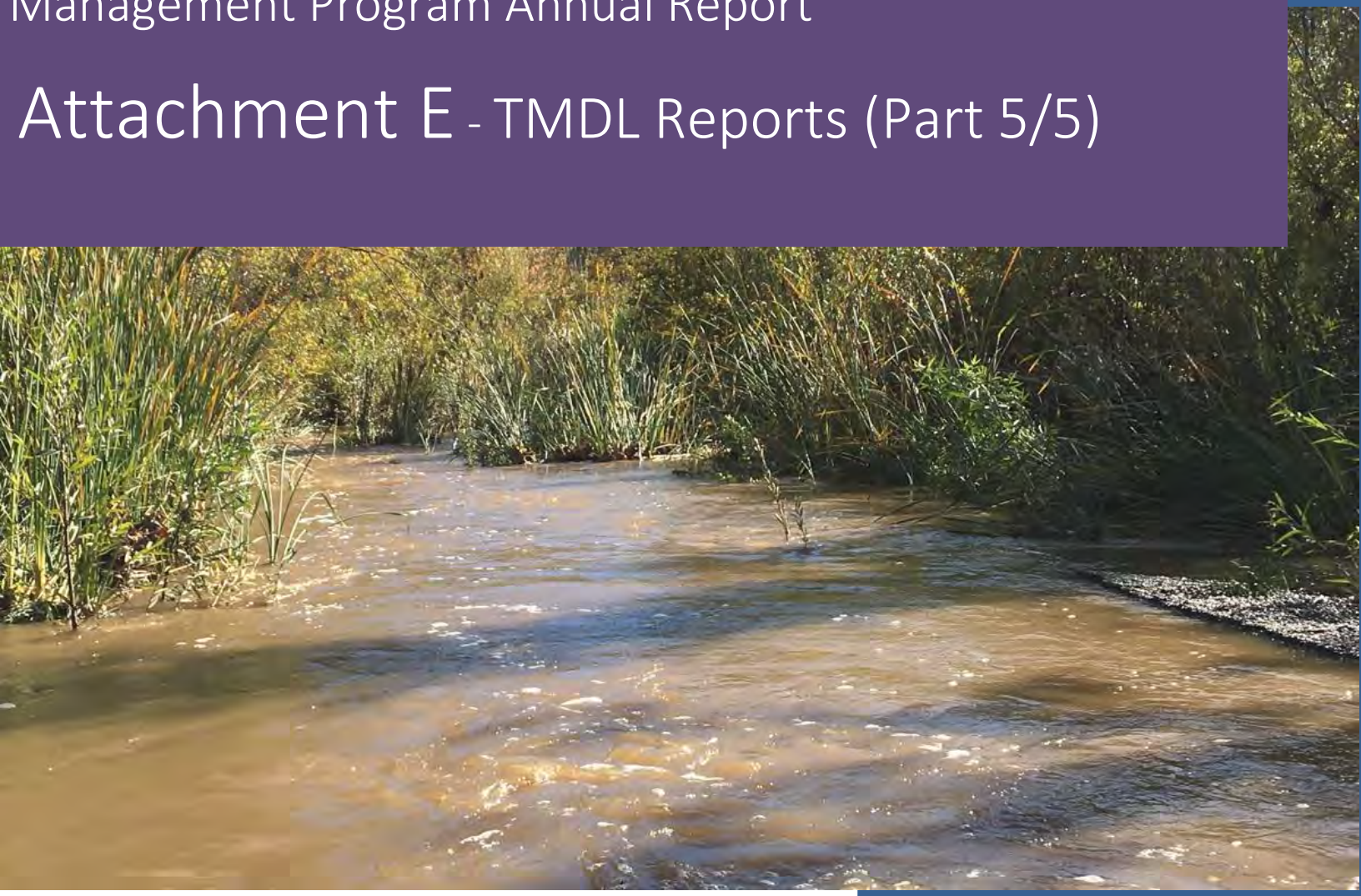
Ventura Countywide Stormwater Quality Management Program

2019-2020 Permit Year

Ventura Countywide Stormwater Quality Management Program Annual Report

Attachment E - TMDL Reports (Part 5/5)



December 15, 2020

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

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

Event 68 – Water & Sediment

Calleguas Creek Watershed TMDL Monitoring Program
Post Event Summary
Event 68: Sediment & Quarterly Water Sampling

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

Crew #1: Greg Cotten (KLI), Tanner Barnes (KLI)
Crew #2: David Thornhill (Fugro), Seth Gray (Fugro)

Sampling Dates: Receiving water and land use sites on August 7th and 8th.

Sampling Type: Sediment, Quarterly Water Chemistry, Toxicity, Metals, PCBs, and Salts.

SITES SAMPLED

Site ID		Constituents					
	Sample Date	General Parameters	Toxicity	Metals	Nutrients	PCBs, OP, OC, and Pyrethroid Pesticides	Salts
01_RR_BR	8/8/18	X		X	X	X	
02_PCH	8/8/18	X		X	X		
03_UNIV	8/8/18	X	X	X	X	X	
9B_ADOLF	8/8/18	X	X		X	X	
9BD_ADOLF	8/8/18	X		X		X	X
05D_SANT_VCWPD	8/7/18	X		X	X	X	X
05_CENTR	8/7/18	X			X		
04_WOOD	8/8/18	X	X	X	X	X	
01T_ODD2_DCH	8/8/18	X		X	X	X	
07_HITCH	8/8/18	X	X		X	X	
07D_SIM_BUS	8/7/18	X				X	X
13_SB_HILL	8/7/18	X				X	X
10_GATE	8/8/18	X	X			X	
13_BELT	8/8/18	X	X			X	

SITES NOT SAMPLED

Site ID	Reason for Omission
02D_BROOM	Site was dry.
06T_FC_BR	Site was dry.
07D_HITCH_LEVEE	Site was dry.
07D_MPK	Site was dry.
06_UPLAND	Site was dry.
04D_WOOD	Site was dry.
04D_VENTURA	Site was under construction. Not accessible
9BD_GERRY	Site was dry.

DEVIATIONS FROM QAPP

Site ID	Deviation
01_RR_BR	No photo was taken due to rule against photography on base. Flow was not measured due to tidal influence.
02_PCH	Flow was not measured due to tidal influence.
04_WOOD	The conductivity at the site 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. To maintain consistency with an existing watershed program, the toxicity testing lab (Pacific EcoRisk) utilized *Hylella azteca* in place of *Americamysis bahia*.
05_CENTR	Intermediate container (Ziploc bag) used to fill sample bottles.
05D_SANT_VCWPD	Intermediate container (Ziploc bag) used to fill sample bottles.
9BD_ADOLF	Intermediate container (Ziploc bag) used to fill sample bottles.

FOLLOW UP ACTIONS

None

SEDIMENT SITES

Site ID	Sample Notes
02_PCH	Sediment tox and chemistry sampled 8-7-18 at 13:15: low tide 2.2 feet
04_WOOD	Sediment tox and chemistry sampled 8-7-18 at 12:10
03_UNIV	Sediment tox and chemistry sampled 8-7-18 at 09:15
9B_ADOLF	Sediment chemistry sampled 8-8-18 at 11:00
06_UPLAND	Sediment chemistry sampled 8-7-18 at 20:00
07_HITCH	Sediment chemistry only sampled 8-8-18 at 18:10
9A_HOWAR	Sediment tox and chemistry sampled 8-7-18 at 10:45

ADDITIONAL COMMENTS

- 10_GATE had a weir and flume installed
- Both teams used digital field logs with paper logs as backup.
- 01_RR_BR water was sampled near 2.3 ft. tidal stage at Point Mugu.
- 02_PCH water was sampled near 2.7 ft. tidal stage at Point Mugu.
- Sediment samples were collected with lab cleaned unused stainless steel scoops.

Field meter calibration notes:

Team 1 (13_BELT, 10_GATE, 07_HITCH, 9B_ADOLF, 9BD_ADOLF, 07D_SIM_BUS, and 13_SB_HILL) field meter passed all parameters for both initial and post calibration.

Team 2 (02_PCH, 03_UNIV, 05D_SANT_VCWPD, 05_CENTR, 04_WOOD, and 01T_ODD2_DCH and 01_RR_BR) field meter passed all parameters both initial and post calibration.

Prepared by:	Tanner Barnes, KLI	Date: 8/27/2018
Reviewed by:	Michael Ray, KLI	Date: 8/28/2018
Approved by:	Michael Marson, LWA	Date: 10/08/2018

Calleguas Creek Watershed TMDL Monitoring Program
Post Event Summary
Event 69: Dry Weather Sampling

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

Crew #1: Greg Cotten (KLI), Tanner Barnes (KLI)
Crew #2: David Thornhill (Fugro), Seth Gray (Fugro)

Sampling Dates: Receiving water and land use sites on November 7th and 8th, 2018.

Sampling Type: Quarterly Water Chemistry, Toxicity, Metals, PCBs and Salts.

SITES SAMPLED

Site ID		Constituents					
	Sample Date	General Parameters	Toxicity	Metals	Nutrients	PCBs, OP, OC, and Pyrethroid Pesticides	Salts
01_RR_BR	11/7/18	X		X	X	X	
02_PCH	11/7/18	X		X	X		
03_UNIV	11/7/18	X	X	X	X	X	
9B_ADOLF	11/7/18	X	X		X	X	
9BD_ADOLF	11/7/18	X		X		X	X
05D_SANT_VCWPD	11/7/18	X		X	X	X	X
05_CENTR	11/7/18	X			X		
04D_WOOD	11/7/18	X		X	X	X	X
04_WOOD	11/7/18	X	X	X	X	X	
01T_ODD2_DCH	11/7/18	X		X	X	X	
07_HITCH	11/7/18	X	X		X	X	
07D_MPK	11/7/18	X				X	X
07D_SIM_BUS	11/8/18	X				X	X
13_SB_HILL	11/8/18	X				X	X
9BD_GERRY	11/7/18	X		X	X	X	X
10_GATE	11/7/18	X	X			X	
13_BELT	11/7/18	X	X			X	

SITES NOT SAMPLED

Site ID	Reason for Omission
02D_BROOM	Site was dry.
06T_FC_BR	Site was dry.
07D_HITCH_LEVEE	Site was dry.
04D_VENTURA	Site construction has installed subterranean culvert. No longer accessable. New site pending approval.
06_UPLAND	Site was dry.

DEVIATIONS FROM QAPP

Site ID	Deviation
01_RR_BR	No photo was taken due to rule against photography on base. Flow was not measured due to tidal influence.
02_PCH	Flow was not measured due to tidal influence.
04_WOOD	The conductivity at the site 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. To maintain consistency with an existing watershed program, the toxicity testing lab (Pacific EcoRisk) utilized *Hylella azteca* in place of *Americamysis bahia*.
05_CENTR	Intermediate container (Ziploc bag) used to fill sample bottles.
05D_SANT_VCWPD	Intermediate container (Ziploc bag) used to fill sample bottles.
9BD_ADOLF	Intermediate container (Ziploc bag) used to fill sample bottles.
04D_WOOD	Intermediate container (Ziploc bag) used to fill sample bottles.
9BD_GERRY	Intermediate container (Ziploc bag) used to fill sample bottles.
07D_MPK	Intermediate container (Ziploc bag) used to fill sample bottles.

FOLLOW UP ACTIONS

None

ADDITIONAL COMMENTS

- Both teams used digital field logs with paper logs as backup.
- 01_RR_BR was sampled near 0.2 ft. tidal stage at Point Mugu.
- 02_PCH was sampled near -0.29 ft. tidal stage at Point Mugu.
- Gerry exceeded the field meters ability to accurately measure turbidity. Turbidity was added to the analytical list for Physis.

Field meter calibration notes:

Team 1 (13_BELT, 10_GATE, 07_HITCH, 9B_ADOLF, 9BD_ADOLF, 07D_SIM_BUS, 13_SB_HILL, 07D_MPK, and 9BD_GERRY) field meter passed all parameters for both initial and post calibration.

Team 2 (01_RR_BR, 02_PCH, 03_UNIV, 05D_SANT_VCWPD, 05_CENTR, 04D_WOOD, 04_WOOD, and 01T_ODD2_DCH) field meter passed all parameters for the initial calibration, but failed the post calibration for turbidity.

Prepared by:	Tanner Barnes	Date: 11/12/18
Reviewed by:	Michael Ray	Date: 11/12/18
Approved by:	Michael Marson	Date: 01/25/19

Event 70 – Storm 1

Calleguas Creek Watershed TMDL Monitoring Program
Post Event Summary
Event 70: Wet Weather Sampling

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

Crew #1: Greg Cotten (KLI), Kagen Holland (KLI)
Crew #2: Gary Gillingham (KLI), Tanner Barnes (KLI)
Crew #3: Jeff Polis (Fugro), Cory Crocker (Fugro)
Crew #4: David Thornhill (Fugro), Seth Gray (Fugro)

Sampling Dates: Receiving water and land use sites on November 29, 2018

Sampling Type: Wet weather water chemistry, toxicity, metals, PCBs and salts.

SITES SAMPLED

Site ID		Constituents					
	Sample Date	General Parameters	Toxicity	Metals	Nutrients	PCBs, OP, OC, and Pyrethroid Pesticides	Salts
01_RR_BR	11/29/18	X		X	X	X	
02_PCH	11/29/18	X		X	X		
03_UNIV	11/29/18	X	X	X	X	X	X
9A_HOWAR	11/29/18	X					X
9B_ADOLF	11/29/18	X	X		X	X	
9BD_ADOLF	11/29/18	X		X		X	X
05D_SANT_VCWPD	11/29/18	X		X	X	X	X
05_CENTR	11/29/18	X			X		
04D_WOOD	11/29/18	X		X	X	X	X
04_WOOD	11/29/18	X	X	X	X	X	X
01T_ODD2_DCH	11/29/18	X		X	X	X	
06_UPLAND	11/29/18	X	X		X	X	
07_HITCH	11/29/18	X	X		X	X	
07D_HITCH_LEVEE_2	11/29/18	X			X	X	X
07_TIERRA	11/29/18	X					X
07D_MPK	11/29/18	X				X	X

Site ID		Constituents					
	Sample Date	General Parameters	Toxicity	Metals	Nutrients	PCBs, OP, OC, and Pyrethroid Pesticides	Salts
07D_SIM_BUS	11/29/18	X				X	X
13_SB_HILL	11/29/18	X				X	X
9B_BARON	11/29/18	X					X
9BD_GERRY	11/29/18	X		X	X	X	X
10_GATE	11/29/18	X	X			X	
13_BELT	11/29/18	X	X			X	

SITES NOT SAMPLED

Site ID	Reason for Omission
02D_BROOM	Site was dry.
04D_VENTURA	Construction effort installed subterranean culvert. Site no longer accessable. New site is pending approval.
06T_FC_BR	Site was dry.

DEVIATIONS FROM QAPP

Site ID	Deviation
01_RR_BR	No photo was taken due to rule against photography on base. Flow was not measured due to tidal influence.
02_PCH	Flow was not measured due to tidal influence.

FOLLOW UP ACTIONS

None

ADDITIONAL COMMENTS

Less safe and less productive night conditions prevented an earlier sampling start. Sampling began at first light. It appears these samples were collected at the middle of the event with some sites rising and some falling while sampling. Our general approach for this and all storms is to begin our sampling at sites higher in the watershed and work our way downstream.

Field meter calibration notes:

Team 1 (13_SB_HILL, 07D_SIM_BUS, 07D_MPK, 07_HITCH, 07D_HITCH_LEVEE_2, 07_TIERRA and 9B_ADOLF) field meter # 0925 passed the initial calibration but failed for DO and conductivity during post calibration.

Team 2 (9BD_ADOLF, 9BD_GERRY, 10_GATE, 13_BELT and 9B_BARON) field meter # 2692 turbidity failed initial calibration, but passed all other parameters for initial and post calibration. Grab samples were taken and measured within 8 hours with meter #4547.

Team 3 (06T_FC_BR , 05D_SANT_VCWPD, 05_CENTR, 04D_VENTURA, 06_UPLAND, 9A_HOWAR and 03_UNIV) field meter # 3760 passed both the initial and post calibration.

Team 4 (04_WOOD, 04D_WOOD, 02D_BROOM, 01T_ODD2_DCH, 02_PCH and 01_RR) field meter # 4547 passed both the initial and post calibration.

Meter exceedences:

Sites where turbidity exceeded 1000 NTU (field meter maximum) Turbidity was added to the site COC for laboratory analysis. These sites were: 9BD_GERRY, 05D_SANT_VCWPD, 05_CENTR, 06_UPLAND, 04D_WOOD.

Flow:

Due to dangerous flow conditions, flow was estimated at all sites except 07D_SIM_BUS, 9B_ADOLF, 07_HITCH and 07D_MPK, where flow was measured using preferred methods. 02D_BROOM, 04D_VENTURA, and 06T_FC_BR were ‘dry’.

Prepared by:	Michael Ray, KLI	Date: 12/12/18
Reviewed by:	Tanner Barnes, KLI	Date: 12/13/18
Approved by:	Michael Marson, LWA	Date: 01/25/19

Event 71 – Storm 2

Calleguas Creek Watershed TMDL Monitoring Program
Post Event Summary
Event 71: Wet Weather Sampling

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

Crew #1: Greg Cotten (KLI), Kagen Holland (KLI)
Crew #2: Michael Ray (KLI), Tanner Barnes (KLI)
Crew #3: Jeff Polis (Fugro), Dustin Snider (Fugro)
Crew #4: Cory Crocker (Fugro), Seth Gray (Fugro)

Sampling Dates: Receiving water and land use sites on January 15, 2019.

Sampling Type: Wet weather water chemistry, toxicity, metals, PCBs and salts.

SITES SAMPLED

Site ID		Constituents					
	Sample Date	General Parameters	Toxicity	Metals	Nutrients	PCBs, OP, OC, Triazines and Pyrethroid Pesticides	Salts
01_RR_BR	1/15/19	X		X	X	X	
02_PCH	1/15/19	X		X	X		
03_UNIV	1/15/19	X	X	X	X	X	X
9A_HOWAR	1/15/19	X					X
9B_ADOLF	1/15/19	X	X		X	X	
9BD_ADOLF	1/15/19	X		X		X	X
05D_SANT_VCWPD	1/15/19	X		X	X	X	X
05_CENTR	1/15/19	X			X		
04D_SPRINGVILLE	1/15/19	X		X		X	X
04D_WOOD	1/15/19	X		X	X	X	X
04_WOOD	1/15/19	X	X	X	X	X	X
01T_ODD2_DCH	1/15/19	X		X	X	X	
06T_FC_BR	1/15/19	X			X	X	X
06_UPLAND	1/15/19	X	X		X	X	
07_HITCH	1/15/19	X	X		X	X	

Site ID		Constituents					
	Sample Date	General Parameters	Toxicity	Metals	Nutrients	PCBs, OP, OC, Triazines and Pyrethroid Pesticides	Salts
07D_HITCH_LEVEE_2	1/15/19	X			X	X	X
07_TIERRA	1/15/19	X					X
07D_MPK	1/15/19	X				X	X
07D_SIM_BUS	1/15/19	X				X	X
13_SB_HILL	1/15/19	X				X	X
9B_BARON	1/15/19	X					X
9BD_GERRY	1/15/19	X		X	X	X	X
10_GATE	1/15/19	X	X			X	
13_BELT	1/15/19	X	X			X	

SITES NOT SAMPLED

Site ID	Reason for Omission
02D_BROOM	Site was dry.

DEVIATIONS FROM QAPP

Site ID	Deviation
01_RR_BR	No photo was taken due to rule against photography on base. Flow was not measured due to tidal influence.
02_PCH	Flow was not measured due to tidal influence.
9BD_ADOLF	Intermediate container (1L AG) used for metals.
9BD_GERRY	Intermediate container (1L AG) used for metals.

FOLLOW UP ACTIONS

None

ADDITIONAL COMMENTS

Field meter calibration notes:

Team 1 (13_SB_HILL, 07D_SIM_BUS, 07D_MPK, 07_HITCH, 07D_HITCH_LEVEE_2 and 07_TIERRA) field meter, Sonde, passed initial calibration except for turbidity and passed post calibration except for dissolved oxygen. Turbidity was taken as grab samples and analysed with Team 4 meter # 3760.

Team 2 (06 _UPLAND, 9B_ADOLF, 9BD_ADOLF, 9BD_GERRY, 10_GATE, 13_BELT and 9B_BARON) field meter, 2692, passed both initial and post calibration except for the turbidity. Turbidity was taken as grab samples and analysed with Team 3 meter #4547.

Team 3 (06T_FC_BR , 05D_SANT_VCWPD, 05_CENTR, 04D_SPRINGVILLE, 9A_HOWAR and 03_UNIV) field meter, 4547, passed both the initial and post calibration.

Team 4 (04_WOOD, 04D_WOOD, 01T_ODD2_DCH, 02_PCH and 01_RR) field meter, 3760, passed both the initial and post calibration.

Meter exceedences:

Sites where turbidity exceeded 1000 NTU (field meter maximum) Turbidity was added to the site COC for laboratory analysis and was recorded in the spreadsheet as “>1000”. These sites were: 04D_WOOD, 04_WOOD, 01T_ODD2_DCH, 03_UNIV, 05_CENTR, 05D_SANT_VCWPD, 06 _UPLAND, 06T_FC_BR and 9BD_GERRY.

Flow:

Due to dangerous flow conditions, flow was estimated at all sites except 04D_WOOD, 07D_HITCH_LEVEE, 13_ SB_HILL, 07D_SIM_BUS and 07D_MPK, where flow was measured using preferred methods. 02D_BROOM outfall was ‘dry’.

Photos:

Some locations were collected after sunset. In order to maximize the information from these site photos, digital enhancements were applied and therefore may appear grainy.

Prepared by:	Tanner Barnes and Michael Ray, KLI	Date: 1/22/19
Reviewed by:	Greg Cotten, KLI	Date: 3/06/19
Approved by:	Michael Marson, LWA	Date: 05/07/19

Calleguas Creek Watershed TMDL Monitoring Program
Post Event Summary
Event 72: Dry Weather Sampling

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

Crew #1: Greg Cotten (KLI), Tanner Barnes (KLI)
Crew #2: David Thornhill (Fugro), Seth Gray (Fugro)

Sampling Dates: Receiving water and land use sites on March 18th and 19th, 2019.

Sampling Type: Quarterly Water Chemistry, Toxicity, Metals, PCBs and Salts.

SITES SAMPLED

Site ID		Constituents					
	Sample Date	General Parameters	Toxicity	Metals	Nutrients	PCBs, OP, OC, and Pyrethroid Pesticides	Salts
01_RR_BR	3-19-19	X		X	X	X	
02_PCH	3-19-19	X		X	X		
03_UNIV	3-19-19	X	X	X	X	X	
9B_ADOLF	3-19-19	X	X		X	X	
9BD_ADOLF	3-19-19	X		X		X	X
05D_SANT_VCWPD	3-19-19	X		X	X	X	X
05_CENTR	3-19-19	X			X		
04D_SPRINGVILLE	3-19-19	X		X		X	X
04D_WOOD	3-19-19	X		X	X	X	X
04_WOOD	3-19-19	X	X	X	X	X	
01T_ODD2_DCH	3-19-19	X		X	X	X	
07_HITCH	3-19-19	X	X		X	X	
07D_HITCH_LEVEE_2	3-19-19	X			X	X	X
07D_MPK	3-18-19	X				X	X
07D_SIM_BUS	3-18-19	X				X	X
13_SB_HILL	3-18-19	X				X	X
10_GATE	3-19-19	X	X			X	

Site ID		Constituents					
	Sample Date	General Parameters	Toxicity	Metals	Nutrients	PCBs, OP, OC, and Pyrethroid Pesticides	Salts
13_BELT	3-19-19	X	X			X	

SITES NOT SAMPLED

Site ID	Reason for Omission
02D_BROOM	Site was dry 3-19-19.
06T_FC_BR	Site had standing water with no flow 3-18-19.
06_UPLAND	Site was dry 3-18-19.
9BD_GERRY	Site was dry 3-19-19.

DEVIATIONS FROM QAPP

Site ID	Deviation
01_RR_BR	No photo was taken due to rule against photography on base. Flow was not measured due to tidal influence.
02_PCH	Flow was not measured due to tidal influence.
04_WOOD	The conductivity at the site 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. To maintain consistency with an existing watershed program, the toxicity testing lab (Pacific EcoRisk) utilized *Hylella azteca* in place of *Americamysis bahia*.
07D_MPK	Intermediate container (Ziploc bag) used to fill sample bottles.
9BD_ADOLF	Intermediate container (Ziploc bag) used to fill sample bottles.
05_CENTR	Intermediate container (Ziploc bag) used to fill sample bottles.
13_SB_HILL	Flow was not recorded at this site.
07D_HITCH_LEVEE_2	Intermediate container (Ziploc bag) used to fill sample bottles.

FOLLOW UP ACTIONS

None

ADDITIONAL COMMENTS

- Both teams used digital field logs.
- 01_RR_BR was sampled near -1.2 ft. tidal stage at Point Mugu.
- 02_PCH was sampled near -1.1 ft. tidal stage at Point Mugu.
- 05_Center construction drainage hose was downstream of sampling site. It was not operating but water in the hose may indicate it was dewatering an agricultural field.
- 13_SB_HILL flow was measured but there is no record of it.
- 07D_MPK was extremely low flow but it was sampled.

Field meter calibration notes:

Team 1 (13_BELT, 10_GATE, 07_HITCH, 07D_HITCH_LEVEE_2, 9B_ADOLF, 9BD_ADOLF, 07D_SIM_BUS, 13_SB_HILL, 06T_FC_BR) field meter #4547 passed all parameters for the pre calibration, but failed the post calibration for dissolved oxygen.

Team 2 (01_RR_BR, 02_PCH, 03_UNIV, 05D_SANT_VCWPD, 05_CENTR, 04D_WOOD, 04_WOOD, 01T_ODD2_DCH, and 04D_SPRINGVILLE) field meter #3670 passed all parameters for both pre and post calibration.

Prepared by:	Michael Ray	Date: 4/1/19
Reviewed by:	Greg Cotten	Date: 5/8/19
Approved by:	Michael Marson, LWA	Date: 5/10/19

Event 73 – Water & Tissue

Calleguas Creek Watershed TMDL Monitoring Program
Post Event Summary
Event 73: Dry Weather Sampling

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

Crew #1: Greg Cotten (KLI), Amy Howk (KLI)
Crew #2: David Thornhill (Fugro), Seth Gray (Fugro)

Sampling Dates: Receiving water and land use sites on May 28th and 29th, 2019.

Sampling Type: Quarterly Water Chemistry, Toxicity, Metals, PCBs and Salts.

SITES SAMPLED

Site ID		Constituents					
	Sample Date	General Parameters	Toxicity	Metals	Nutrients	PCBs, OP, OC, and Pyrethroid Pesticides	Salts
01_RR_BR	5-29-19	X		X	X	X	
02_PCH	5-29-19	X		X	X		
03_UNIV	5-29-19	X	X	X	X	X	
9B_ADOLF	5-29-19	X	X		X	X	
9BD_ADOLF	5-29-19	X		X		X	X
05D_SANT_VCWPD	5-29-19	X		X	X	X	X
05_CENTR	5-29-19	X			X		
04D_SPRINGVILLE	5-29-19	X		X		X	X
04D_WOOD	5-29-19	X		X	X	X	X
04_WOOD	5-29-19	X	X	X	X	X	
01T_ODD2_DCH	5-29-19	X		X	X	X	
07_HITCH	5-29-19	X	X		X	X	
07D_MPK	5-29-19	X				X	X
07D_SIM_BUS	5-28-19	X				X	X
13_SB_HILL	5-28-19	X				X	X
10_GATE	5-29-19	X	X			X	
13_BELT	5-29-19	X	X			X	

SITES NOT SAMPLED

Site ID	Reason for Omission
02D_BROOM	Site was dry 5-29-19
06T_FC_BR	Site was dry 5-28-19
06_UPLAND	Site was dry 5-28-19
07D_HITCH_LEVEE_2	Site was dry 5-29-19
9BD_GERRY	Site was dry 5-28-19 and 5-29-19

DEVIATIONS FROM QAPP

Site ID	Deviation
01_RR_BR	No photo was taken due to rule against photography on base. Flow was not measured due to tidal influence.
02_PCH	Flow was not measured due to tidal influence.
04_WOOD	The conductivity at the site 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. To maintain consistency with an existing watershed program, the toxicity testing lab (Pacific EcoRisk) utilized *Hylella azteca* in place of *Americamysis bahia*.
07D_MPK	Intermediate container (Ziploc bag) used to fill sample bottles.
9BD_ADOLF	Intermediate container (Ziploc bag) used to fill sample bottles.

FOLLOW UP ACTION

- In the case of 05D_SANT_VCWPD that was sampled downstream of paused channel work, field crews have been instructed to sample upstream of in-stream disturbances such as this for future sampling events.

ADDITIONAL COMMENTS

- Both teams used digital field logs.
- 01_RR_BR was sampled at low tide which was 1.0 ft. tidal stage
- 02_PCH was sampled near 1.2 ft. rising tidal stage at Point Mugu.
- 05_CENTR construction drainage hose was downstream of sampling site. It was not operating at sample time but hoses were positioned to drain agriculture ditch above site.
- 07D_MPK was dry on 5-28-19 but had minimal flow and was sampled on 5-29-19.
- 04_SPRINGVILLE flow was collected by meter with limited success so it was also measured by capturing the flow.

Field meter calibration notes:

Team 1 (13_BELT, 10_GATE, 07_HITCH, 07D_HITCH_LEVEE_2, 9B_ADOLF, 9BD_ADOLF, 07D_SIM_BUS, 13_SB_HILL, 06T_FC_BR) field meter #3760 passed all parameters for the pre and post calibrations.

Team 2 (01_RR_BR, 02_PCH, 03_UNIV, 05D_SANT_VCWPD, 05_CENTR, 04D_WOOD, 04_WOOD, 01T_ODD2_DCH, and 04D_SPRINGVILLE) field meter #4547 passed all parameters for pre and post calibration.

Prepared by:	Greg Cotten 06/26/2019
Reviewed by:	Amy Howk 06/26/2019
Approved by:	Michael Marson 08/06/2019

Calleguas Creek Watershed TMDL Monitoring Program
Post Event Summary
Event 73: Tissue Sampling

Sampling Crews: ICF International (ICF)
Crew: Joel Mulder (ICF), Sarah Horwath (ICF)

Sampling Dates: Receiving water sites on April 8th, 2019
Followup fishing day: August 13th, 2019

Sampling Type: Yearly Fish Tissue Chemistry

SITES SAMPLED

Site ID		Constituents			
	Sample Date	General Parameters (Lipids, % solids)	Metals (Methyl Mercury, Selenium)	OP Pesticides (Chlorpyrifos)	PCBs and OC Pesticides
03_UNIV					
9B_ADOLF	04-08-19	X			X
04_WOOD	04-08-19	X	X	X	X
07_HITCH					
07_TIERRA	08-13-19	X			X
9B_BARON					

SITES NOT SAMPLED

Site ID	Reason for Omission
07_TIERRA	Site was visited, but could not see any fish.
9B_BARON	Site was visited, but could not see any fish.
03_UNIV	Site was visited, but could not catch fish.

DEVIATIONS FROM QAPP

Site ID	Deviation

FOLLOW UP ACTIONS

No goldfish were caught at any site. A second day of fishing might be required later.

Goldfish were spotted at the drop structure at TIERRA on August 6th and 8th, so a second day was scheduled for August 13th and the team went there and caught all the goldfish there was.

ADDITIONAL COMMENTS

Prepared by: Michael Marson, LWA Date: August 28, 2019

Appendix B. Rating Curves and EC/Salt Relationships for Salts TMDL Compliance Sites for the July 2018-June 2019 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 (or more frequent) manual measurements of discharge are 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 a monitoring year. Base rating curve equations used for the July 2018-June 2019 monitoring year are provided in Table 1.

Table 1. Rating Curves for Salts TMDL Compliance Sites for Monitoring Year July 2018-June 2019

Site	Rating Curve
03_UNIV	$Q = 0.45*(Lvl - 29.42 + S)^{1.92}$
04_WOOD	$Q = 0.020*(Lvl - 22.00 + S)^{1.7}$
07_TIERRA [a]	$Q = 0.0270*(Lvl - 20 + S)^{1.8} + 0.012*(Lvl - 40 + S)^{2.3}$
9A_HOWAR	$Q = 0.0043*(Lvl - 5.1 + S)^{2.2}$
9B_BARON	$Q = 0.0102*(Lvl + 11 + S)^{2.10}$

[a] Starting in the 2016/2017 monitoring year, a compound rating has been used for 07_TIERRA that includes a second term that applies to stage heights above Lvl=40 cm to account for details in the shape of the channel control (a metal drop structure) that affect the wetted width of the cross section where the gage is located.

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 and up to two wet events per year) using linear regression, in the following form:

[Ion] = A*EC + B, where

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

A = slope

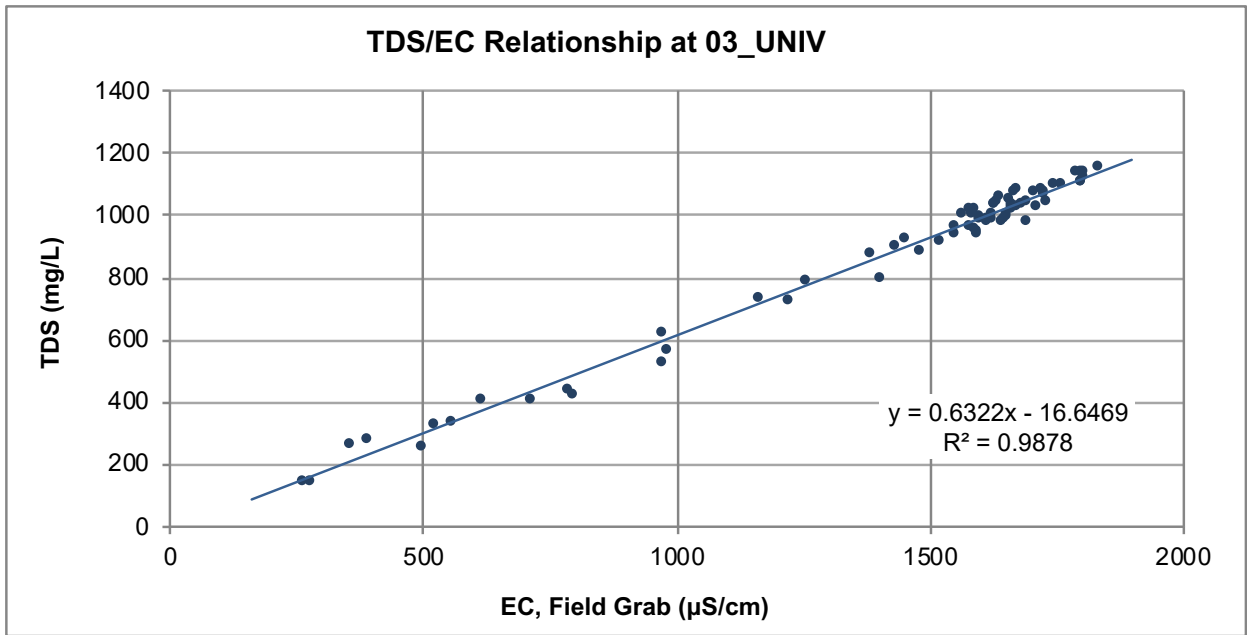
EC = specific conductivity (µS/cm)

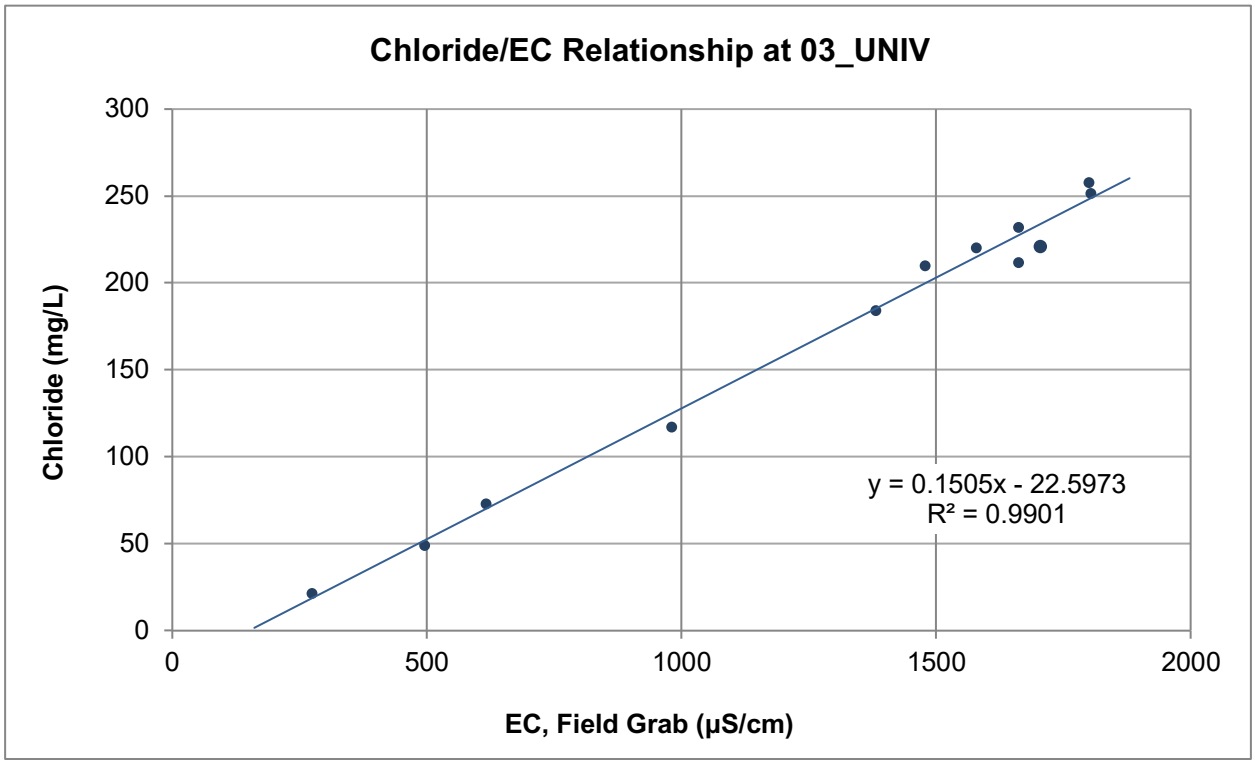
B = y intercept

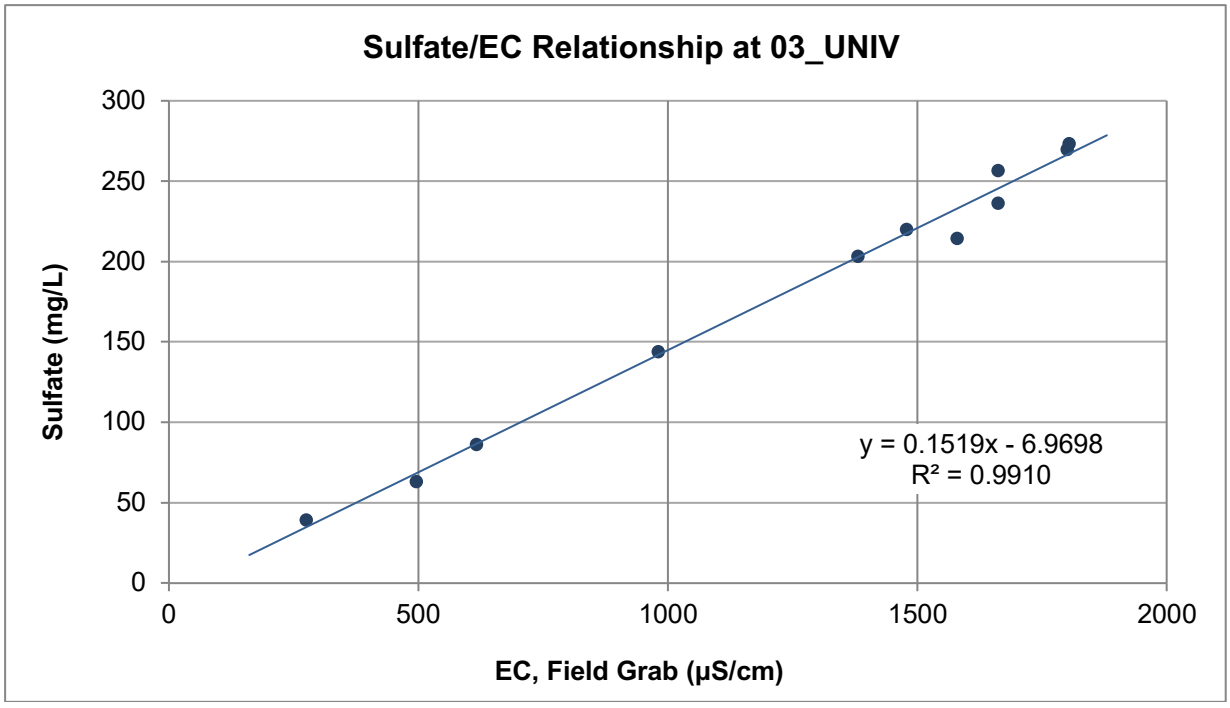
At the conclusion of the 2018/2019 monitoring year, surrogate relationships were evaluated and updated in cases where merited by new data. Surrogate relationships used to process the 2018/2019 EC sensor data are reported in **Table 2** and illustrated in figures following the table.

