-up TIE demonstrated that no additional reductions in survival or reproduction occurred after the initial Baseline treatment, suggesting that the toxicity observed in the initial test was not persistent. This result suggests that the toxicant may have undergone natural degradation processes as the sample water aged.
8. Toxicity testing was not performed at the 06_SOMIS site for Event 44.
9. Toxicity testing was not performed at the 13_BELT site for Event 45.
10. A Phase I TIE was initiated at this site. While the TIE did not conclusively identify a source of toxicity, the results suggest that compounds that are activated by the Cytochrome-P450 system (e.g. OP pesticides) are contributing to sample toxicity.
11. A Phase I TIE was initiated at this site. While the TIE did not conclusively identify a source of toxicity, the results suggest that non-polar organic compound(s) are contributing to the ambient toxicity.
12. Toxicity testing was not performed at the 06_SOMIS or 13_BELT sites for Event 49.

**Table 18. Sediment Toxicity for All CCWTMP Freshwater Monitoring Events and Sites**
(Significant mortality denoted by "X")

| CCWMTP Year | Event | Site ID | | | |
|---|---|---|---|---|---|
| | | 04_WOOD | 02_PCH [1] | 03_UNIV | 9A_HOWAR [1] |
| Year 1 | 1 | X | | | |
| Year 2 | 9 | X | | | |
| Year 3 | 22 | X | | | |
| Year 4 | 28 | X | X | X | |
| Year 5 | 34 | X | | X | |
| Year 6 | 39 | X | | X [2] | |
| Year 7 | 44 | X | | X | |

1. 02_PCH and 9A_HOWAR are toxicity investigation monitoring sites.
2. A TIE targeted for organics was performed for the 03_UNIV site due to a greater than 50 percent reduction in *H. azteca* survival.

**Table 19. Sediment Toxicity for Mugu Lagoon Monitoring Events and Sites**
(Significant mortality denoted by "X")

| CCWMTP Year | Event | Site ID | | | | |
|---|---|---|---|---|---|---|
| | | 01_BPT_3 | 01_BPT_6 | 01_BPT_14 | 01_BPT_15 | 01_BPT_14 |
| Year 1 | 1 | | X [1] | X [1] | X [1] | X [1] |
| Year 4 | 28 | | | | | |
| Year 7 | 44 | | | | | |

1. Survival toxicity for *Eohaustorius estuaries*, but not for *Mytilus galloprovinciales*.

# Compliance Comparison and Discussion

As outlined in the QAPP, data applicable to compliance targets or allocations were reviewed for this report. The collected data were compared to the applicable compliance targets or allocations and it is this comparison that the various agencies will use to determine necessary actions in accordance with their permit. For the compliance comparison, various procedures were used depending on whether or not the final compliance dates for the TMDL were applicable during the monitoring year.

For TMDLs where final allocations or targets are not currently effective (OC Pesticides, Metals, and Salts TMDLs), the following compliance comparisons were conducted:

1. Applicable receiving water data at the compliance locations (base of each subwatershed) were compared to the interim load allocations and waste load allocations.
2. If an exceedance of an interim load allocation and/or waste load allocation was observed, the contributing land use data were reviewed to evaluate the potential cause of the exceedance.
3. POTW effluent data were compared to the relevant interim waste load allocations.

For the Nitrogen TMDL the following compliance comparisons were conducted:

1. For POTWs, the final waste load allocations are currently effective. As a result, effluent monitoring results were compared to the final allocations for the analysis.
2. For agricultural dischargers and other non-point sources, final load allocations are currently effective. Since agricultural dischargers are the only entities with allocations other than POTWs, compliance is evaluated by comparing receiving water results against TMDL numeric targets.

For the Toxicity TMDL, the following compliance comparisons were conducted:

1. For POTWs, the final waste load allocations are currently effective. As a result, effluent monitoring results were compared to the final allocations for the comparison.
2. For MS4 dischargers, the final waste load allocations are currently effective. As a result, applicable receiving water data at the compliance locations (base of each subwatershed) were compared to the final waste load allocations. If an exceedance of the final waste load allocation was found, the contributing urban land use data were reviewed to evaluate whether the MS4 was potentially causing the exceedance.
3. For agricultural dischargers, the final load allocations are not yet effective. As a result, applicable receiving water data at the compliance locations (base of each subwatershed) were compared to the interim load allocations. If an exceedance of an interim load allocation was observed, the contributing agricultural land use data were reviewed to evaluate whether agricultural discharges were potentially causing the exceedance.
4. In cases where the applicable interim load allocations or final waste load allocations have different values for acute (1-hour) toxicity and chronic (4-day) toxicity, the acute toxicity allocations were used for comparing wet weather data and the chronic toxicity allocations were used for comparing dry-weather data.

The following tables compare the applicable allocations based on the compliance procedure outlined above for each of the TMDLs. Some constituents sampled under the CCWTMP do not have applicable allocations and/or targets and are not included in the compliance comparison.

## COMPLIANCE AT RECEIVING WATER SITES

**Table 20. OC Pesticides, PCBs, & Siltation in Sediment**

| Site & Constituent | Units | Interim WLA & LA 1 | Event 44 |
|---|---|---|---|
| | | | Aug-2014 |
| ***Mugu Lagoon – Eastern Arm (01_BPT_3)*** | | | |
| Total Chlordane [2] | ng/g dw | 25 | ND |
| 4,4'-DDD | ng/g dw | 69 | DNQ |
| 4,4'-DDE | ng/g dw | 300 | 5.7 |
| 4,4'-DDT | ng/g dw | 39 | ND |
| Dieldrin | ng/g dw | 19 | ND |
| PCBs [3] | ng/g dw | 180 | ND |
| Toxaphene | ng/g dw | 22900 | ND |
| ***Mugu Lagoon – Eastern Part of Western Arm (01_BPT_6)*** | | | |
| Total Chlordane [2] | ng/g dw | 25 | ND |
| 4,4'-DDD | ng/g dw | 69 | DNQ |
| 4,4'-DDE | ng/g dw | 300 | 10.7 |
| 4,4'-DDT | ng/g dw | 39 | ND |
| Dieldrin | ng/g dw | 19 | ND |
| PCBs [3] | ng/g dw | 180 | ND |
| Toxaphene | ng/g dw | 22900 | ND |
| ***Mugu Lagoon – Central Part of Western Arm (01_BPT_14)*** | | | |
| Total Chlordane [2] | ng/g dw | 25 | ND |
| 4,4'-DDD | ng/g dw | 69 | DNQ |
| 4,4'-DDE | ng/g dw | 300 | 23.9 |
| 4,4'-DDT | ng/g dw | 39 | ND |
| Dieldrin | ng/g dw | 19 | ND |
| PCBs [3] | ng/g dw | 180 | DNQ |
| Toxaphene | ng/g dw | 22900 | ND |
| ***Mugu Lagoon – Central Lagoon (01_BPT_15)*** | | | |
| Total Chlordane [2] | ng/g dw | 25 | ND |
| 4,4'-DDD | ng/g dw | 69 | DNQ |
| 4,4'-DDE | ng/g dw | 300 | 11.8 |
| 4,4'-DDT | ng/g dw | 39 | ND |
| Dieldrin | ng/g dw | 19 | ND |
| PCBs [3] | ng/g dw | 180 | ND |
| Toxaphene | ng/g dw | 22900 | ND |

| Site & Constituent | Units | Interim WLA & LA [1] | Event 44 Aug-2014 |
|---|---|---|---|
| ***Mugu Lagoon – Central Lagoon, South of Drain #7 (01_SG_74)*** | | | |
| Total Chlordane [2] | ng/g dw | 25 | **ND** |
| 4,4'-DDD | ng/g dw | 69 | **DNQ** |
| 4,4'-DDE | ng/g dw | 300 | **8.7** |
| 4,4'-DDT | ng/g dw | 39 | **ND** |
| Dieldrin | ng/g dw | 19 | **ND** |
| PCBs [3] | ng/g dw | 180 | **DNQ** |
| Toxaphene | ng/g dw | 22900 | **ND** |
| ***Calleguas Creek – Hwy 1 Bridge (02_PCH)*** | | | |
| Total Chlordane [2] | ng/g dw | 17 | **ND** |
| 4,4'-DDD | ng/g dw | 66 | **ND** |
| 4,4'-DDE | ng/g dw | 470 | **DNQ** |
| 4,4'-DDT | ng/g dw | 110 | **DNQ** |
| Dieldrin | ng/g dw | 3 | **ND** |
| PCBs [3] | ng/g dw | 3800 | **ND** |
| Toxaphene | ng/g dw | 260 | **ND** |
| ***Revolon Slough – Wood Road (04_WOOD)*** | | | |
| Total Chlordane [2] | ng/g dw | 48 | **ND** |
| 4,4'-DDD | ng/g dw | 400 | **DNQ** |
| 4,4'-DDE | ng/g dw | 1600 | **ND** |
| 4,4'-DDT | ng/g dw | 690 | **7.0** |
| Dieldrin | ng/g dw | 5.7 | **ND** |
| PCBs [3] | ng/g dw | 7600 | **ND** |
| Toxaphene | ng/g dw | 790 | **ND** |
| ***Calleguas Creek – Camarillo Street CSUCI (03_UNIV)*** | | | |
| Total Chlordane [2] | ng/g dw | 17 | **ND** |
| 4,4'-DDD | ng/g dw | 66 | **ND** |
| 4,4'-DDE | ng/g dw | 470 | **DNQ** |
| 4,4'-DDT | ng/g dw | 110 | **ND** |
| Dieldrin | ng/g dw | 3 | **ND** |
| PCBs [3] | ng/g dw | 3800 | **ND** |
| Toxaphene | ng/g dw | 260 | **ND** |

| Site & Constituent | Units | Interim WLA & LA [1] | Event 44 Aug-2014 |
|---|---|---|---|
| ***Conejo Creek – Adolfo Road (9B_ADOLF)*** | | | |
| Total Chlordane [2] | ng/g dw | 3.4 | **DNQ** |
| 4,4'-DDD | ng/g dw | 5.3 | **ND** |
| 4,4'-DDE | ng/g dw | 20 | **19.0** |
| 4,4'-DDT | ng/g dw | 2 | **29.3** |
| Dieldrin | ng/g dw | 3 | **ND** |
| PCBs [3] | ng/g dw | 3800 | **ND** |
| Toxaphene | ng/g dw | 260 | **ND** |
| ***Arroyo Las Posas – Somis Road (06_SOMIS)*** | | | |
| Total Chlordane [2] | ng/g dw | 3.3 | **ND** |
| 4,4'-DDD | ng/g dw | 290 | **ND** |
| 4,4'-DDE | ng/g dw | 950 | **5.1** |
| 4,4'-DDT | ng/g dw | 670 | **DNQ** |
| Dieldrin | ng/g dw | 1.1 | **ND** |
| PCBs [3] | ng/g dw | 25,700 | **ND** |
| Toxaphene | ng/g dw | 230 | **ND** |
| ***Arroyo Simi – Hitch Boulevard (07_HITCH)*** | | | |
| Total Chlordane [2] | ng/g dw | 3.3 | **ND** |
| 4,4'-DDD | ng/g dw | 14 | **ND** |
| 4,4'-DDE | ng/g dw | 170 | **ND** |
| 4,4'-DDT | ng/g dw | 25 | **ND** |
| Dieldrin | ng/g dw | 1.1 | **ND** |
| PCBs [3] | ng/g dw | 25,700 | **ND** |
| Toxaphene | ng/g dw | 230 | **ND** |

ND=not detected; DNQ=detected not quantifiable

1. Interim waste load allocation for stormwater permittees and interim load allocations for agricultural dischargers; effective until March 24, 2026 (R4-2005-010).
2. Total chlordane is the sum of alpha and gamma-chlordane.
3. PCBs concentrations are the sum of the seven aroclors identified in CTR (1016, 1221, 1232, 1242, 1248, 1254, and 1260).

Table 21. Nitrogen Compounds in Water

| Site & Constituent | Units | Target [1] | Event 44 Dry Aug-14 | Event 45 Dry Nov-14 | Event 46 Wet Dec-14 | Event 47 Wet Dec-14 | Event 48 Dry Feb-15 | Event 49 Dry May-15 |
|---|---|---|---|---|---|---|---|---|
| ***Mugu Lagoon - Ronald Reagan Bridge (01_RR_BR)*** | | | | | | | | |
| Ammonia as N | mg/L | 8.1 | 0.19 | 0.7 | 0.54 | 0.91 | ND | 0.12 |
| Nitrate as N | mg/L | 10 | 8.35 | 8.35 | 8.35 | 8.35 | 8.35 | 8.35 |
| Nitrite as N | mg/L | 1 | 0.17 | 0.11 | 0.01 | 0.01 | 0.01 | 0.14 |
| Nitrate-N + Nitrite-N | mg/L | 10 | 8.52 | 26.76 | 28.51 | 5.25 | 0.05 | 13.25 |
| ***Calleguas Creek – Hwy 1 Bridge (02_PCH)*** | | | | | | | | |
| Ammonia as N | mg/L | 5.5 | ND | 0.21 | NR | NR | ND | 0.14 |
| Nitrate as N | mg/L | 10 | 25.02 | 19.87 | NR | NR | 17.36 | 16.23 |
| Nitrite as N | mg/L | 1 | 0.01 | 0.01 | NR | NR | 0.01 | 0.01 |
| Nitrate-N + Nitrite-N | mg/L | 10 | 25.03 | 19.88 | NR | NR | 17.37 | 16.24 |
| ***Calleguas Creek – Camarillo Street CSUCI (03_UNIV)*** | | | | | | | | |
| Ammonia as N | mg/L | 8.4 | 0.06 | 0.09 | 0.33 | 0.55 | 0.13 | 0.08 |
| Nitrate as N | mg/L | 10 | 6.82 | 7.31 | 3.1 | 1.92 | 6.4 | 6.84 |
| Nitrite as N | mg/L | 1 | 0.01 | 0.13 | ND | ND | 0.07 | 0.01 |
| Nitrate-N + Nitrite-N | mg/L | 10 | 6.83 | 7.44 | 3.1 | 1.9 | 6.47 | 6.85 |
| ***Revolon Slough – Wood Road (04_WOOD)*** | | | | | | | | |
| Ammonia as N | mg/L | 5.7 | 0.12 | 0.22 | 0.37 | 0.3 | 0.08 | 0.12 |
| Nitrate as N | mg/L | 10 | 46.9 | 47.33 | 5.56 | 3.71 | 42.65 | 44.6 |
| Nitrite as N | mg/L | 1 | 0.61 | 0.28 | ND | 0.03 | 0.34 | 0.44 |
| Nitrate-N + Nitrite-N | mg/L | 10 | 47.51 | 47.61 | 5.56 | 3.74 | 42.99 | 45.04 |
| ***Beardsley Wash – Central Avenue (05_CENTR)*** | | | | | | | | |
| Ammonia as N | mg/L | 5.7 | ND | 0.11 | 0.47 | 0.6 | ND | ND |
| Nitrate as N | mg/L | 10 | 32.4 | 8.68 | 8.89 | 4.68 | 11.08 | 29.9 |
| Nitrite as N | mg/L | 1 | 0.29 | 0.05 | ND | 0.03 | 0.1 | 0.25 |
| Nitrate-N + Nitrite-N | mg/L | 10 | 32.69 | 8.73 | 8.89 | 4.71 | 11.18 | 30.15 |
| ***Arroyo Las Posas – Somis Road (06_SOMIS)*** | | | | | | | | |
| Ammonia as N | mg/L | 8.1 | -- | 0.07 | 0.44 | 0.51 | ND | NS |
| Nitrate as N | mg/L | 10 | -- | 12.72 | 9.49 | 1.38 | 10.1 | NS |
| Nitrite as N | mg/L | 1 | -- | 0.03 | 0.04 | 0.01 | 0.04 | NS |
| Nitrate-N + Nitrite-N | mg/L | 10 | -- | 12.75 | 9.53 | 1.39 | 10.14 | NS |

| Site & Constituent | Units | Target [1] | Event 44 Dry Aug-14 | Event 45 Dry Nov-14 | Event 46 Wet Dec-14 | Event 47 Wet Dec-14 | Event 48 Dry Feb-15 | Event 49 Dry May-15 |
|---|---|---|---|---|---|---|---|---|
| ***Arroyo Simi – Hitch Boulevard (07_HITCH)*** | | | | | | | | |
| Ammonia as N | mg/L | 4.7 | **0.23** | **0.04** | **0.4** | **0.46** | ND | **0.04** |
| Nitrate as N | mg/L | 10 | **10.09** | **9.86** | **3.67** | **1.29** | **10.77** | **9.92** |
| Nitrite as N | mg/L | 1 | **0.07** | **0.03** | ND | **0.01** | **0.04** | **0.05** |
| Nitrate-N + Nitrite-N | mg/L | 10 | **10.16** | **9.89** | **3.67** | **1.3** | **10.81** | **9.97** |
| ***Arroyo Simi – Madera Avenue (07_MADER)*** | | | | | | | | |
| Ammonia as N | mg/L | 4.7 | **ND** | **0.2** | **0.58** | **0.34** | **0.05** | **0.05** |
| Nitrate as N | mg/L | 10 | **4.1** | **4.79** | **0.93** | **1.32** | **3.44** | **5.15** |
| Nitrite as N | mg/L | 1 | **0.01** | **0.05** | **0.03** | **0.01** | **0.05** | **0.11** |
| Nitrate-N + Nitrite-N | mg/L | 10 | **4.11** | **4.84** | **0.96** | **1.33** | **3.49** | **5.26** |
| ***Conejo Creek – Howard Road Bridge (9A_HOWAR)*** | | | | | | | | |
| Ammonia as N | mg/L | 9.5 | **0.83** | **1.28** | **NR** | **NR** | **0.44** | **0.38** |
| Nitrate as N | mg/L | 10 | **7.73** | **8.31** | **NR** | **NR** | **6.25** | **6.54** |
| Nitrite as N | mg/L | 1 | **0.08** | **0.1** | **NR** | **NR** | **0.04** | **0.06** |
| Nitrate-N + Nitrite-N | mg/L | 10 | **7.81** | **8.41** | **NR** | **NR** | **6.29** | **6.6** |
| ***Conejo Creek – Adolfo Road (9B_ADOLF)*** | | | | | | | | |
| Ammonia as N | mg/L | 9.5 | **0.04** | **0.16** | **0.37** | **0.41** | **0.03** | **0.04** |
| Nitrate as N | mg/L | 10 | **5.63** | **6.29** | **1.14** | **1.71** | **5.56** | **5.76** |
| Nitrite as N | mg/L | 1 | **0.01** | **ND** | **0.01** | **0.01** | **0.01** | **0.01** |
| Nitrate-N + Nitrite-N | mg/L | 10 | **5.64** | **6.29** | **1.15** | **1.72** | **5.57** | **5.77** |
| ***Conejo Creek – Hill Canyon Below N Fork (10_GATE)*** | | | | | | | | |
| Ammonia as N | mg/L | 8.4 | **0.22** | **0.65** | **0.42** | **0.28** | **0.56** | **0.41** |
| Nitrate as N | mg/L | 10 | **5.69** | **5.75** | **0.86** | **1.68** | **4.94** | **5.24** |
| Nitrite as N | mg/L | 1 | **0.17** | **0.19** | **ND** | **0.01** | **0.12** | **0.1** |
| Nitrate-N + Nitrite-N | mg/L | 10 | **5.86** | **5.94** | **0.86** | **1.69** | **5.06** | **5.34** |
| ***Conejo Creek – North Fork Above Hill Canyon (12_PARK)*** | | | | | | | | |
| Ammonia as N | mg/L | 3.2 | **ND** | **0.03** | **NR** | **NR** | **ND** | **ND** |
| Nitrate as N | mg/L | 10 | **ND** | **0.39** | **NR** | **NR** | **0.36** | **0.06** |
| Nitrite as N | mg/L | 1 | **0.01** | **0.01** | **NR** | **NR** | **0.03** | **0.01** |
| Nitrate-N + Nitrite-N | mg/L | 10 | **0.01** | **0.4** | **NR** | **NR** | **0.39** | **0.07** |

| Site & Constituent | Units | Target [1] | Event 44 Dry Aug-14 | Event 45 Dry Nov-14 | Event 46 Wet Dec-14 | Event 47 Wet Dec-14 | Event 48 Dry Feb-15 | Event 49 Dry May-15 |
|---|---|---|---|---|---|---|---|---|
| ***Conejo Creek – S Fork Behind Belt Press Build (13_BELT)*** | | | | | | | | |
| Ammonia as N | mg/L | 5.1 | **ND** | **0.1** | **NR** | **NR** | **ND** | **ND** |
| Nitrate as N | mg/L | 10 | **0.31** | **0.95** | **NR** | **NR** | **0.61** | **0.28** |
| Nitrite as N | mg/L | 1 | **0.01** | **0.01** | **NR** | **NR** | **0.01** | **0.01** |
| Nitrate-N + Nitrite-N | mg/L | 10 | **0.32** | **0.96** | **NR** | **NR** | **0.62** | **0.29** |

NS=no sample, dry; NR=not required; ND=not detected; DNQ=detected not quantifiable; J=estimated DNQ values for Nitrite-N, shown for the purpose of calculating the Nitrite-N + Nitrate-N sum and comparing it against the Nitrate-N + Nitrite-N target.

1. Load allocations for Nitrate-N + Nitrite-N are in effect for agricultural and other non-point sources. To evaluate compliance, monitoring results at receiving water compliance sites were compared against TMDL numeric targets (R4-2008-009).
2. One-hour average.

Results in **bold red type** exceed numeric TMDL target.

**Table 22. Toxicity, Diazinon, and Chlorpyrifos in Water**

| Site & Constituent | Units | Dry WLA [1] | Dry Interim LA [2] | Event 44 Dry Aug-14 | Event 45 Dry Nov-14 | Event 48 Dry Feb-15 | Event 49 Dry May-15 | Wet WLA [1] | Wet Interim LA [2] | Event 46 Wet Dec-14 | Event 47 Wet Dec-14 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Mugu Lagoon – Ronald Reagan Bridge (01_RR_BR)*** | | | | | | | | | | | |
| Chlorpyrifos | ug/L | 0.014 | 0.81 | **0.0017** | **0.028** | **ND** | **ND** | 0.014 | 2.57 | **0.719** | **0.381** |
| Diazinon | ug/L | 0.1 | 0.138 | **ND** | **ND** | **ND** | **ND** | 0.1 | 0.278 | **0.004** | **ND** |
| ***Calleguas Creek – Camarillo Street CSUCI (03_UNIV)*** | | | | | | | | | | | |
| Chlorpyrifos | ug/L | 0.014 | 0.81 | **ND** | **0.114** | **0.004** | **0.005** | 0.014 | 2.57 | **0.348** | **0.152** |
| Diazinon | ug/L | 0.1 | 0.138 | **ND** | **ND** | **ND** | **ND** | 0.1 | 0.278 | **0.006** | **ND** |
| ***Revolon Slough – Wood Road (04_WOOD)*** | | | | | | | | | | | |
| Chlorpyrifos | ug/L | 0.014 | 0.81 | **0.0050** | **0.084** | **0.006** | **0.003** | 0.014 | 2.57 | **3.082** | **0.593** |
| Diazinon | ug/L | 0.1 | 0.138 | **ND** | **0.163** | **ND** | **ND** | 0.1 | 0.278 | **0.019** | **0.0956** |
| ***Arroyo Las Posas – Somis Road (06_SOMIS)*** | | | | | | | | | | | |
| Chlorpyrifos | ug/L | 0.014 | 0.81 | **NS** | **0.009** | **0.003** | **NS** | 0.014 | 2.57 | **0.263** | **0.111** |
| Diazinon | ug/L | 0.1 | 0.138 | **NS** | **ND** | **ND** | **NS** | 0.1 | 0.278 | **ND** | **ND** |
| ***Arroyo Simi – Hitch Boulevard (07_HITCH)*** | | | | | | | | | | | |
| Chlorpyrifos | ug/L | 0.014 | 0.81 | **0.058** | **0.002** | **0.005** | **0.004** | 0.014 | 2.57 | **0.7** | **0.015** |
| Diazinon | ug/L | 0.1 | 0.138 | **ND** | **ND** | **ND** | **ND** | 0.1 | 0.278 | **ND** | **ND** |
| ***Conejo Creek – Adolfo Road (9B_ADOLF)*** | | | | | | | | | | | |
| Chlorpyrifos | ug/L | 0.014 | 0.81 | **ND** | **0.003** | **ND** | **0.003** | 0.014 | 2.57 | **0.022** | **0.026** |
| Diazinon | ug/L | 0.1 | 0.138 | **ND** | **ND** | **ND** | **ND** | 0.1 | 0.278 | **0.027** | **0.014** |
| ***Conejo Creek – Hill Canyon Below N Fork (10_GATE)*** | | | | | | | | | | | |
| Chlorpyrifos | ug/L | 0.014 | 0.81 | **0.0012** | **ND** | **NS** | **ND** | 0.014 | 2.57 | **ND** | **ND** |
| Diazinon | ug/L | 0.1 | 0.138 | **ND** | **ND** | **NS** | **ND** | 0.1 | 0.278 | **ND** | **ND** |
| ***Conejo Creek – S Fork Behind Belt Press Build (13_BELT)*** | | | | | | | | | | | |
| Chlorpyrifos | ug/L | 0.014 | 0.81 | **ND** | **NS** | **ND** | **NS** | 0.014 | 2.57 | **ND** | **ND** |
| Diazinon | ug/L | 0.1 | 0.138 | **ND** | **NS** | **ND** | **NS** | 0.1 | 0.278 | **ND** | **ND** |

ND=not detected; NS=no sample collected due to site being dry.

1. Final Dry and Wet Weather WLAs for Stormwater Dischargers effective as of March 24, 2008 (R4-2005-009).
2. Interim Dry and Wet Weather Load Allocations for Irrigated Agriculture; effective until March 24, 2016 (R4-2005-009).

Results in **bold purple type** exceed the final WLA, but not the interim LA. Results in **bold red type** exceed the final WLA and the interim LA.

**Table 23. Metals and Selenium in Water**

| Constituent | Units | Dry Interim WLA [1] | Dry Interim LA [2] | Event 44 Dry Aug-2014 | Event 45 Dry Nov-2014 | Event 48 Dry Feb-2015 | Event 49 Dry May-2015 | Wet Interim WLA [1] | Wet Interim LA [2] | Event 46 Wet Dec-2014 | Event 47 Wet Dec-2014 | Annual Average [3] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Revolon Slough – Wood Road (04_WOOD)*** | | | | | | | | | | | | |
| Total Copper | µg/L | 19 | 19 | 2.3 | 2.4 | 2.6 | 2.9 | 204 | 1390 | 66.3 | 90.2 | |
| Total Nickel | µg/L | 13 | 42 | 6.7 | 8.1 | 4.9 | 6.1 | 74 [4] | 74 [4] | 42.5 | 72.7 | |
| Total Selenium | µg/L | 13 | 6 | **34.1** | **19.5** | **19.5** | **18.5** | 290 [4] | 290 [4] | 0.8 | 0.9 | |
| Total Mercury [5] | lbs/yr | 1.7 | 2 | | | | | 4 | -- | | | 0.5 |
| ***Calleguas Creek – Camarillo Street CSUCI (03_UNIV)*** | | | | | | | | | | | | |
| Total Copper | µg/L | 19 | 19 | 2.3 | 2.4 | 2.6 | 2.9 | 204 | 1390 | 27 | 99.1 | |
| Total Nickel | µg/L | 13 | 42 | 6.7 | 8.1 | 4.9 | 6.1 | 74 [4] | 74 [4] | 27.2 | 137.3 | |
| Total Selenium | µg/L | -- | -- | 0.5 | 0.5 | 0.9 | 0.9 | -- | -- | 0.3 | 1.7 | |
| Total Mercury [5] | lbs/yr | 3.3 | 3.9 | | | | | 10.5 | -- | | | 0.2 |

1. Interim Dry Weather WLAs for Stormwater Dischargers; effective until March 2022 (R4-2006-0012)
2. Interim Dry Weather LAs for Irrigated Agriculture; effective until March 2022 (R4-2006-0012)
3. Mercury allocation is assessed as an annual load in suspended sediment. The water column mercury concentrations were used in calculating the loads, conservatively assuming that all mercury is on suspended sediment rather than being dissolved. The loads at each site are based on estimated annual concentrations (average of all monitored events at each site) and total annual flow calculated from preliminary streamflow data received from real time data loggers.
4. No wet weather exceedances of these constituents were observed in the TMDL analysis so no interim limits were assigned for the TMDL. For comparison purposes the wet weather targets are included in the table.
5. Interim WLA and LAs are expressed as annual loads. Total annual flow for 07/01/14 to 06/31/15 into Mugu Lagoon from Calleguas Creek and Revolon Slough is calculated as 6,102 Mgal/yr. As such, the interim WLA and LA shown correspond to the flow range of 0 to 15,000 to Mgal/yr, per R4-2006-0012.

Results in **bold red type** exceed applicable interim WLA and LA.

## Table 24. Monthly Mean Salts Concentrations

| | Units | Interim Limit WLA | Interim Limit LA | Jul-14 | Aug-14 | Sep-14 | Oct-14 | Nov-14 | Dec-14 | Jan-15 | Feb-15 | Mar-15 | Apr-15 | May-15 | Jun-15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Revolon Slough – Wood Road (04_WOOD)*** | | | | | | | | | | | | | | | |
| Total Dissolved Solids | mg/L | 1720 | 3995 | **3730** | **3544** | **3489** | **2727** | **3297** | **3510** | **3374** | **3316** | **3237** | **3132** | **3188** | **3692** |
| Chloride | mg/L | 230 | 230 | 210 | 200 | 197 | 155 | 186 | 198 | 190 | 187 | 183 | 177 | 180 | 208 |
| Sulfate | mg/L | 1289 | 1962 | **1982** | **1883** | **1854** | **1449** | **1752** | **1865** | **1793** | **1762** | **1720** | **1664** | **1694** | **1962** |
| Boron | mg/L | 1.3 | 1.8 | **1.93** | **1.84** | **1.81** | **1.42** | **1.71** | **1.82** | **1.75** | **1.72** | **1.68** | **1.62** | **1.65** | **1.91** |
| ***Calleguas Creek – Camarillo Street CSUCI (03_UNIV)*** | | | | | | | | | | | | | | | |
| Total Dissolved Solids | mg/L | 1720 | 3995 | 1031 | 1070 | 1081 | 1090 | 1114 | 1008 | 1039 | 1049 | 1061 | 1082 | 1093 | 1073 |
| Chloride | mg/L | 230 | 230 | 217 | 225 | 228 | 230 | **235** | 211 | 218 | 220 | 223 | 228 | **230** | 226 |
| Sulfate | mg/L | 1289 | 1962 | 264 | 274 | 276 | 278 | 284 | 258 | 266 | 268 | 272 | 276 | 279 | 274 |
| ***Conejo Creek – Howard Road Bridge (9A_HOWAR)*** | | | | | | | | | | | | | | | |
| Total Dissolved Solids | mg/L | 1720 | 3995 | 957 | 1014 | 1012 | 1041 | 1063 | 964 | 979 | 985 | 1015 | 1028 | 1040 | 1024 |
| Chloride | mg/L | 230 | 230 | 205 | 218 | 217 | 224 | 229 | 206 | 210 | 211 | 218 | 221 | 224 | 220 |
| Sulfate | mg/L | 1289 | 1962 | 240 | 255 | 255 | 262 | 268 | 242 | 246 | 248 | 255 | 259 | 262 | 258 |
| ***Conejo Creek – Baron Brothers Nursery (9B_BARON)*** | | | | | | | | | | | | | | | |
| Total Dissolved Solids | mg/L | 1720 | 3995 | 689 | 707 | 687 | 711 | 750 | 789 | 777 | 766 | 763 | 768 | 773 | 752 |
| Chloride | mg/L | 230 | 230 | 154 | 158 | 153 | 159 | 169 | 178 | 175 | 172 | 172 | 173 | 174 | 169 |
| Sulfate | mg/L | 1289 | 1962 | 171 | 176 | 171 | 177 | 187 | 197 | 194 | 191 | 190 | 191 | 192 | 187 |
| ***Arroyo Simi – Tierra Rejada Road (07_TIERRA)*** | | | | | | | | | | | | | | | |
| Total Dissolved Solids | mg/L | 1720 | 3995 | 1152 | 1145 | 1141 | 1138 | 1151 | 1209 | 1189 | 1177 | 1174 | 1179 | 1184 | 1202 |
| Chloride | mg/L | 230 | 230 | 173 | 172 | 171 | 171 | 173 | 182 | 179 | 177 | 176 | 177 | 178 | 181 |
| Sulfate | mg/L | 1289 | 1962 | 433 | 430 | 429 | 427 | 433 | 455 | 448 | 443 | 442 | 444 | 445 | 452 |
| Boron | mg/L | 1.3 | 1.8 | 0.66 | 0.66 | 0.66 | 0.65 | 0.66 | 0.69 | 0.68 | 0.68 | 0.67 | 0.68 | 0.68 | 0.69 |

Notes:

a. Monthly dry weather mean salt concentrations were generated using mean daily salt concentrations (from 5-min data) for days that met the definition of dry weather in the Salts TMDL (i.e., discharge < 86th percentile flow and no measureable rain in preceding 24 hrs). The 86th percentile of mean daily discharge at 03_Univ (generated using 5-min discharge data for the period July 1, 2014-June 30, 2015) was used as the flow-related threshold for distinguishing wet and dry days for all five compliance sites. Daily precipitation records for 23 gages in the CCW watershed (accessed via the VCWPD Hydrologic Data Server) were used to determine days with “measureable precipitation”. Days were considered as having measureable precipitation if two or more rain gages in the watershed received 0.1 inch or more of precipitation.

Results in **bold red type** exceed both the applicable interim WLA and LA. Results in **bold purple type** exceed the interim WLA, but not the interim LA.

## POTW COMPLIANCE

**Table 25. Nitrogen Compounds – POTWs**

| Site & Constituent | Units | Final WLA [1] | Event 44 Dry Aug-14 | Event 45 Dry Nov-14 | Event 48 Dry Feb-15 | Event 49 Dry May-15 |
|---|---|---|---|---|---|---|
| ***Simi Valley Water Quality Control Plant (07D_SIMI)*** | | | | | | |
| Ammonia as N | mg/L | 3.5 [2], 7.8 [3] | **1.3** | **1.1** | **0.6** | **1.4** |
| Nitrate as N | mg/L | 9 | **6.4** | **5.1** | **6.1** | **6.3** |
| Nitrite as N | mg/L | 0.9 | **0.01** | **0.03** | **ND** | **0.03** |
| Nitrate-N + Nitrite-N | mg/L | 9 | **6.4** | **5.1** | **6.1** | **6.3** |
| ***Camarillo Water Reclamation Plan (9AD_CAMA)*** | | | | | | |
| Ammonia as N | mg/L | 3.1 [2], 5.6 [3] | **1.2** | **1.2** | **1.3** | **0.9** |
| Nitrate as N | mg/L | 9 | **8.1** | **7.6** | **5.2** | **7.7** |
| Nitrite as N | mg/L | 0.9 | **ND** | **0.5** | **0.1** | **ND** |
| Nitrate-N + Nitrite-N | mg/L | 9 | **8.1** | **8.1** | **5.2** | **7.7** |
| ***Hill Canyon Wastewater Treatment Plant (10D_HILL)*** | | | | | | |
| Ammonia as N | mg/L | 2.4 [2], 3.3 [3] | **1.8** | **1.9** | **1.7** | **1.7** |
| Nitrate as N | mg/L | 9 | **7.2** | **7.3** | **8** | **7.4** |
| Nitrite as N | mg/L | 0.9 | **ND** | **ND** | **ND** | **ND** |
| Nitrate-N + Nitrite-N | mg/L | 9 | **7.2** | **7.3** | **8** | **7.4** |

ND=constituent not detected at the MDL.
1. The effective date for these WLAs was July 16, 2007 (R4-2008-009)
2. WLAs as Average Monthly Effluent Limit
3. WLAs as Maximum Daily Effluent Limit

**Table 26. OC Pesticides, PCBs, and Siltation - POTWs**

| POTW & Constituent | Units | Final WLA [1] | Event 44 Dry Aug-2014 | Event 45 Dry Nov-2014 | Event 48 Dry Dec-2014 | Event 49 Dry May-2015 |
|---|---|---|---|---|---|---|
| ***Camarillo Water Reclamation Plant (9AD_CAMA)*** | | | | | | |
| Total Chlordane [2] | ng/L | 1.2 | ND | ND | ND | ND |
| 4,4'-DDD | ng/L | 1.7 | ND | ND | ND | ND |
| 4,4'-DDE | ng/L | 1.2 | ND | ND | ND | ND |
| 4,4'-DDT | ng/L | 1.2 | ND | ND | ND | ND |
| Dieldrin | ng/L | 0.28 | ND | ND | ND | ND |
| PCBs [3] | ng/L | 0.34 | ND | ND | ND | ND |
| Toxaphene | ng/L | 0.33 | ND | ND | ND | ND |
| ***Hill Canyon Wastewater Treatment Plant (10D_HILL)*** | | | | | | |
| Total Chlordane [2] | ng/L | 1.2 | ND | ND | ND | ND |
| 4,4'-DDD | ng/L | 1.7 | ND | ND | ND | ND |
| 4,4'-DDE | ng/L | 1.2 | ND | ND | ND | ND |
| 4,4'-DDT | ng/L | 1.2 | ND | ND | ND | ND |
| Dieldrin | ng/L | 0.28 | ND | ND | ND | ND |
| PCBs [3] | ng/L | 0.34 | ND | ND | ND | ND |
| Toxaphene | ng/L | 0.33 | ND | ND | ND | ND |
| ***Simi Valley Water Quality Control Plant (07D_SIMI)*** | | | | | | |
| Total Chlordane [2] | ng/L | 1.2 | ND | ND | ND | ND |
| 4,4'-DDD | ng/L | 1.7 | ND | ND | ND | ND |
| 4,4'-DDE | ng/L | 1.2 | ND | ND | DNQ | ND |
| 4,4'-DDT | ng/L | 1.2 | ND | ND | ND | ND |
| Dieldrin | ng/L | 0.28 | ND | ND | ND | ND |
| PCBs [3] | ng/L | 0.34 | ND | ND | ND | ND |
| Toxaphene | ng/L | 0.33 | ND | ND | ND | ND |

ND=constituent not detected at the MDL.

1. Final WLAs were added to each of the POTWs' permits in 2015.
2. Total chlordane is the sum of alpha and gamma-chlordane.
3. PCBs concentrations are the sum of the seven aroclors identified in CTR (1016, 1221, 1232, 1242, 1248, 1254, and 1260).

**Table 27. Toxicity, Chlorpyrifos, and Diazinon - POTWs**

| POTW & Constituent | Units | Final WLA | Event 44 Dry Aug-2014 | Event 45 Dry Nov-2014 | Event 48 Dry Dec-2014 | Event 49 Dry May-2015 |
|---|---|---|---|---|---|---|
| ***Camarillo Water Reclamation Plant (9AD_CAMA)*** | | | | | | |
| Chlorpyrifos | µg/L | 0.0133 | **ND** | **ND** | **ND** | **0.0008** |
| Diazinon | µg/L | 0.1 | **ND** | **ND** | **ND** | **ND** |
| ***Hill Canyon Wastewater Treatment Plant (10D_HILL)*** | | | | | | |
| Chlorpyrifos | µg/L | 0.014 | **ND** | **ND** | **ND** | **ND** |
| Diazinon | µg/L | 0.1 | **ND** | **ND** | **ND** | **ND** |
| ***Simi Valley Water Quality Control Plant (07D_SIMI)*** | | | | | | |
| Chlorpyrifos | µg/L | 0.014 | **0.002** | **ND** | **ND** | **ND** |
| Diazinon | µg/L | 0.1 | **ND** | **ND** | **ND** | **ND** |

ND=constituent not detected at MDL.

**Table 28. Metals and Selenium - POTWs**

| POTW & Constituent | Units | Daily Max WLA | Monthly Avg WLA | WLA | Event 44 Dry Aug-2014 | Event 45 Dry Nov-2014 | Event 48 Dry Dec-2014 | Event 49 Dry May-2015 |
|---|---|---|---|---|---|---|---|---|
| ***Camarillo Water Reclamation Plant (9AD_CAMA)*** | | | | | | | | |
| Total Copper | µg/L | 57.0 [1] | 20.0 [1] | -- | **4.7** | **4.3** | **3.2** | **4.2** |
| Total Nickel | µg/L | 16.0 [1] | 6.2 [1] | -- | **3.3** | **2.9** | **2.4** | **2.9** |
| Total Mercury [3] | lbs/month [4] | -- | -- | 0.03 [1] | **0.0006** | **0.0002** | **0.0007** | **0.0002** |
| ***Hill Canyon Wastewater Treatment Plant (10D_HILL)*** | | | | | | | | |
| Total Copper | µg/L | 20.0 [1] | 16.0 [1] | -- | **2.9** | **1.5** | **3** | **4.1** |
| Total Nickel | µg/L | 8.3 [1] | 6.4 [1] | -- | **2.4** | **2.7** | **1.9** | **1.9** |
| Total Mercury [3] | lbs/month [4] | -- | -- | 0.23 [1] | **0.004** | **0.003** | **0.02** | **0.02** |
| ***Simi Valley Water Quality Control Plant (07D_SIMI)*** | | | | | | | | |
| Total Copper | µg/L | 31.0 [2] | 30.5 [2] | -- | **6.4** | **5.7** | **3.6** | **4.8** |
| Total Nickel | µg/L | 960 [2] | 169 [2] | -- | **1.9** | **1.7** | **1.3** | **1.9** |
| Total Mercury [3] | lbs/month [4] | -- | -- | 0.18 [1] | **0.0009** | **0.0004** | **0.001** | **0.0004** |

1. Interim WLA; effective until March 26, 2017 (R4-2006-012)
2. Final WLA; effective date was March 26, 2007 (R4-2006-012)
3. For total mercury concentrations reported as not detected (ND); one half of the method detection limit was used to calculate the monthly loads
4. During load calculation, the average monthly flow for each POTW was multiplied by the number of days in the month corresponding to when the sample was collected to get a total monthly flow. The total monthly flow was multiplied by the concentration of total mercury to yield the monthly total mercury load in pounds.

**Table 29. Salts - POTWs**

| POTW & Constituent | Units | Monthly Avg Interim WLA | Jul-14 | Aug-14 | Sep-14 | Oct-14 | Nov-14 | Dec-14 | Jan-15 | Feb-15 | Mar-15 | Apr-15 | May-15 | Jun-15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Camarillo Water Reclamation Plant (9AD_CAMA)*** [1] | | | | | | | | | | | | | | |
| Boron | mg/L | N/A | **0.42** | **0.49** | **0.53** | **0.57** | **0.51** | **0.52** | **0.46** | **0.42** | **0.417** | **0.54** | **0.57** | **0.45** |
| Chloride | mg/L | 216 | **215** | **218** | **217** | **212** | **214** | **203** | **212** | **211** | **209** | **215** | **215** | **218** |
| Sulfate | mg/L | 283 | **220** | **275** | **276** | **262** | **267** | **248** | **255** | **248** | **261** | **257** | **290** | **289** |
| Total Dissolved Solids | mg/L | 1012 | **1032** | **1110** | **1084** | **1040** | **1026** | **1018** | **1026** | **1032** | **1008** | **980** | **1100** | **928** |
| ***Hill Canyon Wastewater Treatment Plant (10D_HILL)*** | | | | | | | | | | | | | | |
| Boron | mg/L | N/A | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** |
| Chloride | mg/L | 189 | **151** | **152** | **143** | **154** | **151** | **151** | **150** | **155** | **153** | **155** | **154** | **153** |
| Sulfate | mg/L | N/A | **119** | **119** | **122** | **101** | **149** | **177** | **149** | **131** | **157** | **155** | **190** | **164** |
| Total Dissolved Solids | mg/L | N/A | **602** | **615** | **610** | **593** | **656** | **694** | **640** | **639** | **686** | **674** | **729** | **690** |
| ***Simi Valley Water Quality Control Plant (07D_SIMI)*** | | | | | | | | | | | | | | |
| Boron | mg/L | N/A | **0.44** | **0.5** | **0.52** | **0.5** | **0.48** | **0.48** | **0.45** | **0.46** | **0.49** | **0.45** | **0.5** | **0.44** |
| Chloride | mg/L | 183 | **136** | **132** | **127** | **132** | **136** | **136** | **140** | **140** | **130** | **154** | **153** | **136** |
| Sulfate | mg/L | 298 | **200** | **196** | **178** | **160** | **209** | **214** | **210** | **210** | **210** | **248** | **247** | **200** |
| Total Dissolved Solids | mg/L | 955 | **732** | **776** | **666** | **684** | **746** | **764** | **722** | **761** | **808** | **809** | **829** | **732** |

N/A: "The 95th percentile concentration is below the Basin Plan objective so interim limits are not necessary."

Results in **bold red type** exceed applicable interim WLA.

1. Due to water conservation and alterations in the composition of the water supply available in the POTW service area, effluent salt concentrations have increased since the adoption of the TMDL. The increased salts concentrations are being addressed through a Time Schedule Order that provides for higher TDS and sulfate interim limits and a stay of interim limits for chloride (SWRCB WQO 2003-0019).

## COMPLIANCE COMPARISON DISCUSSION

### OC Pesticides, Toxicity, Metals, Nutrients, and Salts

The compliance comparison shown in Table 20 through Table 30 above demonstrates that for the most part, the CCW is in compliance with the applicable interim or final WLAs and LAs currently in effect for the Nutrients, OC Pesticides, Toxicity, Salts, and Metals TMDLs. The following observations summarize the compliance status with these load allocations:

1. No exceedances of the interim WLAs or LAs for PCBs were observed at any location in the watershed. One exceedance of the 4,4'-DDT interim WLA and LA under the OC Pesticides TMDL was observed in sediments of Conejo Creek.
2. Exceedances of numeric targets for Nitrate-N and Nitrate-N + Nitrite-N were observed in Mugu Lagoon, Revolon Slough, Beardsley Wash, Calleguas Creek, Arroyo Las Posas, and Arroyo Simi. Most of the exceedances occurred during dry events, but there was one wet weather exceedance during wet weather in Mugu Lagoon. No exceedances of final nutrient WLAs were measured at any POTW compliance site.
3. Four exceedances of the final MS4 WLAs for chlorpyrifos were measured at receiving water sites during the dry weather; however, there were no exceedances of the interim LAs. There were 12 exceedances of the final MS4 chlorpyrifos WLA during wet weather and one instance where the chlorpyrifos concentration was above the final MS4 WLA and the interim LA. In addition, there was one instance where the diazinon final MS4 WLA and interim LA were exceded during dry weather. There were no exceedances of the final WLAs for chlorpyrifos or diazinon at any POTW.
4. There were four exceedances of the interim LA or final MS4 WLA for total selenium measured during the four dry weather sampling events of 2014-2015 at the 04_WOOD site. As discussed in the TMDL, a primary source of selenium in Revolon Slough is considered to be rising groundwater levels and the interim allocations were to be considered in this context.
5. Although toxicity was observed at some locations in the watershed, TIEs were initiated for all samples meeting the requirements in the QAPP. As a result, the Stakeholders are in compliance with the toxicity WLAs and LAs per the requirements of the TMDL.
6. In general, receiving water sites were in compliance with interim LAs and MS4 WLAs established by the Salts TMDL; the only exception being exceedances in sulfate and boron measured at 04_WOOD in the Revolon Slough watershed, and exceedances of chloride limits at 03_UNIV in the Calleguas Creek watershed. POTWs are in compliance with interim salts WLAs, with the exception of Camarillo Water Reclamation Plant (WRP), which experienced exceedances of chloride, sulfate, and TDS. The exceedances of interim salts WLAs for the Camarillo WRP have resulted from increased influent salt concentrations due to water conservation and a shift in the composition of the water supplied within the service area. Since the process for addressing salts is a watershed effort involving significant capital investments, the Camarillo WRP has received a time schedule order to adjust the interim limits for TDS and sulfate. During the last monitoring year, application of interim limits for chlorine was stayed by State Board

Order 2003-019. As a result, the interim limits in the TMDL are not the currently applicable interim limits for the Camarillo WRP discharge.

### *Nutrients*

Exceedances of numeric targets for Nitrate-N and Nitrate-N + Nitrite-N were observed at sites in Mugu Lagoon, Revolon Slough, Beardsley Wash, Arroyo Las Posas, and Calleguas Creek. Nitrate-N exceedances are summarized in Table 31 below. The table focuses on Nitrate-N results since Nitrate-N + Nitrite-N exceedances were caused by high Nitrate-N values. Nitrite-N was below the 1 mg/L target at all sites and events.

**Table 30. Exceedances of Nitrate-N Numeric TMDL Target of 10 mg/L**

| Nitrogen TMDL Compliance Sites | Event 44 Dry Aug-14 | Event 45 Dry Nov-14 | Event 46 Wet Dec-14 | Event 47 Wet Dec-14 | Event 48 Dry Feb-15 | Event 49 Dry May-15 |
|---|---|---|---|---|---|---|
| 01_RR_BR | No | **Yes** | **Yes** | No | No | **Yes** |
| 02_PCH | **Yes** | **Yes** | NS | NS | **Yes** | **Yes** |
| 03_UNIV | No | No | No | No | No | No |
| 04_WOOD | **Yes** | **Yes** | No | No | **Yes** | **Yes** |
| 05_CENTR | **Yes** | No | No | No | **Yes** | **Yes** |
| 06_SOMIS | NR | **Yes** | No | No | **Yes** | NS |
| 07_HITCH | **Yes** | No | No | No | **Yes** | No |
| 07_MADER | No | No | No | No | No | No |
| 9A_HOWAR | No | No | No | No | No | No |
| 9B_ADOLF | No | No | No | No | No | No |
| 10_GATE | No | No | No | No | No | No |
| 12_PARK | No | No | NR | NR | No | No |
| 13_BELT | No | No | NR | NR | No | No |

NR=not required
No signifies that monitoring results were below the Nitrate-N target during the monitoring event.
**Yes** signifies that monitoring results were above the Nitrate-N target during the monitoring event.

Nitrogen exceedances occurred primarily in areas of the watershed with agricultural inputs. Reaches downstream of POTW discharges are generally in compliance with the TMDL requirements and urban discharges were determined to be negligible during the TMDL analysis and therefore do not have TMDL allocations. The final nitrogen LAs for agriculture became effective in July 2010. The exceedances of the nitrogen LAs since that time have triggered the inclusion of nitrogen in the Agriculture Water Quality Management Plan (AWQMP) required under the Ag Waiver that is currently being implemented in the CCW. Agricultural education courses have included various classes focused on nitrogen management; AWQMP implementation will continue to target nitrogen and include best management practices (BMPs) to address these exceedances. Compliance with the load allocations is determined through implementation of the AWQMP.

### *Chlorpyrifos*

Further examination of the chlorpyrifos exceedances at receiving water sites was needed to deterine whether urban dischargers caused the exceedance of the receiving water allocations. The WLAs for urban dischargers are in the receiving water, while agricultural dischargers are not yet required to be in compliance with the chlorpyrifos final load allocations. Monitoring data at urban land use sites from each subwatershed for which an exceedance was observed was compared to the WLA to determine if MS4 discharges exceeded the allocation during the monitoring event where elevated receiving water concentrations were observed. If the urban land use data were below the WLA, the MS4 dischargers were considered to be in compliance with the WLAs. If the urban land use data were above the WLA, the MS4 could be contributing to the exceedance in the receiving water.

As shown in Table 32, there were 16 exceedances of chlorpyrifos targets at the receiving water sites. In most cases, urban land use data for the same event was less than the interim MS4 WLA for chlorpyrifos. However, in two cases, the urban land use data for the same event exceeded the final WLA, but did not exceed the interim LA. In addition, in one case, the urban land use data exceeded the MS4 WLA and the interim LA for chlorpyrifos.

The urban land use site data for diazinon did not exceed the MS4 WLA during the same event the receiving water site had an exceedance of the diazinon MS4 WLA.

**Table 31. Compliance and Land Use Sites Comparison to Determine MS4 Chlorpyrifos WLA Compliance**

| Sites Exceeding WLAs | Constituent | Event 44 Dry Aug-14 | Event 45 Dry Nov-14 | Event 46 Wet Dec-14 | Event 47 Wet Dec-14 | Event 48 Dry Feb-15 | Event 49 Dry May-15 |
|---|---|---|---|---|---|---|---|
| 01_RR_BR | Chlorpyrifos | | NA[1] | NA[1] | NA[1] | | |
| 03_UNIV | Chlorpyrifos | | NA[1] | NA[1] | NA[1] | | |
| 04_WOOD | Chlorpyrifos | | No | Yes | Yes [2] | | |
| 06_SOMIS | Chlorpyrifos | | | NA[1] | NA[1] | | |
| 07_HITCH | Chlorpyrifos | No | | No | No | | |
| 9B_ADOLF | Chlorpyrifos | | | Yes [2] | No | | |
| 04_WOOD | Diazinon | | No | | | | |

No= none of the MS4 land use site for the subwatershed exceeded the MS4 WLA during the monitoring event.
Yes=the MS4 land use site for the subwatershed exceeded the MS4 WLA during the monitoring event.

1. There are no urban land use monitoring sites in these reaches.
2. Urban land use sites exceeded the MS4 WLA, but not the interim LA

Blank cells indicate that a WLA exceedance did not occur at the compliance monitoring site during a particular event.

### *Selenium*

Selenium concentrations in Revolon Slough at 04_WOOD exceeded the urban dischargers interim MS4 WLA and the agricultural dischargers interim LA during all four dry weather monitoring events. A summary of monitoring results for total selenium at sites in the Revolon Slough subwatershed is shown in Table 33 below. For discussion purposes both dry weather and wet weather monitoring results are included in the table.

**Table 32. Selenium Monitoring Data (ug/L) in the Revolon Slough Subwatershed**

| Site ID | Use | Dry Weather Events | | | | | | | Wet Weather Events | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Interim | | 44 | 45 | 48 | 49 | | 46 | 47 |
| | | WLA [1] | LA [1] | Aug-14 | Nov-14 | Feb-15 | May-15 | Target [2] | Dec-14 | Dec-14 |
| 04_WOOD | RW | 13 | 6 | **34.1** | **19.5** | **19.5** | **18.5** | 290 | 0.8 | 0.9 |
| 04D_WOOD | Ag | | 6 | NS | 1.9 | 1.3 | 0.6 | 290 | 0.9 | 1.1 |
| 05D_SANT_VCWPD | Ag | | 6 | **46** | **46.2** | **12.5** | **45.7** | 290 | 7.7 | 1.7 |
| 04D_VENTURA | Urban | 13 | | 0.3 | 0.4 | 0.3 | 0.6 | 290 | 0.07 | 0.1 |

1. Interim WLAs for stormwater permittees and interim LAs for agricultural dischargers are effective until March 2022 (R4-2006-012).
2. No wet weather exceedances were observed in the TMDL analysis so no interim limits were assigned for the TMDL. For comparison purposes, the wet weather targets were included in this table.

RW – Receiving water compliance site; Ag – Agricultural; Urban – Urban

NS – Not sampled, dry

Results in **bold type** exceed applicable interim WLA or interim LA.

As noted in the table above, high levels of selenium were also observed at 05D_SANT_VCWPD, an agricultural use site in the upper reach of the subwatershed. As discussed in the TMDL, a primary source of selenium in Revolon Slough is considered to be rising groundwater levels and the interim allocations were to be considered in this context.

### *Salts*

TDS, sulfate, and boron concentrations in Revolon Slough at 04_WOOD exceeded the interim MS4 WLA during all twelve months of the monitoring period. In addition, sulfate concentrations exceeded the both the interim WLA and the LA during two months of the monitoring period, while boron concentrations exceeded both the interim WLA and the LA during five months of the monitoring period. A summary of monitoring results for total dissolved solids, sulfate, and boron at sites in the Revolon Slough subwatershed are shown in Table 34 through Table 36 below.

## Table 33. Total Dissolved Solids Monitoring Data (mg/L) in Revolon Slough

| Site ID | Use | Interim Limits | | Jul-14 | Aug-14 | Sep-14 | Oct-14 | Nov-14 | Dec-14 | Jan-15 | Feb-15 | Mar-15 | Apr-15 | May-15 | Jun-15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | WLA | LA | | | | | | | | | | | | |
| 04_WOOD [1] | RW | 1720 | 3995 | **3730** | **3544** | **3489** | **2727** | **3297** | **3510** | **3374** | **3316** | **3237** | **3132** | **3188** | **3692** |
| 04D_WOOD [2] | Ag | | 3995 | | NS | | | 1480 | | | 1010 | | | 1830 | |
| 04D_VENTURA [2] | Urban | 1720 | | | 730 | | | 800 | | | 1150 | | | 5740 | |

NS=no sample, dry
1. Data presented are monthly means
2. Data presented are quarterly dry weather grabs

Results in **bold type** exceed applicable interim WLA or interim LA.

## Table 34. Sulfate Monitoring Data (mg/L) in Revolon Slough

| Site ID | Use | Interim Limits | | Jul-14 | Aug-14 | Sep-14 | Oct-14 | Nov-14 | Dec-14 | Jan-15 | Feb-15 | Mar-15 | Apr-15 | May-15 | Jun-15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | WLA | LA | | | | | | | | | | | | |
| 04_WOOD [1] | RW | 1289 | 1962 | **1982** | **1883** | **1854** | **1449** | **1752** | **1865** | **1793** | **1762** | **1720** | **1664** | **1694** | **1962** |
| 04D_WOOD [2] | Ag | | 1962 | | NS | | | 688 | | | 344 | | | 926.4 | |
| 04D_VENTURA [2] | Urban | 1289 | | | 210 | | | 271 | | | 281 | | | 348 | |

NS=no sample, dry
1. Data presented are monthly means
2. Data presented are quarterly dry weather grabs

Results in **bold type** exceed applicable interim WLA or interim LA.

## Table 35. Boron Monitoring Data (mg/L) in Revolon Slough

| Site ID | Use | Interim Limits | | Jul-14 | Aug-14 | Sep-14 | Oct-14 | Nov-14 | Dec-14 | Jan-15 | Feb-15 | Mar-15 | Apr-15 | May-15 | Jun-15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | WLA | LA | | | | | | | | | | | | |
| 04_WOOD [1] | RW | 1.3 | 1.8 | **1.93** | **1.84** | **1.81** | **1.42** | **1.71** | **1.82** | **1.75** | **1.72** | **1.68** | **1.62** | **1.65** | **1.91** |
| 04D_WOOD [2] | Ag | | 1.8 | | NS | | | 0.80 | | | 0.46 | | | 1.05 | |
| 04D_VENTURA [2] | Urban | 1.3 | | | 0.30 | | | 0.33 | | | 0.57 | | | 0.40 | |

NS=no sample, dry
1. Data presented are monthly means
2. Data presented are quarterly dry weather grabs

Results in **bold type** exceed the applicable interim WLA or interim LA

As noted in the previous tables, high levels of total dissolved solids, sulfate, and boron were measured at the 04D_WOOD throughout the monitoring period, exceeding the interim MS4 WLAs for all constituents. In addition, sulfate and boron exceeded the interim LAs, twice and five times respectively.  However, measured concentrations did not exceed the interim agricultural LAs. This site represents agricultural discharge water quality in the Revolon Slough subwatershed. Samples were not taken during the August 2014 sampling event due to no flow being present. 04D_VENTURA, which is an urban land use site in the upper Revolon Slough watershed, had concentrations consistently below the interim MS4 WLAs for TDS, sulfate, and boron.  The persistent dry conditions in the watershed may be contributing to the higher salts concentrations observed in the receiving waters.

# Revisions and Recommendations

The QAPP specifies that upon the completion of each CCWTMP annual report, revisions to standard procedures will be made, including: site relocation, ceasing monitoring efforts and/or deleting certain constituents from sample collection. An updated QAPP was submitted in December 2014 that incorporated the proposed revisions and recommendations included in the previous six CCWTMP annual reports. Additional modifications that reflect the most current lab methods and procedures for the field conditions were also part of the QAPP update process. Monitoring for the 2015-2016 monitoring year is currently being conducted per the revised QAPP. At this time, the Stakeholders do not have any proposed revisions and recommendations, but may have some upon completion of the first monitoring year under the updated QAPP. These will be incorporated into the 2015-2016 eighth-year annual report.

# Appendix A:
# Monitoring Event Summaries for Toxicity, OC Pesticides, Nutrients, Metals, and Salts

# *Event 44 – KLI – Water & Sediment*

# Calleguas Creek Watershed TMDL Monitoring Program
# Post Event Summary
# Event 44: Quarterly Sampling and Sediment Collection

**Sampling Crews:** Kinnetic Laboratories, Inc. (KLI), Fugro

**Crew #1:** Greg Cotten (KLI), Amy Howk (KLI)
**Crew #2:** Justin Martos (Fugro), Jeff Polis (Fugro)

**Sampling Dates:** **Receiving water and land use sites:** August 5th and 6th, 2014

**Sampling Type:** Water Chemistry, Toxicity, Salts and Sediment

## SITES SAMPLED

| Site ID | | Constituents | | | | | |
|---|---|---|---|---|---|---|---|
| | Sample Date | General Parameters | Toxicity | Metals | Nutrients | PCBs, OP, OC, and Pyrethroid Pesticides | Salts |
| 04_WOOD | 8/5/14 | X | X | X | X | X | |
| 04D_VENTURA | 8/6/14 | X | | X | | X | X |
| 01T_ODD2_DCH | 8/6/14 | X | | X | X | X | |
| 02_PCH | 8/5/14 | X | | | X | | |
| 03_UNIV | 8/5/14 | X | X | X | X | X | |
| 9B_ADOLF | 8/5/14 | X | X | | X | X | |
| 9BD_ADOLF | 8/6/14 | X | | X | | X | X |
| 9A_HOWAR | 8/5/14 | X | | | X | | |
| 05D_SANT_VCWPD | 8/6/14 | X | | X | X | X | |
| 05_CENTR | 8/6/14 | X | | | X | | |
| 13_SB_HILL | 8/6/14 | X | | | | X | X |
| 10_GATE | 8/5/14 | X | X | | X | X | |
| 12_PARK | 8/6/14 | X | | | X | | |
| 13_BELT | 8/5/14 | X | X | | X | X | |
| 07D_HITCH_LEVEE2 | 8/5/14 | X | | | X | X | X |
| 07_HITCH | 8/5/14 | X | X | | X | X | |
| 07_MADER | 8/6/14 | X | | | X | | |

| Site ID | | Constituents | | | | | |
|---|---|---|---|---|---|---|---|
| | Sample Date | General Parameters | Toxicity | Metals | Nutrients | PCBs, OP, OC, and Pyrethroid Pesticides | Salts |
| 07D_CTP | 8/6/14 | X | | | | X | X |
| 07T_DC_H | 8/6/14 | X | | | | X | |

## SITES NOT SAMPLED

| Site ID | Reason for Omission |
|---|---|
| 02D_BROOM | Site was dry. |
| 04D_WOOD | Site was dry. |
| 06T_FC_BR | Site was dry. |
| 06_SOMIS | Site was dry. |
| 9BD_GERRY | Site was dry. |

## SEDIMENT SAMPLED

| Site ID | Sediment Toxicity | Sediment Chemistry |
|---|---|---|
| 02_PCH | **X** | **X** |
| 03_UNIV | **X** | **X** |
| 04_WOOD | **X** | **X** |
| 06_SOMIS | | **X** |
| 07_HITCH | | **X** |
| 9A_HOWAR | **X** | **X** |
| 9B_ADOLF | | **X** |

## DEVIATIONS FROM QAPP

| Site ID | Deviation |
|---|---|
| 02_PCH | Flow was not measured due to tidal influence. Site was sampled near low tide to maximize watershed water. |
| 04D_VENTURA | Intermediate container (Ziploc bag) used to fill sample bottles. |
| 05 CENTR | Intermediate container (Nitrate bottle) used to fill sample bottles. |
| 05D_SANT_VCWPD | Intermediate container (Ziploc bag) used to fill sample bottles. |
| 07D_CTP | Intermediate container (Ziploc bag) used to fill sample bottles. |
| 07T_DC_H | Intermediate container (Ziploc bag) used to fill sample bottles. |
| 9BD_ADOLF | Intermediate container (Ziploc bag) used to fill sample bottles. |

## ADDITIONAL COMMENTS

Sediment chemistry taken at non-toxicity sites were collected into a Ziploc bag and then sub-sampled into the chemistry containers. Sediment chemistry at the toxicity sites were sub-sampled by Pacific EcoRisk after the sediment was homogenized.

## FOLLOW UP ACTIONS

None

| | | | |
|---|---|---|---|
| Prepared by: | Amy Howk, KLI | Date: | August 19, 2014 |
| Reviewed by: | Greg Cotten, KLI | Date: | September 4th, 2014 |
| Approved by: | Michael Marson, LWA | Date: | January 9, 2015 |

# Calleguas Creek Watershed TMDL Monitoring Program
# Post Event Summary
# Event 44: Mugu Lagoon Water

**Sampling Crew:** MBC *Applied Environmental Sciences*:
Wayne Dossett, D.J. Schuessler

**Sampling Date:** 19 August 2014

**Sampling Type:** Water Chemistry

## SITES SAMPLED

| Site ID | Constituents | | | | | |
|---|---|---|---|---|---|---|
| | General Water Quality Parameters | DOC | TSS | PCBs, OP, OC, and Pyrethroid Pesticides | Nutrients | Metals w/ Hg |
| 01_BPT_14 Central Western Arm | X | X | X | | | X |
| 01_BPT_15 Central Lagoon | X | X | X | | | X |
| 01_BPT_3 Eastern Arm | X | X | X | | | X |
| 01_BPT_6 East Western Arm | X | X | X | | | X |
| 01_RR_BR Ronald Reagan Bridge | X | X | X | X | X[1] | X |
| 01_SG_74 Central Lagoon S. of Drain #7 | X | X | X | | | X |

1. TKN, Ammonia-N, Organic-N, Total Phosphorus, Nitrate-N, Nitrate-N, Orthophosphate-P.

## SITES NOT SAMPLED

None

## DEVIATIONS FROM QAPP

Station 01_SG_74 Central Lagoon S. of Drain #7 was accessed by land in compliance with the NBVC biologist's request that the field team conduct walk-in sampling at that station on a permanent basis to avoid harassment of harbor seals. The collection at this site was consistent with previous samples in the area. GPS coordinates of the sample collection locations are provided on the field log sheet.

## FOLLOW UP ACTIONS

None

| | | | |
|---|---|---|---|
| Prepared by: | David Vilas, MBC | Submittal Date: | 22 August 2014 |
| Approved by: | Michael Marson, LWA | Submittal Date: | 07 January 2015 |

# Calleguas Creek Watershed TMDL Monitoring Program
# Post Event Summary
# Event 44: Mugu Lagoon Sediment

**Sampling Crew:** MBC *Applied Environmental Sciences*:
Wayne Dossett, James Nunez, D.J. Schuessler

**Sampling Date:** 19 and 20 August 2014

**Sampling Type:** Sediment Chemistry, Characteristics and Toxicity

## SITES SAMPLED

| Site ID | Constituents | | | |
|---|---|---|---|---|
| | **Sediment Analysis** | **Particle Size Distribution** | **Total Organic Carbon** | **Sediment Toxicity Mortality / Growth** |
| 01_BPT_14<br>Central Western Arm | X | X | X | X |
| 01_BPT_15<br>Central Lagoon | X | X | X | X |
| 01_BPT_3<br>Eastern Arm | X | X | X | X |
| 01_BPT_6<br>East Western Arm | X | X | X | X |
| 01_SG_74 Central Lagoon<br>S. of Drain #7 | X | X | X | X |

## SITES NOT SAMPLED

None

## DEVIATIONS FROM QAPP

None

## FOLLOW UP ACTIONS

None

| | | | |
|---|---|---|---|
| Prepared by: | David Vilas, MBC | Submittal Date: | 22 August 2014 |
| Approved by: | Michael Marson, LWA | Submittal Date: | 07 January 2015 |

# Calleguas Creek Watershed TMDL Monitoring Program
# Post Event Summary
# Event 45: Quarterly Sampling

**Sampling Crews:** Kinnetic Laboratories, Inc. (KLI), Fugro

**Crew #1:** Greg Cotten (KLI), Aidas Worthington (KLI)
**Crew #2:** Justin Martos (Fugro), Jeff Polis (Fugro)

**Sampling Dates:** **Receiving water and land use sites:** November 12th and 13th 2014

**Sampling Type:** Water Chemistry, Toxicity, and Salts

## SITES SAMPLED

| Site ID | | Constituents | | | | | |
|---|---|---|---|---|---|---|---|
| | Sample Date | General Parameters | Toxicity | Metals | Nutrients | PCBs, OP, OC, and Pyrethroid Pesticides | Salts |
| 04D_WOOD | 11-12-14 | X | | X | X | X | X |
| 04_WOOD | 11-12-14 | X | X | X | X | X | |
| 04D_VENTURA | 11-13-14 | X | | X | | X | X |
| 01T_ODD2_DCH | 11-12-14 | X | | X | X | X | |
| 02_PCH | 11-12-14 | X | | | X | | |
| 03_UNIV | 11-12-14 | X | X | X | X | X | |
| 9B_ADOLF | 11-12-14 | X | X | | X | X | |
| 9BD_ADOLF | 11-12-14 | X | | X | | X | X |
| 9A_HOWAR | 11-12-14 | X | | | X | | |
| 05D_SANT_VCWPD | 11-13-14 | X | | X | X | X | |
| 05_CENTR | 11-13-14 | X | | | X | | |
| 13_SB_HILL | 11-13-14 | X | | | | X | X |
| 10_GATE | 11-12-14 | X | X | | X | X | |
| 12_PARK | 11-12-14 | X | | | X | | |
| 13_BELT | 11-12-14 | X | | | X | | |
| 06_SOMIS | 11-12-14 | X | X | | X | X | |
| 07_HITCH | 11-12-14 | X | X | | X | X | |

| Site ID | | Constituents | | | | | |
|---|---|---|---|---|---|---|---|
| | Sample Date | General Parameters | Toxicity | Metals | Nutrients | PCBs, OP, OC, and Pyrethroid Pesticides | Salts |
| 07_MADER | 11-12-14 | X | | | X | | |
| 07D_CTP | 11-13-14 | X | | | | X | X |
| 07T_DC_H | 11-12-14 | X | | | | X | |

**SITES NOT SAMPLED**

| Site ID | Reason for Omission |
|---|---|
| 02D_BROOM | Pump stopped while on site. Could not be sampled. |
| 06T_FC_BR | Site was dry. 11-13-14 @ 09:54 |
| 9BD_GERRY | Site was dry. 11-12-14 @12:42, 15:10 and 11-13-14 @ 09:36 |
| 07D_HITCH_LEVEE | Site was dry. 11-12-14 @ 9:25 |

## DEVIATIONS FROM QAPP

| Site ID | Deviation |
|---|---|
| 02_PCH | Flow was not measured due to tidal influence. Site was sampled near low tide to maximize watershed water. |
| 04D_WOOD | Intermediate HDPE sample bottle #07 (Boron) used to fill sample bottles. |
| 04D_VENTURA | Intermediate container (Ziploc® bag) used to fill sample bottles. |
| 05D_SANT_VCWPD | Intermediate HDPE sample bottle #105 (Nitrate) used to fill sample bottles. |
| 07D_CTP | Intermediate container (Ziploc® bag) used to fill sample bottles. |
| 07T_DC_H | Intermediate container (Ziploc® bag) used to fill sample bottles. |
| 9BD_ADOLF | Intermediate container (Ziploc® bag) used to fill sample bottles. |

## FOLLOW UP ACTIONS

None

## ADDITIONAL COMMENTS

QC items:

Mercury blank water was unavailable for CCWTMP-45-ODD2-038. After discussions with LWA (M.Marson) about sampling it the next day it was determined best to leave it rest as an omission.