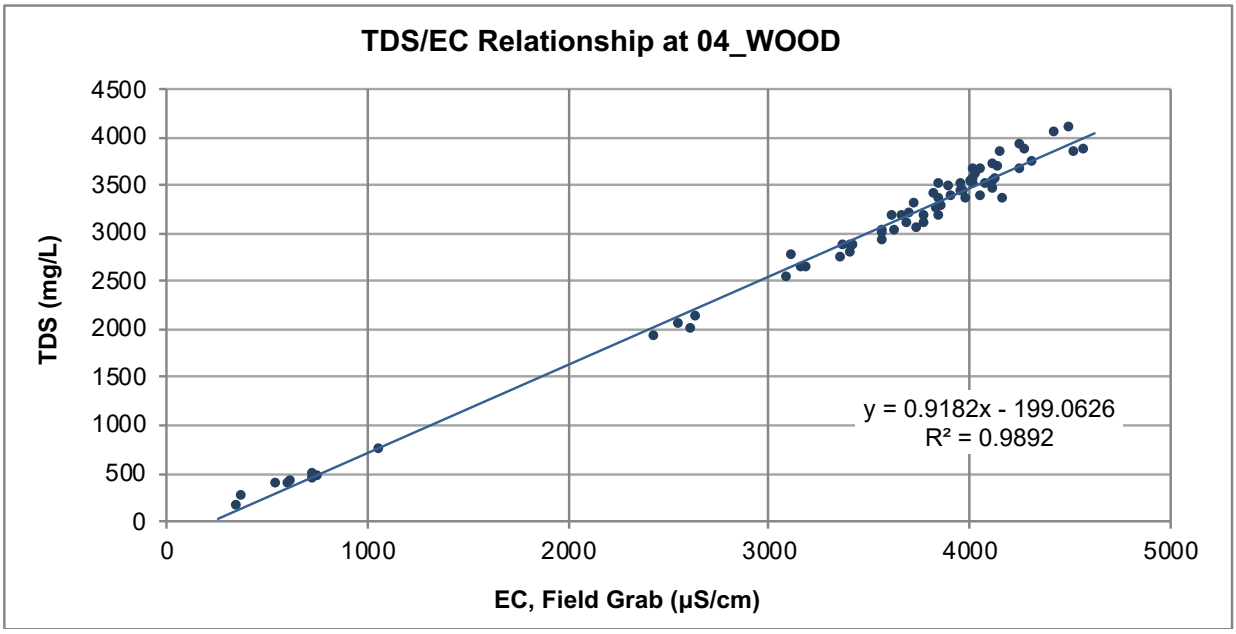
Table 2. Surrogate Relationships Used to Convert EC to Salt Concentrations for the 2017/2018 Monitoring Year

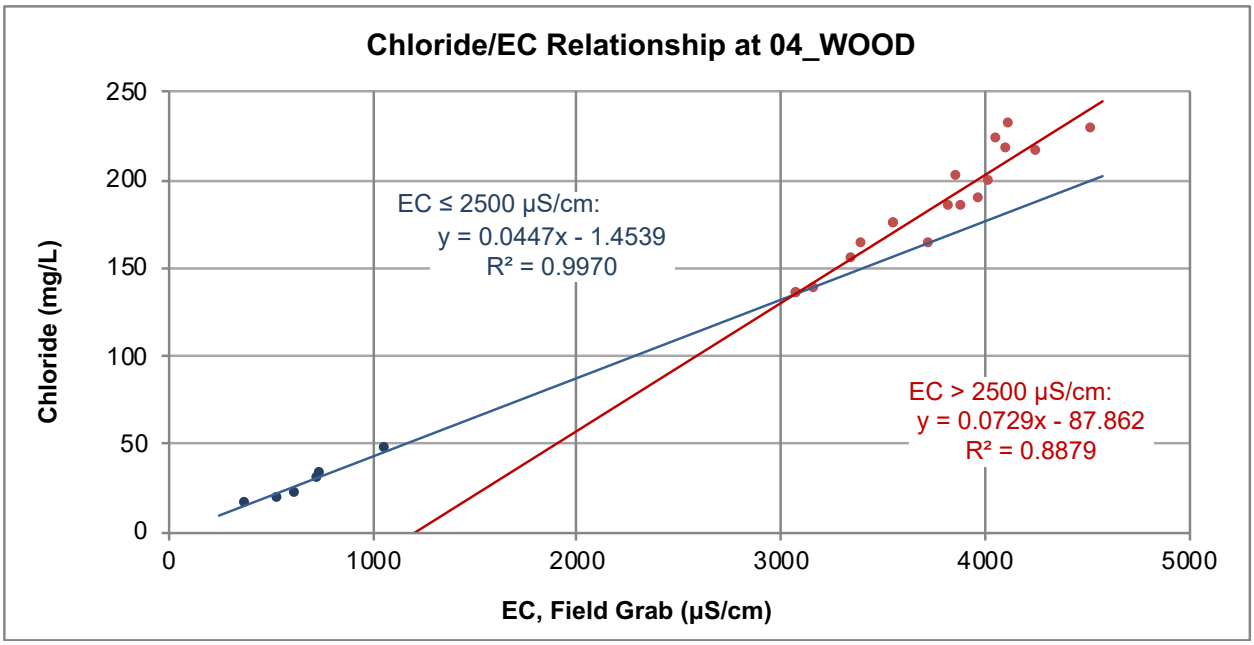
Site	Proxy Relationship	r^2	Underlying Field Data	
			Sample Size	Date Range
03_UNIV	TDS = (0.6322 * EC) – 16.6469	0.9878	72	1/31/2011 – 5/8/2019
	Cl = (0.1505 * EC) – 22.5973	0.9901	12	8/25/2016 - 5/7/2018
	SO4 = (0.1519 * EC) – 6.9698	0.9910	11	8/25/2016 - 5/7/2018
04_WOOD	TDS = (0.9182 * EC) – 199.0626	0.9892	70	1/31/2011 – 5/8/2019
	High Conductivity (>2500 µS/cm): Cl = (0.0729 * EC) – 87.8625	0.8879	17	5/23/2013 - 5/7/2018
	Low Conductivity (≤2500 µS/cm): Cl = (0.0447 * EC) – 1.4539	0.9970	7	5/23/2013 - 5/7/2018
	SO4 = (0.4797 * EC) – 100.2925	0.9936	19	2/28/2014 - 5/7/2018
	B = (0.000475 * EC) - 0.1245	0.9027	78	1/31/2011 – 5/8/2019
07_TIERRA	TDS = (0.7147 * EC) – 70.7692	0.9882	58	1/31/2011 – 5/8/2019
	Cl = (0.1097 * EC) – 13.6194	0.9892	24	2/28/2014 - 5/7/2018
	High Conductivity (>1400 µS/cm): SO4 = (0.4340 * EC) – 297.4593	0.7973	40	1/31/2011 – 5/7/2018
	Low Conductivity (≤1400 µS/cm): SO4 = (0.2530 * EC) – 21.0947	0.9583	11	1/31/2011 – 5/7/2018
	B = (0.000427 * EC) - 0.0607	0.9550	46	8/28/12 - 6/26/2019
9A_HOWAR	TDS = (0.6232 * EC) – 18.9374	0.9886	61	1/31/2011 – 5/8/2019
	Cl = (0.1544 * EC) – 21.4908	0.9712	12	8/25/2016 - 5/7/2018
	SO4 = (0.1637 * EC) – 23.6693	0.9723	11	8/25/2016 - 5/7/2018
9B_BARON	TDS = (0.6141 * EC) – 21.5706	0.9794	61	1/31/2011 – 5/8/2019
	Cl = (0.1634 * EC) – 25.8230	0.9846	12	8/25/2016 - 5/7/2018
	High Conductivity (>1000 µS/cm): SO4 = (0.2812 * EC) -168.0055	0.8039	40	3/20/2011 - 5/7/2018
	Low Conductivity (≤1000 µS/cm): SO4 = (0.1367 * EC) – 2.5933	0.9793	10	3/20/2011 - 5/7/2018

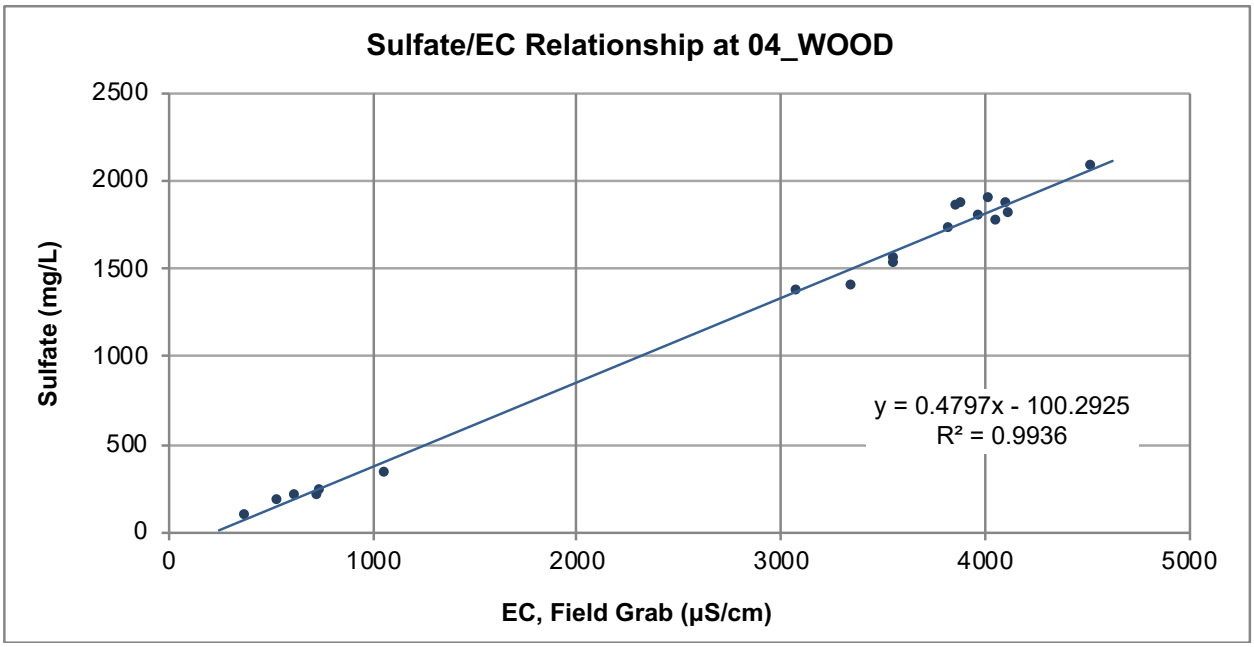

TDS/EC Relationship at 03_UNIV
TDS (mg/L)
1400
1200
1000
800
600
400
200
0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.6322x - 16.6469
R² = 0.9878

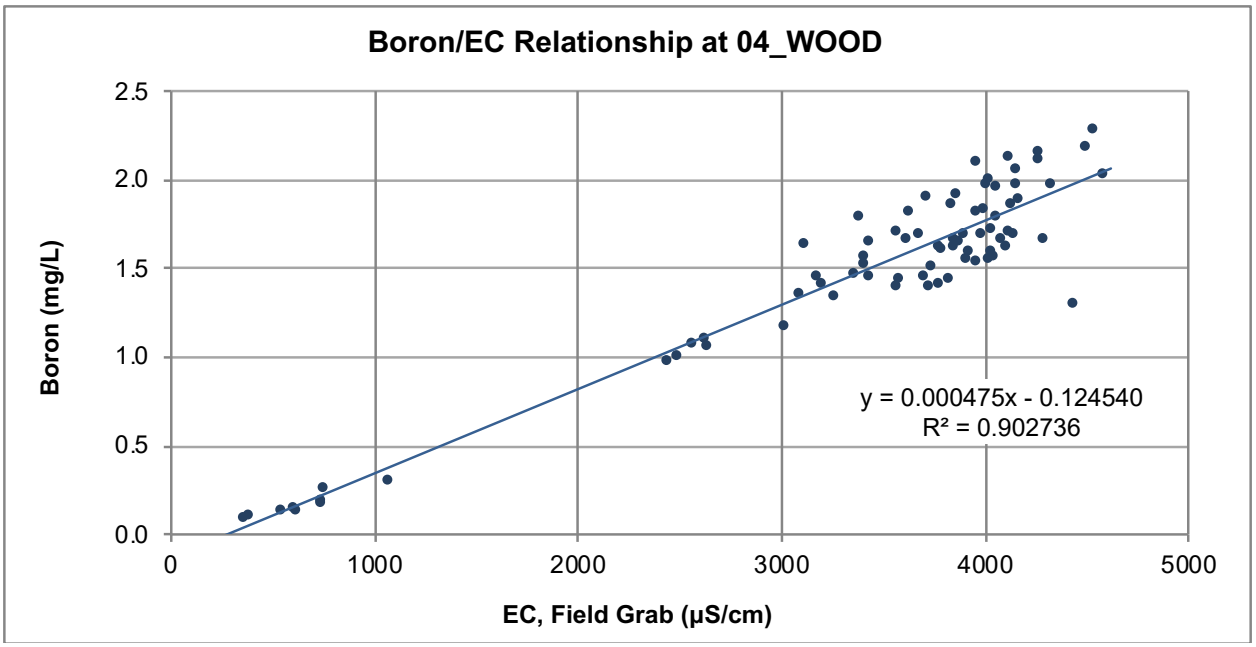

Chloride/EC Relationship at 03_UNIV
Chloride (mg/L)
300
250
200
150
100
50
0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.1505x - 22.5973
R² = 0.9901

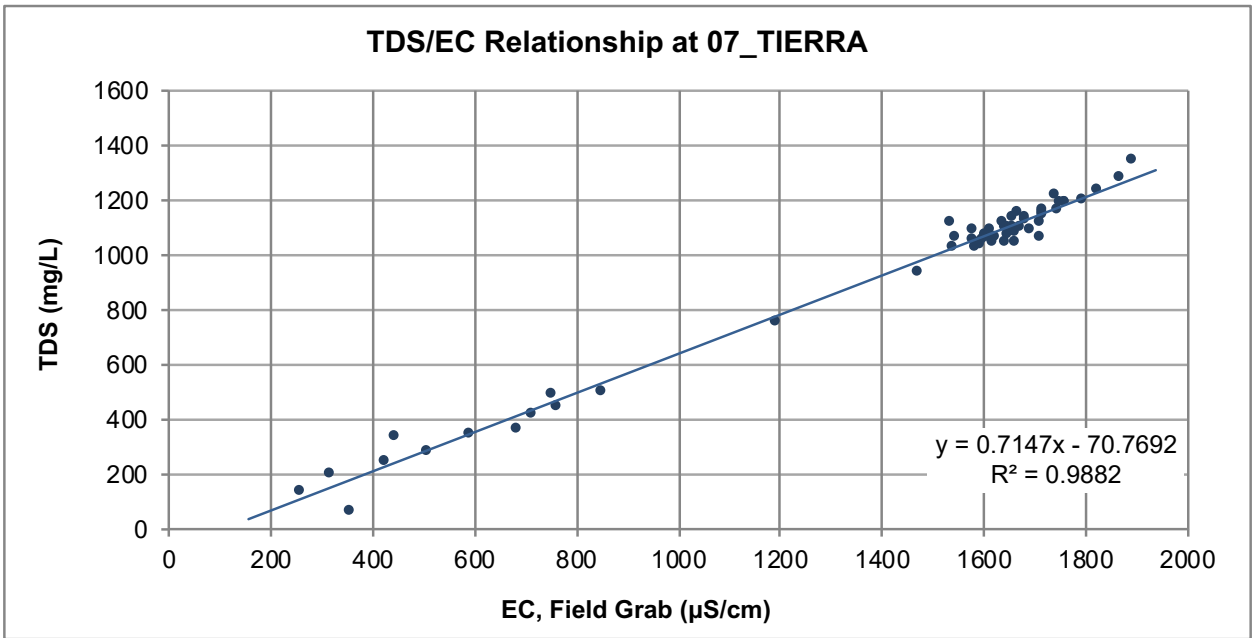

Sulfate/EC Relationship at 03_UNIV
Sulfate (mg/L)
300
250
200
150
100
50
0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.1519x - 6.9698
R² = 0.9910

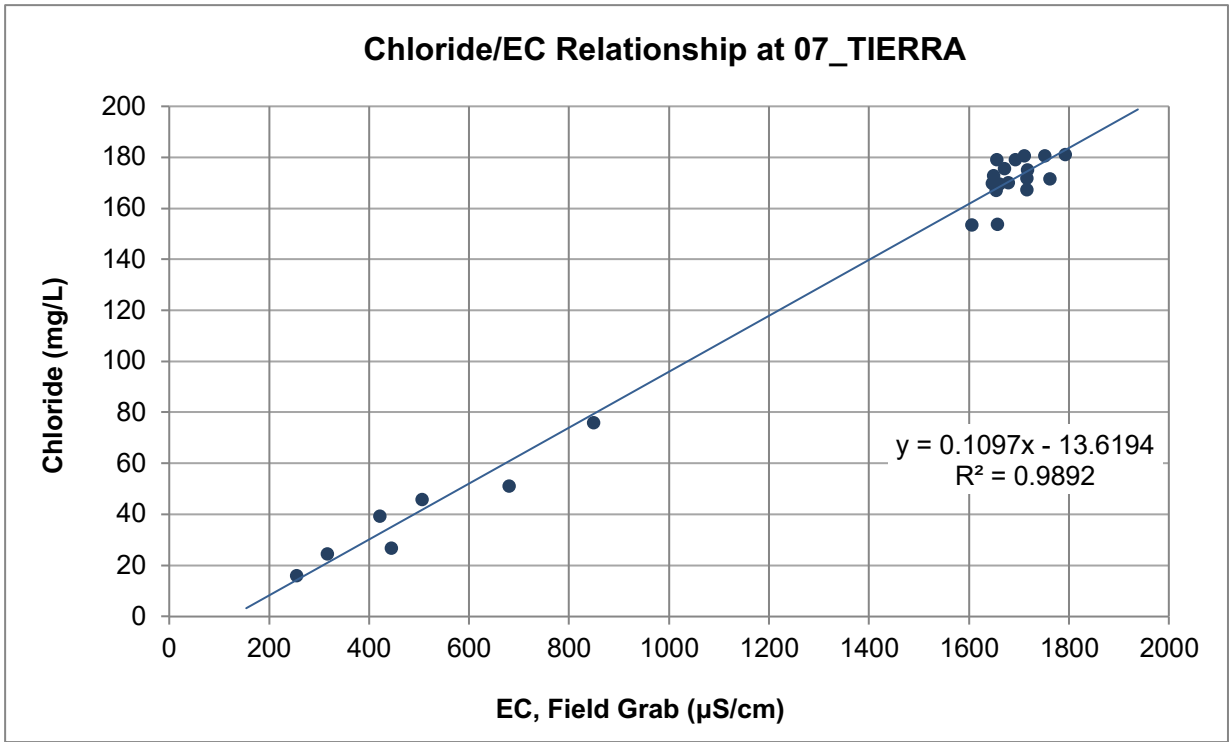

TDS/EC Relationship at 04_WOOD
TDS (mg/L)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
0
1000
2000
3000
4000
5000
EC, Field Grab (µS/cm)
y = 0.9182x - 199.0626
R² = 0.9892

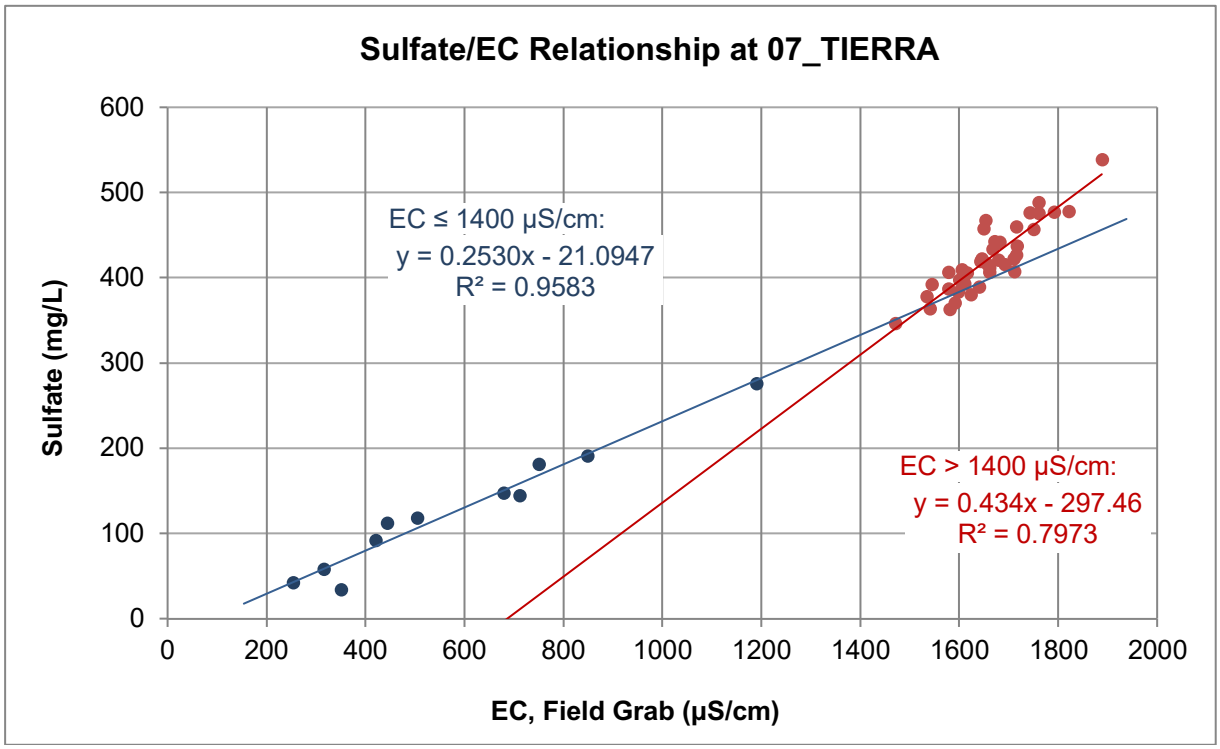

Chloride/EC Relationship at 04_WOOD
Chloride (mg/L)
EC, Field Grab (µS/cm)
EC ≤ 2500 µS/cm:
y = 0.0447x - 1.4539
R² = 0.9970
EC > 2500 µS/cm:
y = 0.0729x - 87.862
R² = 0.8879
0
50
100
150
200
250
0
1000
2000
3000
4000
5000

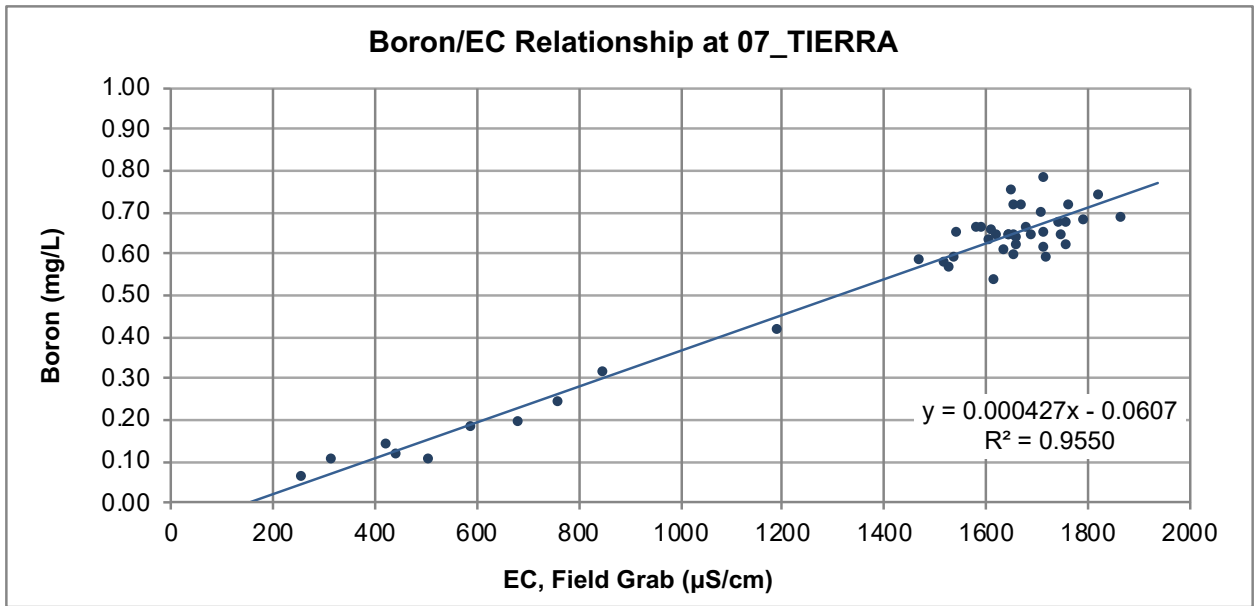

Sulfate/EC Relationship at 04_WOOD
Sulfate (mg/L)
EC, Field Grab (µS/cm)
y = 0.4797x - 100.2925
R² = 0.9936
0
500
1000
1500
2000
2500
0
1000
2000
3000
4000
5000

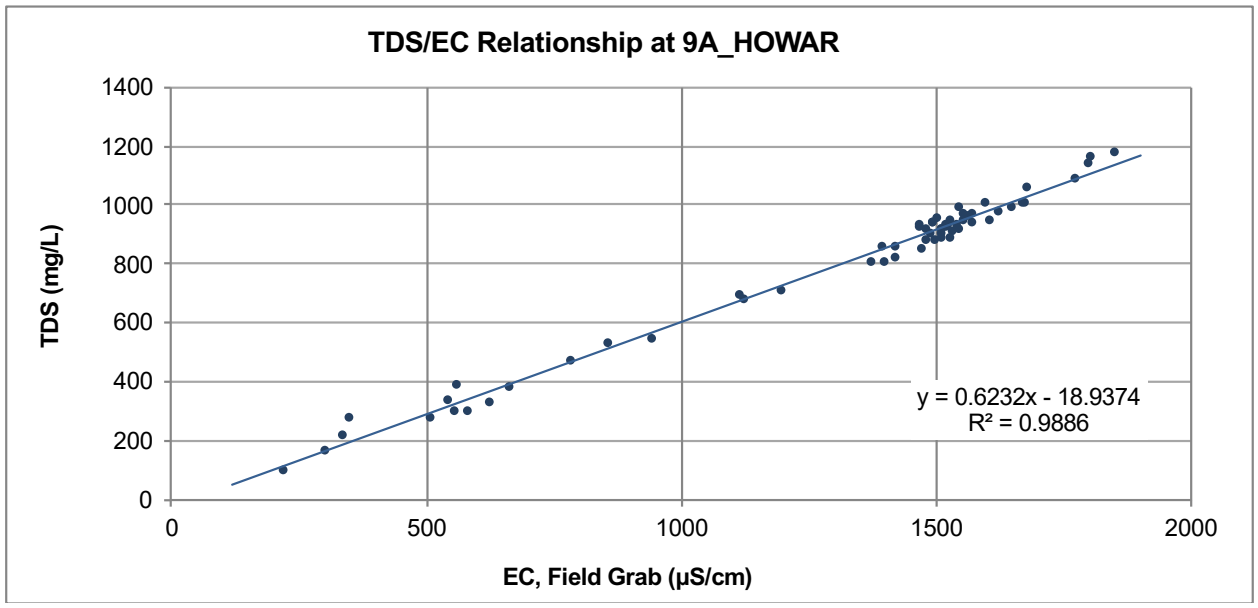

Boron/EC Relationship at 04_WOOD
Boron (mg/L)
2.5
2.0
1.5
1.0
0.5
0.0
0
1000
2000
3000
4000
5000
EC, Field Grab (µS/cm)
y = 0.000475x - 0.124540
R² = 0.902736

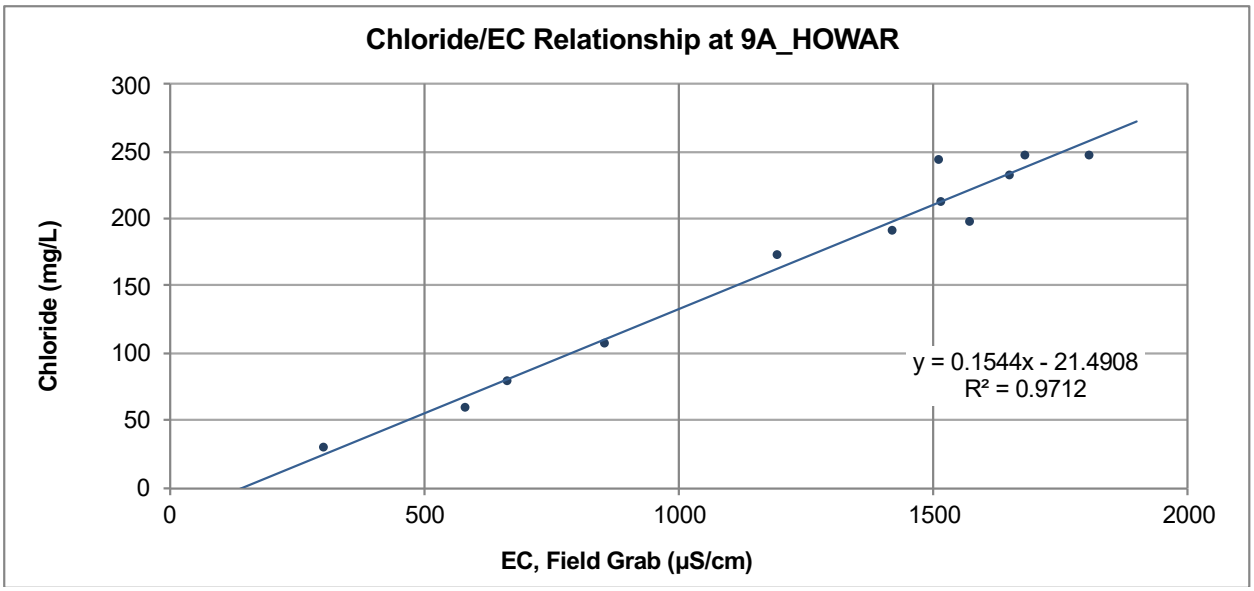

TDS/EC Relationship at 07_TIERRA
TDS (mg/L)
1600
1400
1200
1000
800
600
400
200
0
0
200
400
600
800
1000
1200
1400
1600
1800
2000
EC, Field Grab (µS/cm)
y = 0.7147x - 70.7692
R² = 0.9882

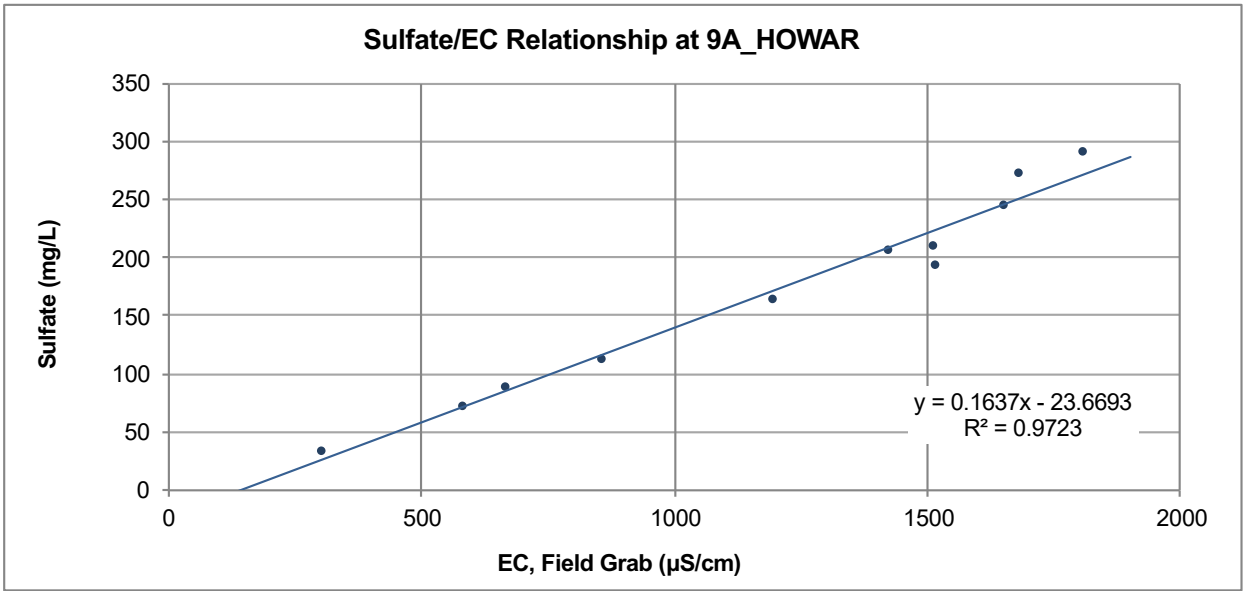

Chloride/EC Relationship at 07_TIERRA
Chloride (mg/L)
EC, Field Grab (µS/cm)
y = 0.1097x - 13.6194
R² = 0.9892
0
20
40
60
80
100
120
140
160
180
200
0
200
400
600
800
1000
1200
1400
1600
1800
2000

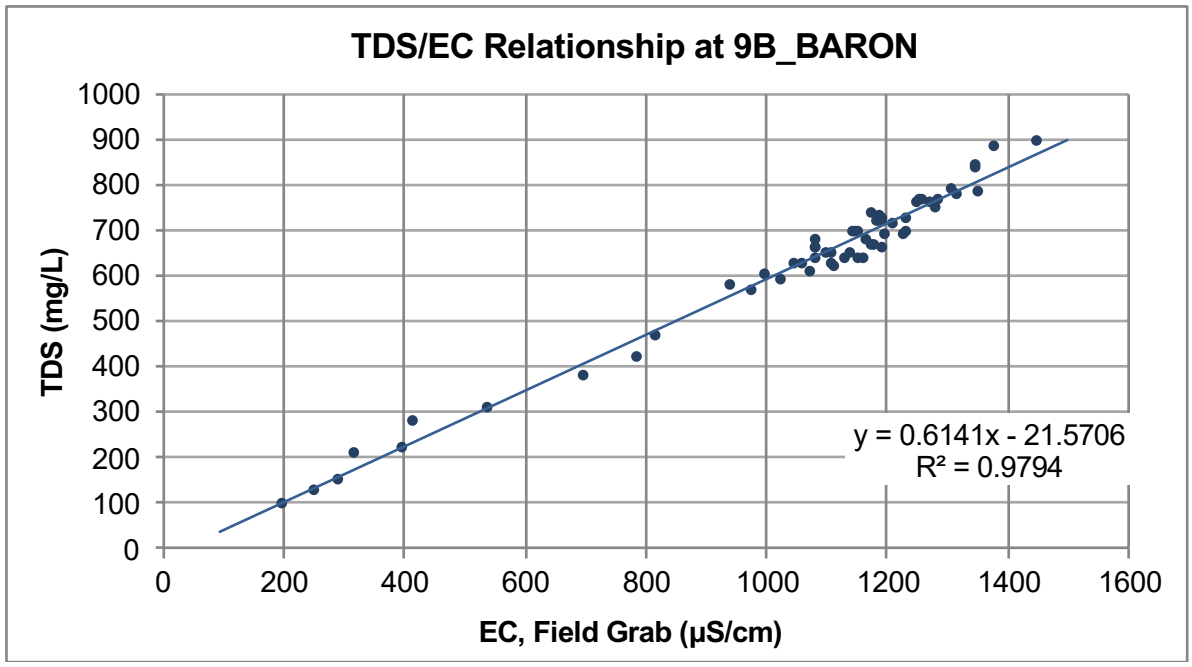

Sulfate/EC Relationship at 07_TIERRA
Sulfate (mg/L)
EC, Field Grab (µS/cm)
EC ≤ 1400 µS/cm:
y = 0.2530x - 21.0947
R² = 0.9583
EC > 1400 µS/cm:
y = 0.434x - 297.46
R² = 0.7973
0
100
200
300
400
500
600
0
200
400
600
800
1000
1200
1400
1600
1800
2000

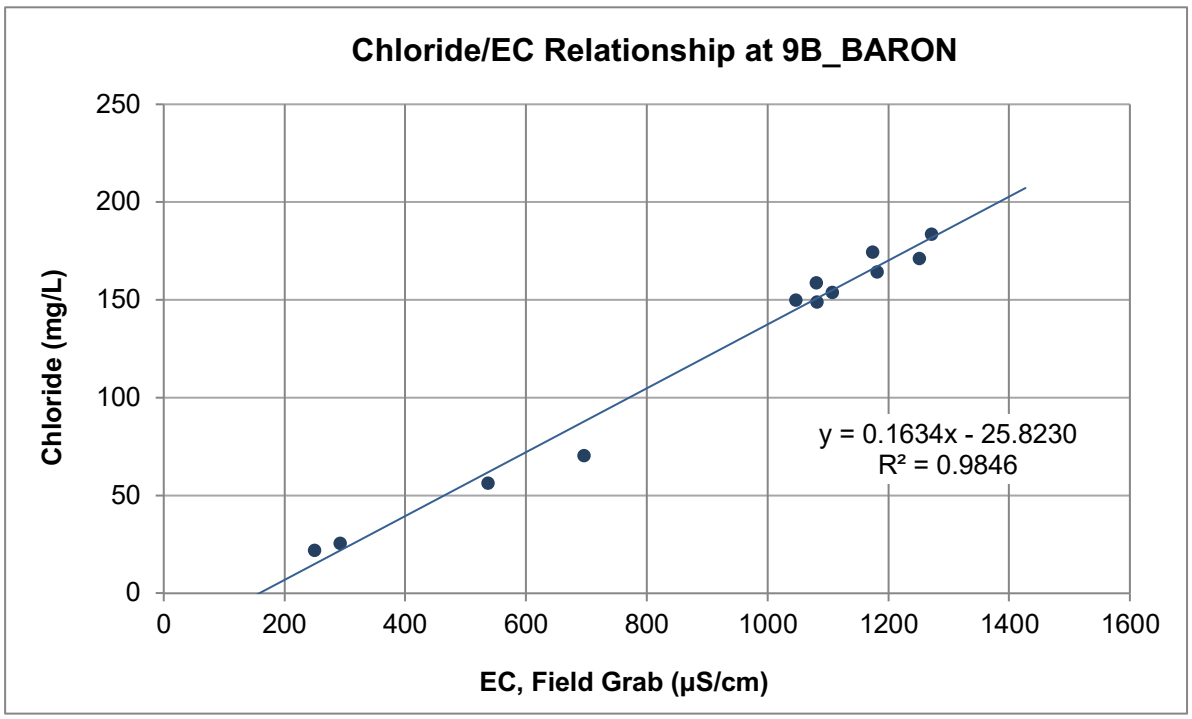

Boron/EC Relationship at 07_TIERRA
Boron (mg/L)
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0
200
400
600
800
1000
1200
1400
1600
1800
2000
EC, Field Grab (µS/cm)
y = 0.000427x - 0.0607
R² = 0.9550

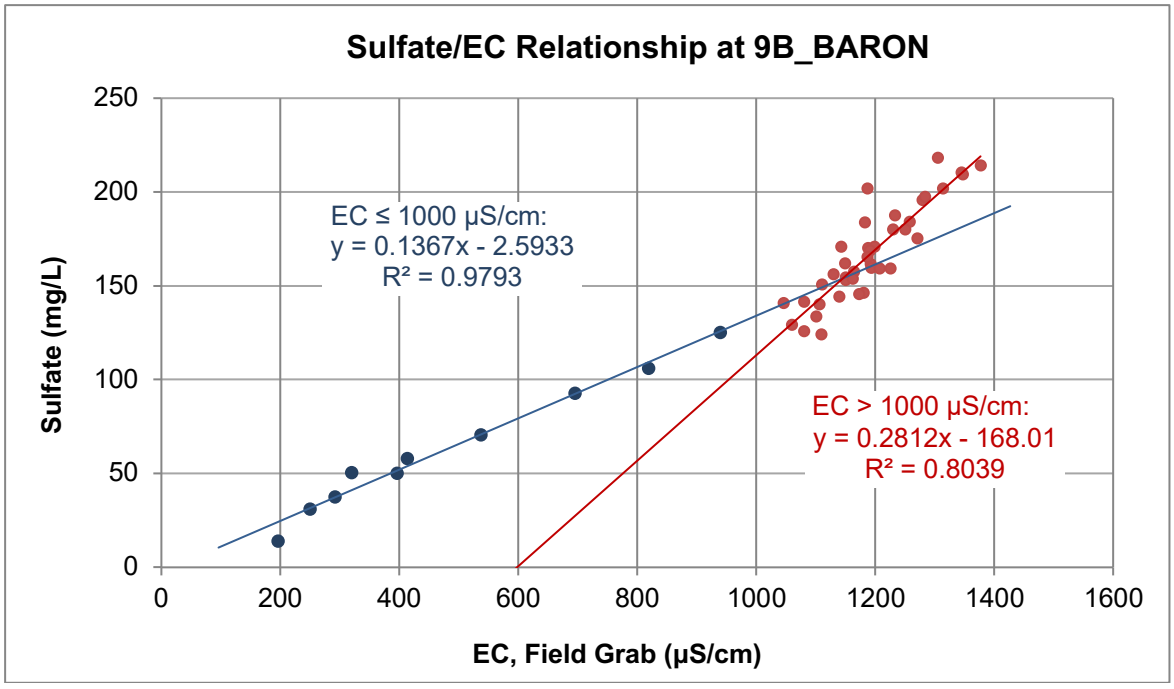

TDS/EC Relationship at 9A_HOWAR
TDS (mg/L)
1400
1200
1000
800
600
400
200
0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.6232x - 18.9374
R² = 0.9886


Chloride/EC Relationship at 9A_HOWAR
Chloride (mg/L)
EC, Field Grab (µS/cm)
y = 0.1544x - 21.4908
R² = 0.9712
0
50
100
150
200
250
300
0
500
1000
1500
2000


Sulfate/EC Relationship at 9A_HOWAR
Sulfate (mg/L)
EC, Field Grab (µS/cm)
y = 0.1637x - 23.6693
R² = 0.9723
0
50
100
150
200
250
300
350
0
500
1000
1500
2000


TDS/EC Relationship at 9B_BARON
TDS (mg/L)
EC, Field Grab (µS/cm)
y = 0.6141x - 21.5706
R² = 0.9794
0
100
200
300
400
500
600
700
800
900
1000
0
200
400
600
800
1000
1200
1400
1600


Chloride/EC Relationship at 9B_BARON
Chloride (mg/L)
EC, Field Grab (µS/cm)
y = 0.1634x - 25.8230
R² = 0.9846
0
50
100
150
200
250
0
200
400
600
800
1000
1200
1400
1600


Sulfate/EC Relationship at 9B_BARON
Sulfate (mg/L)
EC, Field Grab (µS/cm)
EC ≤ 1000 µS/cm:
y = 0.1367x - 2.5933
R² = 0.9793
EC > 1000 µS/cm:
y = 0.2812x - 168.01
R² = 0.8039
0
50
100
150
200
250
0
200
400
600
800
1000
1200
1400
1600

Appendix C:
Toxicity Testing and Toxicity Identification Evaluations (TIE) Summary

TOXICITY TESTING PROCEDURES

For the Calleguas Creek Watershed Total Maximum Daily Load (TMDL) Compliance Monitoring Program (CCWTMP), toxicity testing at various locations is conducted to meet 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 can be 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 percent mortality. The 50 percent 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 percent 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

[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.

with carbofuran, diazinon, or chlorpyrifos, TIE procedures follow those documented in Bailey *et al.*[6]

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, is 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 are 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. Water column toxicity samples are collected at freshwater sites during each of the quarterly and wet weather events. Sediment toxicity samples are collected every three years in Mugu Lagoon. As such, lagoon sediment toxicity samples were not collected during this monitoring year. Monitored sites include the following:

- **Freshwater Sediment Toxicity Sites**
    - 02_PCH (Toxicity Investigation site)
    - 03_UNIV
    - 04_WOOD
    - 9A_HOWAR (Toxicity Investigation site)
- **Freshwater Water Column Toxicity Sites**
    - 04_WOOD
    - 03_UNIV
    - 9B_ADOLF
    - 06_UPLAND
    - 07_HITCH
    - 10_GATE (Toxicity Investigation site)

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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.