Mercury Duplicate CCWTMP-45-ODD2-037 was taken in a Physis double bagged narrow mouth container not a wide mouth like the sample taken in bottle number 36.

| | | | |
|---|---|---|---|
| Prepared by: | Greg Cotten, KLI | Date: | December 4th, 2014 |
| Reviewed by: | Amy Howk, KLI | Date: | December 17th, 2014 |
| Approved by: | Michael Marson, LWA | Date: | January 7th, 2015 |

# Calleguas Creek Watershed TMDL Monitoring Program
# Post Event Summary
# Event 45: Mugu Lagoon Water

**Sampling Crew:** MBC *Applied Environmental Sciences*: James Nuñez, D.J. Schuessler

**Sampling Date:** 12 November 2014

**Sampling Type:** Water Chemistry

### SITES SAMPLED

| Site ID | Constituents | | | | | | |
|---|---|---|---|---|---|---|---|
| | **General Water Quality Parameters** | **TOC** | **DOC** | **TSS** | **PCBs, OP, OC, and Pyrethroid Pesticides** | **Nutrients** | **Metals w/ Hg** |
| 01_BPT_14<br>Central Western Arm | X | | X | X | | | X |
| 01_BPT_15<br>Central Lagoon | X | | X | X | | | X |
| 01_BPT_3<br>Eastern Arm | X | | X | X | | | X |
| 01_BPT_6<br>East Western Arm | X | | X | X | | | X |
| 01_RR_BR<br>Ronald Reagan Bridge | X | | X | X | X | X[1] | X |
| 01_SG_74<br>Central Lagoon S. of Drain #7 | X | | X | X | | | X |

1. TKN, Ammonia-N, Organic-N, Total Phosphorus, Nitrate-N, Nitrate-N, Orthophosphate-P.

### SITES NOT SAMPLED

None

### DEVIATIONS FROM QAPP

Station 01_SG_74 Central Lagoon S. of Drain #7 was accessed by land in compliance with the NBVC biologist's request that the field team conduct walk-in sampling at that station on a permanent basis to avoid harassment of harbor seals. The collection at this site was consistent with previous samples in the area. GPS coordinates of the sample collection locations are provided on the field log sheet.

### NOTE

A floodgate to a side channel about 200 yards upstream of the 01_RR_BR sampling location was opened while the MBC field crew was conducting the survey. Water from the side channel was observed flowing into Calleguas Creek and downstream toward 01_RR_BR the sampling location, although the water from the side channel probably did not reach the station by the time the sampling was completed.

## FOLLOW UP ACTIONS

None

| | | | |
|---|---|---|---|
| Prepared by: | David Vilas, MBC | Submittal Date: | 14 November 2014 |
| Approved by: | Michael Marson, LWA | Submittal Date: | 07 January 2015 |

# Calleguas Creek Watershed TMDL Monitoring Program
# Post Event Summary
# Event 46: Wet Weather Sampling

**Sampling Crews:** Kinnetic Laboratories, Inc. (KLI), Fugro

**Crew #1:** Greg Cotten (KLI), Aidas Worthington (KLI)
**Crew #2:** Amy Howk (KLI), Jon Toal (KLI)
**Crew #3:** Justin Martos (Fugro), Tom Cromwell (Fugro)
**Crew #4:** Tim Nicely (Fugro), Jeff Polis (Fugro)

**Sampling Dates:** **Receiving water and land use sites -** December 2[nd], 2014

**Sampling Type:** Stormwater Chemistry, Toxicity, and Salts

## SITES SAMPLED

| Site ID | | Constituents | | | | | |
|---|---|---|---|---|---|---|---|
| | Sample Date | General Parameters | Toxicity | Metals | Nutrients | PCBs, OP, OC, and Pyrethroid Pesticides | Salts |
| 04D_WOOD | 12-2-14 | X | | X | X | X | X |
| 04_WOOD | 12-2-14 | X | X | X | X | X | X |
| 04D_VENTURA | 12-2-14 | X | | X | | X | X |
| 01T_ODD2_DCH | 12-2-14 | X | | X | X | X | |
| 03_UNIV | 12-2-14 | X | X | X | X | X | X |
| 9B_BARON | 12-2-14 | X | | | | | X |
| 9B_ADOLF | 12-2-14 | X | X | | X | X | |
| 9BD_ADOLF | 12-2-14 | X | | X | | X | X |
| 9BD_GERRY | 12-2-14 | X | | X | X | X | X |
| 9A_HOWAR | 12-2-14 | X | | | | | X |
| 05D_SANT_VCWPD | 12-2-14 | X | | X | X | X | |
| 05_CENTR | 12-2-14 | X | | | X | | |
| 13_SB_HILL | 12-2-14 | X | | | | X | X |
| 10_GATE | 12-2-14 | X | X | | X | X | |
| 13_BELT | 12-2-14 | X | X | | | X | |
| 06T_FC_BR | 12-2-14 | X | | | X | X | |

| Site ID | | Constituents | | | | | |
|---|---|---|---|---|---|---|---|
| | Sample Date | General Parameters | Toxicity | Metals | Nutrients | PCBs, OP, OC, and Pyrethroid Pesticides | Salts |
| 06_SOMIS | 12-2-14 | X | X | | X | X | |
| 07D_HITCH_LEVEE2 | 12-2-14 | X | | | X | X | X |
| 07_HITCH | 12-2-14 | X | X | | X | X | |
| 07_MADER | 12-2-14 | X | | | X | | |
| 07D_CTP | 12-2-14 | X | | | | X | X |
| 07T_DC_H | 12-2-14 | X | | | | X | |
| 07_TIERRA | 12-2-14 | X | | | | | X |

## SITES NOT SAMPLED

| Site ID | Reason for Omission |
|---|---|
| 02D_BROOM | Site was dry |

## DEVIATIONS FROM QAPP

| Site ID | Deviation |
|---|---|
| 9A_HOWAR | Intermediate container (bucket) used to fill sample bottles. |
| 05D_SANT_VCWPD | Intermediate container (bucket) used to fill sample bottles. |
| 06_SOMIS | Intermediate container (bucket & bottle 78) used to fill sample bottles. |
| 9BD_ADOLF | Intermediate container (bottle #123 & bottle #124) used to fill sample bottles. |

## FOLLOW UP ACTIONS

None

## ADDITIONAL COMMENTS

When Turbidity exceeded the measuring capabilities of the field meter (>1000 NTU) then additional Turbidity analysis was requested of Physis Laboratory. The TSS sample was to be used for this analysis and these sites include: 05D_SANT_VCWPD, 05_CENTR, 06T_FC_BR, 06_SOMIS, 9BD_GERRY, 04_WOOD, and 01T_ODD2_DCH.

Turbidity calibration issue with meter 2692 and 3760:

Team 2: 9BD_GERRY, 10_GATE, 13_BELT, 13_SB_HILL and 9A_HOWAR had an additional grab taken in a lab cleaned 250 mL HDPE container for Turbidity analysis within 7 hours with meter # 3755. There was a suspected issue with our 100 NTU calibration solution but not 0 or 1000 NTU. 3755 accepted both 0 and 1000 NTU but was not validated in pre-sampling calibration. The meter passed post calibrations test of both 100 NTU (read 109 NTU) and 0.0 NTU (read 0.0 NTU) back in the lab the following day. Due to Turbidity calibration uncertainty in meter 3760, both 9B_ADOLF and 9BD_ADOLF were also analyzed by Physis Laboratory. The remaining samples from that meter far exceeded the meters ability and were done by the lab.

Strangely, YSI Sonde 6800 AE would not accept a decimal level mS/cm conductivity calibration. Additional grabs were taken at 07_HITCH, 07D_HITCH_LEVEE2, 07D_CTP, 07_MADER, and 07T_DC_H in new Ziploc® bags and analyzed with meter 3755 which past pre-/post-event calibrations. These grab samples were analyzed within 8 hours.

Due to high and dangerous flows, all flows are estimated except: 04D_WOOD, 9BD_GERRY, and 06T_FC_BR. When possible, tools were used to make measured estimates (e.g. bridges were used to take width estimates, laser measures and grab poles for smaller width estimates, and grab poles for depth measurements when possible, etc).

| | | | |
|---|---|---|---|
| Prepared by: | Greg Cotten, KLI | Date: | January 27, 2015 |
| Reviewed by: | Amy Howk, KLI | Date: | January 30, 2015 |
| Approved by: | Michael R Marson, LWA | Date: | February 2, 2015 |

# Calleguas Creek Watershed TMDL Monitoring Program
# Post Event Summary
# Event 47: Wet Weather Sampling

**Sampling Crews:** Kinnetic Laboratories, Inc. (KLI), Fugro

**Crew #1:** Greg Cotten (KLI), Dani Walker (KLI)
**Crew #2:** Amy Howk (KLI), Aidas Worthington (KLI)
**Crew #3:** Justin Martos (Fugro), Jeff Polis (Fugro)
**Crew #4** Tim Nicely (Fugro), Tom Cromwell (Fugro)

**Sampling Dates:** **Receiving water and land use sites:** December 12th, 2014

**Sampling Type:** Water Chemistry, Toxicity, and Salts

**SITES SAMPLED**

| Site ID | | Constituents | | | | | |
|---|---|---|---|---|---|---|---|
| | Sample Date | General Parameters | Toxicity | Metals | Nutrients | PCBs, OP, OC, and Pyrethroid Pesticides | Salts |
| 04D_WOOD | 12-12-14 | X | | X | X | X | X |
| 04_WOOD | 12-12-14 | X | X | X | X | X | X |
| 04D_VENTURA | 12-12-14 | X | | X | | X | X |
| 01T_ODD2_DCH | 12-12-14 | X | | X | X | X | |
| 02D_BROOM | 12-12-14 | X | | X | X | X | |
| 03_UNIV | 12-12-14 | X | X | X | X | X | X |
| 9B_BARON | 12-12-14 | X | | | | | X |
| 9B_ADOLF | 12-12-14 | X | X | | X | X | |
| 9BD_ADOLF | 12-12-14 | X | | X | | X | X |
| 9BD_GERRY | 12-12-14 | X | | X | X | X | X |
| 9A_HOWAR | 12-12-14 | X | | | | | X |
| 05D_SANT_VCWPD | 12-12-14 | X | | X | X | X | |
| 05_CENTR | 12-12-14 | X | | | X | | |
| 13_SB_HILL | 12-12-14 | X | | | | X | X |
| 10_GATE | 12-12-14 | X | X | | X | X | |
| 13_BELT | 12-12-14 | X | X | | | X | |

| Site ID | | Constituents | | | | | |
|---|---|---|---|---|---|---|---|
| | Sample Date | General Parameters | Toxicity | Metals | Nutrients | PCBs, OP, OC, and Pyrethroid Pesticides | Salts |
| 06T_FC_BR | 12-12-14 | X | | | X | X | |
| 06_SOMIS | 12-12-14 | X | X | | X | X | |
| 07D_HITCH_LEVEE_2 | 12-12-14 | X | | | X | X | X |
| 07_HITCH | 12-12-14 | X | X | | X | X | |
| 07_MADER | 12-12-14 | X | | | X | | |
| 07D_CTP | 12-12-14 | X | | | | X | X |
| 07T_DC_H | 12-12-14 | X | | | | X | |
| 07_TIERRA | 12-12-14 | X | | | | | X |

## SITES NOT SAMPLED

| Site ID | Reason for Omission |
|---|---|
| N/A | All sites were sampled |

## DEVIATIONS FROM QAPP

| Site ID | Deviation |
|---|---|
| 06_SOMIS | A bucket was used as an intermediate container to collect toxicity. The bucket was wiped down with a gloved hand and triple rinsed with site water before using it to collect sample. |

## ADDITIONAL COMMENTS

**Field meter calibration issues:**

Team 1 water quality sonde had a conductivity glitch that wouldn't accept a decimal level accuracy and therefore the accuracy of that probe was unacceptable. Conductivity for this team was made from grabs with meter # 2692 on the same day within 7 hours of collection.

Team 2 turbidity sensor wouldn't accept calibration. Turbidity for this meter was analyzed by meter 3755 from grabs within 6.5 hours.

Team 4 meter would not accurately calibrate to a 12,880 so it could not measure a large range of conductivities. It did however exhibit precision during the calibration procedures and therefore was calibrated to 0.0 and 1413. Because all site conductivity levels for this meter were found between 0 - 1413 uS/cm and the meter pasted post calibration check with great accuracy, I feel it's reasonable to accept the field measurements taken with this meter.

**Accurate flow measurements** were taken at 9BD_GERRY, 07T_DC_H, 07D_HITCH_LEVEE_2, 04D_VENTURA, and 04D_WOOD but because of safety and ability concerns, all other flows for this event were measured estimates. Measured estimates means tools were used to make the estimates and actual measurements were made when possible but there was at least one component of the flow measurement that necessitates these flow be considered estimates.

**Turbidity readings** that exceeded the meters ability to accurately measure (>1000 NTU) it was requested of Physis Laboratory to perform a turbidity analysis on the TSS sample.

## FOLLOW UP ACTIONS

None

| | | | |
|---|---|---|---|
| Prepared by: | Greg Cotten, KLI | Date: | February 20, 2015 |
| Reviewed by: | Amy Howk, KLI | Date: | February 23, 2015 |
| Approved by: | Michael R. Marson, LWA | Date: | February 24, 2015 |

# Calleguas Creek Watershed TMDL Monitoring Program
# Post Event Summary
# Event 48: Quarterly Sampling

**Sampling Crews:** Kinnetic Laboratories, Inc. (KLI), Fugro

**Crew #1:** Greg Cotten (KLI), Amy Howk (KLI)
**Crew #2:** Tim Nicely (Fugro), Luke Budny (Fugro)

**Sampling Dates:** **Receiving water and land use sites:** February 3rd and 4th 2015

**Sampling Type:** Water Chemistry, Toxicity, and Salts

## SITES SAMPLED

| Site ID | Sample Date | Constituents | | | | | |
|---|---|---|---|---|---|---|---|
| | | General Parameters | Toxicity | Metals | Nutrients | PCBs, OP, OC, and Pyrethroid Pesticides | Salts |
| 04D_WOOD | 2/4/15 | X | | X | X | X | X |
| 04_WOOD | 2/4/15 | X | X | X | X | X | |
| 04D_VENTURA | 2/3/15 | X | | X | | X | X |
| 01T_ODD2_DCH | 2/3/15 | X | | X | X | X | |
| 02_PCH | 2/3/15 | X | | | X | | |
| 03_UNIV | 2/4/15 | X | X | X | X | X | |
| 9B_ADOLF | 2/4/15 | X | X | | X | X | |
| 9BD_ADOLF | 2/3/15 | X | | X | | X | X |
| 9A_HOWAR | 2/3/15 | X | | | X | | |
| 05D_SANT_VCWPD | 2/3/15 | X | | X | X | X | |
| 05_CENTR | 2/3/15 | X | | | X | | |
| 13_SB_HILL | 2/3/15 | X | | | | X | X |
| 10_GATE | 2/3/15 | X | | | X | | |
| 12_PARK | 2/3/15 | X | | | X | | |
| 13_BELT | 2/4/15 | X | X | | X | X | |
| 06T_FC_BR | 2/3/15 | X | | | X | X | |
| 06_SOMIS | 2/4/15 | X | X | | X | X | |

| Site ID | | Constituents | | | | | |
|---|---|---|---|---|---|---|---|
| | Sample Date | General Parameters | Toxicity | Metals | Nutrients | PCBs, OP, OC, and Pyrethroid Pesticides | Salts |
| 07_HITCH | 2/4/15 | X | X | | X | X | |
| 07_MADER | 2/3/15 | X | | | X | | |
| 07D_CTP | 2/3/15 | X | | | | X | X |
| 07T_DC_H | 2/3/15 | X | | | | X | |

## SITES NOT SAMPLED

| Site ID | Reason for Omission |
|---|---|
| 02D_BROOM | Site was dry 2-4-15 @ 11:40. |
| 9BD_GERRY | Site was dry 2-3-15 @ 14:00, 15:54 and 2-4-15 @ 11:00, 12:10 |
| 07D_HITCH_LEVEE_2 | Site was dry 2-4-15 @ 08:15, 09:45 |

## DEVIATIONS FROM QAPP

| Site ID | Deviation |
|---|---|
| 04D_WOOD | Intermediate container (Ziploc® bag) used to fill sample bottles. |
| 04D_VENTURA | Intermediate container (Ziploc® bag) used to fill sample bottles. |
| 07D_CTP | Intermediate container (Ziploc® bag) used to fill sample bottles. |
| 06_SOMIS | Intermediate HDPE sample bottle #112 (TSS) used to fill Toxicity samples only. |
| 07_HITCH | Intermediate HDPE sample bottle #125 (TSS) used to fill Toxicity samples only. |
| 9BD_ADOLF | Intermediate container (Ziploc® bag) used to fill sample bottles. |

## FOLLOW UP ACTIONS

None

## ADDITIONAL COMMENTS

The field water quality meter used by Team 2, meter #3760, failed the post-calibration for pH. Initial calibration was valid with a confirmation check of 8.04; however post-calibration was 8.44 for pH 8.0. The same meter measured pH 7.45 for pH 7.0 during the post-calibration check.

Turbidity for Team 1 was measured using a HACH 2100 Q portable turbidimeter. The meter was calibrated prior to sampling and post-calibrated. Samples were taken and read immediately with no waiting time.

| | | | |
|---|---|---|---|
| Prepared by: | Amy Howk, KLI | Date: | February 19th, 2015 |
| Reviewed by: | Dani Walker, KLI | Date: | February 23rd, 2015 |
| Approved by: | Michael R. Marson, LWA | Date: | February 25th, 2015 |

# Calleguas Creek Watershed TMDL Monitoring Program
# Post Event Summary
# Event 48: Mugu Lagoon Water

**Sampling Crew:** MBC *Applied Environmental Sciences*: James Nuñez & D.J. Schuessler

**Sampling Date:** 5 February 2015

**Sampling Type:** Water Chemistry

**SITES SAMPLED**

| Site ID | Constituents | | | | | | |
|---|---|---|---|---|---|---|---|
| | **General Water Quality Parameters** | **TOC** | **DOC** | **TSS** | **PCBs, OP, OC, and Pyrethroid Pesticides** | **Nutrients** | **Metals w/ Hg** |
| 01_BPT_14 Central Western Arm | X | | X | X | | | X |
| 01_BPT_15 Central Lagoon | X | | X | X | | | X |
| 01_BPT_3 Eastern Arm | X | | X | X | | | X |
| 1_BPT_6 East Western Arm | X | | X | X | | | X |
| 01_RR_BR Ronald Reagan Bridge | X | | X | X | X | X[1] | X |
| 01_SG_74 Central Lagoon S. of Drain #7 | X | | X | X | | | X |

1. TKN, Ammonia-N, Organic-N, Total Phosphorus, Nitrate-N, Nitrate-N, Orthophosphate-P.

**SITES NOT SAMPLED**

None

**DEVIATIONS FROM QAPP**

Station 01_SG_74 Central Lagoon S. of Drain #7 was accessed by land in compliance with the NBVC biologist's request that the field team conduct walk-in sampling at that station on a permanent basis to avoid harassment of harbor seals. The collection at this site was consistent with previous samples in the area. GPS coordinates of the sample collection locations are provided on the field log sheet.

At Station 01_BPT_15 water quality field data recorded for "1-m depth" was sampled at 0.9 m due to low tidal level.

## FOLLOW UP ACTIONS

None

| | | | |
|---|---|---|---|
| Prepared by: | David Vilas, MBC | Submittal Date: | 6 February 2015 |
| Approved by: | Michael Marson, LWA | Submittal Date: | 18 March 2015 |

# Calleguas Creek Watershed TMDL Monitoring Program
# Post Event Summary
# Event 49: Quarterly Sampling

**Sampling Crews:** Kinnetic Laboratories, Inc. (KLI), Fugro
**Crew #1:** Greg Cotten (KLI), Amy Howk (KLI)
**Crew #2:** Tim Nicely (Fugro), Lucas Budny (Fugro)

**Sampling Dates:** **Receiving water and land use sites:** May 5th and 6th, 2015

**Sampling Type:** Water Chemistry, Toxicity, and Salts

## SITES SAMPLED

| Site ID | | Constituents | | | | | |
|---|---|---|---|---|---|---|---|
| | Sample Date | General Parameters | Toxicity | Metals | Nutrients | PCBs, OP, OC, and Pyrethroid Pesticides | Salts |
| 04D_WOOD | 05-05-15 | X | | X | X | X | X |
| 04_WOOD | 05-06-15 | X | X | X | X | X | |
| 04D_VENTURA | 05-05-15 | X | | X | | X | X |
| 01T_ODD2_DCH | 05-06-15 | X | | X | X | X | |
| 02_PCH | 05-06-15 | X | | | X | | |
| 03_UNIV | 05-06-15 | X | X | X | X | X | |
| 9B_ADOLF | 05-06-15 | X | X | | X | X | |
| 9BD_ADOLF | 05-05-15 | X | | X | | X | X |
| 9A_HOWAR | 05-05-15 | X | | | X | | |
| 05D_SANT_VCWPD | 05-05-15 | X | | X | X | X | |
| 05_CENTR | 05-05-15 | X | | | X | | |
| 13_SB_HILL | 05-05-15 | X | | | | X | X |
| 10_GATE | 05-06-15 | X | X | | X | X | |
| 12_PARK | 05-05-15 | X | | | X | | |
| 13_BELT | 05-05-15 | X | | | X | | |
| 07_HITCH | 05-06-15 | X | X | | X | X | |
| 07_MADER | 05-05-15 | X | | | X | | |

| Site ID | | Constituents | | | | | |
|---|---|---|---|---|---|---|---|
| | Sample Date | General Parameters | Toxicity | Metals | Nutrients | PCBs, OP, OC, and Pyrethroid Pesticides | Salts |
| 07D_CTP | 05-05-15 | X | | | | X | X |
| 07T_DC_H | 05-05-15 | X | | | | X | |

**SITES NOT SAMPLED**

| Site ID | Reason for Omission |
|---|---|
| 02D_BROOM | Site was dry. |
| 06T_FC_BR | Site was dry. |
| 07D_HITCH_LEVEE2 | Site was dry. |
| 9BD_GERRY | Site was dry. |
| 06_SOMIS | Site was dry. |

## DEVIATIONS FROM QAPP

| Site ID | Deviation |
|---|---|
| 02_PCH | Flow was taken in spite of tidal influence. |
| 04_WOOD | The conductivity at the site (3,950 uS/cm) was greater than the accepted range for the designated test species (*Ceriodaphnia dubia*). The QAPP requires the use of *Americamysis bahia*. However, *Hylella azteca* is identified by SWAMP as an appropriate water test species when conductivity is greater than 3,000 us/cm and is currently utilized by the Ventura County Irrigated Lands Group which conducts monitoring in the watershed.<br><br>To maintain consistency with an existing watershed program, the toxicity testing lab (Pacific EcoRisk) utilized *Hylella azteca* in place of *Americamysis bahia*. |
| 04D_VENTURA | Intermediate container (new Ziploc® bag) was used to fill sample bottles. The bag was triple rinsed before sampling. |
| 07D_CTP | Intermediate container (new Ziploc® bag) was used to fill sample bottles. The bag was triple rinsed before sampling. |
| 07T_DC_H | Intermediate container (new Ziploc® bag) was used to fill sample bottles. The bag was triple rinsed before sampling. |
| 9BD_ADOLF | Intermediate container (new Ziploc® bag) was used to fill sample bottles. The bag was triple rinsed before sampling. |
| 05D_SANT_VCWPD | Intermediate container (new Ziploc® bag) was used to fill sample bottles. The bag was triple rinsed before sampling. |

## FOLLOW UP ACTIONS

None

## ADDITIONAL COMMENTS

None

| | | | |
|---|---|---|---|
| Prepared by: | Greg Cotten, KLI | Date: | May 21, 2015 |
| Reviewed by: | Danielle Walker, KLI | Date: | May 21, 2015 |
| Approved by: | Michael Marson, LWA | Date: | June 11, 2015 |

# Calleguas Creek Watershed TMDL Monitoring Program
# Post Event Summary
# Event 49: Mugu Lagoon Water

**Sampling Crew:** MBC *Applied Environmental Sciences*: Wayne Dossett, D.J. Schuessler

**Sampling Date:** 4 May 2015

**Sampling Type:** Water Chemistry

## SITES SAMPLED

| Site ID | Constituents | | | | | | |
|---|---|---|---|---|---|---|---|
| | General Water Quality Parameters | TOC | DOC | TSS | PCBs, OP, OC, and Pyrethroid Pesticides | Nutrients | Metals w/ Hg |
| 01_BPT_14 Central Western Arm | X | | X | X | | | X |
| 01_BPT_15 Central Lagoon | X | | X | X | | | X |
| 01_BPT_3 Eastern Arm | X | | X | X | | | X |
| 1_BPT_6 East Western Arm | X | | X | X | | | X |
| 01_RR_BR Ronald Reagan Bridge | X | | X | X | X | X[1] | X |
| 01_SG_74 Central Lagoon S. of Drain #7 | X | | X | X | | | X |

1. TKN, Ammonia-N, Organic-N, Total Phosphorus, Nitrate-N, Nitrate-N, Orthophosphate-P.

## SITES NOT SAMPLED

None

## DEVIATIONS FROM QAPP

Station 01_SG_74 Central Lagoon S. of Drain #7 was accessed by land in compliance with the NBVC biologist's request that the field team conduct walk-in sampling at that station on a permanent basis to avoid harassment of harbor seals. The collection at this site was consistent with previous samples in the area. GPS coordinates of the sample collection locations are provided on the field log sheet.

## FOLLOW UP ACTIONS

None

| | | | |
|---|---|---|---|
| Prepared by: | David Vilas, MBC | Submittal Date: | 6 May 2015 |
| Approved by: | Michael Marson, LWA | Submittal Date: | July 16, 2015 |

# Calleguas Creek Watershed TMDL Monitoring Program
# Post Event Summary
# Event 49: Mugu Lagoon Tissue

**Sampling Crew:** MBC *Applied Environmental Sciences*:

James Nunez, Wayne Dossett, D.J. Schuessler

**Sampling Date:** 18 May 2015

**Sampling Type:** Mugu Lagoon Tissue Chemistry

**SITES SAMPLED**

| Site ID | Constituents | | | | | |
|---|---|---|---|---|---|---|
| | **PCBs** | **OC Pesticides** | **Chlorpyrifos** | **Metals** | **% Lipids** | **% Moisture** |
| 01_Central Lagoon Mussel Tissue | X | X | X | X | X | X |
| 01_Central Lagoon Bait Fish Tissue | X | X | X | X | X | X |
| 01_Central Lagoon Sport Fish Tissue | X | X | X | X | X | X |
| 01_Western Arm Mussel Tissue | X | X | X | X | X | X |
| 01_Western Arm Bait Fish Tissue | X | X | X | X | X | X |
| 01_Western Arm Sport Fish Tissue | X | X | X | X | X | X |

**SITES NOT SAMPLED**

None

**DEVIATIONS FROM QAPP**

None

**FOLLOW UP ACTIONS**

None

| | | | |
|---|---|---|---|
| Prepared by: | David Vilas, MBC | Submittal Date: | 20 May 2015 |
| Approved by: | Michael Marson, LWA | Submittal Date: | July 16, 2015 |

# Appendix B:
# Calibration Event Summary for Salts TMDL

The following section provides a summary of the monitoring events not covered by our quarterly or wet weather monitoring completed during the seventh year of monitoring. The continuous sensor sites (03_UNIV, 04_WOOD, 9A_HOWAR, 9B_BARON, & 07_TIERRA) were visited monthly for calibration checks and flow measurements.

## SUMMARY OF MONTHLY EVENTS

Monthly sampling events included only measuring electrical conductivity (EC), temperature, and chloride (no grab samples were required during these visits). EC and temperature were measured using a Hach sensION5 meter and chloride was measured with Hach Quantab titration strips. The following section details each monthly event.

**Table 1. Monthly sensor site visits**

| Month | Site ID | Date Visited | EC | Chloride | Discharge |
|---|---|---|---|---|---|
| July 2014 | 04_WOOD | 7/11/2014 | X | X | X |
| | 03_UNIV | 7/10/2014 | X | X | X |
| | 07_TIERRA | 7/10/2014 | X | X | X |
| | 9A_HOWAR | 7/10/2014 | X | X | X |
| | 9B_BARON | 7/10/2014 | X | X | X |
| | 04_WOOD | 7/16/2014 | X | X | X |
| | 9A_HOWAR | 7/25/2014 | | | X |
| | 04_WOOD | 7/25/2014 | | | X |
| August 2014 | 04_WOOD | 08/06/2014 | X | X | X |
| | 03_UNIV | 08/06/2014 | X | X | X |
| | 07_TIERRA | 08/06/2014 | X | X | X |
| | 9A_HOWAR | 08/06/2014 | X | X | X |
| | 9B_BARON | 08/06/2014 | X | X | X |
| September 2014 | 04_WOOD | 09/04/2014 | X | X | X |
| | 03_UNIV | 09/04/2014 | X | X | X |
| | 07_TIERRA | 09/04/2014 | X | X | X |
| | 9A_HOWAR | 09/04/2014 | X | X | X |
| | 9B_BARON | 09/04/2014 | X | X | X |
| October 2014 | 04_WOOD | 10/02/2014 | X | X | X |
| | 03_UNIV | 10/02/2014 | X | X | X |
| | 07_TIERRA | 10/02/2014 | X | X | X |
| | 9A_HOWAR | 10/02/2014 | X | X | X |
| | 9B_BARON | 10/02/2014 | X | X | X |
| | 04_WOOD | 10/30/2014 | X | X | X |
| November 2014 | 04_WOOD | 11/06/2014 | X | X | X |
| | 03_UNIV | 11/06/2014 | X | X | X |
| | 07_TIERRA | 11/06/2014 | X | X | X |
| | 9A_HOWAR | 11/06/2014 | X | X | X |
| | 9B_BARON | 11/06/2014 | X | X | X |
| December 2014 – Storm 1 | 04_WOOD | 12/02/2014 | X | | X |
| | 03_UNIV | 12/02/2014 | X | | X |
| | 07_TIERRA | 12/02/2014 | X | | X |
| | 9A_HOWAR | 12/02/2014 | X | | X |
| | 9B_BARON | 12/02/2014 | X | | X |

| Month | Site ID | Date Visited | EC | Chloride | Discharge |
|---|---|---|---|---|---|
| December 2014 – Post storm | 04_WOOD | 12/05/2014 | X | X | X |
| | 03_UNIV | 12/05/2014 | X | X | X |
| | 07_TIERRA | 12/05/2014 | X | X | X |
| | 9A_HOWAR | 12/05/2014 | X | X | X |
| | 9B_BARON | 12/05/2014 | X | X | X |
| | 03_UNIV | 12/08/2014 | X | X | |
| December 2014 – Storm 2 | 04_WOOD | 12/12/2014 | X | | X |
| | 03_UNIV | 12/12/2014 | X | | X |
| | 07_TIERRA | 12/12/2014 | X | | X |
| | 9A_HOWAR | 12/12/2014 | X | | X |
| | 9B_BARON | 12/12/2014 | X | | X |
| December 2014 – Post storm | 03_UNIV | 12/15/2014 | X | X | |
| | 9A_HOWAR | 12/17/2014 | X | X | X |
| | 03_UNIV | 12/17/2014 | X | X | |
| | 04_WOOD | 12/18/2014 | X | X | X |
| | 9B_BARON | 12/18/2014 | X | X | X |
| | 9A_HOWAR | 12/18/2014 | X | X | X |
| | 07_TIERRA | 12/19/2014 | X | X | X |
| January 2015 | 04_WOOD | 01/14/2015 | X | X | X |
| | 03_UNIV | 01/14/2015 | X | X | X |
| | 07_TIERRA | 01/14/2015 | X | X | X |
| | 9A_HOWAR | 01/14/2015 | X | X | X |
| | 9B_BARON | 01/14/2015 | X | X | X |
| February 2015 | 04_WOOD | 02/04/2015 | X | X | X |
| | 03_UNIV | 02/04/2015 | X | X | X |
| | 07_TIERRA | 02/04/2015 | X | X | X |
| | 9A_HOWAR | 02/04/2015 | X | X | X |
| | 9B_BARON | 02/04/2015 | X | X | X |
| March 2015 | 04_WOOD | 03/04/2015 | X | X | X |
| | 03_UNIV | 03/04/2015 | X | X | X |
| | 07_TIERRA | 03/04/2015 | X | X | X |
| | 9A_HOWAR | 03/04/2015 | X | X | X |
| | 9B_BARON | 03/04/2015 | X | X | X |
| | 04_WOOD | 03/17/2015 | X | X | X |
| | 04_WOOD | 03/25/2015 | X | X | X |

| Month | Site ID | Date Visited | EC | Chloride | Discharge |
|---|---|---|---|---|---|
| April 2015 | 04_WOOD | 04/02/2015 | X | X | X |
| | 03_UNIV | 04/02/2015 | X | X | X |
| | 07_TIERRA | 04/02/2015 | X | X | X |
| | 9A_HOWAR | 04/02/2015 | X | X | X |
| | 9B_BARON | 04/02/2015 | X | X | X |
| | 9A_HOWAR | 04/29/2015 | X | X | |
| | 07_TIERRA | 04/29/2015 | X | X | |
| May 2015 | 04_WOOD | 05/07/2015 | X | X | X |
| | 03_UNIV | 05/07/2015 | X | X | X |
| | 07_TIERRA | 05/07/2015 | X | X | X |
| | 9A_HOWAR | 05/07/2015 | X | X | X |
| | 9B_BARON | 05/07/2015 | X | X | X |
| June 2015 | 04_WOOD | 06/09/2015 | X | X | X |
| | 03_UNIV | 06/09/2015 | X | X | X |
| | 07_TIERRA | 06/09/2015 | X | X | X |
| | 9A_HOWAR | 06/09/2015 | X | X | X |
| | 9B_BARON | 06/09/2015 | X | X | X |
| | 04_WOOD | 06/24/2015 | X | X | X |
| | 9A_HOWAR | 06/24/2015 | X | X | X |
| | 04_WOOD | 06/30/2015 | X | X | X |
| | 03_UNIV | 06/30/2015 | X | X | X |
| | 07_TIERRA | 06/30/2015 | X | X | X |
| | 9B_BARON | 06/30/2015 | X | X | X |

# Appendix C:
# Rating Curves and EC/Salt Relationships for Salts TMDL Compliance Sites for the July 2014-June 2015 Monitoring Year

## RATING CURVES

Continuous water level time series data (5-min intervals) were converted to time series of flow estimates (cfs) using the USGS shift-adjusted rating curve method. The method establishes a base rating for a given date range. Over the date range that shares a base rating, this rating is then shifted, as necessary, for subsets of the data to account for small changes in the geometry of natural channels often caused by deposition, scouring, and vegetation. Rating curves for all sites took the form $Q = c^* (Lvl + a + S)^b$ where,

Q = discharge (cfs)

Lvl = water level or "stage", referenced to depth sensor elevation (cm)

c = scaling coefficient

a = coefficient accounting for the vertical difference between depth sensor elevation (stage = 0) and stage at zero discharge (cm)

b = coefficient accounting for channel shape, natural channels fall between endpoints b=1.5 (square channel), and b=2.5 (triangular channel).

S = stage shift, typically varies over time for natural channels (cm).

Monthly manual measurements of discharge were performed at all sites and are used to establish base ratings and to determine the required "shifts" ("S" in the equation above) over time for the monitoring year. Base rating curve equations are provided in **Table 1**.

**Table 1. Rating Curves for Salts TMDL Compliance Sites for Monitoring Year July 2014-June 2015**

| Site | Rating Curve |
|---|---|
| 03_UNIV[a] | $Q = 0.32*(Lvl – 30.5 + C)^{2.0}$ |
| 04_WOOD | $Q = 0.015*(Lvl - 5 + C)^{1.8}$ |
| 07_TIERRA | $Q = 0.0185*(Lvl - 21.5 + C)^{2.0}$ |
| 9A_HOWAR | $Q = 0.021*(Lvl – 6.0 + C)^{2.0}$ |
| 9B_BARON | $Q = 0.044*(Lvl + 0 + C)^{1.65}$ |

[a] A new base rating curve was developed for 2014-2015 water year and a single relationship is appropriate for both low and high flow conditions (previously, the rating curve was split depending on the water level)

## EC/SALT RELATIONSHIPS

Site-specific, linear relationships between specific conductivity (EC) and salt constituents were used to convert continuous EC sensor data to estimate salt concentrations. Surrogate relationships were derived from field data for EC and salts (grab samples for TDS, sulfate, chloride, or boron from quarterly dry plus wet events) using linear regression, in the following form:

[Ion] = A*EC + B, where,

[Ion] = concentration of TDS, sulfate, chloride, or boron (mg/L)

A = slope

EC = specific conductivity (µS/cm)

B = y-intercept

Two scenarios were evaluated to determine whether EC vs. salt relationships at the Salts TMDL compliance sites had significantly changed from those obtained during a one-year pilot study in 2011, which were subsequently used to prepare salt concentration time series for the 2012/2013 and 2013/2014 monitoring years. The first scenario considered a change in the surrogate relationship after June 2012, a date that separates the initial feasibility study and the start of compliance monitoring in late summer 2012. The second scenario considered a change in the surrogate relationship after February 2014, a date selected to reflect drought conditions and a change in the imported water supply source from 100% State Water Project (SWP) water to approximately 80% SWP water and 20% Colorado River water.

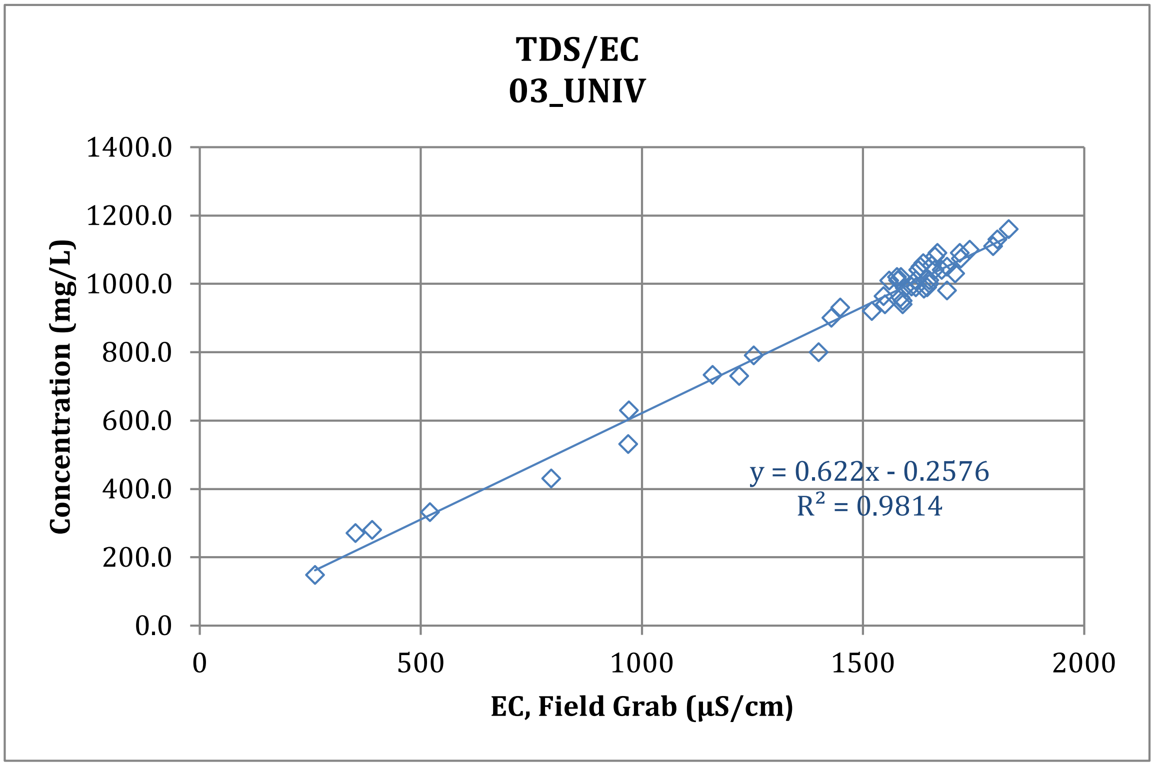
Analysis of covariance (ANCOVA) is a statistical tool for identifying cases where surrogate relationships change; however, further analysis is required to make a decision if the change is both supported by data and is significant enough trigger an update to surrogate relationships.

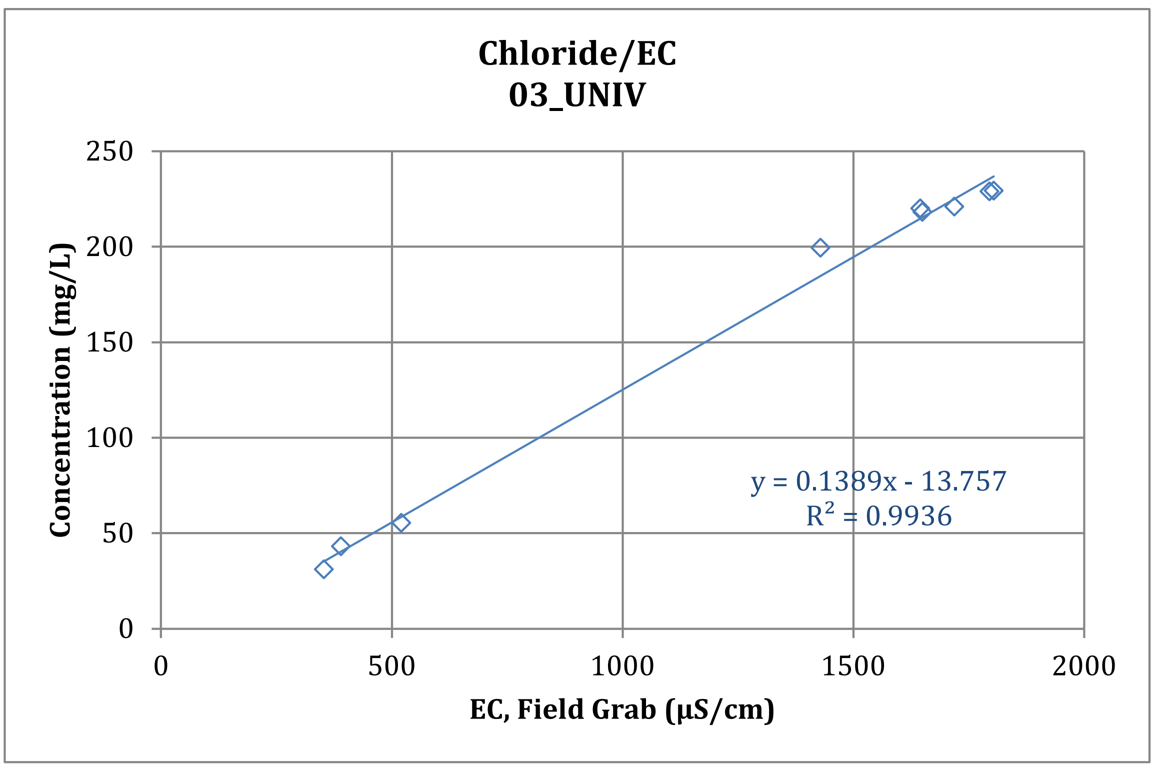
ANCOVA analyses were run to identify cases where there is a statistical possibility that surrogate relationships may have shifted over time, based on one or both of the scenarios described above. Based on this analysis, eight surrogate models were updated for the 2014-2015 water year. Two of the updated surrogate relationships are now based on field data collected starting with the beginning of compliance monitoring in late summer 2012 (EC/B at 07_TIERRA, EC/Cl at 9B_BARON). The other six of the updated surrogate relationships are now based on field data collected starting in February 2014. Relationship parameters and field data date ranges for all surrogate relationships used to process the 2014/2015 EC sensor data are reported in **Table 2**. The surrogate relationships are illustrated in figures following **Table 2**.

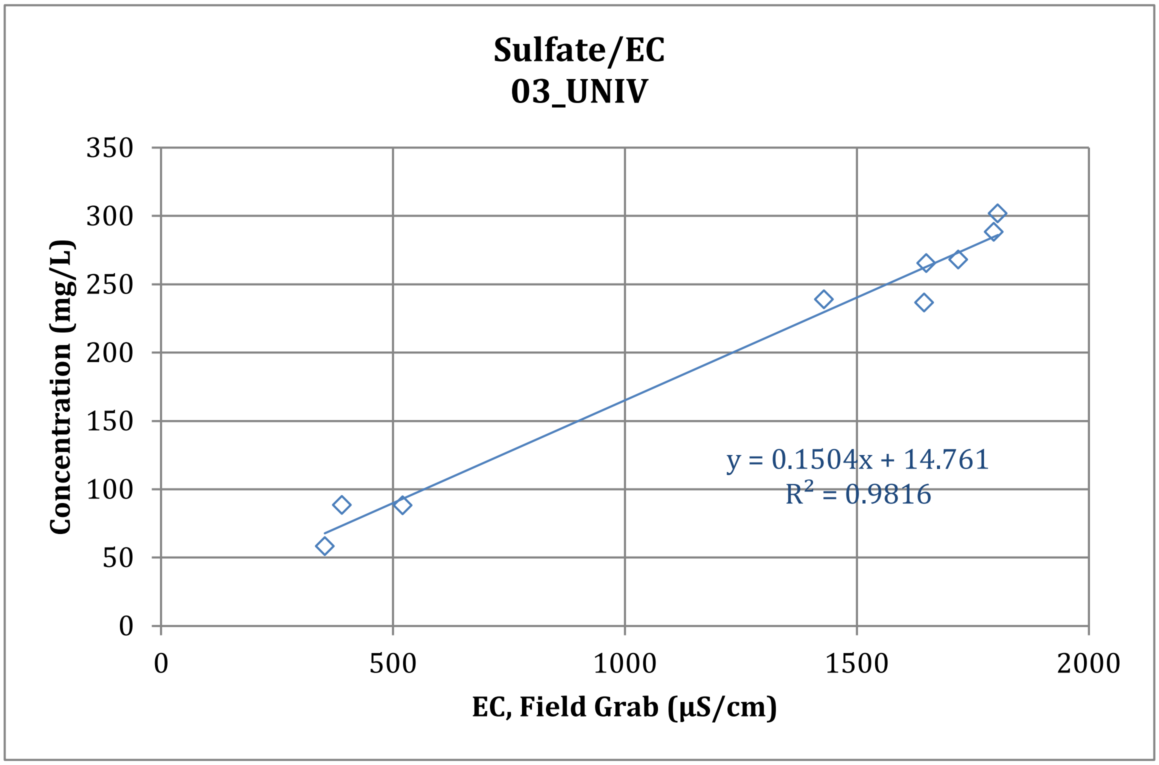
**Table 2. Parameters for surrogate relationships used to derive salt concentrations from EC sensor data for monitoring year July 2014-June 2015. Date ranges are for the field data that were used to construct the relationship.**

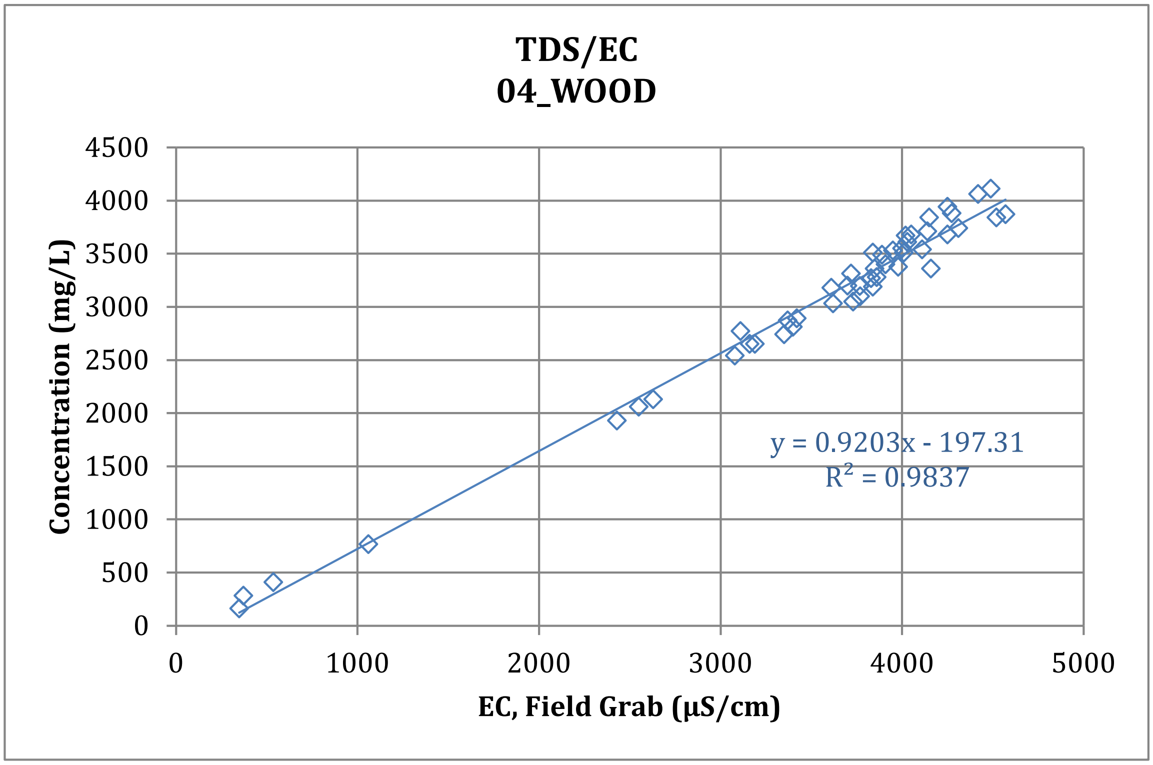
| | | TDS | Cl | SO4 | B |
|---|---|---|---|---|---|
| **03_UNIV** | A | 0.6220 | 0.1389 | 0.1504 | |
| | B | -0.2576 | -13.7568 | 14.7609 | |
| | R2 | 0.9814 | 0.9936 | 0.9816 | |
| | Count | 49 | 9 | 9 | |
| | Date Range | 1/31/2011 – 6/30/2015[a] | 2/28/2014-6/30/2015[a] | | |
| **04_WOOD** | A | 0.9203 | 0.05086 | 0.4890 | 0.0005 |
| | B | -197.3 | -6.8498 | -104.5639 | -0.0930 |
| | R2 | 0.9837 | 0.9896 | 0.9926 | 0.8731 |
| | Count | 48 | 8 | 8 | 48 |
| | Date Range | 1/31/2011 – 6/30/2015[a] | 2/28/2014-6/30/2015[a] | | 1/31/2011 – 6/30/2015[a] |
| **07_TIERRA** | A | 0.7092 | 0.1081 | 0.2763 | 0.0004 |
| | B | -61.26 | -11.9364 | -39.7200 | -0.0406 |
| | R2 | 0.9816 | 0.9940 | 0.9722 | 0.9735 |
| | Count | 37 | 8 | 37 | 16 |
| | Date Range | 1/31/2011 – 6/30/2015[a] | 2/28/2014- 6/30/2015[a] | 1/31/2011 – 6/30/2015[a] | 8/28/2012- 6/30/2015[a] |
| **9A_HOWAR** | A | 0.6097 | 0.1380 | 0.1597 | |
| | B | 1.5996 | -11.5017 | -9.8701 | |
| | R2 | 0.9854 | 0.9900 | 0.9499 | |
| | Count | 38 | 8 | 37 | |
| | Date Range | 1/31/2011 – 6/30/2015[a] | 2/28/2014- 6/30/2015[a] | 1/31/2011 – 6/30/2015[a] | |
| **9B_BARON** | A | 0.6010 | 0.1456 | 0.1533 | |
| | B | -5.5732 | -14.3760 | -6.0782 | |
| | R2 | 0.9715 | 0.9885 | 0.9632 | |
| | Count | 38 | 16 | 8 | |
| | Date Range | 1/31/2011 – 6/30/2015[a] | 8/28/2012- 6/30/2015[a] | 2/28/2014- 6/30/2015[a] | |

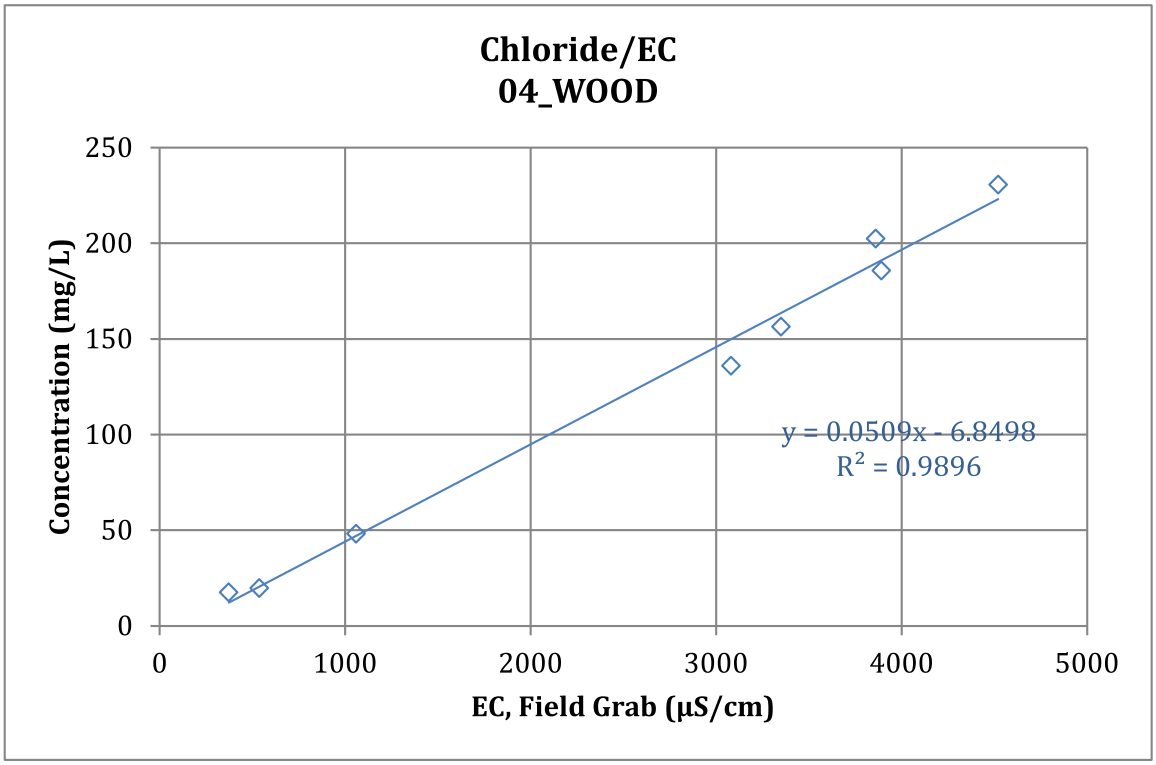
[a] The final field grabs for the July 2014-June 2015 monitoring year were collected on 5/7/2015.

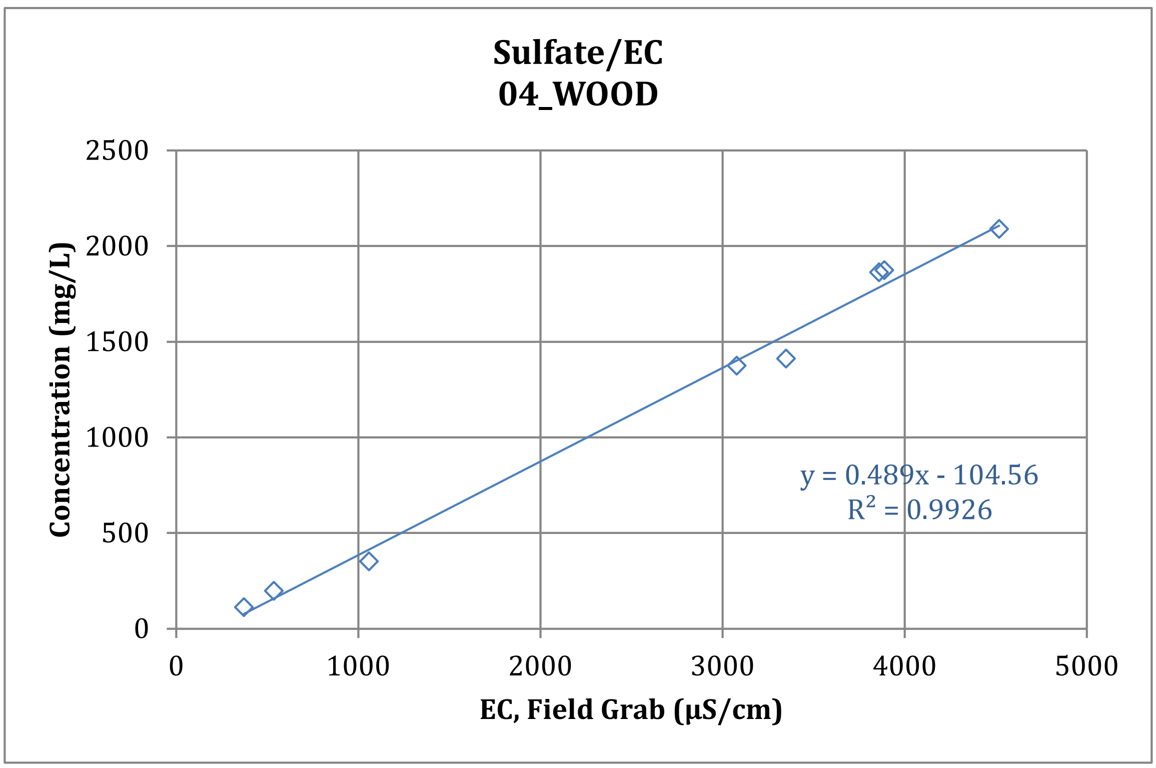

TDS/EC
03_UNIV
1400.0
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
0
500
1000
1500
2000
Concentration (mg/L)
EC, Field Grab (µS/cm)
y = 0.622x - 0.2576
R² = 0.9814

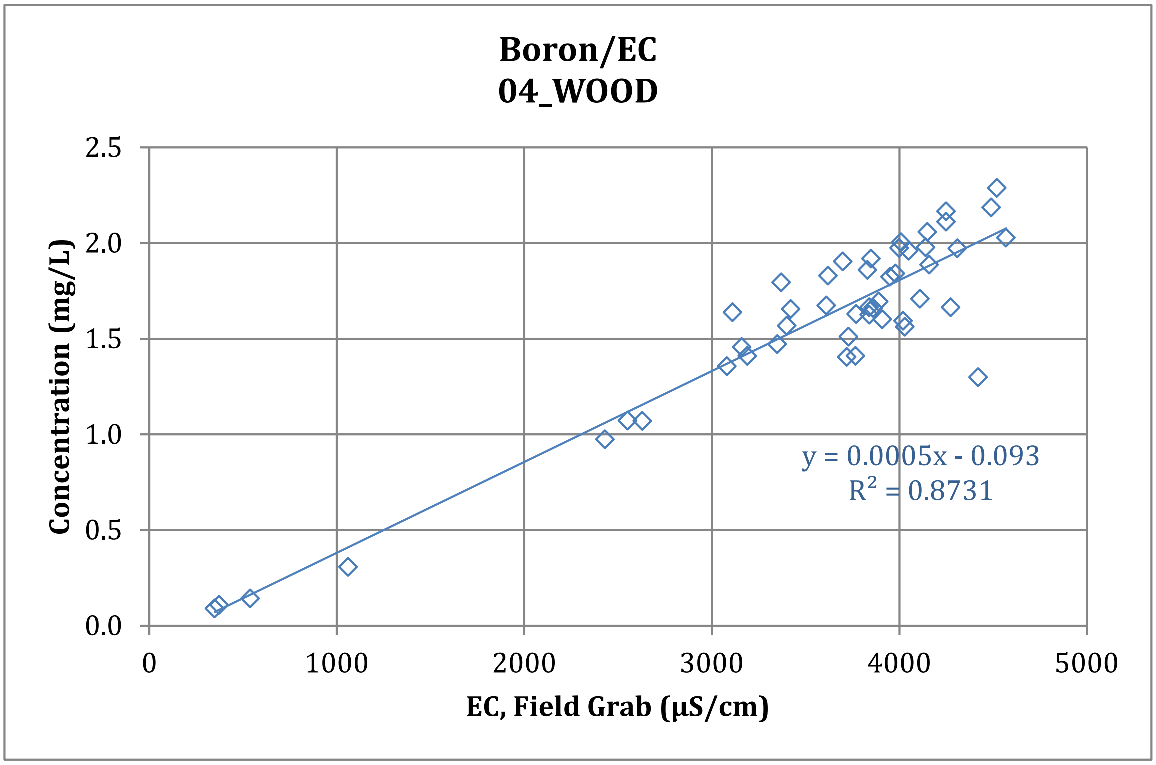

Chloride/EC
03_UNIV
250
200
150
100
50
0
0
500
1000
1500
2000
Concentration (mg/L)
EC, Field Grab (µS/cm)
y = 0.1389x - 13.757
R² = 0.9936

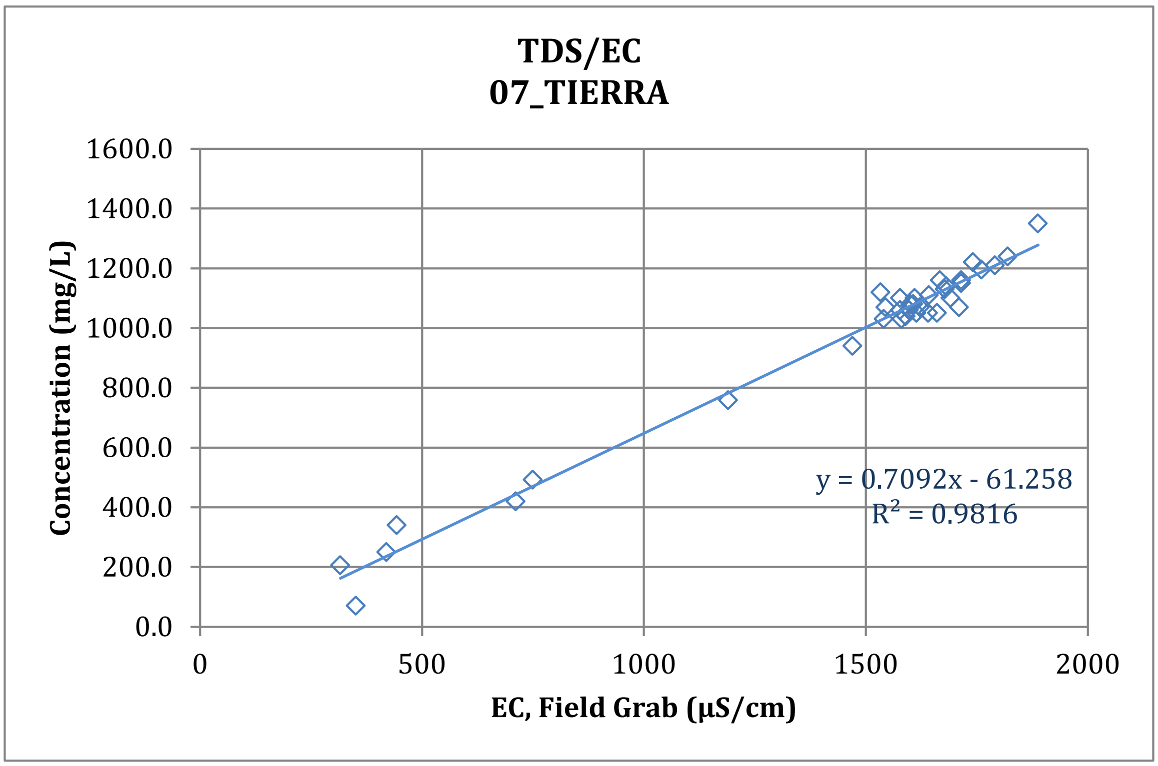

Sulfate/EC
03_UNIV
Concentration (mg/L)
EC, Field Grab (µS/cm)
y = 0.1504x + 14.761
R² = 0.9816
0
50
100
150
200
250
300
350
0
500
1000
1500
2000

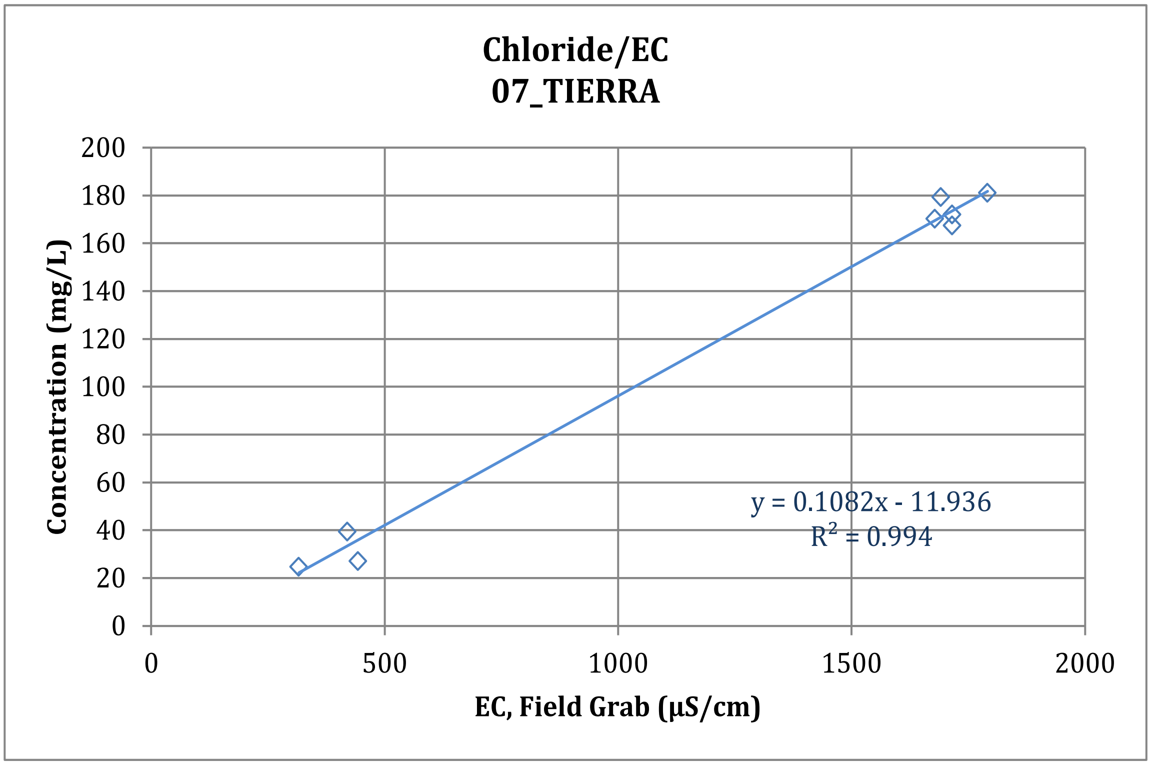

TDS/EC
04_WOOD
Concentration (mg/L)
EC, Field Grab (µS/cm)
y = 0.9203x - 197.31
R² = 0.9837
0
500
1000
1500
2000
2500
3000
3500
4000
4500
0
1000
2000
3000
4000
5000