- 13_BELT (Toxicity Investigation site)

Sediment toxicity samples were collected during dry weather event 68. Water column toxicity testing was conducted during all four dry weather events (Events 68, 69, 72, and 73), and the wet weather events (Events 70 and 71). 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 68 Sediment Toxicity

Table 1. Freshwater Sediment Toxicity Event 68 - *Hyalella azteca*

Site ID	*Hyalella azteca*		
	Survival	**Growth**	**TIE?**
02_PCH	No	No	No
03_UNIV	No	No	No
04_WOOD	No	Yes	No
9A_HOWAR	No	No	No

Event 68 Water Column Toxicity

Table 2. Freshwater Water Column Toxicity Event 68 - *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
07_HITCH	No	No	No		
9B_ADOLF	No	No	No		
10_GATE	No	No	No		
13_BELT	No	No	No		

Event 68 Toxicity and TIE Summary

- Freshwater sediment sites exhibited reduced reproduction at 04_WOOD. However, no significant reduction in survival was observed at any site.
- No significant reductions in survival or reproduction were observed for *Ceriodaphnia dubia* at the five freshwater sample sites during the sampling event.
- There were no significant reductions in survival or reproduction of *Hyalella Azteca* in any of the Calleguas Creek ambient waters.
- No TIEs were performed on samples collected at any other site for this sampling event.

Event 69 Water Quality Toxicity

Table 3. Water Quality Toxicity Event 69 - *Ceriodaphnia dubia* and *Hyalella azteca*

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

Event 69 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 03_UNIV, 07_HITCH, 9B_ADOLF, and 10_GATE.
- No significant reduction in survival was observed for *Hyalella azteca* at the 04_WOOD site.
- No TIEs were performed on samples collected for this sampling event.

Event 70 Water Quality Toxicity

Table 4. Water Quality Toxicity Event 70 - *Ceriodaphnia dubia* and *Hyalella azteca*

Site ID	*Ceriodaphnia dubia*		
	Survival	**Reproduction**	**TIE?**
03_UNIV	No	No	No
04_WOOD	Yes	Yes	No[1]
06_UPLAND	No	No	No
07_HITCH	No	No	No
9B_ADOLF	No	No	No
10_GATE	No	No	No
13_BELT	No	No	No

1. 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.

Event 70 Toxicity and TIE Summary

- No significant reductions in survival or reproduction were observed for *Ceriodaphnia dubia* at six freshwater sample sites during the sampling event.
- Significant reductions in survival and reproduction were observed for *Ceriodaphnia dubia* at the 04_WOOD site.
- A TIE was not initiated at the 04_WOOD 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.
- No TIEs were performed on samples collected at any other site for this sampling event.

Event 71 Water Quality Toxicity

Table 5. Water Quality Toxicity Event 71 - *Ceriodaphnia dubia*

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

Event 71 Toxicity and TIE Summary

- No significant reductions in survival were observed for *Ceriodaphnia dubia* at the seven freshwater sample sites during the sampling event.
- There was a significant reduction in reduction in reproduction observed for *Ceriodaphnia dubia* at the 06_UPLAND site.
- No TIEs were performed on samples collected at the remaining sites for this sampling event.

Event 72 Water Quality Toxicity

Table 6. Water Quality Toxicity Event 72 - *Ceriodaphnia dubia*

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

Event 72 Toxicity and TIE Summary

- No significant reductions in survival or significant reductions in reproduction were observed for *Ceriodaphnia dubia* at all sites.
- No TIEs were performed on samples collected for this sampling event.

Event 73 Water Quality Toxicity

Table 7. Water Quality Toxicity Event 73 - *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[1]
07_HITCH	No	No	No		
9B_ADOLF	No	No	No		
10_GATE	No	No	No		
13_BELT	No	Yes	No		

1. 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.

Event 73 Toxicity and TIE Summary

- No significant reductions in survival were observed for *Ceriodaphnia dubia* at all five freshwater sites.
- Significant reproduction toxicity for *Ceriodaphnia dubia* was observed at 13_BELT.
- Significant reductions in survival were observed for *Hyalella azteca* at 04_WOOD.
- A TIE was not initiated at the 04_WOOD 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.
- No TIEs were performed on samples collected from any other site for this sampling event.

Appendix D:
Laboratory QA/QC Results and Discussion

QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance and quality control (QA/QC) measures are built into the Calleguas Creek Watershed Total Maximum Daily Load (TMDL) Compliance Monitoring Program (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 laboratories and include: method blanks, blank spikes, blank spike duplicates, lab duplicates, matrix spikes, matrix spike duplicates, laboratory control samples, and surrogates (for 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 Quality Assurance Project Plan (QAPP). The following section lists the quality control failures that occurred during the 2018-2019 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 eleventh 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 process and transportation of samples.
- **Equipment blanks** are done by the field crews and look for contamination with the sampling equipment (IE shovels for sediment).
- **Laboratory blanks** are conducted by the analyzing laboratory and look for contamination in the lab.

Blank sample constituent detections were less than one percent considering all blank samples for the monitoring year. Most detections in blank samples were within the field blanks. Most of the field blank detections occurred within the metal's suite or with Ammonia. There was one Total Kjeldahl Nitrogen (TKN) and one Malathion field blank detection. Very few qualifications were required because the environmental sample was greater than 10 times the blank consintractions, or the environmental sample was not detected. There were no equipment blank (EB) failures. Of the 11 laboratory blank failures, four were from general water quality parameters (Electrical Conductivity and Total Dissolved Solids), four were from dissolved metals, and the remainder occurred in pyrethroids samples. Even though the detections were above the MDL value, most were below the RL level and the environmental samples were greater than 10 times the blank detection, so very few qualifications were needed. Details of all the blank sample detections are reported in **Table 1** below. The following lists a basic summary of the blank contamination results:

- Field Blanks – 1871 analyzed – 33 detections above the MDL (1.76%) (does not include lab duplicates or surrogates)
- Equipment Blanks – 151 analyzed – 0 detections above the MDL (0.00%) (does not include lab duplicates or surrogates)
- Laboratory Blanks – 3432 analyzed – 11 detections above the MDL (0.32%) (does not include surrogates)

Precision

Precision (reproducibility) of sample collection, preparation, and analytical methods is demonstrated by analyzing duplicate samples and calculating the relative percent difference (RPD) between the original sample and its duplicate. The 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 – 2034 analyzed – 68 failed RPD (3.34%) (does not include surrogates)
- Laboratory Duplicates – 928 analyzed – 18 failed RPD (1.94%) (includes surrogates)
- Blank Spike/LCS Duplicates – 3006 analyzed – 8 failed RPD (0.27%) (includes surrogates)
- Matrix Spike Duplicates – 703 analyzed – 17 failed RPD (2.42%) (includes surrogates)

Accuracy

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

$$\%R = 100 * [(Cs - C) / S]$$

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, LCS samples, and matrix spike samples check the accuracy of the laboratory reported sample concentrations. The three blank spike samples that fell outside the acceptable range were for Merphos, Dichlorvos, and PCB 153. Of the matrix spike samples that fell outside the acceptable range, they were from all three matrixes; 34 from water (most from within the metals suite), 36 from sediment (all but one from within the pesticides group), and 21 from tissue (a third from Methyl Mercury, and the rest from the pesticides group).

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 – 5982 Analyzed – 3 fell outside the range (0.05%) (does not include surrogates)
- Matrix Spike Samples – 1370 Analyzed – 91 fell outside the range (6.64%) (does not include surrogates)

Table 1. Blank Contamination Observed

Constituent	Matrix	Event Number	Lab Batch	Equip Blank	Field Blank	Lab Blank	Program Qualifier
General Water Quality							
Electrical Conductivity (umhos/cm)	Water	69	2P1813356-B			0.2	DNQ
Total Dissolved Solids (mg/L)	Water	69	2P1813383-A			7.8431	DNQ
Total Dissolved Solids (mg/L)	Water	69	2P1813495-B			10.784	DNQ
Nutrients							
Ammonia as N (mg/L)	Water	71	Physis C-39093 W		0.0207		DNQ
Ammonia as N (mg/L)	Water	72	Physis C-39106 W		0.0755		
Ammonia as N (mg/L)	Water	73	Physis C-39129 W		0.024		DNQ
Total Kjeldahl Nitrogen (mg/L)	Water	68	Associated_QC1194405_W_CON		0.244		DNQ
Metals & Selenium							
Aluminum, Dissolved (ug/L)	Water	68	Physis E-16095 W		85.2		
Aluminum, Dissolved (ug/L)	Water	73	Physis E-17064 W		10.8		
Aluminum, Total (ug/L)	Water	73	Physis E-17064 W		21		
Antimony, Dissolved (ug/L)	Water	68	Physis E-16095 W		0.254		
Arsenic, Dissolved (ug/L)	Water	68	Physis E-16095 W		0.0947		DNQ
Barium, Dissolved (ug/L)	Water	68	Physis E-16095 W		1.57		
Barium, Dissolved (ug/L)	Water	73	Physis E-17064 W		4.62		
Barium, Total (ug/L)	Water	73	Physis E-17064 W		5.29		
Chromium, Dissolved (ug/L)	Water	68	Physis E-16095 W		1.32		
Cobalt, Dissolved (ug/L)	Water	68	Physis E-16095 W		0.0548		
Copper, Dissolved (ug/L)	Water	68	Physis E-16095 W		0.533		
Copper, Dissolved (ug/l)	Water	69	W8K0942			0.34	DNQ
Iron, Dissolved (ug/L)	Water	68	Physis E-16095 W		84.6		
Iron, Total (ug/L)	Water	73	Physis E-17064 W		1.39		DNQ
Lead, Dissolved (ug/L)	Water	68	Physis E-16095 W		0.233		

Constituent	Matrix	Event Number	Lab Batch	Equip Blank	Field Blank	Lab Blank	Program Qualifier
Manganese, Dissolved (ug/L)	Water	68	Physis E-16095 W		0.489		
Nickel, Dissolved (ug/L)	Water	68	Physis E-16095 W		0.0653		
Nickel, Dissolved (ug/l)	Water	69	W8K0942			0.22	DNQ
Nickel, Dissolved (ug/l)	Water	73	W9E0694			0.05	DNQ
Selenium, Dissolved (ug/L)	Water	68	Physis E-16095 W		0.0222		DNQ
Strontium, Dissolved (ug/L)	Water	68	Physis E-16095 W		1.78		
Tin, Dissolved (ug/L)	Water	68	Physis E-16095 W		0.12		DNQ
Tin, Dissolved (ug/L)	Water	73	Physis E-17064 W		3.55		
Tin, Total (ug/L)	Water	73	Physis E-17064 W		6.23		
Titanium, Dissolved (ug/L)	Water	68	Physis E-16095 W		4.77		
Titanium, Dissolved (ug/L)	Water	73	Physis E-17064 W		0.292		DNQ
Titanium, Total (ug/L)	Water	73	Physis E-17064 W		0.458		
Vanadium, Dissolved (ug/L)	Water	68	Physis E-16095 W		0.046		DNQ
Zinc, Dissolved (ug/L)	Water	68	Physis E-16095 W		0.472		
Zinc, Dissolved (ug/l)	Water	69	W8K0942			2.24	DNQ
OC Pesticides							
None							
OP Pesticides							
Malathion, Total (ug/L)	Water	69	Physis O-20148 W		0.0225		
PCBs							
None							
Pyrethroid Pesticides							
Bifenthrin (ug/L)	Water	69	W8K0930			0.00168	DNQ
Cyfluthrin (ug/L)	Water	69	W8K0930			0.00258	
Cypermethrin (ug/L)	Water	69	W8K0930			0.00361	

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										
Total Suspended Solids (mg/L)	Water	72	Physis C-40100 W	07D_SIMI			***44***		FD RPD	Field Duplicate RPD Failed
Total Suspended Solids (mg/L)	Water	72	Physis C-40119 W	07_HITCH/ 07D_MPK		***44***	11		FD RPD	Field Duplicate RPD Failed
Nutrients										
Ammonia as N (mg/L)	Water	68	Physis C-39028 W	03_UNIV/ 05D_SANT_VCWPD	7	***47***	1	19	FD RPD	Field Duplicate RPD Failed
Ammonia as N (mg/L)	Water	68	Physis C-39028 W	07_HITCH /05D_SANT_VCWPD	7	***55***	1	19	FD RPD	Field Duplicate RPD Failed
Ammonia as N (mg/L)	Water	72	Physis C-39106 W	07_HITCH/ 9B_ADOLF	1	***31***	1	1	U	Estimated, constituent was found in blank at >1/10th concentration
Total Kjeldahl Nitrogen (mg/L)	Water	71	Associated_QC12 10642_W_CON	03_UNIV		***185***		9	FD RPD	Field Duplicate RPD Failed
Salts										
Sulfate (mg/L)	Water	68	Physis C-37110 W	9BD_ADOLF	2			***55***	EST MS/MSD	Estimate MS/MSD failed
Sulfate (mg/L)	Water	68	Physis C-37111 W	03_UNIV	6	5	2	***33***	MS <LL, EST MS/MSD	MS failed Lower Limit; Estimate MS/MSD failed
OC Pesticides										
Chlordane, alpha- (ng/dry g)	Sediment	68	Physis O-18104 W	03_UNIV/ 9A_HOWAR	5	13	***33***	3		
Chlordane, alpha-, Total (ug/L)	Water	70	Physis O-22004 W	01T_ODD2_DCH	2	***58***				

Constituent	Matrix	Event	Lab Batch	Site	BS/ BSD RPD	Field Dup RPD	Lab Dup RPD	MS/ MSD RPD	Program Qualifier	Comments
Chlordane, alpha-, Total (ug/L)	Water	70	Physis O-22004 W	10_GATE	2	***46***				
Chlordane, gamma- (ng/dry g)	Sediment	68	Physis O-18104 W	03_UNIV/ 9A_HOWAR	5	16.4	***58***	0		
DDD(o,p'), Total (ug/L)	Water	70	Physis O-22004 W	01T_ODD2_DCH	3	***51***				
DDD(p,p') (ng/dry g)	Sediment	68	Physis O-18104 W	03_UNIV/ 9A_HOWAR	4	***51***	0	1		
DDD(p,p'), Total (ug/L)	Water	69	Physis O-20148 W	01T_ODD2_DCH	2	***34***				
DDE(o,p') (ng/wet g)	Tissue	73	Physis O-21060 W	04_WOOD	2		***32***	1		
DDE(p,p') (ng/dry g)	Sediment	68	Physis O-18104 W	03_UNIV/ 9A_HOWAR	5	16	***42***	5	LD RPD	Lab Duplicate RPD Failed
DDE(p,p') (ng/wet g)	Tissue	73	Physis O-21060 W	04_WOOD	3		12	***64***	MS >UL	MS failed Upper Limit
DDE(p,p'), Total (ug/L)	Water	68	Physis O-20062 W	03_UNIV	2	***68.4***				
DDE(p,p'), Total (ug/L)	Water	72	Physis O-22122 W	07_HITCH	4	***55***				
DDE(p,p'), Total (ug/L)	Water	73	Physis O-23034 W	03_UNIV	2	***86***				
DDT(o,p') (ng/wet g)	Tissue	73	Physis O-21060 W	04_WOOD	0		***74***	1		
DDT(o,p'), Total (ug/L)	Water	72	Physis O-22122 W	04_WOOD	6	***56***				
DDT(p,p') (ng/wet g)	Tissue	73	Physis O-21060 W	04_WOOD	2		***32***	10		
DDT(p,p'), Total (ug/L)	Water	69	Physis O-20148 W	01T_ODD2_DCH	1	***140***				

Constituent	Matrix	Event	Lab Batch	Site	BS/ BSD RPD	Field Dup RPD	Lab Dup RPD	MS/ MSD RPD	Program Qualifier	Comments
DDT(p,p'), Total (ug/L)	Water	71	Physis O-22082 W	03_UNIV	1	***48***			FD RPD	Field Duplicate RPD Failed
Endrin aldehyde (ng/dry g)	Water	68	Physis O-18104 W	03_UNIV/ 9A_HOWAR	***71***	0	0	24	EST BS/BSD	Estimate BS/BSD failed
Endrin aldehyde (ng/wet g)	Water	73	Physis O-21060 W	04_WOOD	***108***		0	5	EST BS/BSD	Estimate BS/BSD failed
Nonachlor, cis, Total (ug/L)	Water	71	Physis O-22082 W	03_UNIV	2	***36***				
Nonachlor, trans, Total (ug/L)	Water	70	Physis O-22004 W	10_GATE	0	***31***				
Nonachlor, trans, Total (ug/L)	Water	71	Physis O-22084 W	13_BELT	2	***61***				
Tetrachloro-m-xylene (Surrogate), Total (%)	Water	73	Physis O-23034 W	03_UNIV	0	***80***				
PCBs										
PCB 018 (ng/wet g)	Tissue	73	Physis O-21060 W	04_WOOD	2		0	***35***	EST MS/MSD	Estimate MS/MSD failed
PCB 030 (Surrogate), Total (%)	Water	73	Physis O-23034 W	03_UNIV	0	***89***				
PCB 049, Total (ug/L)	Water	71	Physis O-22082 W	03_UNIV	4	***87***				
PCB 052 (ng/wet g)	Tissue	73	Physis O-21060 W	04_WOOD	3		***31***	3		
PCB 052, Total (ug/L)	Water	71	Physis O-22082 W	03_UNIV	2	***42***				
PCB 066, Total (ug/L)	Water	71	Physis O-22082 W	03_UNIV	0	***67***				
PCB 070, Total (ug/L)	Water	71	Physis O-22082 W	03_UNIV	4	***68***				
PCB 101 (ng/dry g)	Sediment	68	Physis O-18104 W	03_UNIV/ 9A_HOWAR	8	0	***157***	8		

Constituent	Matrix	Event	Lab Batch	Site	BS/ BSD RPD	Field Dup RPD	Lab Dup RPD	MS/ MSD RPD	Program Qualifier	Comments
PCB 101, Total (ug/L)	Water	71	Physis O-22082 W	03_UNIV	7	***31***				
PCB 110, Total (ug/L)	Water	71	Physis O-22082 W	03_UNIV	1	***46***				
PCB 112 (Surrogate), Total (%)	Water	73	Physis O-23034 W	03_UNIV	1	***91***				
PCB 138 (ng/dry g)	Sediment	68	Physis O-18104 W	03_UNIV	2	***117***				
PCB 138, Total (ug/L)	Water	71	Physis O-22082 W	03_UNIV	11	***62***				
PCB 153 (ng/dry g)	Sediment	68	Physis O-18104 W	03_UNIV/ 9A_HOWAR	1	0	***124***	3	LD RPD	Lab Duplicate RPD Failed
PCB 153 (ng/wet g)	Tissue	73	Physis O-21060 W	04_WOOD	4		8	***31***	EST MS/MSD	Estimate MS/MSD failed
PCB 153, Total (ug/L)	Water	71	Physis O-22082 W	03_UNIV	6	***54***				
PCB 158 (ng/dry g)	Sediment	68	Physis O-18104 W	03_UNIV/ 9A_HOWAR	2	***92***	0	4		
PCB 170 (ng/wet g)	Tissue	73	Physis O-21060 W	04_WOOD	2		21	***40***	EST MS/MSD	Estimate MS/MSD failed
PCB 180 (ng/wet g)	Tissue	73	Physis O-21060 W	04_WOOD	0		24	***85***	EST MS/MSD	Estimate MS/MSD failed
PCB 187 (ng/wet g)	Tissue	73	Physis O-21060 W	04_WOOD	2		17	***31***	EST MS/MSD	Estimate MS/MSD failed
PCB 194 (ng/wet g)	Tissue	73	Physis O-21060 W	04_WOOD	1		0	***40***	EST MS/MSD	Estimate MS/MSD failed
PCB 198 (Surrogate), Total (%)	Water	73	Physis O-23034 W	03_UNIV	0	***99***				
PCB 200 (ng/wet g)	Tissue	73	Physis O-21060 W	04_WOOD	4		***47***	27		

Constituent	Matrix	Event	Lab Batch	Site	BS/ BSD RPD	Field Dup RPD	Lab Dup RPD	MS/ MSD RPD	Program Qualifier	Comments
PCB 206 (ng/wet g)	Tissue	73	Physis O-21060 W	04_WOOD	8		***138***	21		
PCB 209 (ng/wet g)	Tissue	73	Physis O-21060 W	04_WOOD	2		0	***39***	EST MS/MSD	Estimate MS/MSD failed
PCB-1260 (Aroclor 1260), Total (ug/L)	Water	71	Physis O-22082 W	03_UNIV		***83***				
OP Pesticides										
Chlorpyrifos (ng/dry g)	Sediment	68	Physis O-18104 W	03_UNIV/ 9A_HOWAR	9	7	***36***	14		
Chlorpyrifos, Total (ug/L)	Water	69	Physis O-20148 W	10_GATE	4	***80***				
Chlorpyrifos, Total (ug/L)	Water	71	Physis O-22082 W	03_UNIV	1	***63***			FD RPD	Field Duplicate RPD Failed
Chlorpyrifos, Total (ug/L)	Water	72	Physis O-22122 W	07_HITCH	1	***80***			FD RPD	Field Duplicate RPD Failed
Demeton-o (ug/L)	Water	69	W8K0847	10D_HILL				***35***		
Demeton-s (ng/dry g)	Sediment	68	Physis O-18104 W	03_UNIV/ 9A_HOWAR	1	0	0	***44***	EST MS/MSD	Estimate MS/MSD failed
Demeton-s, Total (ug/L)	Water	70	Physis O-22004 W	01T_ODD2_DCH	***31***	***44***			EST BS/BSD, FD RPD	Field Duplicate RPD Failed
Diazinon, Total (ug/L)	Water	70	Physis O-22004 W	01T_ODD2_DCH	5	***42***			FD RPD	Field Duplicate RPD Failed
Malathion, Total (ug/L)	Water	70	Physis O-22004 W	10_GATE	3	***178***				
Methidathion (ng/dry g)	Sediment	68	Physis O-18104 W	03_UNIV/ 9A_HOWAR	2	0	0	***38***	MS <LL, EST MS/MSD	MS failed Lower Limit; Estimate MS/MSD failed

Constituent	Matrix	Event	Lab Batch	Site	BS/ BSD RPD	Field Dup RPD	Lab Dup RPD	MS/ MSD RPD	Program Qualifier	Comments
Phorate (ng/dry g)	Sediment	68	Physis O-18104 W	03_UNIV/ 9A_HOWAR	1	0	0	***57***	MS <LL, EST MS/MSD	MS failed Lower Limit; Estimate MS/MSD failed
Partical Size Distribution										
Clay (%)	Sediment	68	Physis P-1096b W	03_UNIV/02_PCH		***196***	0			
Granule (%)	Sediment	68	Physis P-1096b W	03_UNIV/02_PCH		***199***	0			
Silt (%)	Sediment	68	Physis P-1096b W	03_UNIV/02_PCH		***199***	6			
Pyrethroid Pesticides										
Bifenthrin, Total (ug/L)	Water	68	Physis O-20062 W	03_UNIV	7	***37.4***				
Bifenthrin, Total (ug/L)	Water	70	Physis O-22004 W	01T_ODD2_DCH	4	***38***			FD RPD	Field Duplicate RPD Failed
Bifenthrin, Total (ug/L)	Water	71	Physis O-22084 W	13_BELT	16	***33***			FD RPD	Field Duplicate RPD Failed
Cyfluthrin, total, Total (ug/L)	Water	70	Physis O-22004 W	10_GATE	0	***41***			FD RPD	Field Duplicate RPD Failed
Cyfluthrin, total, Total (ug/L)	Water	71	Physis O-22082 W	03_UNIV	6	***126***			FD RPD	Field Duplicate RPD Failed
Cypermethrin, total, Total (ug/L)	Water	70	Physis O-22004 W	01T_ODD2_DCH	8	***195***				
Cypermethrin, total, Total (ug/L)	Water	71	Physis O-22082 W	03_UNIV	7	***181***			FD RPD	Field Duplicate RPD Failed
Danitol, Total (ug/L)	Water	69	Physis O-20148 W	01T_ODD2_DCH	4	***65***				
Danitol, Total (ug/L)	Water	70	Physis O-22004 W	01T_ODD2_DCH	11	***44***			FD RPD	Field Duplicate RPD Failed
Deltamethrin, Total (ug/L)	Water	73	Physis O-23034 W	03_UNIV	***32***	0			EST BS/BSD	Estimate BS/BSD failed
L-Cyhalothrin, Total (ug/L)	Water	70	Physis O-22004 W	01T_ODD2_DCH	2	***196***				

Constituent	Matrix	Event	Lab Batch	Site	BS/ BSD RPD	Field Dup RPD	Lab Dup RPD	MS/ MSD RPD	Program Qualifier	Comments
Permethrin, cis-, Total (ug/L)	Water	73	Physis O-23006 W	LABQA	***35***				EST BS/BSD	Estimate BS/BSD failed
Permethrin, trans-, Total (ug/L)	Water	70	Physis O-22004 W	01T_ODD2_DCH	***67***	0			EST BS/BSD	Estimate BS/BSD failed
Prallethrin (ng/dry g)	Sediment	68	Physis O-18104 W	03_UNIV/ 9A_HOWAR	16	0	0	***54***	MS <LL, EST MS/MSD	MS failed Lower Limit; Estimate MS/MSD failed
Metals and Selenium										
Aluminum, Dissolved (ug/L)	Water	69	Physis E-16132 W	01T_ODD2_DCH/ 07D_SIMI		***42***	29	3		
Aluminum, Dissolved (ug/L)	Water	70	Physis E-16148 W	01T_ODD2_DCH/ 03_UNIV		***62***	4	2		
Antimony, Dissolved (ug/L)	Water	72	Physis E-17029 W	04_WOOD/ 03_UNIV		***86***	6	1	FD RPD	Field Duplicate RPD Failed
Beryllium, Dissolved (ug/L)	Water	71	Physis E-17010 W	03_UNIV/ 9BD_GERRY		***35***	6	1		
Boron, Total (ug/L)	Water	71	Physis E-17009 W	03_UNIV/ 9BD_ADOLF	3	15	***86***	1	FD RPD	Field Duplicate RPD Failed
Cadmium, Dissolved (ug/L)	Water	72	Physis E-17029 W	04_WOOD/ 03_UNIV		***31***	14	2		
Calcium, Total (mg/L)	Water	72	Physis E-17028 W	04_WOOD	0	0	0	***40***		
Chromium, Dissolved (ug/L)	Water	71	Physis E-17010 W	03_UNIV/ 9BD_GERRY		***36***	3	1	FD RPD	Field Duplicate RPD Failed
Chromium, Total (ug/L)	Water	71	Physis E-17010 W	03_UNIV/ 9BD_GERRY	2	***36***	1		FD RPD	Field Duplicate RPD Failed
Copper, Total (ug/L)	Water	71	Physis E-17010 W	03_UNIV/ 9BD_GERRY	1	***46***	0		FD RPD	Field Duplicate RPD Failed
Iron, Dissolved (ug/L)	Water	70	Physis E-16147 W	02_PCH			***34***		MS >UL	MS failed Upper Limit
Iron, Total (ug/L)	Water	71	Physis E-17010 W	03_UNIV/ 9BD_GERRY	1	***108***	3		FD RPD	Field Duplicate 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 (ug/L)	Water	68	Physis E-16095 W	03_UNIV		***77***	1	0	U, FD RPD	Estimated, constituent was found in blank at >1/5th concentration; Field Duplicate RPD Failed
Lead, Dissolved (ug/L)	Water	72	Physis E-17029 W	04_WOOD/ 03_UNIV		***48***	4	1		
Lead, Total (ug/L)	Water	71	Physis E-17010 W	03_UNIV/ 9BD_GERRY	0	***36***	2		FD RPD	Field Duplicate RPD Failed
Mercury, Dissolved (ug/L)	Water	68	Physis E-15055 W	03_UNIV		***111***				
Mercury, Total (ug/L)	Water	68	Physis E-15055 W	03_UNIV/ 01_RR_BR	4	***145***	1	7	FD RPD	Field Duplicate RPD Failed
Silver, Dissolved (ug/L)	Water	69	Physis E-16141 W	01_RR_BR			***61***			
Thallium, Dissolved (ug/L)	Water	69	Physis E-16133 W	9BD_GERRY			***32***	1		
Thallium, Total (ug/L)	Water	71	Physis E-17010 W	03_UNIV	1	***47***				
Tin, Dissolved (ug/L)	Water	68	Physis E-16095 W	03_UNIV	2	***32***	23	0	U	Estimated, constituent was found in blank at >1/5th concentration
Tin, Dissolved (ug/L)	Water	69	Physis E-16132 W	01T_ODD2_DCH/ 07D_SIMI		0	***39***	2		
Tin, Dissolved (ug/L)	Water	73	Physis E-17064 W	03_UNIV/ 9BD_ADOLF		***67***	0	1	U	Estimated, constituent was found in blank at >1/5th concentration
Vanadium, Total (ug/L)	Water	71	Physis E-17010 W	03_UNIV/ 9BD_GERRY	0	***54***	1		FD RPD	Field Duplicate RPD Failed

Constituent	Matrix	Event	Lab Batch	Site	BS/ BSD RPD	Field Dup RPD	Lab Dup RPD	MS/ MSD RPD	Program Qualifier	Comments
Zinc, Dissolved (ug/L)	Water	71	Physis E-17010 W	03_UNIV/ 9BD_GERRY		2	11	***84***	MS >UL, EST MS/MSD	MS failed Upper Limit; Estimate MS/MSD failed
Zinc, Total (ug/L)	Water	71	Physis E-17010 W	03_UNIV/ 9BD_GERRY	0	***46***	1		FD RPD	Field Duplicate RPD Failed

EST BS/BSD = Estimated due to Blank Spike/Blank Spike Duplicate RPD failure.
EST MS/MSD = Estimated due to Matrix Spike/Matrix Spike Duplicate RPD failure
FD RPD = Field Duplicate Relative Percent Difference failure
LD RPD = Lab Duplicate Relative Percent Difference failure
MS <LL = Matrix spike recovery was below the Lower Limit of the acceptance range
MS >UL = Matrix spike recovery was above the Upper Limit of the acceptance range

Table 3. Accuracy QA/QC Issues

Constituent	Matrix Name	Event Number	LabBatch	LCL	UCL	LCS	LCSD	MS	MSD	Comments
General Water Quality										
None										
Salts										
Chloride (mg/L)	Water	68	Physis C-37110 W	82	114	98	98	***122***	***128***	MS failed Upper Limit
Chloride (mg/L)	Water	68	Physis C-37111 W	51	147	93	91			
Chloride (mg/L)	Water	68	Physis C-37111 W	82	114			112	106	
Sulfate (mg/L)	Water	68	Physis C-37110 W	77	134	108	106	***140***	80	MS failed Upper Limit, Estimate due to MS/MSD RPD failure
Sulfate (mg/L)	Water	68	Physis C-37111 W	77	134	107	101	***72***	100	MS failed Lower Limit, Estimate due to MS/MSD RPD failure
Nutrients										
Ammonia as N (mg/dry kg)	Sediment	68	Physis C-39027 W	78	121	98	97	84	***77***	MS failed Lower Limit
Total Kjeldahl Nitrogen (mg/L)	Water	72	Associated_QC1200237 _W_CON	80	120	88		***77***	***77***	
OC Pesticides										
Chlordane, gamma- (ng/wet g)	Tissue	73	Physis O-21060 W	70	135	93	90	***50***	***64***	MS failed Lower Limit
DDD(p,p') (ng/wet g)	Tissue	73	Physis O-21060 W	46	154	93	93	141	***178***	MS failed Upper Limit
DDE(p,p') (ng/wet g)	Tissue	73	Physis O-21060 W	44	148	91	88	***772***	***1492***	MS failed Upper Limit
Endosulfan I (ng/dry g)	Sediment	68	Physis O-18104 W	21	114	***20***	26	***14***	***17***	MS failed Lower Limit

Constituent	Matrix Name	Event Number	LabBatch	LCL	UCL	LCS	LCSD	MS	MSD	Comments
Endosulfan I (ng/wet g)	Tissue	73	Physis O-21060 W	0	162	49	60	***16951***	***21514***	MS failed Upper Limit
Endosulfan II (ng/dry g)	Sediment	68	Physis O-18104 W	47	117	***33***	***33***	***36***	***34***	MS failed Lower Limit
Methoxychlor (ng/dry g)	Sediment	68	Physis O-18104 W	42	128	***151***	***164***	***135***	***135***	MS failed Upper Limit
Perthane (ng/dry g)	Sediment	68	Physis O-18104 W	63	133	127	***134***	***138***	***137***	MS failed Upper Limit
PCBs										
PCB 003 (ng/wet g)	Tissue	73	Physis O-21060 W	65	153	89	88	128	***156***	MS failed Upper Limit
PCB 037 (ng/wet g)	Tissue	73	Physis O-21060 W	57	137	99	93	***453***	***528***	MS failed Upper Limit
PCB 066 (ng/wet g)	Tissue	73	Physis O-21060 W	52	141	98	95	***173***	***195***	MS failed Upper Limit
PCB 149 (ng/wet g)	Tissue	73	Physis O-21060 W	39	140	93	91	***18***	***15***	MS failed Lower Limit
PCB 153, Total (ug/L)	Water	73	Physis O-23006 W	70	120	116	***122***			
PCB 153, Total (ug/L)	Water	73	Physis O-23006 W	70	120	116	***122***			
OP Pesticides										
Dichlorvos (ug/L)	Water	69	W8K0847	42	137	***138***		***144***	***147***	
Disulfoton (ng/dry g)	Sediment	68	Physis O-18104 W	25	125			27	***20***	MS failed Lower Limit
Fensulfothion (ng/dry g)	Sediment	68	Physis O-18104 W	50	150	80	81	***151***	***153***	MS failed Upper Limit
Merphos (ug/L)	Water	69	W8K0847	3	181	***205***		***206***	180	
Methidathion (ng/dry g)	Sediment	68	Physis O-18104 W	50	150	110	112	***17***	***25***	MS failed Lower Limit, Estimate due to MS/MSD RPD failure

Constituent	Matrix Name	Event Number	LabBatch	LCL	UCL	LCS	LCSD	MS	MSD	Comments
Parathion, Methyl (ng/dry g)	Sediment	68	Physis O-18104 W	50	150	143	141	***158***	***154***	MS failed Upper Limit
Phorate (ng/dry g)	Sediment	68	Physis O-18104 W	50	150	93	92	***5***	***9***	MS failed Lower Limit, Estimate due to MS/MSD RPD failure
Phosmet (ng/dry g)	Sediment	68	Physis O-18104 W	50	150	124	130	***46***	***42***	MS failed Lower Limit
Tetrachlorvinphos (ng/dry g)	Sediment	68	Physis O-18104 W	50	150	150	144	***159***	***157***	MS failed Upper Limit
PAHs										
None										
Pyrethroid Pesticides										
Cyfluthrin, total (ng/dry g)	Sediment	68	Physis O-18104 W	50	150	70	64	***33***	***30***	MS failed Lower Limit
Cypermethrin, total (ng/dry g)	Sediment	68	Physis O-18104 W	50	150	69	63	***33***	***30***	MS failed Lower Limit
Deltamethrin (ng/dry g)	Sediment	68	Physis O-18104 W	50	150	59	53	***14***	***12***	MS failed Lower Limit
Esfenvalerate (ng/dry g)	Sediment	68	Physis O-18104 W	50	150	59	55	***22***	***19***	MS failed Lower Limit
Fenvalerate (ng/dry g)	Sediment	68	Physis O-18104 W	50	150	61	56	***26***	***23***	MS failed Lower Limit
Fluvalinate (ng/dry g)	Sediment	68	Physis O-18104 W	50	150	59	56	***20***	***18***	MS failed Lower Limit
Prallethrin (ng/dry g)	Sediment	68	Physis O-18104 W	50	150	75	88	***0***	***1***	MS failed Lower Limit, Estimate due to MS/MSD RPD failure
Metals and Selenium										
Barium, Dissolved (ug/L)	Water	70	Physis E-16148 W	90	120			***168***	***172***	

Constituent	Matrix Name	Event Number	LabBatch	LCL	UCL	LCS	LCSD	MS	MSD	Comments
Beryllium, Dissolved (ug/L)	Water	70	Physis E-16148 W	86	118			112	***119***	
Calcium, Total (mg/L)	Water	72	Physis E-17028 W	85	115	100	100	***135***	90	
Iron, Dissolved (ug/L)	Water	70	Physis E-16148 W	65	134			***868***	***925***	
Manganese, Dissolved (ug/L)	Water	70	Physis E-16148 W	83	125			124	***126***	
Mercury, Methyl, Total (ng/wet g)	Tissue	73	F905326_T_	70	130	72	71	***60***	***68***	
Mercury, Methyl, Total (ng/wet g)	Tissue	73	F905326_T_	65	130	72	71	***62***	***57***	MS failed Lower Limit
Mercury, Methyl, Total (ng/wet g)	Tissue	73	F905326_T_	65	130	72	71	***52***	***47***	MS failed Lower Limit
Mercury, Methyl, Total (ng/wet g)	Tissue	73	F905326_T_	65	130	72	71	***59***	***49***	MS failed Lower Limit
Molybdenum, Dissolved (ug/L)	Water	70	Physis E-16148 W	79	133			***200***	***210***	
Selenium, Dissolved (ug/L)	Water	70	Physis E-16148 W	77	144			140	***145***	
Silver, Dissolved (ug/L)	Water	72	Physis E-17027 W	52	115			***49***	52	
Sodium, Total (mg/L)	Water	72	Physis E-17028 W	75	125	99	100	***140***	***140***	
Strontium, Dissolved (ug/L)	Water	68	Physis E-16095 W	75	125			***132***	123	MS failed Upper Limit
Strontium, Dissolved (ug/L)	Water	69	Physis E-16133 W	75	125			***72***	***74***	MS failed Lower Limit
Strontium, Dissolved (ug/L)	Water	70	Physis E-16148 W	75	125			***369***	***386***	
Strontium, Dissolved (ug/L)	Water	72	Physis E-17029 W	75	125			***127***	***135***	
Strontium, Dissolved (ug/L)	Water	73	Physis E-17064 W	75	125			***60***	***50***	MS failed Lower Limit

Constituent	Matrix Name	Event Number	LabBatch	LCL	UCL	LCS	LCSD	MS	MSD	Comments
Vanadium, Dissolved (ug/L)	Water	70	Physis E-16148 W	96	126			126	***129***	
Zinc, Dissolved (ug/L)	Water	71	Physis E-17010 W	85	132			***267***	109	

LCL = Lower Control Limit
UCL = Upper Control Limit
MS = Matrix Spike
MSD = Matrix Spike Duplicate
LCS = Laboratory Control Spike
LCSD = Laboratory Control Spike Duplicate

DECEMBER 2019

CALLEGUAS CREEK WATERSHED TMDL COMPLIANCE MONITORING PROGRAM

ELEVENTH YEAR ANNUAL MONITORING REPORT JULY 2018 TO JUNE 2019

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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Table of Contents

List of Tables

List of Figures

Appendices – Text Documents

Attachments – Electronic Documents

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
NR	Not Required
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 eleventh-year monitoring efforts and results of the Calleguas Creek Watershed (CCW) Total Maximum Daily Load (TMDL) Compliance Monitoring Program (CCWTMP), conducted between July 2018 and June 2019. This annual report includes information for the sampling events completed per the current Quality Assurance Project Plan (QAPP), summaries of collected data, water quality data analysis, and TMDL waste load allocation (WLA)/load allocation (LA) exceedance.

TOTAL MAXIMUM DAILY LOADS

There are six TMDLs currently effective and being implemented in the CCW. 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. Over time the original QAPP has been revised to incorporate newly adopted TMDLs, reflect changing field conditions, and include changes recommended in previous annual monitoring reports. The QAPP currently addresses monitoring requirements for the Nitrogen, OC Pesticides, Toxicity, Metals, and Salts TMDLs. The Trash TMDL is addressed through a separate Trash Monitoring and Reporting Plan and annual reports submitted separately to the Regional Water Board.

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:

[1] Information related to the Revolon Slough and Beardsley Wash Trash TMDL is not part of this report. The Trash TMDL annual report is submitted separately to the Regional Water Board by January 28th, annually.

- **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 Ventura County 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, California Department of Transportation, and the California Department of Parks and Recreation[2].

MONITORING EVENT SUMMARIES

Sampling events required by the Nitrogen, OC Pesticides, Toxicity, Metals, and Salts TMDLs during the eleventh year of TMDL monitoring included four dry-weather events (Events 68, 69, 72, 73) and two wet weather events (Events 70 and 71). Grab samples for salts were obtained during these events but were not used directly to determine compliance at receiving water sites.[3] A summary of Events 68 through 73 is included in **Table ES-1**.

Table ES-1. Summary of Year 11 Monitoring Events

Event	Type	Date	Mugu Lagoon			Freshwater Sites		
			Water Quality[1]	Sediment Quality & Toxicity[2]	Tissue[2]	Water Quality & Toxicity	Sediment Quality & Toxicity	Tissue
68	Dry	Aug-18	X			X	X	
69	Dry	Nov-18	X			X		
70	Storm	Nov-18	X			X		
71	Storm	Jan-19	X			X		
72	Dry	Mar-19	X			X		
73	Dry	May-19	X			X		X

1. Mugu Lagoon water quality testing is limited to monitoring site 01_RR_BR per CCWTMP QAPP Revision 3, submitted December 2014.
2. Mugu Lagoon sediment quality, sediment toxicity, and tissue samples are collected every three years. Samples were not collected as part of the Year 11 Annual Report.

RECEIVING WATERS STATUS BY TMDL

The CCW TMDLs were written so that compliance is evaluated on a reach basis (Nitrogen) or by subwatershed (OC Pesticides, Metals Toxicity, Salts), per receiving water compliance site data. The following table is provided as a way of looking at the various TMDLs and the status in attaining applicable load and wasteload allocations, with the goal of acknowledging where progress has been made and where additional focus is needed. Individual Stakeholders are

[2] The California Department of Parks and Recreation joined the Stakeholder group in July 2018.

[3] 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.

working through their various permitting mechanisms with a focus on their individual compliance, however, this is a way to take a general view of the greater watershed and subwatersheds compared to progress expectations at this point in time.

The table expresses allocation achievement status in the following ways:

- ✓ Applicable interim or final allocation consistently met
- o Applicable interim or final allocation typically exceeded
- • Applicable interim or final allocation occasionally exceeded
- ❖ Load allocation met but wasteload allocation exceeded
- No applicable allocation for this subwatershed

Table ES-2. TMDL Allocation Attainment Status by Subwatershed

TMDL	Constituent	Subwatershed					
		Mugu	Calleguas	Revolon	Las Posas	Arroyo Simi	Conejo
Final Allocations Effective							
Nitrogen	Ammonia-N	✓	✓	✓	✓	✓	✓
	Nitrate-N	•	•	o	✓	✓	✓
	Nitrite-N	✓	✓	✓	✓	✓	✓
	Nitrate-N + Nitrite-N	•	•	o	•	✓	✓
Toxicity	Chlorpyrifos (dry)	•	•	✓	✓	✓	✓
	Chlorpyrifos (storms)	✓	✓	o	✓	✓	✓
	Diazinon (dry)	✓	✓	✓	✓	✓	✓
	Diazinon (storms)	✓	✓	✓	✓	✓	✓
Interim Allocations Effective							
OC Pesticides	4,4'-DDD (sediment)	✓	✓	✓	✓	✓	✓
(Final date 2026)	4,4'-DDE (sediment)	✓	✓	✓	✓	✓	✓
	4,4'-DDT (sediment)	✓	✓	✓	✓	✓	✓
	Total Chlordane (sediment)	✓ [2]	✓ [2]	✓ [2]	✓ [2]	✓ [2]	✓ [2]
	Dieldrin (sediment)	✓ [1]	✓ [1]	✓ [1]	✓ [1]	✓ [1]	✓ [1]
	PCBs (sediment)	✓ [1]	✓ [1]	✓ [1]	✓ [1]	✓ [1]	✓ [1]
	Toxaphene (sediment)	✓	✓	✓	✓	✓	✓
Metals	Total Copper (storms and dry)	(1)	✓ [1]	✓ [2]	(1)	(1)	(1)
(Final date 2022)	Total Mercury (annual load)	(2)	✓ [2]	✓ [2]	(2)	(2)	(2)
	Total Nickel (dry)	(1)	✓ [1]	✓ [2]	(1)	(1)	(1)
	Total Selenium (dry)			o			
Salts	Total Dissolved Solids (dry)		✓	❖		✓	✓
(Final date 2023)	Chloride (dry)		✓	✓		✓	✓
	Sulfate (dry)		✓	❖		✓	✓
	Boron (dry)			❖		✓	

1. Final TMDL targets are being attained in these reaches ahead of the TMDL schedule.
2. Final TMDL targets are only occasionally exceeded in these reaches.

MONITORING PROGRAM CHANGES

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 2018-2019 monitoring year was conducted per the revised QAPP.

In August 2018, during the first monitoring event of year 11, construction activities were observed at the monitoring site 04D_VENTURA. This is an urban land use site in the City of Camarillo. It was determined that a stretch of the stormwater channel is being enclosed directly up and downstream of the existing monitoring location. A new sampling site, 04D_SPRINGVILLE was selected to replace 04D_VENTURA for the remainder of the year 11 monitoring period. This site has been permanently relocated approximately 0.6 miles downstream from the original site, but still within the City of Camarillo's urban area.

The Stakeholders have submitted TMDL receiving water data to the California Environmental Data Exchange Network (CEDEN) going back to the beginning of the monitoring program in 2008. TMDL receiving water monitoring data will continue to be uploaded for future monitoring events, as well.

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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 responsible parties that make up the Stakeholders Implementing TMDLs in the CCW (Stakeholders) established a CCW TMDL Compliance Monitoring Program (CCWTMP) and developed a Quality Assurance Project Plan (QAPP) for approval by the Los Angeles Regional Water Quality Control Board (Regional Water Board) Executive Officer. The original QAPP covered monitoring for only the Nitrogen, OC Pesticides, Toxicity, and Metals TMDLs. 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.

Over time, the original QAPP has been revised to incorporate newly adopted TMDLs, reflect changing field conditions, and include changes recommended in previous annual monitoring reports. 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.

The primary purpose of this report is to document the eleventh year monitoring efforts (July 2018 to June 2019) 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 comparison to applicable TMDL allocations and targets. The report is divided into the following sections:

- Introduction and Program Background
- Monitoring Program Structure

[1] Information related to the Revolon Slough and Beardsley Wash Trash TMDL is not part of this report. The Trash TMDL annual report is submitted to the Regional Water Board annually by January 28th.

- Monitoring Data Summary
- Exceedance Evaluation and Discussion
- Revisions and Recommendations

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: Salts Rating Curves and Surrogate Relationships
    - Appendix C: Toxicity Testing and Toxicity Identification Evaluations Summary
    - Appendix D: 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 2018 to June 2019
    - 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, the California Department of Parks and Recreation, 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.

The Stakeholders contracted implementation of the CCWTMP with the following contractors to perform the eleventh year monitoring effort:

- **General Project Management** - Larry Walker Associates, Inc. (LWA)
- **Field Monitoring Activities**
    - **Freshwater Water Quality/Sediment Sampling** - Kinnetic Laboratories, Inc. (KLI), Fugro West, Inc. (Fugro), LWA
    - **Freshwater Fish Tissue** – ICF Jones and Stokes, Inc.
- **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 management activities and sampling efforts covered by this annual report. This list of contractors will be amended in each report to reflect contractors used for the work performed.

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.

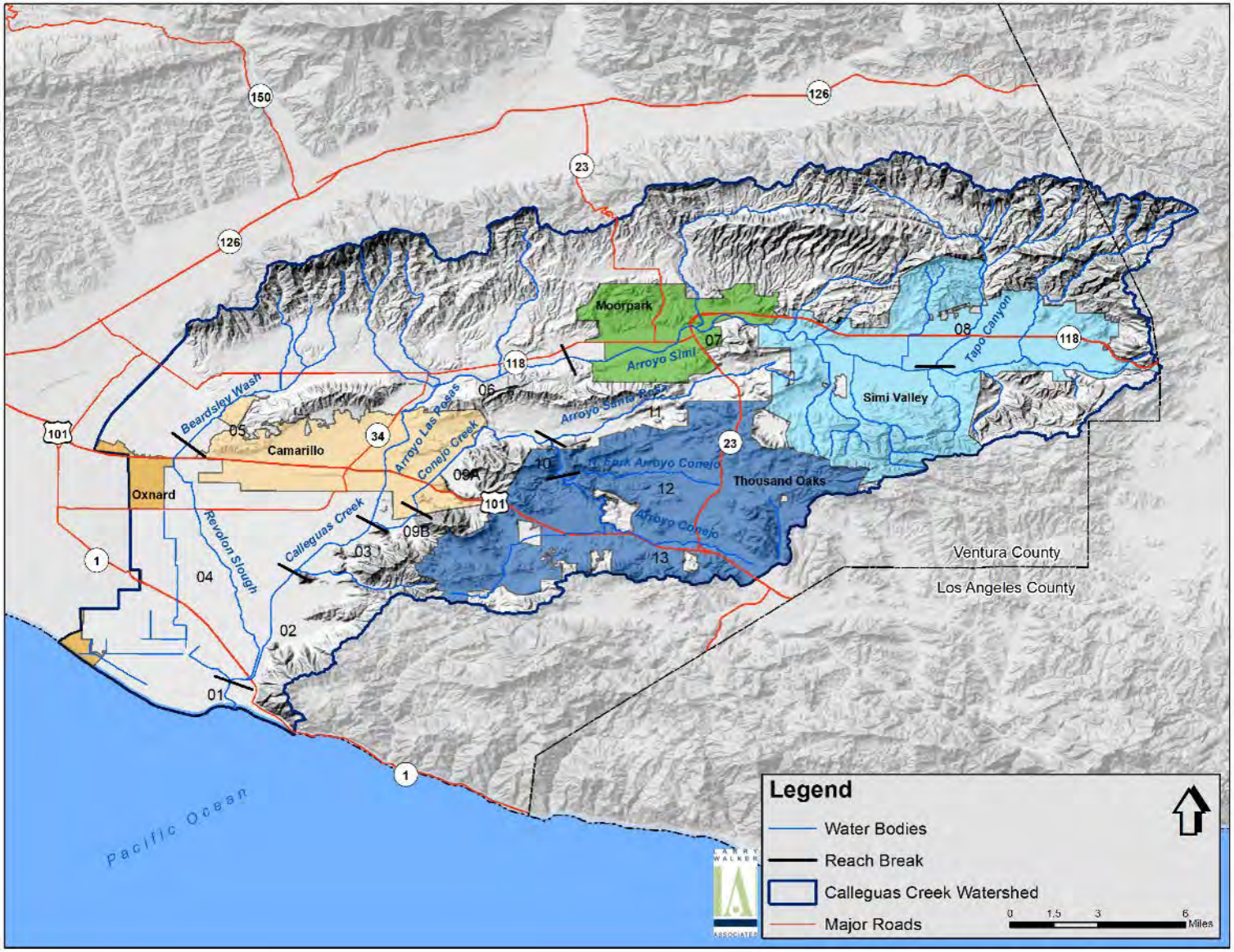


Figure 1. Calleguas Creek Watershed

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, wasteload 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;
- Salt compounds in water and continuous flow in dry weather (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 Pesticides [3], and Pyrethroid Pesticides [4]	
Metals and Selenium In Water	Quarterly + Two wet events [6]
Copper, Mercury, Nickel, Zinc, and Selenium [5]	
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) Other sites: Quarterly + Two wet events
Chronic Sediment Toxicity	Annually (Every three years in Lagoon)
General Sediment Quality Constituents (GSQC)	Annually (Every three years in Lagoon)
Total Ammonia, Percent Moisture, Grain Size Analysis, Total Organic Carbon (TOC)	
Organic Constituents In Sediment	Annually (Every three years in Lagoon)
OC Pesticides[1] and PCBs[2], OP Pesticides[3], and Pyrethroids[4]	

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

Constituent	Frequency
Additional Constituents For Mugu Lagoon Sediment	Every three years
Metals[7]	
Tissue	Annually (Every three years in Lagoon)
Percent Lipids, OC Pesticides[1] and PCBs[2], OP Pesticides[3], and Metals[8]	

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 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. Pyrethroid Pesticides considered: bifenthrin, cyfluthrin, cypermethrin, deltamethrin, and permethrin
5. Copper, mercury, nickel, selenium and zinc will be measured as dissolved and total recoverable.
6. Monitoring at sites in Mugu Lagoon other than at the Ronald Reagan Street Bridge Site (01_RR_BR) for metals is an optional element.
7. Includes arsenic, cadmium, copper, lead, mercury, nickel, selenium and zinc.
8. Total mercury and selenium will be measured in bird eggs and methyl mercury and total selenium will be measured in fish tissue.

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 can provide supplemental data to meet general program goals and answer program questions. **Table 3** also provides a general sampling frequency for each constituent group, should optional monitoring be conducted.

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

Constituent	Frequency[5]
Organic Constituents in Water – Grain Size Fractions [1]	One wet event annually
OC Pesticides and PCBs, OP, and Pyrethroid Pesticides	
Organic Constituents in Sediment – Grain Size Fractions [1]	Annually (Every three years in Mugu Lagoon)
OC Pesticides and PCBs, OP, and Pyrethroid Pesticides	
Additional Constituents for Mugu Lagoon Sediment	Every three years [2]
Macrobenthic community assessment	
Sediment Toxicity – *Eohaustorius estuaries* and *Mytilus galloprovincialis*	
PCBs[3] and PAHs[4]	

1. Please see Table 2 for a list of individual constituents in each suite.
2. Mugu Lagoon assessments were conducted during the first, fourth, seventh, and tenth monitoring years.
3. PCBs considered: 2,4'-Dichlorobiphenyl, 2,2',5-Trichlorobiphenyl, 2,4,4'-Trichlorobiphenyl, 2,2',3,5'-Tetrachlorobiphenyl, 2,2',5,5'-Tetrachlorobiphenyl, 2,3',4,4'-Tetrachlorobiphenyl, 2,2',4,5,5'-Pentachlorobiphenyl, 2,3,3',4,4-Pentachlorobiphenyl, 2,3',4,4',5-Pentachlorobiphenyl, 2,2',3,3',4,4'-Hexachlorobiphenyl, 2,2',3,4,4',5'-Hexachlorobiphenyl, 2,2',4,4',5,5'-Hexachlorobiphenyl, 2,2',3,3',4,4',5-Heptachlorobiphenyl, 2,2',3,4,4',5,5'-Heptachlorobiphenyl, 2,2',3,4',5,5',6-Heptachlorobiphenyl, 2,2',3,3',4,4',5,6-Octachlorobiphenyl, 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl, Decachlorobiphenyl
4. PAHs considered: 1-Methylnaphthalene, 1-Methylphenanthrene, 2,6-Dimethylnaphthalene, 2-Methylnaphthalene, Acenaphthene, Anthracene, Biphenyl, Fluorene, Naphthalene, Phenanthrene, Benz(a)anthracene, Benzo(a)pyrene, Benzo(e)pyrene, Chrysene, Dibenz(a,h)anthracene, Fluoranthene, Perylene, Pyrene.
5. Optional monitoring related to grain size fractions was not performed during the 11th monitoring year. Additional Mugu Lagoon Sediment monitoring was last completed in year 10.

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 analyzed 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. The specific target constituents for each of the previously mentioned TMDLs are listed as footnotes 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. 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 and **Appendix C**.

In-stream water column grab samples for salts were collected quarterly during dry weather and twice during wet weather at the base of each of the subwatersheds specified in the Salts TMDL. 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 comparison to the wasteload allocations presented in the Toxicity, OC Pesticides, Metals, and Salts TMDL BPAs. Currently, POTWs collect data required by each of their individual permits. 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 year eleven, the first storm sampled on November 29, 2018 and the second on January 15, 2019.

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 and were not collected in the eleventh year monitoring effort, having been most recently collected during year ten.

Fish tissue samples are also collected annually in the freshwater portion of the watershed. These samples were collected during year eleven in April 2019 and will continue to be collected annually for the CCWTMP. As with sediment samples, fish tissue samples in Mugu Lagoon were not collected during the eleventh year monitoring efforts. Such samples are collected every three years and were previously collected and reported in year ten of the monitoring program.

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 identified data gaps, 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, nutrients (at agricultural land use sites only), metals, salts, and target organic constituents (constituents monitored per site varies based upon sub-watershed).

Optional Toxicity Investigation

This optional monitoring element includes two sites for water toxicity investigation monitoring and two sites for sediment toxicity investigation monitoring. The annual sampling frequency, constituents analyzed and sites for the toxicity investigation are provided in **Table 6**.

SAMPLING SITES

The QAPP details the justification and rationale for each of the sites sampled via the CCWTMP. Information on compliance monitoring sites and land use sites sample collection frequency is presented in **Table 4** and **Table 5**, respectively. 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 and can be found in previous monitoring reports for the years in which such data was collected.

Optional 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 monthly 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 Optional 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	NA	NA	NA	NA	NA	NA
Calleguas	02_PCH	2	Calleguas Creek NE side of Hwy 1 Bridge	34.1119	-119.0818	NA	NA	6	6	NA	NA	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	NA	4	NA	4	NA	NA	NA	NA	NA
	9A_HOWAR [7]	9B [7]	Conejo Creek at Howard Road Bridge	34.1931	-119.0025	NA	NA	NA	NA	6	NA	NA	NA	NA	NA	NA
	9AD_CAMA [7]	9B [7]	Camarillo Water Reclamation Plant	34.1938	-119.0017	4	4	NA	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
	10D_HILL	10	Hill Canyon Wastewater Treatment Plant	34.2113	-118.9218	4	4	NA	4	4	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

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]
Las Posas	06_UPLAND[8]	6	Arroyo Las Posas upstream of Upland Road	34.2449	-118.0051	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	NA	NA	NA	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
	07D_SIMI	7	Simi Valley Water Quality Control Plant	34.2848	-118.8128	4	4	NA	4	4	4	NA	NA	NA	NA	NA

NA – Not Analyzed

Bolded sites indicate the site was selected for optional nutrient investigation sampling.

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 or measured 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 B).
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 as the primary toxicant has already been identified.
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.
8. In Year 8, sampling crews were unable to access the 06_SOMIS site. Due to the loss of access, 06_SOMIS was replaced with 06_UPLAND, which is approximately one mile downstream.

Table 5. CCWTMP Land Use Monitoring Sites and Sample Frequency

Sub-Wat.	Site ID	Reach	Site Type [1]	Site Location	GPS Coordinates Lat	GPS Coordinates Long	Pests/ PCBs	Nutrients	Metal	Salts	GWQC
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	6	6
	04D_SPRINGVILLE [5]	4	Urban	Camarillo Hills Drain, North side of channel off of Wood Rd on Camarillo Airport.	34.215389	-119.07925	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_MPK [3]	7	Urban	Gabbert Canyon Drain, N. side of 118	34.2790	-118.9056	6	NA	NA	6	6
	07D_SIM_BUS [4]	7	Urban	Bus Canyon Dr N. of 5th St and LA Ave intersection	34.2719	-118.7837	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.
3. In Year 8, site 07D_MPK replaced 07D_CTP to correspond with the Moorpark MS4 outfall sampling location.
4. In Year 8, site 07D_SIM_BUS replaced 07T_DC_H to correspond with the Simi Valley MS4 outfall sampling location.
5. In Year 11, site 04D_SPRINGVILLE replaced 04D_VENTURA due to the construction and enclosure of the storm channel at the original monitoring site.

Table 6. Optional Toxicity Investigation Monitoring Sites and Potential Sampling Frequency

Subwatershed	Site ID	Reach	Site Location	GPS Coordinates		Tox	Pests/PCBs	GWQC
				Lat	Long			
Sediment Toxicity Investigation [1]								
Calleguas	02_PCH	2	Calleguas Creek Northeast Side Of Highway 1 Bridge	34.1119	-119.0818	1	1	1
	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	6	6	6
	13_BELT	13	Conejo Creek South Fork Behind Hill Canyon Belt Press Building	34.2078	-118.9194	6	6	6

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 toxicity investigation sampling frequency when this optional monitoring takes place.
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.

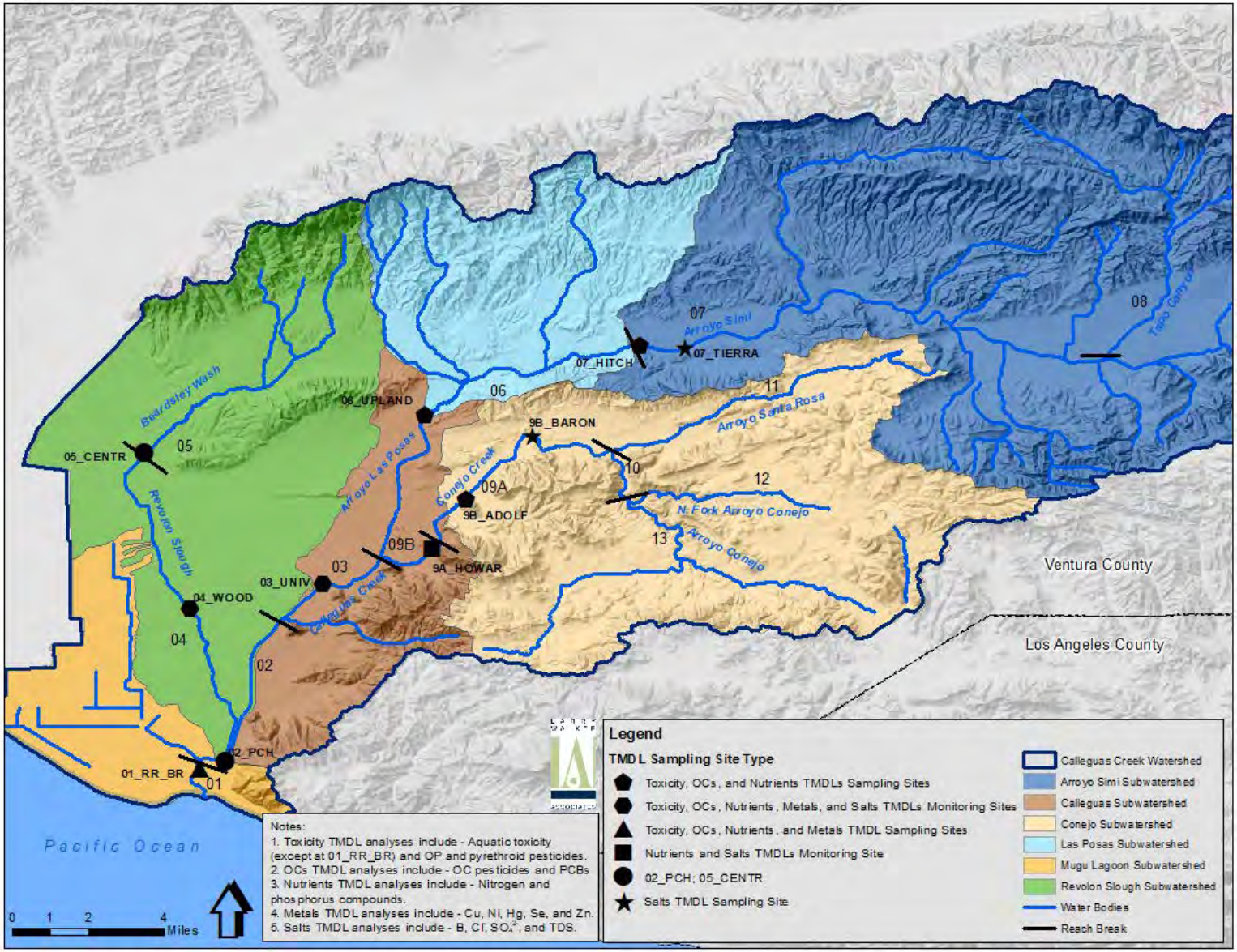


Figure 2. CCWTMP Compliance Monitoring Sampling Sites – Receiving Water

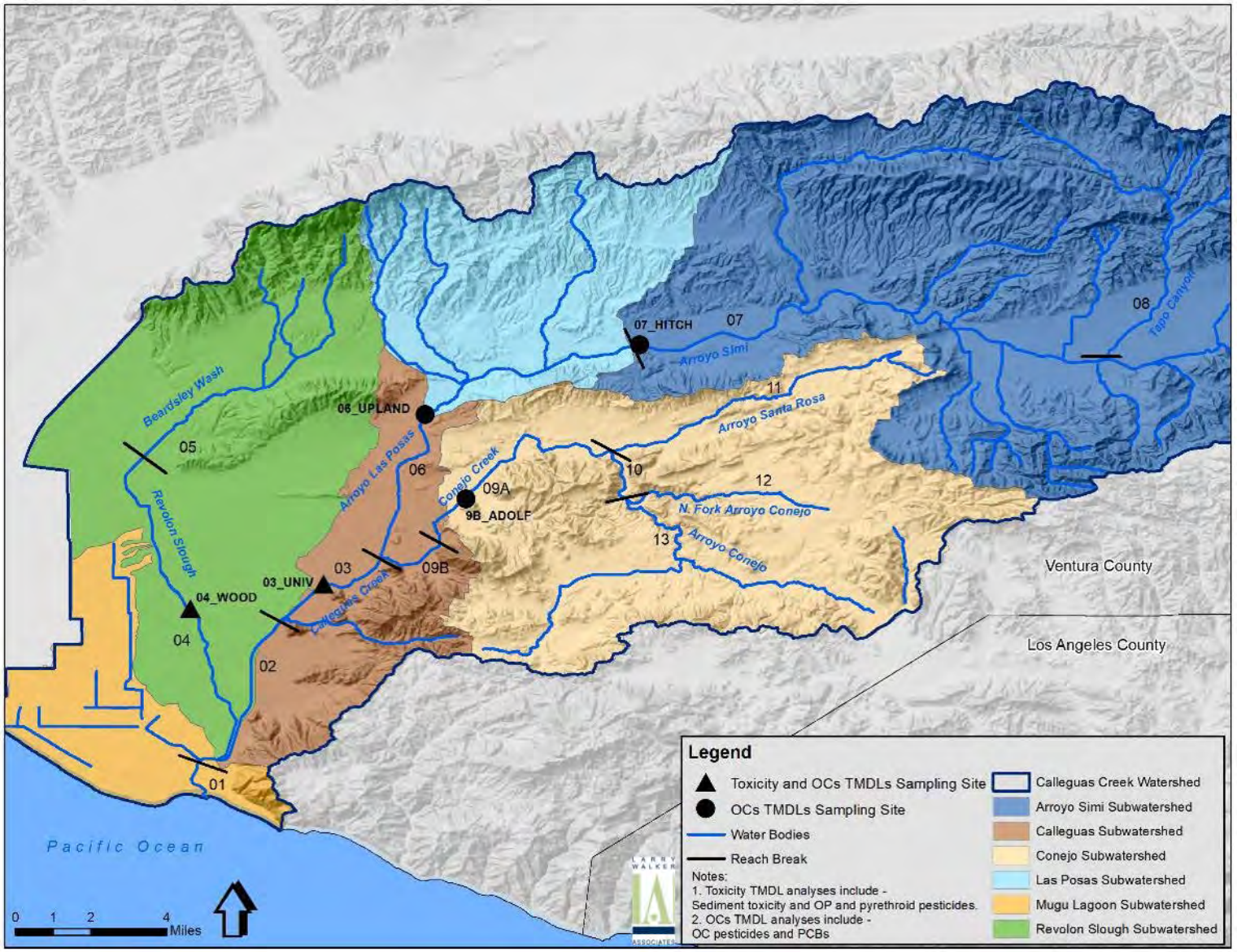


Figure 3. CCWMTP Compliance Monitoring Receiving Water Sampling Sites – Freshwater Sediment