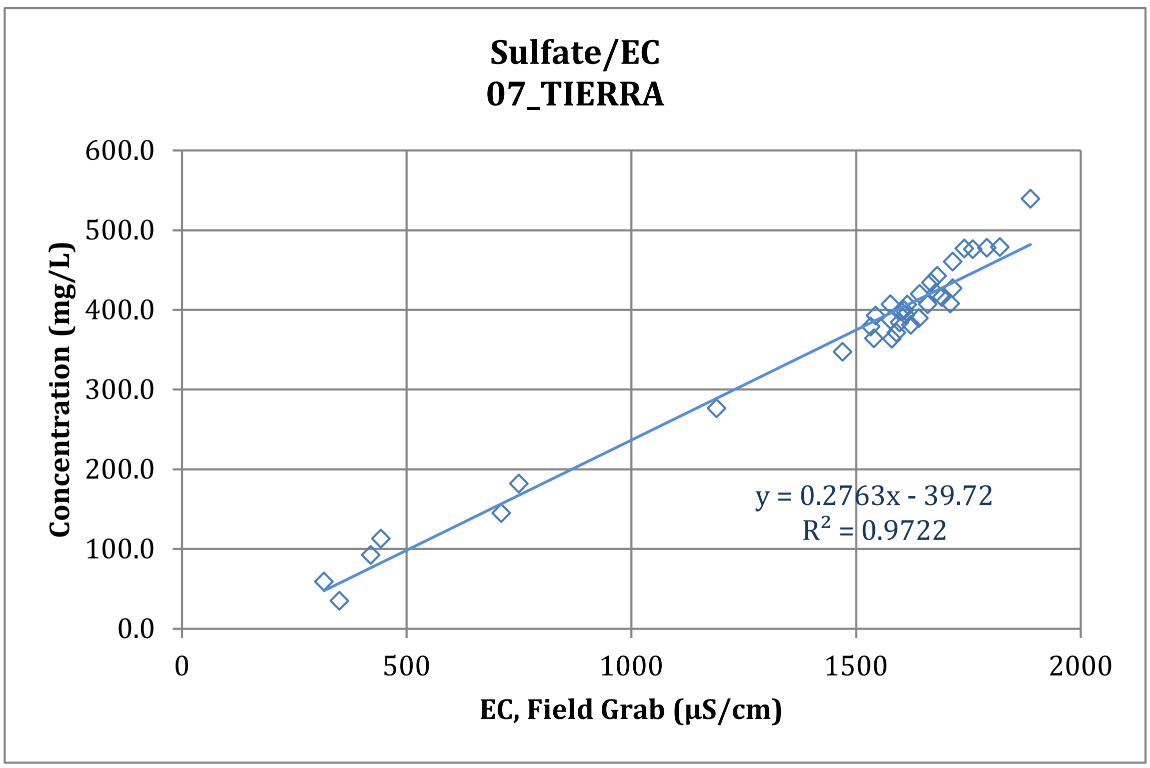

Chloride/EC
04_WOOD
Concentration (mg/L)
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
EC, Field Grab (µS/cm)
y = 0.0509x - 6.8498
R² = 0.9896

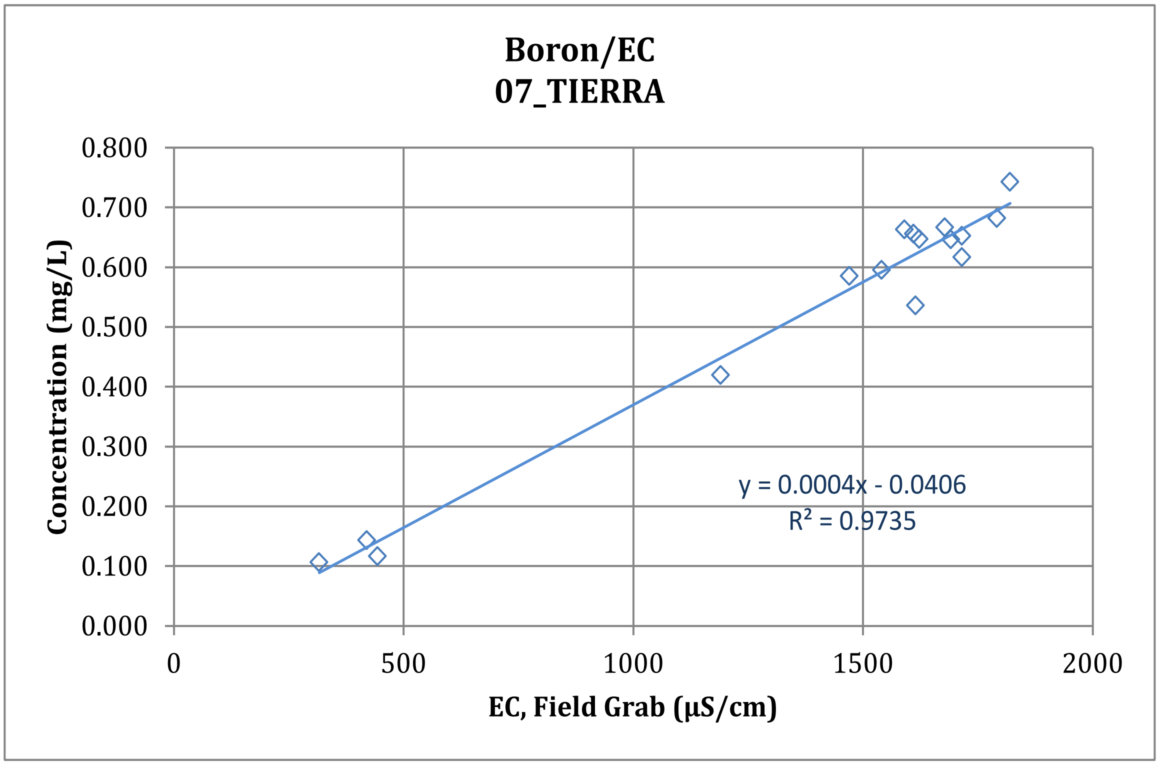

Sulfate/EC
04_WOOD
Concentration (mg/L)
2500
2000
1500
1000
500
0
0
1000
2000
3000
4000
5000
EC, Field Grab (µS/cm)
y = 0.489x - 104.56
R² = 0.9926

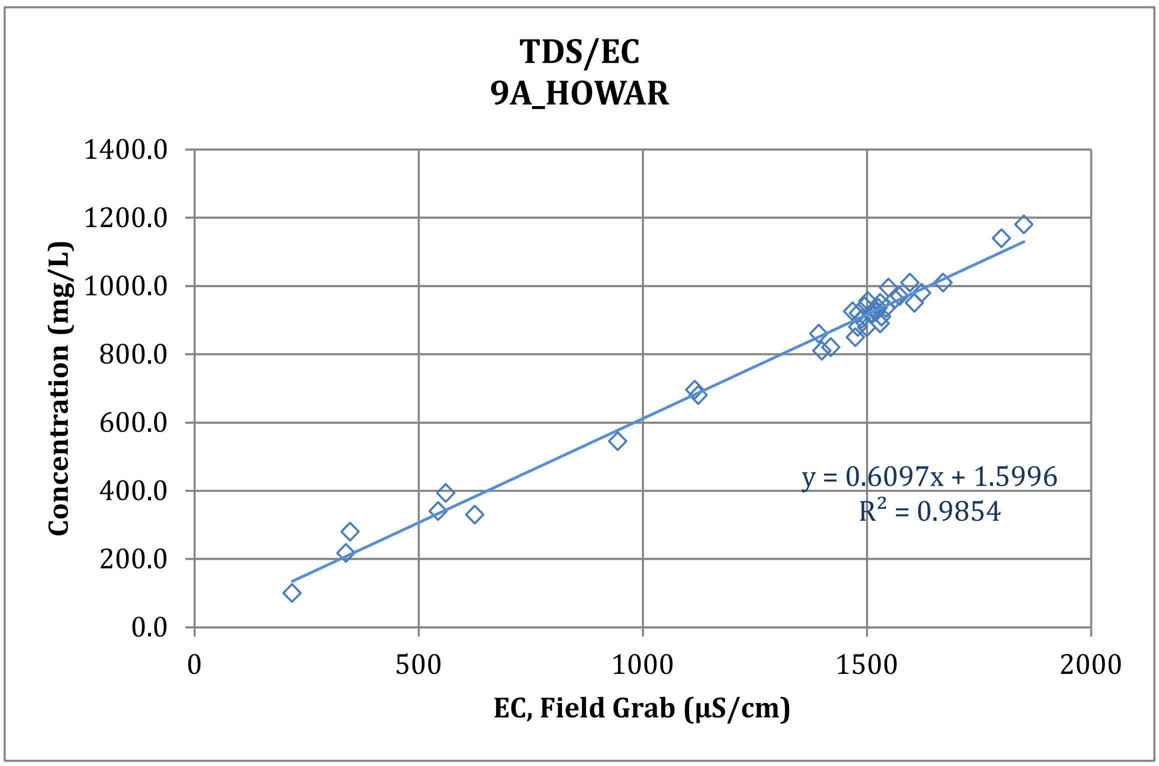

Boron/EC
04_WOOD
Concentration (mg/L)
2.5
2.0
1.5
1.0
0.5
0.0
0
1000
2000
3000
4000
5000
EC, Field Grab (µS/cm)
y = 0.0005x - 0.093
R² = 0.8731

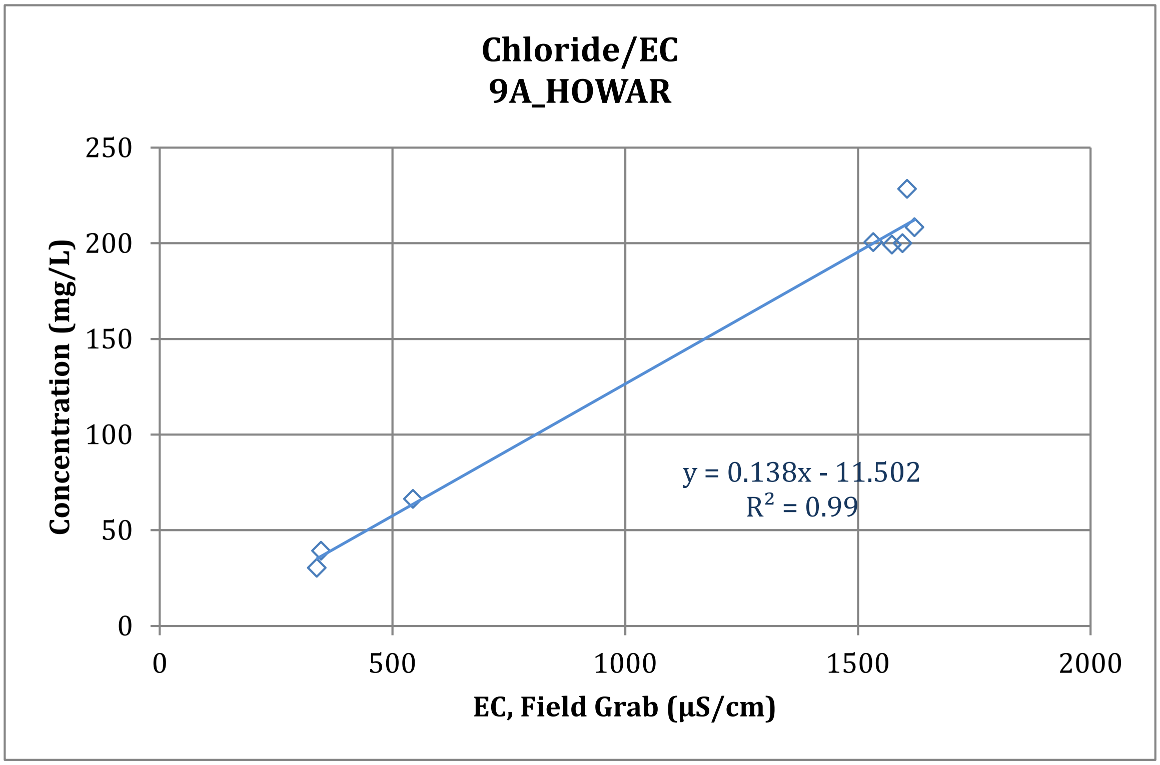

TDS/EC
07_TIERRA
Concentration (mg/L)
1600.0
1400.0
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.7092x - 61.258
R² = 0.9816

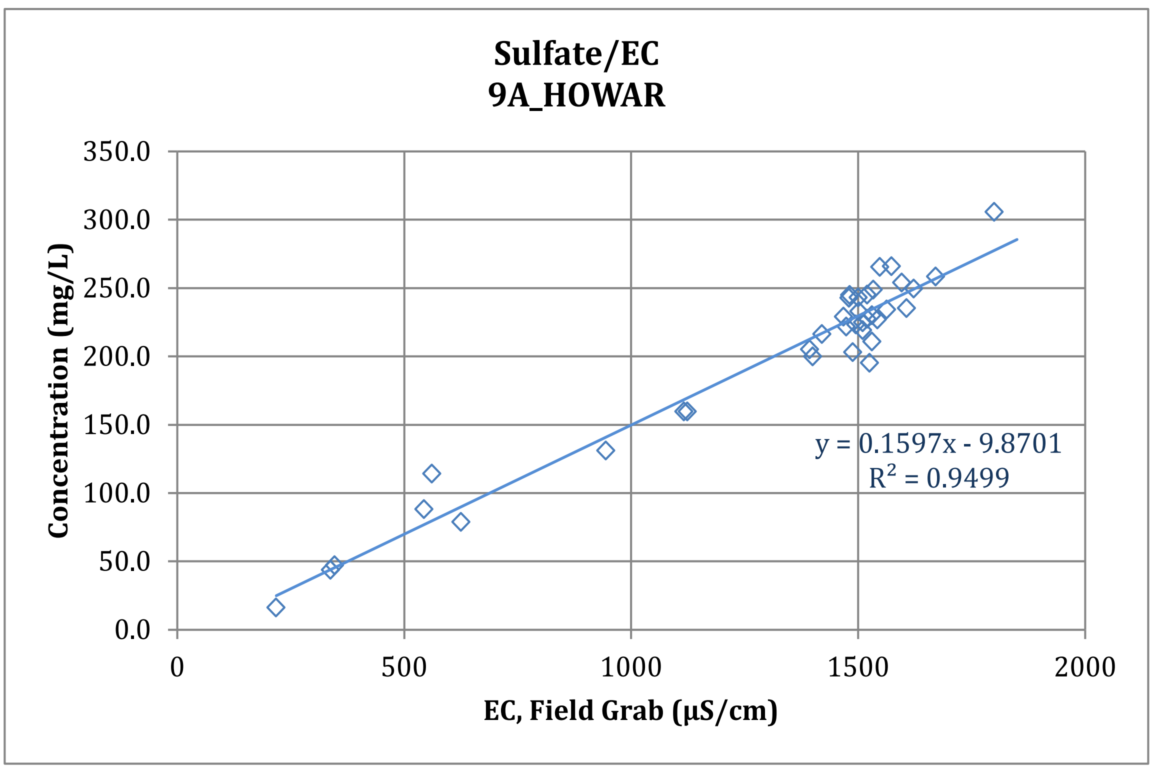

Chloride/EC
07_TIERRA
Concentration (mg/L)
200
180
160
140
120
100
80
60
40
20
0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.1082x - 11.936
R² = 0.994

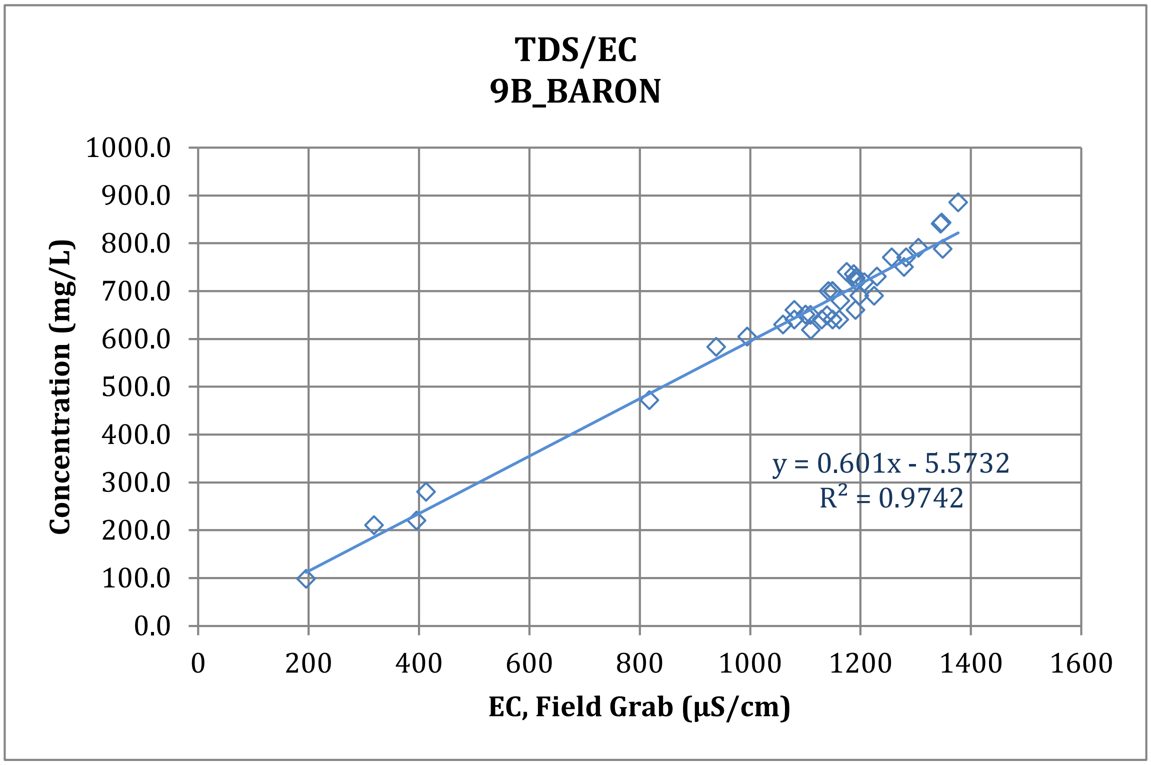

Sulfate/EC
07_TIERRA
Concentration (mg/L)
600.0
500.0
400.0
300.0
200.0
100.0
0.0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.2763x - 39.72
R² = 0.9722

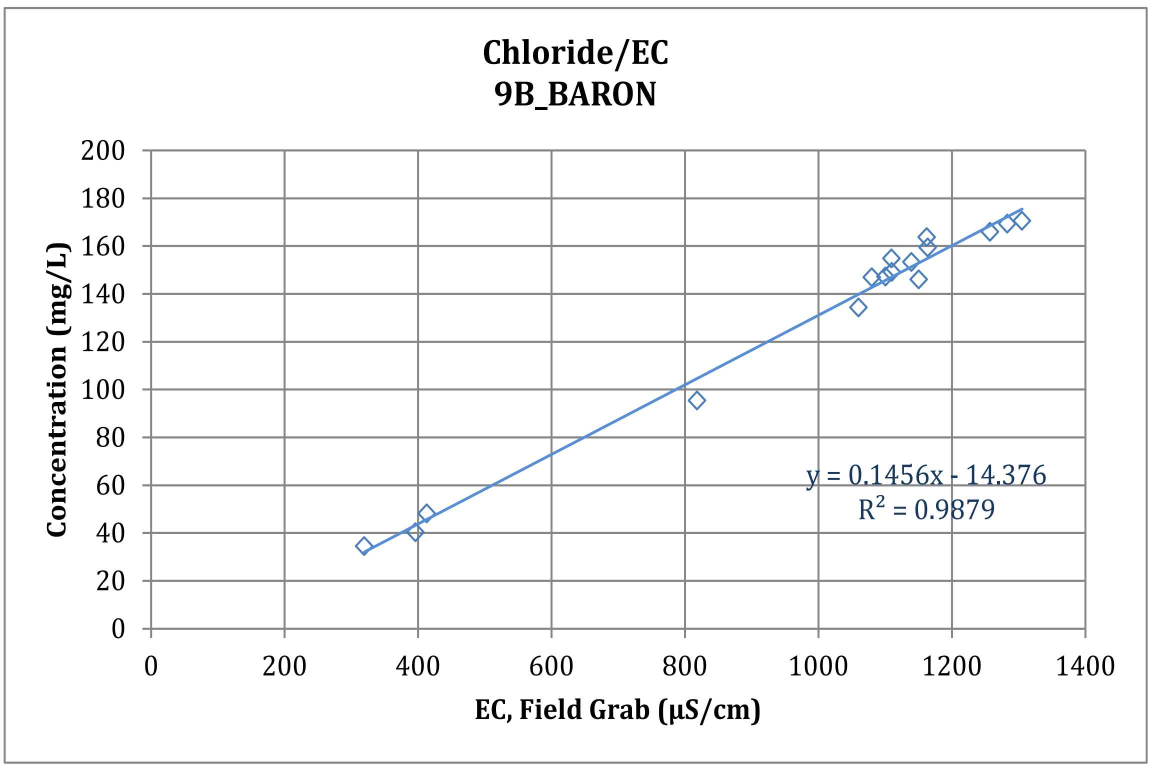

Boron/EC
07_TIERRA
Concentration (mg/L)
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.0004x - 0.0406
R² = 0.9735

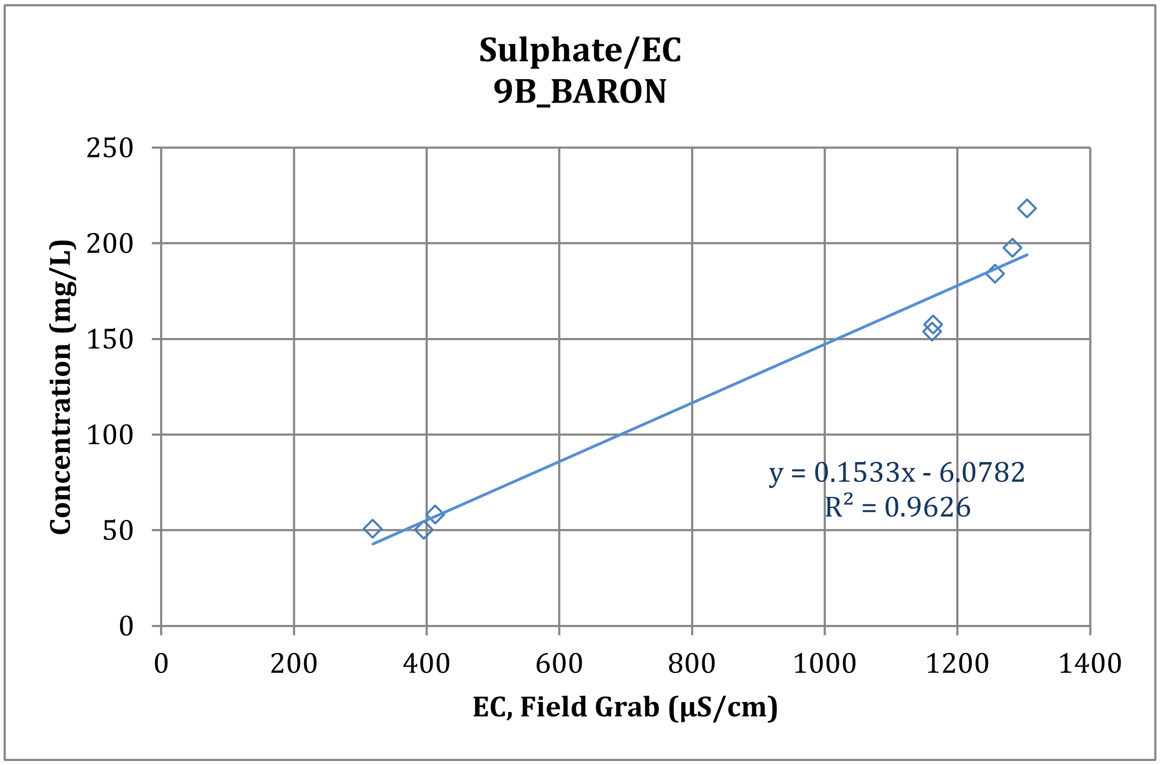

TDS/EC
9A_HOWAR
Concentration (mg/L)
1400.0
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.6097x + 1.5996
R² = 0.9854


Chloride/EC
9A_HOWAR
Concentration (mg/L)
250
200
150
100
50
0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.138x - 11.502
R² = 0.99


Sulfate/EC
9A_HOWAR
Concentration (mg/L)
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.1597x - 9.8701
R² = 0.9499


TDS/EC
9B_BARON
Concentration (mg/L)
1000.0
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
0
200
400
600
800
1000
1200
1400
1600
EC, Field Grab (µS/cm)
y = 0.601x - 5.5732
R² = 0.9742


Chloride/EC
9B_BARON
Concentration (mg/L)
200
180
160
140
120
100
80
60
40
20
0
0
200
400
600
800
1000
1200
1400
EC, Field Grab (µS/cm)
y = 0.1456x - 14.376
R² = 0.9879



Sulphate/EC
9B_BARON
Concentration (mg/L)
250
200
150
100
50
0
0
200
400
600
800
1000
1200
1400
EC, Field Grab (µS/cm)
y = 0.1533x - 6.0782
R² = 0.9626

# Appendix D: Toxicity Testing and Toxicity Identification Evaluations (TIE) Summary

## TOXICITY TESTING PROCEDURES

For the Calleguas Creek Watershed TMDL Compliance Monitoring Program (CCWTMP), toxicity testing at various locations is conducted to meet total maximum daily load (TMDL) requirements. The following is a brief summary of the procedures for the analytical methods used by the CCWTMP. Specific details concerning the standard operating procedures (SOPs) followed by field crews collecting applicable samples and laboratory analyses are found in the Quality Assurance Project Plan (QAPP).

For the CCWTMP toxicity measures, standard test species were utilized for toxicity testing. *Ceriodaphnia dubia* was used for fresh water aquatic toxicity testing and *Hyalella azteca* for the saline water aquatic toxicity testing and bulk sediment and porewater toxicity testing. *Hyalella azteca* was used to conduct aquatic toxicity testing if sample salinity exceeded 1.5 part per thousand (PPT) but was less than 15 PPT. All test species are standard United States Environmental Protection Agency (USEPA) test species and considered the most applicable for the various types of pollutants impacting the watershed, and all analytical testing procedures were conducted using standard USEPA methods.

The results of each toxicity test are used to trigger further investigations to determine the cause of observed laboratory toxicity if necessary per the QAPP. If testing indicates the presence of significant toxicity in the sample, toxicity identification evaluations (TIEs) procedures are initiated to investigate the cause of toxicity. For the purpose of triggering TIE procedures, significant toxicity is defined as at least 50% mortality. The 50% mortality threshold is consistent with the approach recommended in guidance published by USEPA for conducting TIEs (USEPA, 1996), which recommends a minimum threshold of 50% mortality because the probability of completing a successful TIE decreases rapidly for samples with less than this level of toxicity.[1] A component of the compliance requirement when significant toxicity is found is to initiate a targeted Phase 1 TIE and test to determine the general class of constituent (*i.e.*, non-polar organics) causing toxicity. The targeted TIE focuses on classes of constituents anticipated to be observed in drainages dominated by urban and agricultural discharges and those previously observed to cause toxicity. Phase 2 TIEs may also be utilized to identify specific constituents causing toxicity if warranted. TIE methods will generally adhere to USEPA procedures documented in conducting TIEs.[2,3,4,5] For samples exhibiting toxic effects consistent with

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[1] United States Environmental Protection Agency (USEPA). 1996. Marine Toxicity Identification Evaluation. Phase I Guidance Document EPA/600/R-96/054. USEPA, Office of Research and Development, Washington, D.C.

[2] United States Environmental Protection Agency (USEPA). 1991. Methods for Aquatic Toxicity Identification Evaluations: Phase 1 Toxicity Characterization Procedures (Second Edition). EPA-600/6-91/003. USEPA, Environmental Research Laboratory, Duluth, MN.

[3] United States Environmental Protection Agency (USEPA). 1992. Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents Phase 1. EPA/600/6-91/005. USEPA, Office of Research and Development, Washington, D.C.

carbofuran, diazinon, or chlorpyrifos, TIE procedures follow those documented in Bailey *et al*.[6] To address toxicity of unknown causes in sediment (> 50% mortality), sediment porewater was extracted and a Phase 1 TIE was performed. In addition, a Phase 1 TIE was performed on bulk sediment.

The decision to initiate TIE procedures on any sample, including samples exceeding the mortality threshold, as well as the focus and scope of TIE procedures, was determined by the Project Manager and toxicity laboratory staff. When deciding whether to initiate TIE procedures for a specific site and monitoring event, a number of factors were considered, including the level of toxicity, the magnitude of sample mortality and/or reburial levels as compared to lab control results, history of toxicity at the site, the species and endpoints exhibiting toxic effects, as well as the primary technical basis for triggering TIEs described above. A summary of the toxicity results and subsequent TIE actions, including the rationale for initiating TIE procedures for a specific sample are described below.

## TOXICITY RESULTS SUMMARY

Freshwater sediment toxicity samples are collected annually during the first event of each monitoring year. In addition, sediment toxicity samples are collected every three years in Mugu Lagoon. As such, freshwater and lagoon sediment toxicity samples were collected during the first event of this monitoring year. Water column toxicity samples are collected at freshwater sites during each of the quarterly and wet weather events. Monitored sites include the following:

- **Sediment Toxicity (Freshwater Sites)**
    - 02_PCH
    - 03_UNIV
    - 04_WOOD
    - 9A_HOWAR
- **Sediment Toxicity (Lagoon Sites)**
    - 01_BPT_3
    - 01_BPT_6
    - 01_BPT_14
    - 01_BPT_15
    - 01_BPT_74

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[4] United States Environmental Protection Agency (USEPA). 1993a. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fourth Edition. EPA/600/4-90/027F. USEPA, Office of Research and Development, Washington, D.C.

[5] United States Environmental Protection Agency (USEPA). 1993b. Methods for Aquatic Toxicity Identification Evaluations: Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity. EPA/600/R-02/080. USEPA, Office of Research and Development, Washington, D.C.

[6] Bailey, H.C., DiGiorgio, C., Kroll, K., Miller, J.L., Hinton, D.E., Starrett, G. 1996. Development of Procedures for Identifying Pesticide Toxicity in Ambient Waters: Carbofuran, Diazinon, Chlorpyrifos. Environ. Tox. and Chem. V15, No. 6, 837-845.

- **Freshwater Water Column Toxicity**
    - 04_WOOD
    - 03_UNIV
    - 9B_ADOLF
    - 06_SOMIS
    - 07_HITCH
    - 10_GATE (Toxicity Investigation site)
    - 13_BELT (Toxicity Investigation site)

Toxicity samples for sediment were collected at the freshwater and lagoon sites during dry weather Event 44. Water column toxicity testing was conducted during all four dry weather events (Events 44, 45, 48, and 49), and the wet weather events (Events 46 and 47). The following section describes the toxicity samples collected at each site for each event, the results of the tests, and a summary of applicable TIEs initiated per the requirements in the QAPP.

## Event 44 Sediment Toxicity

**Table 1. Freshwater Sediment Toxicity Event 44 - *Hyalella azteca***

| Site ID | *Hyalella azteca* | | | *Eohaustorius estuarius* | | |
|---|---|---|---|---|---|---|
| | Survival | Growth | TIE? | Survival | Reburial | TIE? |
| 02_PCH | No | No | No | | | |
| 03_UNIV | Yes[1] | No | No | | | |
| 04_WOOD | Yes[2] | Yes | No | | | |
| 9A_HOWAR | No | No | No | | | |
| 01_BPT_3 | | | | No | No | No |
| 01_BPT_6 | | | | No | No | No |
| 01_BPT_14 | | | | No | No | No |
| 01_BPT_15 | | | | No | No | No |
| 01_BPT_74 | | | | No | No | No |

1. There was a greater than 50 percent reduction in *Hyalella azteca* survival.
2. Although the reduction in the survival/growth response was statistically significant, there was a less than 20 percent reduction relative to the Control.

## Event 44 Water Column Toxicity

**Table 2. Freshwater Water Column Toxicity Event 39 - *Ceriodaphnia dubia and Hyalella azteca***

| Site ID | *Ceriodaphnia dubia* | | | *Hyalella azteca* | |
|---|---|---|---|---|---|
| | Survival | Reproduction | TIE? | Survival | TIE? |
| 03_UNIV | No[1] | Yes | Yes | | |
| 04_WOOD | | | | Yes | No |
| 07_HITCH | No | Yes | No | | |
| 9B_ADOLF | No | Yes | No | | |
| 10_GATE | No | Yes | No | | |
| 13_BELT | No | No | No | | |

1. There was no statistically significant difference in survival between the control and the ambient water treatments; however, there was greater than 50 percent mortality in the 100 percent ambient water concentration. As such, a TIE was initiated.

## Event 44 Toxicity and TIE Summary

- Freshwater sediment sites exhibited mortality at the 03_UNIV and 04_WOOD sites, but toxicity at the 04_WOOD site was not sufficient (mean percent survival <50 percent) for a TIE to be performed.
- There were no instances of *Eohaustorius estuaries* toxicity in the lagoon sediments.
- A TIE was initiated targeted for organics on the 03_UNIV freshwater sample.
- There were no significant reductions in toxicity by any of the TIE treatments. As such, the TIE results did not indicate a specific cause of the toxicity.
- A follow-up TIE with additional treatments was performed to aid in the identification of the toxicity cause. Toxicity was not observed in the baseline treatment indicating the toxicant may have undergone natural degradation or reduced bioavailability due to sorption. The lack of toxicity persistence suggests an organic compound as the cause of the toxicity.

## Event 45 Water Quality Toxicity

**Table 3. Water Quality Toxicity Event 45 - *Ceriodaphnia dubia* and *Hyalella azteca***

| Site ID | *Ceriodaphnia dubia* | | | *Hyalella azteca* | |
|---|---|---|---|---|---|
| | Survival | Reproduction | TIE? | Survival | TIE? |
| 03_UNIV | No | No | No | | |
| 04_WOOD | | | | Yes | No |
| 06_SOMIS | No | Yes | No | | |
| 07_HITCH | No | Yes | No | | |
| 9B_ADOLF | No | No | No | | |
| 10_GATE | No | Yes | No | | |

## Event 45 Toxicity and TIE Summary

- No significant reductions in survival were observed for *Ceriodaphnia dubia* at the five freshwater sample sites during the sampling event.
- Significant reductions in reproduction were observed for *Ceriodaphnia dubia* at three of the five sites tested for this organism.
- Significant survival toxicity was observed for *Hyalella azteca* at the 04_WOOD site.
- No TIEs were performed on samples collected for this sampling event.

## Event 46 Water Quality Toxicity

**Table 4. Water Quality Toxicity Event 46 - *Ceriodaphnia dubia***

| Site ID | *Ceriodaphnia dubia* | | |
|---|---|---|---|
| | Survival | Reproduction | TIE? |
| 03_UNIV | Yes | Yes | Yes |
| 04_WOOD | Yes | Yes | No |
| 06_SOMIS | Yes | Yes | Yes |
| 07_HITCH | Yes | Yes | Yes |
| 9B_ADOLF | No | No | No |
| 10_GATE | No | No | No |
| 13_BELT | No | No | No |

## Event 46 Toxicity and TIE Summary

- Significant mortality was observed for *Ceriodaphnia dubia* at 03_UNIV, 04_WOOD, 06_SOMIS, and 07_HITCH and TIEs were performed on samples collected from the 03_UNIV, 06_SOMIS, and 07_HITCH sites.
- The TIE for the 03_UNIV sample indicated that compounds associated with suspended particulates are contributing to toxicity and that OP pesticides are also contributing to toxicity.
- The TIE for the 06_SOMIS sample indicated that compounds associated with suspended particulates are contributing to toxicity and that non-polar organic compounds are also contributing to toxicity.
- The TIE for the 07_HITCH sample indicated compounds associated with suspended particulates are contributing to toxicity and that OP pesticides are also contributing to toxicity.

## Event 47 Water Quality Toxicity

**Table 5. Water Quality Toxicity Event 47 - *Ceriodaphnia dubia***

| Site ID | *Ceriodaphnia dubia* | | |
|---|---|---|---|
| | Survival | Reproduction | TIE? |
| 03_UNIV | No | No | No |
| 04_WOOD | Yes | Yes | No |
| 06_SOMIS | No | Yes | No |
| 07_HITCH | No | Yes | No |
| 9B_ADOLF | No | Yes | No |
| 10_GATE | No | No | No |
| 13_BELT | No | No | No |

## Event 47 Toxicity and TIE Summary

- Significant reductions in survival were observed for *Ceriodaphnia dubia* at the 04_WOOD site.
- Significant reduced reproduction was observed for the 04_WOOD, 06_SOMIS, 07_HITCH, and 9B_ADOLF sites.
- A TIE was not performed on any samples collected during the sampling event.

## Event 48 Water Quality Toxicity

**Table 6. Water Quality Toxicity Event 48 - *Ceriodaphnia dubia* and *Hyalella azteca***

| Site ID | *Ceriodaphnia dubia* | | | *Hyalella azteca* | |
|---|---|---|---|---|---|
| | Survival | Reproduction | TIE? | Survival | TIE? |
| 03_UNIV | No | No | No | | |
| 04_WOOD | | | | No | No |
| 06_SOMIS | No | No | No | | |
| 07_HITCH | No | Yes | No | | |
| 9B_ADOLF | No | Yes | No | | |
| 13_BELT | No | No | No | | |

## Event 48 Toxicity and TIE Summary

- No significant reductions in survival were observed for *Ceriodaphnia dubia* or *Hyalella azteca* for all sites.
- Significant reproduction toxicity for *Ceriodaphnia dubia* was observed at the 07_HITCH and 9B_ADOLF sites.
- A TIE was not performed on any samples collected during the sampling event.

## Event 49 Water Quality Toxicity

**Table 7. Water Quality Toxicity Event 49 - *Ceriodaphnia dubia* and *Hyalella azteca***

| Site ID | *Ceriodaphnia dubia* | | | *Hyalella azteca* | |
|---|---|---|---|---|---|
| | Survival | Reproduction | TIE? | Survival | TIE? |
| 03_UNIV | No | No | No | | |
| 04_WOOD | | | | Yes | No |
| 07_HITCH | No | Yes | No | | |
| 9B_ADOLF | No | No | No | | |
| 10_GATE | No | No | No | | |

## Event 49 Toxicity and TIE Summary

- No significant reductions in survival were observed for *Ceriodaphnia dubia*.
- Significant reduction in survival was observed for *Hyalella azteca* at the 04_WOOD site.
- Significant reproduction toxicity for *Ceriodaphnia dubia* was observed at the 07_HITCH site.
- A TIE was not performed on any samples collected during the sampling event.

# Appendix E:
# Laboratory QA/QC Results and Discussion

## QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance and quality control (QA/QC) measures are built into the CCWTMP to assure that collected data are credible. Two types of quality controls were conducted. Field quality controls (to test for field contamination and precision) were conducted by the field crews and include: equipment blanks, field blanks, and field duplicates. Laboratory quality controls (to test for laboratory contamination and precision) were conducted by the labs and include: method blanks, blank spikes, blank spike duplicates, lab duplicates, matrix spikes, matrix spike duplicates, laboratory control samples, and surrogates (organics only). Equipment blanks only apply to the shovels used in sediment sample collection. All field protocols for the collection of clean samples were followed according to the QAPP. The following section lists the quality control failures that occurred during the 2014-2015 monitoring year and any associated qualifiers and comments.

### Blank Contamination

Blank samples are used to identify the presents of and potential sources of sample contamination. During the seventh year of monitoring, there were three types of blank samples conducted.

- **Field blanks** are conducted by field crews and are looking for possible contamination in the collection and transportation of samples.
- **Equipment blanks** are done by the field crews and are look for contamination with the sampling equipment.
- **Laboratory blanks** are conducted by the analyzing laboratory and look for contamination in the lab.

A majority of the blank failures were in the metals field blanks. There were only two other blank detections both for Total Kjeldahl Nitrogen (TKN). There were no equipment blank hits and the lab blank hits were all for metals as well. Even though the detections were above the MDL value, most were low compared to the environmental sample, so no qualification was needed. Details of all the blank hits are reported in Table 1 below. The following lists a basic summary of the blank contamination results:

- Field Blanks – 1619 analyzed – 100 detections above the MDL (6.18%) (does not include surrogates)
- Equipment Blanks – 251 analyzed – 0 detections above MDL (0.0%) (does not include lab duplicates or surrogates)
- Laboratory Blanks – 4190 analyzed – 4 detections above MDL (0.10%) (does not include surrogates)

## Precision

The purpose of analyzing duplicates is to demonstrate precision (reproducibility) of sample collection, preparation, and analytical methods. The relative percent difference (RPD) is reported for field duplicates, lab duplicates, blank spike duplicates, laboratory control spike (LCS) duplicates, and matrix spike duplicates. An RPD is computed as:

$$RPD = 2 * |O_i – D_i| / (O_i + D_i) * 100$$

Where:

RPD = Relative percent difference
$O_i$ = value of compound *i* in original sample
$D_i$ = value of compound *i* in duplicate sample

QA failures for precision are noted when the RPD between a sample and its duplicate are greater than the acceptance value. Details of all the RPD failures are reported in Table 2 below. The following list summarizes the precision analysis results:

- Field Duplicates – 1918 analyzed – 77 failed RPD (4.01%) (does not include surrogates)
- Laboratory Duplicates – 1713 analyzed – 75 failed RPD (4.38%) (includes surrogates)
- Blank Spike/LCS Duplicates – 3719 analyzed – 24 failed RPD (0.65%) (includes surrogates)
- Matrix Spike Duplicates – 1148 analyzed – 29 failed RPD (2.53%) (includes surrogates)

## Accuracy

Accuracy is defined as the degree of agreement of a measurement to an accepted refecence or true value. Accuracy is measured as the percent recovery (%R) of a spiked compound and calculated as:

$$\%R = 100 * [(C_s – C) / S]$$

Where:

%R = percent recovery
$C_s$ = analyzed spiked concentration
C = analyzed concentration of sample matrix
S = known spiked concentration

Percent recoveries of blank spike samples (BS), laboratory control spike samples (LCS), and matrix spike samples (MS) check the accuracy of lab reported sample concentrations. For the BS's and LCS's that fell outside the acceptable range, all were for pesticides constituents, with more than half occurring in the May event from both tissue and water samples. The rest of the failed BS's were scattered across the entire monitoring year. For the matrix spike samples that fell outside the acceptable range, a little less than half of them were from the last event of the year in tissue and water samples. The distribution across nutrients, pesticides, and metals were pretty even. Table 3 summarizes the QA/QC sample results for accuracy that did not meet percent recovery objectives. The following lists the results of the accuracy analysis results:

- Blank Spike/LCS Samples – 7361 Analyzed – 37 fell outside the range (0.50%) (does not include surrogates)
- Matrix Spike Samples – 2324 Analyzed – 83 fell outside the range (3.57%) (does not include surrogates)

**Table 1. Blank Contamination Observed**

| Constituent | Matrix | Event | Lab Batch | Equip Blank | Field Blank | Lab Blank | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|
| **General Water Quality** | | | | | | | | |
| None | | | | | | | | |
| **Nutrients** | | | | | | | | |
| Total Kjeldahl Nitrogen (mg/L) | Water | 44 | Associated_QC1148898_W_CON | | 0.1 | | FD RPD | FieldDup RPD Failed |
| Total Kjeldahl Nitrogen (mg/L) | Water | 49 | Associated_QC1155252_W_CON | | 0.21 | | U | Upper Limit due to analyte found in blank |
| **OC Pesticieds** | | | | | | | | |
| None | | | | | | | | |
| **PCBs** | | | | | | | | |
| None | | | | | | | | |
| **OP Pesticides** | | | | | | | | |
| None | | | | | | | | |
| **Pyrethroid Pesticides** | | | | | | | | |
| None | | | | | | | | |
| **Metals & Selenium** | | | | | | | | |
| Aluminum, Total (µg/L) | Water | 45 | Physis E-8014 W | | 2.32 | | U | Upper Limit due to analyte found in blank |
| Barium, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | | 0.27 | | | |
| Barium, Total (µg/L) | Water | 44 | Physis E-7132 W | | 0.35 | | | |
| Cadmium, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | | 0.007 | | | |
| Cadmium, Dissolved (µg/L) | Water | 48 | Physis E-8059 W | | 0.0059 | | | |
| Chromium, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | | 0.02 | | | |
| Chromium, Dissolved (µg/L) | Water | 46 | Physis E-8027 W | | 0.02 | | | |

| Constituent | Matrix | Event | Lab Batch | Equip Blank | Field Blank | Lab Blank | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|
| Chromium, Total (µg/L) | Water | 44 | Physis E-7132 W | | 0.03 | | | |
| Chromium, Total (µg/L) | Water | 45 | Physis E-8014 W | | 0.03 | | | |
| Chromium, Total (µg/L) | Water | 46 | Physis E-8027 W | | 0.03 | | | |
| Chromium, Total (µg/L) | Water | 49 | Physis E-8083 W | | 0.02 | | | |
| Cobalt, Dissolved (µg/L) | Water | 49 | Physis E-8083 W | | 0.36 | | U | Upper Limit due to analyte found in blank |
| Cobalt, Total (µg/L) | Water | 49 | Physis E-8083 W | | 0.36 | | LD RPD, U, FD RPD | LabDuplicate RPD Failed, Upper Limit due to analyte found in blank, FieldDuplicate RPD Failed |
| Copper, Dissolved (µg/L) | Water | 44 | Physis E-7132 W | | 0.164 | | | |
| Copper, Dissolved (µg/L) | Water | 44 | Physis E-7137 W | | 0.022 | | LD RPD | LabDup RPD Failed |
| Copper, Dissolved (µg/L) | Water | 44 | W4H0652 | | | 0.0695 | | |
| Copper, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | | 0.128 | | | |
| Copper, Dissolved (µg/L) | Water | 45 | Physis E-8016 W | | 0.018 | | LD RPD | LabDup RPD Failed |
| Copper, Dissolved (µg/L) | Water | 48 | Physis E-8059 W | | 0.008 | | LD RPD, FD RPD | LabDup RPD Failed, FieldDup RPD Failed |
| Copper, Dissolved (µg/L) | Water | 49 | Physis E-8082 W | | 0.018 | | | |
| Copper, Total (µg/L) | Water | 44 | Physis E-7132 W | | 0.106 | | | |
| Copper, Total (µg/L) | Water | 44 | Physis E-7137 W | | 0.025 | | | |
| Copper, Total (µg/L) | Water | 45 | Physis E-8014 W | | 0.116 | | | |
| Copper, Total (µg/L) | Water | 45 | Physis E-8016 W | | 0.241 | | | |
| Copper, Total (µg/L) | Water | 46 | Physis E-8027 W | | 0.031 | | | |
| Lead, Dissolved (µg/L) | Water | 44 | Physis E-7132 W | | 0.063 | | LD RPD, FD RPD | LabDup RPD Failed, FieldDup RPD Failed |

| Constituent | Matrix | Event | Lab Batch | Equip Blank | Field Blank | Lab Blank | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|
| Lead, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | | 0.045 | | LD RPD, U, FD RPD | LabDuplicate RPD Failed, Upper Limit due to analyte found in blank, FieldDuplicate RPD Failed |
| Lead, Dissolved (µg/L) | Water | 48 | Physis E-8059 W | | 0.0185 | | LD RPD, FD RPD | LabDup RPD Failed, FieldDup RPD Failed |
| Lead, Dissolved (µg/L) | Water | 49 | Physis E-8082 W | | 0.0029 | | U | Upper Limit due to analyte found in blank |
| Lead, Dissolved (µg/L) | Water | 49 | Physis E-8083 W | | 0.037 | | U | Upper Limit due to analyte found in blank |
| Lead, Total (µg/L) | Water | 44 | Physis E-7132 W | | 0.197 | | LD RPD, U, FD RPD | LabDuplicate RPD Failed, Upper Limit due to analyte found in blank, FieldDuplicate RPD Failed |
| Lead, Total (µg/L) | Water | 45 | Physis E-8014 W | | 0.038 | | LD RPD, U | LabDuplicate RPD Failed, Upper Limit due to analyte found in blank |
| Lead, Total (µg/L) | Water | 46 | Physis E-8027 W | | 0.023 | | | |
| Lead, Total (µg/L) | Water | 49 | Physis E-8083 W | | 0.005 | | | |
| Manganese, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | | 0.041 | | | |
| Manganese, Dissolved (µg/L) | Water | 47 | Physis E-8042 W | | 0.038 | | | |
| Manganese, Total (µg/L) | Water | 44 | Physis E-7132 W | | 0.016 | | | |
| Manganese, Total (µg/L) | Water | 45 | Physis E-8014 W | | 0.055 | | | |
| Manganese, Total (µg/L) | Water | 47 | Physis E-8042 W | | 0.013 | | | |

| Constituent | Matrix | Event | Lab Batch | Equip Blank | Field Blank | Lab Blank | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|
| Mercury, Dissolved (µg/L) | Water | 44 | W4H0386 | | | 0.012 | | |
| Molybdenum, Dissolved (µg/L) | Water | 44 | Physis E-7132 W | | 0.15 | | | |
| Molybdenum, Dissolved (µg/L) | Water | 44 | Physis E-7137 W | | 0.032 | | | |
| Molybdenum, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | | 0.23 | | | |
| Molybdenum, Dissolved (µg/L) | Water | 45 | Physis E-8016 W | | 0.083 | | | |
| Molybdenum, Dissolved (µg/L) | Water | 46 | Physis E-8027 W | | 0.05 | | | |
| Molybdenum, Dissolved (µg/L) | Water | 48 | Physis E-8055 W | | 1.01 | | | |
| Molybdenum, Dissolved (µg/L) | Water | 48 | Physis E-8059 W | | 0.005 | | | |
| Molybdenum, Dissolved (µg/L) | Water | 49 | Physis E-8082 W | | 0.013 | | | |
| Molybdenum, Total (µg/L) | Water | 44 | Physis E-7132 W | | 0.11 | | | |
| Molybdenum, Total (µg/L) | Water | 44 | Physis E-7137 W | | 0.026 | | U | Upper Limit due to analyte found in blank |
| Molybdenum, Total (µg/L) | Water | 45 | Physis E-8014 W | | 0.21 | | | |
| Molybdenum, Total (µg/L) | Water | 45 | Physis E-8016 W | | 0.067 | | | |
| Molybdenum, Total (µg/L) | Water | 46 | Physis E-8027 W | | 0.06 | | | |
| Molybdenum, Total (µg/L) | Water | 48 | Physis E-8055 W | | 0.56 | | | |
| Molybdenum, Total (µg/L) | Water | 49 | Physis E-8082 W | | 0.009 | | | |
| Nickel, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | | 0.03 | | | |
| Nickel, Dissolved (µg/L) | Water | 45 | Physis E-8016 W | | 0.0054 | | | |
| Nickel, Dissolved (µg/L) | Water | 49 | Physis E-8082 W | | 0.0078 | | | |
| Nickel, Total (µg/L) | Water | 44 | Physis E-7132 W | | 0.02 | | | |
| Nickel, Total (µg/L) | Water | 45 | Physis E-8014 W | | 0.33 | | | |
| Nickel, Total (µg/L) | Water | 45 | Physis E-8016 W | | 0.0078 | | | |

| Constituent | Matrix | Event | Lab Batch | Equip Blank | Field Blank | Lab Blank | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|
| Nickel, Total (µg/L) | Water | 46 | Physis E-8027 W | | 0.04 | | | |
| Selenium, Dissolved (µg/L) | Water | 48 | Physis E-8059 W | | 0.011 | | | |
| Selenium, Total (µg/L) | Water | 45 | Physis E-8014 W | | 0.03 | | | |
| Selenium, Total (µg/L) | Water | 46 | Physis E-8027 W | | 0.02 | | | |
| Silver, Dissolved (µg/L) | Water | 45 | Physis E-8016 W | | 0.02 | | LD RPD, U | LabDuplicate RPD Failed, Upper Limit due to analyte found in blank |
| Silver, Dissolved (µg/L) | Water | 48 | Physis E-8059 W | | 0.02 | | | |
| Silver, Dissolved (µg/L) | Water | 49 | Physis E-8082 W | | 0.04 | | U | Upper Limit due to analyte found in blank |
| Silver, Dissolved (µg/L) | Water | 49 | Physis E-8083 W | | 0.02 | | | |
| Silver, Total (µg/L) | Water | 45 | Physis E-8016 W | | 0.01 | | | |
| Silver, Total (µg/L) | Water | 48 | Physis E-8059 W | | 0.03 | | | |
| Silver, Total (µg/L) | Water | 49 | Physis E-8082 W | | 0.07 | | U | Upper Limit due to analyte found in blank |
| Silver, Total (µg/L) | Water | 49 | Physis E-8083 W | | 0.01 | | | |
| Strontium, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | | 0.14 | | EST MS/MSD | Estimate due to MS/MSD RPD failed |
| Strontium, Total (µg/L) | Water | 45 | Physis E-8014 W | | 0.04 | | | |
| Thallium, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | | 0.02 | | U | Upper Limit due to analyte found in blank |
| Thallium, Dissolved (µg/L) | Water | 46 | Physis E-8027 W | | 0.09 | | | |
| Thallium, Dissolved (µg/L) | Water | 49 | Physis E-8083 W | | 0.02 | | U | Upper Limit due to analyte found in blank |

| Constituent | Matrix | Event | Lab Batch | Equip Blank | Field Blank | Lab Blank | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|
| Thallium, Total (µg/L) | Water | 45 | Physis E-8014 W | | 0.01 | | U | Upper Limit due to analyte found in blank |
| Thallium, Total (µg/L) | Water | 46 | Physis E-8027 W | | 0.07 | | | |
| Thallium, Total (µg/L) | Water | 49 | Physis E-8083 W | | 0.02 | | | |
| Titanium, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | | 0.15 | | | |
| Titanium, Dissolved (µg/L) | Water | 48 | Physis E-8055 W | | 0.18 | | | |
| Titanium, Total (µg/L) | Water | 48 | Physis E-8055 W | | 0.14 | | | |
| Vanadium, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | | 0.03 | | | |
| Vanadium, Dissolved (µg/L) | Water | 47 | Physis E-8042 W | | 0.1 | | | |
| Vanadium, Dissolved (µg/L) | Water | 48 | Physis E-8055 W | | 0.08 | | | |
| Vanadium, Total (µg/L) | Water | 45 | Physis E-8014 W | | 0.03 | | | |
| Vanadium, Total (µg/L) | Water | 47 | Physis E-8042 W | | 0.06 | | | |
| Vanadium, Total (µg/L) | Water | 48 | Physis E-8055 W | | 0.09 | | | |
| Zinc, Dissolved (µg/L) | Water | 44 | Physis E-7137 W | | 0.1424 | | FD RPD | FieldDup RPD Failed |
| Zinc, Dissolved (µg/L) | Water | 44 | W4H0652 | | | 3.72 | | |
| Zinc, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | | 0.51 | | U | Upper Limit due to analyte found in blank |
| Zinc, Dissolved (µg/L) | Water | 45 | W4L0056 | | | 1.85 | | |
| Zinc, Dissolved (µg/L) | Water | 47 | Physis E-8042 W | | 1.25 | | FD RPD | FieldDup RPD Failed |
| Zinc, Dissolved (µg/L) | Water | 48 | Physis E-8055 W | | 0.22 | | | |
| Zinc, Dissolved (µg/L) | Water | 48 | Physis E-8059 W | | 0.1782 | | FD RPD | FieldDup RPD Failed |
| Zinc, Total (µg/L) | Water | 44 | Physis E-7137 W | | 0.3735 | | U, FD RPD | Upper Limit due to analyte found in blank, FieldDup RPD Failed |

| Constituent | Matrix | Event | Lab Batch | Equip Blank | Field Blank | Lab Blank | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|
| Zinc, Total (µg/L) | Water | 45 | Physis E-8014 W | | 0.5 | | | |
| Zinc, Total (µg/L) | Water | 47 | Physis E-8042 W | | 1.06 | | | |
| Zinc, Total (µg/L) | Water | 48 | Physis E-8055 W | | 0.26 | | | |
| Zinc, Total (µg/L) | Water | 48 | Physis E-8059 W | | 0.13 | | FD RPD | FieldDup RPD Failed |

**Table 2. Precision QA/QC Issues**

| Constituent | Matrix | Event | Lab Batch | Site | BS/ BSD RPD | Field Dup RPD | Lab Dup RPD | MS/ MSD RPD | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **General Water Quality** | | | | | | | | | | |
| Clay, <0.0039 mm (%) | Sediment | 44 | IIRMES_GC-02-129_S_GS | 01_BPT_14 | | ***52*** | | | FD RPD | FieldDup RPD Failed |
| Dissolved Organic Carbon (mg/L) | Water | 44 | Associated_QC 1148873 | 01_BPT_14 | | ***34*** | | | | |
| Sand, 0.0625 to <2.0 mm (%) | Sediment | 44 | IIRMES_GC-02-129_S_GS | 01_BPT_14 | | ***44*** | | | FD RPD | FieldDup RPD Failed |
| Total Hardness (calc) (mg/L) | Water | 45 | Physis E-8014 W | 01T_ODD2_DCH | | 6 | 1 | ***111*** | MS <LL, EST MS/MSD | MS failed lower limit, Estimate due to RPD failure between MS/MSD |
| Total Organic Carbon, Total (% Dry Weight) | Sediment | 44 | IIRMES_GC-02-128_S_TOC | 07_HITCH | | | ***100*** | | LD RPD | LabDuplicate RPD Failed |
| Total Organic Carbon, Total (% Dry Weight) | Sediment | 44 | IIRMES_GC-02-130_S_TOC | 01_BPT_14 | | ***84*** | | | FD RPD | FieldDup RPD Failed |
| Total Suspended Solids (mg/L) | Water | 44 | Physis C-17036 W | 07T_DC_H | | | ***36*** | | LD RPD | LabDuplicate RPD Failed |

| Constituent | Matrix | Event | Lab Batch | Site | BS/ BSD RPD | Field Dup RPD | Lab Dup RPD | MS/ MSD RPD | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Suspended Solids (mg/L) | Water | 45 | Physis C-17055 W | 01_BPT_15 | | ***76*** | 22 | | FD RPD | FieldDup RPD Failed |
| Total Suspended Solids (mg/L) | Water | 48 | Physis C-17087 W | 01_BPT_3 | | ***42*** | | | FD RPD | FieldDup RPD Failed |
| Lipid (% Dry Weight) | Tissue | 49 | Physis C-22113 W | 03_UNIV | | | ***32*** | | LD RPD | LabDuplicate RPD Failed |
| **Nutrients** | | | | | | | | | | |
| Ammonia as N (mg/L) | Water | 44 | Physis C-18032 W | 03_UNIV | | ***40*** | | | | |
| Nitrite as N (mg/L) | Water | 46 | Physis C-21138 W | 04_WOOD | | 0 | ***40*** | 0 | | |
| OrthoPhosphate as P (mg/L) | Water | 44 | Physis C-21066 W | 03_UNIV | | | | ***31*** | | |
| Total Kjeldahl Nitrogen (mg/L) | Water | 44 | Associated_QC 1148898_W_CON | 10_GATE | | ***179*** | | | FD RPD | FieldDup RPD Failed |
| Total Kjeldahl Nitrogen (mg/L) | Water | 45 | Associated_QC 1151124_W_CON | 07_HITCH | | ***168*** | | | FD RPD | FieldDup RPD Failed |
| **OC Pesticides** | | | | | | | | | | |
| Chlordane, alpha- (ng/dry g) | Sediment | 44 | Physis O-6068 W | 9B_ADOLF | | | ***90*** | 8 | | |
| Chlordane, alpha- (ng/dry g) | Tissue | 49 | Physis O-7130 W | 01_Western_Arm | 14 | | ***89*** | | | |
| Chlordane, gamma- (ng/dry g) | Sediment | 44 | Physis O-6068 W | 9B_ADOLF | | | ***71*** | 7 | | |
| DDD(o,p') (ng/dry g) | Sediment | 44 | Physis O-6088 W | 01_BPT_14 | | 9.5 | ***40*** | 14 | | |
| DDD(p,p') (ng/dry g) | Sediment | 44 | Physis O-6088 W | 01_BPT_14 | | ***34*** | ***83*** | 17 | | |
| DDE(o,p'), Total (µg/L) | Water | 46 | Physis O-7016 W | 04_WOOD | | ***36*** | | | FD RPD | FieldDup RPD Failed |

| Constituent | Matrix | Event | Lab Batch | Site | BS/ BSD RPD | Field Dup RPD | Lab Dup RPD | MS/ MSD RPD | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| DDE(o,p'), Total (µg/L) | Water | 47 | Physis O-7042 W | 03_UNIV | | ***53*** | | | H | Holdtime exceeded |
| DDE(p,p') (ng/dry g) | Sediment | 44 | Physis O-6068 W | 9B_ADOLF | | | ***88*** | 1 | LD RPD | LabDuplicate RPD Failed |
| DDE(p,p') (ng/dry g) | Sediment | 44 | Physis O-6072 W | 04_WOOD | | | ***186*** | 0 | LD RPD | LabDuplicate RPD Failed |
| DDE(p,p') (ng/dry g) | Tissue | 49 | Physis O-7132 W | 01_Western_Arm | 14 | | 13 | ***368*** | | |
| DDE(p,p') (ng/dry g) | Tissue | 49 | Physis O-7134 W | 01_Western_Arm | 2 | | 6 | ***93*** | | |
| DDE(p,p') (ng/dry g) | Tissue | 49 | Physis O-7148 W | 04_WOOD | 3 | | 23 | ***261*** | MS <LL, MS >UL, EST MS/MSD | MS failed lower limit, MS failed upper limit, Estimate due to RPD failure between MS/MSD |
| DDE(p,p'), Total (µg/L) | Water | 44 | Physis O-6066 W | 03_UNIV | | ***71*** | | | | |
| DDT(o,p') (ng/dry g) | Sediment | 44 | Physis O-6072 W | 04_WOOD | | | | ***32*** | | |
| DDT(o,p') (ng/dry g) | Tissue | 49 | Physis O-7130 W | 01_Western_Arm | 8 | | ***33*** | | | |
| DDT(o,p'), Total (µg/L) | Water | 46 | Physis O-7016 W | 04_WOOD | | ***58*** | | | FD RPD | FieldDup RPD Failed |
| DDT(p,p') (ng/dry g) | Sediment | 44 | Physis O-6068 W | 9B_ADOLF | | | ***118*** | ***31*** | LD RPD, MS <LL, EST MS/MSD | LabDuplicate RPD Failed, MS failed lower limit, Estimate due to RPD failure between MS/MSD |
| DDT(p,p') (ng/dry g) | Sediment | 44 | Physis O-6072 W | 04_WOOD | | | | ***45*** | | |
| DDT(p,p') (ng/dry g) | Sediment | 44 | Physis O-6072 W | 04_WOOD | | | ***69*** | | EST MS/MSD | Estimate due to MS/MSD RPD failed |
| DDT(p,p') (ng/dry g) | Sediment | 44 | Physis O-6088 W | 01_BPT_14 | | | | ***43*** | | |

| Constituent | Matrix | Event | Lab Batch | Site | BS/ BSD RPD | Field Dup RPD | Lab Dup RPD | MS/ MSD RPD | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| DDT(p,p') (ng/dry g) | Tissue | 49 | Physis O-7148 W | 04_WOOD | 4 | | 15 | ***31*** | MS >UL, EST MS/MSD | MS failed upper limit, Estimate due to RPD failure between MS/MSD |
| DDT(p,p'), Total (µg/L) | Water | 45 | Physis O-6150 W | 01T_ODD2_DCH | | ***48*** | | | | |
| DDT(p,p'), Total (µg/L) | Water | 46 | Physis O-7016 W | 04_WOOD | | ***53*** | | | FD RPD | FieldDup RPD Failed |
| DDT(p,p'), Total (µg/L) | Water | 48 | Physis O-7060 W | 04_WOOD | | ***86*** | | | | |
| Endosulfan I (ng/dry g) | Tissue | 49 | Physis O-7134 W | 01_Western_Arm | 11 | | 0 | ***53*** | BS <LL | BS failed lower limit |
| Endosulfan II (ng/dry g) | Water | 44 | Physis O-6068 W | LABQA | ***41*** | | | | EST BS/BSD | Estimate due to BS/BSD RPD failed |
| Endosulfan II (ng/dry g) | Tissue | 49 | Physis O-7132 W | 01_Western_Arm | 3 | | 0 | ***49*** | | |
| Endrin Aldehyde (ng/dry g) | Tissue | 49 | Physis O-7150 W | 03_UNIV | 17 | | 0 | ***48*** | EST MS/MSD | Estimate due to MS/MSD RPD failed |
| Hexachlorobenzene (ng/dry g) | Tissue | 49 | Physis O-7130 W | 01_Western_Arm | 18 | | ***31*** | | | |
| Hexachlorobenzene (ng/dry g) | Tissue | 49 | Physis O-7134 W | 01_Western_Arm | 7 | | ***32*** | 21 | | |
| Hexachlorobenzene, Total (µg/L) | Water | 47 | Physis O-7042 W | 03_UNIV | | ***38*** | | | H | Holdtime exceeded |
| Methoxychlor (ng/dry g) | Sediment | 44 | Physis O-6072 W | 04_WOOD | | | | ***39*** | | |
| Methoxychlor (ng/dry g) | Sediment | 44 | Physis O-6088 W | 01_BPT_14 | | | | ***60*** | | |
| Nonachlor, trans (ng/dry g) | Sediment | 44 | Physis O-6068 W | 9B_ADOLF | | | ***109*** | 5 | | |
| Tetrachloro-m-xylene-2,4,5,6 (Surrogate), Total (%) | Water | 47 | Physis O-7042 W | 03_UNIV | | ***32*** | | | H | Holdtime exceeded |

| Constituent | Matrix | Event | Lab Batch | Site | BS/ BSD RPD | Field Dup RPD | Lab Dup RPD | MS/ MSD RPD | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Toxaphene (ng/dry g) | Sediment | 44 | Physis O-6068 W | 9B_ADOLF | | | | ***35*** | | |
| Toxaphene (ng/dry g) | Sediment | 44 | Physis O-6072 W | 04_WOOD | | | | ***32*** | | |
| **PCBs** | | | | | | | | | | |
| PCB 049 (ng/dry g) | Tissue | 49 | Physis O-7130 W | 01_Western_Arm | 9 | | ***43*** | | | |
| PCB 095 (ng/dry g) | Sediment | 44 | Physis O-6088 W | 01_BPT_14 | | 0 | ***46*** | 12 | | |
| PCB 095 (ng/dry g) | Tissue | 49 | Physis O-7148 W | 04_WOOD | 3 | | ***32*** | 13 | | |
| PCB 101 (ng/dry g) | Sediment | 44 | Physis O-6088 W | 01_BPT_14 | | ***67*** | 16 | 11 | | |
| PCB 105 (µg/L) | Water | 46 | Physis O-7024 W | LABQA | ***36*** | | | | EST BS/BSD | Estimate due to BS/BSD RPD failed |
| PCB 105 (ng/dry g) | Tissue | 49 | Physis O-7130 W | 01_Western_Arm | 4 | | ***56*** | | | |
| PCB 110 (ng/dry g) | Sediment | 44 | Physis O-6088 W | 01_BPT_14 | | ***33*** | 7 | 16 | | |
| PCB 110 (ng/dry g) | Tissue | 49 | Physis O-7148 W | 04_WOOD | 3 | | ***34*** | 6 | | |
| PCB 112 (Surrogate), Total (%) | Water | 44 | Physis O-6066 W | 03_UNIV | | ***63*** | | | | |
| PCB 123 (ng/dry g) | Sediment | 44 | Physis O-6088 W | 01_BPT_14 | | 0 | ***79*** | 8 | | |
| PCB 126 (ng/dry g) | Tissue | 49 | Physis O-7134 W | 01_Western_Arm | 6 | | ***32*** | 1 | | |
| PCB 138 (ng/dry g) | Sediment | 44 | Physis O-6088 W | 01_BPT_14 | | 29 | ***115*** | 15 | LD RPD | LabDuplicate RPD Failed |
| PCB 149 (ng/dry g) | Sediment | 44 | Physis O-6088 W | 01_BPT_14 | | 12 | ***59*** | 11 | | |