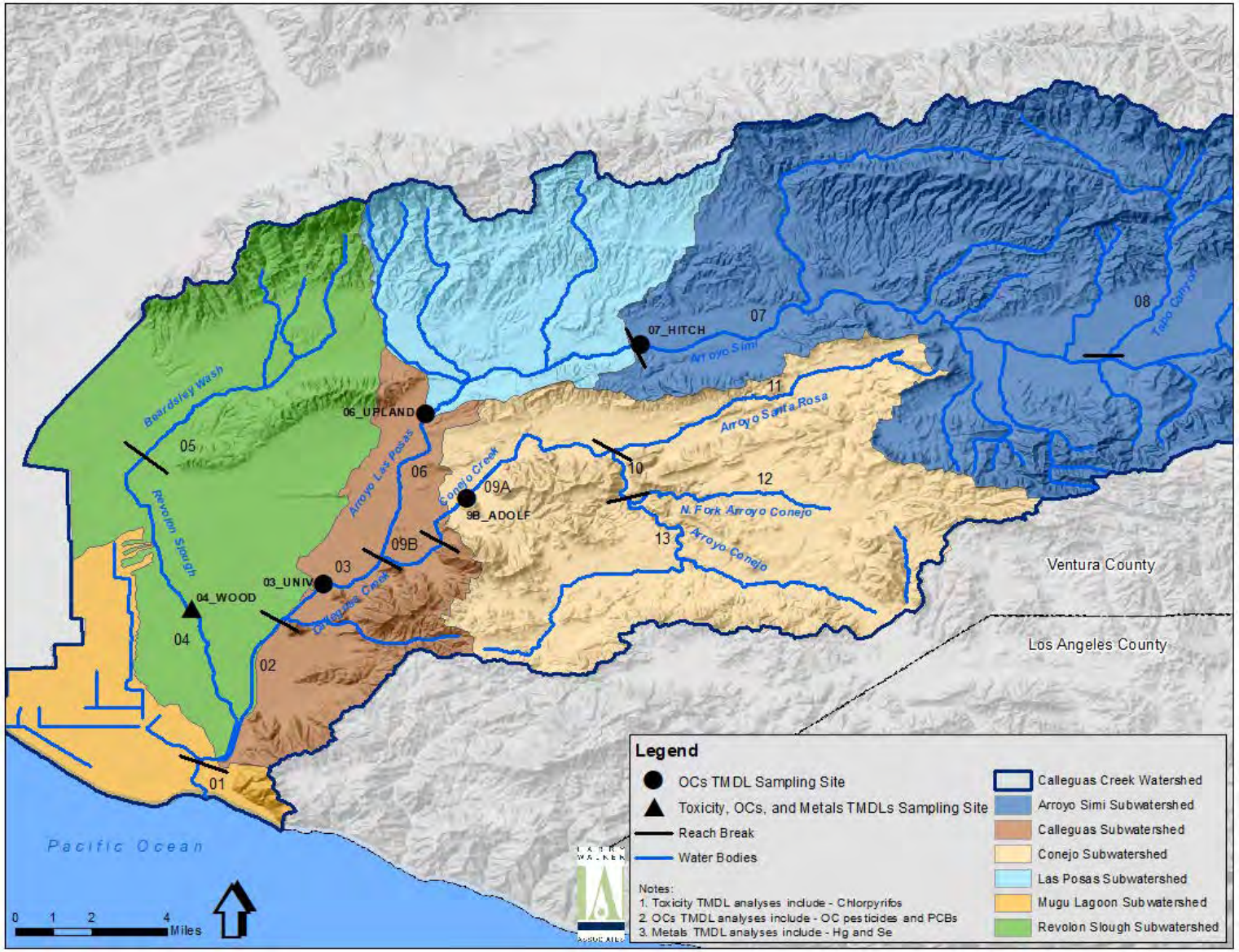


Figure 4. CCWMTP Compliance Monitoring Sampling Sites – Freshwater Fish Tissue

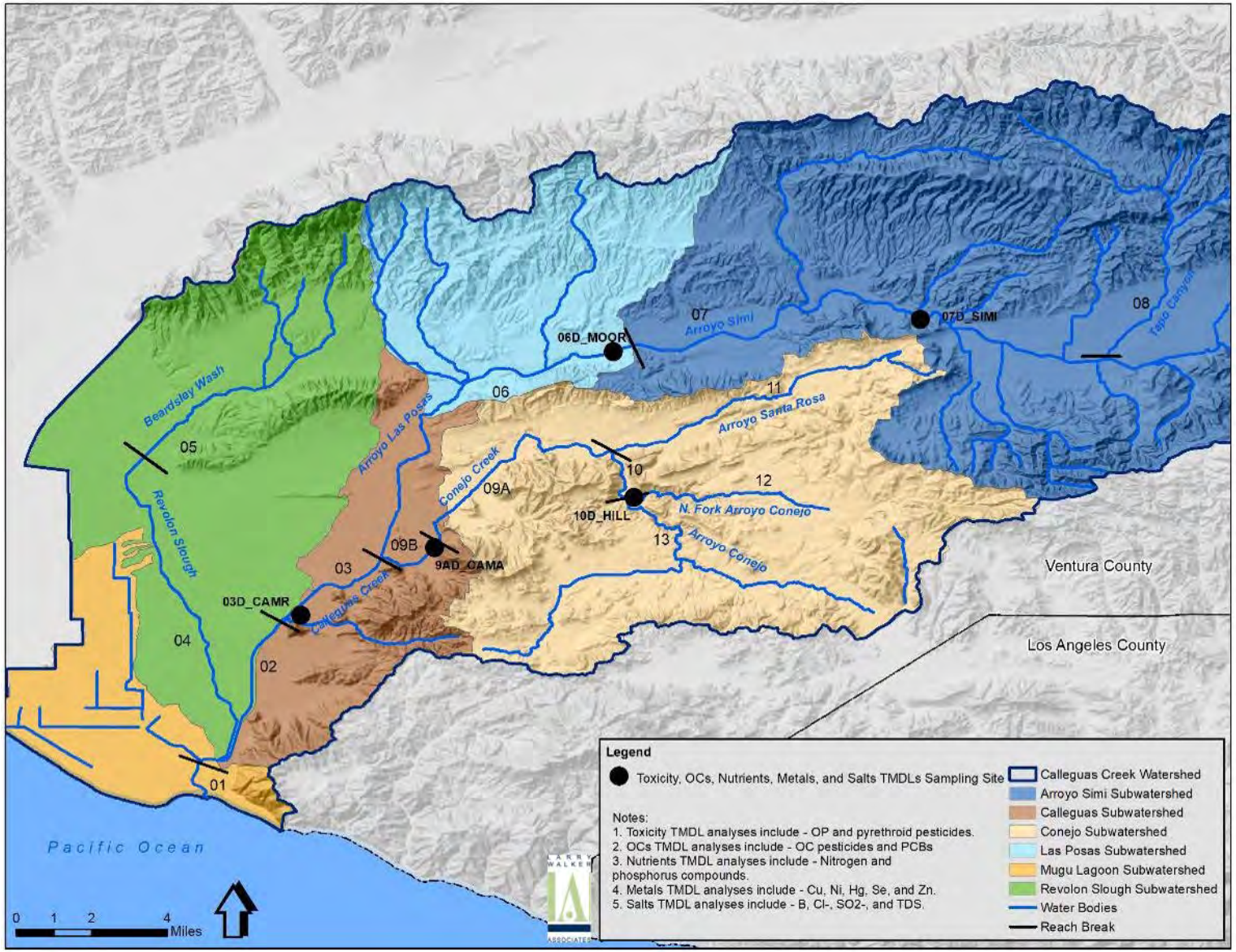


Figure 5. CCWMTP Compliance Monitoring Sampling Sites – POTW Effluent

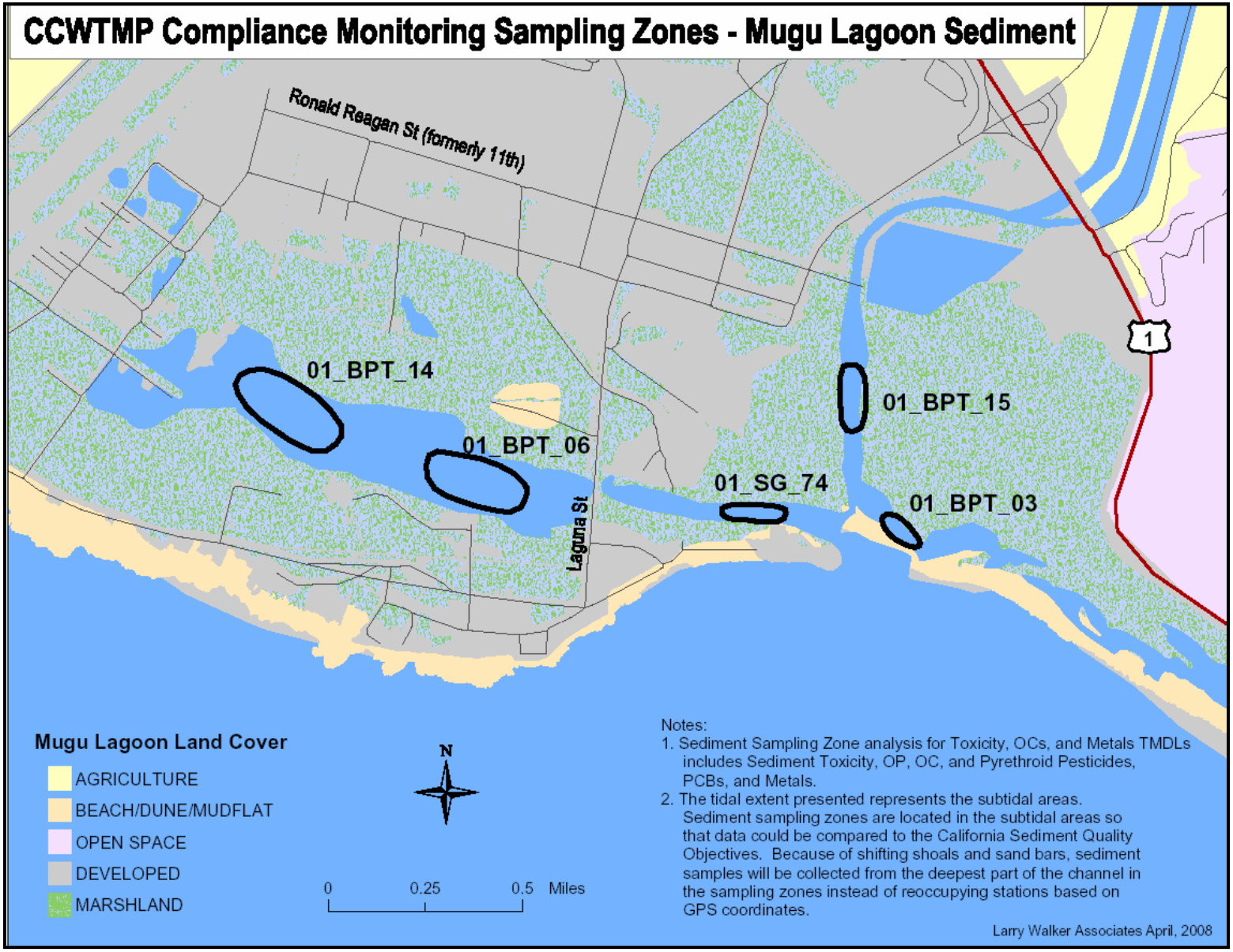


Figure 6. CCWMTP Compliance Monitoring Sampling Zones – Mugu Lagoon Sediment

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

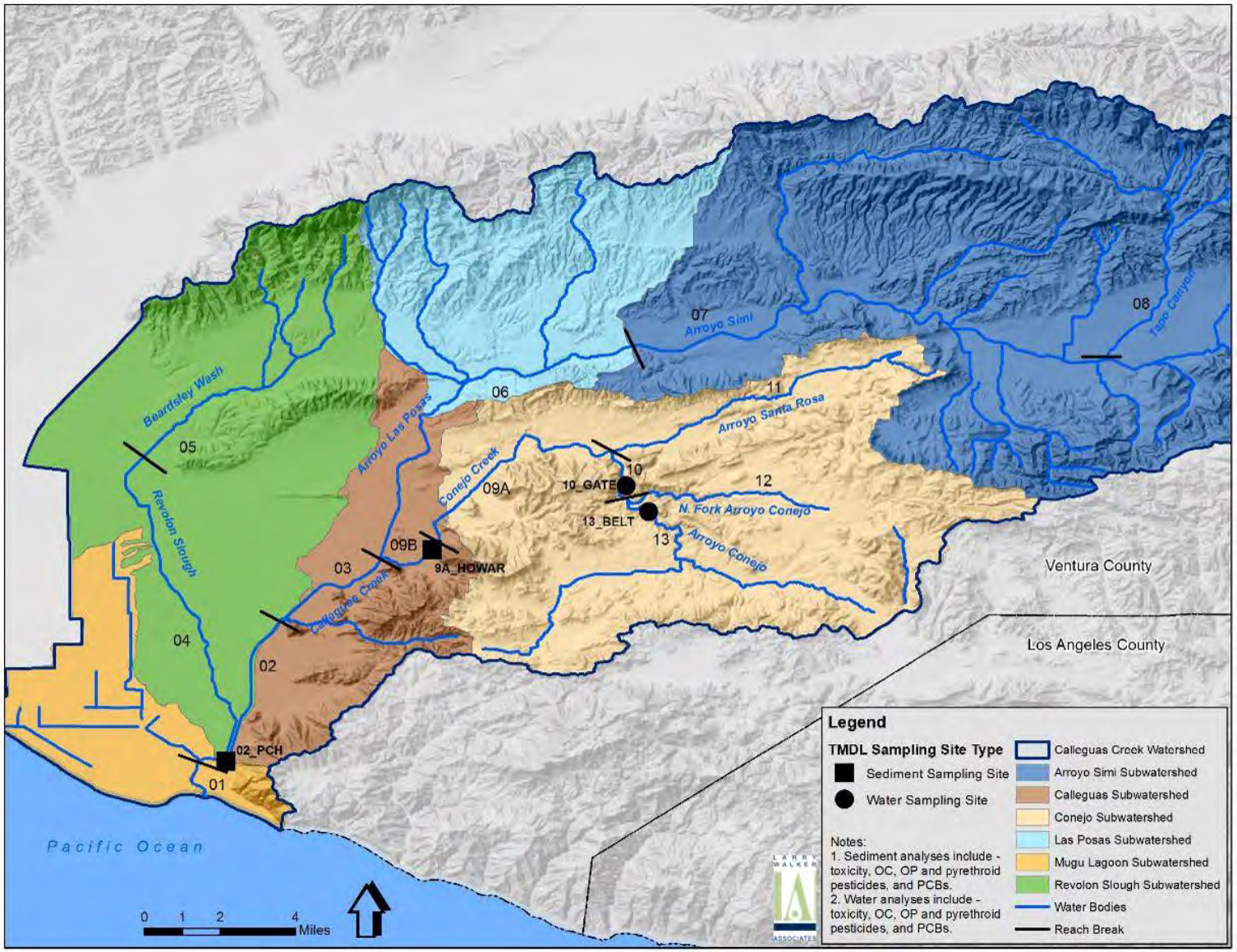


Figure 8. CCWTMP Optional Toxicity Investigation Receiving Water Sampling Sites – Water and Sediment

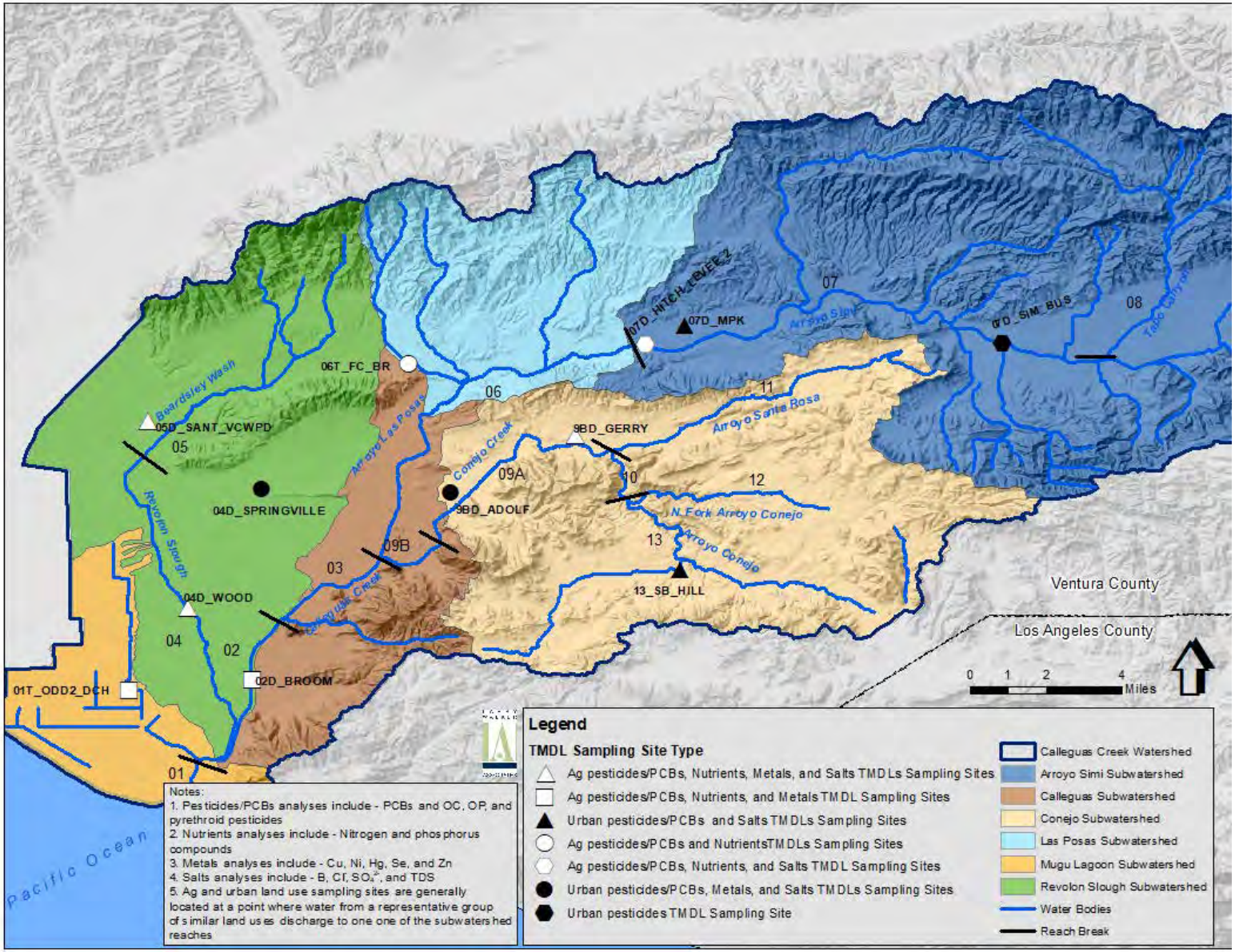


Figure 9. CCWTMP Land Use Sampling Sites

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 eleven, 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 (2008-2019). This was done to allow for easy comparison between recent data and what have been collected overall. The eleventh 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 variable number of samples per site each monitoring year and to preserve the species information associated with each sample.

Toxicity data and TIE results are summarized in **Appendix C**. Summaries for each of the 2018-2019 monitoring events are included as **Appendix A**.

Some TMDL constituents were never, or are rarely detected 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 (eight detects, none this year)
- Endosulfan I (three detects, none this year)
- BHC, gamma (three detects, none this year)
- Total PCBs (five detects, none 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[2]	06_UPLAND
Arroyo Simi	Reach 7	07_HITCH
		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.
2. In Year 8site 06_UPLAND replaced 06_SOMIS due to access issues. 06_UPLAND is approximately one mile downstream of 06_SOMIS..

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

Urban Land Use (MS4) Sites:	
Reach 4	04D_VENTURA[2]
Reach 4	04D_SPRINGVILLE
Reach 7	07D_MPK
Reach 7	07D_SIM_BUS
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.
2. In 2018, construction of a culvert led to the loss of access to 04D_VENTURA. The site was replaced with 04D_SPRINGVILLE.

OC PESTICIDES TMDL DATA SUMMARY

The following figures present OC pesticides data in both water and sediment. Presently, only the POTWs have wasteload allocations 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. Data collected during year eleven, 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 (2008-2019). This was done to allow for easy comparison between recent data and what have been collected overall.

The eleventh year data are presented in tabular form below each box plot. Bolded values in the tables within each figure indicate the concentration was above the applicable allocations 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.

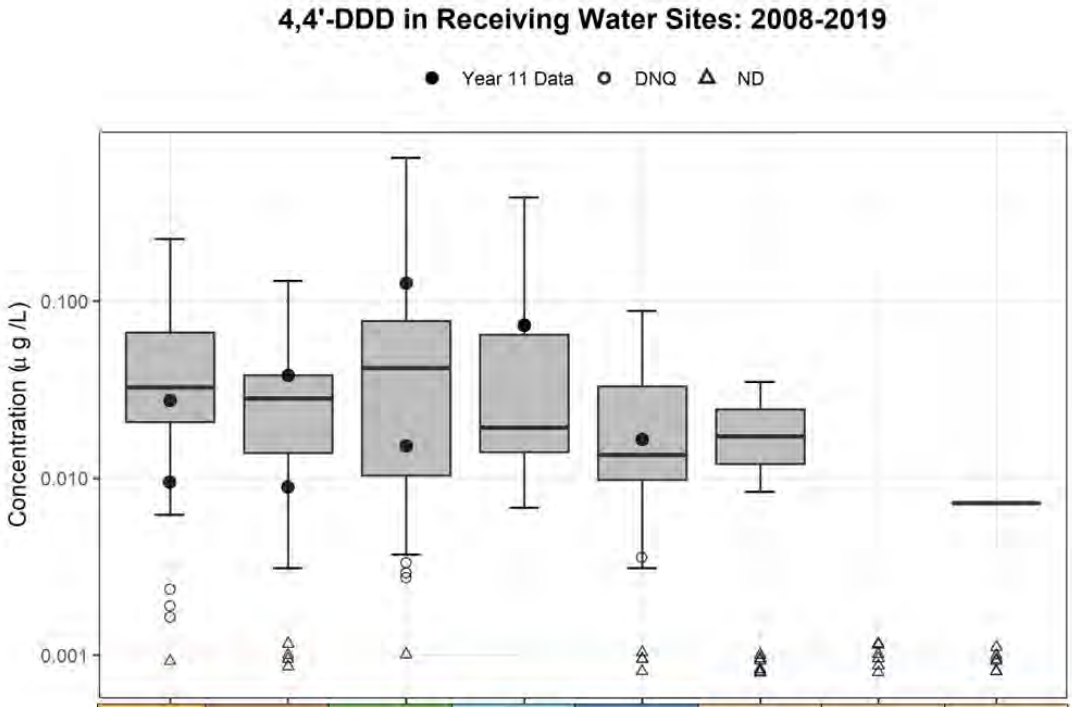
Table 9 shows a summary of monitoring events for the OC Pesticides TMDL receiving water monitoring sites, and **Table 10** shows a summary of monitoring events for OC Pesticides TMDL land use monitoring sites. For both tables, shaded cells indicate sites that were not sampled in accordance with the QAPP, values identifies as "x" in the tables indicate that samples were collected at this site, and values identified as "Dry" indicate that samples were not collected at this site due to dry conditions.

Table 9. OC Pesticides TMDL Receiving Water Monitoring Site Event Summary - Year 11

Subwatershed	Reach	Site ID	Year 11 Events					
			68	69	70	71	72	73
			18-Aug	18-Nov	18-Nov	19-Jan	19-Feb	19-May
Mugu Lagoon	Reach 1	01_BPT_14						
		01_BPT_15						
		01_BPT_3						
		01_BPT_6						
		01_RR_BR	x	x	x	x	x	x
		01_SG_74						
Calleguas	Reach 2	02_PCH						
	Reach 3	03_UNIV	x	x	x	x	x	x
	Reach 9B	9A_HOWAR						
Revolon Slough	Reach 4	04_WOOD	x	x	x	x	x	x
	Reach 5	05_CENTR						
Las Posas	Reach 6	06_UPLAND	Dry	Dry	x	x	Dry	Dry
Arroyo Simi	Reach 7	07_HITCH	x	x	x	x	x	x
		07_TIERRA						
Conejo	Reach 9A	9B_ADOLF	x	x	x	x	x	x
	Reach 9A	9B_BARON						
	Reach 10	10_GATE	x	x	x	x	x	x
	Reach 12	12_PARK						
	Reach 13	13_BELT	x	x	x	x	x	x

Table 10. OC Pesticides TMDL Land Use Monitoring Site Event Summary - Year 11

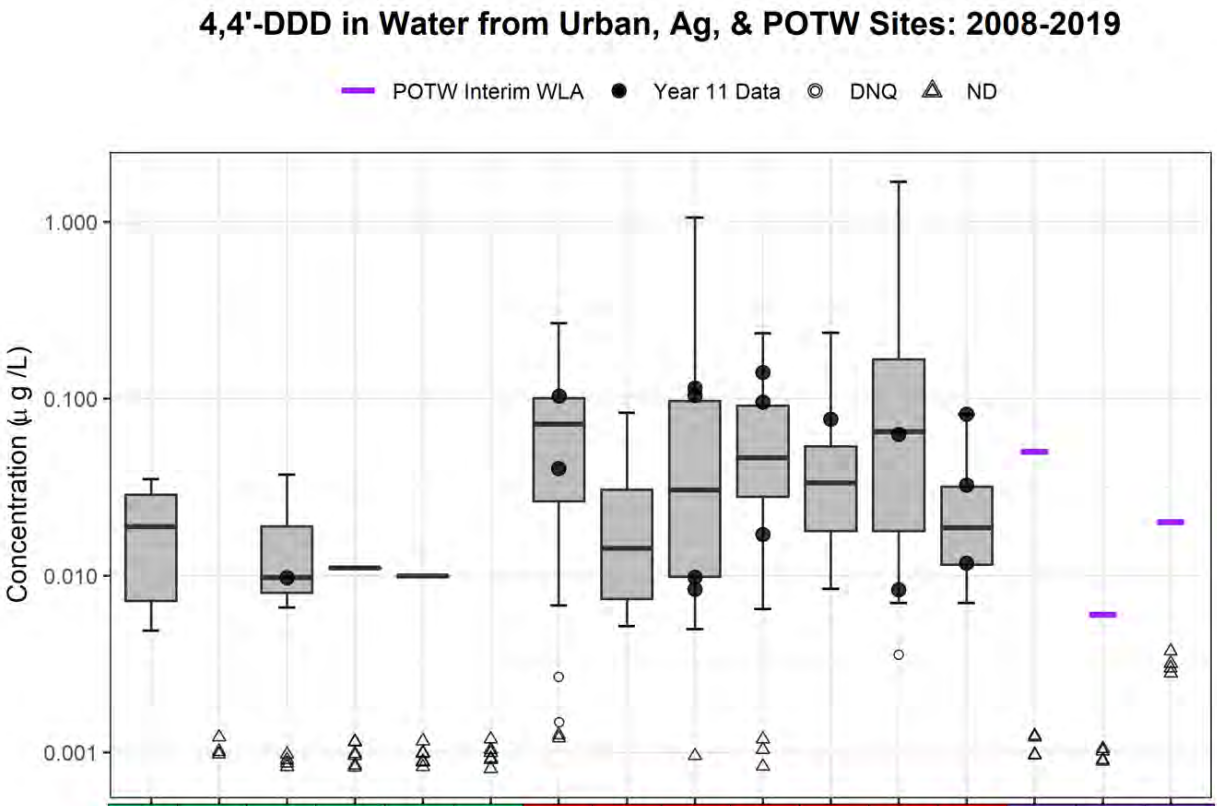
Land Use Type	Reach	Site ID	Year 11 Events					
			68	69	70	71	72	73
			18-Aug	18-Nov	18-Nov	19-Jan	19-Feb	19-May
Urban (MS4) Sites	Reach 4	04D_VENTURA	Dry	Dry	Dry			
	Reach 4	04D_SPRINGVILLE				x	x	x
	Reach 7	07D_MPK	Dry	x	x	x	x	x
	Reach 7	07D_SIM_BUS	x	x	x	x	x	x
	Reach 9A	9BD_ADOLF	x	x	x	x	x	x
	Reach 13	13_SB_HILL	x	x	x	x	x	x
Agriculture Sites	Reach 1	01T_ODD2_DCH	x	x	x	x	x	x
	Reach 2	02D_BROOM	Dry	Dry	Dry	Dry	Dry	Dry
	Reach 4	04D_WOOD	Dry	x	x	x	x	x
	Reach 5	05D_SANT_VCWPD	x	x	x	x	x	x
	Reach 6	06T_FC_BR	Dry	Dry	Dry	x	Dry	Dry
	Reach 7	07D_HITCH_LEVEE_2	Dry	Dry	x	x	x	Dry
	Reach 9A	9BD_GERRY	Dry	x	x	x	Dry	Dry
POTW Sites	Reach 7	07D_SIMI	x	x			x	x
	Reach 9B	9AD_CAMA	x	x			x	x
	Reach 10	10D_HILL	x	x			x	x



Date	Type	Event	01_RR_BR	03_UNIV	04_WOOD	06_UPLAND1	07_HITCH	9B_ADOLF	10_GATE	13_BELT
Aug-18	Dry	68	0.009	<0.001	*0.003*	--	<0.001	<0.001	<0.001	<0.001
Nov-18	Dry	69	*0.001*	<0.001	*0.002*	--	<0.001	<0.001	<0.001	<0.001
Nov-18	Storm	70	<0.001	0.008	0.015	0.072	*0.003*	<0.001	<0.001	<0.001
Jan-19	Storm	71	0.027	0.038	0.127	0.073	0.016	<0.001	<0.001	<0.001
Mar-19	Dry	72	*0.002*	<0.001	*0.002*	--	<0.001	<0.001	<0.001	<0.001
May-19	Dry	73	*0.001*	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001

1. Access to 06_SOMIS was revoked during Year 8 and was replaced by 06_UPLAND in Year 9. All collected data prior to event 56 were obtained from 06_SOMIS. This footnote applies to all boxplots with 06_UPLAND.

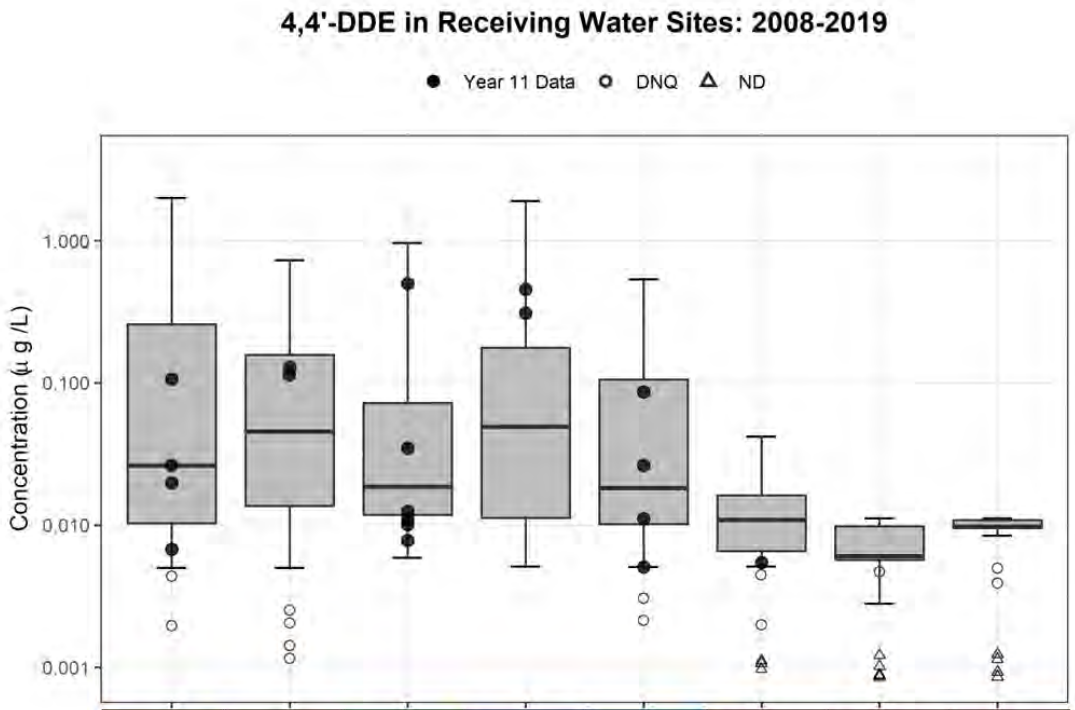
Figure 10. 4,4'-DDD Water Column Concentrations in Receiving Water Sites: 2008-2019



Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE[1]	07D_MPK	07D_SIM_BUS	9BD_ADOLF	13_SB_HILL	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-18	Dry	68	--	--	--	<0.001	<0.001	<0.001	<0.001	--	--	<0.001	--	--	--	<0.001	<0.001	<0.003
Nov-18	Dry	69	--	--	<0.001	<0.001	<0.001	<0.001	*0.002*	--	0.008	<0.001	--	--	0.032	<0.001	<0.001	<0.003
Nov-18	Storm	70	--	--	<0.001	<0.001	<0.001	<0.001	0.040	--	0.115	0.095	--	0.008	0.011	--	--	--
Jan-19	Storm	71	--	<0.001	0.009	<0.001	<0.001	<0.001	0.104	--	0.104	0.141	0.077	0.063	0.081	--	--	--
Mar-19	Dry	72	--	<0.001	<0.001	<0.001	<0.001	<0.001	*0.001*	--	0.009	<0.001	--	*0.003*	--	<0.001	<0.001	<0.003
May-19	Dry	73	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001	0.017	--	--	--	<0.001	<0.001	<0.003

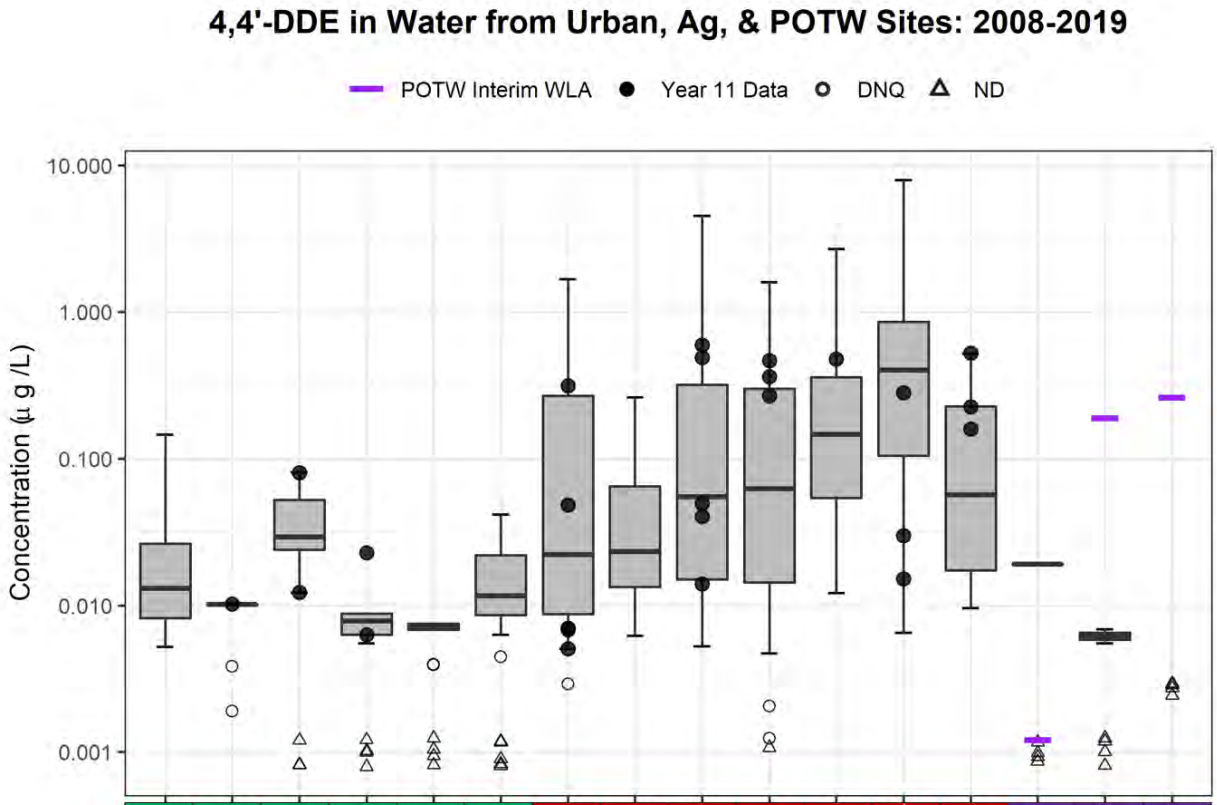
1. Access to 04D_VENTURA was lost after Event 70 and eventually was replaced by 04D_SPRINGVILLE in Year 11. All collected data prior to event 70 were obtained from 04D_VENTURA. This footnote applies to all boxplots with 04D_SPRINGVILLE.

Figure 11. 4,4'-DDD Water Column Concentrations in Urban, Ag, and POTW Sites: 2008-2019



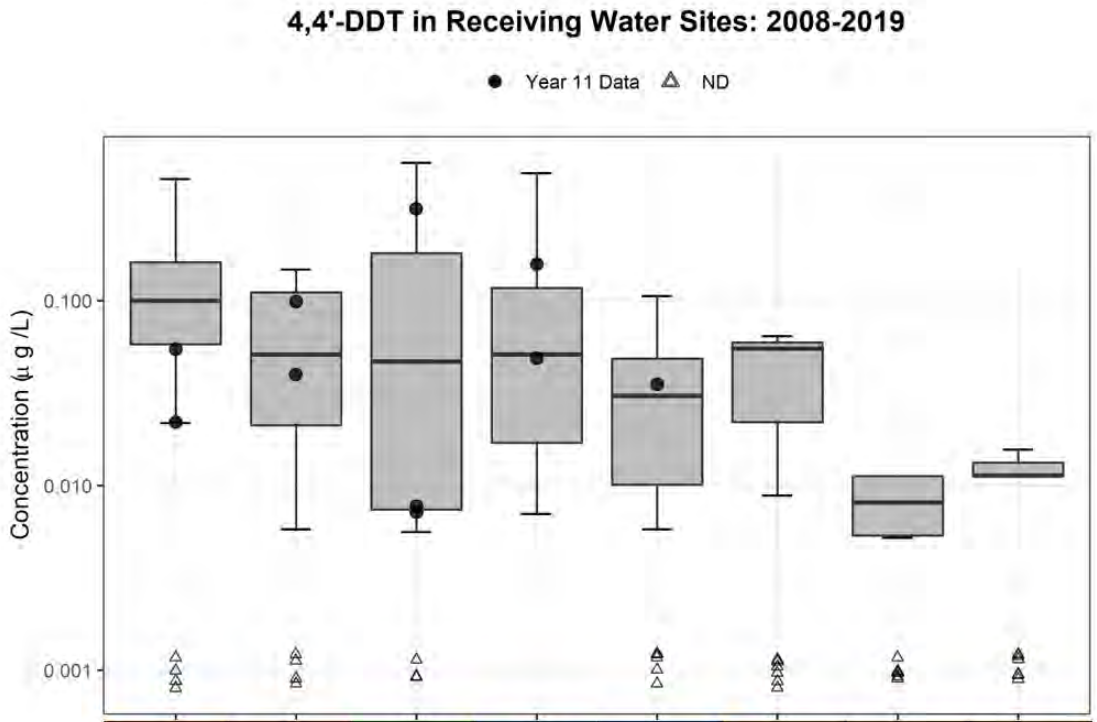
Date	Type	Event	01_RR_BR	03_UNIV	04_WOOD	06_UPLAND[1]	07_HITCH	9B_ADOLF	10_GATE	13_BELT
Aug-18	Dry	68	0.026	*0.002*	0.007	--	*0.003*	*0.002*	<0.001	<0.001
Nov-18	Dry	69	*0.004*	*0.001*	0.010	--	*0.002*	<0.001	<0.001	<0.001
Nov-18	Storm	70	*0.001*	0.114	0.034	0.454	0.026	*0.004*	*0.004*	*0.004*
Jan-19	Storm	71	0.106	0.129	0.498	0.308	0.086	0.005	<0.001	*0.003*
Mar-19	Dry	72	0.019	*0.001*	0.012	--	0.005	<0.001	<0.001	<0.001
May-19	Dry	73	0.006	*0.002*	0.011	--	0.011	<0.001	<0.001	<0.001

Figure 12. 4,4'-DDE Water Column Concentrations in Receiving Water Sites: 2008-2019



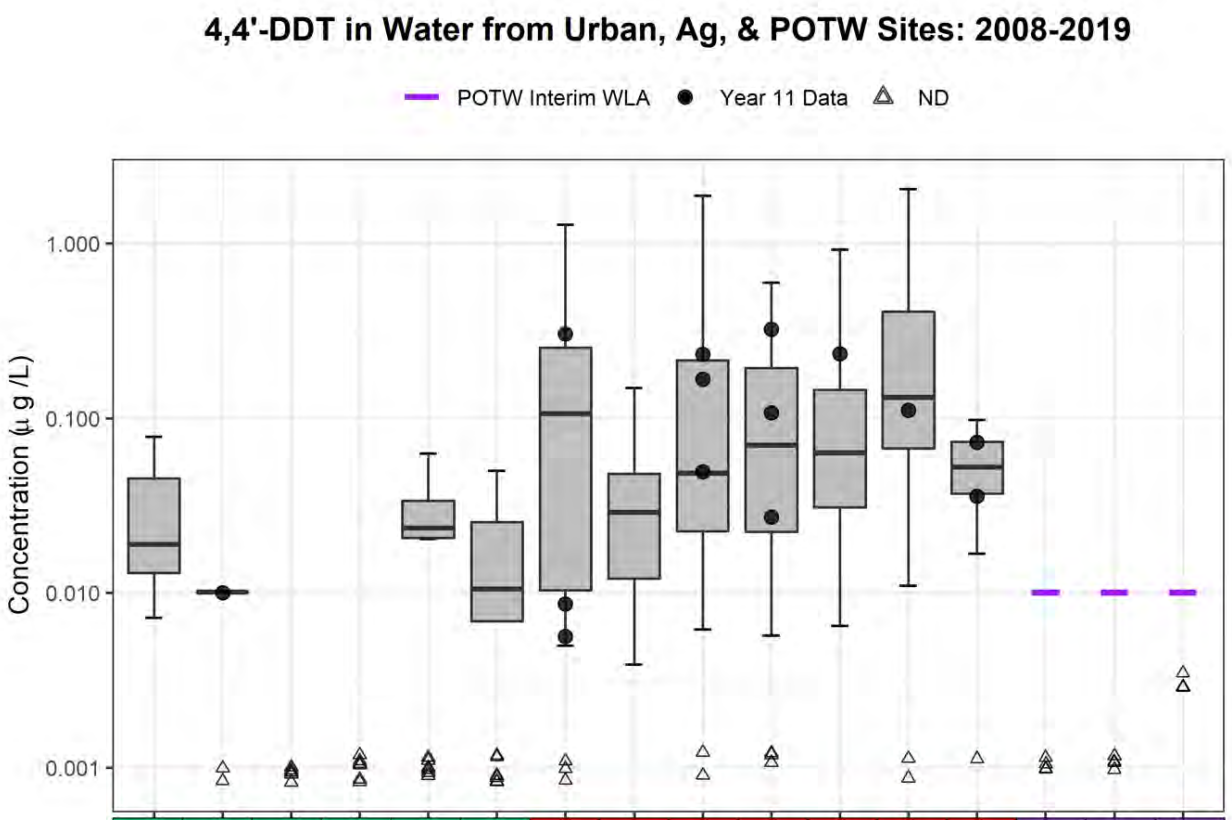
Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE1	07D_MPK	07D_SIM_BUS	9BD_ADOLF	13_SB_HILL	01T_ODD2_DCH	02D_BROOM	04D_WOOD	05D_SANT_VCWPD	06T_FC_BR	07D_HITCH_LEVEE_2	9BD_GERRY	07D_SIMI	9AD_CAMA	10D_HILL
Aug-18	Dry	68	--	--	--	<0.001	<0.001	<0.001	*0.002*	--	--	<0.001	--	--	--	<0.001	<0.001	<0.002
Nov-18	Dry	69	--	--	<0.001	<0.001	<0.001	<0.001	0.007	--	0.040	<0.001	--	--	0.228	<0.001	<0.001	<0.002
Nov-18	Storm	70	--	--	0.012	0.023	*0.003*	*0.004*	0.048	--	0.597	0.364	--	0.03	0.159	--	--	--
Jan-19	Storm	71	--	0.010	0.080	0.006	*0.003*	<0.001	0.314	--	0.495	0.463	0.475	0.28	0.522	--	--	--
Mar-19	Dry	72	--	*0.001*	<0.001	<0.001	<0.001	<0.001	0.005	--	0.049	*0.002*	--	0.015	--	<0.001	<0.001	<0.002
May-19	Dry	73	--	*0.003*	<0.001	<0.001	<0.001	<0.001	0.006	--	0.014	0.268	--	--	--	<0.001	<0.001	<0.002

Figure 13. 4,4'-DDE Water Column Concentrations in Urban, Ag, and POTW Sites: 2008-2019



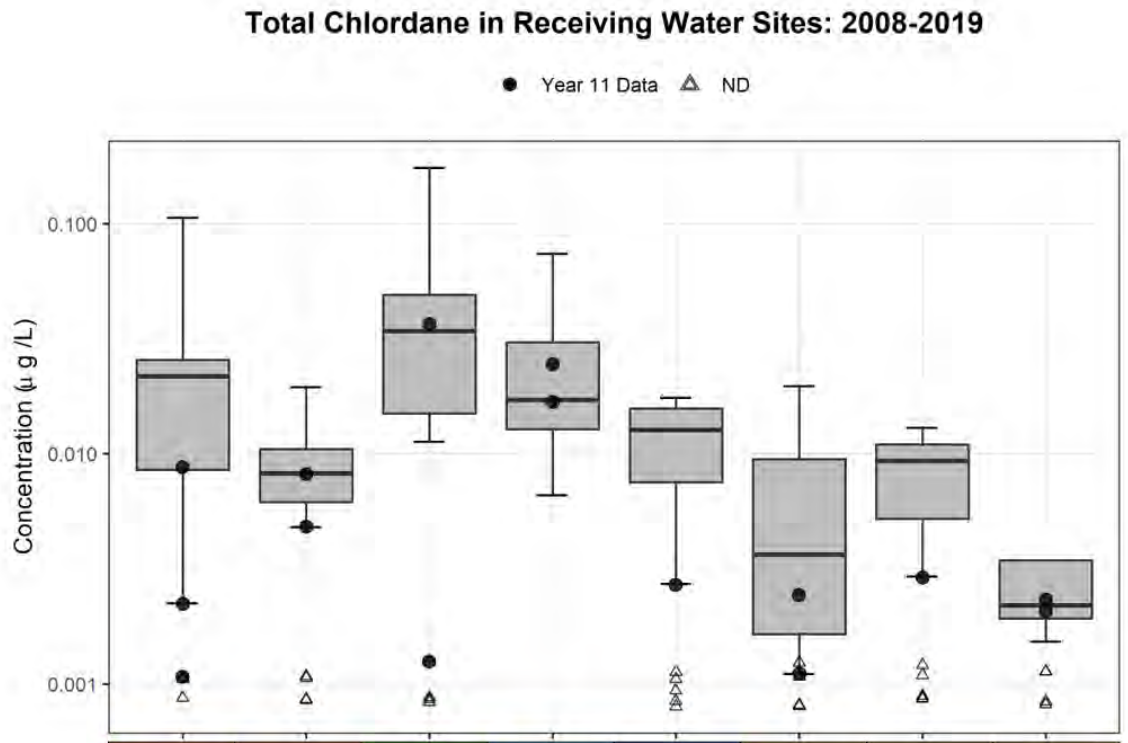
Date	Type	Event	01_RR_BR	03_UNIV	04_WOOD	06_UPLAND[1]	07_HITCH	9B_ADOLF	10_GATE	13_BELT
Aug-18	Dry	68	<0.001	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001
Nov-18	Dry	69	<0.001	<0.001	0.007	--	<0.001	<0.001	<0.001	<0.001
Nov-18	Storm	70	<0.001	0.096	<0.001	0.048	<0.001	<0.001	<0.001	<0.001
Jan-19	Storm	71	0.054	0.039	0.311	0.157	0.034	<0.001	<0.001	<0.001
Mar-19	Dry	72	0.022	<0.001	0.007	--	<0.001	<0.001	<0.001	<0.001
May-19	Dry	73	<0.001	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001

Figure 14. 4,4'-DDT Water Column Concentrations in Receiving Water Sites: 2008-2019



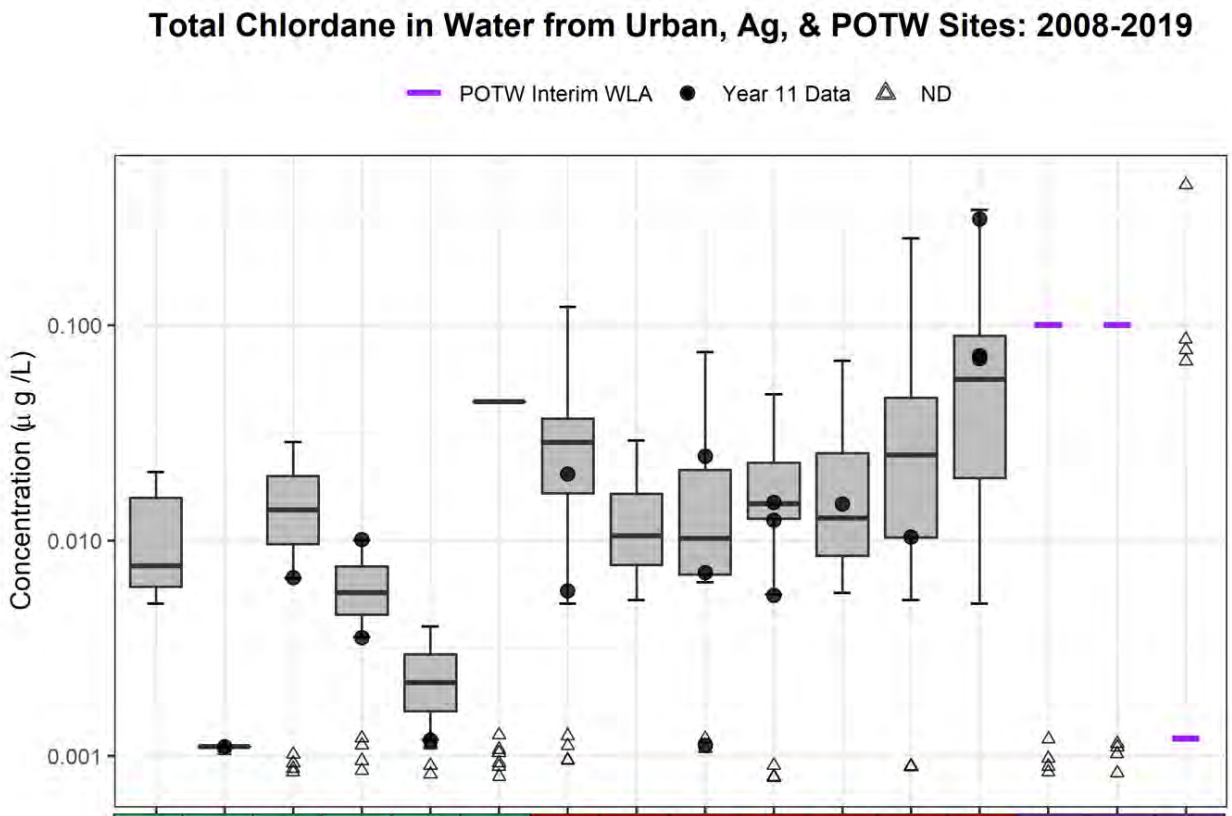
Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE	07D_MPK	07D_SIM_BUS	9BD_ADOLF	13_SB_HILL	01T_ODD2_DCH	02D_BROOM	04D_WOOD	05D_SANT_VCWPD	06T_FC_BR	07D_HITCH_LEVEE_2	9BD_GERRY	07D_SIMI	9AD_CAMA	10D_HILL
Aug-18	Dry	68	--	--	--	<0.001	<0.001	<0.001	<0.001	--	--	<0.001	--	--	--	<0.001	<0.001	<0.003
Nov-18	Dry	69	--	--	<0.001	<0.001	<0.001	<0.001	0.005	--	<0.001	<0.001	--	--	0.0733	<0.001	<0.001	<0.003
Nov-18	Storm	70	--	--	<0.001	<0.001	<0.001	<0.001	<0.001	--	0.167	0.107	--	<0.001	0.0357	--	--	--
Jan-19	Storm	71	--	<0.001	<0.001	<0.001	<0.001	<0.001	0.305	--	0.232	0.323	0.235	0.111	<0.001	--	--	--
Mar-19	Dry	72	--	0.010	<0.001	<0.001	<0.001	<0.001	0.008	--	0.0494	<0.001	--	<0.001	--	<0.001	<0.001	<0.003
May-19	Dry	73	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001	0.0273	--	--	--	<0.001	<0.001	<0.003

Figure 15. 4,4'-DDT Water Column Concentrations in Urban, Ag, and POTW Sites: 2008-2019



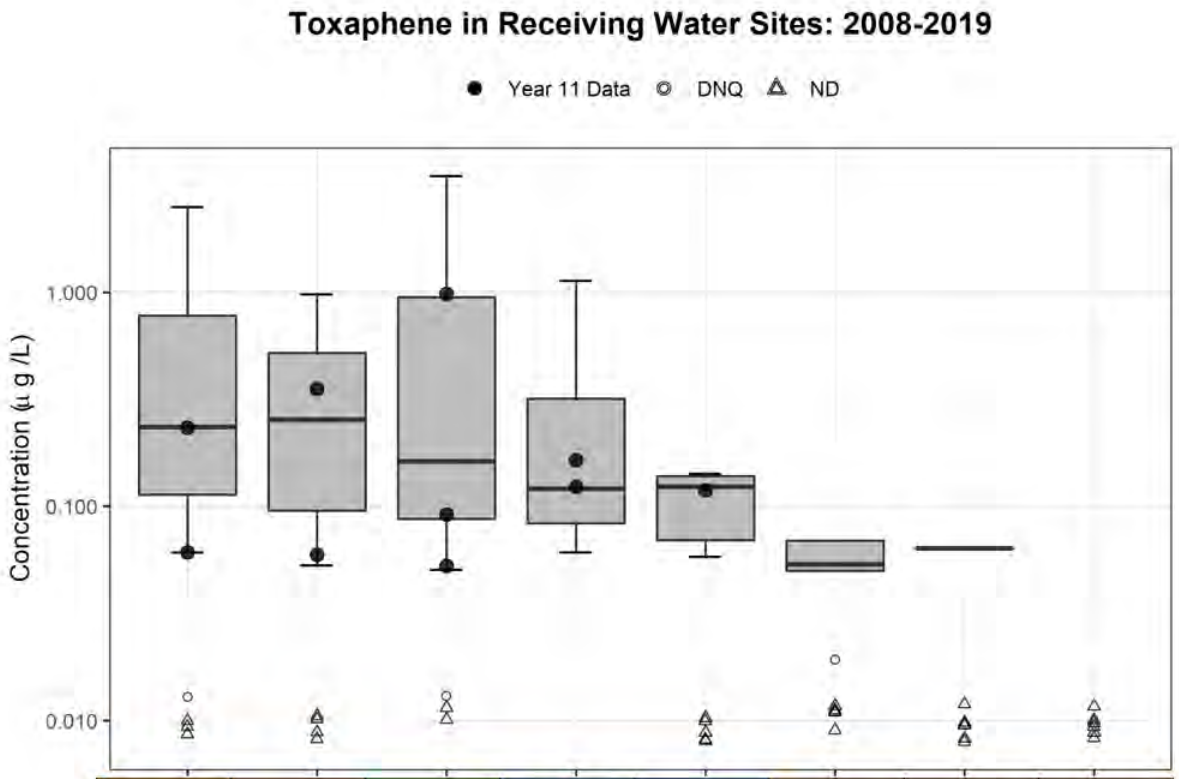
Date	Type	Event	01_RR_BR	03_UNIV	04_WOOD	06_UPLAND[1]	07_HITCH	9B_ADOLF	10_GATE	13_BELT
Aug-18	Dry	68	0.002	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001
Nov-18	Dry	69	<0.001	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001
Nov-18	Storm	70	<0.001	0.004	0.001	0.016	<0.001	0.001	0.002	0.002
Jan-19	Storm	71	0.008	0.008	0.037	0.024	0.002	0.002	<0.001	0.002
Mar-19	Dry	72	0.001	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001
May-19	Dry	73	<0.001	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001

Figure 16. Total Chlordane Water Column Concentrations in Receiving Water Sites: 2008-2019



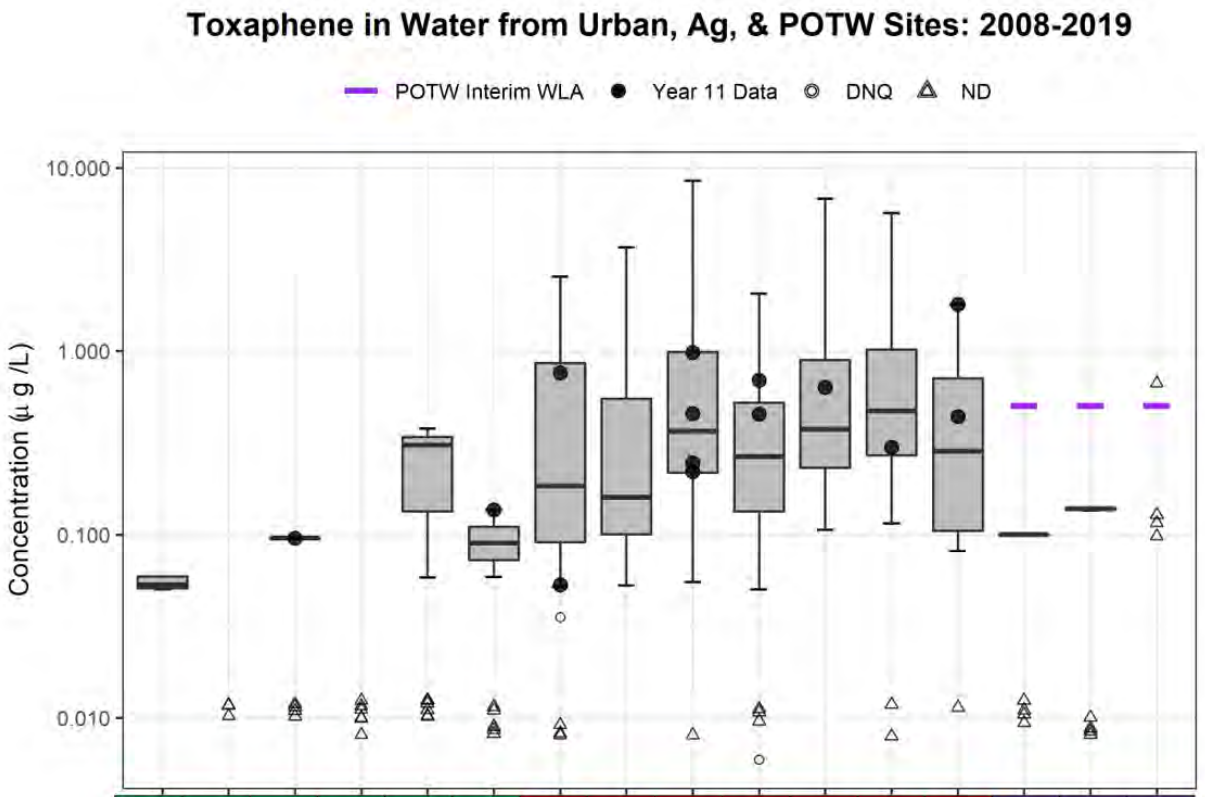
Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE1	07D_MPK	07D_SIM_BUS	9BD_ADOLF	13_SB_HILL	01T_ODD2_DCH	02D_BROOM	04D_WOOD	05D_SANT_VCWPD	06T_FC_BR	07D_HITCH_LEVEE_2	9BD_GERRY	07D_SIMI	9AD_CAMA	10D_HILL
Aug-18	Dry	68	--	--	--	<0.001	<0.001	<0.001	<0.001	--	--	<0.001	--	--	--	<0.001	<0.001	<0.4
Nov-18	Dry	69	--	--	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001	<0.001	--	--	0.069	<0.001	<0.001	<0.08
Nov-18	Storm	70	--	--	<0.001	0.010	<0.001	<0.001	0.005	--	0.024	0.012	--	<0.001	0.072	--	--	--
Jan-19	Storm	71	--	0.001	0.006	0.003	0.001	<0.001	0.020	--	0.007	0.014	0.014	0.010	0.313	--	--	--
Mar-19	Dry	72	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	0.001	0.001	--	<0.001	--	<0.001	<0.001	<0.08
May-19	Dry	73	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001	0.005	--	--	--	<0.001	<0.001	<0.08

Figure 17. Total Chlordane Water Column Concentrations in Urban, Ag, and POTW Sites: 2008-2019



Date	Type	Event	01_RR_BR	03_UNIV	04_WOOD	06_UPLAND[1]	07_HITCH	9B_ADOLF	10_GATE	13_BELT
Aug-18	Dry	68	<0.01	<0.01	*0.01*	--	<0.01	<0.01	<0.01	<0.01
Nov-18	Dry	69	*0.01*	<0.01	0.09	--	<0.01	<0.01	<0.01	<0.01
Nov-18	Storm	70	<0.01	0.35	<0.01	0.12	<0.01	<0.01	<0.01	<0.01
Jan-19	Storm	71	0.23	0.05	0.98	0.16	0.11	*0.01*	<0.01	<0.01
Mar-19	Dry	72	0.06	<0.01	0.05	--	<0.01	<0.01	<0.01	<0.01
May-19	Dry	73	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01

Figure 18. Toxaphene Water Column Concentrations in Receiving Water Sites: 2008-2019



Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE[1]	07D_MPK	07D_SIM_BUS	9BD_ADOLF	13_SB_HILL	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-18	Dry	68	--	--	--	<0.01	<0.01	<0.01	<0.01	--	--	<0.01	--	--	--	<0.01	<0.01	<0.60
Nov-18	Dry	69	--	--	<0.01	<0.01	<0.01	<0.01	*0.04*	--	0.24	0.010	--	--	0.44	<0.01	<0.01	<0.12
Nov-18	Storm	70	--	--	<0.01	<0.01	<0.01	0.13	0.05	--	0.45	0.69	--	<0.01	<0.01	--	--	--
Jan-19	Storm	71	--	<0.01	0.09	<0.01	<0.01	<0.01	0.76	--	0.98	0.45	0.63	0.29	1.8	--	--	--
Mar-19	Dry	72	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	0.22	<0.01	--	<0.01	--	<0.01	<0.01	<0.12
May-19	Dry	73	--	<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: 2008-2019

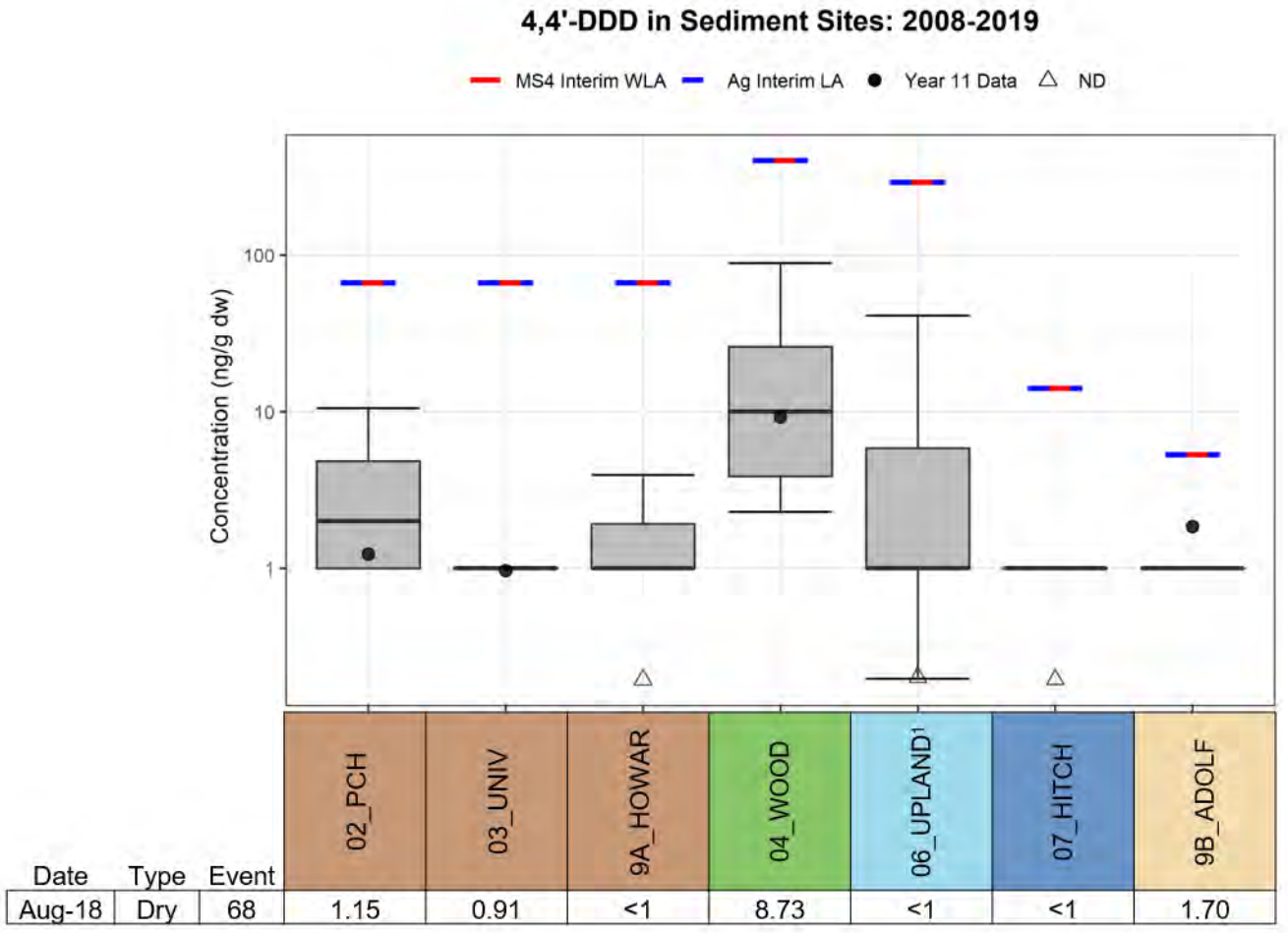


Figure 20. 4,4'-DDD Sediment Concentrations in Receiving Water Sites: 2008-2019

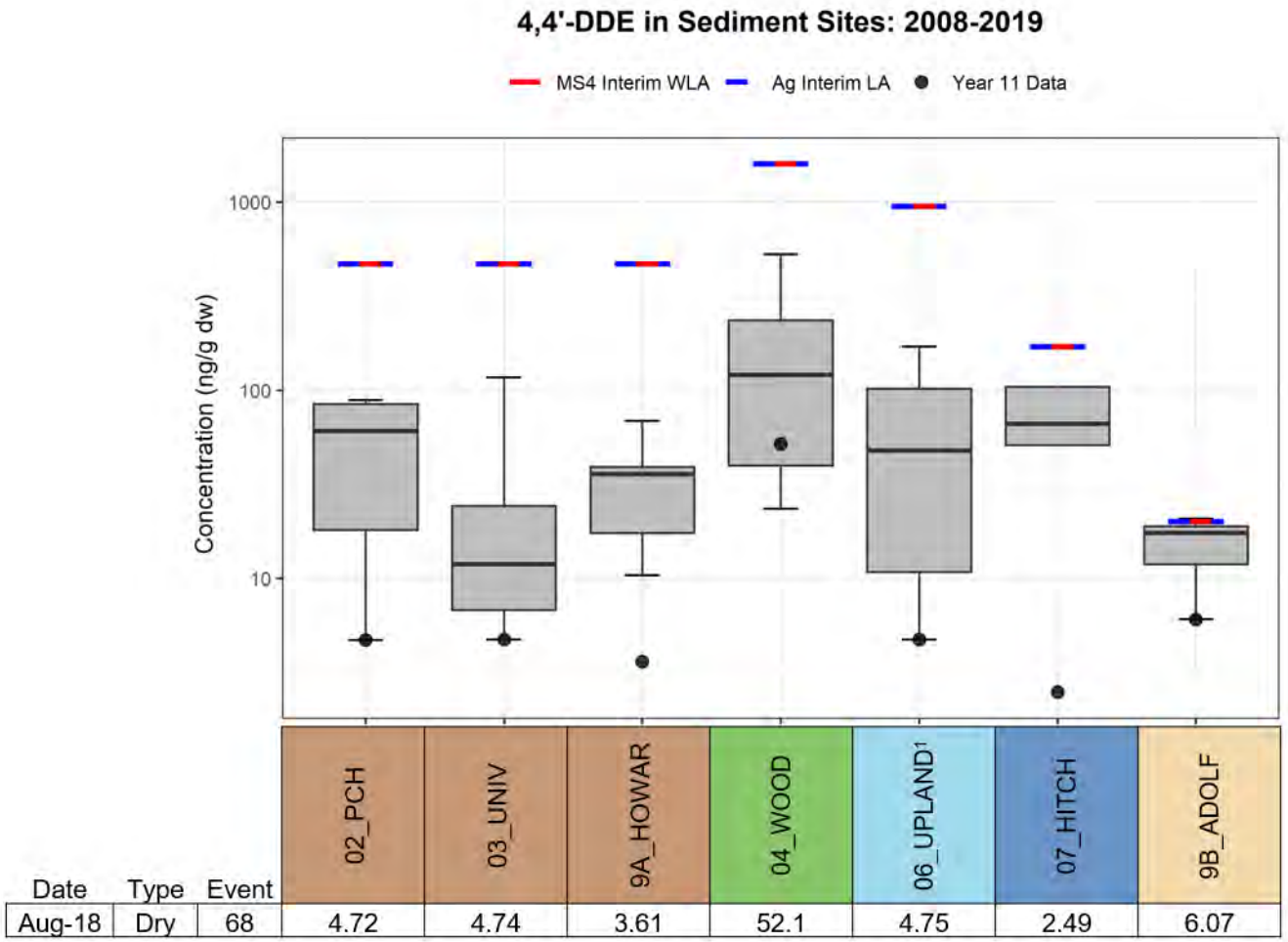


Figure 21. 4,4'-DDE Sediment Concentrations in Receiving Water Sites: 2008-2019

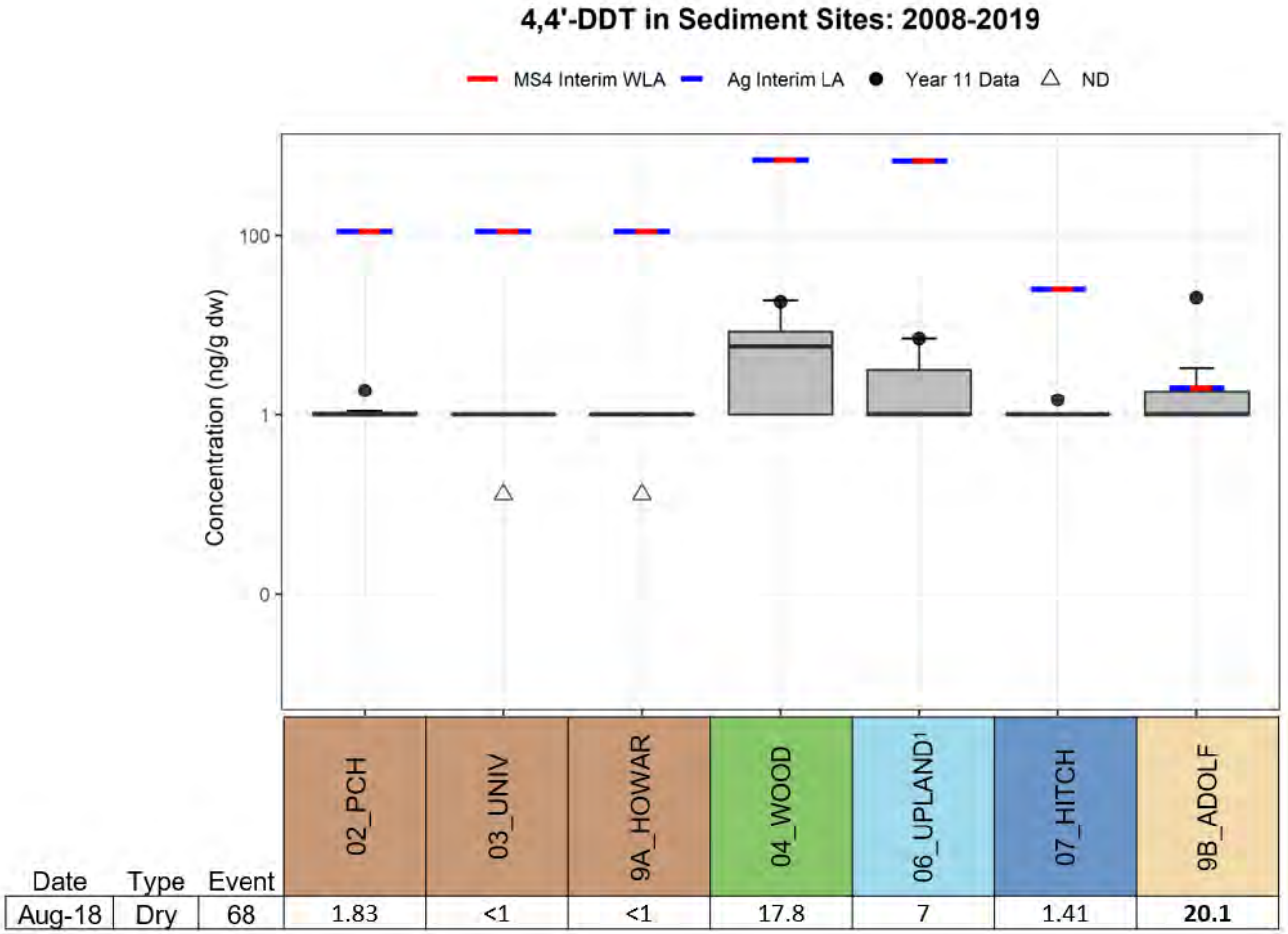


Figure 22. 4,4'-DDT Sediment Concentrations in Receiving Water Sites: 2008-2019

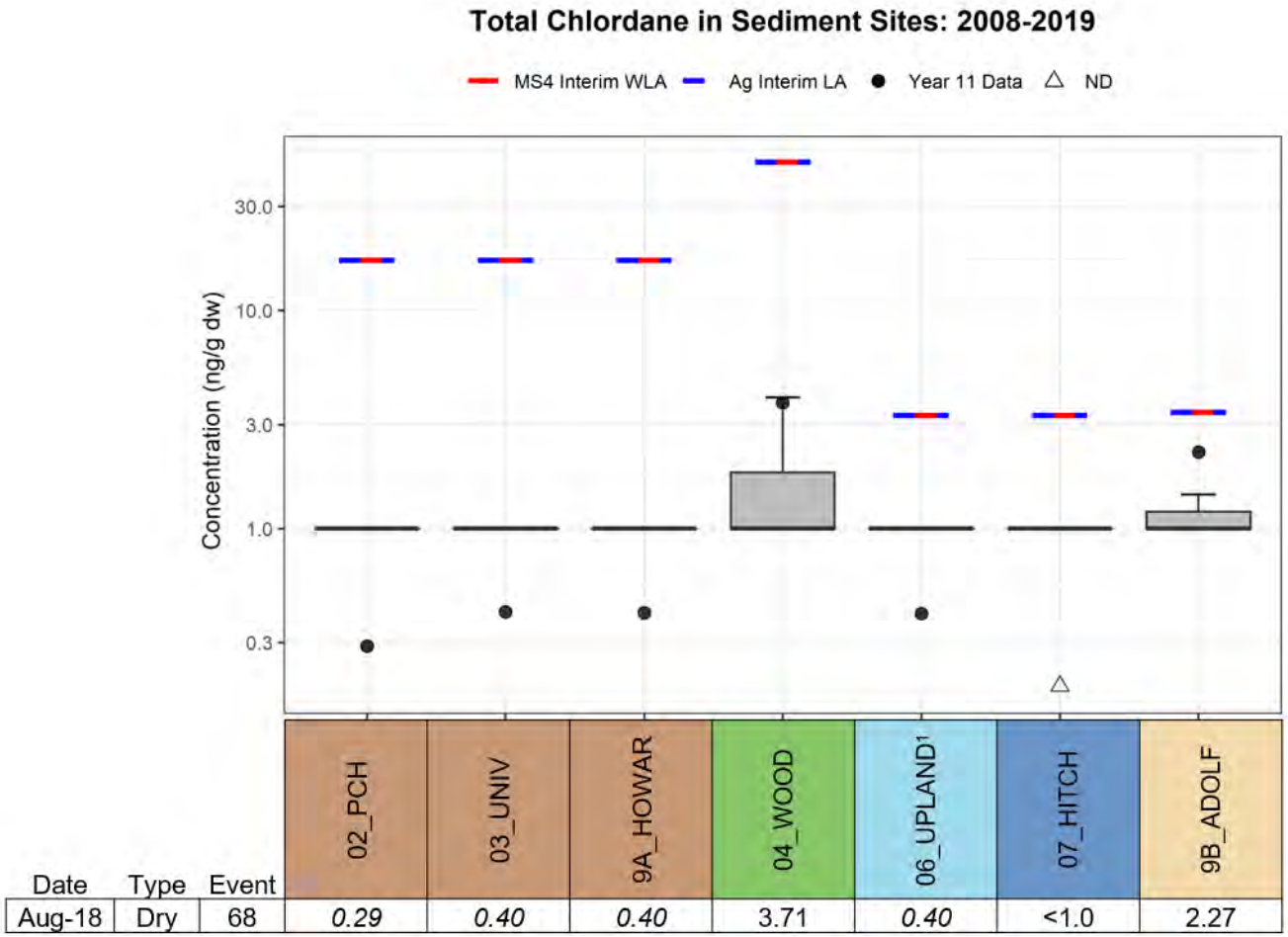


Figure 23. Total Chlordane Sediment Concentrations in Receiving Water Sites: 2008-2019

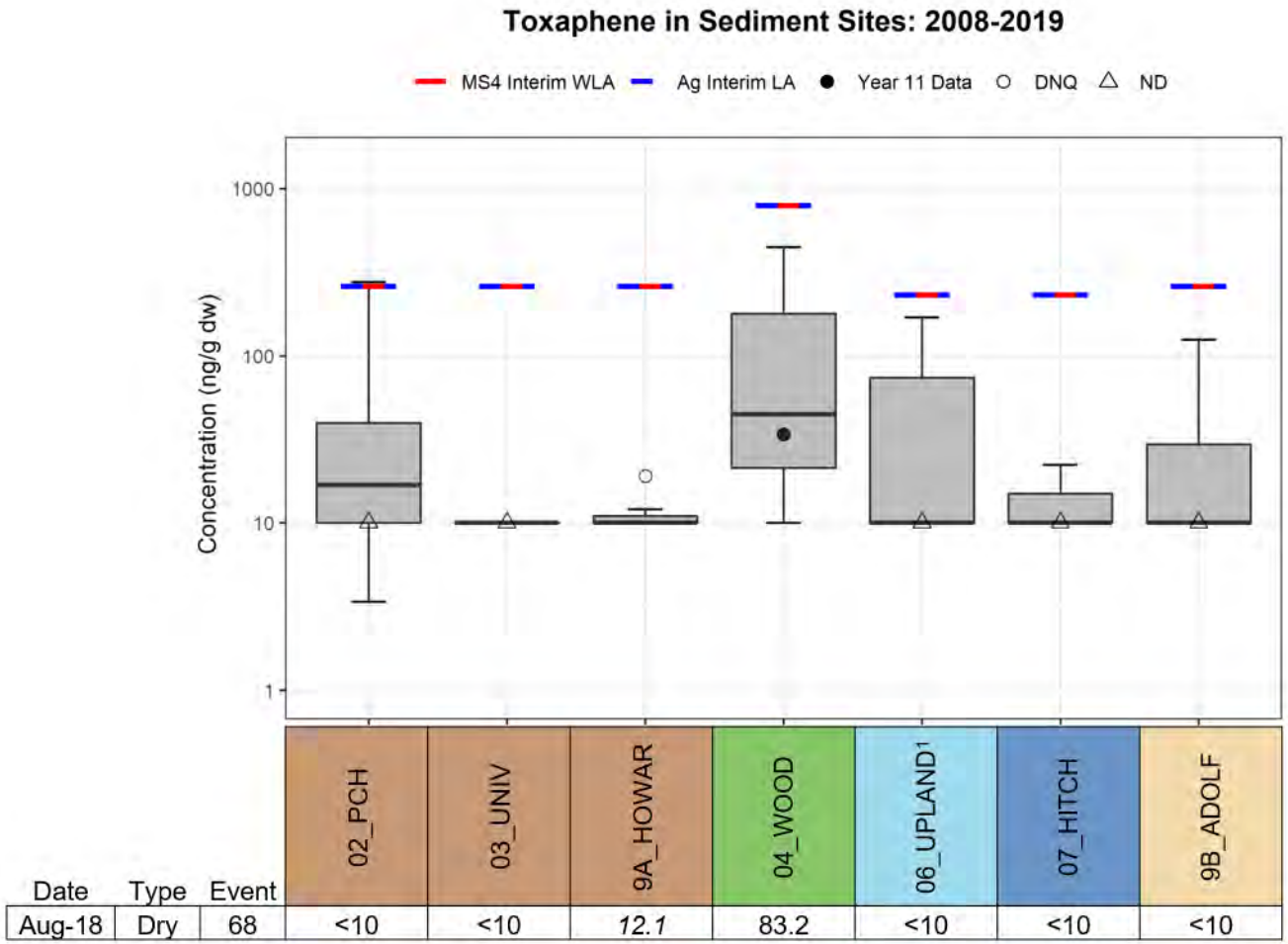


Figure 24. Toxaphene Sediment Concentrations in Receiving Water Sites: 2008-2019

METALS TMDL DATA SUMMARY

The following figures present metals water quality data from receiving water, agricultural, urban, and POTW monitoring sites. 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 exceedance evaluation section of the report. The Metals TMDL specifies final targets for dissolved copper, nickel and zinc to correspond with the objectives which are expressed in dissolved form. Dissolved concentrations for these three metals have been plotted for reference. Data collected during year eleven, 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 (2008-2019). This was done to allow for easy comparison between recent data and what have been collected overall. The eleventh year data are presented in tabular form below each box plot. 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.

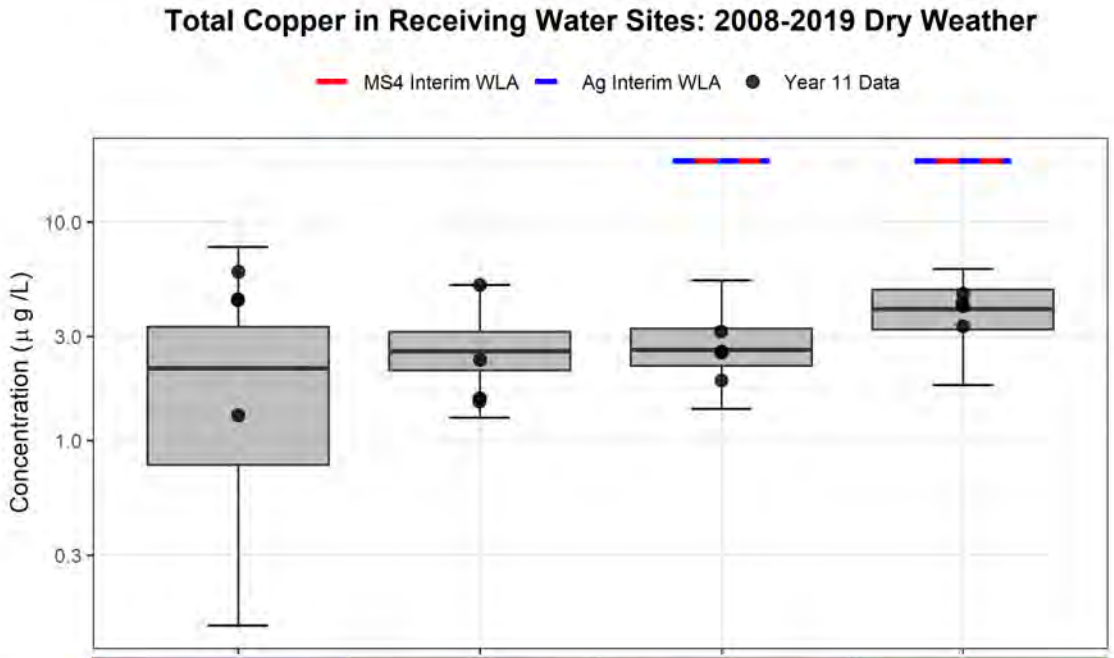
Table 11 shows a summary of monitoring events for the Metals TMDL receiving water monitoring sites, and **Table 12** shows a summary of monitoring events for Metals TMDL land use monitoring sites. For both tables, shaded cells indicate sites that were not sampled in accordance with the QAPP, values identifies as "x" in the tables indicate that samples were collected at this site, and values identified as "Dry" indicate that samples were not collected at this site due to dry conditions.