| Constituent | Matrix | Event | Lab Batch | Site | BS/ BSD RPD | Field Dup RPD | Lab Dup RPD | MS/ MSD RPD | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| PCB 149 (ng/dry g) | Tissue | 49 | Physis O-7148 W | 04_WOOD | 4 | | ***41*** | 13 | | |
| PCB 151 (ng/dry g) | Sediment | 44 | Physis O-6088 W | 01_BPT_14 | | 0 | ***62*** | 11 | | |
| PCB 153 (ng/dry g) | Sediment | 44 | Physis O-6088 W | 01_BPT_14 | | 5 | ***89*** | 12 | | |
| PCB 153 (ng/dry g) | Tissue | 49 | Physis O-7132 W | 01_Western_Arm | 1 | | 16 | ***68*** | | |
| PCB 153, Total (µg/L) | Water | 47 | Physis O-7042 W | 03_UNIV | | ***67*** | | | H | Holdtime exceeded |
| PCB 156 (ng/dry g) | Tissue | 49 | Physis O-7132 W | 01_Western_Arm | 10 | | ***40*** | 6 | | |
| PCB 156 (ng/dry g) | Tissue | 49 | Physis O-7134 W | 01_Western_Arm | 5 | | ***75*** | 9 | | |
| PCB 158 (ng/dry g) | Tissue | 49 | Physis O-7130 W | 01_Western_Arm | 6 | | ***74*** | | | |
| PCB 167, Total (µg/L) | Water | 47 | Physis O-7042 W | LABQA | ***48*** | | | | EST BS/BSD | Estimate due to BS/BSD RPD failed |
| PCB 168/132 (ng/dry g) | Sediment | 44 | Physis O-6088 W | 01_BPT_14 | | 0 | ***62*** | 15 | | |
| PCB 170 (ng/dry g) | Sediment | 44 | Physis O-6088 W | 01_BPT_14 | | ***33*** | 13 | 7 | | |
| PCB 174 (ng/dry g) | Sediment | 44 | Physis O-6088 W | 01_BPT_14 | | 0 | ***62*** | 9 | | |
| PCB 177 (ng/dry g) | Sediment | 44 | Physis O-6088 W | 01_BPT_14 | | 0 | ***46*** | 10 | | |
| PCB 177 (ng/dry g) | Tissue | 49 | Physis O-7130 W | 01_Western_Arm | 6 | | ***34*** | | | |
| PCB 180 (ng/dry g) | Sediment | 44 | Physis O-6088 W | 01_BPT_14 | | 26 | ***70*** | 9 | | |
| PCB 183 (ng/dry g) | Tissue | 49 | Physis O-7130 W | 01_Western_Arm | 20 | | ***44*** | | | |
| PCB 187 (ng/dry g) | Sediment | 44 | Physis O-6088 W | 01_BPT_14 | | 0 | ***71*** | 8 | | |

| Constituent | Matrix | Event | Lab Batch | Site | BS/ BSD RPD | Field Dup RPD | Lab Dup RPD | MS/ MSD RPD | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| PCB 187 (ng/dry g) | Tissue | 49 | Physis O-7132 W | 01_Western_Arm | 8 | | 14 | ***48*** | | |
| PCB 194 (ng/dry g) | Tissue | 49 | Physis O-7132 W | 01_Western_Arm | 7 | | ***37*** | 7 | | |
| PCB 195 (ng/dry g) | Tissue | 49 | Physis O-7130 W | 01_Western_Arm | 24 | | ***62*** | | | |
| PCB 198 (Surrogate), Total (%) | Water | 44 | Physis O-6066 W | 03_UNIV | | ***65*** | | | | |
| PCB 206 (ng/dry g) | Tissue | 49 | Physis O-7132 W | 01_Western_Arm | 5 | | 0 | ***38*** | | |
| PCB 209 (ng/dry g) | Tissue | 49 | Physis O-7132 W | 01_Western_Arm | 16 | | 0 | ***40*** | | |
| PCB 209, Total (µg/L) | Water | 46 | Physis O-7016 W | LABQA | ***42*** | | | | EST BS/BSD | Estimate due to BS/BSD RPD failed |
| PCB AROCLOR 1254 (ng/dry g) | Sediment | 44 | Physis O-6088 W | 01_BPT_14 | | ***57*** | ***89*** | | LD RPD | LabDuplicate RPD Failed |
| **OP Pesticides** | | | | | | | | | | |
| Azinphos methyl (Guthion) (µg/L) | Water | 44 | W4H0315 | 10D_HILL | ***33*** | | | | | |
| Chlorpyrifos (ng/dry g) | Water | 49 | Physis O-7132 W | LABQA | ***31*** | | | | BS <LL, EST BS/BSD | BS failed lower limit, Estimate due to BS/BSD RPD failed |
| Chlorpyrifos (ng/dry g) | Sediment | 44 | Physis O-6072 W | 04_WOOD | | | ***32*** | 6 | | |
| Chlorpyrifos, Total (µg/L) | Water | 45 | Physis O-6150 W | 01T_ODD2_DCH | | ***34*** | | | FD RPD | FieldDup RPD Failed |
| Demeton-s (ng/dry g) | Water | 44 | Physis O-6072 W | LABQA | ***32*** | | | | EST BS/BSD | Estimate due to BS/BSD RPD failed |
| Demeton-s, Total (µg/L) | Water | 45 | Physis O-6144 W | 07D_SIMI | ***45*** | | | | EST BS/BSD | Estimate due to BS/BSD RPD failed |
| Diazinon (µg/L) | Water | 44 | W4H0315 | 10D_HILL | ***29*** | | | | | |
| Diazinon (µg/L) | Water | 49 | W5E1199 | 10D_HILL | | | | ***31*** | | |

| Constituent | Matrix | Event | Lab Batch | Site | BS/ BSD RPD | Field Dup RPD | Lab Dup RPD | MS/ MSD RPD | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Diazinon, Total (µg/L) | Water | 46 | Physis O-7016 W | 04_WOOD | | ***31*** | | | FD RPD | FieldDup RPD Failed |
| Dimethoate (ng/dry g) | Sediment | 44 | Physis O-6072 W | 04_WOOD | | | | ***31*** | | |
| Dimethoate, Total (µg/L) | Water | 47 | Physis O-7046 W | LABQA | ***78*** | | | | EST BS/BSD | Estimate due to BS/BSD RPD failed |
| Disulfoton (ng/dry g) | Water | 44 | Physis O-6072 W | LABQA | ***31*** | | | | EST BS/BSD | Estimate due to BS/BSD RPD failed |
| Disulfoton (ng/dry g) | Sediment | 44 | Physis O-6072 W | 04_WOOD | | | | ***40*** | EST BS/BSD | Estimate due to BS/BSD RPD failed |
| Disulfoton, Total (µg/L) | Water | 45 | Physis O-6144 W | 07D_SIMI | ***51*** | | | | EST BS/BSD | Estimate due to BS/BSD RPD failed |
| Ethoprop (µg/L) | Water | 44 | W4H0315 | 10D_HILL | ***27*** | | | | | |
| Ethyl parathion (µg/L) | Water | 45 | W4K0927 | 10D_HILL | | | | ***36*** | | |
| Malathion, Total (µg/L) | Water | 49 | Physis O-7098 W | 01T_ODD2_DC H | | ***48*** | | | | |
| Mevinphos, Total (µg/L) | Water | 44 | Physis O-6082 W | LABQA | ***62*** | | | | BS <LL, EST BS/BSD | BS failed lower limit, Estimate due to BS/BSD RPD failed |
| Perylene-d12 (µg/L) | Water | 49 | W5E1327 | 10D_HILL | ***56*** | | | | | |
| Triphenyl phosphate (µg/L) | Water | 49 | W5E1327 | 10D_HILL | ***53*** | | | | | |
| **PAHs** | | | | | | | | | | |
| None | | | | | | | | | | |
| **Pyrethroid Pesticides** | | | | | | | | | | |
| Bifenthrin, Total (µg/L) | Water | 44 | Physis O-6066 W | 03_UNIV | | ***67*** | | | | |
| Bifenthrin, Total (µg/L) | Water | 48 | Physis O-7060 W | 04_WOOD | | ***167*** | | | FD RPD | FieldDup RPD Failed |

| Constituent | Matrix | Event | Lab Batch | Site | BS/ BSD RPD | Field Dup RPD | Lab Dup RPD | MS/ MSD RPD | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Cyfluthrin, Total (µg/L) | Water | 46 | Physis O-7016 W | 04_WOOD | | ***187*** | | | FD RPD | FieldDup RPD Failed |
| Esfenvalerate, Total (µg/L) | Water | 47 | Physis O-7042 W | 03_UNIV | | ***118*** | | | FD RPD | FieldDup RPD Failed |
| Fenvalerate, Total (µg/L) | Water | 47 | Physis O-7042 W | 03_UNIV | | ***86*** | | | | |
| L-Cyhalothrin, Total (µg/L) | Water | 46 | Physis O-7016 W | 04_WOOD | | ***160*** | | | FD RPD | FieldDup RPD Failed |
| L-Cyhalothrin, Total (µg/L) | Water | 49 | Physis O-7098 W | 9B_ADOLF | | ***35*** | | | | |
| Permethrin, cis-, Total (µg/L) | Water | 44 | Physis O-6066 W | LABQA | ***76*** | | | | BS <LL, EST BS/BSD | BS failed lower limit, Estimate due to BS/BSD RPD failed |
| Permethrin, cis-, Total (µg/L) | Water | 48 | Physis O-7056 W | LABQA | ***46*** | | | | | |
| Permethrin, cis-, Total (µg/L) | Water | 46 | Physis O-7016 W | 04_WOOD | | ***184*** | | | FD RPD | FieldDup RPD Failed |
| Permethrin, trans- (µg/L) | Water | 44 | Physis O-6066 W | LABQA | ***39*** | | | | EST BS/BSD | Estimate due to BS/BSD RPD failed |
| Permethrin, trans-, Total (µg/L) | Water | 44 | Physis O-6066 W | LABQA | ***39*** | | | | EST BS/BSD | Estimate due to BS/BSD RPD failed |
| Permethrin, trans-, Total (µg/L) | Water | 46 | Physis O-7016 W | 04_WOOD | | ***187*** | | | FD RPD | FieldDup RPD Failed |
| **Metals and Selenium** | | | | | | | | | | |
| Aluminum, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | 01T_ODD2_DC H | | ***70*** | 20 | 3 | | |
| Aluminum, Dissolved (µg/L) | Water | 45 | Physis E-8016 W | 01_BPT_14 | | | ***70*** | | | |
| Aluminum, Dissolved (µg/L) | Water | 47 | Physis E-8042 W | 01T_ODD2_DC H | | | ***146*** | 1 | LD RPD | LabDuplicate RPD Failed |
| Aluminum, Dissolved (µg/L) | Water | 47 | Physis E-8042 W | 03_UNIV | | ***36*** | | | LD RPD | LabDuplicate RPD Failed |

| Constituent | Matrix | Event | Lab Batch | Site | BS/ BSD RPD | Field Dup RPD | Lab Dup RPD | MS/ MSD RPD | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum, Dissolved (µg/L) | Water | 49 | Physis E-8083 W | 01T_ODD2_DC H | | ***46*** | 23 | 9 | | |
| Aluminum, Total (µg/L) | Water | 48 | Physis E-8059 W | 01_BPT_3 | | ***34*** | | | FD RPD | FieldDup RPD Failed |
| Antimony, Dissolved (µg/L) | Water | 47 | Physis E-8042 W | 03_UNIV | | **33** | | | FD RPD | FieldDup RPD Failed |
| Arsenic, Dissolved (µg/L) | Water | 49 | Physis E-8083 W | 01T_ODD2_DC H | | **32** | 9 | 2 | FD RPD | FieldDup RPD Failed |
| Cadmium, Dissolved (µg/L) | Water | 46 | Physis E-8027 W | 04_WOOD | | **41** | **39** | 1 | LD RPD, FD RPD | LabDuplicate RPD Failed, FieldDuplicate RPD Failed |
| Chromium, Dissolved (µg/L) | Water | 46 | Physis E-8029 W | 01_RR_BR | | | **49** | | LD RPD | LabDuplicate RPD Failed |
| Chromium, Dissolved (µg/L) | Water | 48 | Physis E-8059 W | 01_BPT_3 | | **131** | | | FD RPD | FieldDup RPD Failed |
| Cobalt, Dissolved (µg/L) | Water | 46 | Physis E-8027 W | 04_WOOD | | **37** | 6 | 0 | FD RPD | FieldDup RPD Failed |
| Cobalt, Total (µg/L) | Water | 49 | Physis E-8083 W | 01T_ODD2_DC H | | **65** | **45** | | LD RPD, U, FD RPD | LabDuplicate RPD Failed, Upper Limit due to analyte found in blank, FieldDuplicate RPD Failed |
| Copper, Dissolved (µg/L) | Water | 44 | Physis E-7137 W | 01_BPT_14 | | 15 | **36** | | LD RPD | LabDuplicate RPD Failed |
| Copper, Dissolved (µg/L) | Water | 45 | Physis E-8016 W | 01_BPT_14 | | | **80** | | LD RPD | LabDuplicate RPD Failed |
| Copper, Dissolved (µg/L) | Water | 46 | Physis E-8029 W | 01_RR_BR | | | **35** | | LD RPD | LabDuplicate RPD Failed |
| Copper, Dissolved (µg/L) | Water | 48 | Physis E-8059 W | 01_BPT_14 | | | **188** | | LD RPD, FD RPD | LabDuplicate RPD Failed, FieldDuplicate RPD Failed |

| Constituent | Matrix | Event | Lab Batch | Site | BS/ BSD RPD | Field Dup RPD | Lab Dup RPD | MS/ MSD RPD | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Copper, Dissolved (µg/L) | Water | 48 | Physis E-8059 W | 01_BPT_3 | | **181** | | | LD RPD, FD RPD | LabDuplicate RPD Failed, FieldDuplicate RPD Failed |
| Copper, Total (µg/L) | Water | 48 | Physis E-8059 W | 01_BPT_14 | | | **61** | | LD RPD, FD RPD | LabDuplicate RPD Failed, FieldDuplicate RPD Failed |
| Copper, Total (µg/L) | Water | 48 | Physis E-8059 W | 01_BPT_3 | | **34** | | | LD RPD, FD RPD | LabDuplicate RPD Failed, FieldDuplicate RPD Failed |
| Copper, Total (µg/L) | Water | 49 | Physis E-8082 W | 01_BPT_6 | | **36** | 27 | | FD RPD | FieldDup RPD Failed |
| Iron, Total (µg/L) | Water | 48 | Physis E-8059 W | 01_BPT_3 | | ***55*** | | | FD RPD | FieldDup RPD Failed |
| Lead, Dissolved (µg/L) | Water | 44 | Physis E-7132 W | 01T_ODD2_DCH | | | ***55*** | | LD RPD, U, FD RPD | LabDuplicate RPD Failed, Upper Limit due to analyte found in blank, FieldDuplicate RPD Failed |
| Lead, Dissolved (µg/L) | Water | 44 | Physis E-7132 W | 03_UNIV | | ***44*** | ***34*** | | LD RPD, U, FD RPD | LabDuplicate RPD Failed, Upper Limit due to analyte found in blank, FieldDuplicate RPD Failed |
| Lead, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | 01T_ODD2_DCH | | ***55*** | 24 | | LD RPD, U, FD RPD | LabDuplicate RPD Failed, Upper Limit due to analyte found in blank, FieldDuplicate RPD Failed |

| Constituent | Matrix | Event | Lab Batch | Site | BS/ BSD RPD | Field Dup RPD | Lab Dup RPD | MS/ MSD RPD | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Lead, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | 04D_VENTURA | | | ***56*** | | LD RPD, U, FD RPD | LabDuplicate RPD Failed, Upper Limit due to analyte found in blank, FieldDuplicate RPD Failed |
| Lead, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | 9AD_CAMA | | | ***43*** | | LD RPD, U, FD RPD | LabDuplicate RPD Failed, Upper Limit due to analyte found in blank, FieldDuplicate RPD Failed |
| Lead, Dissolved (µg/L) | Water | 45 | Physis E-8016 W | 01_BPT_14 | | | ***126*** | | LD RPD | LabDuplicate RPD Failed |
| Lead, Dissolved (µg/L) | Water | 46 | Physis E-8027 W | 04_WOOD | | ***141*** | 0 | 0 | FD RPD | FieldDup RPD Failed |
| Lead, Dissolved (µg/L) | Water | 47 | Physis E-8042 W | 01T_ODD2_DC H | | | ***157*** | 1 | LD RPD, FD RPD | LabDuplicate RPD Failed, FieldDuplicate RPD Failed |
| Lead, Dissolved (µg/L) | Water | 47 | Physis E-8042 W | 03_UNIV | | ***125*** | | | LD RPD, FD RPD | LabDuplicate RPD Failed, FieldDuplicate RPD Failed |
| Lead, Dissolved (µg/L) | Water | 48 | Physis E-8059 W | 01_BPT_14 | | | ***107*** | | LD RPD, U, FD RPD | LabDuplicate RPD Failed, Upper Limit due to analyte found in blank, FieldDuplicate RPD Failed |
| Lead, Dissolved (µg/L) | Water | 48 | Physis E-8059 W | 01_BPT_3 | | ***108*** | | | LD RPD, U, FD RPD | LabDuplicate RPD Failed, Upper Limit due to analyte found in blank, FieldDuplicate RPD Failed |

| Constituent | Matrix | Event | Lab Batch | Site | BS/ BSD RPD | Field Dup RPD | Lab Dup RPD | MS/ MSD RPD | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Lead, Dissolved (µg/L) | Water | 49 | Physis E-8082 W | 01_BPT_6 | | | ***104*** | | | |
| Lead, Dissolved (µg/L) | Water | 49 | Physis E-8083 W | 01T_ODD2_DCH | | ***35*** | 13 | | U | Upper Limit due to analyte found in blank |
| Lead, Total (µg/L) | Water | 44 | Physis E-7132 W | 01T_ODD2_DCH | | | ***71*** | | LD RPD, U, FD RPD | LabDuplicate RPD Failed, Upper Limit due to analyte found in blank, FieldDuplicate RPD Failed |
| Lead, Total (µg/L) | Water | 44 | Physis E-7132 W | 03_UNIV | | ***40*** | ***60*** | | LD RPD, U, FD RPD | LabDuplicate RPD Failed, Upper Limit due to analyte found in blank, FieldDuplicate RPD Failed |
| Lead, Total (µg/L) | Water | 45 | Physis E-8014 W | 9AD_CAMA | | | ***57*** | | LD RPD, U | LabDuplicate RPD Failed, Upper Limit due to analyte found in blank |
| Lead, Total (µg/L) | Water | 48 | Physis E-8059 W | 01_BPT_3 | | ***121*** | | | FD RPD | FieldDup RPD Failed |
| Lead, Total (µg/L) | Water | 49 | Physis E-8082 W | 01_BPT_6 | | ***54*** | 7.5 | | FD RPD | FieldDup RPD Failed |
| Manganese, Dissolved (µg/L) | Water | 46 | Physis E-8027 W | 04_WOOD | | ***108*** | 0 | 1 | FD RPD | FieldDup RPD Failed |
| Manganese, Dissolved (µg/L) | Water | 48 | Physis E-8059 W | 01_BPT_3 | | ***104*** | | | FD RPD | FieldDup RPD Failed |
| Selenium, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | 9AD_CAMA | | | ***47*** | | LD RPD | LabDuplicate RPD Failed |
| Selenium, Dissolved (µg/L) | Water | 45 | Physis E-8016 W | 01_BPT_14 | | | ***162*** | | LD RPD | LabDuplicate RPD Failed |
| Selenium, Dissolved (µg/L) | Water | 48 | Physis E-8059 W | 01_BPT_14 | | | ***31*** | | U | Upper Limit due to analyte found in blank |

| Constituent | Matrix | Event | Lab Batch | Site | BS/ BSD RPD | Field Dup RPD | Lab Dup RPD | MS/ MSD RPD | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Selenium, Dissolved (µg/L) | Water | 49 | Physis E-8082 W | 01_BPT_6 | | 0 | ***43*** | | | |
| Selenium, Total (µg/L) | Water | 45 | Physis E-8016 W | 01_BPT_14 | | | ***108*** | | LD RPD | LabDuplicate RPD Failed |
| Selenium, Total (µg/L) | Water | 48 | Physis E-8059 W | 01_BPT_3 | | ***60*** | | | | |
| Silver, Dissolved (µg/L) | Water | 44 | Physis E-7137 W | 01_BPT_14 | | ***36*** | 29 | | FD RPD | FieldDup RPD Failed |
| Silver, Dissolved (µg/L) | Water | 45 | Physis E-8016 W | 01_BPT_14 | | | ***50*** | | LD RPD, U | LabDuplicate RPD Failed, Upper Limit due to analyte found in blank |
| Silver, Total (µg/L) | Water | 45 | Physis E-8014 W | 9AD_CAMA | | | ***67*** | | | |
| Strontium, Dissolved (µg/L) | Water | 44 | Physis E-7132 W | 01T_ODD2_DC H | | | | ***69*** | | |
| Strontium, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | 01T_ODD2_DC H | | 0 | 1 | ***39*** | MS >UL, EST MS/MSD | MS failed upper limit, Estimate due to RPD failure between MS/MSD |
| Strontium, Dissolved (µg/L) | Water | 49 | Physis E-8083 W | 01T_ODD2_DC H | | 1 | 1 | ***39*** | MS <LL, MS >UL, EST MS/MSD | MS failed lower limit, MS failed upper limit, Estimate due to RPD failure between MS/MSD |
| Thallium, Dissolved (µg/L) | Water | 44 | Physis E-7132 W | 03_UNIV | | ***40*** | ***40*** | 1 | | |
| Thallium, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | 01T_ODD2_DC H | | ***86*** | 22 | | U | Upper Limit due to analyte found in blank |
| Thallium, Dissolved (µg/L) | Water | 46 | Physis E-8027 W | 04_WOOD | | ***80*** | 29 | | U | Upper Limit due to analyte found in blank |
| Thallium, Dissolved (µg/L) | Water | 49 | Physis E-8083 W | 04D_VENTURA | | | ***67*** | 0 | | |

| Constituent | Matrix | Event | Lab Batch | Site | BS/ BSD RPD | Field Dup RPD | Lab Dup RPD | MS/ MSD RPD | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Thallium, Total (µg/L) | Water | 44 | Physis E-7132 W | 03_UNIV | | ***67*** | 0 | | | |
| Thallium, Total (µg/L) | Water | 45 | Physis E-8014 W | 01T_ODD2_DC H | | ***40*** | 0 | | U | Upper Limit due to analyte found in blank |
| Thallium, Total (µg/L) | Water | 45 | Physis E-8014 W | 9AD_CAMA | | | ***40*** | | U | Upper Limit due to analyte found in blank |
| Tin, Total (µg/L) | Water | 44 | Physis E-7137 W | 01_BPT_14 | | ***34*** | | | | |
| Tin, Total (µg/L) | Water | 46 | Physis E-8027 W | 04_WOOD | | 13 | ***48*** | | | |
| Tin, Total (µg/L) | Water | 47 | Physis E-8042 W | 03_UNIV | | ***133*** | | | | |
| Titanium, Dissolved (µg/L) | Water | 49 | Physis E-8083 W | 01T_ODD2_DC H | | 8 | 2 | ***35*** | MS <LL, EST MS/MSD | MS failed lower limit, Estimate due to RPD failure between MS/MSD |
| Zinc, Dissolved (µg/L) | Water | 44 | Physis E-7137 W | 01_BPT_14 | | ***92*** | 17 | | FD RPD | FieldDup RPD Failed |
| Zinc, Dissolved (µg/L) | Water | 46 | Physis E-8027 W | 04_WOOD | | ***47*** | 5 | 2 | FD RPD | FieldDup RPD Failed |
| Zinc, Dissolved (µg/L) | Water | 47 | Physis E-8042 W | 03_UNIV | | ***63*** | | | U, FD RPD | Upper Limit due to analyte found in blank, FieldDup RPD Failed |
| Zinc, Dissolved (µg/L) | Water | 48 | Physis E-8059 W | 01_BPT_3 | | ***65*** | | | U, FD RPD | Upper Limit due to analyte found in blank, FieldDup RPD Failed |
| Zinc, Dissolved (µg/L) | Water | 49 | Physis E-8082 W | 01_BPT_6 | | ***33*** | 24 | | FD RPD | FieldDup RPD Failed |
| Zinc, Total (µg/L) | Water | 44 | Physis E-7137 W | 01_BPT_14 | | ***33*** | 22 | | FD RPD | FieldDup RPD Failed |

| Constituent | Matrix | Event | Lab Batch | Site | BS/ BSD RPD | Field Dup RPD | Lab Dup RPD | MS/ MSD RPD | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Zinc, Total (µg/L) | Water | 48 | Physis E-8059 W | 01_BPT_3 | | ***46*** | | | U, FD RPD | Upper Limit due to analyte found in blank, FieldDup RPD Failed |
| Zinc, Total (µg/L) | Water | 49 | Physis E-8082 W | 01_BPT_6 | | ***62*** | 9 | | FD RPD | FieldDup RPD Failed |

BS/BSD = Blank Spike/Blank Spike Duplicate
MS/MSD = Matrix Spike/Matrix Spike Duplicate
RPD = Relative Percent Difference

**Table 3. Accuracy QA/QC Issues**

| Constituent | Matrix | Event | Lab Batch | LCL | UCL | LCS %Rec. | LCSD %Rec. | MS %Rec. | MSD %Rec. | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **General Water Quality** | | | | | | | | | | | |
| Total Hardness (calc) (mg/L) | Water | 45 | Physis E-8014 W | 70 | 130 | | | ***14*** | ***4*** | MS <LL, EST MS/MSD | MS failed lower limit, Estimate due to RPD failure between MS/MSD |
| **Nutrients** | | | | | | | | | | | |
| Ammonia as N (mg/dry kg) | Sediment | 44 | Physis C-18033 W | 70 | 130 | | | ***131*** | 128 | | |
| Ammonia as N (mg/dry kg) | Sediment | 44 | Physis C-18037 W | 70 | 130 | | | ***137*** | ***131*** | | |
| Total Kjeldahl Nitrogen (mg/L) | Water | 45 | Associated_QC1 151080_W_CON | 80 | 120 | | | ***320*** | ***310*** | MS >UL | MS failed upper limit |
| Total Kjeldahl Nitrogen (mg/L) | Water | 46 | Associated_QC1 151859_W_CON | 80 | 120 | | | ***69*** | 83 | MS <LL | MS failed lower limit |
| **OC Pesticides** | | | | | | | | | | | |
| DDE(p,p') (ng/dry g) | Tissue | 49 | Physis O-7130 W | 50 | 150 | | | ***194*** | | | |

| Constituent | Matrix | Event | Lab Batch | LCL | UCL | LCS %Rec. | LCSD %Rec. | MS %Rec. | MSD %Rec. | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DDE(p,p') (ng/dry g) | Tissue | 49 | Physis O-7132 W | 50 | 150 | | | ***-24*** | 81 | | |
| DDE(p,p') (ng/dry g) | Tissue | 49 | Physis O-7134 W | 50 | 150 | | | ***24*** | 66 | | |
| DDE(p,p') (ng/dry g) | Tissue | 49 | Physis O-7148 W | 50 | 150 | | | ***-12*** | ***942*** | MS <LL, MS >UL, EST MS/MSD | MS failed lower limit, MS failed upper limit, Estimate due to RPD failure between MS/MSD |
| DDT(o,p') (ng/dry g) | Sediment | 44 | Physis O-6088 W | 50 | 150 | | | 54 | ***47*** | | |
| DDT(p,p') (ng/dry g) | Sediment | 44 | Physis O-6068 W | 50 | 150 | | | 67 | ***49*** | LD RPD | LabDuplicate RPD Failed |
| DDT(p,p') (ng/dry g) | Sediment | 44 | Physis O-6088 W | 50 | 150 | | | ***48*** | ***31*** | | |
| DDT(p,p') (ng/dry g) | Tissue | 49 | Physis O-7148 W | 50 | 150 | | | ***159*** | ***218*** | MS >UL, EST MS/MSD | MS failed upper limit, Estimate due to RPD failure between MS/MSD |
| Endosulfan I (ng/dry g) | Water | 49 | Physis O-7130 W | 50 | 150 | ***14*** | ***16*** | | | BS <LL | BS failed lower limit |
| Endosulfan I (ng/dry g) | Water | 49 | Physis O-7132 W | 50 | 150 | ***14*** | ***17*** | | | BS <LL | BS failed lower limit |
| Endosulfan I (ng/dry g) | Water | 49 | Physis O-7134 W | 50 | 150 | ***18*** | ***20*** | | | BS <LL | BS failed lower limit |
| Endosulfan I (ng/dry g) | Tissue | 49 | Physis O-7134 W | 50 | 150 | | | ***46*** | 79 | BS <LL | BS failed lower limit |
| Endosulfan II (ng/dry g) | Water | 49 | Physis O-7130 W | 50 | 150 | ***33*** | ***32*** | | | BS <LL | BS failed lower limit |
| Endosulfan II (ng/dry g) | Water | 49 | Physis O-7134 W | 50 | 150 | ***34*** | ***40*** | | | BS <LL | BS failed lower limit |
| Endosulfan II (ng/dry g) | Tissue | 49 | Physis O-7132 W | 50 | 150 | | | ***34*** | 56 | | |

| Constituent | Matrix | Event | Lab Batch | LCL | UCL | LCS %Rec. | LCSD %Rec. | MS %Rec. | MSD %Rec. | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Endrin (ng/dry g) | Tissue | 49 | Physis O-7130 W | 25 | 125 | | | ***149*** | | | |
| Endrin (ng/dry g) | Tissue | 49 | Physis O-7134 W | 25 | 125 | | | 117 | ***127*** | | |
| Endrin, Total (µg/L) | Water | 47 | Physis O-7042 W | 25 | 125 | 125 | ***132*** | | | | |
| Methoxychlor (ng/dry g) | Sediment | 44 | Physis O-6088 W | 50 | 150 | | | 54 | ***29*** | | |
| **PCBs** | | | | | | | | | | | |
| PCB 149 (ng/dry g) | Tissue | 49 | Physis O-7132 W | 50 | 150 | | | ***47*** | ***39*** | | |
| PCB 149 (ng/dry g) | Tissue | 49 | Physis O-7134 W | 50 | 150 | | | 55 | ***43*** | | |
| PCB 153 (ng/dry g) | Tissue | 49 | Physis O-7132 W | 50 | 150 | | | 86 | ***175*** | | |
| PCB 194, Total (µg/L) | Water | 44 | Physis O-6066 W | 50 | 150 | ***163*** | 139 | | | | |
| PCB 209 (ng/dry g) | Tissue | 49 | Physis O-7134 W | 50 | 150 | | | ***48*** | ***39*** | | |
| **OP Pesticides** | | | | | | | | | | | |
| Azinphos methyl (Guthion) (µg/L) | Water | 45 | W4K0927 | 0.1 | 154 | | | 140 | ***167*** | | |
| Chlorpyrifos (ng/dry g) | Water | 49 | Physis O-7130 W | 50 | 150 | ***27*** | ***32*** | | | BS <LL | BS failed lower limit |
| Chlorpyrifos (ng/dry g) | Water | 49 | Physis O-7132 W | 50 | 150 | ***27*** | ***37*** | | | BS <LL, EST BS/BSD | BS failed lower limit, Estimate due to BS/BSD RPD failed |
| Diazinon (µg/L) | Water | 48 | W5B0473 | 36 | 153 | | | ***155*** | 141 | | |
| Ethoprop (µg/L) | Water | 44 | W4H0315 | 40 | 153 | 132 | ***173*** | | | | |
| Fensulfothion, Total (µg/L) | Water | 46 | Physis O-7016 W | 50 | 150 | 60 | ***45*** | | | BS <LL | BS failed lower limit |
| Malathion (ng/dry g) | Sediment | 44 | Physis O-6072 W | 50 | 150 | | | 142 | ***151*** | | |

| Constituent | Matrix | Event | Lab Batch | LCL | UCL | LCS %Rec. | LCSD %Rec. | MS %Rec. | MSD %Rec. | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mevinphos, Total (µg/L) | Water | 44 | Physis O-6082 W | 50 | 150 | ***29*** | 55 | | | BS <LL, EST BS/BSD | BS failed lower limit, Estimate due to BS/BSD RPD failed |
| Mevinphos, Total (µg/L) | Water | 47 | Physis O-7042 W | 50 | 150 | ***43*** | 56 | | | BS <LL | BS failed lower limit |
| Mevinphos, Total (µg/L) | Water | 48 | Physis O-7060 W | 50 | 150 | 51 | ***45*** | | | BS <LL | BS failed lower limit |
| Naled (µg/L) | Water | 45 | W4K0927 | 0.1 | 242 | | | ***248*** | 239 | | |
| Phorate, Total (µg/L) | Water | 49 | Physis O-7094 W | 50 | 150 | ***47*** | 50 | | | BS <LL | BS failed lower limit |
| Phosmet (µg/L) | Water | 44 | Physis O-6066 W | 50 | 150 | 54 | ***45*** | | | BS <LL | BS failed lower limit |
| Phosmet (ng/dry g) | Water | 44 | Physis O-6088 W | 50 | 150 | 51 | ***49*** | | | BS <LL | BS failed lower limit |
| Phosmet (ng/dry g) | Sediment | 44 | Physis O-6072 W | 50 | 150 | | | ***158*** | ***164*** | | |
| Phosmet, Total (µg/L) | Water | 44 | Physis O-6066 W | 50 | 150 | 54 | ***45*** | | | BS <LL | BS failed lower limit |
| Ronnel (µg/L) | Water | 48 | W5B0473 | 29 | 153 | | | ***156*** | 147 | | |
| Stirophos (µg/L) | Water | 45 | W4K0927 | 0.1 | 167 | | | 141 | ***183*** | | |
| Trichloronate (µg/L) | Water | 48 | W5B0473 | 40 | 150 | | | ***156*** | 146 | | |
| Triphenyl phosphate (µg/L) | Water | 45 | W4K0927 | 40 | 163 | | | 135 | ***166*** | | |
| **Pyrethroid Pesticides** | | | | | | | | | | | |
| Allethrin (µg/L) | Water | 45 | W4K0781 | 0.1 | 222 | | | ***227*** | ***261*** | | |
| Bifenthrin (ng/dry g) | Sediment | 44 | Physis O-6072 W | 50 | 150 | | | 150 | ***173*** | | |
| Cyfluthrin (µg/L) | Water | 49 | W5E1327 | 11 | 214 | | | ***325*** | ***352*** | | |

| Constituent | Matrix | Event | Lab Batch | LCL | UCL | LCS %Rec. | LCSD %Rec. | MS %Rec. | MSD %Rec. | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cypermethrin (µg/L) | Water | 49 | W5E1327 | 20 | 206 | | | ***289*** | ***320*** | | |
| Deltamethrin/Tralomethrin (µg/L) | Water | 49 | W5E1327 | 0.2 | 230 | | | ***243*** | ***269*** | | |
| Fenvalerate/Esfenvalerate (µg/L) | Water | 49 | W5E1327 | 32 | 193 | | | ***308*** | ***330*** | | |
| Pendimethalin (µg/L) | Water | 45 | W4K0781 | 8 | 203 | | | 197 | ***233*** | | |
| Pendimethalin (µg/L) | Water | 49 | W5E1327 | 8 | 203 | | | ***212*** | ***208*** | | |
| Permethrin (µg/L) | Water | 49 | W5E1327 | 37 | 209 | | | ***266*** | ***286*** | | |
| Permethrin, cis- (µg/L) | Water | 44 | Physis O-6066 W | 50 | 150 | ***37*** | 82 | | | BS <LL, EST BS/BSD | BS failed lower limit, Estimate due to BS/BSD RPD failed |
| Permethrin, cis- (ng/dry g) | Sediment | 44 | Physis O-6072 W | 50 | 150 | | | ***171*** | ***176*** | | |
| Permethrin, cis-, Total (µg/L) | Water | 46 | Physis O-7024 W | 50 | 150 | 57 | ***45*** | | | BS <LL | BS failed lower limit |
| Permethrin, trans-, Total (µg/L) | Water | 49 | Physis O-7094 W | 50 | 150 | ***162*** | 139 | | | | |
| Prallethrin (µg/L) | Water | 45 | W4K0781 | 11 | 247 | | | 229 | ***260*** | | |
| **Metals and Selenium** | | | | | | | | | | | |
| Iron, Dissolved (µg/L) | Water | 44 | Physis E-7132 W | 75 | 125 | | | ***137*** | 119 | | |
| Iron, Dissolved (µg/L) | Water | 48 | Physis E-8055 W | 80 | 120 | | | 119 | ***138*** | MS >UL | MS failed upper limit |
| Mercury, Dissolved (µg/L) | Water | 46 | Physis E-6102 W | 75 | 125 | | | ***133*** | ***133*** | MS >UL | MS failed upper limit |
| Silver, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | 75 | 125 | | | 78 | ***73*** | | |
| Strontium, Dissolved (µg/L) | Water | 44 | Physis E-7132 W | 75 | 125 | | | ***238*** | 116 | | |

| Constituent | Matrix | Event | Lab Batch | LCL | UCL | LCS %Rec. | LCSD %Rec. | MS %Rec. | MSD %Rec. | Program Qualifier | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Strontium, Dissolved (µg/L) | Water | 45 | Physis E-8014 W | 75 | 125 | | | ***372*** | ***250*** | MS >UL, EST MS/MSD | MS failed upper limit, Estimate due to RPD failure between MS/MSD |
| Strontium, Dissolved (µg/L) | Water | 46 | Physis E-8027 W | 75 | 125 | | | ***30*** | ***29*** | MS <LL | MS failed lower limit |
| Strontium, Dissolved (µg/L) | Water | 48 | Physis E-8055 W | 75 | 125 | | | ***263*** | ***330*** | MS >UL | MS failed upper limit |
| Strontium, Dissolved (µg/L) | Water | 48 | Physis E-8055 W | 75 | 125 | | | ***228*** | ***187*** | MS >UL | MS failed upper limit |
| Strontium, Dissolved (µg/L) | Water | 49 | Physis E-8083 W | 75 | 125 | | | ***34*** | ***46*** | MS <LL, MS >UL, EST MS/MSD | MS failed lower limit, MS failed upper limit, Estimate due to RPD failure between MS/MSD |
| Strontium, Dissolved (µg/L) | Water | 49 | Physis E-8083 W | 75 | 125 | | | ***327*** | ***221*** | MS <LL, MS >UL, EST MS/MSD | MS failed lower limit, MS failed upper limit, Estimate due to RPD failure between MS/MSD |
| Sumithrin (Phenothrin) (µg/L) | Water | 49 | W5E1327 | 12 | 247 | | | ***257*** | ***291*** | | |
| Titanium, Dissolved (µg/L) | Water | 44 | Physis E-7132 W | 75 | 125 | | | ***168*** | ***135*** | | |
| Titanium, Dissolved (µg/L) | Water | 49 | Physis E-8083 W | 75 | 125 | | | ***59*** | ***66*** | MS <LL, EST MS/MSD | MS failed lower limit, Estimate due to RPD failure between MS/MSD |

LCL = Lower Control Limit
UCL = Upper Control Limit
MS = Matrix Spike
MS = Matrix Spike Duplicate
LCS = Laboratory Control Spike
LCSD = Laboratory Control Spike Duplicate
%Rec = Percent Recovery

CALLEGUAS CREEK

Watershed Management Plan

A COOPERATIVE STRATEGY FOR
RESOURCE MANAGEMENT & PROTECTION

October 2, 2015

Electronic Submission: losangeles@waterboards.ca.gov

California Regional Water Quality Control Board, Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, California 90013
Attn: Dr. Celine Gallon

**Subject: Comments on the Staff Report and tentative Board Resolution for the 2014-2016 Triennial Review**

Dear Dr. Gallon:

The Stakeholders Implementing Total Maximum Daily Loads (TMDLs) in the Calleguas Creek Watershed (Stakeholders) appreciate the opportunity to provide comments on the California Regional Water Quality Control Board, Los Angeles's (Regional Board) 2014-2016 Triennial Review to consider and adopt a list of the highest priority issues regarding water quality standards for the Los Angeles Region (Triennial Review). In the Triennial Review the Regional Board determines and prioritizes potential revisions to the Water Quality Control Plan for the Los Angeles Region (Basin Plan).

The Stakeholders consist of agricultural, wastewater, and MS4s that are responsible parties to six effective TMDLs in the Calleguas Creek Watershed (CCW). Five cities (Camarillo, Thousand Oaks, Simi Valley, Moorpark, and Oxnard), unincorporated Ventura County, and the Ventura County Watershed Protection District are all MS4 permittees within the CCW that must comply with the TMDLs to comply with the NPDES MS4 permit for Ventura County (Ventura MS4 Order).

In March 2015, the Stakeholders submitted a comment letter on the Request for Data and Information on Water Quality Standards for the Triennial Review. In that letter, and as noted in Table 5 of the staff report, the Stakeholders requested two issues be prioritized for consideration in the Triennial Review: 1) TMDL reconsideration for a number of local TMDLs, and 2) the further development and incorporation of natural source exclusions to improve the accuracy of water quality standards.

Upon review of the Triennial Review Staff Report, the Stakeholders would like to provide further comments on the following issues:

**Comment #1**:

The Staff Report notes under Section 5, Potential Projects Identified by Staff, the update of ammonia objectives based on recommended criteria issued by the Environmental Protection Agency (EPA) in 2013. The Stakeholders encourage the Regional Board to focus the resources that would be allocated on this criteria review on other priorities. As the majority of wastewater treatment plants that discharge to inland surface waters in the Los Angeles Region have upgraded their treatment to remove ammonia, ammonia toxicity in most receiving waters has been reduced to such an extent that the Stakeholders do not feel that limited resources should be prioritized for the ammonia criteria review. Previously issued EPA criteria have not merited Basin Plan revisions. For example, the 2007 USEPA copper criteria has not been subject to the sort of assessment as is proposed for the ammonia criteria.

If the Regional Board moves forward with consideration of the criteria, a careful examination of its application in the waters of Southern California will be required. The revised ammonia criteria was structured around designating standards that are protective of freshwater mussels, which have been identified as the most sensitive aquatic life receptor. However, scientific literature has noted that freshwater mussels are, and likely have been, extirpated from the waters of Southern California[1]; Coney notes freshwater mussels are, "undoubtedly extirpated from all of Southern California"[2]. The USEPA criteria notes that "unionid mussel species are not prevalent in some waters, such as in the arid west." In the 2009 draft version of the USEPA criteria, EPA had proposed a mussels present and mussels absent criteria to acknowledge the lack of freshwater mussels in some waterbodies. While the 2013 criteria did not maintain this distinction, it will be critical for the Regional Board to consider deriving site-specific applications of the criteria. The 2013 USEPA criteria discusses the derivation of site-specific criteria and includes an appendix discussing the procedures for developing the criteria (Appendix N). Should the Regional Board pursue this evaluation, it should include consideration of developing site-specific criteria in accordance with Appendix N.

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[1] Howard,J.K., J.L.Furnish, J.B. Box, S. Jepsen. 2015. The decline of native freshwater mussels (Bivalvia: Unionoida) in California as determined from historical and current surveys. California Fish and Game 101 (1):8-23.

[2] Coney, C.C. 1993. Freshwater Mollusca of the Los Angeles River: past and present status and distribution. The biota of the Los Angeles River: an overview of the historical and present plant and animal life of the Los Angeles River drainage. C1-C22.

Recommendation:
Deprioritize the update of freshwater ammonia objectives based on the EPA's 2013 criteria and allocate those resources to other higher priority projects.

**Comments #2**:

While Table 7 of the Staff Report states that work on a high flow suspension in Ventura County was not highlighted as a priority by commenters, the Stakeholders have in previous opportunities voiced support for this concept, and still are in strong support of this work and feel that it is a high priority for the Triennial Review. As the State Water Resources Control Board (State Board) is currently developing a Statewide Bacteria Policy which will include consideration of high flow suspension, we encourage the Regional Board to include the Bacteria Policy as a State Board program it will support during this Triennial Review. This support could include moving forward from work already done on high flow suspension in Ventura County, with a goal of incorporating high flow suspensions consistent with the statewide policy.

Implementation of a high flow suspension will allow resources to be focused on protecting recreational beneficial uses where and when they actually occur as conditions during storm events are unsafe for recreation and compliance with objectives is temporarily unachievable.

Recommendation:
Prioritize support for the State Board's Statewide Bacteria Policy in this Triennial Review cycle, and conduct further work started on high flow suspension in Ventura County as part of that support.

**Comment #3**

The Stakeholders would like to thank the Regional Board for including TMDL support as a priority project during this Triennial Review period. The Stakeholders have previously submitted comments outlining needed modifications to a number of local TMDLs to improve their effectiveness and better align their requirements with the most recent scientific knowledge gained during their implementation. We look forward to working with you on these TMDL modifications.

Recommendation:
As a Triennial Review priority, ensure that Regional Board staff provide support to the TMDL program as needed to improve its effectiveness, including efforts such as the requested TMDL reconsiderations.

Thank you for your time and consideration of these comments. If you have questions, please contact me at (805) 388-5334 or lmcgovern@cityofcamarillo.org

Sincerely,

Lucia McGovern
Chair Stakeholders Implementing TMDLs in the Calleguas Creek Watershed

# county of ventura

**PUBLIC WORKS AGENCY**
**JEFF PRATT**
Agency Director

Central Services Department
**J. Tabin Cosio**, Director

Engineering Services Department
**Herbert L. Schwind**, Director

Transportation Department
**David L. Fleisch**, Director

Water & Sanitation Department
**Michaela Brown**, Director

Watershed Protection District
**Tully K. Clifford**, Director

June 27, 2016

Kangshi Wang, Ph.D.
California Regional Water Quality Control Board
Los Angeles Region
Standards & TMDL Unit
320 West 4th Street, Suite 200
Los Angeles, CA 90013
(213) 576-6780

**Subject: MALIBU CREEK AND LAGOON BACTERIA TMDL COMPLIANCE MONITORING FOR VENTURA COUNTY AND CITY OF THOUSAND OAKS**

Dear Dr. Wang:

The table below summarizes the results of the weekly monitoring effort required by the Malibu Creek and Lagoon Bacteria TMDL (TMDL) Compliance Monitoring Plan (CMP) for the month of May 2016. Sites were sampled weekly on Tuesdays (May 3, 10, 24 and 31), except for one instance when sites were sampled on Wednesday (May 18) due to staffing conflicts. Sites without results reported were not sampled due to insufficient flow and are labeled "Dry." Daily geomeans were calculated using results from the previous 30 days (actual sampling date marked with♦). Weeks with wet weather samples (collected less than 72 hours after a day with > 0.1" rain) use the previous non-rain single sample value to calculate the geomean. Half the detection limit was used for the purpose of calculating the daily geomean for sites with results reported as <20 MPN/100ml or for dry weather when no sample was taken.

Fecal coliform monitoring has been discontinued, as approved by the Los Angeles Regional Water Quality Control Board on October 31, 2014, in alignment with the Regional Board's removal of the fecal coliform objective for REC-1 freshwaters from the TMDL on June 7, 2012 and subsequent approval by the U.S. Environmental Protection Agency on July 2, 2014.

If you have any questions regarding this matter, please contact me at (805) 645-1382.

Sincerely,

Ewelina Mutkowska
County Stormwater Program Manager, Watershed Protection District

CC: Tully Clifford, Watershed Protection District
Paul Jorgensen, City of Thousand Oaks (via email)
Joe Bellomo, Willdan Associates (via email)
Kelly Fisher, City of Agoura Hills (via email)
Allen Ma, County of Los Angeles (via email)

**Table 1. Weekly sampling results**

| Location | Time | Date | [illegible] | | [illegible] |
|---|---|---|---|---|---|
| | | | | | [illegible] (235 MPN/[illegible]) |
| MCW-8b | — | 5/3/2016♦ | | | Dry |
| MCW-8b | — | 5/10/2016♦ | | | Dry |
| MCW-8b | — | 5/18/2016♦ | | | Dry |
| MCW-8b | — | 5/24/2016♦ | | | Dry |
| MCW-8b | — | 5/31/2016♦ | | | Dry |
| | | | | | |
| MCW-9 | — | 5/3/2016♦ | | | Dry |
| MCW-9 | — | 5/10/2016♦ | | | Dry |
| MCW-9 | — | 5/18/2016♦ | | | Dry |
| MCW-9 | — | 5/24/2016♦ | | | Dry |
| MCW-9 | — | 5/31/2016♦ | | | |
| | | | | | |
| MCW-12 | — | 5/3/2016♦ | | | Dry |
| MCW-12 | | 5/10/2016♦ | | | Dry |
| MCW-12 | | 5/18/2016♦ | | | Dry |
| MCW-12 | | 5/24/2016♦ | | | Dry |
| MCW-12 | | 5/31/2016♦ | | | |
| | | | | | |
| MCW-14b | 1025 | 5/3/2016♦ | | = | 300 |
| MCW-14b | 925 | 5/10/2016♦ | | = | 30 |
| MCW-14b | 940 | 5/18/2016♦ | | = | 300 |
| MCW-14b | 815 | 5/24/2016♦ | | = | 170 |
| MCW-14b | 850 | 5/31/2016♦ | | = | 90 |
| | | | | | |
| MCW-15c | 950 | 5/3/2016♦ | | = | 70 |
| MCW-15c | 850 | 5/10/2016♦ | | = | 20 |
| MCW-15c | 900 | 5/18/2016♦ | | = | 80 |
| MCW-15c | 740 | 5/24/2016♦ | | = | 40 |
| MCW-15c | 810 | 5/31/2016♦ | | = | 80 |
| | | | | | |
| MCW-17 | — | 5/3/2016♦ | | | Dry |
| MCW-17 | — | 5/10/2016♦ | | | Dry |
| MCW-17 | — | 5/18/2016♦ | | | Dry |
| MCW-17 | | 5/24/2016♦ | | | Dry |
| MCW-17 | | 5/31/2016♦ | | | Dry |
| | | | | | |
| MCW-18 | — | 5/3/2016♦ | | | Dry |
| MCW-18 | — | 5/10/2016♦ | | | Dry |
| MCW-18 | — | 5/18/2016♦ | | | Dry |
| MCW-18 | — | 5/24/2016♦ | | | Dry |
| MCW-18 | — | 5/31/2016♦ | | | Dry |

Notes:
* The RWQCB granted permission to replace site MCW-15b with site Special-05 (renamed MCW-15c) on August 11th, 2010.
♦ Date of sampling

**Table 2. Computation of daily geomean**

| Location | Time | Date | [illegible] | | [illegible] adjusted [illegible] [illegible] (MPN) | Geomean [illegible] (MPN) |
|---|---|---|---|---|---|---|
| MCW-8b | - | 5/1/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/2/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/3/2016* | Dry | < | 10 | 10 |
| MCW-8b | - | 5/4/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/5/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/6/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/7/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/8/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/9/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/10/2016* | Dry | < | 10 | 10 |
| MCW-8b | - | 5/11/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/12/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/13/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/14/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/15/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/16/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/17/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/18/2016* | Dry | < | 10 | 10 |
| MCW-8b | - | 5/19/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/20/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/21/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/22/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/23/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/24/2016* | Dry | < | 10 | 10 |
| MCW-8b | - | 5/25/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/26/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/27/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/28/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/29/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/30/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 5/31/2016* | Dry | < | 10 | 10 |
| MCW-9 | - | 5/1/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 5/2/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 5/3/2016* | Dry | < | 10 | 10 |
| MCW-9 | - | 5/4/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 5/5/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 5/6/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 5/7/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 5/8/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 5/9/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 5/10/2016* | Dry | < | 10 | 10 |
| MCW-9 | - | 5/11/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 5/12/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 5/13/2016 | Dry | < | 10 | 10 |

| [illegible] | [illegible] | [illegible] | [illegible] | | [illegible] NDA) [illegible] ([illegible] MPN) | [illegible] ([illegible] MPN) |
|---|---|---|---|---|---|---|
| MCW-9 | | 5/14/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 5/15/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 5/16/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 5/17/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 5/18/2016* | Dry | < | 10 | 10 |
| MCW-9 | | 5/19/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 5/20/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 5/21/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 5/22/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 5/23/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 5/24/2016* | Dry | < | 10 | 10 |
| MCW-9 | | 5/25/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 5/26/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 5/27/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 5/28/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 5/29/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 5/30/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 5/31/2016* | Dry | < | 10 | 10 |
| MCW-12 | | 5/1/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 5/2/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 5/3/2016* | Dry | < | 10 | 10 |
| MCW-12 | | 5/4/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 5/5/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 5/6/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 5/7/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 5/8/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 5/9/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 5/10/2016* | Dry | < | 10 | 10 |
| MCW-12 | | 5/11/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 5/12/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 5/13/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 5/14/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 5/15/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 5/16/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 5/17/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 5/18/2016* | Dry | < | 10 | 10 |
| MCW-12 | | 5/19/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 5/20/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 5/21/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 5/22/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 5/23/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 5/24/2016* | Dry | < | 10 | 10 |
| MCW-12 | | 5/25/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 5/26/2016 | Dry | < | 10 | 10 |

| Location | Time | Date | Rain | | [illegible] (CDs) [illegible] ([illegible]) | Geometric [illegible] ([illegible]) |
|---|---|---|---|---|---|---|
| MCW-12 | - | 5/27/2016 | Dry | < | 10 | 10 |
| MCW-12 | - | 5/28/2016 | Dry | < | 10 | 10 |
| MCW-12 | - | 5/29/2016 | Dry | < | 10 | 10 |
| MCW-12 | - | 5/30/2016 | Dry | < | 10 | 10 |
| MCW-12 | - | 5/31/2016 • | Dry | < | 10 | 10 |
| MCW-14b | 900 | 5/1/2016 | | = | 1,300 | 679 |
| MCW-14b | 900 | 5/2/2016 | | = | 1,300 | 701 |
| MCW-14b | 1025 | 5/3/2016 • | | = | 500 | 701 |
| MCW-14b | 1025 | 5/4/2016 | | = | 500 | 701 |
| MCW-14b | 1025 | 5/5/2016 | | = | 500 | 726 |
| MCW-14b | 1025 | 5/6/2016 | | = | 500 | 742 |
| MCW-14b | 1025 | 5/7/2016 | | = | 500 | 780 |
| MCW-14b | 1025 | 5/8/2016 | | = | 500 | 809 |
| MCW-14b | 1025 | 5/9/2016 | | = | 500 | 839 |
| MCW-14b | 925 | 5/10/2016 • | | = | 80 | 818 |
| MCW-14b | 925 | 5/11/2016 | | = | 80 | 797 |
| MCW-14b | 925 | 5/12/2016 | | = | 80 | 750 |
| MCW-14b | 925 | 5/13/2016 | | = | 80 | 706 |
| MCW-14b | 925 | 5/14/2016 | | = | 80 | 664 |
| MCW-14b | 925 | 5/15/2016 | | = | 80 | 625 |
| MCW-14b | 925 | 5/16/2016 | | = | 80 | 588 |
| MCW-14b | 925 | 5/17/2016 | | = | 80 | 553 |
| MCW-14b | 940 | 5/18/2016 • | | = | 300 | 543 |
| MCW-14b | 940 | 5/19/2016 | | = | 300 | 507 |
| MCW-14b | 940 | 5/20/2016 | | = | 300 | 473 |
| MCW-14b | 940 | 5/21/2016 | | = | 300 | 441 |
| MCW-14b | 940 | 5/22/2016 | | = | 300 | 412 |
| MCW-14b | 940 | 5/23/2016 | | = | 300 | 384 |
| MCW-14b | 815 | 5/24/2016 • | | = | 170 | 352 |
| MCW-14b | 815 | 5/25/2016 | | = | 170 | 322 |
| MCW-14b | 815 | 5/26/2016 | | = | 170 | 301 |
| MCW-14b | 815 | 5/27/2016 | | = | 170 | 281 |
| MCW-14b | 815 | 5/28/2016 | | = | 170 | 263 |
| MCW-14b | 815 | 5/29/2016 | | = | 170 | 246 |
| MCW-14b | 815 | 5/30/2016 | | = | 170 | 229 |
| MCW-14b | 850 | 5/31/2016 • | | = | 80 | 207 |
| MCW-15c | 900 | 5/1/2016 | | = | 500 | 391 |
| MCW-15c | 900 | 5/2/2016 | | = | 500 | 368 |
| MCW-15c | 950 | 5/3/2016 • | | = | 70 | 325 |
| MCW-15c | 950 | 5/4/2016 | | = | 70 | 287 |
| MCW-15c | 950 | 5/5/2016 | | = | 70 | 275 |
| MCW-15c | 950 | 5/6/2016 | | = | 70 | 270 |

| [illegible] | Time | Date | [illegible] | | [illegible] [illegible] | [illegible] [illegible] |
|---|---|---|---|---|---|---|
| MCW-15c | 950 | 5/7/2016 | | = | 70 | 282 |
| MCW-15c | 950 | 5/8/2016 | | = | 70 | 253 |
| MCW-15c | 950 | 5/9/2016 | | = | 70 | 247 |
| MCW-15c | 850 | 5/10/2016* | | = | 20 | 230 |
| MCW-15c | 850 | 5/11/2016 | | = | 20 | 214 |
| MCW-15c | 850 | 5/12/2016 | | = | 20 | 206 |
| MCW-15c | 850 | 5/13/2016 | | = | 20 | 197 |
| MCW-15c | 850 | 5/14/2016 | | = | 20 | 189 |
| MCW-15c | 850 | 5/15/2016 | | = | 20 | 181 |
| MCW-15c | 850 | 5/16/2016 | | = | 20 | 178 |
| MCW-15c | 850 | 5/17/2016 | | = | 20 | 167 |
| MCW-15c | 900 | 5/18/2016* | | = | 80 | 168 |
| MCW-15c | 900 | 5/19/2016 | | = | 80 | 151 |
| MCW-15c | 900 | 5/20/2016 | | = | 80 | 137 |
| MCW-15c | 900 | 5/21/2016 | | = | 80 | 128 |
| MCW-15c | 900 | 5/22/2016 | | = | 60 | 112 |
| MCW-15c | 900 | 5/23/2016 | | = | 80 | 102 |
| MCW-15c | 740 | 5/24/2016* | | = | 40 | 85 |
| MCW-15c | 740 | 5/25/2016 | | = | 40 | 78 |
| MCW-15c | 740 | 5/26/2016 | | = | 40 | 72 |
| MCW-15c | 740 | 5/27/2016 | | = | 40 | 66 |
| MCW-15c | 740 | 5/28/2016 | | = | 40 | 63 |
| MCW-15c | 740 | 5/29/2016 | | = | 40 | 56 |
| MCW-15c | 740 | 5/30/2016 | | = | 40 | 52 |
| MCW-15c | 810 | 5/31/2016* | | = | 60 | 48 |
| MCW-17 | — | 5/1/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 5/2/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 5/3/2016* | Dry | < | 10 | 10 |
| MCW-17 | — | 5/4/2016 | Dry | = | 10 | 10 |
| MCW-17 | — | 5/5/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 5/6/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 5/7/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 5/8/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 5/9/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 5/10/2016* | Dry | < | 10 | 10 |
| MCW-17 | — | 5/11/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 5/12/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 5/13/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 5/14/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 5/15/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 5/16/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 5/17/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 5/18/2016* | Dry | = | 10 | 10 |
| MCW-17 | — | 5/19/2016 | Dry | < | 10 | 10 |

| [illegible] | [illegible] | Date | [illegible] | | [illegible] NTU) [illegible] (2.1 MPN) | [illegible] (2.8 MPN) |
|---|---|---|---|---|---|---|
| MCW-17 | – | 5/20/2016 | Dry | < | 10 | 10 |
| MCW-17 | – | 5/21/2016 | Dry | < | 10 | 10 |
| MCW-17 | – | 5/22/2016 | Dry | < | 10 | 10 |
| MCW-17 | – | 5/23/2016 | Dry | < | 10 | 10 |
| MCW-17 | – | 5/24/2016* | Dry | < | 10 | 10 |
| MCW-17 | – | 5/25/2016 | Dry | < | 10 | 10 |
| MCW-17 | – | 5/26/2016 | Dry | < | 10 | 10 |
| MCW-17 | – | 5/27/2016 | Dry | < | 10 | 10 |
| MCW-17 | – | 5/28/2016 | Dry | < | 10 | 10 |
| MCW-17 | – | 5/29/2016 | Dry | < | 10 | 10 |
| MCW-17 | – | 5/30/2016 | Dry | < | 10 | 10 |
| MCW-17 | – | 5/31/2016* | Dry | < | 10 | 10 |
| MCW-18 | – | 5/1/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/2/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/3/2016* | Dry | < | 10 | 10 |
| MCW-18 | – | 5/4/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/5/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/6/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/7/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/8/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/9/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/10/2016* | Dry | < | 10 | 10 |
| MCW-18 | – | 5/11/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/12/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/13/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/14/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/15/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/16/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/17/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/18/2016* | Dry | < | 10 | 10 |
| MCW-18 | – | 5/19/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/20/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/21/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/22/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/23/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/24/2016* | Dry | < | 10 | 10 |
| MCW-18 | – | 5/25/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/26/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/27/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/28/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/29/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/30/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 5/31/2016* | Dry | < | 10 | 10 |

Notes:
[illegible]
[illegible]
[illegible]
[illegible]

county of ventura

PUBLIC WORKS AGENCY
JEFF PRATT
Agency Director

Watershed Protection District
Tully K. Clifford, Director

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David L. Fleisch, Director

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Herbert L. Schwind, Director

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David J. Sasek, Director

Central Services Department
Janice E. Turner, Director

May 23, 2016

Kangshi Wang, Ph.D.
California Regional Water Quality Control Board
Los Angeles Region
Standards & TMDL Unit
320 West 4th Street, Suite 200
Los Angeles, CA 90013
(213) 576-6780

**Subject: MALIBU CREEK AND LAGOON BACTERIA TMDL COMPLIANCE MONITORING FOR VENTURA COUNTY AND CITY OF THOUSAND OAKS**

Dear Dr. Wang:

The table below summarizes the results of the weekly monitoring effort required by the Malibu Creek and Lagoon Bacteria TMDL (TMDL) Compliance Monitoring Plan (CMP) for the month of April 2016. Sites were sampled weekly on Tuesdays (April 5, 12, 19 and 26). Sites without results reported were not sampled due to insufficient flow and are labeled "Dry." Daily geomeans were calculated using results from the previous 30 days (actual sampling date marked with ∗). Weeks with wet weather samples (collected less than 72 hours after a day with > 0.1" rain) use the previous non-rain single sample value to calculate the geomean. Half the detection limit was used for the purpose of calculating the daily geomean for sites with results reported as < 20 MPN/100ml or for dry weather when no sample was taken.

Fecal coliform monitoring has been discontinued, as approved by the Los Angeles Regional Water Quality Control Board on October 31, 2014, in alignment with the Regional Board's removal of the fecal coliform objective for REC-1 freshwaters from the TMDL on June 7, 2012 and subsequent approval by the U.S. Environmental Protection Agency on July 2, 2014.

If you have any questions regarding this matter, please contact me at (805) 645-1382.

Sincerely,

Ewelina Mutkowska
County Stormwater Program Manager, Watershed Protection District

CC: Tully Clifford, Watershed Protection District
Paul Jorgensen, City of Thousand Oaks (via email)
Joe Bellomo, Willdan Associates (via email)
Kelly Fisher, City of Agoura Hills (via email)
Allen Ma, County of Los Angeles (via email)

**Table 1. Weekly sampling results**

| Location | Time | Date | Rain | | Single Sample [illegible] E. coli (235 MPN) |
|---|---|---|---|---|---|
| MCW-8b | — | 4/5/2016● | | | Dry |
| MCW-8b | — | 4/12/2016● | | | Dry |
| MCW-8b | — | 4/19/2016● | | | Dry |
| MCW-8b | — | 4/26/2016● | | | Dry |
| | | | | | |
| | | | | | |
| MCW-9 | — | 4/5/2016● | | | Dry |
| MCW-9 | — | 4/12/2016● | | | Dry |
| MCW-9 | — | 4/19/2016● | | | Dry |
| MCW-9 | — | 4/26/2016● | | | Dry |
| | | | | | |
| | | | | | |
| MCW-12 | — | 4/5/2016● | | | Dry |
| MCW-12 | — | 4/12/2016● | | | Dry |
| MCW-12 | — | 4/19/2016● | | | Dry |
| MCW-12 | — | 4/26/2016● | | | Dry |
| | | | | | |
| | | | | | |
| MCW-14b | 915 | 4/5/2016● | | = | 170 |
| MCW-14b | 855 | 4/12/2016● | | = | 500 |
| MCW-14b | 900 | 4/19/2016● | | = | 2,400 |
| MCW-14b | 940 | 4/26/2016● | | = | 1,300 |
| | | | | | |
| | | | | | |
| MCW-15a | 840 | 4/5/2016● | | = | 170 |
| MCW-15a | 815 | 4/12/2016● | | = | 70 |
| MCW-15a | 820 | 4/19/2016● | | = | 1,700 |
| MCW-15a | 900 | 4/26/2016● | | = | 500 |
| | | | | | |
| | | | | | |
| MCW-17 | — | 4/1/2016● | | | Dry |
| MCW-17 | — | 4/12/2016● | | | Dry |
| MCW-17 | | 4/19/2016● | | | Dry |
| MCW-17 | | 4/26/2016● | | | Dry |
| | | | | | |
| | | | | | |
| MCW-18 | — | 4/5/2016● | | | Dry |
| MCW-18 | — | 4/15/2016● | | | Dry |
| MCW-18 | — | 4/19/2016● | | | Dry |
| MCW-18 | — | 4/26/2016● | | | Dry |
| | | | | | |

Notes:
* The RWQCB granted permission to replace site MCW-[illegible] [illegible] MCW-[illegible] on August 18th, 2010.
● Date of sampling

**Table 2. Computation of daily geomean**

| Location | Time | Date | Rain | | Single Sample (adjusted to sampling time & Day) | Geomean |
|---|---|---|---|---|---|---|
| | | | | | E. coli | E. coli |
| | | | | | (235 MPN) | (126 MPN) |
| MCW-8b | – | 4/1/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/2/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/3/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/4/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/5/2016* | Dry | < | 10 | 10 |
| MCW-8b | – | 4/6/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/7/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/8/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/9/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/10/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/11/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/12/2016* | Dry | < | 10 | 10 |
| MCW-8b | – | 4/13/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/14/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/15/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/16/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/17/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/18/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/19/2016* | Dry | < | 10 | 10 |
| MCW-8b | – | 4/20/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/21/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/22/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/23/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/24/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/25/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/26/2016* | Dry | < | 10 | 10 |
| MCW-8b | – | 4/27/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/28/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/29/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 4/30/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 4/1/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 4/2/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 4/3/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 4/4/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 4/5/2016* | Dry | < | 10 | 10 |
| MCW-9 | – | 4/6/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 4/7/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 4/8/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 4/9/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 4/10/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 4/11/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 4/12/2016* | Dry | < | 10 | 10 |
| MCW-9 | – | 4/13/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 4/14/2016 | Dry | < | 10 | 10 |

| Location | Time | Date | Rain | | Single Sample (adjusted for sampling day and NDO) E. coli (235 MPN) | Geomean E. coli (≤ 30 MPN) |
|---|---|---|---|---|---|---|
| MCW-9 | — | 4/15/2016 | Dry | < | 10 | 10 |
| MCW-9 | — | 4/16/2016 | Dry | < | 10 | 10 |
| MCW-9 | — | 4/17/2016 | Dry | < | 10 | 10 |
| MCW-9 | — | 4/18/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 4/19/2016* | Dry | < | 10 | 10 |
| MCW-9 | | 4/20/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 4/21/2016 | Dry | < | 10 | 10 |
| MCW-9 | — | 4/22/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 4/23/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 4/24/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 4/25/2016 | Dry | < | 10 | 10 |
| MCW-9 | — | 4/26/2016* | Dry | < | 10 | 10 |
| MCW-9 | | 4/27/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 4/28/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 4/29/2016 | Dry | < | 10 | 10 |
| MCW-9 | | 4/30/2016 | Dry | < | 10 | 10 |
| MCW-12 | — | 4/1/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 4/2/2016 | Dry | < | 10 | 10 |
| MCW-12 | — | 4/3/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 4/4/2016 | Dry | < | 10 | 10 |
| MCW-12 | — | 4/5/2016* | Dry | < | 10 | 10 |
| MCW-12 | — | 4/6/2016 | Dry | < | 10 | 10 |
| MCW-12 | — | 4/7/2016 | Dry | < | 10 | 10 |
| MCW-12 | - | 4/8/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 4/9/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 4/10/2016 | Dry | < | 10 | 10 |
| MCW-12 | - | 4/11/2016 | Dry | < | 10 | 10 |
| MCW-12 | - | 4/12/2016* | Dry | < | 10 | 10 |
| MCW-12 | | 4/13/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 4/14/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 4/15/2016 | Dry | < | 10 | 10 |
| MCW-12 | — | 4/16/2016 | Dry | < | 10 | 10 |
| MCW-12 | — | 4/17/2016 | Dry | < | 10 | 10 |
| MCW-12 | — | 4/18/2016 | Dry | | 10 | 10 |
| MCW-12 | — | 4/19/2016* | Dry | < | 10 | 10 |
| MCW-12 | — | 4/20/2016 | Dry | < | 10 | 10 |
| MCW-12 | — | 4/21/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 4/22/2016 | Dry | < | 10 | 10 |
| MCW-12 | — | 4/23/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 4/24/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 4/25/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 4/26/2016* | Dry | < | 10 | 10 |
| MCW-12 | | 4/27/2016 | Dry | < | 10 | 10 |
| MCW-12 | | 4/28/2016 | Dry | < | 10 | 10 |

| Location | Time | Date | Rain | | Single Sample (Enhanced for Rain, Dry and NDW) E. coli (235 MPN) | Geomean E. coli (126 MPN) |
|---|---|---|---|---|---|---|
| MCW-13 | -- | 4/29/2016 | Dry | < | 10 | 25 |
| MCW-13 | -- | 4/30/2016 | Dry | < | 10 | 22 |
| MCW-14b | 955 | 4/1/2016 | | = | 500 | 48 |
| MCW-14b | 955 | 4/2/2016 | | = | 500 | 55 |
| MCW-14b | 955 | 4/3/2016 | | = | 500 | 63 |
| MCW-14b | 955 | 4/4/2016 | | = | 500 | 72 |
| MCW-14b | 915 | 4/5/2016* | | = | 170 | 79 |
| MCW-14b | 915 | 4/6/2016 | | = | 170 | 86 |
| MCW-14b | 915 | 4/7/2016 | | = | 170 | 86 |
| MCW-14b | 915 | 4/8/2016 | | = | 170 | 85 |
| MCW-14b | 915 | 4/9/2016 | | = | 170 | 84 |
| MCW-14b | 915 | 4/10/2016 | | = | 170 | 83 |
| MCW-14b | 915 | 4/11/2016 | | = | 170 | 82 |
| MCW-14b | 855 | 4/12/2016* | | = | 500 | 84 |
| MCW-14b | 855 | 4/13/2016 | | = | 500 | 87 |
| MCW-14b | 855 | 4/14/2016 | | = | 500 | 94 |
| MCW-14b | 855 | 4/15/2016 | | = | 500 | 102 |
| MCW-14b | 855 | 4/16/2016 | | = | 500 | 111 |
| MCW-14b | 855 | 4/17/2016 | | = | 500 | 121 |
| MCW-14b | 855 | 4/18/2016 | | = | 500 | 132 |
| MCW-14b | 900 | 4/19/2016* | | = | 2,400 | 151 |
| MCW-14b | 900 | 4/20/2016 | | = | 2,400 | 173 |
| MCW-14b | 900 | 4/21/2016 | | = | 2,400 | 208 |
| MCW-14b | 900 | 4/22/2016 | | = | 2,400 | 250 |
| MCW-14b | 900 | 4/23/2016 | | = | 2,400 | 300 |
| MCW-14b | 900 | 4/24/2016 | | = | 2,400 | 360 |
| MCW-14b | 900 | 4/25/2016 | | = | 2,400 | 432 |
| MCW-14b | 940 | 4/26/2016* | | = | 1,300 | 508 |
| MCW-14b | 940 | 4/27/2016 | | = | 1,300 | 597 |
| MCW-14b | 940 | 4/28/2016 | | = | 1,300 | 617 |
| MCW-14b | 940 | 4/29/2016 | | = | 1,300 | 637 |
| MCW-14b | 940 | 4/30/2016 | | = | 1,300 | 657 |
| MCW-15c | 920 | 4/1/2016 | | = | 3,000 | 58 |
| MCW-15c | 920 | 4/2/2016 | | = | 3,000 | 70 |
| MCW-15c | 920 | 4/3/2016 | | = | 3,000 | 84 |
| MCW-15c | 920 | 4/4/2016 | | = | 3,000 | 102 |
| MCW-15c | 840 | 4/5/2016* | | = | 170 | 112 |
| MCW-15c | 840 | 4/6/2016 | | = | 170 | 123 |
| MCW-15c | 840 | 4/7/2016 | | = | 170 | 118 |
| MCW-15c | 840 | 4/8/2016 | | = | 170 | 112 |
| MCW-15c | 840 | 4/9/2016 | | = | 170 | 107 |
| MCW-15c | 840 | 4/10/2016 | | = | 170 | 102 |

| [illegible] | [illegible] | [illegible] | [illegible] | | [illegible] | [illegible] |
|---|---|---|---|---|---|---|
| | | | | | (MPN) | (MPN) |
| MCW-15c | 840 | 4/11/2016 | | = | 170 | 97 |
| MCW-15c | 815 | 4/12/2016* | | = | 70 | 90 |
| MCW-15c | 815 | 4/13/2016 | | = | 70 | 85 |
| MCW-15c | 815 | 4/14/2016 | | = | 70 | 89 |
| MCW-15c | 815 | 4/15/2016 | | = | 70 | 95 |
| MCW-15c | 815 | 4/16/2016 | | = | 70 | 101 |
| MCW-15c | 815 | 4/17/2016 | | = | 70 | 108 |
| MCW-15c | 815 | 4/18/2016 | | = | 70 | 115 |
| MCW-15c | 820 | 4/19/2016* | | = | 1,700 | 137 |
| MCW-15c | 820 | 4/20/2016 | | = | 1,700 | 163 |
| MCW-15c | 820 | 4/21/2016 | | = | 1,700 | 193 |
| MCW-15c | 820 | 4/22/2016 | | = | 1,700 | 229 |
| MCW-15c | 820 | 4/23/2016 | | = | 1,700 | 272 |
| MCW-15c | 820 | 4/24/2016 | | = | 1,700 | 322 |
| MCW-15c | 820 | 4/25/2016 | | = | 1,700 | 383 |
| MCW-15c | 900 | 4/26/2016* | | = | 500 | 436 |
| MCW-15c | 900 | 4/27/2016 | | = | 500 | 477 |
| MCW-15c | 900 | 4/28/2016 | | = | 500 | 468 |
| MCW-15c | 900 | 4/29/2016 | | = | 500 | 441 |
| MCW-15c | 900 | 4/30/2016 | | = | 500 | 415 |
| MCW-17 | — | 4/1/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 4/2/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 4/3/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 4/4/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 4/5/2016* | Dry | < | 10 | 10 |
| MCW-17 | — | 4/6/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 4/7/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 4/8/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 4/9/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 4/10/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 4/11/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 4/12/2016* | Dry | < | 10 | 10 |
| MCW-17 | — | 4/13/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 4/14/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 4/15/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 4/16/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 4/17/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 4/18/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 4/19/2016* | Dry | < | 10 | 10 |
| MCW-17 | — | 4/20/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 4/21/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 4/22/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 4/23/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 4/24/2016 | Dry | < | 10 | 10 |

| Station | Tide | Date | Weather | | Single Sample (Adjusted for calculating geomean) E.coli (235 MPN) | Geomean E.coli[1] (126 MPN) |
|---|---|---|---|---|---|---|
| MCW-17 | – | 4/25/2016 | Dry | < | 10 | 10 |
| MCW-17 | – | 4/26/2016• | Dry | < | 10 | 10 |
| MCW-17 | – | 4/27/2016 | Dry | < | 10 | 10 |
| MCW-17 | – | 4/28/2016 | Dry | < | 10 | 10 |
| MCW-17 | – | 4/29/2016 | Dry | < | 10 | 10 |
| MCW-17 | – | 4/30/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/1/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/2/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/3/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/4/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/5/2016• | Dry | < | 10 | 10 |
| MCW-18 | – | 4/6/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/7/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/8/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/9/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/10/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/11/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/12/2016• | Dry | < | 10 | 10 |
| MCW-18 | – | 4/13/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/14/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/15/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/16/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/17/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/18/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/19/2016• | Dry | < | 10 | 10 |
| MCW-18 | – | 4/20/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/21/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/22/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/23/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/24/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/25/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/26/2016• | Dry | < | 10 | 10 |
| MCW-18 | – | 4/27/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/28/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/29/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 4/30/2016 | Dry | < | 10 | 10 |

Notes:
Weeks with wet weather samples (collected less than 72 hours after a day with >0.1" rain) use the previous non-rain single sample value to calculate the geomean.
Results of <20 are adjusted to one half the MDL (=10) in the calculation of the geomean.
[1] The RWQCB granted permission to replace site MCW-15b with site Special 29 (renamed MCW-15c) on August 16th, 2010
•Date of sampling

county of ventura

PUBLIC WORKS AGENCY
JEFF PRATT
Agency Director

Watershed Protection District
Tully K. Clifford, Director

Transportation Department
David L. Fleisch, Director

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Water & Sanitation Department
David J. Sasek, Director

Central Services Department
Janice E. Turner, Director

April 12, 2016

Kangshi Wang, Ph.D.
California Regional Water Quality Control Board
Los Angeles Region
Standards & TMDL Unit
320 West 4th Street, Suite 200
Los Angeles, CA 90013
(213) 576-6780

Subject: **MALIBU CREEK AND LAGOON BACTERIA TMDL COMPLIANCE MONITORING FOR VENTURA COUNTY AND CITY OF THOUSAND OAKS**

Dear Dr. Wang:

The table below summarizes the results of the weekly monitoring effort required by the Malibu Creek and Lagoon Bacteria TMDL (TMDL) Compliance Monitoring Plan (CMP) for the month of March 2016. Sites were sampled weekly on Tuesdays (March 1, 8, 15, 22 and 29). Sites without results reported were not sampled due to insufficient flow and are labeled "Dry." Daily geomeans were calculated using results from the previous 30 days (actual sampling date marked with∗). Weeks with wet weather samples (collected less than 72 hours after a day with > 0.1" rain) use the previous non-rain single sample value to calculate the geomean. Half the detection limit was used for the purpose of calculating the daily geomean for sites with results reported as < 20 MPN/100ml or for dry weather when no sample was taken.

Fecal coliform monitoring has been discontinued, as approved by the Los Angeles Regional Water Quality Control Board on October 31, 2014, in alignment with the Regional Board's removal of the fecal coliform objective for REC-1 freshwaters from the TMDL on June 7, 2012 and subsequent approval by the U.S. Environmental Protection Agency on July 2, 2014.

If you have any questions regarding this matter, please contact me at (805) 645-1382.

Sincerely,

Ewelina Mutkowska
County Stormwater Program Manager, Watershed Protection District

CC: Tully Clifford, Watershed Protection District
Paul Jorgensen, City of Thousand Oaks (via email)
Joe Bellomo, Willdan Associates (via email)
Kelly Fisher, City of Agoura Hills (via email)
Allen Ma, County of Los Angeles (via email)

**Table 1. Weekly sampling results**

| Location | Time | Date | Rain | | E. coli Result [illegible] (DS MPN) |
|---|---|---|---|---|---|
| MCW-8b | | 3/1/2016● | | | Dry |
| MCW-8b | | 3/8/2016● | | | Dry |
| MCW-8b | | 3/15/2016● | | | Dry |
| MCW-8b | | 3/22/2016● | | | Dry |
| MCW-8b | | 3/29/2016● | | | Dry |
| | | | | | |
| MCW-9 | | 3/1/2016● | | | Dry |
| MCW-9 | | 3/8/2016● | | | Dry |
| MCW-9 | | 3/15/2016● | | | Dry |
| MCW-9 | | 3/22/2016● | | | Dry |
| MCW-9 | | 3/29/2016● | | | Dry |
| | | | | | |
| MCW-12 | 1000 | 3/1/2016● | | = | 70 |
| MCW-12 | 815 | 3/8/2016● | Rain | = | 1,400 |
| MCW-12 | 900 | 3/15/2016● | | = | 40 |
| MCW-12 | 1115 | 3/22/2016● | | < | 20 |
| MCW-12 | | 3/29/2016● | | | Dry |
| | | | | | |
| MCW-14b | 915 | 3/1/2016● | | = | 230 |
| MCW-14b | 745 | 3/8/2016● | Rain | = | 9,000 |
| MCW-14b | 1000 | 3/15/2016● | | = | 80 |
| MCW-14b | 1020 | 3/22/2016● | | < | 20 |
| MCW-14b | 955 | 3/29/2016● | | = | 500 |
| | | | | | |
| MCW-15c | 830 | 3/1/2016● | | = | 700 |
| MCW-15c | 730 | 3/8/2016● | Rain | = | 140 |
| MCW-15c | 1100 | 3/15/2016● | | < | 20 |
| MCW-15c | 915 | 3/22/2016● | | < | 20 |
| MCW-15c | 920 | 3/29/2016● | | = | 3,000 |
| | | | | | |
| MCW-17 | | 3/1/2016● | | | Dry |
| MCW-17 | | 3/8/2016● | | | Dry |
| MCW-17 | | 3/15/2016● | | | Dry |
| MCW-17 | | 3/22/2016● | | | Dry |
| MCW-17 | | 3/29/2016● | | | Dry |
| | | | | | |
| MCW-18 | | 3/1/2016● | | | Dry |
| MCW-18 | | 3/8/2016● | | | Dry |
| MCW-18 | | 3/15/2016● | | | Dry |
| MCW-18 | | 3/22/2016● | | | Dry |
| MCW-18 | | 3/29/2016● | | | Dry |

Notes:
* The RWQCB granted permission to replace site MCW-15b with the Special-15 (renamed MCW-15c) on August 11th, 2007.
● Date of sampling

**Table 2. Computation of daily geomean**

| Location | Time | Date | Rain | | Single Sample [illegible] *E. coli* (235 MPN) | Geomean *E. coli* (126 MPN) |
|---|---|---|---|---|---|---|
| MCW-8b | – | 3/1/2016* | Dry | < | 10 | 10 |
| MCW-8b | – | 3/2/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/3/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/4/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/5/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/6/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/7/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/8/2016* | Dry | < | 10 | 10 |
| MCW-8b | – | 3/9/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/10/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/11/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/12/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/13/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/14/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/15/2016* | Dry | < | 10 | 10 |
| MCW-8b | – | 3/16/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/17/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/18/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/19/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/20/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/21/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/22/2016* | Dry | < | 10 | 10 |
| MCW-8b | – | 3/23/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/24/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/25/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/26/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/27/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/28/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/29/2016* | Dry | < | 10 | 10 |
| MCW-8b | – | 3/30/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 3/31/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 3/1/2016* | Dry | < | 10 | 10 |
| MCW-9 | – | 3/2/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 3/3/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 3/4/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 3/5/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 3/6/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 3/7/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 3/8/2016* | Dry | < | 10 | 10 |
| MCW-9 | – | 3/9/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 3/10/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 3/11/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 3/12/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 3/13/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 3/14/2016 | Dry | < | 10 | 10 |

| Station | Time | Date | Rain | | [illegible] | [illegible] |
|---|---|---|---|---|---|---|
| | | | | | E. coli | [illegible] |
| | | | | | (MPN) | (MPN) |
| MCW-9 | — | 3/15/2016● | Dry | < | 10 | 10 |
| MCW-9 | — | 3/16/2016 | Dry | < | 10 | 10 |
| MCW-9 | — | 3/17/2016 | Dry | < | 10 | 10 |
| MCW-9 | — | 3/18/2016 | Dry | < | 10 | 10 |
| MCW-9 | — | 3/19/2016 | Dry | < | 10 | 10 |
| MCW-9 | — | 3/20/2016 | Dry | < | 10 | 10 |
| MCW-9 | — | 3/21/2016 | Dry | < | 10 | 10 |
| MCW-9 | — | 3/22/2016● | Dry | < | 10 | 10 |
| MCW-9 | — | 3/23/2016 | Dry | < | 10 | 10 |
| MCW-9 | — | 3/24/2016 | Dry | < | 10 | 10 |
| MCW-9 | — | 3/25/2016 | Dry | < | 10 | 10 |
| MCW-9 | — | 3/26/2016 | Dry | < | 10 | 10 |
| MCW-9 | — | 3/27/2016 | Dry | < | 10 | 10 |
| MCW-9 | — | 3/28/2016 | Dry | < | 10 | 10 |
| MCW-9 | — | 3/29/2016● | Dry | < | 10 | 10 |
| MCW-9 | — | 3/30/2016 | Dry | < | 10 | 10 |
| MCW-9 | — | 3/31/2016 | Dry | < | 10 | 10 |
| MCW-12 | 1000 | 3/1/2016● | | = | 70 | [illegible] |
| MCW-12 | 1000 | 3/2/2016 | | = | 70 | 74 |
| MCW-12 | 1000 | 3/3/2016 | | = | 70 | 72 |
| MCW-12 | 1000 | 3/4/2016 | | = | 70 | 71 |
| MCW-12 | 1000 | 3/5/2016 | | = | 70 | 69 |
| MCW-12 | 1000 | 3/6/2016 | | = | 70 | 67 |
| MCW-12 | 1000 | 3/7/2016 | | = | 70 | 68 |
| MCW-12 | 815 | 3/8/2016● | Rain | | **Rain** | **Rain** |
| MCW-12 | 815 | 3/9/2016 | Rain | | **Rain** | **Rain** |
| MCW-12 | 815 | 3/10/2016 | Rain | | **Rain** | **Rain** |
| MCW-12 | 815 | 3/11/2016 | Rain | | **Rain** | **Rain** |
| MCW-12 | 815 | 3/12/2016 | Rain | | **Rain** | **Rain** |
| MCW-12 | 815 | 3/13/2016 | Rain | | **Rain** | **Rain** |
| MCW-12 | 815 | 3/14/2016 | Rain | | **Rain** | **Rain** |
| MCW-12 | 900 | 3/15/2016● | | = | 40 | 63 |
| MCW-12 | 900 | 3/16/2016 | | = | 40 | 60 |
| MCW-12 | 900 | 3/17/2016 | | = | 40 | 58 |
| MCW-12 | 900 | 3/18/2016 | | = | 40 | 53 |
| MCW-12 | 900 | 3/19/2016 | | = | 40 | 49 |
| MCW-12 | 900 | 3/20/2016 | | = | 40 | 46 |
| MCW-12 | 900 | 3/21/2016 | | = | 40 | 45 |
| MCW-12 | 1115 | 3/22/2016● | | < | 10 | 38 |
| MCW-12 | 1115 | 3/23/2016 | | < | 10 | 34 |
| MCW-12 | 1115 | 3/24/2016 | | < | 10 | 32 |
| MCW-12 | 1115 | 3/25/2016 | | < | 10 | 30 |
| MCW-12 | 1115 | 3/26/2016 | | < | 10 | 28 |
| MCW-12 | 1115 | 3/27/2016 | | < | 10 | 26 |
| MCW-12 | 1115 | 3/28/2016 | | < | 10 | 25 |

| Location | Time | Date | Rain/ | | [illegible] | [illegible] |
|---|---|---|---|---|---|---|
| | | | | | [illegible] | [illegible] |
| | | | | | [illegible] | [illegible] |
| MCW-12 | | 3/29/2016● | Dry | < | 10 | 21 |
| MCW-12 | | 3/30/2016 | Dry | < | 10 | 22 |
| MCW-12 | | 3/31/2016 | Dry | < | 10 | 22 |
| MCW-14b | 915 | 3/1/2016● | | = | 230 | 32 |
| MCW-14b | 915 | 3/2/2016 | | = | 230 | 34 |
| MCW-14b | 915 | 3/3/2016 | | = | 230 | 36 |
| MCW-14b | 915 | 3/4/2016 | | = | 230 | 37 |
| MCW-14b | 915 | 3/5/2016 | | = | 230 | 60 |
| MCW-14b | 915 | 3/6/2016 | | = | 230 | 62 |
| MCW-14b | 915 | 3/7/2016 | | = | 230 | 64 |
| MCW-14b | 745 | 3/8/2016● | Rain | | **Rain** | **Rain** |
| MCW-14b | 745 | 3/9/2016 | Rain | | **Rain** | **Rain** |
| MCW-14b | 745 | 3/10/2016 | Rain | | **Rain** | **Rain** |
| MCW-14b | 745 | 3/11/2016 | Rain | | **Rain** | **Rain** |
| MCW-14b | 745 | 3/12/2016 | Rain | | **Rain** | **Rain** |
| MCW-14b | 745 | 3/13/2016 | Rain | | **Rain** | **Rain** |
| MCW-14b | 745 | 3/14/2016 | Rain | | **Rain** | **Rain** |
| MCW-14b | 1000 | 3/15/2016● | | = | 40 | 62 |
| MCW-14b | 1000 | 3/16/2016 | | = | 40 | 61 |
| MCW-14b | 1000 | 3/17/2016 | | = | 40 | 63 |
| MCW-14b | 1000 | 3/18/2016 | | = | 40 | 63 |
| MCW-14b | 1000 | 3/19/2016 | | = | 40 | 63 |
| MCW-14b | 1000 | 3/20/2016 | | = | 40 | 61 |
| MCW-14b | 1000 | 3/21/2016 | | = | 40 | 61 |
| MCW-14b | 1020 | 3/22/2016● | | < | 10 | 58 |
| MCW-14b | 1020 | 3/23/2016 | | < | 10 | 56 |
| MCW-14b | 1020 | 3/24/2016 | | < | 10 | 51 |
| MCW-14b | 1020 | 3/25/2016 | | < | 10 | 46 |
| MCW-14b | 1020 | 3/26/2016 | | < | 10 | 42 |
| MCW-14b | 1020 | 3/27/2016 | | < | 10 | 38 |
| MCW-14b | 1020 | 3/28/2016 | | < | 10 | 35 |
| MCW-14b | 955 | 3/29/2016● | | = | 500 | 36 |
| MCW-14b | 955 | 3/30/2016 | | = | 500 | 37 |
| MCW-14b | 955 | 3/31/2016 | | = | 500 | 42 |
| MCW-15c | 830 | 3/1/2016● | | = | 700 | 43 |
| MCW-15c | 830 | 3/2/2016 | | = | 700 | 48 |
| MCW-15c | 830 | 3/3/2016 | | = | 700 | 50 |
| MCW-15c | 830 | 3/4/2016 | | = | 700 | 52 |
| MCW-15c | 830 | 3/5/2016 | | = | 700 | 55 |
| MCW-15c | 830 | 3/6/2016 | | = | 700 | 57 |
| MCW-15c | 830 | 3/7/2016 | | = | 700 | 60 |
| MCW-15c | 710 | 3/8/2016● | Rain | | **Rain** | **Rain** |
| MCW-15c | 710 | 3/9/2016 | Rain | | **Rain** | **Rain** |
| MCW-15c | 710 | 3/10/2016 | Rain | | **Rain** | **Rain** |

| Location | Time | Date | Rain | | Single Sample (limit not for rain, dry and NSD) E. coli (235 MPN) | Geomean E. coli (126 MPN) |
|---|---|---|---|---|---|---|
| MCW-15c | 710 | 3/11/2016 | Rain | | **Rain** | **Rain** |
| MCW-15c | 710 | 3/12/2016 | Rain | | **Rain** | **Rain** |
| MCW-15c | 710 | 3/13/2016 | Rain | | **Rain** | **Rain** |
| MCW-15c | 710 | 3/14/2016 | Rain | | **Rain** | **Rain** |
| MCW-15c | 1100 | 3/15/2016* | | < | 10 | 55 |
| MCW-15c | 1100 | 3/16/2016 | | < | 10 | 50 |
| MCW-15c | 1100 | 3/17/2016 | | < | 10 | 49 |
| MCW-15c | 1100 | 3/18/2016 | | < | 10 | 46 |
| MCW-15c | 1100 | 3/19/2016 | | < | 10 | 47 |
| MCW-15c | 1100 | 3/20/2016 | | < | 10 | 45 |
| MCW-15c | 1100 | 3/21/2016 | | < | 10 | 44 |
| MCW-15c | 915 | 3/22/2016* | | < | 10 | 43 |
| MCW-15c | 915 | 3/23/2016 | | < | 10 | 43 |
| MCW-15c | 915 | 3/24/2016 | | < | 10 | 40 |
| MCW-15c | 915 | 3/25/2016 | | < | 10 | 37 |
| MCW-15c | 915 | 3/26/2016 | | < | 10 | 35 |
| MCW-15c | 915 | 3/27/2016 | | < | 10 | 33 |
| MCW-15c | 915 | 3/28/2016 | | < | 10 | 31 |
| MCW-15c | 920 | 3/29/2016* | | < | 3,000 | 35 |
| MCW-15c | 920 | 3/30/2016 | | < | 1,000 | 39 |
| MCW-15c | 920 | 3/31/2016 | | < | 5,000 | 48 |
| MCW-17 | -- | 3/1/2016* | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/2/2016 | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/3/2016 | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/4/2016 | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/5/2016 | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/6/2016 | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/7/2016 | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/8/2016* | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/9/2016 | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/10/2016 | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/11/2016 | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/12/2016 | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/13/2016 | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/14/2016 | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/15/2016* | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/16/2016 | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/17/2016 | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/18/2016 | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/19/2016 | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/20/2016 | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/21/2016 | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/22/2016* | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/23/2016 | Dry | < | 10 | 10 |
| MCW-17 | -- | 3/24/2016 | Dry | < | 10 | 10 |

| [illegible] | [illegible] | Date | [illegible] | [illegible] (Optional [illegible]) | | [illegible] |
|---|---|---|---|---|---|---|
| | | | | | [illegible] | [illegible] |
| | | | | | ([illegible]) | ([illegible]) |
| MCW-17 | – | 3/25/2016 | Dry | < | 10 | 10 |
| MCW-17 | – | 3/26/2016 | Dry | < | 10 | 10 |
| MCW-17 | – | 3/27/2016 | Dry | < | 10 | 10 |
| MCW-17 | – | 3/28/2016 | Dry | < | 10 | 10 |
| MCW-17 | – | 3/29/2016♦ | Dry | < | 10 | 10 |
| MCW-17 | – | 3/30/2016 | Dry | < | 10 | 10 |
| MCW-17 | – | 3/31/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/1/2016♦ | Dry | < | 10 | 10 |
| MCW-18 | – | 3/2/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/3/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/4/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/5/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/6/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/7/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/8/2016♦ | Dry | < | 10 | 10 |
| MCW-18 | – | 3/9/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/10/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/11/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/12/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/13/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/14/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/15/2016♦ | Dry | < | 10 | 10 |
| MCW-18 | – | 3/16/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/17/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/18/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/19/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/20/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/21/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/22/2016♦ | Dry | < | 10 | 10 |
| MCW-18 | – | 3/23/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/24/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/25/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/26/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/27/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/28/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/29/2016♦ | Dry | < | 10 | 10 |
| MCW-18 | – | 3/30/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 3/31/2016 | Dry | < | 10 | 10 |

Notes:
[illegible] samples (collected less than 72 hours after a day with >0.1" rain) use the [illegible] single sample taken to calculate the geomean.
[illegible]
[illegible] MCW-18 [illegible]
♦Date of sampling

# county of ventura

**PUBLIC WORKS AGENCY**
**JEFF PRATT**
Agency Director

Watershed Protection District
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**Janice E. Turner**, Director

March 24, 2016

Kangshi Wang, Ph.D.
California Regional Water Quality Control Board
Los Angeles Region
Standards & TMDL Unit
320 West 4th Street, Suite 200
Los Angeles, CA 90013
(213) 576-6780

**Subject: MALIBU CREEK AND LAGOON BACTERIA TMDL COMPLIANCE MONITORING FOR VENTURA COUNTY AND CITY OF THOUSAND OAKS**

Dear Dr. Wang:

The table below summarizes the results of the weekly monitoring effort required by the Malibu Creek and Lagoon Bacteria TMDL (TMDL) Compliance Monitoring Plan (CMP) for the month of February 2016. Sites were sampled weekly on Tuesdays (February 2, 9, 16 and 23). Sites without results reported were not sampled due to insufficient flow and are labeled "Dry." Daily geomeans were calculated using results from the previous 30 days (actual sampling date marked with ♦). Weeks with wet weather samples (collected less than 72 hours after a day with > 0.1" rain) use the previous non-rain single sample value to calculate the geomean. Half the detection limit was used for the purpose of calculating the daily geomean for sites with results reported as < 20 MPN/100ml or for dry weather when no sample was taken.

Fecal coliform monitoring has been discontinued, as approved by the Los Angeles Regional Water Quality Control Board on October 31, 2014, in alignment with the Regional Board's removal of the fecal coliform objective for REC-1 freshwaters from the TMDL on June 7, 2012 and subsequent approval by the U.S. Environmental Protection Agency on July 2, 2014.

If you have any questions regarding this matter, please contact me at (805) 645-1382.

Sincerely,

Ewelina Mutkowska
County Stormwater Program Manager, Watershed Protection District

CC: Tully Clifford, Watershed Protection District
Paul Jorgensen, City of Thousand Oaks (via email)
Joe Bellomo, Willdan Associates (via email)
Kelly Fisher, City of Agoura Hills (via email)
Allen Ma, County of Los Angeles (via email)

**Table 1. Weekly sampling results**

| Location | Time | Date | Rain | | Single Sample [illegible]<br>Result<br>(235 MPN) |
|---|---|---|---|---|---|
| MCW-8b | – | 2/2/2016♦ | | | Dry |
| MCW-8b | | 2/9/2016♦ | | | Dry |
| MCW-8b | – | 2/16/2016♦ | | | Dry |
| MCW-8b | | 2/23/2016♦ | | | Dry |
| | | | | | |
| | | | | | |
| MCW-9 | – | 2/2/2016♦ | | | Dry |
| MCW-9 | | 2/9/2016♦ | | | Dry |
| MCW-9 | | 2/16/2016♦ | | | Dry |
| MCW-9 | – | 2/23/2016♦ | | | Dry |
| | | | | | |
| | | | | | |
| MCW-12 | 1200 | 2/2/2016♦ | Rain | = | 1,300 |
| MCW-12 | 900 | 2/9/2016♦ | | = | 300 |
| MCW-12 | 840 | 2/16/2016♦ | | = | 20 |
| MCW-12 | 920 | 2/23/2016♦ | | < | 20 |
| | | | | | |
| | | | | | |
| MCW-14b | 1115 | 2/2/2016♦ | Rain | = | 78 |
| MCW-14b | 920 | 2/9/2016♦ | | = | 40 |
| MCW-14b | 910 | 2/16/2016♦ | | = | 170 |
| MCW-14b | 850 | 2/23/2016♦ | | < | 20 |
| | | | | | |
| | | | | | |
| MCW-15c | 1030 | 2/2/2016♦ | Rain | = | 220 |
| MCW-15c | 945 | 2/9/2016♦ | | = | 20 |
| MCW-15c | 930 | 2/16/2016♦ | | = | 70 |
| MCW-15c | 815 | 2/23/2016♦ | | < | 20 |
| | | | | | |
| | | | | | |
| MCW-17 | | 2/2/2016♦ | | | Dry |
| MCW-17 | – | 2/9/2016♦ | | | Dry |
| MCW-17 | | 2/16/2016♦ | | | Dry |
| MCW-17 | | 2/23/2016♦ | | | Dry |
| | | | | | |
| | | | | | |
| MCW-18 | | 2/2/2016♦ | | | Dry |
| MCW-18 | | 2/9/2016♦ | | | Dry |
| MCW-18 | | 2/16/2016♦ | | | Dry |
| MCW-18 | | 2/23/2016♦ | | | Dry |
| | | | | | |

Notes:
* The RWQCB granted permission to replace the MCW-15b with one special ID (renamed MCW-15c) on August 17th 2010
♦Date of sampling

**Table 2. Computation of daily geomean**

| | | | | | Single Sample [illegible] | Geomean |
|---|---|---|---|---|---|---|
| Location | Time | Date | Season | | E. coli | E. coli |
| | | | | | (235 MPN) | (126 MPN) |
| MCW-8b | – | 2/1/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/2/2016* | Dry | < | 10 | 10 |
| MCW-8b | – | 2/3/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/4/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/5/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/6/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/7/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/8/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/9/2016* | Dry | < | 10 | 10 |
| MCW-8b | – | 2/10/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/11/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/12/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/13/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/14/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/15/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/16/2016* | Dry | < | 10 | 10 |
| MCW-8b | – | 2/17/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/18/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/19/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/20/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/21/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/22/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/23/2016* | Dry | < | 10 | 10 |
| MCW-8b | – | 2/24/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/25/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/26/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/27/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/28/2016 | Dry | < | 10 | 10 |
| MCW-8b | – | 2/29/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 2/1/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 2/2/2016* | Dry | < | 10 | 10 |
| MCW-9 | – | 2/3/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 2/4/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 2/5/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 2/6/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 2/7/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 2/8/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 2/9/2016* | Dry | < | 10 | 10 |
| MCW-9 | – | 2/10/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 2/11/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 2/12/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 2/13/2016 | Dry | < | 10 | 10 |
| MCW-9 | – | 2/14/2016 | Dry | < | 10 | 10 |

| Location | Time | Date | Rain | | Single Sample [illegible] E. coli (235 MPN) | Geomean E. coli (126 MPN) |
|---|---|---|---|---|---|---|
| MCW-9 | - | 2/15/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 2/16/2016 • | Dry | < | 10 | 10 |
| MCW-9 | - | 2/17/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 2/18/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 2/19/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 2/20/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 2/21/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 2/22/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 2/23/2016 • | Dry | < | 10 | 10 |
| MCW-9 | - | 2/24/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 2/25/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 2/26/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 2/27/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 2/28/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 2/29/2016 | Dry | < | 10 | 10 |
| MCW-12 | 720 | 2/1/2016 | | = | 140 | 119 |
| MCW-12 | 1200 | 2/2/2016 • | | | **Rain** | **Rain** |
| MCW-12 | 1200 | 2/3/2016 | | | **Rain** | **Rain** |
| MCW-12 | 1200 | 2/4/2016 | | | **Rain** | **Rain** |
| MCW-12 | 1200 | 2/5/2016 | | | **Rain** | **Rain** |
| MCW-12 | 1200 | 2/6/2016 | | | **Rain** | **Rain** |
| MCW-12 | 1200 | 2/7/2016 | | | **Rain** | **Rain** |
| MCW-12 | 1200 | 2/8/2016 | | | **Rain** | **Rain** |
| MCW-12 | 900 | 2/9/2016 • | | = | 300 | 136 |
| MCW-12 | 900 | 2/10/2016 | | = | 300 | 150 |
| MCW-12 | 900 | 2/11/2016 | | = | 300 | 168 |
| MCW-12 | 900 | 2/12/2016 | | = | 300 | 190 |
| MCW-12 | 900 | 2/13/2016 | | = | 300 | 211 |
| MCW-12 | 900 | 2/14/2016 | | = | 300 | 236 |
| MCW-12 | 900 | 2/15/2016 | | = | 300 | 265 |
| MCW-12 | 840 | 2/16/2016 • | | = | 70 | 283 |
| MCW-12 | 840 | 2/17/2016 | | = | 70 | 301 |
| MCW-12 | 840 | 2/18/2016 | | = | 70 | 271 |
| MCW-12 | 840 | 2/19/2016 | | = | 70 | 233 |
| MCW-12 | 840 | 2/20/2016 | | = | 70 | 219 |
| MCW-12 | 840 | 2/21/2016 | | = | 70 | 198 |
| MCW-12 | 840 | 2/22/2016 | | = | 70 | 177 |
| MCW-12 | 920 | 2/23/2016 • | | < | 10 | 149 |
| MCW-12 | 920 | 2/24/2016 | | < | 10 | 126 |
| MCW-12 | 920 | 2/25/2016 | | < | 10 | 114 |
| MCW-12 | 920 | 2/26/2016 | | < | 10 | 106 |
| MCW-12 | 920 | 2/27/2016 | | < | 10 | 95 |
| MCW-12 | 920 | 2/28/2016 | | < | 10 | 86 |
| MCW-12 | 920 | 2/29/2016 | | < | 10 | 78 |
| MCW-14 | 745 | 2/1/2016 | | = | 80 | 80 |

| Location | Time | Date | Rain | | Single Sample (adjusted for rain) (ground Stc) E. coli (235 MPN) | Geomean E. coli (126 MPN) |
|---|---|---|---|---|---|---|
| MCW-14b | 1115 | 2/2/2016● | | | **Rain** | **Rain** |
| MCW-14b | 1115 | 2/3/2016 | | | **Rain** | **Rain** |
| MCW-14b | 1115 | 2/4/2016 | | | **Rain** | **Rain** |
| MCW-14b | 1115 | 2/5/2016 | | | **Rain** | **Rain** |
| MCW-14b | 1115 | 2/6/2016 | | | **Rain** | **Rain** |
| MCW-14b | 1115 | 2/7/2016 | | | **Rain** | **Rain** |
| MCW-14b | 1115 | 2/8/2016 | | | **Rain** | **Rain** |
| MCW-14b | 920 | 2/9/2016● | | = | 40 | 46 |
| MCW-14b | 920 | 2/10/2016 | | = | 40 | 35 |
| MCW-14b | 920 | 2/11/2016 | | = | 40 | 34 |
| MCW-14b | 920 | 2/12/2016 | | = | 40 | 33 |
| MCW-14b | 920 | 2/13/2016 | | = | 40 | 32 |
| MCW-14b | 920 | 2/14/2016 | | = | 40 | 30 |
| MCW-14b | 920 | 2/15/2016 | | = | 40 | 39 |
| MCW-14b | 910 | 2/16/2016● | | = | 170 | 46 |
| MCW-14b | 910 | 2/17/2016 | | = | 170 | 52 |
| MCW-14b | 910 | 2/18/2016 | | = | 170 | 56 |
| MCW-14b | 910 | 2/19/2016 | | = | 170 | 60 |
| MCW-14b | 910 | 2/20/2016 | | = | 170 | 64 |
| MCW-14b | 910 | 2/21/2016 | | = | 170 | 68 |
| MCW-14b | 910 | 2/22/2016 | | = | 170 | 74 |
| MCW-14b | 850 | 2/23/2016● | | < | 10 | 72 |
| MCW-14b | 850 | 2/24/2016 | | < | 10 | 77 |
| MCW-14b | 850 | 2/25/2016 | | < | 10 | 66 |
| MCW-14b | 850 | 2/26/2016 | | < | 10 | 61 |
| MCW-14b | 850 | 2/27/2016 | | < | 10 | 57 |
| MCW-14b | 850 | 2/28/2016 | | < | 10 | 54 |
| MCW-14b | 850 | 2/29/2016 | | < | 10 | 50 |
| MCW-15c | 845 | 2/1/2016 | | = | 170 | 36 |
| MCW-15c | 1030 | 2/2/2016● | | | **Rain** | **Rain** |
| MCW-15c | 1030 | 2/3/2016 | | | **Rain** | **Rain** |
| MCW-15c | 1030 | 2/4/2016 | | | **Rain** | **Rain** |
| MCW-15c | 1030 | 2/5/2016 | | | **Rain** | **Rain** |
| MCW-15c | 1030 | 2/6/2016 | | | **Rain** | **Rain** |
| MCW-15c | 1030 | 2/7/2016 | | | **Rain** | **Rain** |
| MCW-15c | 1030 | 2/8/2016 | | | **Rain** | **Rain** |
| MCW-15c | 945 | 2/9/2016● | | = | 20 | 37 |
| MCW-15c | 945 | 2/10/2016 | | = | 20 | 38 |
| MCW-15c | 945 | 2/11/2016 | | = | 20 | 39 |
| MCW-15c | 945 | 2/12/2016 | | = | 20 | 40 |
| MCW-15c | 945 | 2/13/2016 | | = | 20 | 40 |
| MCW-15c | 945 | 2/14/2016 | | = | 20 | 41 |
| MCW-15c | 945 | 2/15/2016 | | = | 20 | 42 |
| MCW-15c | 930 | 2/16/2016● | | = | 70 | 45 |
| MCW-15c | 930 | 2/17/2016 | | = | 70 | 46 |
| MCW-15c | 930 | 2/18/2016 | | = | 70 | 50 |

| Location | Time | Date | Rain | | Single Sample (Adjusted [illegible]) E. coli (235 MPN) | (Geomean) Enterococcus (104 MPN) |
|---|---|---|---|---|---|---|
| MCW-15a | 930 | 2/19/2016 | | < | 70 | 52 |
| MCW-15a | 930 | 2/20/2016 | | < | 70 | 55 |
| MCW-15a | 930 | 2/21/2016 | | < | 70 | 57 |
| MCW-15a | 930 | 2/22/2016 | | < | 70 | 50 |
| MCW-15a | 815 | 2/23/2016* | | < | 10 | 58 |
| MCW-15a | 815 | 2/24/2016 | | < | 10 | 57 |
| MCW-15a | 815 | 2/25/2016 | | < | 10 | 53 |
| MCW-15a | 815 | 2/26/2016 | | < | 10 | 40 |
| MCW-15a | 815 | 2/27/2016 | | < | 10 | 46 |
| MCW-15a | 815 | 2/28/2016 | | < | 10 | 43 |
| MCW-15a | 815 | 2/29/2016 | | < | 10 | 10 |
| MCW-17 | — | 2/1/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/2/2016* | Dry | < | 10 | 10 |
| MCW-17 | — | 2/3/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/4/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/5/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/6/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/7/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/8/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/9/2016* | Dry | < | 10 | 10 |
| MCW-17 | — | 2/10/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/11/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/12/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/13/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/14/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/15/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/16/2016* | Dry | < | 10 | 10 |
| MCW-17 | — | 2/17/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/18/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/19/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/20/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/21/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/22/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/23/2016* | Dry | < | 10 | 10 |
| MCW-17 | — | 2/24/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/25/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/26/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/27/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/28/2016 | Dry | < | 10 | 10 |
| MCW-17 | — | 2/29/2016 | Dry | < | 10 | 10 |
| MCW-18 | — | 2/1/2016 | Dry | < | 10 | 10 |
| MCW-18 | — | 2/2/2016* | Dry | < | 10 | 10 |
| MCW-18 | — | 2/3/2016 | Dry | < | 10 | 10 |
| MCW-18 | — | 2/4/2016 | Dry | < | 10 | 10 |
| MCW-18 | — | 2/5/2016 | Dry | < | 10 | 10 |
| MCW-18 | — | 2/6/2016 | Dry | < | 10 | 10 |

| | | | | Single Sample (adjusted for ½ DL dry and ND) | | Geomean |
|---|---|---|---|---|---|---|
| Location | Time | Date | Dry/Wet | | E. coli | E. coli |
| | | | | | (235 MPN) | (126 MPN) |
| MCW-18 | - | 2/7/2016 | Dry | < | 10 | 10 |
| MCW-18 | - | 2/8/2016 | Dry | < | 10 | 10 |
| MCW-18 | - | 2/9/2016# | Dry | < | 10 | 10 |
| MCW-18 | - | 2/10/2016 | Dry | < | 10 | 10 |
| MCW-18 | - | 2/11/2016 | Dry | < | 10 | 10 |
| MCW-18 | - | 2/12/2016 | Dry | < | 10 | 10 |
| MCW-18 | - | 2/13/2016 | Dry | < | 10 | 10 |
| MCW-18 | - | 2/14/2016 | Dry | < | 10 | 10 |
| MCW-18 | - | 2/15/2016 | Dry | < | 10 | 10 |
| MCW-18 | - | 2/16/2016# | Dry | < | 10 | 10 |
| MCW-18 | - | 2/17/2016 | Dry | < | 10 | 10 |
| MCW-18 | - | 2/18/2016 | Dry | < | 10 | 10 |
| MCW-18 | - | 2/19/2016 | Dry | < | 10 | 10 |
| MCW-18 | - | 2/20/2016 | Dry | < | 10 | 10 |
| MCW-18 | - | 2/21/2016 | Dry | < | 10 | 10 |
| MCW-18 | - | 2/22/2016 | Dry | < | 10 | 10 |
| MCW-18 | - | 2/23/2016# | Dry | < | 10 | 10 |
| MCW-18 | - | 2/24/2016 | Dry | < | 10 | 10 |
| MCW-18 | - | 2/25/2016 | Dry | < | 10 | 10 |
| MCW-18 | - | 2/26/2016 | Dry | < | 10 | 10 |
| MCW-18 | - | 2/27/2016 | Dry | < | 10 | 10 |
| MCW-18 | - | 2/28/2016 | Dry | < | 10 | 10 |
| MCW-18 | - | 2/29/2016 | Dry | < | 10 | 10 |
| | | | | | | |
| | | | | | | |

Notes:
Weeks with wet weather samples (collected less than 72 hours after a day with >0.1" rain) use the previous non-rain single sample value to calculate the geomean.
Results of <20 are adjusted to use half the MDL (=10) in the calculation of the geomean.
* The RWQCB granted permission to replace site MCW-15B with site Special 05 (renamed MCW-15C) on August 11th, 2010.
# Date of sampling

**county of ventura**

**PUBLIC WORKS AGENCY**
**JEFF PRATT**
Agency Director

Watershed Protection District
Tully K. Clifford, Director

Transportation Department
David L. Fleisch, Director

Engineering Services Department
Herbert L. Schwind, Director

Water & Sanitation Department
David J. Sasek, Director

Central Services Department
Janice E. Turner, Director

February 22, 2016

Kangshi Wang, Ph.D.
California Regional Water Quality Control Board
Los Angeles Region
Standards & TMDL Unit
320 West 4th Street, Suite 200
Los Angeles, CA 90013
(213) 576-6780

**Subject: MALIBU CREEK AND LAGOON BACTERIA TMDL COMPLIANCE MONITORING FOR VENTURA COUNTY AND CITY OF THOUSAND OAKS**

Dear Dr. Wang:

The table below summarizes the results of the weekly monitoring effort required by the Malibu Creek and Lagoon Bacteria TMDL (TMDL) Compliance Monitoring Plan (CMP) for the month of January 2016. Sites were sampled weekly on Tuesdays (January 5, 12, 19 and 26). Sites without results reported were not sampled due to insufficient flow and are labeled "Dry." Daily geomeans were calculated using results from the previous 30 days (actual sampling date marked with♦). Weeks with wet weather samples (collected less than 72 hours after a day with > 0.1" rain) use the previous non-rain single sample value to calculate the geomean. Half the detection limit was used for the purpose of calculating the daily geomean for sites with results reported as < 20 MPN/100ml or for dry weather when no sample was taken.

Fecal coliform monitoring has been discontinued, as approved by the Los Angeles Regional Water Quality Control Board on October 31, 2014, in alignment with the Regional Board's removal of the fecal coliform objective for REC-1 freshwaters from the TMDL on June 7, 2012 and subsequent approval by the U.S. Environmental Protection Agency on July 2, 2014.

If you have any questions regarding this matter, please contact Ewelina Mutkowska at (805) 645-1382.

Sincerely,

for Gerhardt Hubner
Deputy Director, Watershed Protection District

CC: Tully Clifford, Watershed Protection District
Ewelina Mutkowska, County of Ventura
Paul Jorgensen, City of Thousand Oaks (via email)
Joe Bellomo, Willdan Associates (via email)
Kelly Fisher, City of Agoura Hills (via email)
Allen Ma, County of Los Angeles (via email)

**Table 1. Weekly sampling results**

| | | | | | Single Sample (cfu/100ml) |
|---|---|---|---|---|---|
| Location | Time | Date | Rain | | E. coli |
| | | | | | (235 MPN) |
| MCW-8b | – | 1/5/2016* | | | Dry |
| MCW-8b | – | 1/12/2016* | | | Dry |
| MCW-8b | – | 1/19/2016* | | | Dry |
| MCW-8b | – | 1/26/2016* | | | Dry |
| | | | | | |
| | | | | | |
| MCW-9 | – | 1/5/2016* | | | Dry |
| MCW-9 | – | 1/12/2016* | | | Dry |
| MCW-9 | – | 1/19/2016* | | | Dry |
| MCW-9 | – | 1/26/2016* | | | Dry |
| | | | | | |
| | | | | | |
| MCW-12 | 1045 | 1/5/2016* | Rain | = | 9,000 |
| MCW-12 | 920 | 1/12/2016* | | = | 1,700 |
| MCW-12 | 1110 | 1/19/2016* | | = | 170 |
| MCW-12 | 720 | 1/26/2016* | | = | 140 |
| | | | | | |
| | | | | | |
| MCW-14b | 950 | 1/5/2016* | Rain | = | 1,300 |
| MCW-14b | 845 | 1/12/2016* | | = | 20 |
| MCW-14b | 1045 | 1/19/2016* | | = | 40 |
| MCW-14b | 745 | 1/26/2016* | | = | 80 |
| | | | | | |
| | | | | | |
| MCW-15c | 850 | 1/5/2016* | Rain | = | 1,100 |
| MCW-15c | 820 | 1/12/2016* | | = | 20 |
| MCW-15c | 1015 | 1/19/2016* | | = | 80 |
| MCW-15c | 645 | 1/26/2016* | | = | 170 |
| | | | | | |
| | | | | | |
| MCW-17 | – | 1/5/2016* | | | Dry |
| MCW-17 | – | 1/12/2016* | | | Dry |
| MCW-17 | – | 1/19/2016* | | | Dry |
| MCW-17 | – | 1/26/2016* | | | Dry |
| | | | | | |
| | | | | | |
| MCW-18 | – | 1/5/2016* | | | Dry |
| MCW-18 | – | 1/12/2016* | | | Dry |
| MCW-18 | – | 1/19/2016* | | | Dry |
| MCW-18 | – | 1/26/2016* | | | Dry |
| | | | | | |

Notes:
c The RWQCB granted permission to replace site MCW-15b with site Special-05 (renamed MCW-15c) on August 11th, 2010.
* Date of sampling

**Table 2. Computation of daily geomean**

| | | | | | Single sample (adjusted for rain, dry and NDs) | Geomean |
|---|---|---|---|---|---|---|
| Location | Time | Date | Rain | | E. coli (235 MPN) | E. coli (126 MPN) |
| MCW-8b | - | 1/1/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/2/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/3/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/4/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/5/2016 * | Dry | < | 10 | 10 |
| MCW-8b | - | 1/6/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/7/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/8/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/9/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/10/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/11/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/12/2016 * | Dry | < | 10 | 10 |
| MCW-8b | - | 1/13/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/14/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/15/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/16/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/17/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/18/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/19/2016 * | Dry | < | 10 | 10 |
| MCW-8b | - | 1/20/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/21/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/22/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/23/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/24/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/25/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/26/2016 * | Dry | < | 10 | 10 |
| MCW-8b | - | 1/27/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/28/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/29/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/30/2016 | Dry | < | 10 | 10 |
| MCW-8b | - | 1/31/2016 | Dry | < | 10 | 10 |
| | | | | | | |
| MCW-9 | - | 1/1/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 1/2/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 1/3/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 1/4/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 1/5/2016 * | Dry | < | 10 | 10 |
| MCW-9 | - | 1/6/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 1/7/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 1/8/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 1/9/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 1/10/2016 | Dry | < | 10 | 10 |
| MCW-9 | - | 1/11/2016 | Dry | < | 10 | 10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW-9 | – | 1/12/2016* | Dry | – | 10 | 10 |
| MCW-9 | – | 1/13/2016 | Dry | – | 12 | 10 |
| MCW-9 | – | 1/14/2016 | Dry | – | 10 | 10 |
| MCW-9 | – | 1/15/2016 | Dry | – | 10 | 10 |
| MCW-9 | – | 1/16/2016 | Dry | – | 10 | 10 |
| MCW-9 | – | 1/17/2016 | Dry | – | 10 | 10 |
| MCW-9 | – | 1/18/2016 | Dry | – | 10 | 10 |
| MCW-9 | – | 1/19/2016* | Dry | – | 10 | 10 |
| MCW-9 | – | 1/20/2016 | Dry | – | 10 | 10 |
| MCW-9 | – | 1/21/2016 | Dry | – | 10 | 10 |
| MCW-9 | – | 1/22/2016 | Dry | – | 10 | 10 |
| MCW-9 | – | 1/23/2016 | Dry | – | 10 | 10 |
| MCW-9 | – | 1/24/2016 | Dry | – | 10 | 10 |
| MCW-9 | – | 1/25/2016 | Dry | – | 10 | 10 |
| MCW-9 | – | 1/26/2016* | Dry | – | 10 | 10 |
| MCW-9 | – | 1/27/2016 | Dry | – | 10 | 10 |
| MCW-9 | – | 1/28/2016 | Dry | – | 10 | 10 |
| MCW-9 | – | 1/29/2016 | Dry | – | 10 | 10 |
| MCW-9 | – | 1/30/2016 | Dry | – | 10 | 10 |
| MCW-9 | – | 1/31/2016 | Dry | – | 10 | 10 |
| | | | | | | |
| MCW-12 | – | 1/1/2016 | Dry | – | 10 | 10 |
| MCW-12 | – | 1/2/2016 | Dry | – | 10 | 10 |
| MCW-12 | – | 1/3/2016 | Dry | – | 10 | 10 |
| MCW-12 | – | 1/4/2016 | Dry | – | 10 | 10 |
| MCW-12 | 1045 | 1/5/2016* | Rain | | **Rain** | **Rain** |
| MCW-12 | 1045 | 1/6/2016 | Rain | | **Rain** | **Rain** |
| MCW-12 | 1045 | 1/7/2016 | Rain | | **Rain** | **Rain** |
| MCW-12 | 1045 | 1/8/2016 | Rain | | **Rain** | **Rain** |
| MCW-12 | 1045 | 1/9/2016 | Rain | | **Rain** | **Rain** |
| MCW-12 | 1045 | 1/10/2016 | Rain | | **Rain** | **Rain** |
| MCW-12 | 1045 | 1/11/2016 | Rain | | **Rain** | **Rain** |
| MCW-12 | 910 | 1/12/2016* | | – | 1,700 | 12 |
| MCW-12 | 910 | 1/13/2016 | | – | 1,700 | 44 |
| MCW-12 | 910 | 1/14/2016 | | – | 1,700 | 17 |
| MCW-12 | 910 | 1/15/2016 | | – | 1,700 | 26 |
| MCW-12 | 910 | 1/16/2016 | | – | 1,700 | 29 |
| MCW-12 | 910 | 1/17/2016 | | – | 1,700 | 22 |
| MCW-12 | 910 | 1/18/2016 | | – | 1,700 | 33 |
| MCW-12 | 1110 | 1/19/2016* | | – | 170 | 36 |
| MCW-12 | 1110 | 1/20/2016 | | – | 170 | 40 |
| MCW-12 | 1110 | 1/21/2016 | | – | 170 | 44 |
| MCW-12 | 1110 | 1/22/2016 | | – | 170 | 38 |
| MCW-12 | 1110 | 1/23/2016 | | – | 170 | 53 |
| MCW-12 | 1110 | 1/24/2016 | | – | 170 | 58 |
| MCW-12 | 1110 | 1/25/2016 | | – | 170 | 44 |
| MCW-12 | 1110 | 1/26/2016* | | – | 170 | 77 |
| MCW-12 | 1110 | 1/27/2016 | | – | 170 | 81 |
| MCW-12 | 1110 | 1/28/2016 | | – | 170 | 88 |
| MCW-12 | 720 | [illegible] | | – | 140 | 119 |

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW-12 | 720 | 1/30/2016 | | = | 140 | 102 |
| MCW-12 | 720 | 1/31/2016 | | = | 140 | 111 |
| | | | | | | |
| MCW-14b | 850 | 1/1/2016 | | = | 80 | 260 |
| MCW-14b | 850 | 1/2/2016 | | = | 80 | 272 |
| MCW-14b | 850 | 1/3/2016 | | = | 80 | 283 |
| MCW-14b | 850 | 1/4/2016 | | = | 80 | [illegible] |
| MCW-14b | 930 | 1/5/2016 * | | | [illegible] | [illegible] |
| MCW-14b | 930 | 1/6/2016 | | | [illegible] | [illegible] |
| MCW-14b | 930 | 1/7/2016 | | | [illegible] | [illegible] |
| MCW-14b | 930 | 1/8/2016 | | | [illegible] | [illegible] |
| MCW-14b | 930 | 1/9/2016 | | | [illegible] | [illegible] |
| MCW-14b | 930 | 1/10/2016 | | | [illegible] | [illegible] |
| MCW-14b | 930 | 1/11/2016 | | | [illegible] | [illegible] |
| MCW-14b | 845 | 1/12/2016 * | | = | 20 | 289 |
| MCW-14b | 845 | 1/13/2016 | | = | 20 | 299 |
| MCW-14b | 845 | 1/14/2016 | | = | 20 | 285 |
| MCW-14b | 845 | 1/15/2016 | | = | 20 | 272 |
| MCW-14b | 845 | 1/16/2016 | | = | 20 | 260 |
| MCW-14b | 845 | 1/17/2016 | | = | 20 | 248 |
| MCW-14b | 845 | 1/18/2016 | | = | 20 | 237 |
| MCW-14b | 1045 | 1/19/2016 * | | = | 80 | 227 |
| MCW-14b | 1045 | 1/20/2016 | | = | 80 | 237 |
| MCW-14b | 1045 | 1/21/2016 | | = | 80 | 227 |
| MCW-14b | 1045 | 1/22/2016 | | = | 80 | 217 |
| MCW-14b | 1045 | 1/23/2016 | | = | 80 | 209 |
| MCW-14b | 1045 | 1/24/2016 | | = | 80 | 199 |
| MCW-14b | 1045 | 1/25/2016 | | = | 80 | 190 |
| MCW-14b | 1045 | 1/26/2016 * | | = | 80 | 182 |
| MCW-14b | 1045 | 1/27/2016 | | = | 80 | 174 |
| MCW-14b | 1045 | 1/28/2016 | | = | 80 | 149 |
| MCW-14b | 745 | 1/29/2016 | | = | 80 | 127 |
| MCW-14b | 745 | 1/30/2016 | | = | 80 | 109 |
| MCW-14b | 745 | 1/31/2016 | | = | 80 | 93 |
| | | | | | | |
| MCW-15c | 820 | 1/1/2016 | | = | 10 | 208 |
| MCW-15c | 820 | 1/2/2016 | | = | 10 | 197 |
| MCW-15c | 820 | 1/3/2016 | | = | 10 | 188 |
| MCW-15c | 820 | 1/4/2016 | | = | 10 | 178 |
| MCW-15c | 850 | 1/5/2016 * | | | [illegible] | [illegible] |
| MCW-15c | 850 | 1/6/2016 | | | [illegible] | [illegible] |
| MCW-15c | 850 | 1/7/2016 | | | [illegible] | [illegible] |
| MCW-15c | 850 | 1/8/2016 | | | [illegible] | [illegible] |
| MCW-15c | 850 | 1/9/2016 | | | [illegible] | [illegible] |
| MCW-15c | 850 | 1/10/2016 | | | [illegible] | [illegible] |
| MCW-15c | 850 | 1/11/2016 | | | [illegible] | [illegible] |
| MCW-15c | 820 | 1/12/2016 * | | = | 20 | 93 |
| MCW-15c | 820 | 1/13/2016 | | = | 20 | 77 |
| MCW-15c | 820 | 1/14/2016 | | = | 20 | 66 |
| MCW-15c | 820 | 1/15/2016 | | = | 20 | 56 |
| MCW-15c | 820 | 1/16/2016 | | = | 20 | 48 |

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW-15e | 820 | 1/17/2016 | | — | 20 | 40 |
| MCW-15e | 820 | 1/18/2016 | | — | 20 | 35 |
| MCW-15e | 1015 | 1/19/2016● | | — | 80 | 37 |
| MCW-15e | 1015 | 1/20/2016 | | — | 80 | 28 |
| MCW-15e | 1015 | 1/21/2016 | | — | 80 | 27 |
| MCW-15e | 1015 | 1/22/2016 | | — | 80 | 25 |
| MCW-15e | 1015 | 1/23/2016 | | — | 80 | 25 |
| MCW-15e | 1015 | 1/24/2016 | | — | 80 | 24 |
| MCW-15e | 1015 | 1/25/2016 | | — | 80 | 25 |
| MCW-15e | 1015 | 1/26/2016● | | — | 80 | 25 |
| MCW-15e | 1015 | 1/27/2016 | | — | 80 | 25 |
| MCW-15e | 1015 | 1/28/2016 | | — | 80 | 24 |
| MCW-15e | 645 | 1/29/2016 | | — | 170 | 25 |
| MCW-15e | 645 | 1/30/2016 | | — | 170 | 28 |
| MCW-15e | 645 | 1/31/2016 | | — | 170 | 25 |
| | | | | | | |
| MCW-17 | — | 1/1/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/2/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/3/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/4/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/5/2016● | Dry | — | 10 | 10 |
| MCW-17 | — | 1/6/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/7/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/8/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/9/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/10/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/11/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/12/2016● | Dry | — | 10 | 10 |
| MCW-17 | — | 1/13/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/14/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/15/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/16/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/17/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/18/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/19/2016● | Dry | — | 10 | 10 |
| MCW-17 | — | 1/20/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/21/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/22/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/23/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/24/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/25/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/26/2016● | Dry | — | 10 | 10 |
| MCW-17 | — | 1/27/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/28/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/29/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/30/2016 | Dry | — | 10 | 10 |
| MCW-17 | — | 1/31/2016 | Dry | — | 10 | 10 |
| | | | | | | |
| MCW-18 | — | 1/1/2016 | Dry | — | 10 | 10 |
| MCW-18 | — | 1/2/2016 | Dry | — | 10 | 10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW-18 | | 1/3/2016 | Dry | | 10 | 10 |
| MCW-18 | – | 1/4/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/5/2016* | Dry | < | 10 | 10 |
| MCW-18 | – | 1/6/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/7/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/8/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/9/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/10/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/11/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/12/2016* | Dry | < | 10 | 10 |
| MCW-18 | – | 1/13/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/14/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/15/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/16/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/17/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/18/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/19/2016* | Dry | < | 10 | 10 |
| MCW-18 | – | 1/20/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/21/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/22/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/23/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/24/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/25/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/26/2016* | Dry | < | 10 | 10 |
| MCW-18 | – | 1/27/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/28/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/29/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/30/2016 | Dry | < | 10 | 10 |
| MCW-18 | – | 1/31/2016 | Dry | < | 10 | 10 |

Notes:
Weeks with wet weather samples (collected less than 72 hours after a day with >0.1" rain) use the previous non-rain single sample value to calculate the geomean. Results of <20 are adjusted to one half the MDL (=10) in the calculation of the geomean.
* The RWQCB granted permission to replace site MCW-15 with [illegible] (renamed MCW-15C) on August 11th, 2010

* Date of sampling

county of ventura

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January 19, 2016

Kangshi Wang, Ph.D.
California Regional Water Quality Control Board
Los Angeles Region
Standards & TMDL Unit
320 West 4th Street, Suite 200
Los Angeles, CA 90013
(213) 576-6780

**Subject: MALIBU CREEK AND LAGOON BACTERIA TMDL COMPLIANCE MONITORING FOR VENTURA COUNTY AND CITY OF THOUSAND OAKS**

Dear Dr. Wang:

The table below summarizes the results of the weekly monitoring effort required by the Malibu Creek and Lagoon Bacteria TMDL (TMDL) Compliance Monitoring Plan (CMP) for the month of November 2015. Sites were sampled weekly on Tuesdays (December 1, 8, 15, 22 and 29). Sites without results reported were not sampled due to insufficient flow and are labeled "Dry." Daily geomeans were calculated using results from the previous 30 days (actual sampling date marked with ♦). Weeks with wet weather samples (collected less than 72 hours after a day with > 0.1" rain) use the previous non-rain single sample value to calculate the geomean. Half the detection limit was used for the purpose of calculating the daily geomean for sites with results reported as < 20 MPN/100ml or for dry weather when no sample was taken.

Fecal coliform monitoring has been discontinued, as approved by the Los Angeles Regional Water Quality Control Board on October 31, 2014, in alignment with the Regional Board's removal of the fecal coliform objective for REC-1 freshwaters from the TMDL on June 7, 2012 and subsequent approval by the U.S. Environmental Protection Agency on July 2, 2014.

If you have any questions regarding this matter, please contact Ewelina Mutkowska at (805) 645-1382.