Table 11. Metals TMDL Receiving Water Monitoring Site Event Summary - Year 11

Subwatershed	Reach	Site ID	Year 11 Events					
			68	69	70	71	72	73
			18-Aug	18-Nov	18-Nov	19-Jan	19-Feb	19-May
Mugu Lagoon	Reach 1	01_BPT_14						
		01_BPT_15						
		01_BPT_3						
		01_BPT_6						
		01_RR_BR	x	x	x	x	x	x
		01_SG_74						
Calleguas	Reach 2	02_PCH	x	x	x	x	x	x
	Reach 3	03_UNIV	x	x	x	x	x	x
	Reach 9B	9A_HOWAR						
Revolon Slough	Reach 4	04_WOOD	x	x	x	x	x	x
	Reach 5	05_CENTR						
Las Posas	Reach 6	06_UPLAND						
Arroyo Simi	Reach 7	07_HITCH						
		07_TIERRA						
Conejo	Reach 9A	9B_ADOLF						
	Reach 9A	9B_BARON						
	Reach 10	10_GATE						
	Reach 12	12_PARK						
	Reach 13	13_BELT						

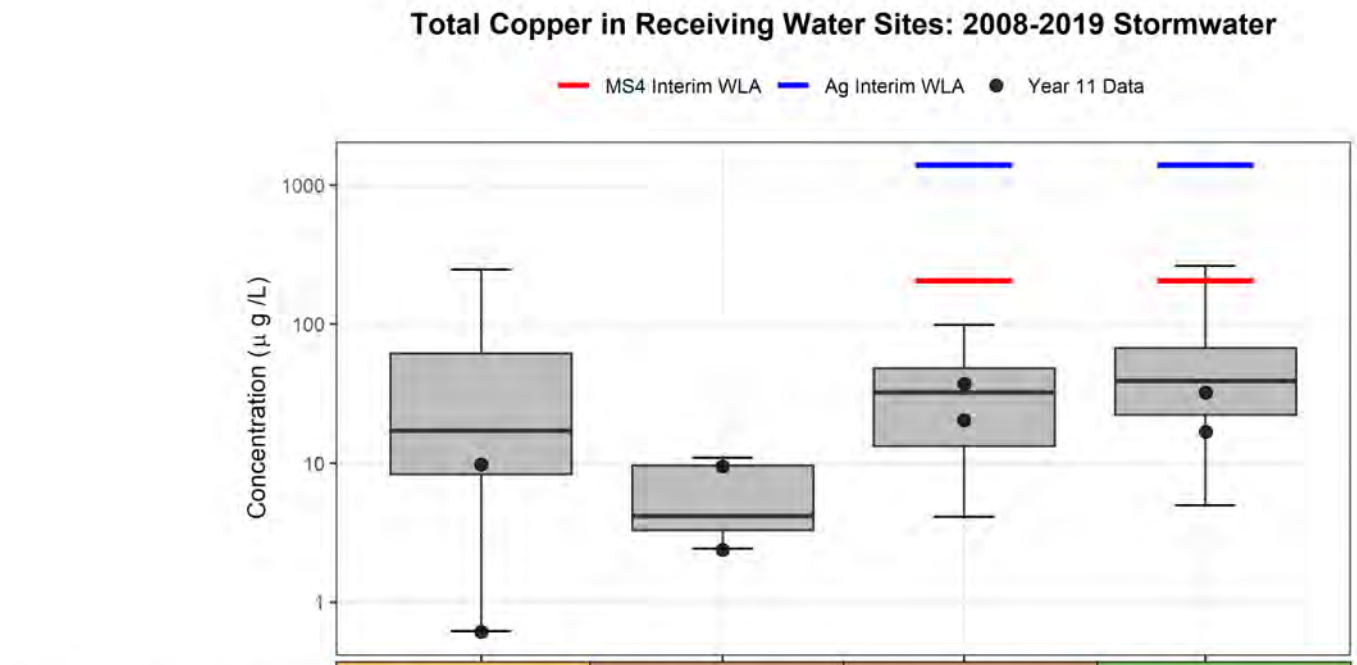
Table 12. Metals TMDL Land Use Monitoring Site Event Summary - Year 11

Land Use Type	Reach	Site ID	Year 11 Events					
			68	69	70	71	72	73
			18-Aug	18-Nov	18-Nov	19-Jan	19-Feb	19-May
Urban (MS4) Sites	Reach 4	04D_VENTURA	Dry	Dry	Dry			
	Reach 4	04D_SPRINGVILLE				x	x	x
	Reach 7	07D_MPK						
	Reach 7	07D_SIM_BUS						
	Reach 9A	9BD_ADOLF	x	x	x	x	x	x
	Reach 13	13_SB_HILL						
Agriculture Sites	Reach 1	01T_ODD2_DCH	x	x	x	x	x	x
	Reach 2	02D_BROOM	Dry	Dry	Dry	Dry	Dry	Dry
	Reach 4	04D_WOOD	Dry	x	x	x	x	x
	Reach 5	05D_SANT_VCWPD	x	x	x	x	x	x
	Reach 6	06T_FC_BR						
	Reach 7	07D_HITCH_LEVEE_2						
	Reach 9A	9BD_GERRY	Dry	x	x	x	Dry	Dry
POTW Sites	Reach 7	07D_SIMI	x	x			x	x
	Reach 9B	9AD_CAMA	x	x			x	x
	Reach 10	10D_HILL	x	x			x	x



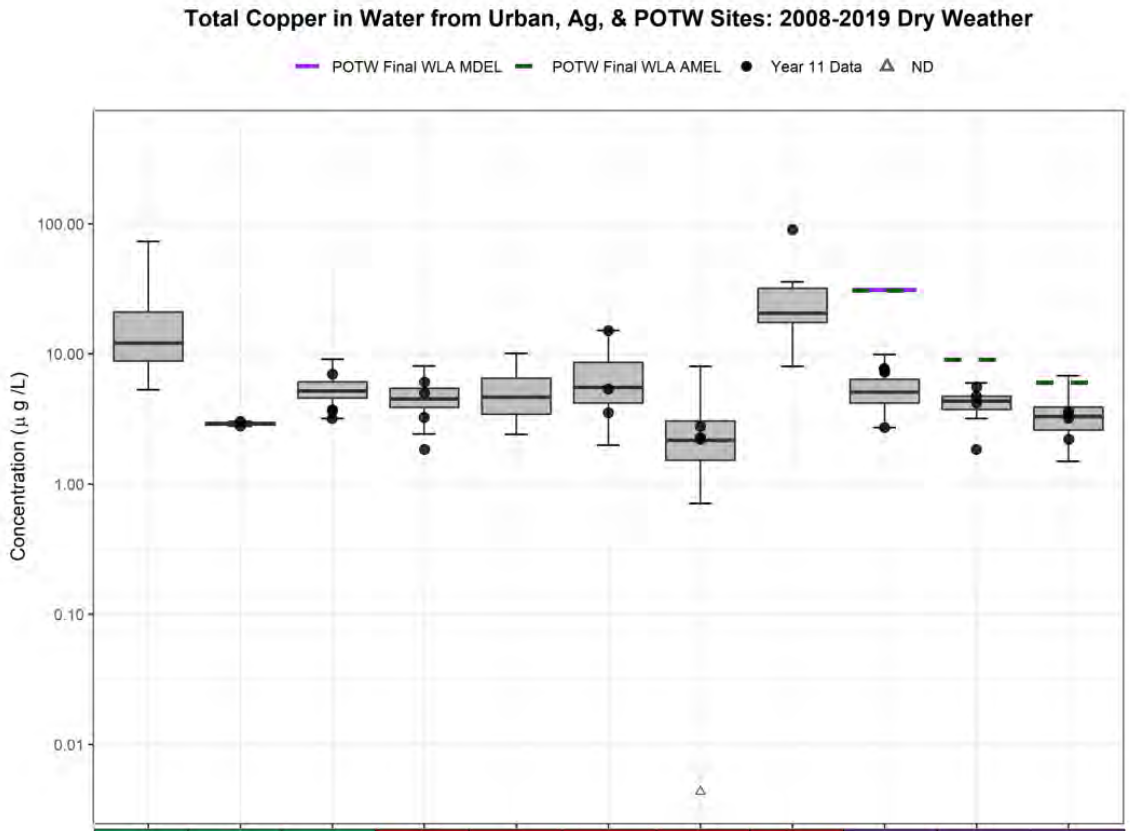
Date	Type	Event	01_RR_BR	02_PCH	03_UNIV	04_WOOD
Aug-18	Dry	68	5.95	1.56	2.54	4.7
Nov-18	Dry	69	1.31	1.51	1.89	3.32
Mar-19	Dry	72	4.43	2.35	2.56	4.28
May-19	Dry	73	4.38	5.16	3.16	4.13

Figure 25. Total Copper Dry Weather Concentrations in Receiving Water Sites: 2008-2019



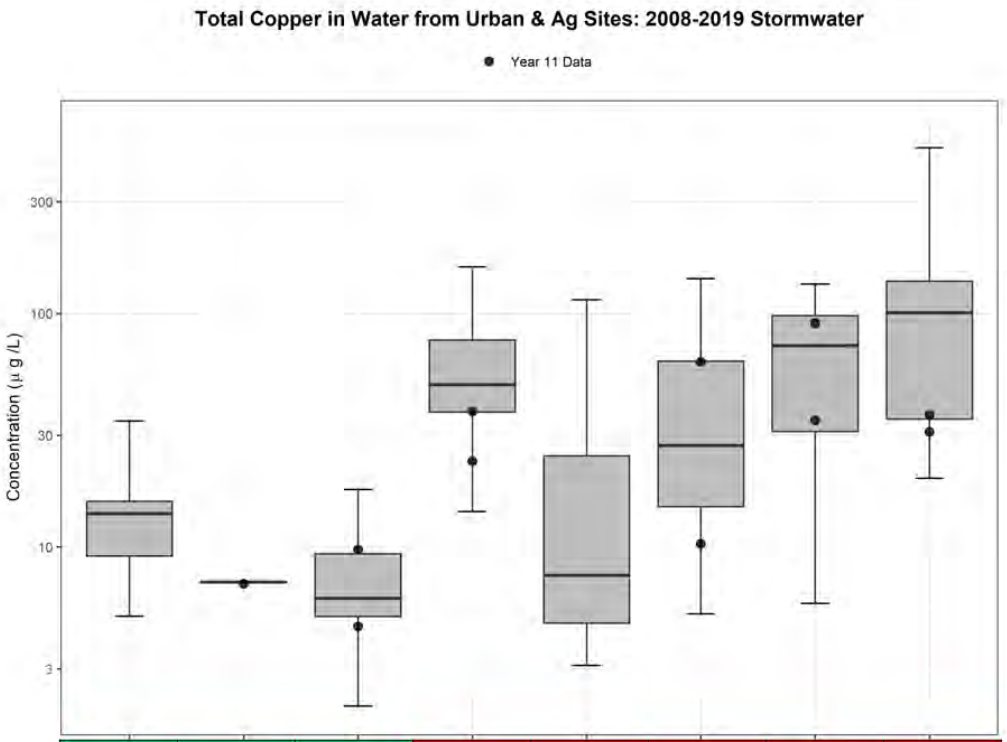
Date	Type	Event	01_RR_BR	02_PCH	03_UNIV	04_WOOD
Nov-18	Storm	70	0.61	2.42	20.8	16.9
Jan-19	Storm	71	9.88	9.24	37.9	32

Figure 26. Total Copper Stormwater Concentrations in Receiving Water Sites: 2008-2019



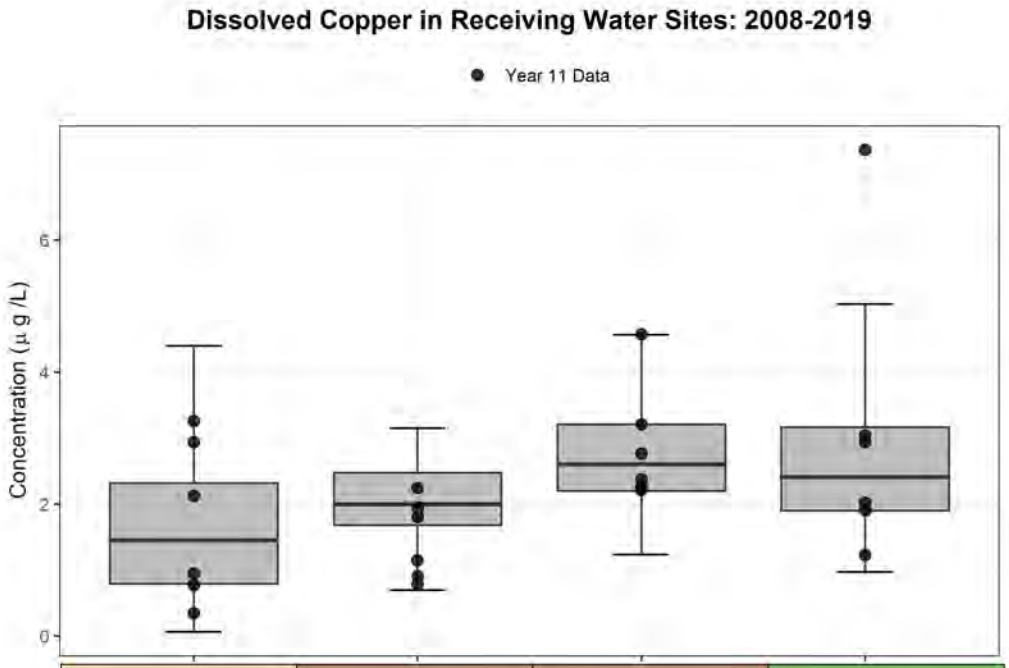
Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE[1]	9BD_ADOLF	01T_ODD2_DCH	02D_BROOM	04D_WOOD	05D_SANT_VCWPD	9BD_GERRY	07D_SIMI	9AD_CAMA	10D_HILL
Aug-18	Dry	68	--	--	6.97	1.85	--	--	2.78	--	7.48	4.74	2.2
Nov-18	Dry	69	--	--	3.20	3.25	--	3.54	<0.007	90.4	7.23	1.85	3.6
Mar-19	Dry	72	--	3.03	3.71	5.01	--	5.36	2.28	--	2.72	5.59	3.2
May-19	Dry	73	--	2.79	3.67	6.08	--	15.1	2.21	--	7.75	4.19	3.5

Figure 27. Total Copper Dry Weather Concentrations in Urban, Ag, and POTW Sites: 2008-2019



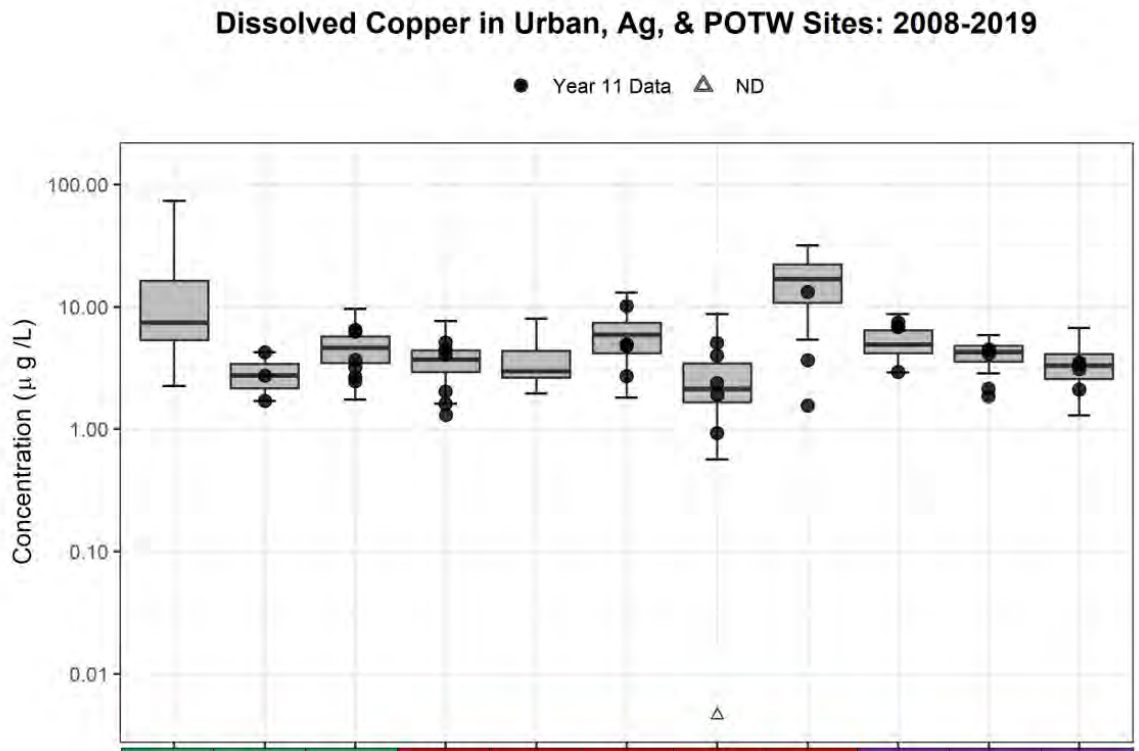
Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE[1]	9BD_ADOLF	01T_ODD2 _DCH	02D_BROOM	04D_WOOD	05D_SANT_VCWPD	9BD_GERRY
Nov-18	Storm	70	--	--	9.86	23.3	--	61.5	90.1	36.8
Jan-19	Storm	71	--	7.05	4.55	38.1	--	10.3	34.8	30.9

Figure 28. Total Copper Wet Weather Concentrations in Urban and Ag Sites: 2008-2019



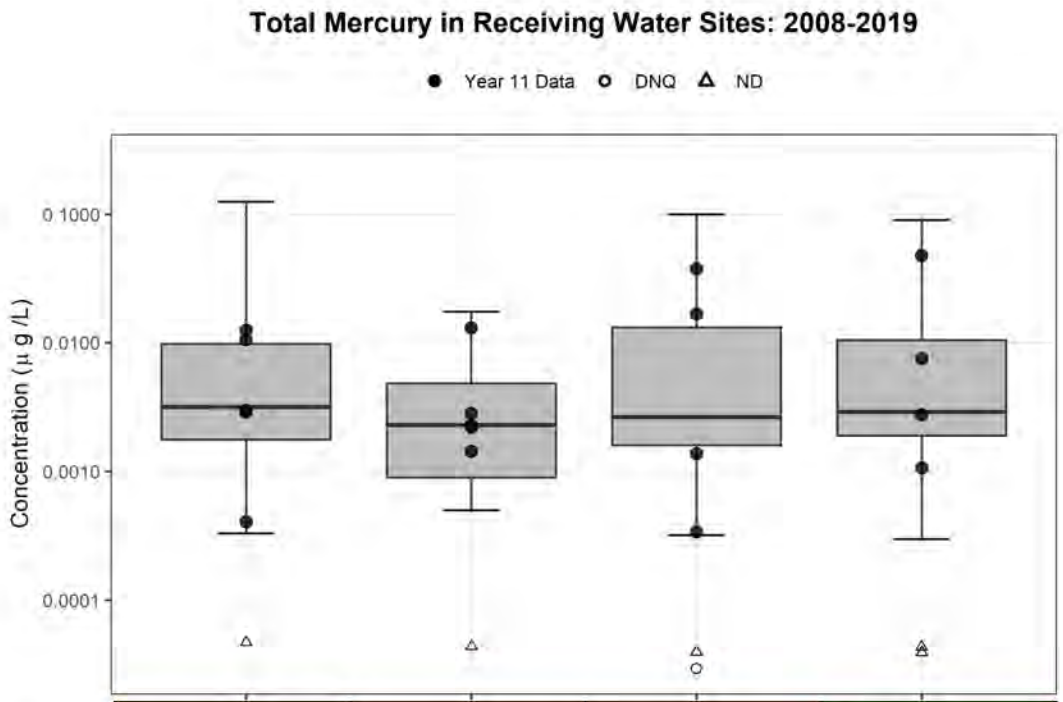
Date	Type	Event	01_RR_BR	02_PCH	03_UNIV	04_WOOD
Aug-18	Dry	68	0.942	0.785	2.27	3.04
Nov-18	Dry	69	0.773	1.15	2.21	1.22
Nov-18	Storm	70	0.343	0.906	4.57	7.37
Jan-19	Storm	71	2.94	2.24	3.21	2.94
Mar-19	Dry	72	3.26	1.8	2.37	1.9
May-19	Dry	73	2.12	1.95	2.76	2.02

Figure 29. Dissolved Copper Concentrations in Receiving Water Sites: 2008-2019



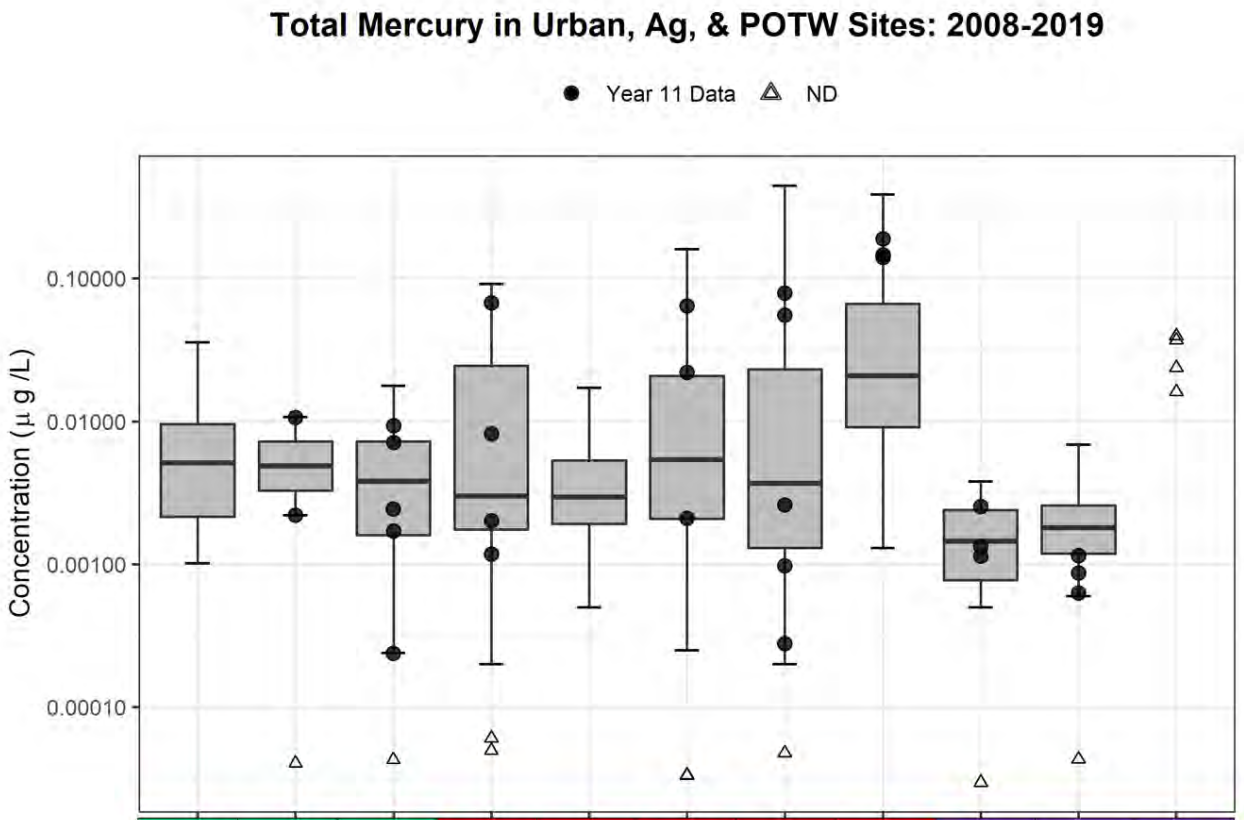
Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE	9BD_ADOLF	01T_ODD2_DCH	02D_BROOM	04D_WOOD	05D_SANT _VCWPD	9BD_GERRY	07D_SIMI	9AD_CAMA	10D_HILL
Aug-18	Dry	68	--	--	6.49	2.03	--	--	2.37	--	6.90	4.48	2.1
Nov-18	Dry	69	--	--	2.65	1.31	--	2.71	<0.007	1.56	6.82	2.13	3.5
Nov-18	Storm	70	--	--	6.24	4.05	--	4.79	5.06	3.66	--	--	--
Jan-19	Storm	71	--	4.26	2.47	1.62	--	4.93	3.98	13.30	--	--	--
Mar-19	Dry	72	--	2.73	3.68	4.46	--	4.86	1.90	--	2.92	1.85	3.1
May-19	Dry	73	--	1.70	3.2	5.12	--	10.2	0.923	--	7.44	4.12	3.4

Figure 30. Dissolved Copper Concentrations in Urban, Ag, and POTW Sites: 2008-2019



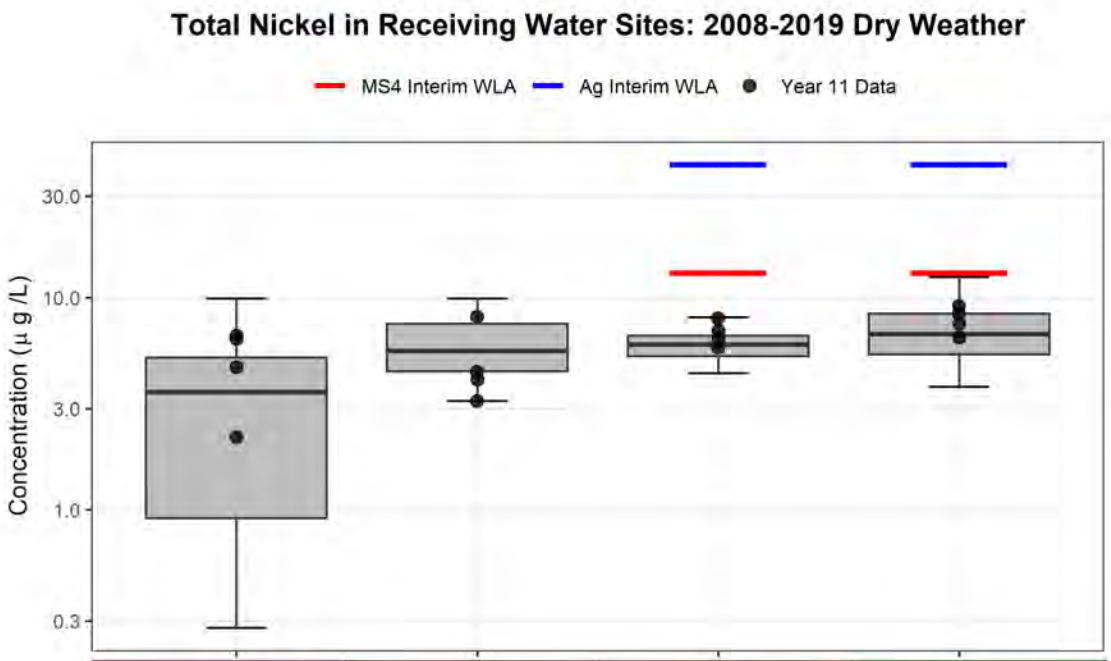
Date	Type	Event	01_RR_BR	02_PCH	03_UNIV	04_WOOD
Aug-18	Dry	68	0.01260	0.00284	*0.00004*	0.00107
Nov-18	Dry	69	<0.00004	<0.00004	<0.00004	<0.00004
Nov-18	Storm	70	0.00041	0.00230	0.01690	0.00752
Jan-19	Storm	71	0.01060	0.01310	0.03770	0.04770
Mar-19	Dry	72	0.00301	0.00144	0.00138	0.00276
May-19	Dry	73	0.00288	0.00220	0.00034	<0.00004

Figure 31. Total Mercury Concentrations in Receiving Water Sites: 2008-2019



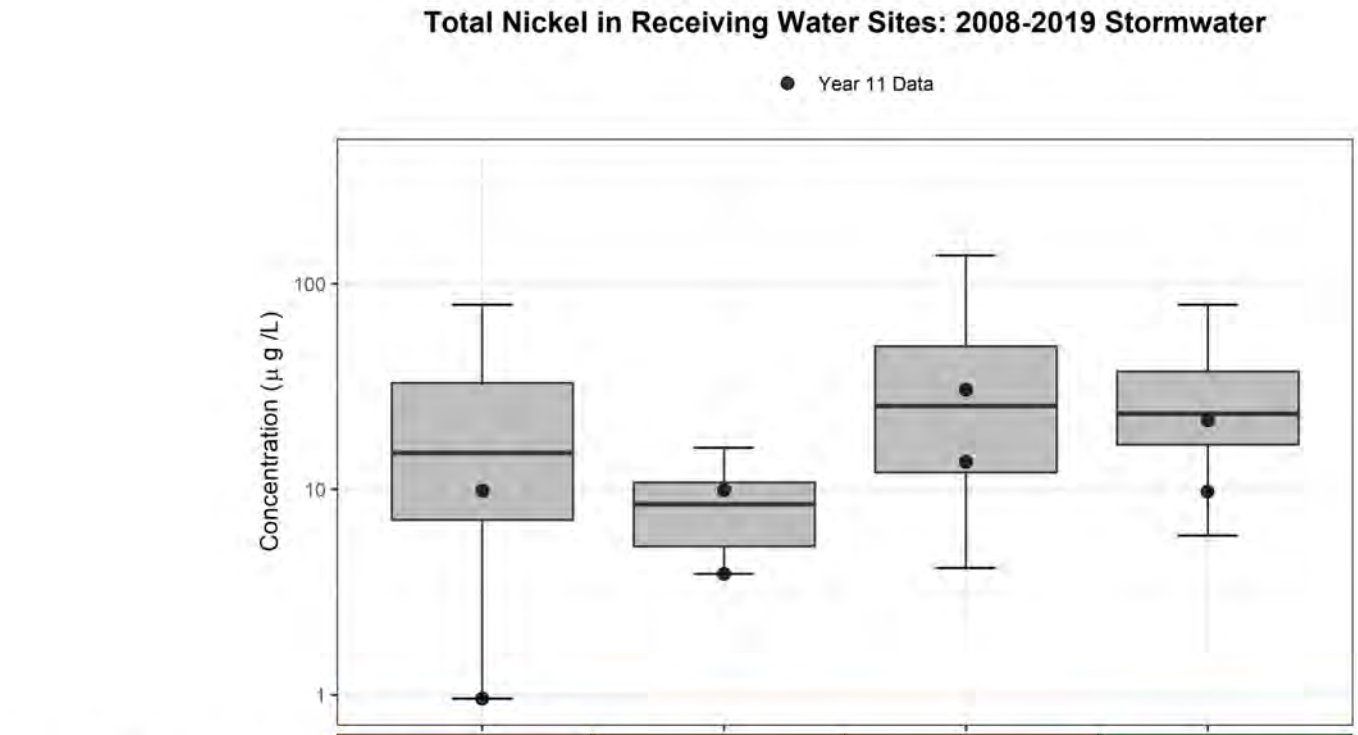
Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE	9BD_ADOLF	01T_ODD2_DCH	02D_BROOM	04D_WOOD	05D_SANT_VCWPD	9BD_GERRY	07D_SIMI	9AD_CAMA	10D_HILL
Aug-18	Dry	68	--	--	0.00170	0.00118	--	--	0.00028	--	0.00132	0.00115	<0.025
Nov-18	Dry	69	--	--	<0.00004	<0.00004	--	<0.00004	<0.00004	0.146	<0.00004	<0.00004	<0.025
Nov-18	Storm	70	--	--	0.00707	0.00821	--	0.06410	0.05540	0.141	--	--	--
Jan-19	Storm	71	--	0.01070	0.00935	0.06700	--	0.02190	0.07920	0.189	--	--	--
Mar-19	Dry	72	--	0.00220	0.00244	0.00200	--	0.00210	0.00098	--	0.00113	0.00063	<0.025
May-19	Dry	73	--	<0.00004	0.00024	<0.00004	--	<0.00004	0.00262	--	0.00253	0.00087	<0.025

Figure 32. Total Mercury Concentrations in Urban and Ag Sites: 2008-2019



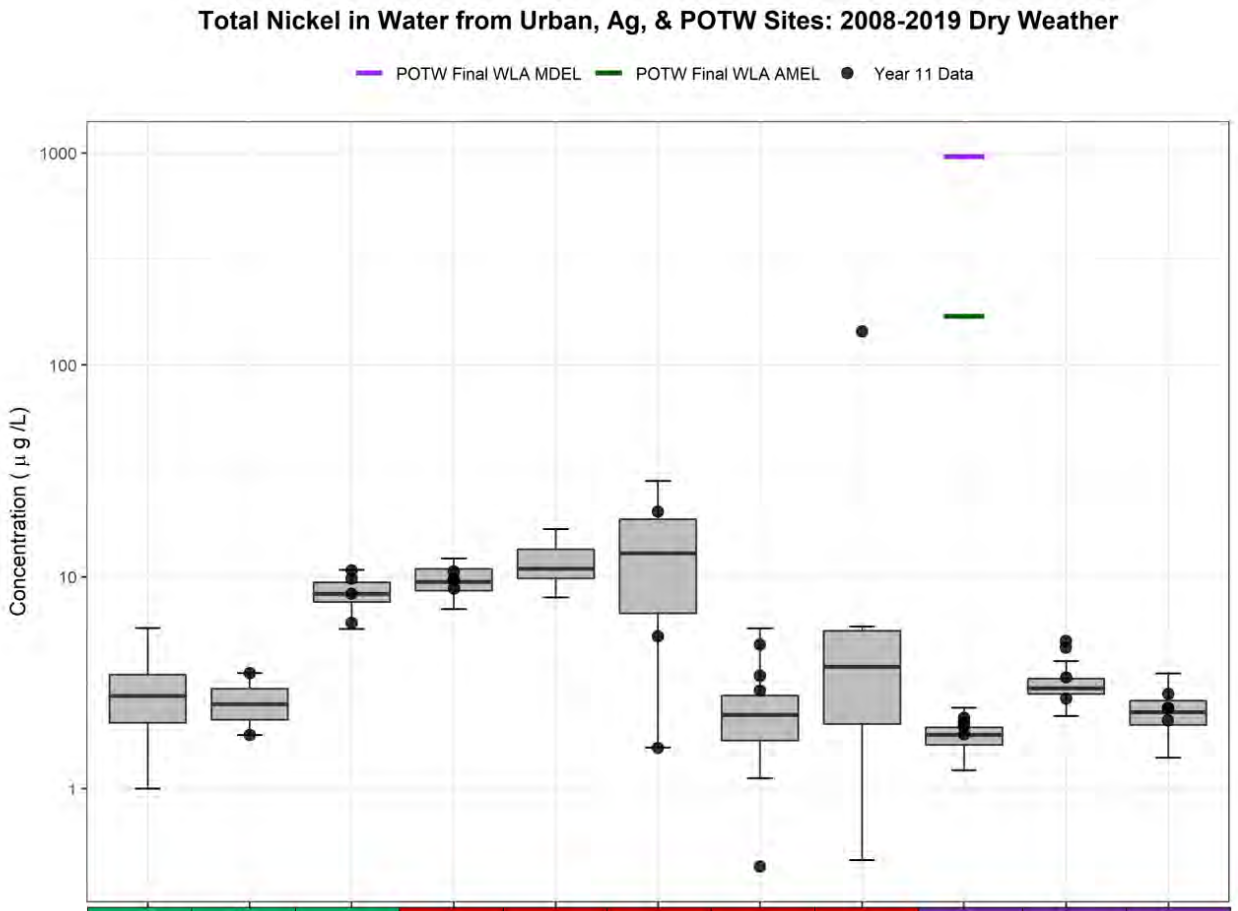
Date	Type	Event	01_RR_BR	02_PCH	03_UNIV	04_WOOD
Aug-18	Dry	68	4.71	4.11	7.98	8.39
Nov-18	Dry	69	2.2	3.25	6.97	7.52
Mar-19	Dry	72	6.38	4.47	5.81	9.14
May-19	Dry	73	6.63	8.09	6.39	6.48

Figure 33. Total Nickel Dry Weather Concentrations in Receiving Water Sites: 2008-2019



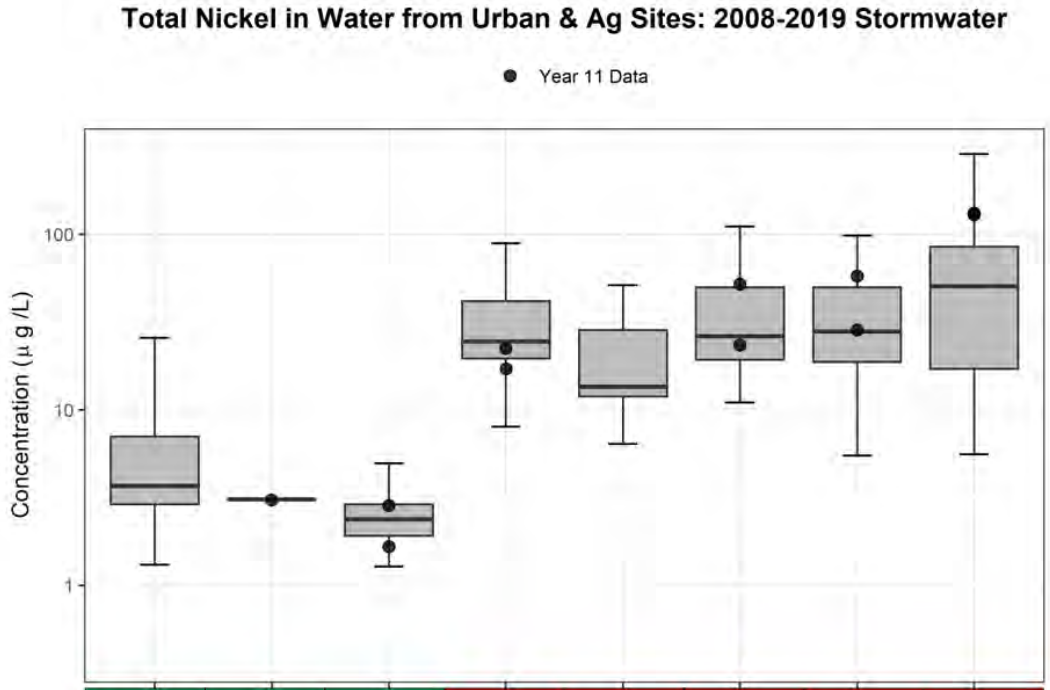
Date	Type	Event	01_RR_BR	02_PCH	03_UNIV	04_WOOD
Nov-18	Storm	70	0.959	3.87	13.6	9.73
Jan-19	Storm	71	9.81	9.93	30.4	21.6

Figure 34. Total Nickel Stormwater Concentrations in Receiving Water Sites: 2008-2019



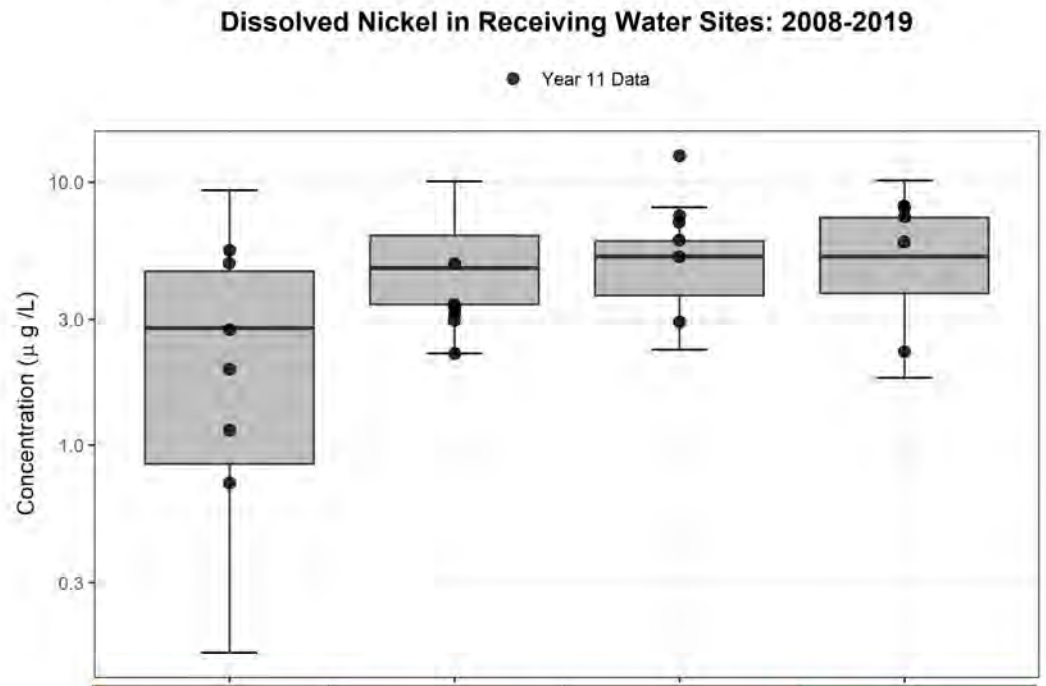
Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE	9BD_ADOLF	01T_ODD2 _DCH	02D_BROOM	04D_WOOD	05D_SANT_ VCWPD	9BD_GERRY	07D_SIMI	9AD_CAMA	10D_HILL
Aug-18	Dry	68	--	--	8.31	8.79	--	--	2.9	--	2.16	4.63	2.4
Nov-18	Dry	69	--	--	6.06	9.62	--	5.24	0.429	144	1.8	2.66	2.1
Mar-19	Dry	72	--	3.51	10.7	9.77	--	20.3	3.41	--	1.96	4.98	2.8
May-19	Dry	73	--	1.79	9.79	10.6	--	1.56	4.78	--	2.05	3.35	2.4

Figure 35. Total Nickel Dry Weather Concentrations in Urban, Ag, and POTW Sites: 2008-2019



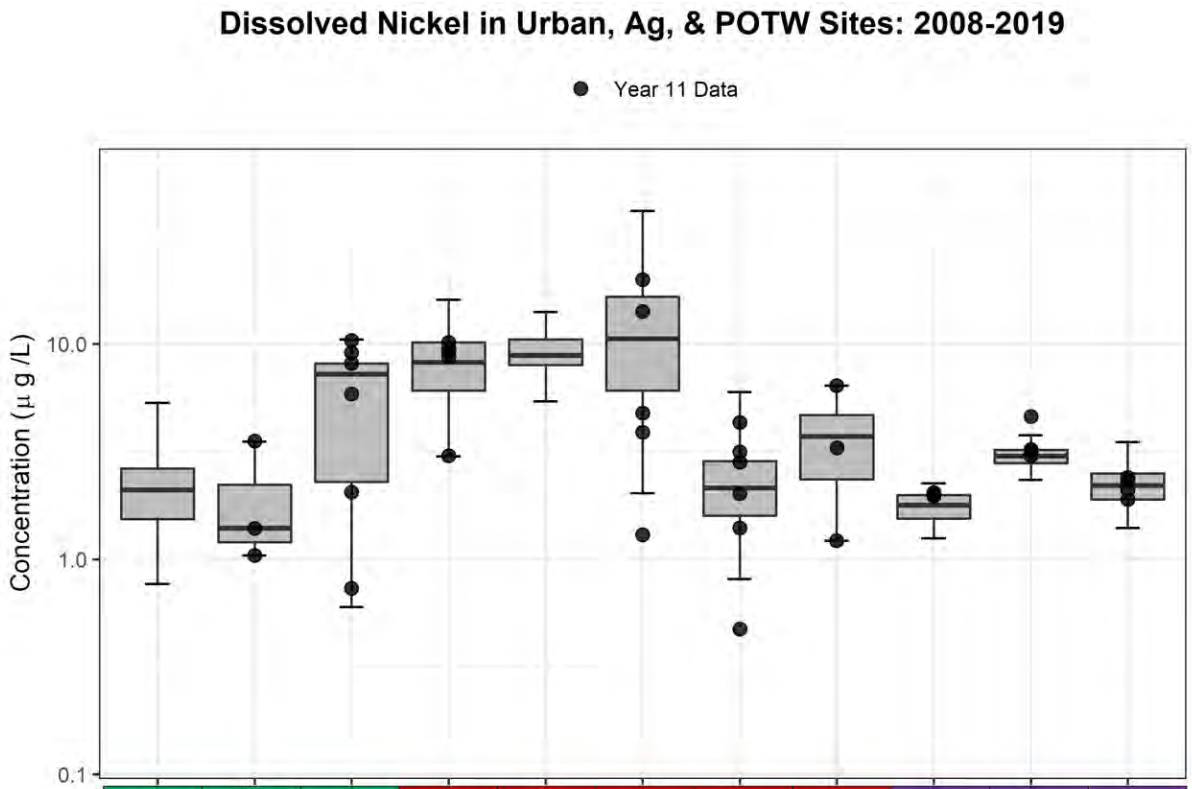
Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE	9BD_ADOLF	01T_ODD2_DCH	02D_BROOM	04D_WOOD	05D_SANT_VCWPD	9BD_GERRY
Nov-18	Storm	70	--	--	2.87	17.2	--	52	58.2	130
Jan-19	Storm	71	--	3.08	1.66	22.3	--	23.4	28.6	132