Sincerely,

Gerhardt Hubner
Deputy Director, Watershed Protection District

CC: Tully Clifford, Watershed Protection District
Ewelina Mutkowska, County of Ventura
Paul Jorgensen, City of Thousand Oaks (via email)
Joe Bellomo, Willdan Associates (via email)
Kelly Fisher, City of Agoura Hills (via email)
Allen Ma, County of Los Angeles (via email)

**Table 1. Weekly sampling results**

| Location | Time | Date | Rain | | Single Sample (as sampled) E. coli (MPN) |
|---|---|---|---|---|---|
| MCW-8b | — | 12/1/2015● | | | Dry |
| MCW-8b | — | 12/8/2015● | | | Dry |
| MCW-8b | — | 12/15/2015● | | | Dry |
| MCW-8b | — | 12/22/2015● | | | Dry |
| MCW-8b | — | 12/29/2015● | | | Dry |
| | | | | | |
| MCW-8 | — | 12/1/2015● | | | Dry |
| MCW-8 | — | 12/8/2015● | | | Dry |
| MCW-8 | — | 12/15/2015● | | | Dry |
| MCW-8 | — | 12/22/2015● | | | Dry |
| MCW-8 | — | 12/29/2015● | | | Dry |
| | | | | | |
| MCW-12 | — | 12/1/2015● | | | Dry |
| MCW-12 | — | 12/8/2015● | | | Dry |
| MCW-12 | — | 12/15/2015● | | | Dry |
| MCW-12 | — | 12/22/2015● | Rain | = | 2,400 |
| MCW-12 | — | 12/29/2015● | | | Dry |
| | | | | | |
| MCW-14b | 1055 | 12/1/2015● | | = | 80 |
| MCW-14b | 845 | 12/8/2015● | | = | 300 |
| MCW-14b | 745 | 12/15/2015● | | = | 1,600 |
| MCW-14b | 1005 | 12/22/2015● | Rain | = | 300 |
| MCW-14b | 850 | 12/29/2015● | | = | 80 |
| | | | | | |
| MCW-15c | 1030 | 12/1/2015● | | = | 2,400 |
| MCW-15c | 820 | 12/8/2015● | | = | 220 |
| MCW-15c | 720 | 12/15/2015● | | = | 20 |
| MCW-15c | 925 | 12/22/2015● | Rain | = | 230 |
| MCW-15c | 820 | 12/29/2015● | | = | 30 |
| | | | | | |
| MCW-17 | — | 12/1/2015● | | | Dry |
| MCW-17 | — | 12/8/2015● | | | Dry |
| MCW-17 | — | 12/15/2015● | | | Dry |
| MCW-17 | — | 12/22/2015● | | | Dry |
| MCW-17 | — | 12/29/2015● | | | Dry |
| | | | | | |
| MCW-18 | — | 12/1/2015● | | | Dry |
| MCW-18 | — | 12/8/2015● | | | Dry |
| MCW-18 | — | 12/15/2015● | | | Dry |
| MCW-18 | — | 12/22/2015● | | | Dry |
| MCW-18 | — | 12/29/2015● | | | Dry |

Notes:
* The RWQCB granted permission to replace the MCW-15b with [illegible] (renamed MCW-15c) on August 10th, 2015
● Date of sampling

**Table 1. Weekly sampling results**

| Location | Time | Date | Rain | | Single Sample (as sampled) E. coli (235 MPN) |
|---|---|---|---|---|---|
| MCW-8b | | 12/1/2015● | | | Dry |
| MCW-8b | – | 12/8/2015● | | | Dry |
| MCW-8b | | 12/15/2015● | | | Dry |
| MCW-8b | – | 12/22/2015● | | | Dry |
| MCW-8b | – | 12/29/2015● | | | Dry |
| | | | | | |
| MCW-9 | – | 12/1/2015● | | | Dry |
| MCW-9 | – | 12/8/2015● | | | Dry |
| MCW-9 | – | 12/15/2015● | | | Dry |
| MCW-9 | – | 12/22/2015● | | | Dry |
| MCW-9 | – | 12/29/2015● | | | Dry |
| | | | | | |
| MCW-12 | – | 12/1/2015● | | | Dry |
| MCW-12 | – | 12/8/2015● | | | Dry |
| MCW-12 | – | 12/15/2015● | | | Dry |
| MCW-12 | – | 12/22/2015● | Rain | = | 2,400 |
| MCW-12 | – | 12/29/2015● | | | Dry |
| | | | | | |
| MCW-14b | 1055 | 12/1/2015● | | = | 80 |
| MCW-14b | 845 | 12/8/2015● | | = | 300 |
| MCW-14b | 745 | 12/15/2015● | | = | 9,000 |
| MCW-14b | 1005 | 12/22/2015● | Rain | = | 300 |
| MCW-14b | 850 | 12/29/2015● | | = | 80 |
| | | | | | |
| MCW-15c | 1030 | 12/1/2015● | | = | 2,400 |
| MCW-15c | 820 | 12/8/2015● | | = | 220 |
| MCW-15c | 720 | 12/15/2015● | | < | 20 |
| MCW-15c | 925 | 12/22/2015● | Rain | = | 250 |
| MCW-15c | 820 | 12/29/2015● | | < | 20 |
| | | | | | |
| MCW-17 | – | 12/1/2015● | | | Dry |
| MCW-17 | – | 12/8/2015● | | | Dry |
| MCW-17 | – | 12/15/2015● | | | Dry |
| MCW-17 | – | 12/22/2015● | | | Dry |
| MCW-17 | | 12/29/2015● | | | Dry |
| | | | | | |
| MCW-18 | – | 12/1/2015● | | | Dry |
| MCW-18 | – | 12/8/2015● | | | Dry |
| MCW-18 | – | 12/15/2015● | | | Dry |
| MCW-18 | – | 12/22/2015● | | | Dry |
| MCW-18 | – | 12/29/2015● | | | Dry |

Notes:
* The RWQCB granted permission to replace site MCW-15b with site Special-09 (renamed MCW-15c) on August 11th, 2010
● Date of sampling

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW-9 | — | 12/12/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/13/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/14/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/15/2015● | Dry | < | 10 | 10 |
| MCW-9 | — | 12/16/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/17/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/18/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/19/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/20/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/21/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/22/2015● | Dry | < | 10 | 10 |
| MCW-9 | — | 12/23/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/24/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/25/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/26/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/27/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/28/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/29/2015● | Dry | < | 10 | 10 |
| MCW-9 | — | 12/30/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/31/2015 | Dry | < | 10 | 10 |
| | | | | | | |
| MCW-12 | — | 12/1/2015● | Dry | < | 10 | 10 |
| MCW-12 | — | 12/2/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/3/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/4/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/5/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/6/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/7/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/8/2015● | Dry | < | 10 | 10 |
| MCW-12 | — | 12/9/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/10/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/11/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/12/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/13/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/14/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/15/2015● | Dry | < | 10 | 10 |
| MCW-12 | — | 12/16/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/17/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/18/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/19/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/20/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/21/2015 | Dry | < | 10 | 10 |
| MCW-12 | 1055 | 12/22/2015● | Rain | | [illegible] | [illegible] |
| MCW-12 | 1055 | 12/23/2015 | Rain | | [illegible] | [illegible] |
| MCW-12 | 1055 | 12/24/2015 | Rain | | [illegible] | [illegible] |
| MCW-12 | 1055 | 12/25/2015 | Rain | | [illegible] | [illegible] |
| MCW-12 | 1055 | 12/26/2015 | Rain | | [illegible] | [illegible] |
| MCW-12 | 1055 | 12/27/2015 | Rain | | [illegible] | [illegible] |
| MCW-12 | 1055 | 12/28/2015 | Rain | | [illegible] | [illegible] |
| MCW-12 | — | 12/29/2015● | Dry | < | 10 | 10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW-9 | — | 12/12/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/13/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/14/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/15/2015● | Dry | < | 10 | 10 |
| MCW-9 | — | 12/16/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/17/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/18/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/19/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/20/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/21/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/22/2015● | Dry | < | 10 | 10 |
| MCW-9 | — | 12/23/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/24/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/25/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/26/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/27/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/28/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/29/2015● | Dry | < | 10 | 10 |
| MCW-9 | — | 12/30/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 12/31/2015 | Dry | < | 10 | 10 |
| | | | | | | |
| MCW-12 | — | 12/1/2015● | Dry | < | 10 | 10 |
| MCW-12 | — | 12/2/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/3/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/4/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/5/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/6/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/7/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/8/2015● | Dry | < | 10 | 10 |
| MCW-12 | — | 12/9/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/10/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/11/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/12/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/13/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/14/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/15/2015● | Dry | < | 10 | 10 |
| MCW-12 | — | 12/16/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/17/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/18/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/19/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/20/2015 | Dry | < | 10 | 10 |
| MCW-12 | — | 12/21/2015 | Dry | < | 10 | 10 |
| MCW-12 | 1055 | 12/22/2015● | Rain | | [illegible] | [illegible] |
| MCW-12 | 1055 | 12/23/2015 | Rain | | [illegible] | [illegible] |
| MCW-12 | 1055 | 12/24/2015 | Rain | | [illegible] | [illegible] |
| MCW-12 | 1055 | 12/25/2015 | Rain | | [illegible] | [illegible] |
| MCW-12 | 1055 | 12/26/2015 | Rain | | [illegible] | [illegible] |
| MCW-12 | 1055 | 12/27/2015 | Rain | | [illegible] | [illegible] |
| MCW-12 | 1055 | 12/28/2015 | Rain | | [illegible] | [illegible] |
| MCW-12 | | 12/29/2015● | Dry | < | 10 | 10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW-13 | | 12/30/2015 | Dry | | 10 | 10 |
| MCW-12 | | 12/30/2015 | Dry | = | 10 | 10 |
| | | | | | | |
| MCW-14b | 1055 | 12/1/2015● | | = | 80 | 119 |
| MCW-14b | 1055 | 12/2/2015 | | = | 80 | 125 |
| MCW-14b | 1055 | 12/3/2015 | | = | 80 | 118 |
| MCW-14b | 1055 | 12/4/2015 | | = | 80 | 123 |
| MCW-14b | 1055 | 12/5/2015 | | = | 80 | 108 |
| MCW-14b | 1055 | 12/6/2015 | | = | 80 | 104 |
| MCW-14b | 1055 | 12/7/2015 | | = | 80 | 99 |
| MCW-14b | 845 | 12/8/2015● | | = | 300 | 99 |
| MCW-14b | 845 | 12/9/2015 | | = | 300 | 99 |
| MCW-14b | 845 | 12/10/2015 | | = | 300 | 99 |
| MCW-14b | 845 | 12/11/2015 | | = | 300 | 99 |
| MCW-14b | 845 | 12/12/2015 | | = | 300 | 99 |
| MCW-14b | 845 | 12/13/2015 | | = | 300 | 99 |
| MCW-14b | 845 | 12/14/2015 | | = | 300 | 99 |
| MCW-14b | 745 | 12/15/2015● | | = | 9,000 | 111 |
| MCW-14b | 745 | 12/16/2015 | | = | 9,000 | 120 |
| MCW-14b | 745 | 12/17/2015 | | = | 9,000 | 139 |
| MCW-14b | 745 | 12/18/2015 | | = | 9,000 | 140 |
| MCW-14b | 745 | 12/19/2015 | | = | 9,000 | 181 |
| MCW-14b | 745 | 12/20/2015 | | = | 9,000 | 213 |
| MCW-14b | 745 | 12/21/2015 | | = | 9,000 | 345 |
| MCW-14b | 1005 | 12/22/2015● | Rain | | **Rain** | **Rain** |
| MCW-14b | 1005 | 12/23/2015 | Rain | | **Rain** | **Rain** |
| MCW-14b | 1005 | 12/24/2015 | Rain | | **Rain** | **Rain** |
| MCW-14b | 1005 | 12/25/2015 | Rain | | **Rain** | **Rain** |
| MCW-14b | 1005 | 12/26/2015 | Rain | | **Rain** | **Rain** |
| MCW-14b | 1005 | 12/27/2015 | Rain | | **Rain** | **Rain** |
| MCW-14b | 1005 | 12/28/2015 | Rain | | **Rain** | **Rain** |
| MCW-14b | 850 | 12/29/2015● | | = | 80 | 241 |
| MCW-14b | 850 | 12/30/2015 | | = | 80 | 237 |
| MCW-14b | 850 | 12/31/2015 | | = | 80 | 248 |
| | | | | | | |
| MCW-15c | 1030 | 12/1/2015● | | = | 2,400 | 139 |
| MCW-15c | 1030 | 12/2/2015 | | = | 2,400 | 133 |
| MCW-15c | 1030 | 12/3/2015 | | = | 2,400 | 176 |
| MCW-15c | 1030 | 12/4/2015 | | = | 2,400 | 216 |
| MCW-15c | 1030 | 12/5/2015 | | = | 2,400 | 283 |
| MCW-15c | 1030 | 12/6/2015 | | = | 2,400 | 339 |
| MCW-15c | 1030 | 12/7/2015 | | = | 2,400 | 407 |
| MCW-15c | 820 | 12/8/2015● | | = | 220 | 452 |
| MCW-15c | 820 | 12/9/2015 | | = | 220 | 502 |
| MCW-15c | 820 | 12/10/2015 | | = | 220 | [illegible] |
| MCW-15c | 820 | 12/11/2015 | | = | 220 | 561 |
| MCW-15c | 820 | 12/12/2015 | | = | 220 | 589 |
| MCW-15c | 820 | 12/13/2015 | | = | 220 | 626 |
| MCW-15c | 820 | 12/14/2015 | | = | 220 | 658 |
| [illegible] | 730 | 12/15/2015● | | = | 10 | 605 |
| MCW-15c | 730 | 12/16/2015 | | = | 10 | 606 |

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW-15c | 720 | 12/17/2015 | | < | 10 | 520 |
| MCW-15c | 720 | 12/18/2015 | | < | 10 | 515 |
| MCW-15c | 720 | 12/19/2015 | | < | 10 | 450 |
| MCW-15c | 720 | 12/20/2015 | | < | 10 | [illegible] |
| MCW-15c | 720 | 12/21/2015 | | < | 10 | [illegible] |
| MCW-15c | 925 | 12/22/2015● | Rain | | **Rain** | **Rain** |
| MCW-15c | 925 | 12/23/2015 | Rain | | **Rain** | **Rain** |
| MCW-15c | 925 | 12/24/2015 | Rain | | **Rain** | **Rain** |
| MCW-15c | 925 | 12/25/2015 | Rain | | **Rain** | **Rain** |
| MCW-15c | 925 | 12/26/2015 | Rain | | **Rain** | **Rain** |
| MCW-15c | 925 | 12/27/2015 | Rain | | **Rain** | **Rain** |
| MCW-15c | 925 | 12/28/2015 | Rain | | **Rain** | **Rain** |
| MCW-15c | 820 | 12/29/2015● | | < | 10 | 227 |
| MCW-15c | 820 | 12/30/2015 | | < | 10 | 228 |
| MCW-15c | 820 | 12/31/2015 | | < | 10 | 250 |
| | | | | | | |
| MCW-17 | - | 12/1/2015● | Dry | < | 10 | 10 |
| MCW-17 | - | 12/2/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/3/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/4/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/5/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/6/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/7/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/08/2015● | Dry | < | 10 | 10 |
| MCW-17 | - | 12/9/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/10/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/11/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/12/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/13/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/14/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/15/2015● | Dry | < | 10 | 10 |
| MCW-17 | - | 12/16/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/17/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/18/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/19/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/20/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/21/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/22/2015● | Dry | < | 10 | 10 |
| MCW-17 | - | 12/23/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/24/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/25/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/26/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/27/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/28/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/29/2015● | Dry | < | 10 | 10 |
| MCW-17 | - | 12/30/2015 | Dry | < | 10 | 10 |
| MCW-17 | - | 12/31/2015 | Dry | < | 10 | 10 |
| | | | | | | |
| MCW-18 | - | 12/1/2015● | Dry | < | 10 | [illegible] |
| MCW-18 | - | 12/2/2015 | Dry | < | 10 | [illegible] |

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW-18 | -- | 12/3/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/4/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/5/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/6/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/7/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/8/2015• | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/9/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/10/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/11/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/12/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/13/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/14/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/15/2015• | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/16/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/17/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/18/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/19/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/20/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/21/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/22/2015• | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/23/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/24/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/25/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/26/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/27/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/28/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/29/2015• | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/30/2015 | Dry | < | 10 | 10 |
| MCW-18 | -- | 12/31/2015 | Dry | < | 10 | 10 |

Notes:
[illegible] samples [illegible] 72 hours after a [illegible] use the previous [illegible] sample value to calculate the geomean. Results of <20 are adjusted to [illegible] in the calculations of the geomean.
* The RWQCB granted permission to replace [illegible] MCW-15b with [illegible] (renamed MCW-15b) on August 11th, 2010
• Date of sampling

# county of ventura

**PUBLIC WORKS AGENCY**
**JEFF PRATT**
Agency Director

Watershed Protection District
**Tully K. Clifford, Director**

Transportation Department
**David L. Fleisch, Director**

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Central Services Department
**Janice E. Turner, Director**


December 21, 2015

Kangshi Wang, Ph.D.
California Regional Water Quality Contol Board
Los Angeles Region
Standards & TMDL Unit
320 West 4th Street, Suite 200
Los Angeles, CA 90013
(213) 576-6780

**Subject: MALIBU CREEK AND LAGOON BACTERIA TMDL COMPLIANCE MONITORING FOR VENTURA COUNTY AND CITY OF THOUSAND OAKS**

Dear Dr. Wang:

The table below summarizes the results of the weekly monitoring effort required by the Malibu Creek and Lagoon Bacteria TMDL (TMDL) Compliance Monitoring Plan (CMP) for the month of November 2015. Sites were sampled weekly on Tuesdays (November 3, 10 and 24), except for one instance when sites were sampled on Wednesday (November 18) due to staffing conflicts. Sites without results reported were not sampled due to insufficient flow and are labeled "Dry." Daily geomeans were calculated using results from the previous 30 days (actual sampling date marked with ♦). Weeks with wet weather samples (collected less than 72 hours after a day with > 0.1" rain) use the previous non-rain single sample value to calculate the geomean. Half the detection limit was used for the purpose of calculating the daily geomean for sites with results reported as < 20 MPN/100ml or for dry weather when no sample was taken.

Fecal coliform monitoring has been discontinued, as approved by the Los Angeles Regional Water Quality Control Board on October 31, 2014, in alignment with the Regional Board's removal of the fecal coliform objective for REC-1 freshwaters from the TMDL on June 7, 2012 and subsequent approval by the U.S. Environmental Protection Agency on July 2, 2014.

If you have any questions regarding this matter, please contact Ewelina Mutkowska at (805) 645-1382.

Sincerely,

Gerhardt Hubner
Deputy Director, Watershed Protection District

CC: Tully Clifford, Watershed Protection District
Ewelina Mutkowska, County of Ventura
Paul Jorgensen, City of Thousand Oaks (via email)
Joe Bellomo, Willdan Associates (via email)
Allen Ma, County of Los Angeles (via email)
Kelly Fisher, City of Agoura (via email)

**Table 1. Weekly sampling results**

| Location | Time | Date | Rain | | Single Sample (as sampled) E. coli (235 MPN) |
|---|---|---|---|---|---|
| | | | | | |
| [illegible] | – | 11/3/2015* | | | Dry |
| [illegible] | – | 11/10/2015* | | | Dry |
| [illegible] | – | 11/18/2015* | | | Dry |
| [illegible] | – | 11/24/2015* | | | Dry |
| | | | | | |
| | | | | | |
| [illegible] | – | 11/3/2015* | | | Dry |
| [illegible] | – | 11/10/2015* | | | Dry |
| [illegible] | – | 11/18/2015* | | | Dry |
| [illegible] | – | 11/24/2015* | | | Dry |
| | | | | | |
| | | | | | |
| MCW-12 | – | 11/3/2015* | | | Dry |
| MCW-12 | – | 11/10/2015* | | | Dry |
| MCW-12 | – | 11/18/2015* | | | Dry |
| MCW-12 | – | 11/24/2015* | | | Dry |
| | | | | | |
| | | | | | |
| MCW-14B | 800 | 11/3/2015* | | – | 300 |
| MCW-14B | 925 | 11/10/2015* | | – | 300 |
| MCW-14B | 800 | 11/18/2015* | | – | 130 |
| MCW-14B | 915 | 11/24/2015* | | – | 20 |
| | | | | | |
| | | | | | |
| [illegible] | 730 | 11/3/2015* | | – | 20 |
| [illegible] | 830 | 11/10/2015* | | – | 40 |
| [illegible] | 730 | 11/18/2015* | | – | 350 |
| MCW-15 | 915 | 11/24/2015* | | – | 5,000 |
| | | | | | |
| | | | | | |
| MCW-17 | – | 11/3/2015* | | | Dry |
| MCW-17 | – | 11/10/2015* | | | Dry |
| [illegible] | | 11/18/2015* | | | Dry |
| [illegible] | | 11/24/2015* | | | Dry |
| | | | | | |
| | | | | | |
| MCW-18 | | 11/3/2015* | | | Dry |
| MCW-18 | | 11/10/2015* | | | Dry |
| MCW-18 | | 11/18/2015* | | | Dry |
| MCW-18 | | 11/24/2015* | | | Dry |
| | | | | | |

[illegible]
[illegible]
[illegible]

**Table 2. Computation of daily geomean**

| | | | | | Single Sample (adjusted for rain, dry and NDs) | Geomean |
|---|---|---|---|---|---|---|
| Location | Time | Date | Rain | | E. coli | E. coli |
| | | | | | (235 MPN) | (126 MPN) |
| MCW-8b | | 11/1/2015 | Dry | | 10 | 10 |
| MCW-8b | – | 11/2/2015 | Dry | < | 10 | 10 |
| MCW-8b | | 11/3/2015* | Dry | | 10 | 10 |
| MCW-8b | | 11/4/2015 | Dry | < | 10 | 10 |
| MCW-8b | | 11/5/2015 | Dry | | 10 | 10 |
| MCW-8b | | 11/6/2015 | Dry | | 10 | 10 |
| MCW-8b | – | 11/7/2015 | Dry | < | 10 | 10 |
| MCW-8b | – | 11/8/2015 | Dry | < | 10 | 10 |
| MCW-8b | – | 11/9/2015 | Dry | < | 10 | 10 |
| MCW-8b | | 11/10/2015* | Dry | < | 10 | 10 |
| MCW-8b | – | 11/11/2015 | Dry | < | 10 | 10 |
| MCW-8b | | 11/12/2015 | Dry | < | 10 | 10 |
| MCW-8b | | 11/13/2015 | Dry | | 10 | 10 |
| MCW-8b | | 11/14/2015 | Dry | | 10 | 10 |
| MCW-8b | | 11/15/2015 | Dry | | 10 | 10 |
| MCW-8b | | 11/16/2015 | Dry | | 10 | 10 |
| MCW-8b | – | 11/17/2015 | Dry | – | 10 | 10 |
| MCW-8b | – | 11/18/2015* | Dry | – | 10 | 10 |
| MCW-8b | – | 11/19/2015 | Dry | – | 10 | 10 |
| MCW-8b | – | 11/20/2015 | Dry | < | 10 | 10 |
| MCW-8b | – | 11/21/2015 | Dry | < | 10 | 10 |
| MCW-8b | – | 11/22/2015 | Dry | | 10 | 10 |
| MCW-8b | | 11/23/2015 | Dry | – | 10 | 10 |
| MCW-8b | | 11/24/2015* | Dry | | 10 | 10 |
| MCW-8b | – | 11/25/2015 | Dry | | 10 | 10 |
| MCW-8b | | 11/26/2015 | Dry | – | 10 | 10 |
| MCW-8b | | 11/27/2015 | Dry | < | 10 | 10 |
| MCW-8b | – | 11/28/2015 | Dry | < | 10 | 10 |
| MCW-8b | | 11/29/2015 | Dry | – | 10 | 10 |
| MCW-8b | | 11/30/2015 | Dry | | 10 | 10 |
| | | | | | | |
| MCW-9 | | 11/1/2015 | Dry | | 10 | 10 |
| MCW-9 | | 11/2/2015 | Dry | | 10 | 10 |
| MCW-9 | – | 11/3/2015* | Dry | | 10 | 10 |
| MCW-9 | – | 11/4/2015 | Dry | | 10 | 10 |
| MCW-9 | – | 11/5/2015 | Dry | | 10 | 10 |
| MCW-9 | | 11/6/2015 | Dry | | 10 | 10 |
| MCW-9 | | 11/7/2015 | Dry | | 10 | 10 |
| MCW-9 | | 11/8/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 11/9/2015 | Dry | | 10 | 10 |
| MCW-9 | | 11/10/2015* | Dry | | 10 | 10 |
| MCW-9 | | 11/11/2015 | Dry | | 10 | 10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW 8 | | 11/12/2015 | Dry | - | ND | ND |
| MCW 8 | — | 11/13/2015 | Dry | - | ND | ND |
| MCW 8 | — | 11/14/2015 | Dry | - | ND | ND |
| MCW 8 | — | 11/15/2015 | Dry | - | ND | ND |
| MCW 8 | — | 11/16/2015 | Dry | - | ND | ND |
| MCW 8 | — | 11/17/2015 | Dry | - | ND | ND |
| MCW 8 | — | 11/18/2015• | Dry | - | ND | ND |
| MCW 8 | — | 11/19/2015 | Dry | - | ND | ND |
| MCW 8 | — | 11/20/2015 | Dry | - | ND | ND |
| MCW 8 | — | 11/21/2015 | Dry | - | ND | ND |
| MCW 8 | — | 11/22/2015 | Dry | - | ND | ND |
| MCW 8 | — | 11/23/2015 | Dry | - | ND | ND |
| MCW 8 | — | 11/24/2015• | Dry | - | ND | ND |
| MCW 8 | — | 11/25/2015 | Dry | - | ND | ND |
| MCW 8 | — | 11/26/2015 | Dry | - | ND | ND |
| MCW 8 | — | 11/27/2015 | Dry | - | ND | ND |
| MCW 8 | — | 11/28/2015 | Dry | - | ND | ND |
| MCW 8 | — | 11/29/2015 | Dry | - | ND | ND |
| MCW 8 | — | 11/30/2015 | Dry | - | ND | ND |
| | | | | | | |
| | | | | | | |
| MCW 12 | — | 11/1/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/2/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/3/2015• | Dry | - | ND | ND |
| MCW 12 | — | 11/4/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/5/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/6/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/7/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/8/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/9/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/10/2015• | Dry | - | ND | ND |
| MCW 12 | — | 11/11/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/12/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/13/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/14/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/15/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/16/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/17/2015• | Dry | - | ND | ND |
| MCW 12 | — | 11/18/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/19/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/20/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/21/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/22/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/23/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/24/2015• | Dry | - | ND | ND |
| MCW 12 | — | 11/25/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/26/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/27/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/28/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/29/2015 | Dry | - | ND | ND |
| MCW 12 | — | 11/30/2015 | Dry | - | ND | ND |

| | | | | | | |
|---|---|---|---|---|---|---|
| [illegible] | | 11/30/2013 | [illegible] | | 0 | [illegible] |
| | | | | | | |
| | | | | | | |
| MCW 14B | 935 | 11/1/2013 | | [illegible] | 10 | 1005 |
| MCW 14B | 935 | 11/2/2013 | | [illegible] | 10 | 1110 |
| MCW 14B | 900 | 11/3/2013* | | [illegible] | 200 | 1009 |
| MCW 14B | 900 | 11/4/2013 | | [illegible] | 200 | 900 |
| MCW 14B | 900 | 11/5/2013 | | [illegible] | 200 | 875 |
| MCW 14B | 900 | 11/6/2013 | | | 300 | [illegible] |
| MCW 14B | 900 | 11/7/2013 | | [illegible] | 300 | 558 |
| MCW 14B | 900 | 11/8/2013 | | [illegible] | 300 | 473 |
| MCW 14B | 900 | 11/9/2013 | | [illegible] | 300 | 450 |
| MCW 14B | 925 | 11/10/2013* | | [illegible] | 300 | 493 |
| MCW 14B | 925 | 11/11/2013 | | [illegible] | 300 | 443 |
| MCW 14B | 925 | 11/12/2013 | | [illegible] | 300 | 388 |
| MCW 14B | 925 | 11/13/2013 | | [illegible] | 300 | [illegible] |
| MCW 14B | 925 | 11/14/2013 | | [illegible] | 300 | [illegible] |
| MCW 14B | 925 | 11/15/2013 | | | 300 | 251 |
| MCW 14B | 925 | 11/16/2013 | | [illegible] | 300 | 230 |
| MCW 14B | 925 | 11/17/2013 | | [illegible] | 300 | 200 |
| MCW 14B | 800 | 11/18/2013* | | [illegible] | 130 | 150 |
| MCW 14B | 800 | 11/19/2013 | | [illegible] | 130 | 160 |
| MCW 14B | 800 | 11/20/2013 | | [illegible] | 130 | 140 |
| MCW 14B | 800 | 11/21/2013 | | [illegible] | 130 | [illegible] |
| MCW 14B | 800 | 11/22/2013 | | [illegible] | 130 | 132 |
| MCW 14B | 800 | 11/23/2013 | | [illegible] | 130 | 123 |
| MCW 14B | 935 | 11/24/2013* | | [illegible] | 20 | 105 |
| MCW 14B | 935 | 11/25/2013 | | [illegible] | 20 | [illegible] |
| MCW 14B | 935 | 11/26/2013 | | [illegible] | 20 | [illegible] |
| MCW 14B | 935 | 11/27/2013 | | [illegible] | 20 | 100 |
| MCW 14B | [illegible] | 11/28/2013 | | [illegible] | 20 | 103 |
| MCW 14B | 935 | 11/29/2013 | | [illegible] | 20 | [illegible] |
| MCW 14B | 935 | 11/30/2013 | | [illegible] | 20 | [illegible] |
| | | | | | | |
| | | | | | | |
| MCW 15B | 850 | 11/1/2013 | | [illegible] | 30 | [illegible] |
| MCW 15B | 850 | 11/2/2013 | | [illegible] | [illegible] | [illegible] |
| MCW 15B | 730 | 11/3/2013* | | | 10 | 200 |
| MCW 15B | 730 | 11/4/2013 | | [illegible] | 10 | 207 |
| MCW 15B | 730 | 11/5/2013 | | [illegible] | 10 | 175 |
| MCW 15B | 730 | 11/6/2013 | | [illegible] | 10 | 131 |
| MCW 15B | 730 | 11/7/2013 | | [illegible] | 10 | 118 |
| MCW 15B | 730 | 11/8/2013 | | [illegible] | 10 | 98 |
| MCW 15B | 730 | 11/9/2013 | | [illegible] | 10 | 83 |
| MCW 15B | 900 | 11/10/2013* | | [illegible] | [illegible] | [illegible] |
| MCW 15B | 900 | 11/11/2013 | | [illegible] | [illegible] | 61 |
| [illegible] | 900 | [illegible] | | [illegible] | [illegible] | [illegible] |
| [illegible] | 900 | [illegible] | | [illegible] | [illegible] | [illegible] |
| [illegible] | 900 | [illegible] | | [illegible] | [illegible] | [illegible] |
| [illegible] | 900 | [illegible] | | [illegible] | [illegible] | [illegible] |
| [illegible] | 900 | 11/16/2013 | | [illegible] | [illegible] | [illegible] |

| | | | | | | |
|---|---|---|---|---|---|---|
| [illegible] | [illegible] | [illegible] | | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] * | | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | | [illegible] | [illegible] | [illegible] |
| MCW-15c | 730 | [illegible] | | = | [illegible] | [illegible] |
| MCW-15c | [illegible] | [illegible] | | [illegible] | [illegible] | [illegible] |
| [illegible] | 730 | 11/23/2015 | | = | [illegible] | [illegible] |
| MCW-15c | 730 | [illegible] | | = | [illegible] | [illegible] |
| MCW-15c | 915 | [illegible] * | | = | [illegible] | [illegible] |
| MCW-15c | 915 | 11/25/2015 | | = | 5,000 | 47 |
| MCW-15c | 915 | 11/26/2015 | | = | 5,000 | 47 |
| MCW-15c | 915 | 11/27/2015 | | = | 5,000 | 68 |
| MCW-15c | 915 | 11/28/2015 | | = | 5,000 | 82 |
| MCW-15c | 915 | 11/29/2015 | | = | 5,000 | 89 |
| MCW-15c | 915 | 11/30/2015 | | = | 5,000 | [illegible] |
| | | | | | | |
| | | | | | | |
| [illegible] | | 11/1/2015 | Dry | = | 10 | 10 |
| [illegible] | | 11/2/2015 | Dry | = | 16 | 10 |
| [illegible] | | 11/3/2015 * | Dry | = | 16 | 10 |
| [illegible] | | 11/4/2015 | Dry | = | 16 | 10 |
| MCW-17 | | 11/5/2015 | Dry | = | 18 | 10 |
| MCW-17 | | 11/6/2015 | Dry | = | 10 | 10 |
| MCW-17 | | 11/7/2015 | Dry | = | 10 | 10 |
| MCW-17 | | 11/8/2015 | Dry | = | 10 | 10 |
| MCW-17 | | 11/9/2015 | Dry | = | 10 | 10 |
| MCW-17 | | 11/10/2015 * | Dry | = | 16 | 10 |
| MCW-17 | | 11/11/2015 | Dry | = | 10 | 10 |
| MCW-17 | | 11/12/2015 | Dry | = | 10 | 10 |
| MCW-17 | | 11/13/2015 | Dry | = | 16 | 10 |
| MCW-17 | | 11/14/2015 | Dry | = | 10 | 10 |
| MCW-17 | | 11/15/2015 | Dry | = | 10 | 10 |
| MCW-17 | | 11/16/2015 | Dry | = | 16 | 10 |
| MCW-17 | | 11/17/2015 | Dry | = | 10 | 10 |
| MCW-17 | | 11/18/2015 * | Dry | = | [illegible] | 10 |
| MCW-17 | | [illegible] | Dry | = | [illegible] | 10 |
| [illegible] | | [illegible] | Dry | = | [illegible] | 10 |
| [illegible] | | [illegible] | Dry | = | [illegible] | 10 |
| MCW-17 | | 11/22/2015 | Dry | = | 16 | 10 |
| MCW-17 | | 11/23/2015 | Dry | = | 16 | 10 |
| MCW-17 | | 11/24/2015 * | Dry | = | [illegible] | 10 |
| MCW-17 | | 11/25/2015 | Dry | = | [illegible] | 10 |
| MCW-17 | | 11/26/2015 | Dry | = | [illegible] | 10 |
| MCW-17 | | 11/27/2015 | Dry | = | [illegible] | 10 |
| MCW-17 | | 11/28/2015 | Dry | = | [illegible] | 10 |
| [illegible] | | [illegible] | Dry | = | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | | | 10 |
| | | | | | | |
| | | | | | | |
| MCW-18 | | 11/1/2015 | Dry | = | [illegible] | 10 |
| [illegible] | | 11/2/2015 | Dry | = | 10 | 10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW-18 | | 11/3/2015● | Dry | | 10 | [illegible] |
| MCW-18 | — | 11/4/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 11/5/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 11/6/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 11/7/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 11/8/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 11/9/2015 | Dry | — | 10 | [illegible] |
| MCW-18 | — | 11/10/2015● | Dry | — | 10 | 10 |
| MCW-18 | — | 11/11/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 11/12/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 11/13/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 11/14/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 11/15/2015 | Dry | — | 10 | 12 |
| MCW-18 | — | 11/16/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 11/17/2015 | Dry | — | 10 | [illegible] |
| MCW-18 | — | 11/18/2015● | Dry | — | 10 | 10 |
| MCW-18 | — | 11/19/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 11/20/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 11/21/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 11/22/2015 | Dry | — | 10 | [illegible] |
| MCW-18 | — | 11/23/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 11/24/2015● | Dry | — | 10 | 10 |
| MCW-18 | — | 11/25/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 11/26/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 11/27/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 11/28/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 11/29/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 11/30/2015 | Dry | — | 10 | 10 |
| | | | | | | |

Notes:
[illegible]

* [illegible]

● Date of sampling

**county of ventura**

**PUBLIC WORKS AGENCY**
**JEFF PRATT**
Agency Director

Watershed Protection District
**Tully K. Clifford**, Director

Transportation Department
**David L. Fleisch**, Director

Engineering Services Department
**Herbert L. Schwind**, Director

Water & Sanitation Department
**David J. Sasek**, Director

Central Services Department
**Janice E. Turner**, Director

November 24, 2015

Kangshi Wang, Ph.D.
California Regional Water Quality Control Board
Los Angeles Region
Standards & TMDL Unit
320 West 4th Street, Suite 200
Los Angeles, CA 90013
(213) 576-6780

**Subject: MALIBU CREEK AND LAGOON BACTERIA TMDL COMPLIANCE MONITORING FOR VENTURA COUNTY AND CITY OF THOUSAND OAKS**

Dear Dr. Wang:

The table below summarizes the results of the weekly monitoring effort required by the Malibu Creek and Lagoon Bacteria TMDL (TMDL) Compliance Monitoring Plan (CMP) for the month of October 2015. Sites were sampled weekly on Tuesdays (October 6, 13, 20 and 27). Sites without results reported were not sampled due to insufficient flow and are labeled "Dry." Daily geomeans were calculated using results from the previous 30 days (actual sampling date marked with♦). Weeks with wet weather samples (collected less than 72 hours after a day with > 0.1" rain) use the previous non-rain single sample value to calculate the geomean. Half the detection limit was used for the purpose of calculating the daily geomean for sites with results reported as < 20 MPN/100ml or for dry weather when no sample was taken.

Fecal coliform monitoring has been discontinued, as approved by the Los Angeles Regional Water Quality Control Board on October 31, 2014, in alignment with the Regional Board's removal of the fecal coliform objective for REC-1 freshwaters from the TMDL on June 7, 2012 and subsequent approval by the U.S. Environmental Protection Agency on July 2, 2014.

If you have any questions regarding this matter, please contact Ewelina Mutkowska at (805) 645-1382.

Sincerely,

Gerhardt Hubner
Deputy Director, Watershed Protection District

CC: Tully Clifford, Watershed Protection District
Ewelina Mutkowska, County of Ventura
Paul Jorgensen, City of Thousand Oaks
Joe Bellomo, Wildan Associates
Allen Ma, County of Los Angeles (via email)

**Table 1. Weekly sampling results**

| Location | Time | Date | Rain | | Single Sample (re-sampled) E. coli (235 MPN) |
|---|---|---|---|---|---|
| [illegible] | | [illegible] ● | | | Dry |
| [illegible] | | [illegible] ● | | | Dry |
| [illegible] | | [illegible] ● | | | Dry |
| [illegible] | | [illegible] ● | | | Dry |
| | | | | | |
| | | | | | |
| MCW-5 | | 10/6/2015 ● | | | Dry |
| MCW-5 | | 10/13/2015 ● | | | Dry |
| MCW-5 | | 10/20/2015 ● | | | Dry |
| MCW-5 | | 10/27/2015 ● | | | Dry |
| | | | | | |
| | | | | | |
| MCW-12 | | 10/6/2015 ● | | | Dry |
| MCW-12 | | 10/13/2015 ● | | | Dry |
| MCW-12 | | 10/20/2015 ● | | | Dry |
| MCW-12 | | 10/27/2015 ● | | | Dry |
| | | | | | |
| | | | | | |
| MCW-14b | 925 | 10/6/2015 ● | | * | 3,000 |
| MCW-14b | [illegible] | 10/13/2015 ● | | * | [illegible] |
| MCW-14b | 1000 | 10/20/2015 ● | | * | 800 |
| MCW-14b | 925 | 10/27/2015 ● | | * | 230 |
| | | | | | |
| | | | | | |
| MCW-15a | 900 | 10/6/2015 ● | | * | 2,400 |
| MCW-15a | 830 | 10/13/2015 ● | | * | 300 |
| MCW-15a | 1030 | 10/20/2015 ● | | * | 300 |
| MCW-15a | 850 | 10/27/2015 ● | | * | 20 |
| | | | | | |
| | | | | | |
| MCW-17 | | 10/6/2015 ● | | | Dry |
| MCW-17 | | 10/13/2015 ● | | | Dry |
| MCW-17 | | 10/20/2015 ● | | | Dry |
| MCW-17 | | 10/27/2015 ● | | | Dry |
| | | | | | |
| | | | | | |
| [illegible] | | 10/6/2015 ● | | | Dry |
| [illegible] | | 10/13/2015 ● | | | Dry |
| [illegible] | | 10/20/2015 ● | | | Dry |
| [illegible] | | 10/27/2015 ● | | | Dry |
| | | | | | |

Notes:
* [illegible]
● [illegible]

**Table 2. Computation of daily geomean**

| | | | | Single Sample (adjusted for rain, dry and ND) | | Geomean |
|---|---|---|---|---|---|---|
| Location | Time | Date | Rain | | E. coli | E. coli |
| | | | | | (2MMPN) | (0.63MPN) |
| MCW-8b | - | 10/1/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/2/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/3/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/4/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/5/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/6/2015● | Dry | < | 10 | 10 |
| MCW-8b | - | 10/7/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/8/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/9/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/10/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/11/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/12/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/13/2015● | Dry | < | 10 | 10 |
| MCW-8b | - | 10/14/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/15/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/16/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/17/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/18/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/19/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/20/2015● | Dry | < | 10 | 10 |
| MCW-8b | - | 10/21/2015 | Dry | < | 10 | 10 |
| [illegible] | - | 10/22/2015 | Dry | < | 10 | 10 |
| [illegible] | - | [illegible] | Dry | < | [illegible] | 10 |
| [illegible] | - | [illegible] | Dry | < | 10 | 10 |
| MCW-8b | - | 10/25/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/26/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/27/2015● | Dry | < | 10 | 10 |
| MCW-8b | - | 10/28/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/29/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/30/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 10/31/2015 | Dry | < | 10 | 10 |
| | | | | | | |
| MCW-9 | - | 10/1/2015 | Dry | < | 10 | 10 |
| MCW-9 | - | 10/2/2015 | Dry | < | 10 | 10 |
| MCW-9 | - | 10/3/2015 | Dry | < | 10 | 10 |
| MCW-9 | - | 10/4/2015 | Dry | < | 10 | 10 |
| MCW-9 | - | 10/5/2015 | Dry | < | 10 | 10 |
| MCW-9 | - | 10/6/2015● | Dry | < | 10 | 10 |
| [illegible] | - | 10/7/2015 | Dry | < | [illegible] | 10 |
| [illegible] | - | 10/8/2015 | Dry | < | [illegible] | 10 |
| [illegible] | - | [illegible] | Dry | < | [illegible] | 10 |
| [illegible] | - | 10/10/2015 | Dry | < | [illegible] | 10 |
| [illegible] | - | 10/11/2015 | Dry | < | [illegible] | 10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW-9 | | 10/12/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 10/13/2015● | Dry | < | 10 | 10 |
| MCW-9 | | 10/14/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 10/15/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 10/16/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 10/17/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 10/18/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 10/19/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 10/20/2015● | Dry | < | 10 | 10 |
| MCW-9 | | 10/21/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 10/22/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 10/23/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 10/24/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 10/25/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 10/26/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 10/27/2015● | Dry | < | 10 | 10 |
| MCW-9 | | 10/28/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 10/29/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 10/30/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 10/31/2015 | Dry | < | 10 | 10 |
| | | | | | | |
| MCW-12 | | [illegible] | Dry | < | [illegible] | 10 |
| MCW-12 | | [illegible] | Dry | < | [illegible] | [illegible] |
| MCW-12 | | 10/3/2015 | Dry | < | [illegible] | 10 |
| MCW-12 | | 10/4/2015 | Dry | < | 10 | 10 |
| MCW-12 | | 10/5/2015 | Dry | < | 10 | 10 |
| MCW-12 | | 10/6/2015● | Dry | < | 10 | 10 |
| MCW-12 | | 10/7/2015 | Dry | < | 10 | 10 |
| MCW-12 | | 10/8/2015 | Dry | < | 10 | 10 |
| MCW-12 | | 10/9/2015 | Dry | < | 10 | [illegible] |
| MCW-12 | | 10/10/2015 | Dry | < | [illegible] | [illegible] |
| MCW-12 | | 10/11/2015 | Dry | < | 10 | 10 |
| MCW-12 | | 10/12/2015 | Dry | < | [illegible] | [illegible] |
| MCW-12 | | 10/13/2015● | Dry | < | [illegible] | [illegible] |
| MCW-12 | | 10/14/2015 | Dry | < | 10 | 10 |
| MCW-12 | | 10/15/2015 | Dry | < | 10 | 10 |
| MCW-12 | | 10/16/2015 | Dry | < | 10 | 10 |
| MCW-12 | | 10/17/2015 | Dry | < | [illegible] | 10 |
| MCW-12 | | [illegible] | Dry | < | [illegible] | [illegible] |
| MCW-12 | | [illegible] | Dry | < | [illegible] | [illegible] |
| MCW-12 | | 10/20/2015● | Dry | < | [illegible] | [illegible] |
| MCW-12 | | 10/21/2015 | Dry | < | [illegible] | 10 |
| MCW-12 | | 10/22/2015 | Dry | < | 10 | 10 |
| MCW-12 | | 10/23/2015 | Dry | < | 10 | 10 |
| MCW-12 | | 10/24/2015 | Dry | < | [illegible] | 10 |
| MCW-12 | | 10/25/2015 | Dry | < | 10 | 10 |
| MCW-12 | | 10/26/2015 | Dry | < | [illegible] | 10 |
| MCW-12 | | 10/27/2015● | Dry | < | [illegible] | 10 |
| MCW-12 | | 10/28/2015 | Dry | < | [illegible] | 10 |
| MCW-12 | | 10/29/2015 | Dry | < | [illegible] | [illegible] |

| | | | | | | |
|---|---|---|---|---|---|---|
| [illegible] | | 10/30/2015 | Dry | [illegible] | 10 | 15 |
| MCW-13 | | 10/31/2015 | Dry | [illegible] | 10 | 10 |
| | | | | | | |
| MCW-14b | 900 | 10/1/2015 | | [illegible] | 5,000 | 169 |
| MCW-14b | 900 | 10/2/2015 | | [illegible] | 5,000 | 191 |
| MCW-14b | 900 | 10/3/2015 | | [illegible] | 2,000 | [illegible] |
| MCW-14b | 900 | 10/4/2015 | | [illegible] | 5,000 | 240 |
| MCW-14b | 900 | 10/5/2015 | | [illegible] | 2,000 | 225 |
| [illegible] | 925 | 10/6/2015* | | [illegible] | 9,000 | 253 |
| MCW-14b | 925 | 10/7/2015 | | [illegible] | 9,000 | 288 |
| MCW-14b | 925 | 10/8/2015 | | [illegible] | 9,000 | 292 |
| MCW-14b | 925 | 10/9/2015 | | [illegible] | 9,000 | 318 |
| MCW-14b | 925 | 10/10/2015 | | [illegible] | 9,000 | 387 |
| [illegible] | 925 | 10/11/2015 | | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | 10/13/2015* | | [illegible] | [illegible] | [illegible] |
| [illegible] | 855 | [illegible] | | [illegible] | 14,000 | [illegible] |
| [illegible] | 855 | [illegible] | | [illegible] | 16,000 | 1,062 |
| MCW-14b | 855 | 10/16/2015 | | [illegible] | 16,000 | 1,383 |
| MCW-14b | 855 | 10/17/2015 | | [illegible] | 16,000 | [illegible] |
| MCW-14b | 855 | 10/18/2015 | | [illegible] | 16,000 | 2,343 |
| MCW-14b | 855 | 10/19/2015 | | [illegible] | 15,000 | 3,050 |
| MCW-14b | 1010 | 10/20/2015* | | [illegible] | 900 | 3,537 |
| MCW-14b | 1010 | 10/21/2015 | | [illegible] | [illegible] | [illegible] |
| [illegible] | 1010 | 10/22/2015 | | [illegible] | [illegible] | [illegible] |
| [illegible] | 1010 | 10/23/2015 | | [illegible] | [illegible] | [illegible] |
| MCW-14b | 1010 | 10/24/2015 | | [illegible] | [illegible] | [illegible] |
| MCW-14b | 1010 | 10/25/2015 | | [illegible] | 900 | [illegible] |
| MCW-14b | 1010 | 10/26/2015 | | [illegible] | 900 | 4,410 |
| MCW-14b | 925 | 10/27/2015* | | [illegible] | 10 | 3,022 |
| MCW-14b | 925 | 10/28/2015 | | [illegible] | 10 | 2,955 |
| MCW-14b | 925 | 10/29/2015 | | [illegible] | 10 | 2,410 |
| [illegible] | 925 | 10/30/2015 | | [illegible] | [illegible] | [illegible] |
| MCW-14b | 925 | 10/31/2015 | | [illegible] | 10 | 1,404 |
| | | | | | | |
| MCW-15c | 830 | 10/1/2015 | | [illegible] | 5,000 | [illegible] |
| MCW-15c | 830 | 10/2/2015 | | [illegible] | 5,000 | 296 |
| MCW-15c | 830 | 10/3/2015 | | [illegible] | 5,000 | 326 |
| MCW-15c | 830 | 10/4/2015 | | [illegible] | 5,000 | [illegible] |
| MCW-15c | 830 | 10/5/2015 | | [illegible] | 5,000 | 331 |
| MCW-15c | 900 | 10/6/2015* | | [illegible] | 2,400 | [illegible] |
| MCW-15c | 900 | 10/7/2015 | | [illegible] | 2,400 | 371 |
| MCW-15c | 900 | 10/8/2015 | | [illegible] | 2,400 | [illegible] |
| MCW-15c | 900 | 10/9/2015 | | [illegible] | 2,400 | [illegible] |
| MCW-15c | 900 | 10/10/2015 | | [illegible] | 2,400 | [illegible] |
| MCW-15c | [illegible] | 10/11/2015 | | [illegible] | 2,400 | [illegible] |
| [illegible] | [illegible] | [illegible] | | [illegible] | 2,400 | [illegible] |
| [illegible] | 830 | 10/13/2015* | | [illegible] | 500 | [illegible] |
| [illegible] | [illegible] | [illegible] | | [illegible] | [illegible] | 1,3[illegible] |
| [illegible] | 830 | 10/15/2015 | | [illegible] | [illegible] | 1,175 |
| MCW-15c | 830 | 10/16/2015 | | [illegible] | 500 | 1,325 |

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW-15c | 850 | 10/17/2015 | | = | 100 | 1,009 |
| MCW-15c | 850 | 10/18/2015 | | = | 200 | 1,002 |
| MCW-15c | 850 | 10/19/2015 | | — | 500 | 1,011 |
| [illegible] | 1000 | 10/20/2015● | | — | 200 | 1,150 |
| MCW-15c | 1000 | 10/21/2015 | | — | 800 | [illegible] |
| MCW-15c | 1000 | 10/22/2015 | | — | 300 | [illegible] |
| MCW-15c | 1050 | 10/23/2015 | | = | 800 | 1,596 |
| MCW-15c | 1050 | 10/24/2015 | | — | 600 | 1,044 |
| MCW-15c | 1050 | 10/25/2015 | | = | 100 | 1,106 |
| MCW-15c | 1050 | 10/26/2015 | | = | 100 | 1,181 |
| MCW-15c | 850 | 10/27/2015● | | = | 20 | 949 |
| MCW-15c | 850 | 10/28/2015 | | = | 20 | 763 |
| MCW-15c | 850 | 10/29/2015 | | = | 20 | 619 |
| MCW-15c | 850 | 10/30/2015 | | — | 20 | [illegible] |
| MCW-15c | 850 | 10/31/2015 | | — | 20 | [illegible] |
| | | | | | | |
| MCW-17 | — | 10/1/2015 | Dry | — | — | 10 |
| MCW-17 | — | 10/2/2015 | Dry | — | 10 | 10 |
| MCW-17 | — | 10/3/2015 | Dry | — | 10 | 10 |
| MCW-17 | — | 10/4/2015 | Dry | = | 10 | 10 |
| MCW-17 | — | 10/5/2015 | Dry | — | 10 | 10 |
| MCW-17 | — | 10/6/2015● | Dry | — | [illegible] | 10 |
| MCW-17 | — | 10/7/2015 | Dry | — | [illegible] | 10 |
| MCW-17 | — | 10/8/2015 | Dry | — | [illegible] | 10 |
| MCW-17 | — | 10/9/2015 | Dry | — | [illegible] | 10 |
| MCW-17 | — | 10/10/2015 | Dry | — | [illegible] | 10 |
| MCW-17 | — | 10/11/2015 | Dry | — | [illegible] | 10 |
| MCW-17 | — | 10/12/2015 | Dry | — | 10 | 10 |
| MCW-17 | — | 10/13/2015● | Dry | = | 10 | 10 |
| MCW-17 | — | 10/14/2015 | Dry | — | [illegible] | 10 |
| MCW-17 | — | 10/15/2015 | Dry | = | 10 | 10 |
| MCW-17 | — | 10/16/2015 | Dry | = | 10 | 10 |
| MCW-17 | — | 10/17/2015 | Dry | = | [illegible] | [illegible] |
| MCW-17 | — | 10/18/2015 | Dry | = | 10 | 10 |
| MCW-17 | — | 10/19/2015 | Dry | = | [illegible] | [illegible] |
| MCW-17 | — | 10/20/2015● | Dry | = | [illegible] | [illegible] |
| MCW-17 | — | 10/21/2015 | Dry | = | 10 | 10 |
| MCW-17 | — | 10/22/2015 | Dry | = | [illegible] | 10 |
| MCW-17 | — | 10/23/2015 | Dry | — | 10 | 10 |
| MCW-17 | — | 10/24/2015 | Dry | = | 10 | 10 |
| MCW-17 | — | 10/25/2015 | Dry | = | 10 | 10 |
| MCW-17 | — | 10/26/2015 | Dry | = | 10 | 10 |
| MCW-17 | — | 10/27/2015● | Dry | = | 10 | 10 |
| MCW-17 | — | 10/28/2015 | Dry | = | [illegible] | 10 |
| MCW-17 | — | 10/29/2015 | Dry | = | [illegible] | 10 |
| MCW-17 | — | 10/30/2015 | Dry | — | — | [illegible] |
| MCW-17 | — | 10/31/2015 | Dry | — | [illegible] | 10 |
| | | | | | | |
| MCW-28 | — | 10/1/2015 | Dry | = | 10 | 10 |
| MCW-28 | — | 10/2/2015 | Dry | = | 10 | 10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| [illegible] | — | 10/3/2015 | Dry | — | [illegible] | 10 |
| [illegible] | — | 10/4/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 10/5/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 10/6/2015♦ | Dry | — | 10 | 10 |
| MCW-18 | — | 10/7/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 10/8/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 10/9/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 10/10/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 10/11/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 10/12/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 10/13/2015♦ | Dry | — | 10 | 10 |
| MCW-18 | — | 10/14/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 10/15/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 10/16/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 10/17/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 10/18/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 10/19/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 10/20/2015♦ | Dry | — | 10 | 10 |
| MCW-18 | — | 10/21/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 10/22/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 10/23/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 10/24/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 10/25/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 10/26/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 10/27/2015♦ | Dry | — | 10 | 10 |
| MCW-18 | — | 10/28/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | 10/29/2015 | Dry | — | 10 | 10 |
| MCW-18 | — | [illegible] | Dry | — | 10 | 10 |
| MCW-18 | — | [illegible] | Dry | — | 10 | 10 |

Notes:

[illegible]

* [illegible] MCW-18 [illegible] August [illegible] 2010

♦ Date of [illegible]

# county of ventura

**PUBLIC WORKS AGENCY**
**JEFF PRATT**
Agency Director

Watershed Protection District
**Tully K. Clifford**, Director

Transportation Department
**David L. Fleisch**, Director

Engineering Services Department
**Herbert L. Schwind**, Director

Water & Sanitation Department
**David J. Sasek**, Director

Central Services Department
**Janice E. Turner**, Director

October 15, 2015

Kangshi Wang, Ph.D.
California Regional Water Quality Control Board
Los Angeles Region
Standards & TMDL Unit
320 West 4th Street, Suite 200
Los Angeles, CA 90013
(213) 576-6780

**Subject: MALIBU CREEK AND LAGOON BACTERIA TMDL COMPLIANCE MONITORING FOR VENTURA COUNTY AND CITY OF THOUSAND OAKS**

Dear Dr. Wang:

The table below summarizes the results of the weekly monitoring effort required by the Malibu Creek and Lagoon Bacteria TMDL (TMDL) Compliance Monitoring Plan (CMP) for the month of September 2015. Sites were sampled weekly on Tuesdays (September 1, 8 and 29), except for two instances when sites were sampled on Monday (September 14) and Wednesday (September 23) due to staffing conflicts. Sites without results reported were not sampled due to insufficient flow and are labeled "Dry." Daily geomeans were calculated using results from the previous 30 days (actual sampling date marked with ♦). Weeks with wet weather samples (collected less than 72 hours after a day with > 0.1" rain) use the previous non-rain single sample value to calculate the geomean. Half the detection limit was used for the purpose of calculating the daily geomean for sites with results reported as < 20 MPN/100ml or for dry weather when no sample was taken.

Fecal coliform monitoring has been discontinued, as approved by the Los Angeles Regional Water Quality Control Board on October 31, 2014, in alignment with the Regional Board's removal of the fecal coliform objective for REC-1 freshwaters from the TMDL on June 7, 2012 and subsequent approval by the U.S. Environmental Protection Agency on July 2, 2014.

If you have any questions regarding this matter, please contact Ewelina Mutkowska at (805) 645-1382.

Sincerely,

Gerhardt Hubner
Deputy Director, Watershed Protection District

CC: Tully Clifford, Watershed Protection District
Ewelina Mutkowska, County of Ventura
Paul Jorgensen, City of Thousand Oaks
Joe Bellomo, Willdan Associates
Allen Ma, County of Los Angeles (via email)

**Table 1. Weekly sampling results**

| Location | Time | Date | Rain | | Single Sample (as sampled) E. coli (2M MPN) |
|---|---|---|---|---|---|
| [illegible] | | [illegible]/2015● | | | [illegible] |
| MCW-8b | | 9/8/2015● | | | [illegible] |
| MCW-8b | | 9/14/2015● | | | Dry |
| MCW-8b | | 9/23/2015● | | | Dry |
| MCW-8b | | 9/28/2015● | | | Dry |
| | | | | | |
| MCW-9 | | 9/1/2015● | | | Dry |
| MCW-9 | | 9/8/2015● | | | Dry |
| MCW-9 | | 9/14/2015● | | | Dry |
| MCW-9 | | 9/23/2015● | | | Dry |
| MCW-9 | | 9/28/2015● | | | Dry |
| | | | | | |
| MCW-12 | | 9/1/2015● | | | Dry |
| MCW-12 | | 9/8/2015● | | | Dry |
| MCW-12 | | 9/14/2015● | | | Dry |
| MCW-12 | | 9/23/2015● | | | Dry |
| MCW-12 | | 9/28/2015● | | | Dry |
| | | | | | |
| MCW-14b | 1100 | 9/1/2015● | | [illegible] | 400 |
| MCW-14b | 1015 | 9/8/2015● | | [illegible] | 500 |
| MCW-14b | 1100 | 9/14/2015● | | [illegible] | 20 |
| MCW-14b | 840 | 9/23/2015● | | [illegible] | 330 |
| MCW-14b | 900 | 9/28/2015● | | [illegible] | 3,000 |
| | | | | | |
| MCW-15c | 930 | 9/1/2015● | | [illegible] | 20 |
| MCW-15c | 930 | 9/8/2015● | | [illegible] | 600 |
| MCW-15c | 1140 | 9/14/2015● | | [illegible] | 20 |
| MCW-15c | 815 | 9/23/2015● | | [illegible] | 3,000 |
| MCW-15c | 830 | 9/28/2015● | | [illegible] | 7,000 |
| | | | | | |
| MCW-17 | | 9/1/2015● | | | Dry |
| MCW-17 | | 9/8/2015● | | | Dry |
| MCW-17 | | 9/14/2015● | | | Dry |
| MCW-17 | | 9/23/2015● | | | Dry |
| MCW-17 | | 9/28/2015● | | | Dry |
| | | | | | |
| MCW-18 | | 9/1/2015● | | | Dry |
| MCW-18 | | 9/8/2015● | | | Dry |
| MCW-18 | | 9/14/2015● | | | Dry |
| MCW-18 | | 9/23/2015● | | | Dry |
| MCW-18 | | 9/28/2015● | | | Dry |

Notes:
[illegible] MCW [illegible]
[illegible]
● [illegible] of sampling

**Table 2. Computation of daily geomean**

| | | | | | Single Sample (adjusted for rain, dry and NDs) | Geomean |
|---|---|---|---|---|---|---|
| Location | Time | Date | Rain | | E. coli | E. coli |
| | | | | | (235 MPN) | (126 MPN) |
| MCW-8b | | 9/1/2015● | Dry | - | 10 | 10 |
| MCW-8b | | 9/2/2015 | Dry | - | 10 | 10 |
| MCW-8b | | 9/3/2015 | Dry | | 10 | 10 |
| MCW-8b | | 9/4/2015 | Dry | - | 10 | 10 |
| MCW-8b | | 9/5/2015 | Dry | - | 10 | 10 |
| MCW-8b | | 9/6/2015 | Dry | - | 10 | 10 |
| MCW-8b | | 9/7/2015 | Dry | | 10 | 10 |
| MCW-8b | | 9/8/2015● | Dry | | 10 | 10 |
| MCW-8b | | 9/9/2015 | Dry | | 10 | 10 |
| MCW-8b | | 9/10/2015 | Dry | | 10 | 12 |
| MCW-8b | | 9/11/2015 | Dry | | 10 | 10 |
| MCW-8b | | 9/12/2015 | Dry | | 10 | 10 |
| MCW-8b | | 9/13/2015 | Dry | | 10 | 10 |
| MCW-8b | | 9/14/2015● | Dry | | 10 | 10 |
| MCW-8b | - | 9/15/2015 | Dry | - | 10 | 10 |
| MCW-8b | | 9/16/2015 | Dry | | 10 | 10 |
| MCW-8b | | 9/17/2015 | Dry | | 10 | 10 |
| MCW-8b | | 9/18/2015 | Dry | | 10 | 10 |
| MCW-8b | | 9/19/2015 | Dry | - | 10 | 10 |
| MCW-8b | | 9/20/2015 | Dry | - | 10 | 10 |
| MCW-8b | | 9/21/2015 | Dry | - | 10 | 10 |
| MCW-8b | | 9/22/2015 | Dry | - | 17 | 16 |
| MCW-8b | | 9/23/2015● | Dry | - | 10 | 10 |
| MCW-8b | | 9/24/2015 | Dry | - | 10 | 10 |
| MCW-8b | | 9/25/2015 | Dry | - | 10 | 10 |
| MCW-8b | | 9/26/2015 | Dry | - | 10 | 10 |
| MCW-8b | | 9/27/2015 | Dry | - | 10 | 10 |
| MCW-8b | | 9/28/2015 | Dry | | 10 | 10 |
| MCW-8b | | 9/29/2015● | Dry | - | 10 | 10 |
| MCW-8b | | 9/30/2015 | Dry | - | 10 | 10 |
| | | | | | | |
| | | | | | | |
| MCW-9 | - | 9/1/2015● | Dry | - | 10 | 10 |
| MCW-9 | - | 9/2/2015 | Dry | - | 10 | 10 |
| MCW-9 | | 9/3/2015 | Dry | | 10 | 10 |
| MCW-9 | | [illegible] | [illegible] | | [illegible] | 10 |
| MCW-9 | | [illegible] | [illegible] | | [illegible] | 10 |
| MCW-9 | | [illegible] | Dry | - | 10 | 10 |
| MCW-9 | | 9/7/2015 | Dry | - | 10 | 10 |
| MCW-9 | | 9/8/2015● | Dry | - | 10 | 10 |
| MCW-9 | | 9/9/2015 | Dry | | 10 | 10 |
| MCW-9 | | 9/10/2015 | Dry | - | 10 | 10 |
| MCW-9 | | 9/11/2015 | Dry | - | 10 | 10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW-9 | | 9/12/2015 | Dry | - | 10 | 10 |
| MCW-9 | | 9/13/2015 | Dry | - | 10 | 10 |
| MCW-9 | | 9/14/2015● | Dry | - | 10 | 10 |
| MCW-9 | | 9/15/2015 | Dry | - | 10 | 10 |
| MCW-9 | | 9/16/2015 | Dry | - | 10 | 10 |
| MCW-9 | | 9/17/2015 | Dry | - | 10 | 10 |
| MCW-9 | | 9/18/2015 | Dry | - | 10 | 10 |
| MCW-9 | | 9/19/2015 | Dry | - | 10 | 10 |
| MCW-9 | | 9/20/2015 | Dry | - | 10 | 10 |
| MCW-9 | | 9/21/2015 | Dry | - | 10 | 10 |
| MCW-9 | | 9/22/2015 | Dry | - | 10 | 10 |
| MCW-9 | | 9/23/2015● | Dry | - | 10 | 10 |
| MCW-9 | | 9/24/2015 | Dry | - | 10 | 10 |
| MCW-9 | | 9/25/2015 | Dry | - | 10 | [illegible] |
| MCW-9 | | 9/26/2015 | Dry | - | 10 | 10 |
| MCW-9 | | 9/27/2015 | Dry | - | 10 | 10 |
| MCW-9 | | 9/28/2015 | Dry | - | 10 | 10 |
| MCW-9 | | 9/29/2015● | Dry | - | 10 | 10 |
| MCW-9 | | 9/30/2015 | Dry | - | 10 | 10 |
| | | | | | | |
| | | | | | | |
| MCW-12 | | 9/1/2015● | Dry | - | 10 | 10 |
| MCW-12 | | 9/2/2015 | Dry | - | 10 | 10 |
| MCW-12 | | 9/3/2015 | Dry | - | 10 | 10 |
| MCW-12 | | 9/4/2015 | Dry | - | 10 | 10 |
| MCW-12 | | 9/5/2015 | Dry | - | 10 | 10 |
| MCW-12 | | 9/6/2015 | Dry | - | 10 | 10 |
| MCW-12 | | 9/7/2015 | Dry | - | 10 | 10 |
| MCW-12 | | 9/8/2015● | Dry | - | 10 | 10 |
| MCW-12 | | 9/9/2015 | Dry | - | 10 | 10 |
| MCW-12 | | 9/10/2015 | Dry | - | 10 | 10 |
| MCW-12 | | 9/11/2015 | Dry | - | 10 | 10 |
| MCW-12 | | [illegible] | Dry | - | 10 | 10 |
| MCW-12 | | [illegible] | Dry | - | 10 | 10 |
| MCW-12 | | 9/14/2015● | Dry | - | 10 | 10 |
| MCW-12 | | 9/15/2015 | Dry | - | 10 | 10 |
| MCW-12 | | 9/16/2015 | Dry | - | 10 | 10 |
| MCW-12 | | 9/17/2015 | Dry | - | 10 | 10 |
| MCW-12 | | 9/18/2015 | Dry | - | 10 | 10 |
| MCW-12 | | 9/19/2015 | Dry | - | 10 | 10 |
| MCW-12 | | 9/20/2015 | Dry | - | 10 | 10 |
| MCW-12 | | 9/21/2015 | Dry | - | 10 | 10 |
| MCW-12 | | 9/22/2015 | Dry | - | 10 | 10 |
| MCW-12 | | 9/23/2015● | Dry | - | 10 | 10 |
| MCW-12 | | 9/24/2015 | Dry | - | 10 | 10 |
| MCW-12 | | 9/25/2015 | Dry | - | 10 | 10 |
| MCW-12 | | 9/26/2015 | Dry | - | 10 | 10 |
| MCW-12 | | 9/27/2015 | Dry | - | 10 | 10 |
| MCW-12 | | 9/28/2015 | Dry | - | 10 | 10 |
| MCW-12 | | 9/29/2015● | Dry | - | 10 | 10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW-12 | | 9/30/2015 | Dry | | 10 | 10 |
| | | | | | | |
| | | | | | | |
| MCW-14b | 1000 | 9/1/2015● | | | 800 | 1,055 |
| MCW-14b | 1000 | 9/2/2015 | | | 800 | [illegible] |
| MCW-14b | 1000 | 9/3/2015 | | - | 800 | 1,090 |
| MCW-14b | 1000 | 9/4/2015 | | - | 800 | 1,120 |
| MCW-14b | 1000 | 9/5/2015 | | - | 800 | 1,143 |
| MCW-14b | 1000 | 9/6/2015 | | - | 800 | 1,165 |
| MCW-14b | 1000 | 9/7/2015 | | - | 800 | 1,188 |
| MCW-14b | 1000 | 9/8/2015● | | - | 800 | 1,183 |
| MCW-14b | 1000 | 9/9/2015 | | - | 800 | 1,092 |
| MCW-14b | 1000 | 9/10/2015 | | - | 800 | 1,067 |
| MCW-14b | 1000 | 9/11/2015 | | - | 800 | [illegible] |
| MCW-14b | 1000 | 9/12/2015 | | - | 800 | [illegible] |
| MCW-14b | 1000 | 9/13/2015 | | - | 800 | [illegible] |
| MCW-14b | 1100 | 9/14/2015● | | - | 10 | 775 |
| MCW-14b | 1100 | 9/15/2015 | | - | 10 | 593 |
| MCW-14b | 1100 | 9/16/2015 | | - | 10 | 450 |
| MCW-14b | 1100 | 9/17/2015 | | - | 10 | 350 |
| MCW-14b | 1100 | 9/18/2015 | | - | 10 | 269 |
| MCW-14b | 1100 | 9/19/2015 | | - | 10 | 221 |
| MCW-14b | 1100 | 9/20/2015 | | - | 10 | [illegible] |
| MCW-14b | 1100 | 9/21/2015 | | - | 10 | [illegible] |
| MCW-14b | 1100 | 9/22/2015 | | - | 10 | [illegible] |
| MCW-14b | 840 | 9/23/2015● | | - | 350 | 118 |
| MCW-14b | 840 | 9/24/2015 | | - | 350 | 119 |
| MCW-14b | 840 | 9/25/2015 | | - | 330 | 125 |
| MCW-14b | 840 | 9/26/2015 | | - | 330 | 123 |
| MCW-14b | 840 | 9/27/2015 | | - | 330 | 132 |
| MCW-14b | 840 | 9/28/2015 | | - | 330 | 136 |
| MCW-14b | 900 | 9/29/2015● | | - | 1,000 | [illegible] |
| MCW-14b | 900 | 9/30/2015 | | - | 1,000 | [illegible] |
| | | | | | | |
| | | | | | | |
| MCW-15c | 930 | 9/1/2015● | | - | 10 | 732 |
| MCW-15c | 930 | 9/2/2015 | | - | 10 | 655 |
| MCW-15c | 930 | 9/3/2015 | | - | 10 | 557 |
| MCW-15c | 930 | 9/4/2015 | | - | 10 | 498 |
| MCW-15c | 930 | 9/5/2015 | | - | 10 | 408 |
| MCW-15c | 930 | 9/6/2015 | | - | 10 | 370 |
| MCW-15c | 930 | 9/7/2015 | | - | 10 | [illegible] |
| MCW-15c | 930 | 9/8/2015● | | - | 800 | [illegible] |
| MCW-15c | 930 | 9/9/2015 | | - | 800 | 251 |
| MCW-15c | 930 | 9/10/2015 | | - | 800 | 264 |
| MCW-15c | 930 | 9/11/2015 | | - | 800 | 245 |
| MCW-15c | 930 | 9/12/2015 | | - | 800 | 229 |
| MCW-15c | 930 | 9/13/2015 | | - | 800 | 216 |
| MCW-15c | 1140 | 9/14/2015● | | - | 10 | 171 |
| MCW-15c | 1140 | 9/15/2015 | | - | 10 | [illegible] |
| MCW-15c | 1140 | 9/16/2015 | | - | 10 | [illegible] |

| | | | | | | |
|---|---|---|---|---|---|---|
| [illegible] | 1140 | 9/17/2015 | | [illegible] | [illegible] | 80 |
| [illegible] | 1140 | 9/18/2015 | | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | | | [illegible] | [illegible] |
| [illegible] | [illegible] | 9/20/2015 | | | 140 | [illegible] |
| [illegible] | [illegible] | [illegible] | | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | | [illegible] | [illegible] | 34 |
| [illegible] | 815 | 9/23/2015* | | = | 5,500 | 41 |
| [illegible] | 815 | 9/24/2015 | | = | 5,000 | 89 |
| [illegible] | 815 | 9/25/2015 | | = | 5,000 | 58 |
| [illegible] | 815 | 9/26/2015 | | = | 5,000 | 69 |
| [illegible] | 815 | [illegible] | | = | 5,000 | 67 |
| [illegible] | 815 | [illegible] | | = | 5,000 | [illegible] |
| [illegible] | [illegible] | [illegible]* | | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | | | [illegible] | [illegible] |
| | | | | | | |
| | | | | | | |
| [illegible] | | 9/1/2015* | Dry | = | 10 | 10 |
| [illegible] | | 9/2/2015 | Dry | = | 10 | 10 |
| [illegible] | | 9/3/2015 | Dry | = | 10 | 10 |
| [illegible] | | 9/4/2015 | Dry | = | 10 | 10 |
| [illegible] | | 9/5/2015 | Dry | = | 10 | 10 |
| [illegible] | | [illegible] | Dry | = | 10 | [illegible] |
| [illegible] | | [illegible] | Dry | = | 10 | 10 |
| [illegible] | | [illegible]* | Dry | = | 10 | 10 |
| [illegible] | | [illegible] | Dry | = | 10 | 10 |
| [illegible] | | 9/10/2015 | Dry | = | 10 | 10 |
| [illegible] | | 9/11/2015 | Dry | = | 10 | 10 |
| [illegible] | | 9/12/2015 | Dry | = | 10 | 10 |
| [illegible] | | 9/13/2015 | Dry | = | 10 | 10 |
| [illegible] | | 9/14/2015* | Dry | = | 10 | 10 |
| [illegible] | | [illegible] | Dry | = | 10 | 10 |
| [illegible] | | [illegible] | Dry | = | 10 | 10 |
| [illegible] | | [illegible] | Dry | = | 10 | 10 |
| [illegible] | | 9/14/2015 | Dry | = | 10 | 10 |
| [illegible] | | 9/17/2015 | Dry | = | 10 | 10 |
| [illegible] | | 9/20/2015 | Dry | = | 10 | 10 |
| [illegible] | | 9/21/2015 | Dry | = | 10 | 10 |
| [illegible] | | 9/22/2015 | Dry | = | 10 | 10 |
| [illegible] | | 9/23/2015* | Dry | = | 10 | 10 |
| [illegible] | | 9/24/2015 | Dry | = | 10 | 10 |
| [illegible] | | 9/25/2015 | Dry | = | 10 | 10 |
| [illegible] | | [illegible] | Dry | = | 10 | 10 |
| [illegible] | | [illegible] | Dry | = | [illegible] | 10 |
| [illegible] | | [illegible] | Dry | = | 10 | 10 |
| [illegible] | | [illegible]* | Dry | = | 10 | 10 |
| [illegible] | | [illegible] | Dry | = | 10 | 10 |
| | | | | | | |
| | | | | | | |
| [illegible] | | 9/1/2015* | Dry | = | 10 | |
| [illegible] | | [illegible] | Dry | = | [illegible] | |

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW-18 | | 9/3/2015 | Dry | | 10 | -- |
| MCW-18 | | 9/4/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/5/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/6/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/7/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/8/2015● | Dry | | 10 | 10 |
| MCW-18 | | 9/9/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/10/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/11/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/12/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/13/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/14/2015● | Dry | | 10 | 10 |
| MCW-18 | | 9/15/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/16/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/17/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/18/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/19/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/20/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/21/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/22/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/23/2015● | Dry | | 10 | 10 |
| MCW-18 | | 9/24/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/25/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/26/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/27/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/28/2015 | Dry | | 10 | 10 |
| MCW-18 | | 9/29/2015● | Dry | | 10 | 10 |
| MCW-18 | | 9/30/2015 | Dry | | 10 | 10 |
| | | | | | | |

Notes:

[illegible]

[illegible]

● [illegible]

**county of ventura**

**PUBLIC WORKS AGENCY**
**JEFF PRATT**
Agency Director

Watershed Protection District
**Tully K. Clifford, Director**
Transportation Department
**David L. Fleisch, Director**
Engineering Services Department
**Herbert L. Schwind, Director**
Water & Sanitation Department
**David J. Sasek, Director**
Central Services Department
**Janice E. Turner, Director**

September 21, 2015

Kangshi Wang, Ph.D.
California Regional Water Quality Control Board
Los Angeles Region
Standards & TMDL Unit
320 West 4th Street, Suite 200
Los Angeles, CA 90013
(213) 576-6780

**Subject: MALIBU CREEK AND LAGOON BACTERIA TMDL COMPLIANCE MONITORING FOR VENTURA COUNTY AND CITY OF THOUSAND OAKS**

Dear Dr. Wang:

The table below summarizes the results of the weekly monitoring effort required by the Malibu Creek and Lagoon Bacteria TMDL (TMDL) Compliance Monitoring Plan (CMP) for the month of August 2015. Sites were sampled weekly on Tuesdays (August 4, 11, 18 and 25). Sites without results reported were not sampled due to insufficient flow and are labeled "Dry." Daily geomeans were calculated using results from the previous 30 days (actual sampling date marked with♦). Weeks with wet weather samples (collected less than 72 hours after a day with > 0.1" rain) use the previous non-rain single sample value to calculate the geomean. Half the detection limit was used for the purpose of calculating the daily geomean for sites with results reported as < 20 MPN/100ml or for dry weather when no sample was taken.

Fecal coliform monitoring has been discontinued, as approved by the Los Angeles Regional Water Quality Control Board on October 31, 2014, in alignment with the Regional Board's removal of the fecal coliform objective for REC-1 freshwaters from the TMDL on June 7, 2012 and subsequent approval by the U.S. Environmental Protection Agency on July 2, 2014.

If you have any questions regarding this matter, please contact Ewelina Mutkowska at (805) 645-1382.

Sincerely,

Gerhardt Hubner
Deputy Director, Watershed Protection District

CC: Tully Clifford, Watershed Protection District
Ewelina Mutkowska, County of Ventura
Paul Jorgensen, City of Thousand Oaks
Joe Bellomo, Wildan Associates
Allen Ma, County of Los Angeles (via email)

**Table 1. Weekly sampling results**

| Location | Time | Date | Rain | | Single Sample (as sampled) E. coli |
|---|---|---|---|---|---|
| | | | | | [illegible] |
| [illegible] | | 8/4/2015● | | | Dry |
| [illegible] | | 8/11/2015● | | | Dry |
| [illegible] | | 8/18/2015● | | | Dry |
| [illegible] | | 8/25/2015● | | | Dry |
| | | | | | |
| | | | | | |
| MCW 9 | | 8/4/2015● | | | Dry |
| MCW 9 | | 8/11/2015● | | | Dry |
| MCW 9 | | 8/18/2015● | | | Dry |
| MCW 9 | | 8/25/2015● | | | Dry |
| | | | | | |
| | | | | | |
| MCW 12 | | 8/4/2015● | | | Dry |
| MCW 12 | | 8/11/2015● | | | Dry |
| MCW 12 | | 8/18/2015● | | | Dry |
| MCW 12 | | 8/25/2015● | | | Dry |
| | | | | | |
| | | | | | |
| [illegible] | 1115 | 8/4/2015● | | = | 200 |
| [illegible] | 1100 | 8/11/2015● | | = | 2,400 |
| [illegible] | 1100 | 8/18/2015● | | = | 10,000 |
| [illegible] | 900 | 8/25/2015● | | = | 150 |
| | | | | | |
| | | | | | |
| [illegible] | 1000 | 8/4/2015● | | = | [illegible] |
| [illegible] | 1000 | 8/11/2015● | | = | 5,[illegible] |
| [illegible] | 1000 | 8/18/2015● | | = | [illegible] |
| [illegible] | 930 | 8/25/2015● | | = | 40 |
| | | | | | |
| | | | | | |
| MCW 17 | | 8/4/2015● | | | Dry |
| MCW 17 | | 8/11/2015● | | | Dry |
| MCW 17 | | 8/18/2015● | | | Dry |
| MCW 17 | | 8/25/2015● | | | Dry |
| | | | | | |
| | | | | | |
| [illegible] | | 8/4/2015● | | | Dry |
| [illegible] | | 8/11/2015● | | | Dry |
| [illegible] | | 8/18/2015● | | | Dry |
| [illegible] | | 8/25/2015● | | | Dry |
| | | | | | |

Notes:
[illegible]
● [illegible]

**Table 2. Computation of daily geomean**

| | | | | | Single Sample (based ND/2) | Geomean |
|---|---|---|---|---|---|---|
| Location | Flow | Date | Rain | | E. coli (235 MPN) | E. coli (126 MPN) |
| MCW-8b | — | 8/1/2015 | Dry | < | 10 | 10 |
| MCW-8b | — | 8/2/2015 | Dry | < | 10 | 10 |
| MCW-8b | — | 8/3/2015 | Dry | | 10 | 10 |
| MCW-8b | | 8/4/2015* | Dry | | 10 | 10 |
| MCW-8b | | 8/5/2015 | Dry | < | [illegible] | 10 |
| MCW-8b | | 8/6/2015 | Dry | | 10 | 10 |
| MCW-8b | — | 8/7/2015 | Dry | | 10 | 10 |
| MCW-8b | | 8/8/2015 | Dry | | 10 | 10 |
| MCW-8b | | 8/9/2015 | Dry | | 10 | 10 |
| MCW-8b | — | 8/10/2015 | Dry | | 10 | 10 |
| MCW-8b | | 8/11/2015* | Dry | | 10 | 10 |
| MCW-8b | | 8/12/2015 | Dry | < | 10 | 10 |
| MCW-8b | | 8/13/2015 | Dry | < | 10 | 10 |
| MCW-8b | | 8/14/2015 | Dry | | 10 | 10 |
| MCW-8b | | 8/15/2015 | Dry | | 10 | 10 |
| MCW-8b | | 8/16/2015 | Dry | | 10 | 10 |
| MCW-8b | | 8/17/2015 | Dry | < | 10 | 10 |
| MCW-8b | — | 8/18/2015* | Dry | < | 10 | 10 |
| MCW-8b | — | 8/19/2015 | Dry | < | 10 | 10 |
| MCW-8b | — | 8/20/2015 | Dry | < | 10 | 10 |
| MCW-8b | | 8/21/2015 | Dry | | 10 | 10 |
| MCW-8b | | 8/22/2015 | Dry | < | 10 | 10 |
| MCW-8b | | 8/23/2015 | Dry | | 10 | 10 |
| MCW-8b | | 8/24/2015 | Dry | | 10 | 10 |
| MCW-8b | | 8/25/2015* | Dry | | 10 | 10 |
| MCW-8b | | 8/26/2015 | Dry | < | 10 | 10 |
| MCW-8b | — | 8/27/2015 | Dry | < | [illegible] | 10 |
| MCW-8b | | 8/28/2015 | Dry | < | 10 | 10 |
| MCW-8b | | 8/29/2015 | Dry | < | 10 | 10 |
| MCW-8b | — | 8/30/2015 | Dry | | 10 | 10 |
| MCW-8b | | 8/31/2015 | Dry | | 10 | 10 |
| | | | | | | |
| MCW-9 | | 8/1/2015 | Dry | | 10 | 10 |
| MCW-9 | | 8/2/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 8/3/2015 | Dry | < | 10 | 10 |
| MCW-9 | — | 8/4/2015* | Dry | < | 10 | 10 |
| MCW-9 | | 8/5/2015 | Dry | | 10 | 10 |
| MCW-9 | | 8/6/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 8/7/2015 | Dry | | 10 | 10 |
| MCW-9 | | 8/8/2015 | Dry | | 10 | 10 |
| MCW-9 | | 8/9/2015 | Dry | | 10 | 10 |
| MCW-9 | | 8/10/2015 | Dry | | 10 | 10 |
| MCW-9 | | 8/11/2015* | Dry | | 10 | 10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW 9 | | [illegible] | Dry | | 10 | 10 |
| MCW 9 | | 8/13/2015 | Dry | | 10 | 10 |
| MCW 9 | | 8/14/2015 | Dry | | 10 | 10 |
| MCW 9 | | 8/15/2015 | Dry | | 10 | 10 |
| MCW 9 | | 8/16/2015 | Dry | | 10 | 10 |
| MCW 9 | | 8/17/2015 | [illegible] | | [illegible] | [illegible] |
| MCW 9 | | 8/18/2015 ● | Dry | | [illegible] | 10 |
| MCW 9 | | [illegible] | Dry | - | [illegible] | [illegible] |
| MCW 9 | | 8/20/2015 | Dry | | 10 | 10 |
| MCW 9 | | 8/21/2015 | Dry | - | 10 | 10 |
| MCW 9 | | 8/22/2015 | Dry | - | 10 | 10 |
| MCW 9 | | 8/23/2015 | Dry | - | 10 | 10 |
| MCW 9 | | 8/24/2015 | Dry | - | 10 | 10 |
| MCW 9 | | 8/25/2015 ● | Dry | - | 10 | 10 |
| [illegible] | | [illegible] | [illegible] | - | [illegible] | 10 |
| [illegible] | | [illegible] | [illegible] | - | [illegible] | 10 |
| MCW 9 | | 8/28/2015 | Dry | - | [illegible] | [illegible] |
| MCW 9 | | 8/29/2015 | Dry | - | 10 | 10 |
| MCW 9 | | 8/30/2015 | Dry | - | 10 | 10 |
| MCW 9 | | 8/31/2015 | Dry | - | 10 | 10 |
| | | | | | | |
| MCW 12 | | 8/1/2015 | Dry | - | 10 | 10 |
| MCW 12 | | 8/2/2015 | Dry | - | 10 | 10 |
| MCW 12 | | 8/3/2015 | Dry | - | [illegible] | 10 |
| MCW 12 | | 8/4/2015 ● | Dry | | [illegible] | [illegible] |
| MCW 12 | | 8/5/2015 | Dry | | 10 | 10 |
| MCW 12 | | 8/6/2015 | Dry | - | 10 | 10 |
| MCW 12 | | 8/7/2015 | Dry | - | 10 | 10 |
| MCW 12 | | 8/8/2015 | Dry | - | 10 | 10 |
| MCW 12 | | 8/9/2015 | Dry | - | [illegible] | [illegible] |
| MCW 12 | | 8/10/2015 | Dry | - | 10 | 10 |
| MCW 12 | | 8/11/2015 ● | Dry | | 10 | 10 |
| MCW 12 | | 8/12/2015 | Dry | | 10 | [illegible] |
| MCW 12 | | 8/13/2015 | Dry | - | [illegible] | [illegible] |
| MCW 12 | | 8/14/2015 | Dry | - | [illegible] | [illegible] |
| MCW 12 | | 8/15/2015 | Dry | | 10 | 10 |
| MCW 12 | | 8/16/2015 | Dry | - | [illegible] | 10 |
| MCW 12 | | [illegible] | [illegible] | - | [illegible] | [illegible] |
| MCW 12 | | 8/18/2015 ● | Dry | - | 10 | 10 |
| MCW 12 | | 8/19/2015 | Dry | - | 10 | 10 |
| MCW 12 | | 8/20/2015 | Dry | | 10 | 10 |
| MCW 12 | | 8/21/2015 | Dry | - | 10 | 10 |
| MCW 12 | | 8/22/2015 | Dry | - | 10 | 10 |
| MCW 12 | | 8/23/2015 | Dry | - | 10 | 10 |
| MCW 12 | | [illegible] | Dry | | [illegible] | [illegible] |
| MCW 12 | | 8/25/2015 ● | [illegible] | | [illegible] | [illegible] |
| MCW 12 | | [illegible] | Dry | | 10 | [illegible] |
| MCW 12 | | [illegible] | Dry | | 10 | 10 |
| MCW 12 | | 8/28/2015 | Dry | | [illegible] | [illegible] |
| MCW 12 | | 8/29/2015 | Dry | | 10 | [illegible] |

| | | | | | | |
|---|---|---|---|---|---|---|
| [illegible] | | 8/30/2013 | Dry | | 10 | 10 |
| [illegible] | | [illegible] | Dry | | 10 | [illegible] |
| | | | | | | |
| [illegible] | 1100 | 8/1/2015 | | | 800 | [illegible] |
| [illegible] | 1100 | [illegible] | | | 800 | [illegible] |
| [illegible] | 1100 | 8/3/2015 | | | 800 | [illegible] |
| [illegible] | 1115 | [illegible]• | | | 250 | [illegible] |
| MCW 14B | 1115 | 8/5/2015 | | | 250 | [illegible] |
| MCW 14B | 1115 | 8/6/2015 | | | 250 | [illegible] |
| MCW 14B | 1115 | 8/7/2015 | | | 250 | [illegible] |
| MCW 14B | 1115 | 8/8/2015 | | | 200 | 240 |
| MCW 14B | 1115 | 8/9/2015 | | | [illegible] | [illegible] |
| MCW 14B | 1115 | 8/10/2015 | | | [illegible] | [illegible] |
| MCW 14B | 1100 | 8/11/2015• | | | [illegible] | [illegible] |
| MCW 14B | 1100 | 8/12/2015 | | | 2,400 | 270 |
| [illegible] | 1120 | [illegible] | | | [illegible] | [illegible] |
| [illegible] | 1120 | [illegible] | | | 2,400 | [illegible] |
| [illegible] | 1100 | 8/15/2015 | | | 2,400 | [illegible] |
| [illegible] | 1100 | 8/16/2015 | | | 2,400 | [illegible] |
| [illegible] | 1100 | 8/17/2015 | | | 2,400 | [illegible] |
| [illegible] | 1100 | 8/18/2015• | | | 14,000 | [illegible] |
| MCW 14B | 1100 | 8/19/2015 | | | 14,000 | [illegible] |
| MCW 14B | 1100 | 8/20/2015 | | | 14,000 | [illegible] |
| [illegible] | 1100 | [illegible] | | | [illegible] | [illegible] |
| [illegible] | 1100 | [illegible] | | | [illegible] | [illegible] |
| [illegible] | 1100 | 8/23/2015 | | | 14,000 | [illegible] |
| [illegible] | 1100 | 8/24/2015 | | | 14,000 | 1,218 |
| MCW 14B | 900 | 8/25/2015• | | | 130 | 1,294 |
| MCW 14B | 900 | 8/26/2015 | | | 130 | 1,452 |
| MCW 14B | 900 | 8/27/2015 | | | 130 | 1,342 |
| MCW 14B | 900 | 8/28/2015 | | | 130 | [illegible] |
| MCW 14B | 900 | 8/29/2015 | | | 130 | [illegible] |
| MCW 14B | 900 | 8/30/2015 | | | 130 | [illegible] |
| MCW 14B | [illegible] | 8/31/2015 | | | [illegible] | [illegible] |
| | | | | | | |
| [illegible] | [illegible] | 8/1/2015 | | | 800 | [illegible] |
| [illegible] | [illegible] | [illegible] | | | 500 | [illegible] |
| MCW 15 | [illegible] | 8/3/2015 | | | 800 | 89 |
| MCW 15 | 1000 | 8/4/2015• | | | 800 | 92 |
| [illegible] | 1000 | [illegible] | | | [illegible] | [illegible] |
| MCW 15 | 1000 | [illegible] | | | [illegible] | [illegible] |
| MCW 15 | 1000 | [illegible] | | | [illegible] | [illegible] |
| MCW 15 | 1000 | [illegible] | | | [illegible] | [illegible] |
| MCW 15 | 1000 | [illegible] | | | [illegible] | [illegible] |
| [illegible] | 1000 | [illegible] | | | [illegible] | [illegible] |
| [illegible] | 1000 | [illegible]• | | | 5,400 | 144 |
| MCW 15 | 1000 | 8/12/2015 | | | 5,400 | 147 |
| MCW 15 | 1000 | 8/13/2015 | | | [illegible] | [illegible] |
| MCW 15 | 1000 | 8/14/2015 | | | 5,400 | 208 |
| MCW 15 | 1000 | 8/15/2015 | | | 5,400 | [illegible] |
| MCW 15 | 1000 | 8/16/2015 | | | [illegible] | [illegible] |

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW-15c | 1000 | 8/17/2015 | | — | 1,400 | 37 |
| [illegible] | 1000 | 8/18/2015 ● | | — | [illegible] | [illegible] |
| [illegible] | 1000 | [illegible] | | — | 1,000 | 81 |
| [illegible] | 1000 | [illegible] | | — | [illegible] | [illegible] |
| [illegible] | 1000 | [illegible] | | | 5,000 | 203 |
| [illegible] | 1000 | [illegible] | | | 5,000 | [illegible] |
| MCW-15c | 1000 | 8/23/2015 | | | 5,000 | 677 |
| MCW-15c | 1000 | 8/24/2015 | | — | 5,000 | 1,047 |
| MCW-15c | 830 | 8/25/2015 ● | | — | 40 | 1,073 |
| MCW-15c | 830 | 8/26/2015 | | — | 40 | 1,203 |
| [illegible] | 830 | [illegible] | | — | [illegible] | [illegible] |
| [illegible] | 830 | [illegible] | | — | [illegible] | [illegible] |
| MCW-15c | 830 | 8/29/2015 | | — | [illegible] | 920 |
| MCW-15c | 830 | 8/30/2015 | | — | [illegible] | 903 |
| MCW-15c | 830 | 8/31/2015 | | — | [illegible] | 694 |
| | | | | | | |
| MCW-17 | — | 8/1/2015 | Dry | — | 10 | 10 |
| MCW-17 | — | 8/2/2015 | Dry | — | 10 | 10 |
| MCW-17 | — | 8/3/2015 | Dry | — | 10 | 10 |
| MCW-17 | — | 8/4/2015 ● | Dry | — | 10 | 10 |
| [illegible] | — | [illegible] | Dry | — | [illegible] | [illegible] |
| [illegible] | | 8/6/2015 | [illegible] | — | 10 | 10 |
| [illegible] | | [illegible] | — | — | [illegible] | 10 |
| [illegible] | | 8/8/2015 | Dry | — | 10 | 10 |
| [illegible] | | 8/9/2015 | Dry | — | [illegible] | 10 |
| MCW-17 | | 8/10/2015 | Dry | — | [illegible] | 10 |
| MCW-17 | | 8/11/2015 ● | Dry | — | 10 | 10 |
| MCW-17 | | 8/12/2015 | Dry | — | 10 | 10 |
| MCW-17 | — | 8/13/2015 | Dry | — | 10 | 10 |
| MCW-17 | | 8/14/2015 | Dry | — | 10 | 10 |
| [illegible] | | [illegible] | Dry | — | [illegible] | [illegible] |
| MCW-17 | | [illegible] | Dry | — | 10 | 10 |
| MCW-17 | — | [illegible] | Dry | — | 10 | 10 |
| MCW-17 | | 8/18/2015 ● | Dry | — | 10 | 10 |
| MCW-17 | | 8/19/2015 | Dry | — | 10 | 10 |
| MCW-17 | — | 8/20/2015 | Dry | — | 10 | 10 |
| MCW-17 | | 8/21/2015 | Dry | — | 10 | 10 |
| MCW-17 | | 8/22/2015 | Dry | — | 10 | 10 |
| MCW-17 | | [illegible] | Dry | — | [illegible] | 10 |
| [illegible] | | 8/23/2015<br>8/24/2015 ● | Dry<br>Dry | — | [illegible] | [illegible] |
| MCW-17 | | 8/25/2015 | Dry | — | [illegible] | [illegible] |
| MCW-17 | | 8/26/2015 | Dry | — | 10 | 10 |
| MCW-17 | | 8/27/2015 | Dry | — | 10 | 10 |
| MCW-17 | — | 8/28/2015 | Dry | — | 10 | 10 |
| MCW-17 | | 8/30/2015 | Dry | — | 10 | 10 |
| MCW-17 | | 8/31/2015 | Dry | — | 10 | 10 |
| | | | | | | |
| [illegible] | | [illegible] | [illegible] | — | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | — | [illegible] | [illegible] |

| | | | | | | |
|---|---|---|---|---|---|---|
| [illegible] | – | [illegible] | Dry | | 10 | [illegible] |
| [illegible] | | [illegible] ✱ | Dry | | [illegible] | [illegible] |
| [illegible] | | [illegible] | Dry | – | 10 | 10 |
| MCW-18 | | 8/6/2015 | Dry | | 10 | 10 |
| MCW-18 | – | 8/7/2015 | Dry | < | 10 | 10 |
| MCW-18 | – | 8/8/2015 | Dry | < | 10 | 10 |
| MCW-18 | | 8/9/2015 | Dry | | 10 | 10 |
| MCW-18 | | 8/10/2015 | Dry | | 10 | 10 |
| [illegible] | | [illegible] ✱ | Dry | | 10 | [illegible] |
| [illegible] | | [illegible] | [illegible] | | [illegible] | [illegible] |
| [illegible] | | [illegible] | Dry | | 10 | 10 |
| MCW-18 | | 8/14/2015 | Dry | | 10 | 10 |
| MCW-18 | – | 8/15/2015 | Dry | | 10 | 10 |
| MCW-18 | | 8/16/2015 | Dry | – | 10 | 10 |
| MCW-18 | – | 8/17/2015 | Dry | – | 10 | 10 |
| MCW-18 | | 8/18/2015✱ | Dry | – | 10 | 10 |
| MCW-18 | | 8/19/2015 | Dry | | 10 | 10 |
| MCW-18 | | [illegible] | Dry | | 10 | 10 |
| [illegible] | | [illegible] | Dry | | 10 | 10 |
| MCW-18 | | 8/22/2015 | Dry | | 10 | 10 |
| MCW-18 | | 8/23/2015 | Dry | – | 10 | 10 |
| MCW-18 | | 8/24/2015 | Dry | – | 10 | 10 |
| MCW-18 | | 8/25/2015✱ | Dry | | 10 | 10 |
| MCW-18 | | 8/26/2015 | Dry | | 10 | 10 |
| MCW-18 | | 8/27/2015 | Dry | | 10 | 10 |
| [illegible] | | [illegible] | Dry | | 10 | 10 |
| [illegible] | | [illegible] | Dry | | 10 | 10 |
| [illegible] | | [illegible] | Dry | | 10 | 10 |
| [illegible] | | [illegible] | Dry | | 10 | 10 |

Notes:

[illegible]

✱ Date of sampling

# county of ventura

PUBLIC WORKS AGENCY
JEFF PRATT
Agency Director

Watershed Protection District
Tully K. Clifford, Director

Transportation Department
David L. Fleisch, Director

Engineering Services Department
Herbert L. Schwind, Director

Water & Sanitation Department
David J. Sasek, Director

Central Services Department
Janice E. Turner, Director

August 24, 2015

Kangshi Wang, Ph.D.
California Regional Water Quality Control Board
Los Angeles Region
Standards & TMDL Unit
320 West 4th Street, Suite 200
Los Angeles, CA 90013
(213) 576-6780

**Subject: MALIBU CREEK AND LAGOON BACTERIA TMDL COMPLIANCE MONITORING FOR VENTURA COUNTY AND CITY OF THOUSAND OAKS**

Dear Dr. Wang:

The table below summarizes the results of the weekly monitoring effort required by the Malibu Creek and Lagoon Bacteria TMDL (TMDL) Compliance Monitoring Plan (CMP) for the month of July 2015. Sites were sampled weekly on Tuesdays (July 7, 14, 21 and 28). Sites without results reported were not sampled due to insufficient flow and are labeled "Dry." Daily geomeans were calculated using results from the previous 30 days (actual sampling date marked with ♦). Weeks with wet weather samples (collected less than 72 hours after a day with > 0.1" rain) use the previous non-rain single sample value to calculate the geomean. Half the detection limit was used for the purpose of calculating the daily geomean for sites with results reported as < 20 MPN/100ml or for dry weather when no sample was taken.

Fecal coliform monitoring has been discontinued, as approved by the Los Angeles Regional Water Quality Control Board on October 31, 2014, in alignment with the Regional Board's removal of the fecal coliform objective for REC-1 freshwaters from the TMDL on June 7, 2012 and subsequent approval by the U.S. Environmental Protection Agency on July 2, 2014.

If you have any questions regarding this matter, please contact Ewelina Mutkowska at (805) 645-1382.

Sincerely,

Gerhardt Hubner
Deputy Director, Watershed Protection District

CC: Tully Clifford, Watershed Protection District
Ewelina Mutkowska, County of Ventura
Paul Jorgensen, City of Thousand Oaks
Joe Bellomo, Wildan Associates
Allen Ma, County of Los Angeles (via email)

**Table 1. Weekly sampling results**

| Location | Time | Date | Rain | | Single Sample (as sampled) E. coli (235 MPN) |
|---|---|---|---|---|---|
| MCW-06 | | 7/7/2015• | | | Dry |
| MCW-06 | | 7/14/2015• | | | Dry |
| MCW-06 | | 7/21/2015• | | | Dry |
| MCW-06 | | 7/28/2015• | | | Dry |
| | | | | | |
| | | | | | |
| MCW-9 | | 7/7/2015• | | | Dry |
| MCW-9 | | 7/14/2015• | | | Dry |
| MCW-9 | | 7/21/2015• | | | Dry |
| MCW-9 | | 7/28/2015• | | | Dry |
| | | | | | |
| | | | | | |
| MCW-12 | – | 7/7/2015• | | | Dry |
| MCW-12 | | 7/14/2015• | | | Dry |
| MCW-12 | 1115 | 7/21/2015• | Rain | = | 110 |
| MCW-12 | – | 7/28/2015• | | | Dry |
| | | | | | |
| | | | | | |
| MCW-16c | 215 | 7/7/2015• | | [illegible] | [illegible] |
| MCW-16c | 1015 | 7/14/2015• | | = | 20 |
| MCW-16c | 1100 | 7/21/2015• | Rain | = | 210 |
| MCW-16c | 1100 | 7/28/2015• | | = | 800 |
| | | | | | |
| | | | | | |
| MCW-15c | 1100 | 7/7/2015• | | = | 80 |
| MCW-15c | 945 | 7/14/2015• | | = | 20 |
| MCW-15c | 1020 | 7/21/2015• | Rain | = | 240 |
| MCW-15c | 1000 | 7/28/2015• | | = | 100 |
| | | | | | |
| | | | | | |
| MCW-17 | | 7/7/2015• | | | Dry |
| MCW-17 | | 7/14/2015• | | | Dry |
| MCW-17 | | 7/21/2015• | | | Dry |
| MCW-17 | | 7/28/2015• | | | Dry |
| | | | | | |
| | | | | | |
| MCW-18 | | 7/7/2015• | | | Dry |
| MCW-18 | | 7/14/2015• | | | Dry |
| MCW-18 | | 7/21/2015• | | | Dry |
| MCW-18 | | 7/28/2015• | | | Dry |
| | | | | | |

Notes:
*[illegible]
•Time of sampling

**Table 2. Computation of daily geomean**

| | | | | | Single Sample (adjusted for rain, dry and NDs) | Geomean |
|---|---|---|---|---|---|---|
| Location | Time | Date | Rain | | E. coli | E. coli |
| | | | | | (235 MPN) | (126 MPN) |
| [illegible] | | [illegible] | Dry | | [illegible] | 10 |
| MCW-8b | | 7/2/2015 | Dry | | 10 | 10 |
| MCW-8b | | 7/3/2015 | Dry | | [illegible] | 10 |
| MCW-8b | | 7/4/2015 | Dry | | [illegible] | 10 |
| MCW-8b | | 7/5/2015 | Dry | | 10 | 10 |
| MCW-8b | | 7/6/2015 | Dry | < | 10 | 10 |
| MCW-8b | | 7/7/2015 ● | Dry | | 10 | 10 |
| MCW-8b | | 7/8/2015 | Dry | < | 10 | 10 |
| MCW-8b | | 7/9/2015 | Dry | < | 10 | 10 |
| MCW-8b | | 7/10/2015 | Dry | | [illegible] | 10 |
| MCW-8b | | 7/11/2015 | Dry | | 10 | 10 |
| MCW-8b | | [illegible] | Dry | | [illegible] | 10 |
| MCW-8b | | 7/13/2015 | Dry | | 10 | 10 |
| MCW-8b | | 7/14/2015 ● | Dry | | 10 | 10 |
| MCW-8b | | 7/15/2015 | Dry | | [illegible] | 10 |
| MCW-8b | | 7/16/2015 | Dry | < | 10 | 10 |
| MCW-8b | | 7/17/2015 | Dry | < | 10 | 10 |
| MCW-8b | | 7/18/2015 | Dry | < | 10 | 10 |
| MCW-8b | | 7/19/2015 | Dry | < | 10 | 10 |
| MCW-8b | | [illegible] | Dry | | [illegible] | [illegible] |
| MCW-8b | | 7/21/2015 ● | Dry | | 10 | 10 |
| MCW-8b | | 7/22/2015 | Dry | | 10 | 10 |
| MCW-8b | | 7/23/2015 | Dry | | 10 | 10 |
| MCW-8b | | 7/24/2015 | Dry | < | 10 | 10 |
| MCW-8b | | 7/25/2015 | Dry | < | 10 | 10 |
| MCW-8b | | 7/26/2015 | Dry | < | 10 | 10 |
| MCW-8b | - | 7/27/2015 | Dry | < | 10 | 10 |
| MCW-8b | | 7/28/2015 ● | Dry | < | 10 | 10 |
| MCW-8b | | 7/29/2015 | Dry | < | 10 | 10 |
| MCW-8b | | 7/30/2015 | Dry | | 10 | 10 |
| MCW-8b | | 7/31/2015 | [illegible] | < | 10 | 10 |
| | | | | | | |
| MCW-9 | | 7/1/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 7/2/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 7/3/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 7/4/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 7/5/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 7/6/2015 | Dry | < | 10 | [illegible] |
| MCW-9 | | 7/7/2015 ● | Dry | | 10 | [illegible] |
| MCW-9 | | 7/8/2015 | Dry | | [illegible] | 10 |
| MCW-9 | | 7/9/2015 | Dry | | 10 | 10 |
| MCW-9 | | 7/10/2015 | Dry | < | 10 | 10 |
| MCW-9 | | 7/11/2015 | Dry | < | 10 | 10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| [illegible] | | 7/12/2015 | Dry | | 10 | 10 |
| MCW-9 | | 7/13/2015 | Dry | | 10 | 10 |
| MCW-9 | | 7/14/2015 * | Dry | | [illegible] | 10 |
| MCW-9 | | 7/15/2015 | Dry | | 10 | 10 |
| MCW-9 | | 7/16/2015 | Dry | | 10 | 10 |
| MCW-9 | | 7/17/2015 | Dry | | 10 | 10 |
| MCW-9 | | 7/18/2015 | Dry | | 10 | 10 |
| MCW-9 | | 7/19/2015 | Dry | | 10 | 10 |
| MCW-9 | | 7/20/2015 | Dry | | 10 | 10 |
| MCW-9 | | 7/21/2015 * | Dry | | 10 | 10 |
| MCW-9 | | 7/22/2015 | Dry | | 10 | 10 |
| MCW-9 | | 7/23/2015 | Dry | | 10 | 10 |
| MCW-9 | | 7/24/2015 | Dry | | 10 | 10 |
| MCW-9 | | [illegible] | Dry | | [illegible] | 10 |
| MCW-9 | | [illegible] | Dry | | [illegible] | 10 |
| MCW-9 | | [illegible] | Dry | | [illegible] | 10 |
| MCW-9 | | [illegible] * | Dry | | 10 | 10 |
| MCW-9 | | 7/29/2015 | Dry | | 10 | 10 |
| MCW-9 | | 7/30/2015 | Dry | | 10 | 10 |
| MCW-9 | | 7/31/2015 | Dry | | 10 | 10 |
| | | | | | | |
| MCW-12 | | 7/1/2015 | Dry | | 10 | 10 |
| MCW-12 | | [illegible] | Dry | | 10 | [illegible] |
| MCW-12 | | 7/3/2015 | Dry | | [illegible] | [illegible] |
| MCW-12 | | 7/4/2015 | Dry | | 10 | 10 |
| MCW-12 | | 7/5/2015 | Dry | | [illegible] | 10 |
| MCW-12 | | 7/6/2015 | Dry | | 10 | 10 |
| MCW-12 | | 7/7/2015 * | Dry | | 10 | 10 |
| MCW-12 | | 7/8/2015 | Dry | | 10 | 10 |
| MCW-12 | | 7/9/2015 | Dry | | 10 | 10 |
| MCW-12 | | 7/10/2015 | Dry | | 10 | 10 |
| MCW-12 | | 7/11/2015 | Dry | | 10 | 10 |
| MCW-12 | | 7/12/2015 | Dry | | 10 | 10 |
| MCW-12 | | [illegible] | Dry | | 10 | 10 |
| MCW-12 | | [illegible] * | Dry | | 10 | 10 |
| MCW-12 | | 7/15/2015 | Dry | | 10 | 10 |
| MCW-12 | | 7/16/2015 | Dry | | 10 | 10 |
| MCW-12 | | 7/17/2015 | Dry | | 10 | 10 |
| MCW-12 | | 7/18/2015 | Dry | | 10 | 10 |
| MCW-12 | | 7/19/2015 | Dry | | 10 | 10 |
| MCW-12 | | 7/20/2015 | Dry | | 10 | 10 |
| MCW-12 | 1115 | 7/21/2015 * | [illegible] | | [illegible] | [illegible] |
| MCW-12 | [illegible] | [illegible] | [illegible] | | [illegible] | [illegible] |
| MCW-12 | [illegible] | [illegible] | [illegible] | | [illegible] | [illegible] |
| MCW-12 | [illegible] | 7/24/2015 | [illegible] | | [illegible] | [illegible] |
| MCW-12 | 1115 | 7/25/2015 | [illegible] | | [illegible] | [illegible] |
| MCW-12 | 1115 | 7/26/2015 | [illegible] | | [illegible] | [illegible] |
| MCW-12 | 1118 | 7/27/2015 | [illegible] | | [illegible] | [illegible] |
| MCW-12 | | 7/28/2015 * | Dry | | 10 | 10 |
| [illegible] | | 7/29/2015 | [illegible] | | 10 | 10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW-12 | | 7/30/2015 | Dry | | [illegible] | [illegible] |
| MCW-13 | | 7/31/2015 | Dry | [illegible] | [illegible] | [illegible] |
| | | | | | | |
| MCW-14b | 1130 | 7/1/2015 | | | [illegible] | [illegible] |
| MCW-14b | 1130 | 7/2/2015 | | = | 170 | 112 |
| MCW-14b | 1130 | 7/3/2015 | | = | [illegible] | 108 |
| MCW-14b | 1130 | 7/4/2015 | | = | 170 | 109 |
| MCW-14b | 1130 | 7/5/2015 | | = | 170 | 108 |
| MCW-14b | 1130 | 7/6/2015 | | = | 170 | 112 |
| MCW-14b | 215 | 7/7/2015* | | = | 500 | 116 |
| MCW-14b | 215 | 7/8/2015 | | = | 500 | 122 |
| MCW-14b | 215 | 7/9/2015 | | = | 500 | [illegible] |
| MCW-14b | 215 | 7/10/2015 | | = | 400 | [illegible] |
| MCW-14b | 215 | 7/11/2015 | | = | [illegible] | [illegible] |
| MCW-14b | 215 | 7/12/2015 | | = | [illegible] | 120 |
| MCW-14b | 215 | 7/13/2015 | | = | 300 | 110 |
| MCW-14b | 1015 | 7/14/2015* | | = | 20 | 119 |
| MCW-14b | 1015 | 7/15/2015 | | = | 20 | 109 |
| MCW-14b | 1015 | 7/16/2015 | | = | 20 | 109 |
| MCW-14b | 1015 | 7/17/2015 | | = | 20 | 109 |
| MCW-14b | 1015 | 7/18/2015 | | = | 20 | 109 |
| MCW-14b | 1015 | [illegible] | | = | [illegible] | [illegible] |
| MCW-14b | 1015 | [illegible] | | | [illegible] | [illegible] |
| MCW-14b | 1100 | [illegible]* | Rain | | [illegible] | **Rain** |
| MCW-14b | 1100 | [illegible] | Rain | | **Rain** | **Rain** |
| MCW-14b | 1100 | [illegible] | Rain | | **Rain** | **Rain** |
| MCW-14b | 1100 | 7/24/2015 | Rain | | **Rain** | **Rain** |
| MCW-14b | 1100 | 7/25/2015 | Rain | | **Rain** | **Rain** |
| MCW-14b | 1100 | 7/26/2015 | Rain | | **Rain** | **Rain** |
| MCW-14b | 1100 | 7/27/2015 | Rain | | **Rain** | **Rain** |
| MCW-14b | 1100 | 7/28/2015* | | = | [illegible] | [illegible] |
| MCW-14b | 1100 | 7/29/2015 | | = | [illegible] | [illegible] |
| MCW-14b | 1100 | 7/30/2015 | | = | [illegible] | [illegible] |
| MCW-14b | 1100 | 7/31/2015 | | = | [illegible] | [illegible] |
| | | | | | | |
| MCW-15c | 1030 | 7/1/2015 | | = | 110 | 274 |
| MCW-15c | 1030 | 7/2/2015 | | = | 110 | 265 |
| MCW-15c | 1030 | 7/3/2015 | | = | 110 | 256 |
| MCW-15c | 1030 | 7/4/2015 | | = | 110 | [illegible] |
| MCW-15c | 1030 | 7/5/2015 | | = | 110 | [illegible] |
| MCW-15c | 1030 | 7/6/2015 | | = | 110 | [illegible] |
| MCW-15c | 1100 | [illegible]* | | | [illegible] | [illegible] |
| MCW-15c | 1100 | 7/8/2015 | | = | [illegible] | 218 |
| MCW-15c | 1100 | 7/9/2015 | | = | [illegible] | [illegible] |
| MCW-15c | 1100 | 7/10/2015 | | = | [illegible] | 176 |
| MCW-15c | 1100 | 7/11/2015 | | = | [illegible] | [illegible] |
| MCW-15c | 1100 | 7/12/2015 | | = | [illegible] | 148 |
| MCW-15c | 1100 | 7/13/2015 | | = | [illegible] | 132 |
| MCW-15c | 945 | 7/14/2015* | | = | 20 | 110 |
| MCW-15c | 945 | 7/15/2015 | | = | [illegible] | [illegible] |
| MCW-15c | 945 | 7/16/2015 | | = | [illegible] | [illegible] |

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW 15c | 945 | [illegible] | | [illegible] | [illegible] | [illegible] |
| MCW 15c | 945 | 7/19/2015 | | [illegible] | 83 | 83 |
| MCW 15c | 945 | [illegible] | | | [illegible] | [illegible] |
| MCW 15c | 945 | 7/20/2015 | | [illegible] | [illegible] | [illegible] |
| MCW 15c | 1020 | 7/23/2015* | Rain | | **Low** | **Low** |
| MCW 15c | 1020 | 7/23/2015 | Rain | | **Low** | **Low** |
| MCW 15c | 1020 | 7/23/2015 | Rain | | **Low** | **Low** |
| MCW 15c | 1030 | 7/24/2015 | Rain | | **Low** | **Low** |
| MCW 15c | 1030 | 7/25/2015 | Rain | | **Low** | **Low** |
| MCW 15c | 1030 | 7/26/2015 | Rain | | [illegible] | **Low** |
| MCW 15c | [illegible] | [illegible] | Rain | | [illegible] | [illegible] |
| MCW 15c | [illegible] | [illegible]* | | [illegible] | [illegible] | [illegible] |
| MCW 15c | 1000 | [illegible] | | [illegible] | [illegible] | 83 |
| MCW 15c | 1000 | [illegible] | | [illegible] | [illegible] | 83 |
| MCW 15c | 1000 | 7/31/2015 | | [illegible] | 100 | 84 |
| | | | | | | |
| MCW 17 | — | 7/1/2015 | Dry | [illegible] | 10 | 10 |
| MCW 17 | | 7/2/2015 | Dry | [illegible] | 10 | 10 |
| MCW 17 | | 7/3/2015 | Dry | [illegible] | 10 | 10 |
| MCW 17 | | 7/4/2015 | Dry | [illegible] | 10 | 10 |
| MCW 17 | | [illegible] | Dry | | [illegible] | [illegible] |
| MCW 17 | | [illegible] | Dry | [illegible] | [illegible] | [illegible] |
| MCW 17 | | 7/7/2015* | Dry | [illegible] | 10 | 10 |
| MCW 17 | | 7/8/2015 | Dry | [illegible] | 10 | 10 |
| MCW 17 | | 7/9/2015 | Dry | [illegible] | 10 | 10 |
| MCW 17 | | 7/10/2015 | Dry | | 10 | 10 |
| MCW 17 | | 7/11/2015 | Dry | [illegible] | 10 | 10 |
| MCW 17 | | 7/12/2015 | Dry | [illegible] | 10 | 10 |
| MCW 17 | | 7/13/2015 | Dry | [illegible] | [illegible] | 10 |
| MCW 17 | | [illegible]* | Dry | [illegible] | [illegible] | [illegible] |
| MCW 17 | | 7/15/2015 | [illegible] | | [illegible] | 10 |
| MCW 17 | | 7/16/2015 | Dry | | [illegible] | 10 |
| MCW 17 | | 7/17/2015 | Dry | | 10 | 10 |
| MCW 17 | | 7/18/2015 | Dry | [illegible] | 10 | 10 |
| MCW 17 | | 7/19/2015 | Dry | [illegible] | 10 | 10 |
| MCW 17 | | 7/20/2015 | Dry | [illegible] | 10 | 10 |
| MCW 17 | | 7/21/2015* | Dry | | 10 | 10 |
| MCW 17 | | [illegible] | Dry | | [illegible] | [illegible] |
| MCW 17 | | 7/23/2015 | Dry | [illegible] | 10 | 10 |
| MCW 17 | | [illegible] | Dry | [illegible] | [illegible] | [illegible] |
| MCW 17 | | [illegible] | Dry | [illegible] | [illegible] | [illegible] |
| MCW 17 | | 7/26/2015 | Dry | [illegible] | [illegible] | 10 |
| MCW 17 | | 7/27/2015 | Dry | | 10 | 10 |
| MCW 17 | | 7/28/2015* | Dry | | 10 | 10 |
| MCW 17 | | 7/29/2015 | Dry | | 10 | 10 |
| MCW 17 | | 7/30/2015 | Dry | [illegible] | [illegible] | 10 |
| MCW 17 | | 7/31/2015 | Dry | | [illegible] | 10 |
| | | | | | | |
| MCW 17 | | [illegible] | Dry | | [illegible] | [illegible] |
| MCW 17 | | [illegible] | Dry | [illegible] | [illegible] | [illegible] |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | [illegible] | Dry | | 10 | 10 |
| | | 7/4/2015 | Dry | | 10 | 10 |
| MCW-18 | | 7/5/2015 | Dry | | 10 | 10 |
| MCW-18 | | 7/6/2015 | Dry | < | 10 | 10 |
| MCW-18 | | 7/7/2015• | Dry | | 10 | 10 |
| MCW-18 | | 7/8/2015 | Dry | < | 10 | 10 |
| MCW-18 | | 7/9/2015 | Dry | < | 10 | 10 |
| MCW-18 | | 7/10/2015 | Dry | < | 10 | 10 |
| MCW-18 | | 7/11/2015 | Dry | | 10 | 10 |
| MCW-18 | | 7/12/2015 | Dry | | 10 | 10 |
| MCW-18 | | 7/13/2015 | Dry | | 10 | 10 |
| MCW-18 | | 7/14/2015• | Dry | | 10 | 10 |
| MCW-18 | | 7/15/2015 | Dry | < | 10 | 10 |
| MCW-18 | | 7/16/2015 | Dry | < | 10 | 10 |
| MCW-18 | | 7/17/2015 | Dry | < | 10 | 10 |
| MCW-18 | | 7/18/2015 | Dry | < | 10 | 10 |
| MCW-18 | | 7/19/2015 | Dry | | 10 | 10 |
| MCW-18 | | 7/20/2015 | Dry | | 10 | 10 |
| MCW-18 | | 7/21/2015• | Dry | | [illegible] | 10 |
| MCW-18 | | 7/22/2015 | Dry | < | 10 | 10 |
| MCW-18 | | 7/23/2015 | Dry | | 10 | 10 |
| MCW-18 | | 7/24/2015 | Dry | < | 10 | 10 |
| MCW-18 | | 7/25/2015 | Dry | < | 10 | 10 |
| MCW-18 | | 7/26/2015 | Dry | < | 10 | 10 |
| MCW-18 | | 7/27/2015 | Dry | < | 10 | 10 |
| MCW-18 | | 7/28/2015• | Dry | < | 10 | 10 |
| MCW-18 | | 7/29/2015 | Dry | < | 10 | 10 |
| MCW-18 | | 7/30/2015 | Dry | < | 10 | 10 |
| MCW-18 | | 7/31/2015 | Dry | < | 10 | 10 |

Notes:
[illegible]

* The [illegible]

•Day of sampling

**county of ventura**

**PUBLIC WORKS AGENCY**
**JEFF PRATT**
Agency Director

Watershed Protection District
**Tully K. Clifford**, Director

Transportation Department
**David L. Fleisch**, Director

Engineering Services Department
**Herbert L. Schwind**, Director

Water & Sanitation Department
**David J. Sasek**, Director

Central Services Department
**Janice E. Turner**, Director

July 27, 2015

Kangshi Wang, Ph.D.
California Regional Water Quality Control Board
Los Angeles Region
Standards & TMDL Unit
320 West 4th Street, Suite 200
Los Angeles, CA 90013
(213) 576-6780

**Subject: MALIBU CREEK AND LAGOON BACTERIA TMDL COMPLIANCE MONITORING FOR VENTURA COUNTY AND CITY OF THOUSAND OAKS**

Dear Dr. Wang:

The table below summarizes the results of the weekly monitoring effort required by the Malibu Creek and Lagoon Bacteria TMDL (TMDL) Compliance Monitoring Plan (CMP) for the month of June 2015. Sites were sampled weekly on Tuesdays (June 2, 9, 16, 23 and 30). Sites without results reported were not sampled due to insufficient flow and are labeled "Dry." Daily geomeans were calculated using results from the previous 30 days (actual sampling date marked with ♦). Weeks with wet weather samples (collected less than 72 hours after a day with > 0.1" rain) use the previous non-rain single sample value to calculate the geomean. Half the detection limit was used for the purpose of calculating the daily geomean for sites with results reported as < 20 MPN/100ml or for dry weather when no sample was taken.

Fecal coliform monitoring has been discontinued, as approved by the Los Angeles Regional Water Quality Control Board on October 31, 2014, in alignment with the Regional Board's removal of the fecal coliform objective for REC-1 freshwaters from the TMDL on June 7, 2012 and subsequent approval by the U.S. Environmental Protection Agency on July 2, 2014.

If you have any questions regarding this matter, please contact Ewelina Mutkowska at (805) 645-1382.

Sincerely,

Gerhardt Hubner
Deputy Director, Watershed Protection District

CC: Tully Clifford, Watershed Protection District
Ewelina Mutkowska, County of Ventura
JoAnne Kelly, City of Thousand Oaks
Joe Bellomo, Wildan Associates
Allen Ma, County of Los Angeles (via email)

**Table 1. Weekly sampling results**

| Location | Time | Date | Rain | | Single Sample [illegible] E. coli (235 MPN) |
|---|---|---|---|---|---|
| MCW-10 | | 6/2/2015* | | | Dry |
| MCW-10 | | 6/9/2015* | | | Dry |
| MCW-10 | | 6/16/2015* | | | Dry |
| MCW-10 | | 6/23/2015* | | | Dry |
| MCW-10 | | 6/30/2015* | | | Dry |
| | | | | | |
| MCW-9 | | 6/2/2015* | | | Dry |
| MCW-9 | | 6/9/2015* | | | Dry |
| MCW-9 | | 6/16/2015* | | | Dry |
| MCW-9 | | 6/23/2015* | | | Dry |
| | | 6/30/2015* | | | |
| | | | | | |
| MCW-12 | | 6/2/2015* | | | Dry |
| MCW-12 | | 6/9/2015* | | | Dry |
| MCW-12 | | 6/16/2015* | | | Dry |
| MCW-12 | | 6/23/2015* | | | Dry |
| MCW-12 | | 6/30/2015* | | | Dry |
| | | | | | |
| MCW-14b | 1200 | 6/2/2015* | | = | 130 |
| MCW-14b | 1215 | 6/9/2015* | | = | 330 |
| MCW-14b | 1200 | 6/16/2015* | | = | 20 |
| MCW-14b | 1315 | 6/23/2015* | | = | 130 |
| MCW-14b | 1130 | 6/30/2015* | | = | [illegible] |
| | | | | | |
| MCW-15c | 1140 | 6/2/2015* | | = | 100 |
| MCW-15c | 1120 | 6/9/2015* | | = | 1300 |
| MCW-15c | 1015 | 6/16/2015* | | = | 110 |
| MCW-15c | 1015 | 6/23/2015* | | = | 170 |
| MCW-15c | 1030 | 6/30/2015* | | = | 110 |
| | | | | | |
| MCW-17 | | 6/2/2015* | | | Dry |
| MCW-17 | | 6/9/2015* | | | Dry |
| MCW-17 | | 6/16/2015* | | | Dry |
| MCW-17 | | 6/23/2015* | | | Dry |
| MCW-17 | | 6/30/2015* | | | Dry |
| | | | | | |
| MCW-18 | | 6/2/2015* | | | Dry |
| MCW-18 | | 6/9/2015* | | | Dry |
| MCW-18 | | 6/16/2015* | | | Dry |
| MCW-18 | | 6/23/2015* | | | Dry |
| MCW-18 | | 6/30/2015* | | | Dry |

Notes:
[illegible] MCW-15c [illegible], 2015
* Due to [illegible]

**Table 2. Computation of daily geomean**

| Location | Time | Date | Rain | | Single Sample (adjusted for rain, dry and NDs) E. coli (235 MPN)* | [illegible] E. coli (126 MPN) |
|---|---|---|---|---|---|---|
| [illegible] | | 6/1/2015 | Dry | | 10 | 10 |
| [illegible] | | 6/2/2015• | Dry | | 10 | 10 |
| [illegible] | | 6/3/2015 | Dry | | 10 | 10 |
| [illegible] | | 6/4/2015 | Dry | | 10 | 10 |
| [illegible] | | 6/5/2016 | Dry | | 10 | 10 |
| [illegible] | | 6/6/2015 | Dry | | 10 | 10 |
| [illegible] | | 6/7/2015 | Dry | | 10 | 10 |
| [illegible] | | 6/8/2015 | Dry | | 10 | 10 |
| [illegible] | | 6/9/2015• | Dry | | 10 | 10 |
| [illegible] | | 6/10/2015 | Dry | | 10 | 10 |
| [illegible] | | 6/11/2015 | Dry | | 10 | [illegible] |
| [illegible] | | 6/12/2015 | Dry | | 10 | 10 |
| [illegible] | | 6/13/2015 | Dry | | 10 | 10 |
| [illegible] | | 6/14/2015 | Dry | | 10 | 10 |
| [illegible] | | 6/15/2015 | Dry | | 10 | 10 |
| [illegible] | | 6/16/2015• | Dry | | 10 | 10 |
| [illegible] | | 6/17/2015 | Dry | | 10 | 10 |
| [illegible] | | 6/18/2015 | Dry | | 10 | 10 |
| [illegible] | | [illegible] | Dry | | 10 | [illegible] |
| [illegible] | | 6/20/2015 | Dry | | 10 | [illegible] |
| [illegible] | | [illegible] | Dry | | 10 | 10 |
| [illegible] | | 6/22/2015 | Dry | | 10 | 10 |
| [illegible] | | 6/23/2015• | Dry | | 10 | 10 |
| [illegible] | | 6/24/2015 | Dry | | 10 | 10 |
| [illegible] | | 6/25/2015 | Dry | | 10 | 10 |
| [illegible] | | 6/26/2015 | Dry | | 10 | 10 |
| [illegible] | | 6/27/2015 | Dry | | 10 | 10 |
| [illegible] | | 6/28/2015 | Dry | | [illegible] | 10 |
| [illegible] | | [illegible] | Dry | | [illegible] | 10 |
| [illegible] | | 6/30/2015• | Dry | | 10 | [illegible] |
| | | | | | | |
| | | | | | | |
| [illegible] | | 6/1/2015 | Dry | | 10 | 10 |
| [illegible] | | 6/2/2015• | Dry | | 10 | 10 |
| [illegible] | | 6/3/2015 | Dry | | 10 | 10 |
| [illegible] | | [illegible] | Dry | | [illegible] | 10 |
| [illegible] | | 6/5/2015 | Dry | | 10 | 10 |
| [illegible] | | 6/6/2015 | Dry | | [illegible] | 10 |
| [illegible] | | 6/7/2016 | Dry | | [illegible] | [illegible] |
| [illegible] | | 6/8/2015 | Dry | | 10 | 10 |
| [illegible] | | 6/9/2015• | Dry | | 10 | 10 |
| [illegible] | | 6/10/2015 | Dry | | 10 | 10 |
| [illegible] | | 6/11/2015 | Dry | | 10 | 10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW-9 | | 6/12/2015 | Dry | | 10 | 10 |
| MCW-9 | | 6/13/2015 | Dry | | [illegible] | 10 |
| MCW-9 | | 6/14/2015 | Dry | | 10 | 10 |
| MCW-9 | | 6/15/2015 | Dry | | 10 | 10 |
| MCW-9 | | 6/16/2015* | Dry | | 10 | 10 |
| MCW-9 | | 6/17/2015 | Dry | | 10 | 10 |
| MCW-9 | | 6/18/2015 | Dry | | 10 | 10 |
| MCW-9 | | 6/19/2015 | Dry | | 10 | 10 |
| MCW-9 | | 6/20/2015 | Dry | | 10 | 10 |
| MCW-9 | | 6/21/2015 | Dry | | 10 | 10 |
| MCW-9 | | 6/22/2015 | Dry | | 10 | 10 |
| MCW-9 | | 6/23/2015* | Dry | | 10 | 10 |
| MCW-9 | | 6/24/2015 | Dry | | 10 | 10 |
| MCW-9 | | 6/25/2015 | Dry | | 10 | 10 |
| MCW-9 | | 6/26/2015 | Dry | | 10 | 10 |
| MCW-9 | | 6/27/2015 | Dry | | 10 | 10 |
| MCW-9 | | 6/28/2015 | Dry | | 10 | 10 |
| MCW-9 | | 6/29/2015 | Dry | | 10 | 10 |
| MCW-9 | | 6/30/2015* | Dry | | 10 | 10 |
| | | | | | | |
| | | | | | | |
| MCW-12 | | 6/1/2015 | Dry | | [illegible] | 22 |
| MCW-12 | | 6/2/2015* | Dry | | [illegible] | 22 |
| MCW-12 | | 6/3/2015 | Dry | | [illegible] | 26 |
| MCW-12 | | 6/4/2015 | Dry | | [illegible] | 23 |
| MCW-12 | | 6/5/2015 | Dry | | [illegible] | 23 |
| MCW-12 | | 6/6/2015 | Dry | | [illegible] | 19 |
| MCW-12 | | 6/7/2015 | Dry | | [illegible] | 17 |
| MCW-12 | | 6/8/2015 | Dry | | [illegible] | 13 |
| MCW-12 | | 6/9/2015* | Dry | | [illegible] | 13 |
| MCW-12 | | 6/10/2015 | Dry | | [illegible] | 13 |
| MCW-12 | | 6/11/2015 | Dry | | [illegible] | 13 |
| MCW-12 | | 6/12/2015 | Dry | | [illegible] | 12 |
| MCW-12 | | 6/13/2015 | Dry | | [illegible] | 12 |
| MCW-12 | | 6/14/2015 | Dry | | 10 | 12 |
| MCW-12 | | 6/15/2015 | Dry | | 10 | 12 |
| MCW-12 | | 6/16/2015* | Dry | | 10 | 12 |
| MCW-12 | | 6/17/2015 | Dry | | 10 | 12 |
| MCW-12 | | 6/18/2015 | Dry | | 10 | 11 |
| MCW-12 | | 6/19/2015 | Dry | | 10 | 11 |
| MCW-12 | | 6/20/2015 | Dry | | 10 | 11 |
| MCW-12 | | 6/21/2015 | Dry | | [illegible] | 11 |
| MCW-12 | | 6/22/2015 | Dry | | 10 | 10 |
| MCW-12 | | 6/23/2015* | Dry | | 10 | 10 |
| MCW-12 | | 6/24/2015 | Dry | | 10 | 10 |
| MCW-12 | | 6/25/2015 | Dry | | 10 | 10 |
| MCW-12 | | 6/26/2015 | Dry | | 10 | 10 |
| MCW-12 | | 6/27/2015 | Dry | | 10 | 10 |
| MCW-12 | | 6/28/2015 | Dry | | 10 | [illegible] |
| MCW-12 | | 6/29/2015 | Dry | | [illegible] | [illegible] |

| | | | | | | |
|---|---|---|---|---|---|---|
| [illegible] | | 6/30/2015* | [illegible] | [illegible] | [illegible] | [illegible] |
| | | | | | | |
| | | | | | | |
| MCW-14b | 1100 | 6/1/2015 | | [illegible] | 10 | 19 |
| MCW-14b | 1230 | 6/2/2015* | | [illegible] | 130 | [illegible] |
| MCW-14b | 1230 | 6/3/2015 | | [illegible] | 130 | [illegible] |
| MCW-14b | 1230 | 6/4/2015 | | [illegible] | 130 | 20 |
| MCW-14b | 1230 | 6/5/2015 | | [illegible] | 130 | 21 |
| MCW-14b | 1230 | 6/6/2015 | | [illegible] | 120 | 23 |
| MCW-14b | 1230 | [illegible] | | [illegible] | 50 | 23 |
| [illegible] | [illegible] | [illegible] | | [illegible] | 120 | 25 |
| [illegible] | 1215 | [illegible]* | | [illegible] | 330 | [illegible] |
| [illegible] | 1215 | [illegible] | | [illegible] | 330 | [illegible] |
| MCW-14b | 1215 | [illegible] | | [illegible] | 330 | 30 |
| [illegible] | 1215 | 6/12/2015* | | [illegible] | 330 | 33 |
| [illegible] | 1215 | 6/13/2015 | | [illegible] | 330 | 36 |
| [illegible] | 1215 | 6/14/2015 | | [illegible] | 330 | 39 |
| MCW-14b | 1215 | 6/15/2015 | | [illegible] | 330 | 41 |
| MCW-14b | 1100 | 6/16/2015* | | [illegible] | 20 | [illegible] |
| MCW-14b | 1100 | 6/17/2015 | | [illegible] | [illegible] | 41 |
| [illegible] | 1100 | [illegible] | | [illegible] | [illegible] | [illegible] |
| [illegible] | 1100 | [illegible] | | [illegible] | 20 | [illegible] |
| MCW-14b | 1100 | 6/20/2015 | | [illegible] | 20 | 46 |
| MCW-14b | 1100 | 6/21/2015 | | [illegible] | 20 | 47 |
| MCW-14b | 1100 | 6/22/2015 | | [illegible] | 20 | 48 |
| MCW-14b | 1115 | 6/23/2015* | | [illegible] | 130 | 53 |
| MCW-14b | 1115 | 6/24/2015 | | [illegible] | 130 | 57 |
| MCW-14b | 1115 | 6/25/2015 | | [illegible] | 130 | 62 |
| [illegible] | 1115 | [illegible] | | | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | | [illegible] | [illegible] | [illegible] |
| [illegible] | 1115 | [illegible] | | [illegible] | [illegible] | [illegible] |
| [illegible] | 1115 | [illegible] | | [illegible] | [illegible] | [illegible] |
| [illegible] | 1130 | 6/30/2015* | | [illegible] | 170 | [illegible] |
| | | | | | | |
| | | | | | | |
| [illegible] | 1000 | 6/1/2015 | | [illegible] | 10 | 22 |
| MCW-15a | 1140 | 6/2/2015* | | [illegible] | 300 | 23 |
| [illegible] | 1140 | [illegible] | | [illegible] | [illegible] | [illegible] |
| [illegible] | 1140 | [illegible] | | [illegible] | 300 | [illegible] |
| [illegible] | 1140 | [illegible] | | [illegible] | [illegible] | [illegible] |
| [illegible] | 1140 | [illegible] | | [illegible] | [illegible] | [illegible] |
| [illegible] | 1140 | [illegible] | | [illegible] | 300 | 29 |
| [illegible] | 1140 | [illegible] | | [illegible] | 300 | 30 |
| [illegible] | 1120 | [illegible]* | | [illegible] | [illegible] | 33 |
| [illegible] | 1120 | 6/10/2015 | | [illegible] | 1,300 | 38 |
| [illegible] | 1120 | 6/11/2015 | | [illegible] | [illegible] | 42 |
| [illegible] | 1120 | [illegible] | | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] | | [illegible] | [illegible] | [illegible] |
| [illegible] | 1015 | [illegible]* | | [illegible] | [illegible] | [illegible] |

| | | | | | | |
|---|---|---|---|---|---|---|
| [illegible] | [illegible] | [illegible] | | [illegible] | 110 | [illegible] |
| [illegible] | 2015 | 6/18/2015 | | [illegible] | 110 | [illegible] |
| MCW 15e | 2015 | 6/19/2015 | | [illegible] | 110 | [illegible] |
| MCW 15e | 2015 | 6/20/2015 | | [illegible] | 100 | [illegible] |
| MCW 15e | 2015 | 6/21/2015 | | [illegible] | 110 | [illegible] |
| [illegible] | 2015 | 6/22/2015 | | [illegible] | 110 | [illegible] |
| [illegible] | 2015 | 6/23/2015 ● | | [illegible] | [illegible] | [illegible] |
| [illegible] | 2015 | 6/24/2015 | | [illegible] | [illegible] | [illegible] |
| [illegible] | 2015 | [illegible] | | [illegible] | [illegible] | [illegible] |
| [illegible] | 2015 | [illegible] | | [illegible] | [illegible] | [illegible] |
| [illegible] | 2015 | 6/27/2015 | | [illegible] | [illegible] | [illegible] |
| MCW 15e | 2015 | 6/28/2015 | | [illegible] | 110 | 212 |
| [illegible] | 2015 | 6/29/2015 | | [illegible] | 110 | 231 |
| [illegible] | 2015 | 6/30/2015 ● | | [illegible] | 110 | 233 |
| | | | | | | |
| | | | | | | |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] ● | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | 6/6/2015 | [illegible] | [illegible] | [illegible] | [illegible] |
| MCW 17 | [illegible] | 6/7/2015 | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | 6/8/2015 | [illegible] | [illegible] | [illegible] | [illegible] |
| MCW 17 | | 6/9/2015 ● | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| MCW 17 | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | 6/12/2015 | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | 6/13/2015 | [illegible] | [illegible] | [illegible] | [illegible] |
| MCW 17 | | 6/14/2015 | [illegible] | [illegible] | [illegible] | [illegible] |
| MCW 17 | | 6/15/2015 | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | 6/16/2015 ● | [illegible] | [illegible] | [illegible] | [illegible] |
| MCW 17 | | 6/17/2015 | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | 6/18/2015 | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | 6/22/2015 | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | 6/23/2015 ● | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | 6/24/2015 | [illegible] | [illegible] | [illegible] | [illegible] |
| MCW 17 | | 6/25/2015 | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | 6/26/2015 | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | 6/27/2015 | [illegible] | [illegible] | [illegible] | [illegible] |
| MCW 17 | | 6/28/2015 | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | 6/29/2015 | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | 6/30/2015 ● | [illegible] | [illegible] | [illegible] | [illegible] |
| | | | | | | |
| | | | | | | |
| [illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | | [illegible] ● | [illegible] | [illegible] | [illegible] | [illegible] |

| | | | | | | |
|---|---|---|---|---|---|---|
| MCW-18 | | 6/3/2015 | Dry | [illegible] | 10 | 10 |
| MCW-18 | | 6/4/2015 | Dry | [illegible] | 10 | 10 |
| MCW-18 | | 6/5/2015 | Dry | | 10 | 10 |
| [illegible] | | [illegible] | [illegible] | | [illegible] | [illegible] |
| MCW-18 | | [illegible] | [illegible] | | [illegible] | [illegible] |
| MCW-18 | | 6/8/2015 | Dry | | 10 | 10 |
| MCW-18 | [illegible] | 6/9/2015* | Dry | | 10 | 10 |
| MCW-18 | [illegible] | 6/10/2015 | Dry | [illegible] | 10 | 10 |
| MCW-18 | [illegible] | 6/11/2015 | Dry | [illegible] | 10 | 10 |
| MCW-18 | [illegible] | 6/12/2015 | Dry | [illegible] | 10 | 10 |
| MCW-18 | [illegible] | 6/13/2015 | Dry | [illegible] | 10 | 10 |
| MCW-18 | [illegible] | 6/14/2015 | Dry | [illegible] | 10 | 10 |
| MCW-18 | | 6/15/2015 | Dry | | 10 | 10 |
| MCW-18 | | 6/16/2015* | Dry | | 10 | 10 |
| MCW-18 | [illegible] | 6/17/2015 | Dry | | 10 | 10 |
| MCW-18 | | 6/18/2015 | Dry | | 10 | 10 |
| MCW-18 | | 6/19/2015 | Dry | [illegible] | 10 | 10 |
| MCW-18 | | 6/20/2015 | Dry | | 10 | 10 |
| MCW-18 | | 6/21/2015 | Dry | | 10 | 10 |
| MCW-18 | | 6/22/2015 | Dry | | 10 | 10 |
| MCW-18 | | 6/23/2015* | Dry | | 10 | 10 |
| MCW-18 | | 6/24/2015 | Dry | | 10 | 10 |
| MCW-18 | | 6/25/2015 | Dry | | 10 | 10 |
| MCW-18 | | 6/26/2015 | Dry | | 10 | 10 |
| MCW-18 | | 6/27/2015 | Dry | | [illegible] | [illegible] |
| MCW-18 | | 6/28/2015 | Dry | | 10 | 10 |
| MCW-18 | | 6/29/2015 | Dry | | 10 | 10 |
| MCW-18 | | 6/30/2015* | Dry | [illegible] | 10 | 10 |
| | | | | | | |

Notes:

[illegible]

[illegible]

* [illegible]

JANUARY 2016

# TOTAL MAXIMUM DAILY LOAD FOR ALGAE, EUTROPHIC CONDITIONS, AND NUTRIENTS IN VENTURA RIVER, INCLUDING THE ESTUARY, AND ITS TRIBUTARIES (VR ALGAE TMDL)

## 2015 DRY SEASON DATA SUMMARY

*Submitted to*

TMDL Responsible Parties Implementing Receiving Water Monitoring Requirements:

City of Ojai
City of Ventura
County of Ventura
Ojai Valley Sanitary District
California Department of Transportation
Ventura County Agricultural Irrigated Lands Group
Ventura County Watershed Protection District

*Prepared by:*

Ventura County Watershed Protection District
Stormwater Resources Section
January 19, 2016

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# ATTACHMENTS (PROVIDED AS ELECTRONIC FILES)

Attachment A: Sampling event data in summary format, including water quality analytical results and field measurements.

# Executive Summary

On behalf of the TMDL Responsible Parties, the Ventura County Watershed Protection District (District) began sampling in accordance with the VR Algae TMDL Comprehensive Monitoring Plan for Receiving Waters (CMP) on January 14, 2015. As required by the TMDL, the CMP prescribes year-round monthly water quality monitoring for nutrients and other water quality parameters at one site in the Ventura River Estuary, one site in each of the Ventura River reaches 1 – 4, and in two main tributaries, Cañada Larga and San Antonio Creek. Continuous monitoring of dissolved oxygen, pH, temperature, and conductivity are required at each site approximately quarterly. The CMP also requires monthly monitoring of algae during the dry season (May – September). This report covers the dry season monitoring from May 2015 – September 2015, including monthly checks for flow at the observations sites and the continuous data logging conducted in May and September 2015.

Access permission was requested and received for all sites in time for the dry season monitoring, however TMDL-R2 is sampled approximately 200 meters upstream of the OVSD site (R5) during the dry season in order to be entirely on permitted property.

All sites met the seasonal average numeric target for macroalgal cover and, with the exception of TMDL-R1, the seasonal average numeric target for chlorophyll *a*. All measurements for pH were within the numeric target limits, however levels of dissolved oxygen below the numeric target were measured during periods of low flow.

Seven Hydrolab HL4 water quality sondes were selected for quarterly two-week continuous monitoring and first deployed for this project in March 2015. The second and third quarter deployments occurred in May and September, respectively. The issues encountered during the March deployment (false battery alarms, factory calibration errors, siltation, and water level changes (e.g. estuary breaching)) were resolved prior to the May event. The sondes with the battery alarm failures were sent back to the factory and new sondes were sent as replacements. All sondes were calibrated by District staff before each event to ensure calibrations were accurate. The estuary sonde was lowered to a depth of approximately ten feet in order to avoid exposure if the estuary breaches and reduce the risk of potential vandalism. Sondes which had experienced siltation issues were deployed higher in the water column. The sondes were programmed to log dry season data from May 7-25 and September 1-15, 2015. The estuary dissolved oxygen sensor fouled during May so was re-deployed from June 2 – 16, 2015. The dissolved oxygen data for the estuary during the May deployment appears inaccurate and indicates a fouling of the sensor over time. Fouling of the specific conductivity sensor is suspected on the R2 sonde during the May deployment and on the R3 sonde during the September deployment, resulting in the decreasing readings for R2 and unusually low readings for R3. A false battery alarm issue occurred again during the September deployment of the R1 sonde, which shifted the data set by a few minutes but did not otherwise affect the data. All sondes were returned to the factory after the September event and new replacement sondes were sent under warranty.

Southern California is currently experiencing drought conditions. The River was dry at the observation locations upstream of R4 for this reporting period. Flow variations between monitoring sites and events may be due to a combination of factors including geology, weather conditions, inputs, and extractions.

Sampling event data, including photos, water quality analytical results, field measurements, laboratory reports, chain of custody forms, field data sheets, and other raw data are provided as an attachment to this report as electronic files on the CDs provided to the Responsible Parties.

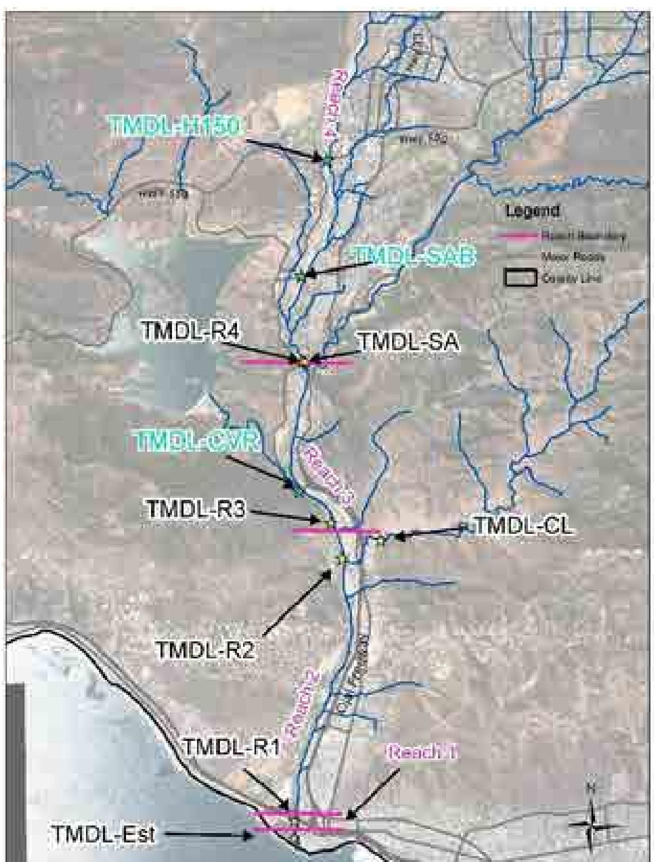
# Background

The Water Quality Control Plan for the Los Angeles Region was amended on December 6, 2012 to incorporate the Total Maximum Daily Load for Algae, Eutrophic Conditions, and Nutrients in Ventura River, including the Estuary, and its Tributaries (VR Algae TMDL). The VR Algae TMDL became effective on June 28, 2013 and required the development and implementation a comprehensive monitoring plan (CMP) for receiving water monitoring to assess numeric attainment and measure in-stream nutrient concentrations. The CMP submitted by the Responsible Parties (Ojai Valley Sanitary District, Ventura County Watershed Protection District, County of Ventura, City of Ojai, City of San Buenaventura (Ventura), California Department of Transportation, and the Ventura County Agricultural Irrigated Lands Group (represented by the Farm Bureau of Ventura County)) was approved by the Los Angeles Regional Water Quality Control Board (Regional Board) on October 20, 2014.

On November 18, 2014, the Ventura County Watershed Protection District (District) was retained by the Responsible Parties to conduct the monitoring in accordance with the CMP for up to 5 years. The CMP required sampling to begin no later than 90 days after the Los Angeles Regional Water Quality Control Board approved the CMP, which equates to January 18, 2015. Monitoring began on January 14, 2015.

As required by the TMDL, the CMP prescribes year-round monthly water quality monitoring for nutrients and other water quality parameters at one site in the Ventura River Estuary, one site in each of the Ventura River reaches 1 – 4, and in two main tributaries, Cañada Larga and San Antonio Creek. Continuous monitoring of dissolved oxygen, pH, temperature, and conductivity are required at each site approximately quarterly. The CMP also requires monthly monitoring of algae during the dry season (May – September). This report is a summary of dry season monitoring data from May – September 2015, including the continuous data logging conducted in May and September.

**FIGURE 1. SAMPLING SITES AND FLOW OBSERVATION LOCATIONS**




Note: Yellow site markers (black labels) are sampling locations. Blue site markers (blue labels) are flow observation locations.

## Access Permission

Special access permission for wet season monitoring is not needed for TMDL-Est, TMDL-R1, TMDL-R4, TMDL-CL, and TMDL-SA due to public right-of-way and other agencies' land ownership, however access permission is required for dry season sampling (May – September), as the monitoring protocols utilize a 150 meter reach of the river. Access permission prior to wet season sampling was needed for TMDL-R2 and TMDL-R3. The District utilized the services of the County of Ventura's Real Estate Services Division (RES) to request access permission from the owners of the properties on which the monitoring sites as listed in the CMP are located. Five-year easements were sought from the property owners for the fee of $250 per term. The temporary easements will expire five years from the date of approval (early 2020). With the exception of site TMDL-R2, permission was granted by the property owners for all sites. Two property owners declined the five year easement request but signed an annual access permit instead. The sites affected by the annual permits are TMDL-R2 upstream of the site listed in the CMP and TMDL-SA directly above the confluence with the Ventura River. A new access permit will be required to sample these two sites beyond February 2016. TMDL-R2 will be sampled approximately 200 meters upstream of the OVSD site (R5) during the dry season in order to be entirely on permitted property.

## Monthly Monitoring

The 2015 dry season sampling occurred monthly starting in May through September as required. There was no connectivity between the upper and lower watershed, as shown in Table 1. TMDL-CL was dry May through September. Dry season sample dates and the collecting agency are shown in Table 2 (sample sites that were dry are noted as such and shaded grey). Monthly field data is summarized in Table 3 and nutrient data in Table 4. The District contracted with Aquatic Bioassay & Consulting Laboratories, Inc. (ABC) for assistance with the monthly monitoring of chlorophyll *a* and percent cover of algae during the dry season, May to September. Algal biomass and percent cover data are summarized in Tables 5 - 7.

**TABLE 1. MAY - SEPTEMBER 2015 OBSERVATION SITES**

| Date | Ventura River at Hwy 150 | Ventura River at Santa Ana Blvd | Ventura River at Casitas Road |
|---|---|---|---|
| 5/21/2015 | DRY | DRY | Flowing east side 2-3 cfs, flowing west side ~1cfs |
| 6/16/2015 | DRY | DRY | Flowing 2-3 cfs |
| 7/16/2015 | DRY | DRY | Pond NW side at bridge, NE channels flowing 2-3 cfs |
| 8/12/2015 | DRY | DRY | Ponded east and west side of riverbed, upstream and downstream of bridge |
| 9/23/2015 | DRY | DRY | Ponds on eastside of riverbed, dry on west side |

There was no connectivity with the upper watershed during the 2015 dry season.

**TABLE 2. MAY - SEPTEMBER 2015 WATER QUALITY SAMPLE COLLECTION DATE AGENCY**

| Site | Collecting Agency | Sampling Date | | | | |
|---|---|---|---|---|---|---|
| | | May 2015 | June 2015 | July 2015 | August 2015 | September 2015 |
| TMDL-Est | District/ABC | 5/22/2015 | 6/19/2015 | 7/16/2015 | 8/12/2015 | 9/23/2015 |
| TMDL-R1 | District/ABC | 5/21/2015 | 6/19/2015 | 7/16/2015 | 8/12/2015 | 9/23/2015 |
| TMDL-R2 | District/ABC | 5/20/2015 | 6/18/2015 | 7/15/2015 | 8/11/2015 | 9/22/2015 |
| TMDL-R3 | District/ABC | 5/20/2015 | 6/18/2015 | 7/15/2015 | 8/11/2015 | 9/22/2015 |
| TMDL-R4 | District/ABC | 5/20/2015 | 6/18/2015 | DRY (7/15/2015) | DRY (8/11/2015) | DRY (9/22/2015) |
| TMDL-CL | District/ABC | DRY (5/20/2015) | DRY (6/18/2015) | DRY (7/15/2015) | DRY (8/11/2015) | DRY (9/23/2015) |
| TMDL-SA | District/ABC | 5/20/2015 | 6/19/2015 | DRY (7/15/2015) | DRY (8/11/2015) | DRY (9/22/2015) |

**TABLE 3. MAY – SEPTEMBER 2015 FIELD DATA**

| Site | Sample Date | Sample Time | Berm Status | Flow Field Meter (cfs) | pH Field Meter (pH Units) | DO Field Meter (mg/L) | SC Field Meter (µS/cm) | Salinity Field Meter (ppt) | Water Temp Field Meter (°C) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | ***Numeric Target 6.5 - 8.5*** | ***Numeric Target >7 mg/L*** | | | |
| TMDL-Est | 5/22/2015 | 8:40 | Closed | NA | 8.17 | 9.94 | 6240 | 3.34 | 19.4 |
| TMDL-Est | 6/19/2015 | 11:10 | Closed | NA | 8.24 | 9.66 | 2570 | 1.3 | 25.6 |
| TMDL-Est | 7/16/2015 | 11:20 | Closed | NA | 8.08 | 8.29 | 1733 | 0.9 | 25.1 |
| TMDL-Est | 8/12/2015 | 11:40 | Closed | NA | 8.29 | 9.78 | 3223 | 1.7 | 23.9 |
| TMDL-Est | 9/23/2015 | 11:10 | Closed | NA | 8.5 | 9.4 | 2405 | 1.2 | 25.3 |
| TMDL-R1 | 5/21/2015 | 9:30 | NA | 2.09 | 8.00 | 8.65 | 1660 | 0.8 | 17.8 |
| TMDL-R1 | 6/19/2015 | 8:25 | NA | 1.86 | 8.04 | 7.56 | 1660 | 0.8 | 19.9 |
| TMDL-R1 | 7/16/2015 | 8:00 | NA | 1.84 | 8.13 | 6.55 | 1433 | 0.8 | 20.7 |
| TMDL-R1 | 8/12/2015 | 8:00 | NA | 0.26* | 7.97 | 7.19 | 1811 | 0.9 | 19.4 |
| TMDL-R1 | 9/23/2015 | 7:45 | NA | 0.16* | 7.81 | 6.46 | 1904 | 1 | 21.0 |
| TMDL-R2 | 5/20/2015 | 14:00 | NA | 4.9 | 7.98 | 8.78 | 1309 | NA | 20.7 |
| TMDL-R2 | 6/18/2015 | 13:10 | NA | 3.24 | 7.88 | 9.33 | 1300 | NA | 22.6 |
| TMDL-R2 | 7/15/2015 | 11:25 | NA | 3.4 | 7.9 | 7.72 | 1218 | NA | 22.5 |
| TMDL-R2 | 8/11/2015 | 11:20 | NA | 1.09 | 7.87 | 6.34 | 1343 | NA | 23.6 |
| TMDL-R2 | 9/22/2015 | 11:25 | NA | 1.91 | 7.91 | 6.65 | 1256 | NA | 25.7 |
| TMDL-R3 | 5/20/2015 | 11:35 | NA | 1.45 | 7.94 | 8.82 | 1219 | NA | 18 |
| TMDL-R3 | 6/18/2015 | 11:00 | NA | 1.61 | 7.86 | 7.7 | 1228 | NA | 19.5 |
| TMDL-R3 | 7/15/2015 | 9:15 | NA | 2.28 | 7.88 | 6.9 | 805 | NA | 19.6 |
| TMDL-R3 | 8/11/2015 | 8:00 | NA | <0.10* | 7.64 | 6.75 | 1277 | NA | 19.3 |
| TMDL-R3 | 9/22/2015 | 9:00 | NA | 0.13* | 7.42 | 4.82 | 1320 | NA | 20.7 |
| TMDL-R4 | 5/20/2015 | 8:35 | NA | 0.04 | 7.4 | 6.35 | 1059 | NA | 15.5 |
| TMDL-R4 | 6/18/2015 | 8:25 | NA | PONDED | 7.16 | 3.86 | 1092 | NA | 17.5 |
| TMDL-R4 | 7/15/2015 | 8:00 | NA | DRY | DRY | DRY | DRY | NA | DRY |

| Site | Sample Date | Sample Time | Berm Status | Flow Field Meter (cfs) | pH Field Meter (pH Units) | DO Field Meter (mg/L) | SC Field Meter (µS/cm) | Salinity Field Meter (ppt) | Water Temp Field Meter (°C) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | ***Numeric Target 6.5 - 8.5*** | ***Numeric Target >7 mg/L*** | | | |
| TMDL-R4 | 8/12/2015 | 8:30 | NA | DRY | DRY | DRY | DRY | NA | DRY |
| TMDL-R4 | 9/22/2015 | 7:30 | NA | DRY | DRY | DRY | DRY | NA | DRY |
| TMDL-CL | 5/20/2015 | 7:00 | NA | DRY | DRY | DRY | DRY | NA | DRY |
| TMDL-CL | 6/18/2015 | 10:40 | NA | DRY | DRY | DRY | DRY | NA | DRY |
| TMDL-CL | 7/16/2015 | 10:15 | NA | DRY | DRY | DRY | DRY | NA | DRY |
| TMDL-CL | 8/12/2015 | 10:30 | NA | DRY | DRY | DRY | DRY | NA | DRY |
| TMDL-CL | 9/23/2015 | 10:05 | NA | DRY | DRY | DRY | DRY | NA | DRY |
| TMDL-SA | 5/20/2015 | 10:30 | NA | 0.03* | 7.16 | 4.82 | 1034 | NA | 17.5 |
| TMDL-SA | 6/18/2015 | 9:40 | NA | 0.05* | 7.24 | 4.53 | 1056 | NA | 17.3 |
| TMDL-SA | 7/15/2015 | 8:40 | NA | DRY | DRY | DRY | DRY | NA | DRY |
| TMDL-SA | 8/12/2015 | 8:45 | NA | DRY | DRY | DRY | DRY | NA | DRY |
| TMDL-SA | 9/22/2015 | 7:45 | NA | DRY | DRY | DRY | DRY | NA | DRY |

* The flow during this event was below the threshold for accurate meter measurement. These results are estimated and subject to error.
NA: Not applicable. Berm status only applies to the estuary site TMDL-Est. Salinity is included for the TMDL-Est and TMDL-R1 sites to indicate the level of ocean influence at these sites.

Flow at R4 and above was minimal to none during this reporting period. Surface flow in the River began around Foster Park and is typically perennial at R3 and below. The flow at R2 is a combination of the flow in the Ventura River downstream of R3 and the discharge from the Ojai Valley Sanitary District's wastewater treatment plant. Flow decreased between R2 and R1. Potential causes for changes in flow include surface/subsurface flow, groundwater interaction, geology and infiltration rates, antecedent moisture, agricultural and urban inputs and extractions, etc. Ponded locations, and those with shallow and/or slow moving water appear to experience greater variation in measured levels of DO and so ponds will be avoided where possible, but may not be able to be avoided in all cases.

All measurements for pH were within the numeric target limits. Low levels of dissolved oxygen tended to occur during periods of low flow, possibly due to the ponding of water upstream and/or at the measurement location.

**TABLE 4. MAY - SEPTEMBER 2015 NUTRIENT DATA**

| Site | Sample Date | Sample Time | P Total EPA 365.1 (mg/L) | P Diss EPA 365.1 (mg/L) | TKN Total EPA 351.2 (mg/L) | TKN Diss EPA 351.2 (mg/L) | N Total Calculated (mg/L) | N Diss Calculated (mg/L) | NO3+ NO2-N EPA 353.2 (mg/L) |
|---|---|---|---|---|---|---|---|---|---|
| TMDL-Est | 5/22/2015 | 8:40 | 0.063 | 0.032 | 0.33 | 0.35* | 0.33 | 0.35 | ND |
| TMDL-Est | 6/19/2015 | 11:10 | 0.06 | 0.02 | 0.53 | 0.43 | 0.53 | 0.43 | ND |
| TMDL-Est | 7/16/2015 | 11:20 | 0.041 | 0.015 | 0.52 | 0.3 | 0.57 | 0.34 | 0.043 |
| TMDL-Est | 8/12/2015 | 11:40 | 0.4 | 0.015 | 0.61 | 0.51 | 0.63 | 0.54 | 0.023 |
| TMDL-Est | 9/23/2015 | 11:10 | 0.042 | 0.02 | 0.86 | 0.56 | 0.89 | 0.59 | 0.031 |
| TMDL-R1 | 5/21/2015 | 9:30 | 0.12 | 0.059 | 0.51 | 0.3 | 0.55 | 0.35 | 0.0456 |
| TMDL-R1 | 6/19/2015 | 8:25 | 0.088 | 0.067 | 0.43 | 0.24 | 0.49 | 0.3 | 0.06 |

| Site | Sample Date | Sample Time | P Total EPA 365.1 (mg/L) | P Diss EPA 365.1 (mg/L) | TKN Total EPA 351.2 (mg/L) | TKN Diss EPA 351.2 (mg/L) | N Total Calculated (mg/L) | N Diss Calculated (mg/L) | NO3+ NO2-N EPA 353.2 (mg/L) |
|---|---|---|---|---|---|---|---|---|---|
| TMDL-R1 | 7/16/2015 | 8:00 | 0.011 | 0.086 | 0.44 | 0.44 | 0.74 | 0.74 | 0.3 |
| TMDL-R1 | 8/12/2015 | 8:00 | 0.18 | 0.15 | 0.62 | 0.6 | 0.81 | 0.79 | 0.19 |
| TMDL-R1 | 9/23/2015 | 7:45 | 0.35 | 0.26 | 0.74 | 0.52 | 1.1 | 0.85 | 0.32 |
| TMDL-R2 | 5/20/2015 | 14:00 | 0.22 | 0.18 | 0.34 | 0.42 | 1.1 | 1.1 | 0.71 |
| TMDL-R2 | 6/18/2015 | 13:10 | 0.12 | 0.11 | 0.28 | 0.27 | 0.81 | 0.81 | 0.54 |
| TMDL-R2 | 7/15/2015 | 11:25 | 0.17 | 0.15 | 0.22 | 0.15 | 0.86 | 0.89 | 0.63 |
| TMDL-R2 | 8/11/2015 | 11:20 | 0.71 | 0.7 | 0.87 | 0.71 | 1.9 | 1.7 | 1 |
| TMDL-R2 | 9/22/2015 | 11:25 | 1.2 | 1.1 | 0.76 | 0.74 | 2.6 | 2.6 | 1.9 |
| TMDL-R3 | 5/20/2015 | 11:35 | 0.014 | 0.01 | 0.054 | ND | ND | ND | 0.061 |
| TMDL-R3 | 6/18/2015 | 11:00 | 0.013 | 0.011 | 0.08 | 0.057 | ND | ND | 0.076 |
| TMDL-R3 | 7/15/2015 | 9:15 | 0.013 | 0.0095 | ND | ND | ND | ND | 0.092 |
| TMDL-R3 | 8/11/2015 | 8:00 | 0.022 | 0.015 | 0.19 | ND | 0.28 | ND | 0.088 |
| TMDL-R3 | 9/22/2015 | 9:00 | 0.079 | 0.018 | 0.42 | ND | 0.51 | ND | 0.087 |
| TMDL-R4 | 5/20/2015 | 8:35 | 0.0055 | 0.0046 | 0.075 | 0.055 | 1.4 | 1.4 | 1.4 |
| TMDL-R4 | 6/18/2015 | 8:25 | 0.0047 | 0.0061 | ND | ND | 1.2 | 1.2 | 1.2 |
| TMDL-R4 | 7/15/2015 | 8:00 | DRY | DRY | DRY | DRY | DRY | DRY | DRY |
| TMDL-R4 | 8/12/2015 | 8:30 | DRY | DRY | DRY | DRY | DRY | DRY | DRY |
| TMDL-R4 | 9/22/2015 | 7:30 | DRY | DRY | DRY | DRY | DRY | DRY | DRY |
| TMDL-CL | 5/20/2015 | 7:00 | DRY | DRY | DRY | DRY | DRY | DRY | DRY |
| TMDL-CL | 6/18/2015 | 10:40 | DRY | DRY | DRY | DRY | DRY | DRY | DRY |
| TMDL-CL | 7/16/2015 | 10:15 | DRY | DRY | DRY | DRY | DRY | DRY | DRY |
| TMDL-CL | 8/12/2015 | 10:30 | DRY | DRY | DRY | DRY | DRY | DRY | DRY |
| TMDL-CL | 9/23/2015 | 10:05 | DRY | DRY | DRY | DRY | DRY | DRY | DRY |
| TMDL-SA | 5/20/2015 | 10:30 | 0.0076 | 0.0073 | 0.24 | ND | 1.9 | 1.7 | 1.7 |
| TMDL-SA | 6/18/2015 | 9:40 | 0.019 | 0.0063 | 0.11 | 0.074 | 1.3 | 1.3 | 1.2 |
| TMDL-SA | 7/15/2015 | 8:40 | DRY | DRY | DRY | DRY | DRY | DRY | DRY |
| TMDL-SA | 8/12/2015 | 8:45 | DRY | DRY | DRY | DRY | DRY | DRY | DRY |
| TMDL-SA | 9/22/2015 | 7:45 | DRY | DRY | DRY | DRY | DRY | DRY | DRY |

**TABLE 5. MAY – SEPTEMBER 2015 MONTHLY ALGAL BIOMASS (CHLOROPHYLL A) AND PERCENT MACROALGAL COVER (RIVER SITES)**

| Site | Date | Field Replicate | Number of Transects Collected | Chlorophyll *a* | Chlorophyll *a* units | Percent Presence Macroalgae (%) |
|---|---|---|---|---|---|---|
| TMDL-R1 | 5/21/2015 | 1 | 11 | 206.9 | $mg/m^2$ | 13.59 |
| TMDL-R1 | 6/19/2015 | 1 | 10 | 140 | $mg/m^2$ | 6.19 |
| TMDL-R1 | 6/19/2015 | 2 | 10 | 190 | $mg/m^2$ | NA |
| TMDL-R1 | 7/16/2015 | 1 | 10 | 170 | $mg/m^2$ | 4.26 |
| TMDL-R1 | 8/12/2015 | 1 | 11 | 520 | $mg/m^2$ | 0.00 |
| TMDL-R1 | 9/23/2015 | 1 | 10 | 300 | $mg/m^2$ | 0.00 |
| TMDL-R2 | 5/20/2015 | 1 | 9 | 61 | $mg/m^2$ | 9.88 |
| TMDL-R2 | 6/18/2015 | 1 | 11 | 75.9 | $mg/m^2$ | 1.90 |

| Site | Date | Field Replicate | Number of Transects Collected | Chlorophyll *a* | Chlorophyll *a* units | Percent Presence Macroalgae (%) |
|---|---|---|---|---|---|---|
| TMDL-R2 | 7/15/2015 | 1 | 11 | 63 | $mg/m^2$ | 0.00 |
| TMDL-R2 | 8/11/2015 | 1 | 7 | 110 | $mg/m^2$ | 1.64 |
| TMDL-R2 | 9/22/2015 | 1 | 11 | 138 | $mg/m^2$ | 0.00 |
| TMDL-R3 | 5/20/2015 | 1 | 11 | 51 | $mg/m^2$ | 42.72 |
| TMDL-R3 | 6/18/2015 | 1 | 11 | 75.5 | $mg/m^2$ | 8.65 |
| TMDL-R3 | 7/15/2015 | 1 | 11 | 68 | $mg/m^2$ | 8.74 |
| TMDL-R3 | 8/11/2015 | 1 | 11 | 100 | $mg/m^2$ | 18.56 |
| TMDL-R3 | 9/22/2015 | 1 | 11 | 54 | $mg/m^2$ | 21.00 |
| TMDL-R4 | 5/20/2015 | 1 | 11 | 21 | $mg/m^2$ | 22.33 |
| TMDL-R4 | 6/18/2015 | 1 | 5 | 26.3 | $mg/m^2$ | 32.76 |
| TMDL-R4 | 7/15/2015 | 1 | DRY | DRY | $mg/m^2$ | DRY |
| TMDL-R4 | 8/12/2015 | 1 | DRY | DRY | $mg/m^2$ | DRY |
| TMDL-R4 | 9/22/2015 | 1 | DRY | DRY | $mg/m^2$ | DRY |
| TMDL-SA | 5/20/2015 | 1 | 3 | 97.4 | $mg/m^2$ | 8.70 |
| TMDL-SA | 6/18/2015 | 1 | 3 | 30 | $mg/m^2$ | 13.64 |
| TMDL-SA | 7/15/2015 | 1 | DRY | DRY | $mg/m^2$ | DRY |
| TMDL-SA | 8/12/2015 | 1 | DRY | DRY | $mg/m^2$ | DRY |
| TMDL-SA | 9/22/2015 | 1 | DRY | DRY | $mg/m^2$ | DRY |
| TMDL-CL | 5/20/2015 | 1 | DRY | DRY | $mg/m^2$ | DRY |
| TMDL-CL | 6/18/2015 | 1 | DRY | DRY | $mg/m^2$ | DRY |
| TMDL-CL | 7/15/2015 | 1 | DRY | DRY | $mg/m^2$ | DRY |
| TMDL-CL | 8/12/2015 | 1 | DRY | DRY | $mg/m^2$ | DRY |
| TMDL-CL | 9/22/2015 | 1 | DRY | DRY | $mg/m^2$ | DRY |

All riverine sites met the seasonal average numeric target for macroalgal cover and, with the exception of TMDL-R1, they also met the seasonal average numeric target for chlorophyll *a*.

**TABLE 6. 2015 DRY SEASON AVERAGE MACROALGAL BIOMASS AND COVER_RIVER SITES**

| Site | Seasonal Average Biomass (Chlorophyll a) | Seasonal Average Macroalgal Cover |
|---|---|---|
| | ***Numeric Target Seasonal Average 150 $mg/m^2$ ($mg/m^2$)*** | ***Numeric Target Seasonal Average ≤ 30% (%)*** |
| TMDL-R1 | 254.5 | 4.8 |
| TMDL-R2 | 89.6 | 2.7 |
| TMDL-R3 | 69.7 | 19.9 |
| TMDL-R4 | 23.7 | 27.5 |
| TMDL-SA | 63.7 | 11.2 |
| TMDL-CL | DRY | DRY |

The SWAMP protocol for determining percent cover for the riverine sites only considers alive algae whereas the Bight '08 protocols do not specify whether dead or desiccated algae should be included with alive algae in the calculations. The Bight '08 study also includes measurements of floating algae at a depth of 0.3 meters for four quadrats per transect, in addition to measuring algal cover on the shoreline. All of these variables are included in Table 7 and all met the seasonal average numeric target.

**TABLE 7. 2015 DRY SEASON AVERAGE MACROALGAL COVER_ESTUARY**

| Site | Date | Biomass Phytoplankton Chlorophyll *a* (µg/L) | Land-Based Percent Cover (%) Alive Algae | Land-Based Percent Cover (%) Dead Algae | Land-Based Percent Cover (%) All Algae | Floating Percent Cover (%) Alive Algae | Floating Percent Cover (%) Dead Algae | Floating Percent Cover (%) All Algae |
|---|---|---|---|---|---|---|---|---|
| ***Seasonal Average Numeric Target*** | | ***20 µg/L*** | ***≤ 15%*** | | | | | |
| TMDL-Est | 5/22/2015 | 6 | 2.31 | 0.20 | 2.04 | 0.75 | 0.00 | 0.75 |
| TMDL-Est | 6/19/2015 | 6 | 24.42 | 4.42 | 20.60 | 0.00 | 0.00 | 0.00 |
| TMDL-Est | 7/16/2015 | 7 | 9.32 | 16.73 | 18.61 | 0.00 | 0.00 | 0.00 |
| TMDL-Est | 8/12/2015 | <2 | 6.46 | 0.00 | 4.62 | 0.00 | 0.00 | 0.00 |
| TMDL-Est | 9/23/2015 | 12 | 1.84 | 9.80 | 8.31 | 0.00 | 0.00 | 0.00 |
| **TMDL-Est** | **Seasonal Average** | **6.4** | **8.87** | **6.23** | **10.84** | **0.15** | **0.00** | **0.15** |

## Continuous Data Logging

Seven Hydrolab HL4 water quality data sondes (Figure 2) were selected and purchased for this program. The HL4 has the ability to accurately measure and log dissolved oxygen, conductivity, pH and temperature within a self-contained package that is 1.75" in diameter and just over two feet in length, which allows it to fit inside a short length protective housing of 2" diameter schedule 40 pipe. The data sonde installations are vulnerable to potential vandalism and theft and so need to be as inconspicuous as possible (i.e. below the water surface among rocks and tree roots). Each sonde is assigned to a particular TMDL site and is labeled with the site name for additional consistency between events. Pre and post calibrations and/or calibration checks are performed for each deployed sonde for each event (data included in attachments).

**FIGURE 2. HYDROLAB HL4 SONDE**

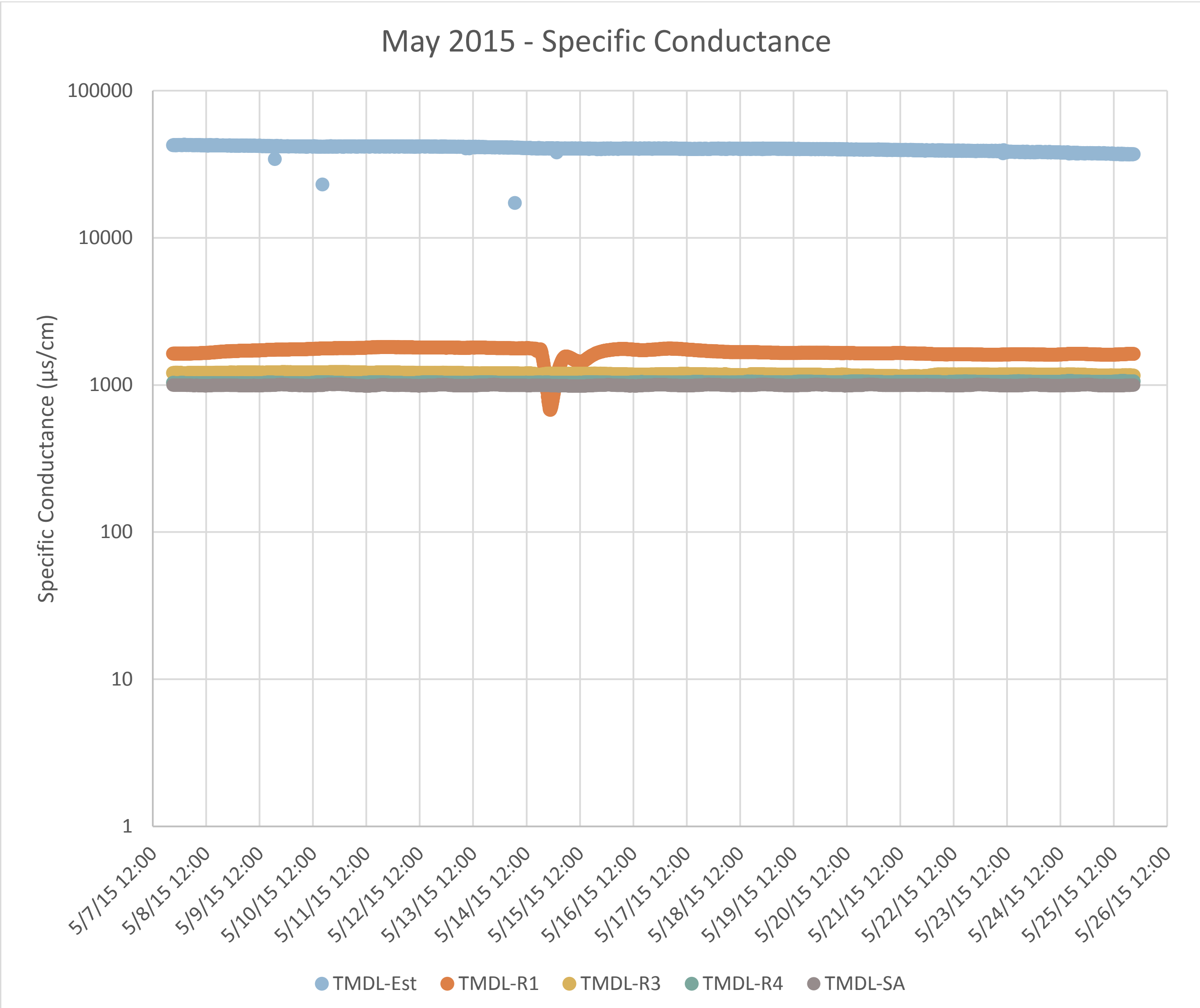

Continuous monitoring for pH, specific conductivity, temperature, and dissolved oxygen was conducted for a two week period at all sites in May and September. After the first deployment in March when the estuary breached and left the estuary sonde exposed to potential vandalism or theft, the placement was redesigned to 10 feet below the water surface. The deeper placement of the sonde likely contributed to the lack of diurnal variability in the estuary sonde temperature data observed in the May and September continuous data logging events.

Six Hydrolab HL4 water quality data sondes were installed on May 7, 2015 and were programmed to log data from May 7, 2015 at 21:00 to May 25, 2015 at 21:00 (Figure 3, Figure 4, Figure 5, and Figure 6). TMDL-CL was dry so the sonde could not be deployed. It is suspected that the specific conductance sensor at TMDL-R2 fouled during the data logging as the results are far below expected and those measured above and below stream (Figure 3). The dissolved oxygen sensor on the estuary sonde also fouled and the sonde was calibrated and redeployed to log data from June 2, 2015 at 13:00 to June 16, 2015 at 13:00 (Figure 7).

In September, three TMDL monitoring stations (TMDL-R4, TMDL-SA, and TMDL-CL) were dry and so only four Hydrolab HL4 water quality data sondes were installed for continuous data logging. The sondes were installed on September 1, 2015 at TMDL-Est, TMDL-R1, TMDL-R2, and TMDL-R3 and programmed to log data from September 1, 2015 at 19:00 to September 15, 2015 at 19:00 (Figure 8, Figure 9, Figure 10, and Figure 11). The specific conductance and salinity at TMDL-R3 were lower than those typically seen in natural waters, however the pre and post calibration checks were within acceptable levels. Based on consultation with Hydrolab technicians, it is suspected that debris lodged in the sonde's conductivity chamber during deployment and was dislodged during sonde removal. A firmware bug in the TMDL-R1 also caused a false battery alarm which shifted the data by a few minutes but did not otherwise affect the data. All sondes were returned to the factory under warranty after the September deployment and replaced with brand new sondes. The battery failure alarm required a change to the circuit board to rectify.

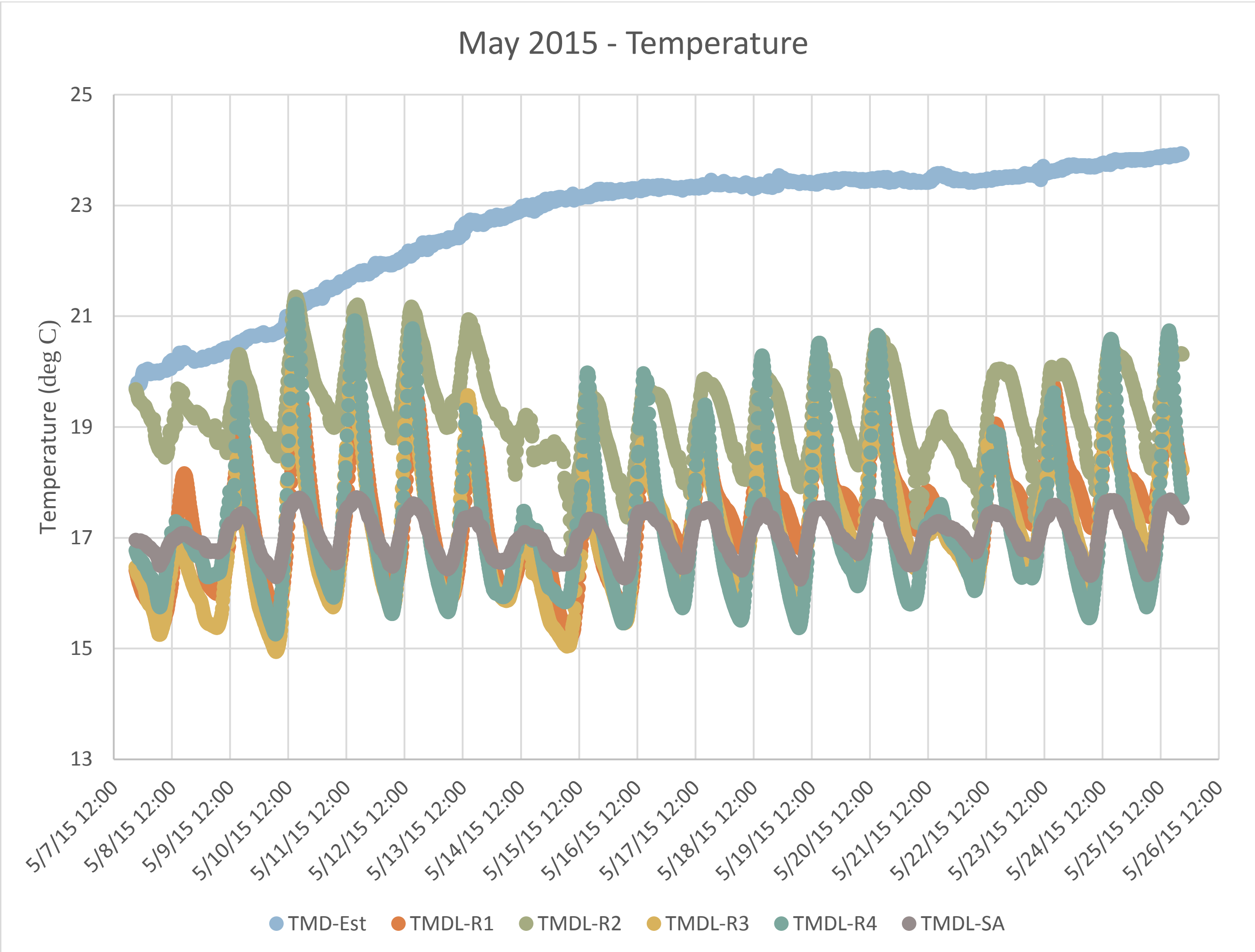
Graphical representations of the March, May, and September continuous monitoring data are presented together in the attachments to this report.

**FIGURE 3. MAY 2015 - SPECIFIC CONDUCTANCE (CONTINUOUS DATA LOGGER)**




Note: The TMDL-R2 results for specific conductance are highly suspect, as the values decreased noticeably from the time of deployment and dropped well below both the expected range and the values measured by the upstream and downstream sondes. Fouling is suspected. The data is excluded from this chart but is included in the electronic attachments to this report. Specific conductance is not a required continuous monitoring parameter so the sonde was not re-deployed for this quarter.

**FIGURE 4. MAY 2015 - TEMPERATURE (CONTINUOUS DATA LOGGER)**




Note: The deeper placement of the sonde likely contributed to the lack of diurnal variability in the estuary sonde temperature data.

**FIGURE 5. MAY 2015 - PH (CONTINUOUS DATA LOGGER)**

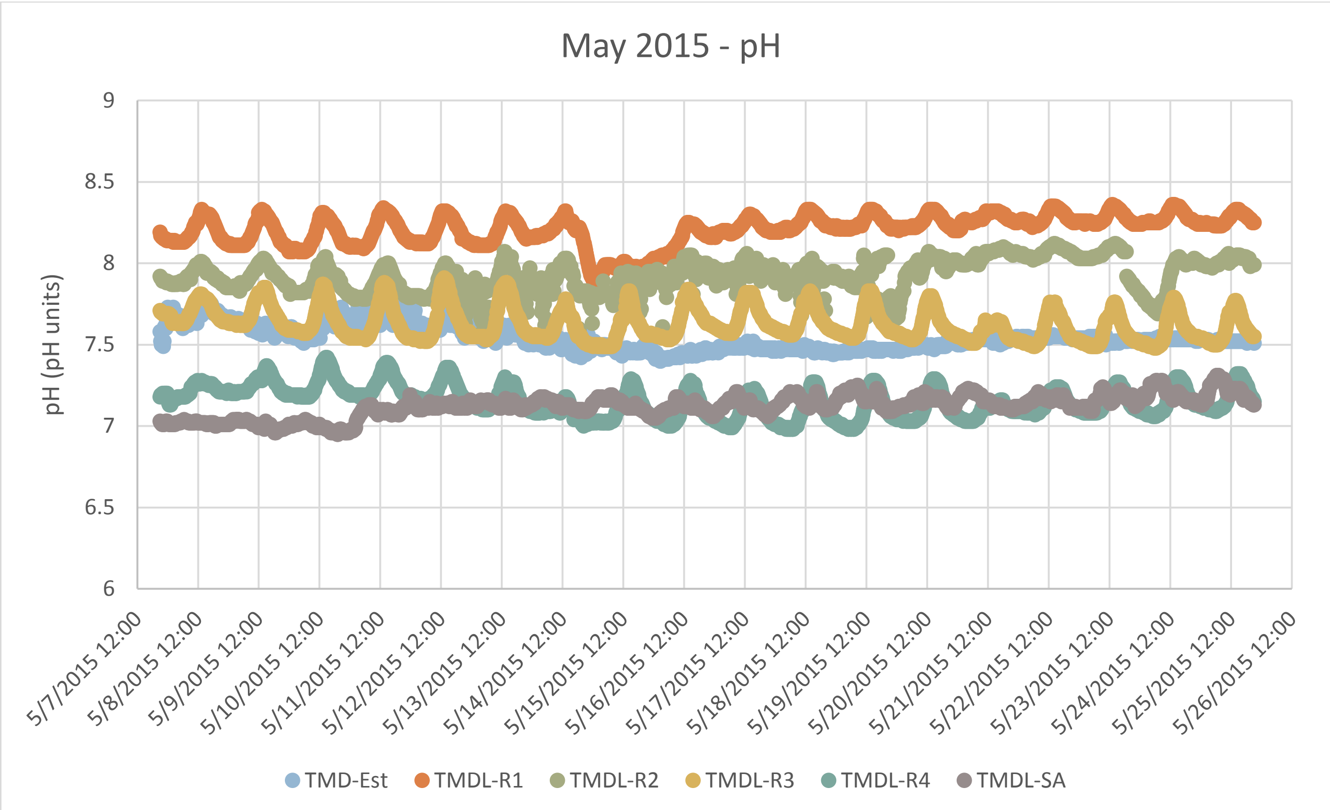
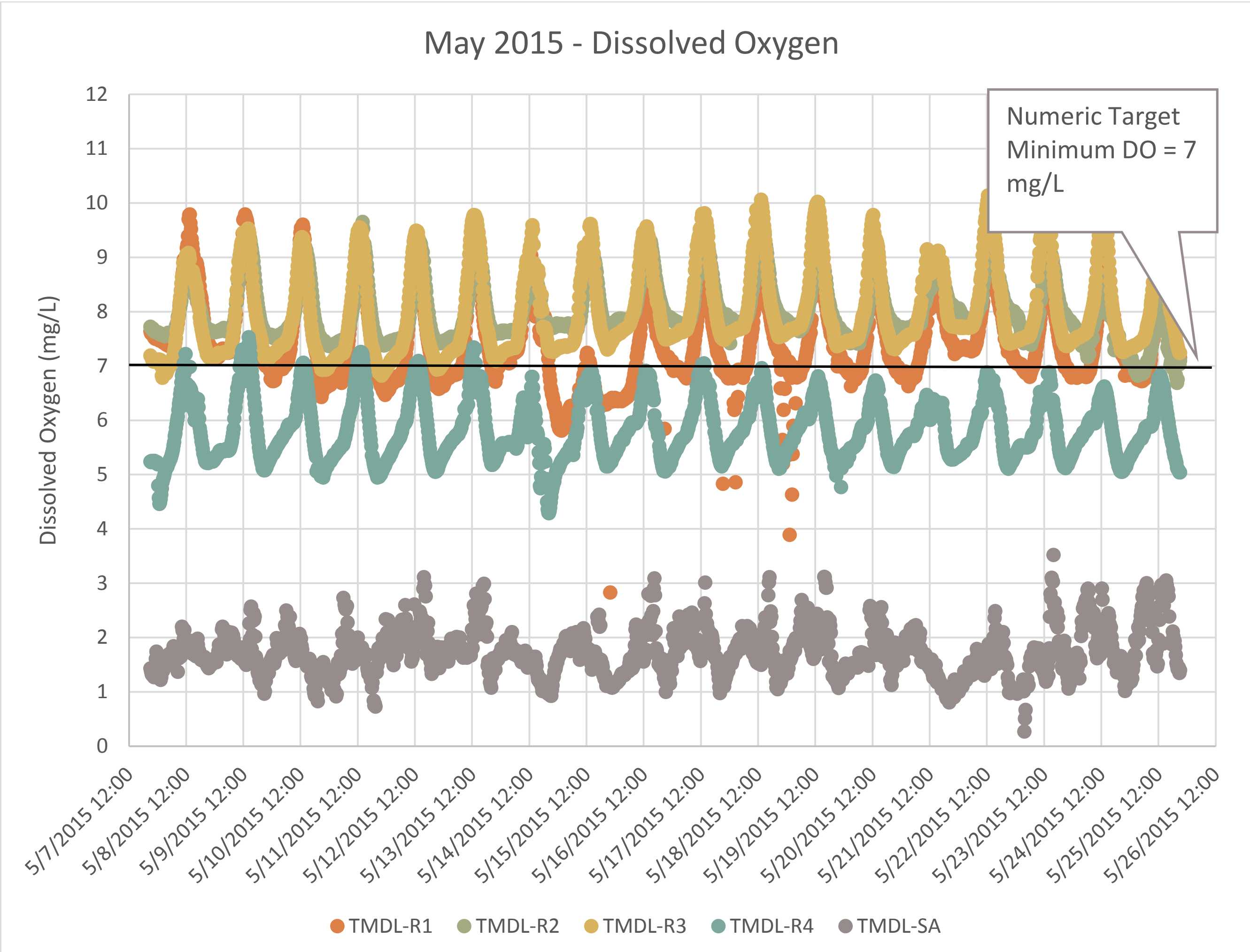


**FIGURE 6. MAY 2015 - DISSOLVED OXYGEN (CONTINUOUS DATA LOGGER)**




Note: The TMDL-Est dissolved oxygen results are suspected to be incorrect. A sonde was re-deployed from June 6, 2015 to June 15, 2015 at TMDL-Est to log dissolved oxygen (Figure 7). The TMDL-Est data is excluded from this chart but is included in the electronic attachments to this report.

**FIGURE 7. JUNE 2016 – TMDL-ESTUARY DISSOLVED OXYGEN (CONTINOUS DATA LOGGING)**

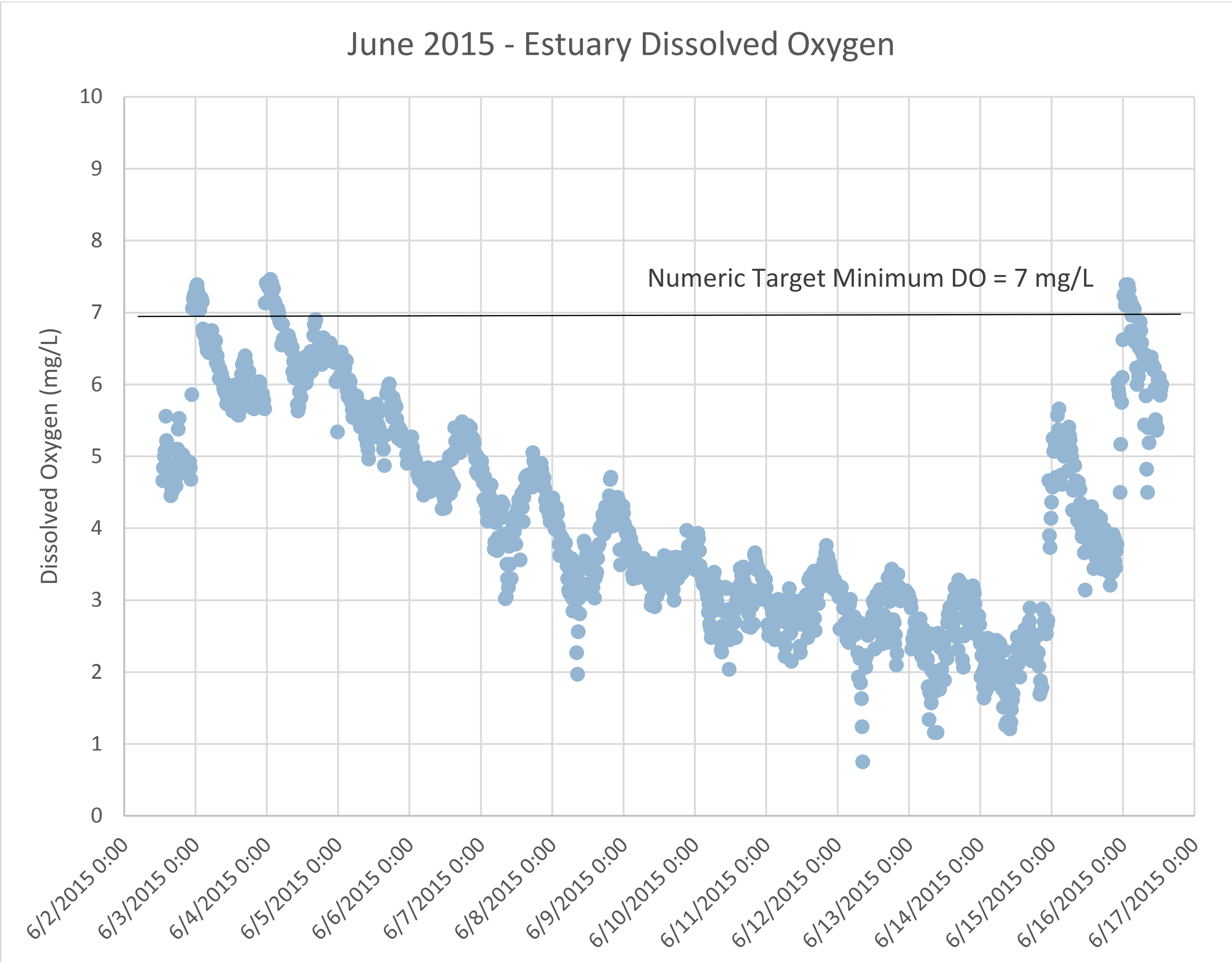
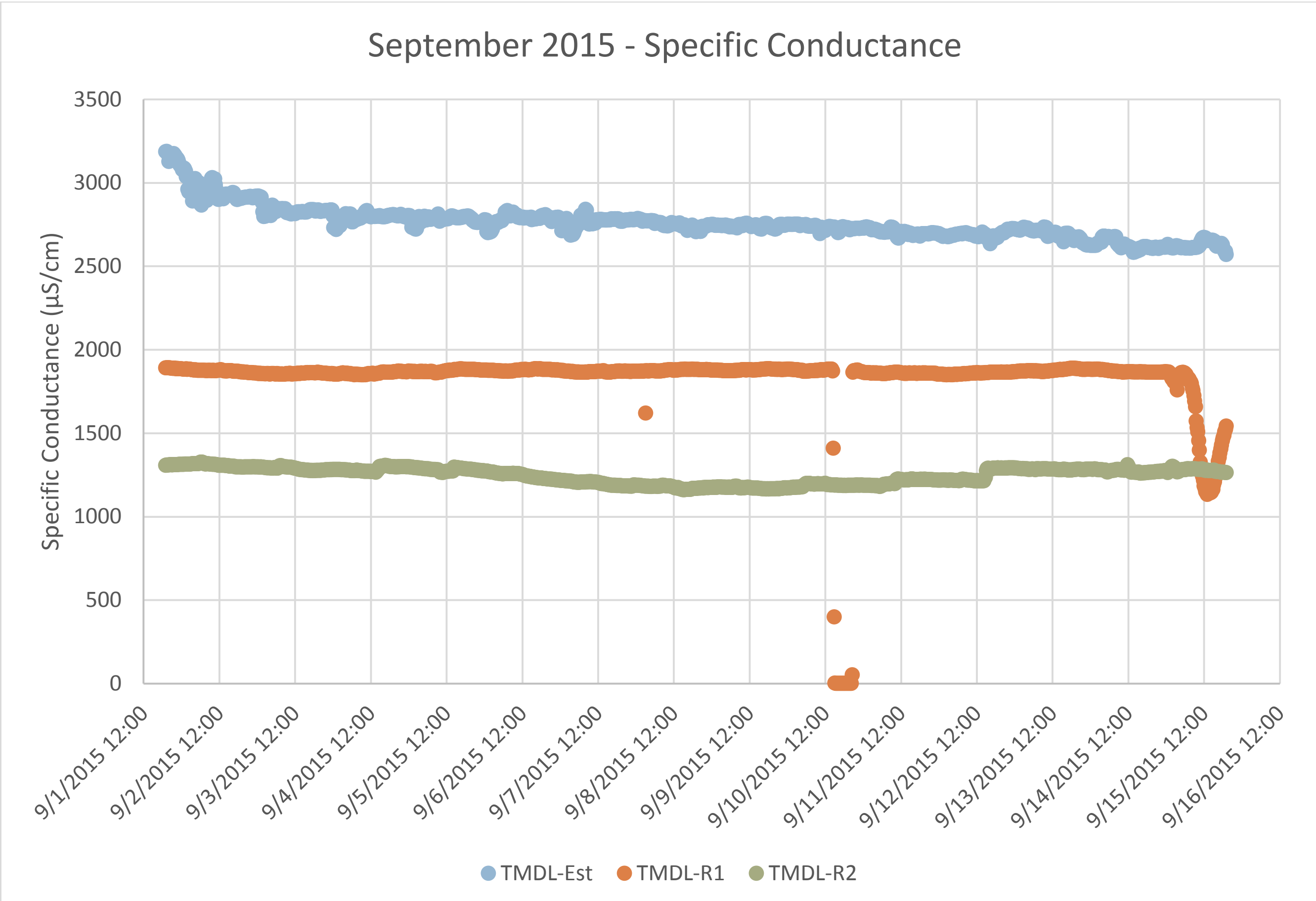


**FIGURE 8. SEPTEMBER 2015 - SPECIFIC CONDUCTANCE (CONTINOUS DATA LOGGING)**




Note: The TMDL-R3 specific conductivity results are lower than expected but the pre and post deployment calibration checks were within acceptance limits. Fouling is suspected. The data is excluded from this chart but is included in the electronic attachments to this report. Specific conductance is not a required continuous monitoring parameter the sonde was not re-deployed for this quarter.

**FIGURE 9. SEPTEMBER 2015 - TEMPERATURE (CONTINOUS DATA LOGGING)**

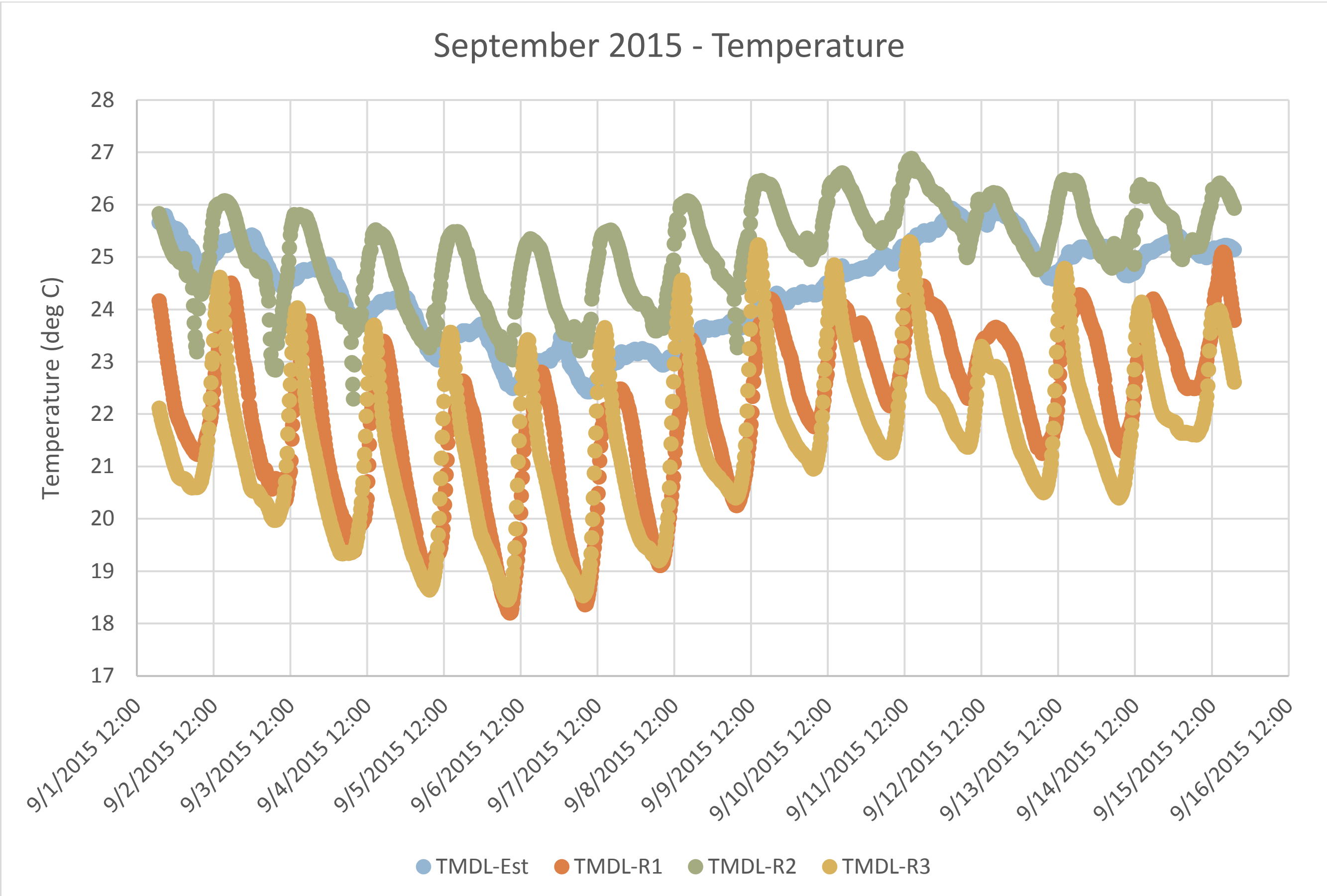


**FIGURE 10. SEPTEMBER 2015 - PH (CONTINOUS DATA LOGGING)**

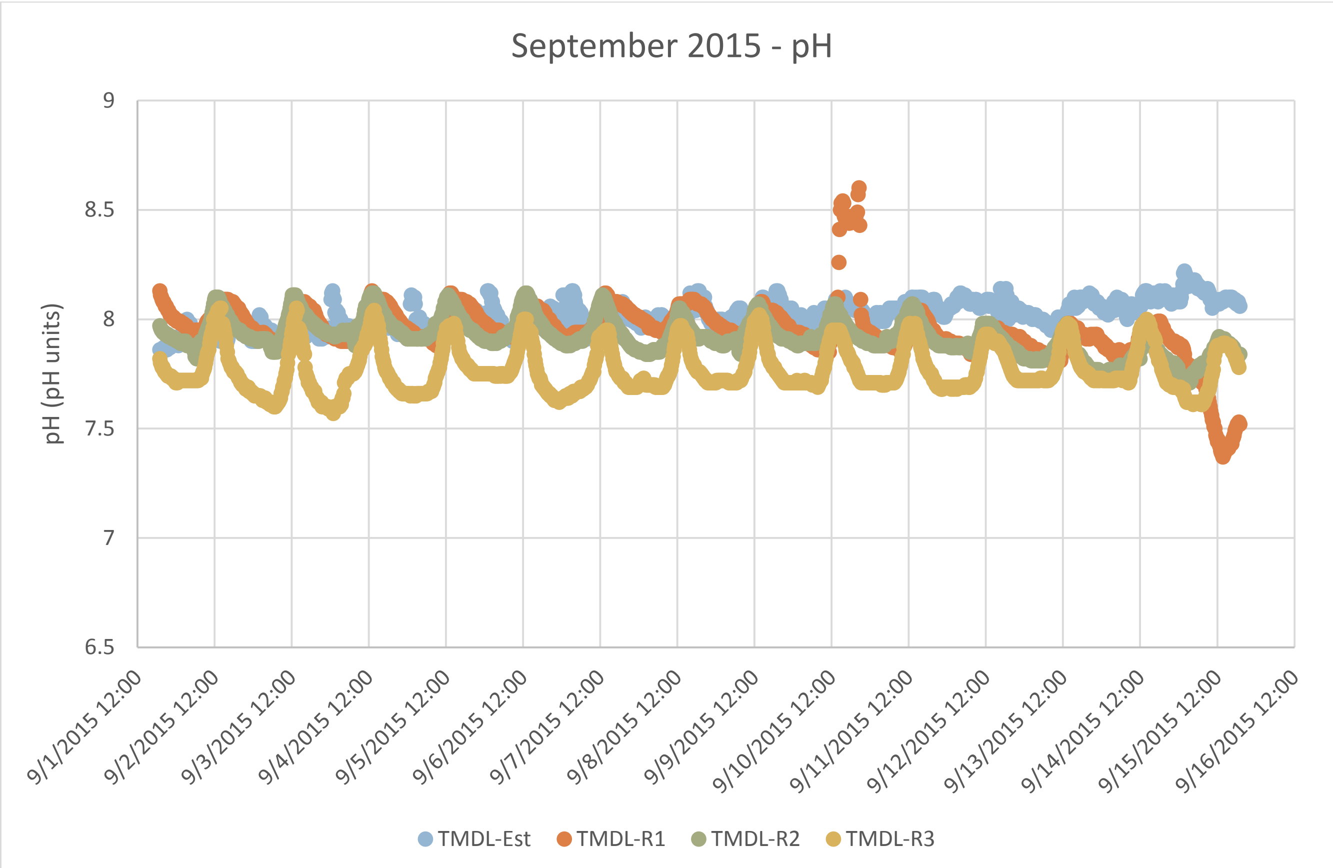
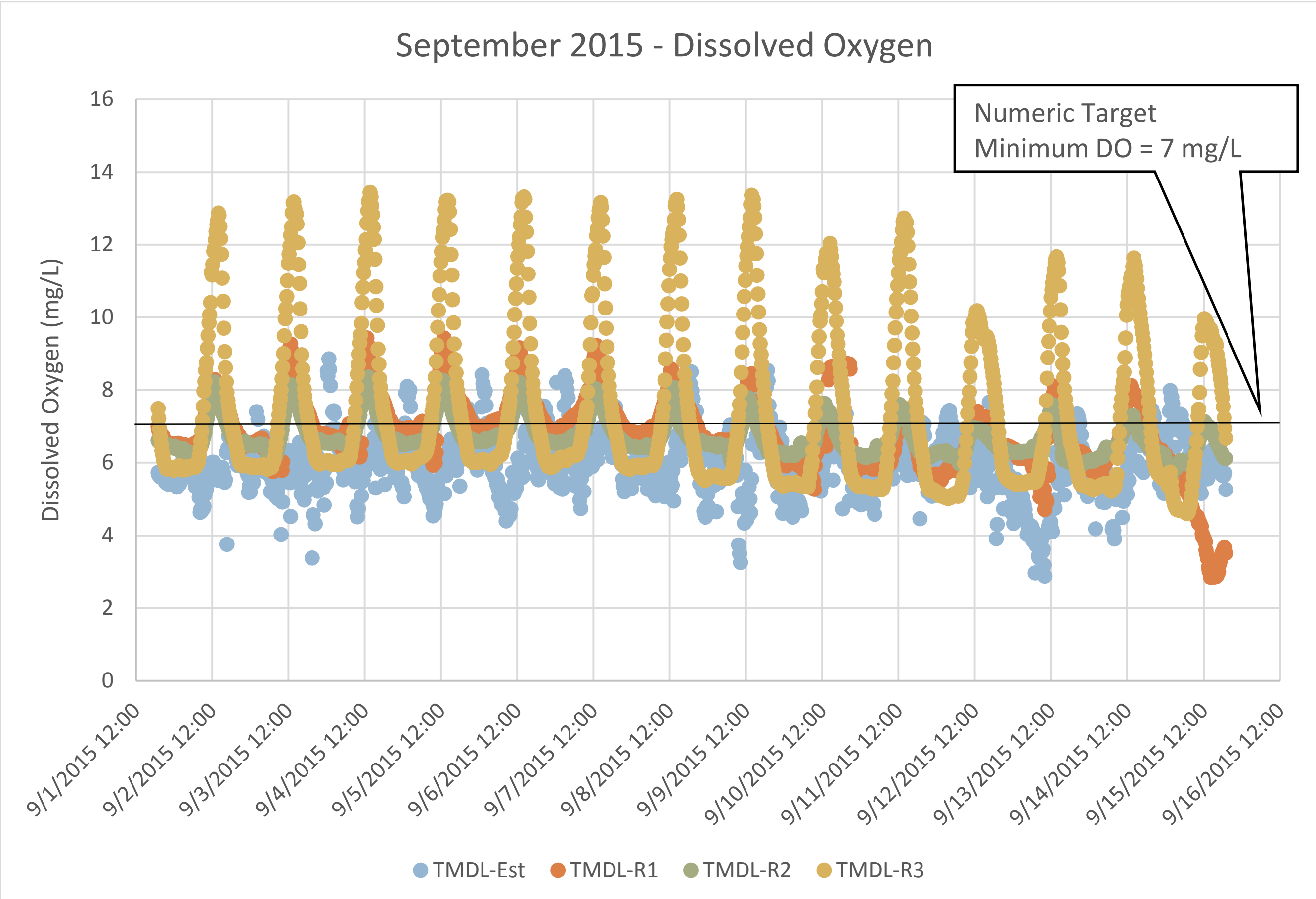


**FIGURE 11. SEPTEMBER 2015 - DISSOLVED OXYGEN (CONTINOUS DATA LOGGING)**




## OBSERVATIONS AND LESSONS LEARNED

Southern California is currently experiencing drought conditions. The River was dry at the observation locations upstream of R4 for this reporting period. Flow variations between monitoring sites and events are likely due to a combination of factors, including geology, temperature, inputs, and extractions. Ponded locations, and those with shallow and/or slow moving water appear to experience greater variation in measured levels of DO and so ponds will be avoided where possible, but may not be able to be avoided in all cases.

Siltation can be an issue in slow moving water and sondes will be installed higher in the water column in areas where it is likely to occur. All sondes were checked and/or calibrated by monitoring staff before and after deployment, regardless of history. The equipment used to secure the estuary sonde has been modified to better accommodate the variations in water level associated with changes in berm status (i.e. open vs. closed).

All monthly grab measurements for pH were within the numeric target limits of pH 6.5-8.5, as were the May and September continuous data logger results with the exception of TMDL-R1, which experienced a period of high pH in combination with low conductivity and an increase in dissolved oxygen between 2 and 9 pm on September 10, 2015, it is unknown if this was due to a discharge, a decrease in flow (exposing the sonde to air), or a sonde malfunction. Levels of dissolved oxygen were observed at some sites during the monthly grab monitoring, and appear to be associated with low flow, possibly due to the ponding of water upstream and/or at the measurement location. Dissolved oxygen levels below the numeric target of 7 mg/L were observed at least intermittently at all sites during both the May and September continuous data logger deployments.

Temperature displayed a diurnal pattern at most sites but the pattern was muted at TMDL-Est, likely due to the deeper level of deployment. Specific conductance remained relatively stable at most sites during the May and September deployments, with the exception of TMDL-R2 in May and TMDL-R3 in September, which appear to have suspect readings, based on their comparison with nearby sites. TMDL-Est appears to have experienced a greater ocean influence in May (average conductivity 40,000 µS/cm) than in September (average conductivity 2,800 µS/cm).

## ATTACHMENTS TO DRY SEASON DATA SUMMARY

Sampling event data, including water quality analytical results and field measurements, in a summary format using MS Excel spreadsheet are provided as electronic files on the CD provided to the Responsible Parties.