Figure 36. Total Nickel Stormwater Concentrations in Urban and Ag Sites: 2008-2019



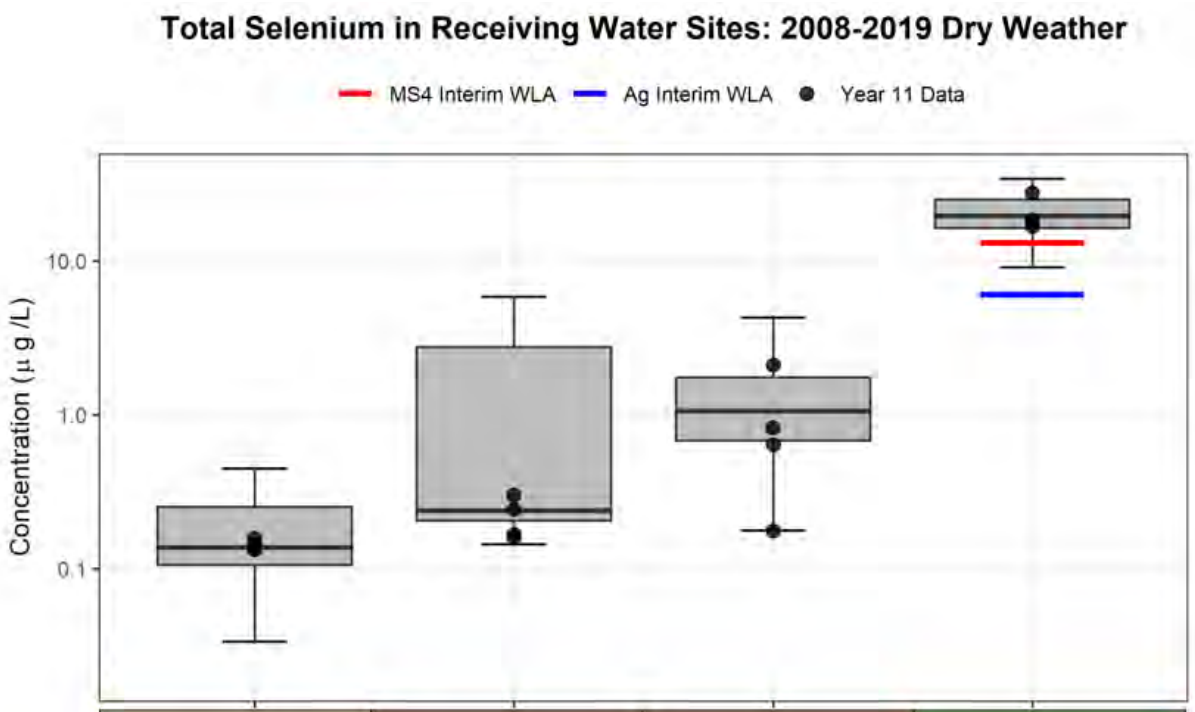
Date	Type	Event	01_RR_BR	02_PCH	03_UNIV	04_WOOD
Aug-18	Dry	68	1.14	3.42	7.44	8.03
Nov-18	Dry	69	1.95	3.15	7.02	7.39
Nov-18	Storm	70	0.719	2.23	12.6	7.98
Jan-19	Storm	71	2.75	2.98	2.94	2.26
Mar-19	Dry	72	4.92	3.33	5.21	8.11
May-19	Dry	73	1.14	3.42	7.44	8.03

Figure 37. Dissolved Nickel Concentrations in Receiving Water Sites: 2008-2019



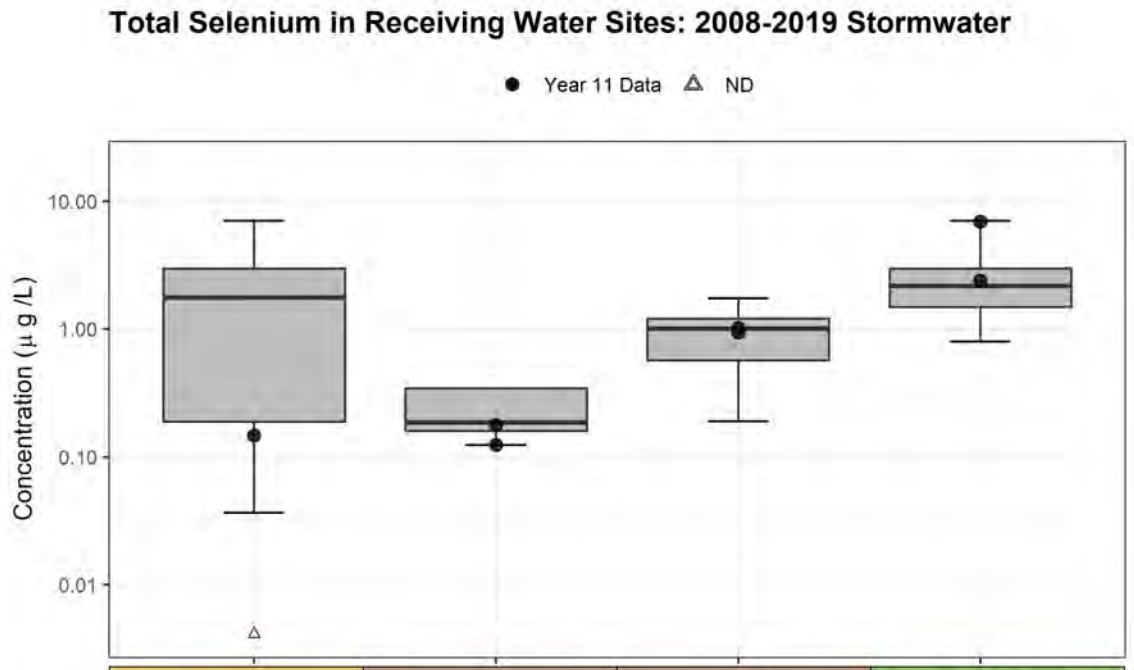
Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE	9BD_ADOLF	01T_ODD2_DCH	02D_BROOM	04D_WOOD	05D_SANT_VCWPD	9BD_GERRY	07D_SIMI	9AD_CAMA	10D_HILL
Aug-18	Dry	68	--	--	8.12	8.75	--	--	2.83	--	2.04	4.62	2.3
Nov-18	Dry	69	--	--	5.87	9.32	--	4.79	0.47	1.22	1.97	3.23	2.1
Nov-18	Storm	70	--	--	2.05	9.19	--	3.88	4.33	6.40	--	--	--
Jan-19	Storm	71	--	1.04	0.73	3.02	--	14.20	2.02	3.29	--	--	--
Mar-19	Dry	72	--	3.53	10.40	9.55	--	19.90	3.16	--	2.00	3.02	1.9
May-19	Dry	73	--	1.39	9.12	10.20	--	1.30	1.40	--	2.03	3.17	2.4

Figure 38. Dissolved Nickel Concentrations in Urban, Ag, and POTW Sites: 2008-2019



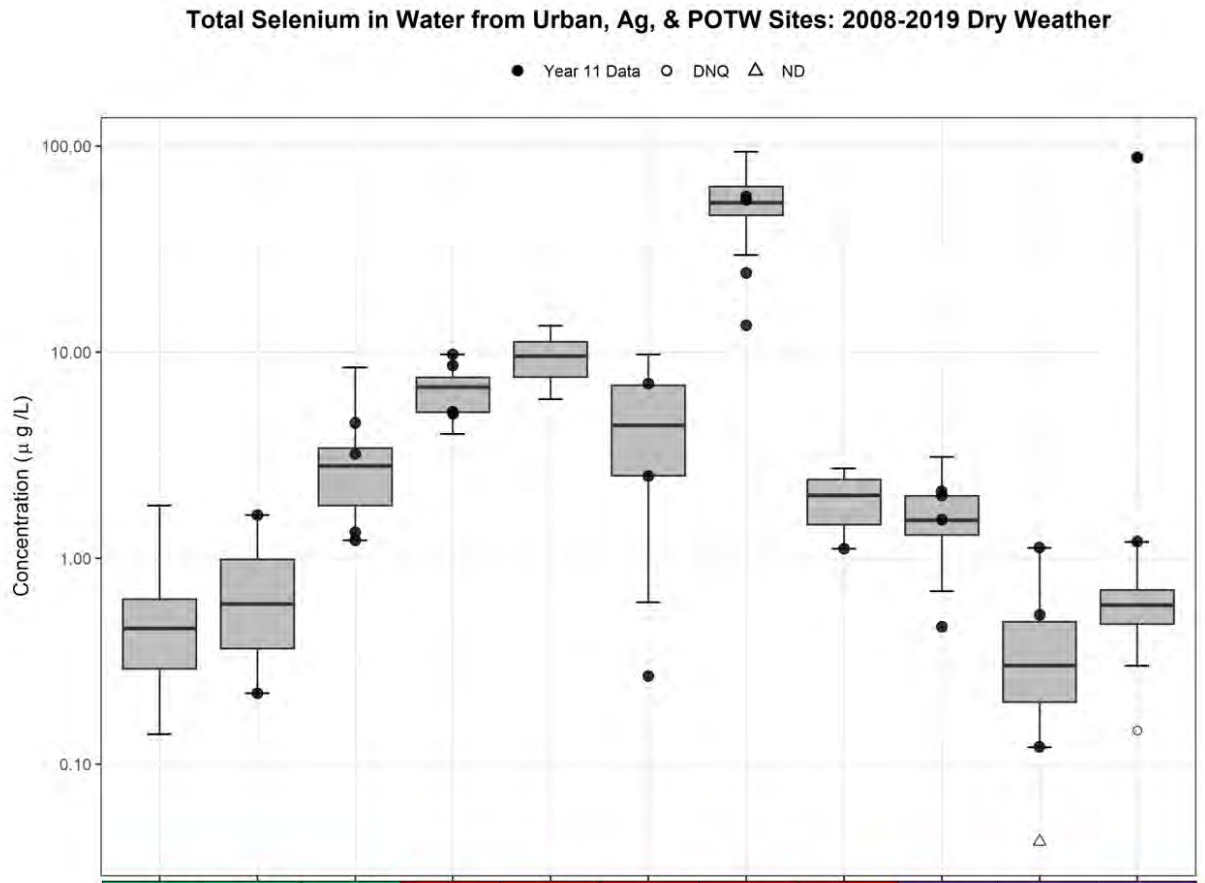
Date	Type	Event	01_RR_BR	02_PCH	03_UNIV	04_WOOD
Aug-18	Dry	68	0.156	0.304	0.642	**27.8**
Nov-18	Dry	69	0.134	0.244	0.178	**16.6**
Mar-19	Dry	72	0.145	0.168	2.110	**17.8**
May-19	Dry	73	0.134	0.161	0.823	**18.3**

Figure 39. Total Selenium Dry Weather Concentrations in Receiving Water Sites: 2008-2019



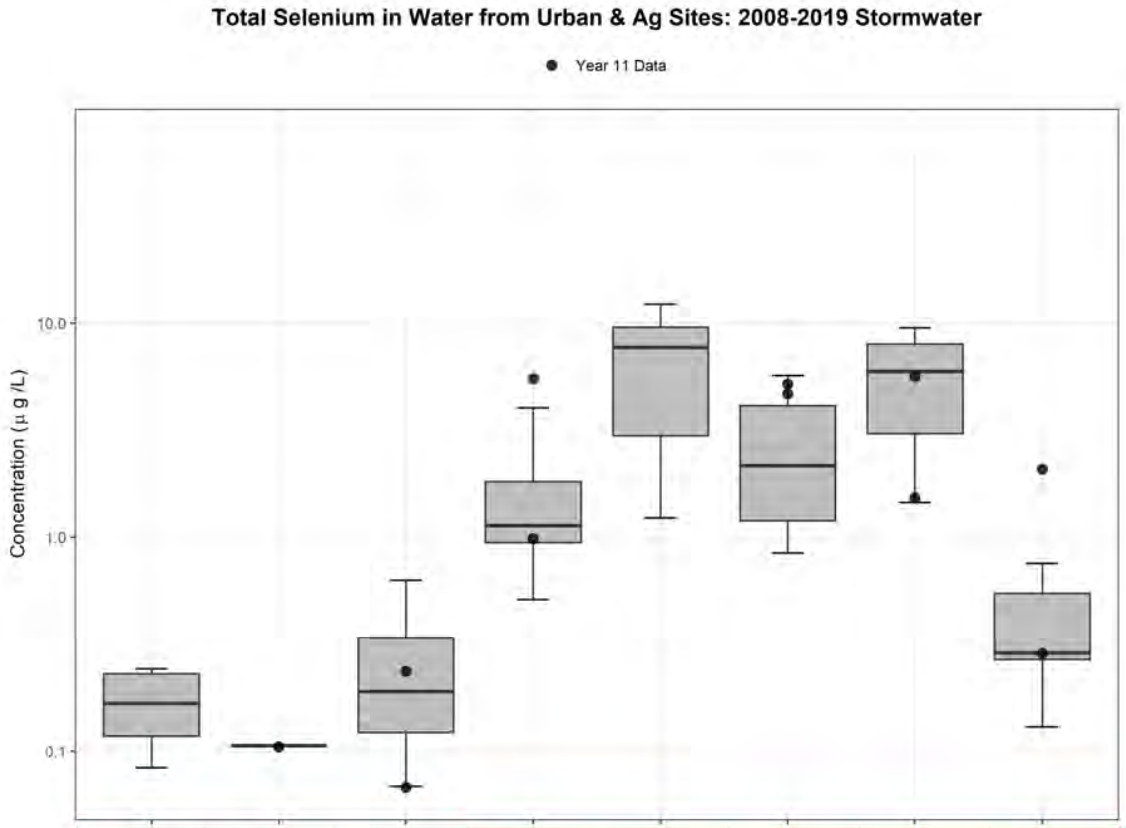
Date	Type	Event	01_RR_BR	02_PCH	03_UNIV	04_WOOD
Nov-18	Storm	70	0.005	0.175	1.010	7.06
Jan-19	Storm	71	0.149	0.124	0.959	2.45

Figure 40. Total Selenium Stormwater Concentration in Receiving Water Sites: 2008-2019



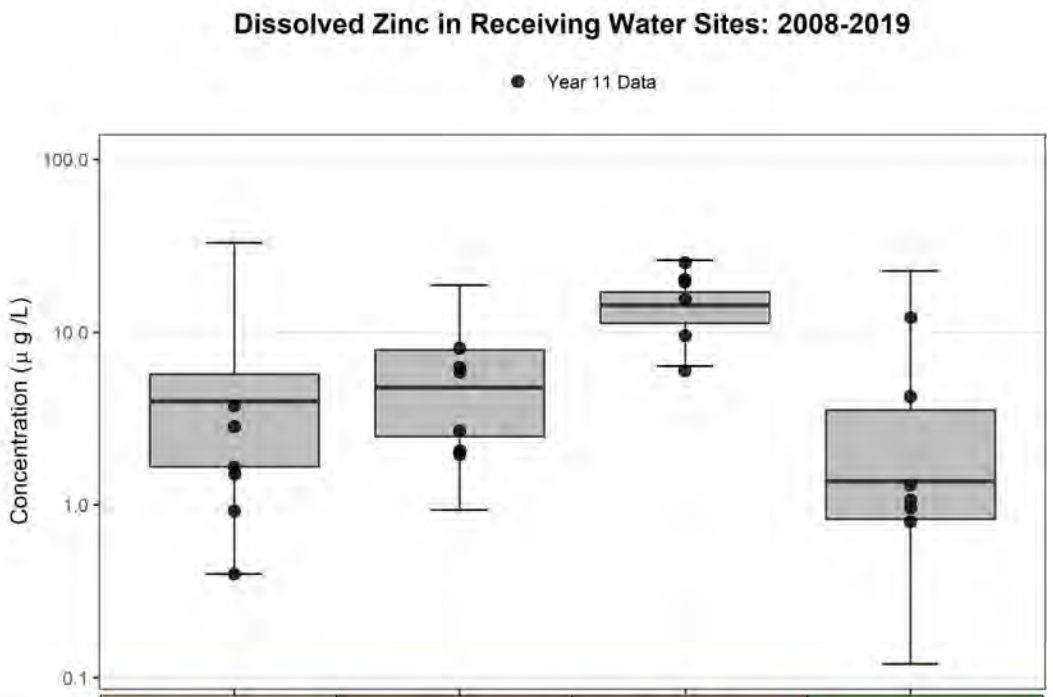
Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE	9BD_ADOLF	01T_ODD2_DCH	02D_BROOM	04D_WOOD	05D_SANT_VCWPD	9BD_GERRY	07D_SIMI	9AD_CAMA	10D_HILL
Aug-18	Dry	68	--	--	1.22	5.02	--	--	54.8	--	1.54	0.121	0.27
Nov-18	Dry	69	--	--	1.33	5.11	--	2.51	13.5	1.11	0.466	<0.021	--
Mar-19	Dry	72	--	1.62	4.52	9.73	--	7.04	56.9	--	2.11	1.120	1.20
May-19	Dry	73	--	0.22	3.21	8.61	--	0.26	24.2	--	2.01	0.529	--

Figure 41. Total Selenium Dry Weather Concentrations in Urban, Ag, and POTW Sites: 2008-2019



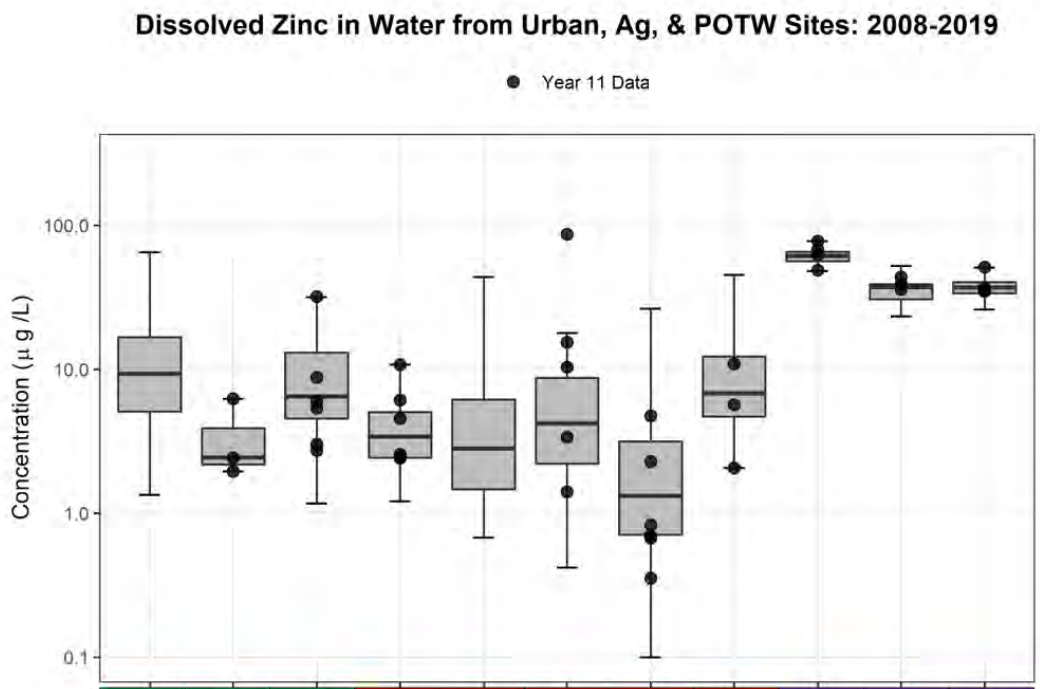
Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE	9BD_ADOLF	01T_ODD2_DCH	02D_BROOM	04D_WOOD	05D_SANT_VCWPD	9BD_GERRY
Nov-18	Storm	70	--	--	0.238	5.41	--	4.67	5.71	2.09
Jan-19	Storm	71	--	0.106	0.068	0.979	--	5.15	1.53	0.28

Figure 42. Total Selenium Stormwater Concentrations in Urban and Ag Sites: 2008-2019



Date	Type	Event	01_RR_BR	02_PCH	03_UNIV	04_WOOD
Aug-18	Dry	68	0.39	1.95	19.40	1.31
Nov-18	Dry	69	1.51	2.05	20.30	0.96
Nov-18	Storm	70	0.92	2.69	9.54	12.20
Jan-19	Storm	71	3.74	5.88	5.96	4.23
Mar-19	Dry	72	2.84	6.25	15.40	1.07
May-19	Dry	73	1.66	8.04	25.20	0.79

Figure 43. Dissolved Zinc Concentrations in Receiving Water Sites: 2008-2019



Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE	9BD_ADOLF	01T_ODD2_DCH	02D_BROOM	04D_WOOD	05D_SANT_VCWPD	9BD_GERRY	07D_SIMI	9AD_CAMA	10D_HILL
Aug-18	Dry	68	--	--	6.01	2.58	--	--	0.69	--	62.4	36.0	35
Nov-18	Dry	69	--	--	5.37	2.45	--	3.38	0.35	2.06	68.0	43.6	35
Nov-18	Storm	70	--	--	31.80	10.80	--	15.4	4.75	10.90	--	--	--
Jan-19	Storm	71	--	6.25	8.77	6.12	--	10.4	2.28	5.68	--	--	--
Mar-19	Dry	72	--	2.43	3.02	4.56	--	1.41	0.82	--	48.9	38.7	37
May-19	Dry	73	--	1.96	2.72	2.41	--	87.2	0.67	--	77.8	39.1	51

Figure 44. Dissolved Zinc Concentrations in Urban, Ag, and POTW Sites: 2008-2019

TOXICITY TMDL

For the Toxicity TMDL, urban dischargers' and POTWs' final wasteload allocations and load allocations for agricultural dischargers are effective. 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 have been separated into dry weather and stormwater since the allocations differ for the two conditions. Data collected during year eleven, 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 (2008-2019). This was done to allow for easy comparison between recent data and what have been collected overall. The eleventh year data are presented in tabular form below each box plot. 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.

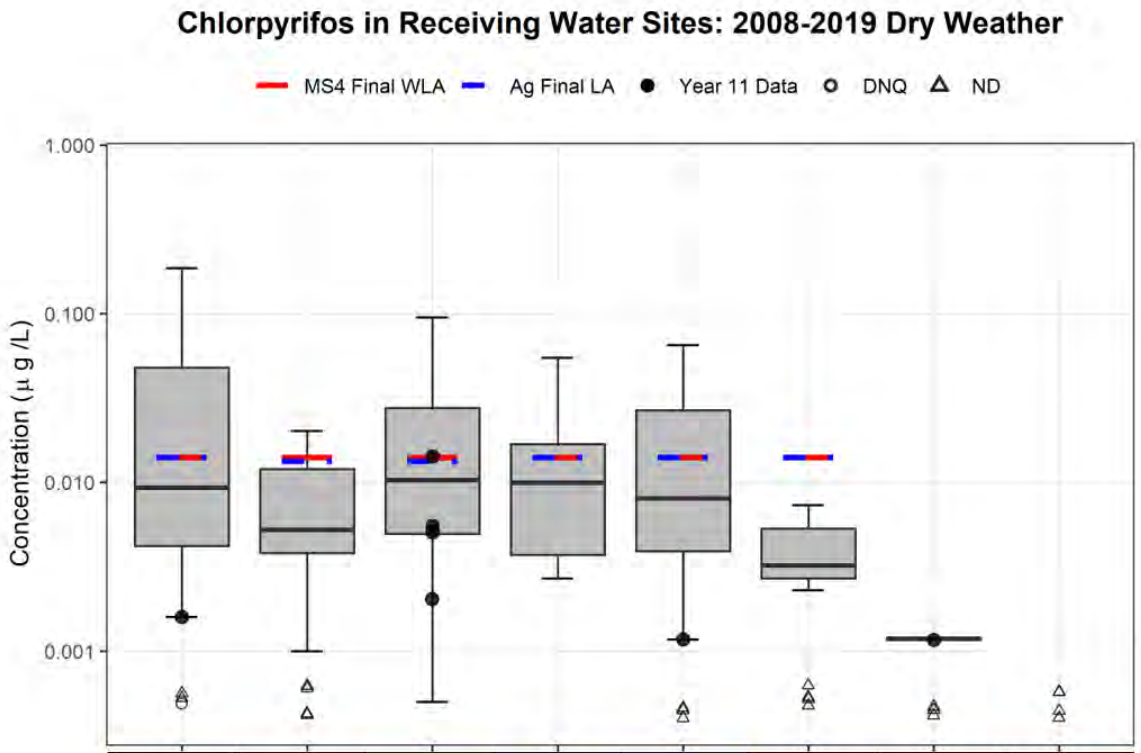
Table 13 shows a summary of monitoring events for the Toxicity TMDL receiving water monitoring sites, and **Table 14** shows a summary of monitoring events for Toxicity TMDL land use monitoring sites. For both tables, shaded cells indicate sites that were not sampled in accordance with the QAPP, values identifies as "x" in the tables indicate that samples were collected at this site, and values identified as "Dry" indicate that samples were not collected at this site due to dry conditions.

Table 13. Toxicity TMDL Receiving Water Monitoring Sites Event Summary - Year 11

Subwatershed	Reach	Site ID	Year 11 Events					
			68	69	70	71	72	73
			18-Aug	18-Nov	18-Nov	19-Jan	19-Feb	19-May
Mugu Lagoon	Reach 1	01_BPT_14						
		01_BPT_15						
		01_BPT_3						
		01_BPT_6						
		01_RR_BR	x	x	x	x	x	x
		01_SG_74						
Calleguas	Reach 2	02_PCH						
	Reach 3	03_UNIV	x	x	x	x	x	x
	Reach 9B	9A_HOWAR						
Revolon Slough	Reach 4	04_WOOD	x	x	x	x	x	x
	Reach 5	05_CENTR						
Las Posas	Reach 6	06_UPLAND	Dry	Dry	x	x	Dry	Dry
Arroyo Simi	Reach 7	07_HITCH	x	x	x	x	x	x
		07_TIERRA						
Conejo	Reach 9A	9B_ADOLF	x	x	x	x	x	x
	Reach 9A	9B_BARON						
	Reach 10	10_GATE	x	x	x	x	x	x
	Reach 12	12_PARK						
	Reach 13	13_BELT	x	x	x	x	x	x

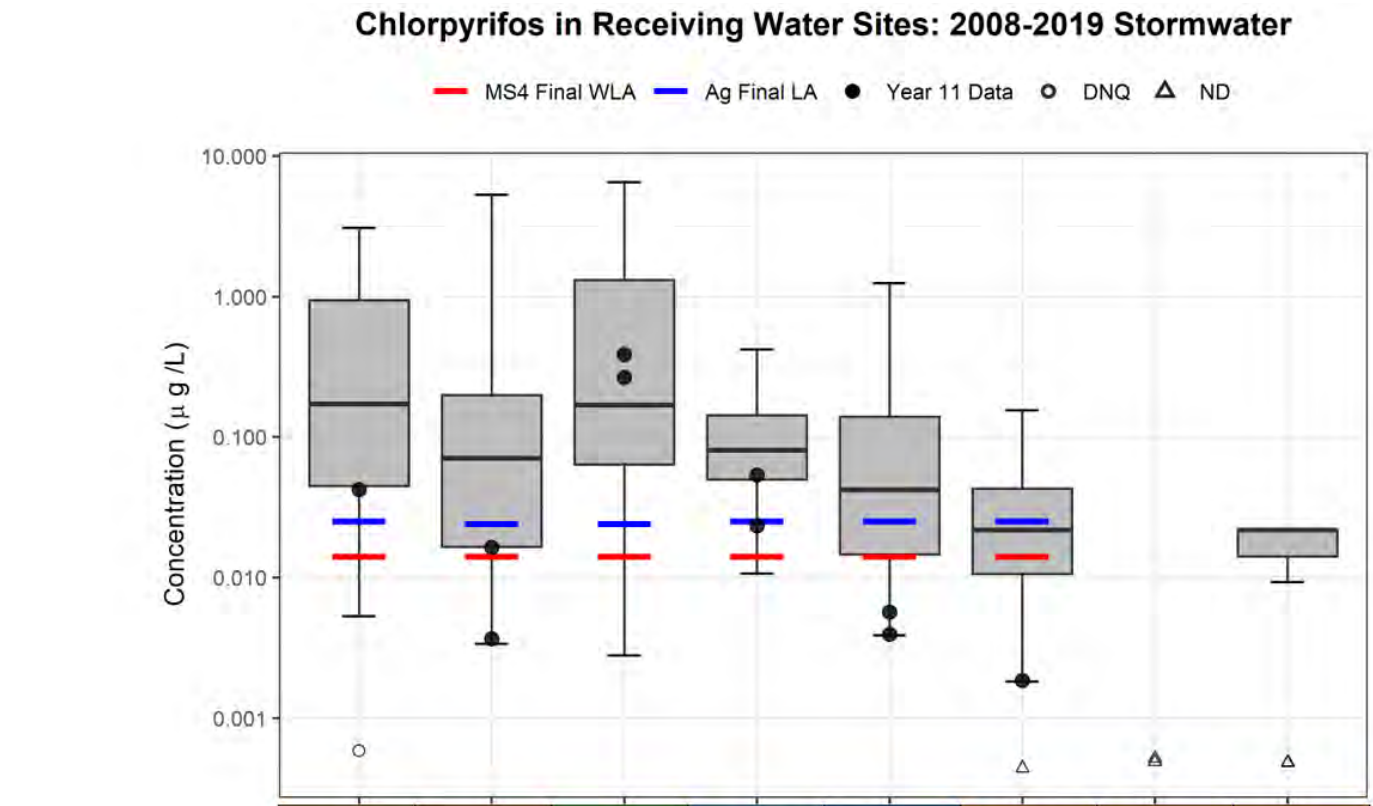
Table 14. Toxicity TMDL Land Use Monitoring Sites Event Summary - Year 11

Land Use Type	Reach	Site ID	Year 11 Events					
			68	69	70	71	72	73
			18-Aug	18-Nov	18-Nov	19-Jan	19-Feb	19-May
Urban (MS4) Sites	Reach 4	04D_VENTURA	Dry	Dry	Dry			
	Reach 4	04D_SPRINGVILLE				x	x	x
	Reach 7	07D_MPK	Dry	x	x	x	x	x
	Reach 7	07D_SIM_BUS	x	x	x	x	x	x
	Reach 9A	9BD_ADOLF	x	x	x	x	x	x
	Reach 13	13_SB_HILL	x	x	x	x	x	x
Agriculture Sites	Reach 1	01T_ODD2_DCH	x	x	x	x	x	x
	Reach 2	02D_BROOM	Dry	Dry	Dry	Dry	Dry	Dry
	Reach 4	04D_WOOD	Dry	x	x	x	x	x
	Reach 5	05D_SANT_VCWPD	x	x	x	x	x	x
	Reach 6	06T_FC_BR	Dry	Dry	Dry	x	Dry	Dry
	Reach 7	07D_HITCH_LEVEE_2	Dry	Dry	x	x	x	Dry
	Reach 9A	9BD_GERRY	Dry	x	x	x	Dry	Dry
POTW Sites	Reach 7	07D_SIMI	x	x			x	x
	Reach 9B	9AD_CAMA	x	x			x	x
	Reach 10	10D_HILL	x	x			x	x



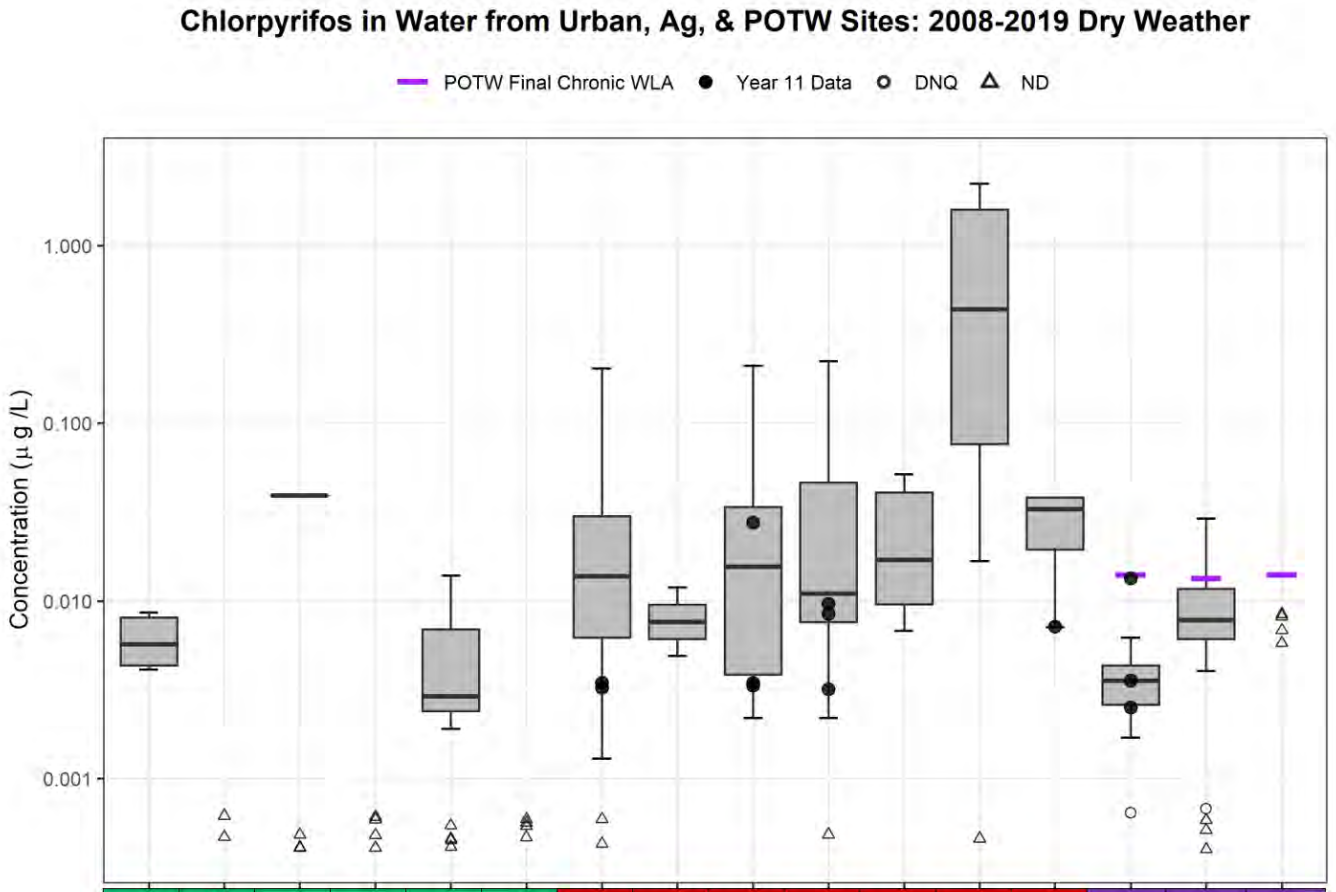
Date	Type	Event	01_RR_BR	03_UNIV	04_WOOD	06_UPLAND	07_HITCH	9B_ADOLF	10_GATE	13_BELT
Aug-18	Dry	68	<0.0005	<0.0005	0.0051	--	<0.0005	<0.0005	<0.0005	<0.0005
Nov-18	Dry	69	<0.0005	<0.0005	**0.0142**	--	<0.0005	<0.0005	0.0012	<0.0005
Mar-19	Dry	72	0.0016	<0.0005	0.0055	--	0.0012	<0.0005	<0.0005	<0.0005
May-19	Dry	73	*0.0006*	<0.0005	0.0020	--	<0.0005	<0.0005	<0.0005	<0.0005

Figure 45. Chlorpyrifos Dry Weather Concentrations in Receiving Water Sites: 2008-2019



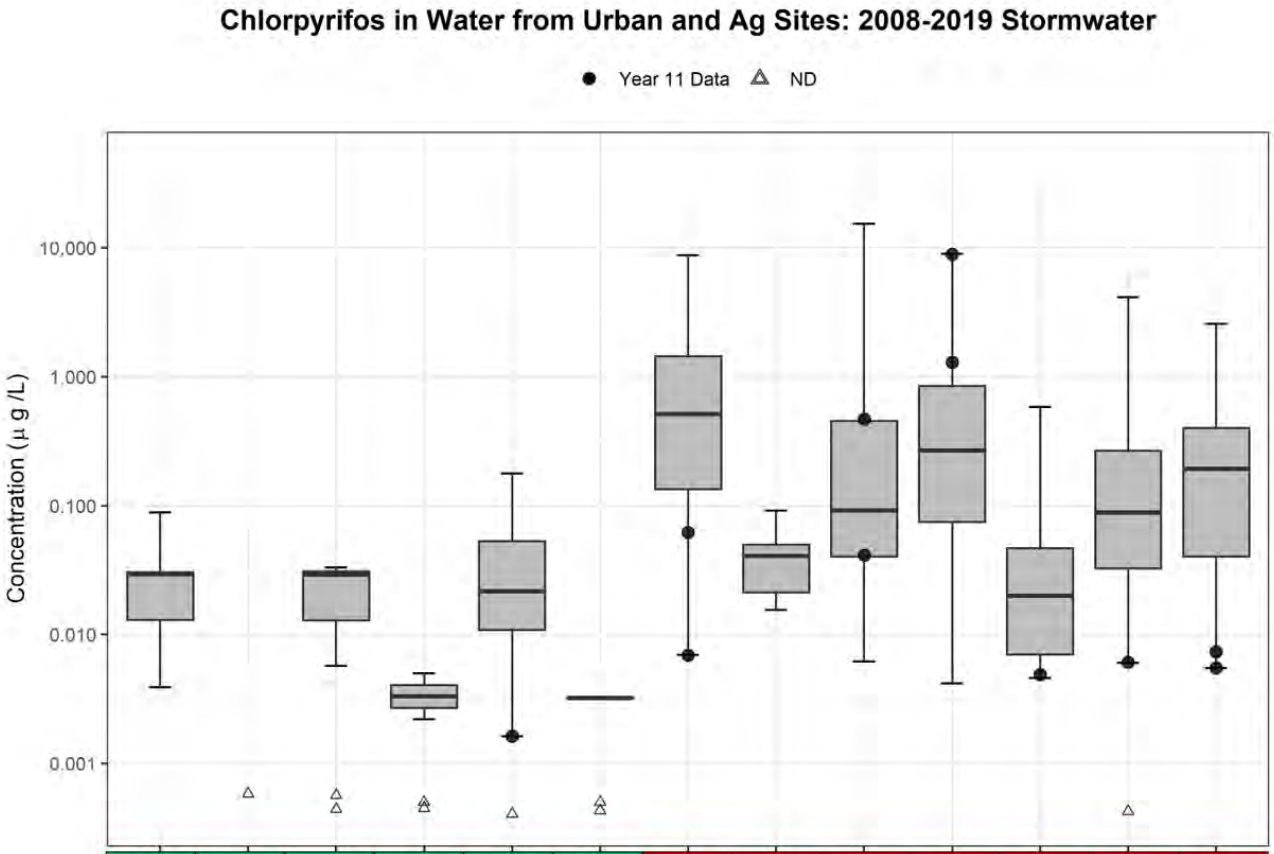
Date	Type	Event	01_RR_BR	03_UNIV	04_WOOD	06_UPLAND	07_HITCH	9B_ADOLF	10_GATE	13_BELT
Nov-18	Storm	70	*0.0009*	**0.0176**	**0.2590**	**0.0525**	0.0042	<0.0005	<0.0005	<0.0005
Jan-19	Storm	71	**0.0411**	0.0034	**0.3790**	**0.0237**	0.0057	0.0019	<0.0005	<0.0005

Figure 46. Chlorpyrifos Stormwater Concentrations in Receiving Water Sites: 2008-2019



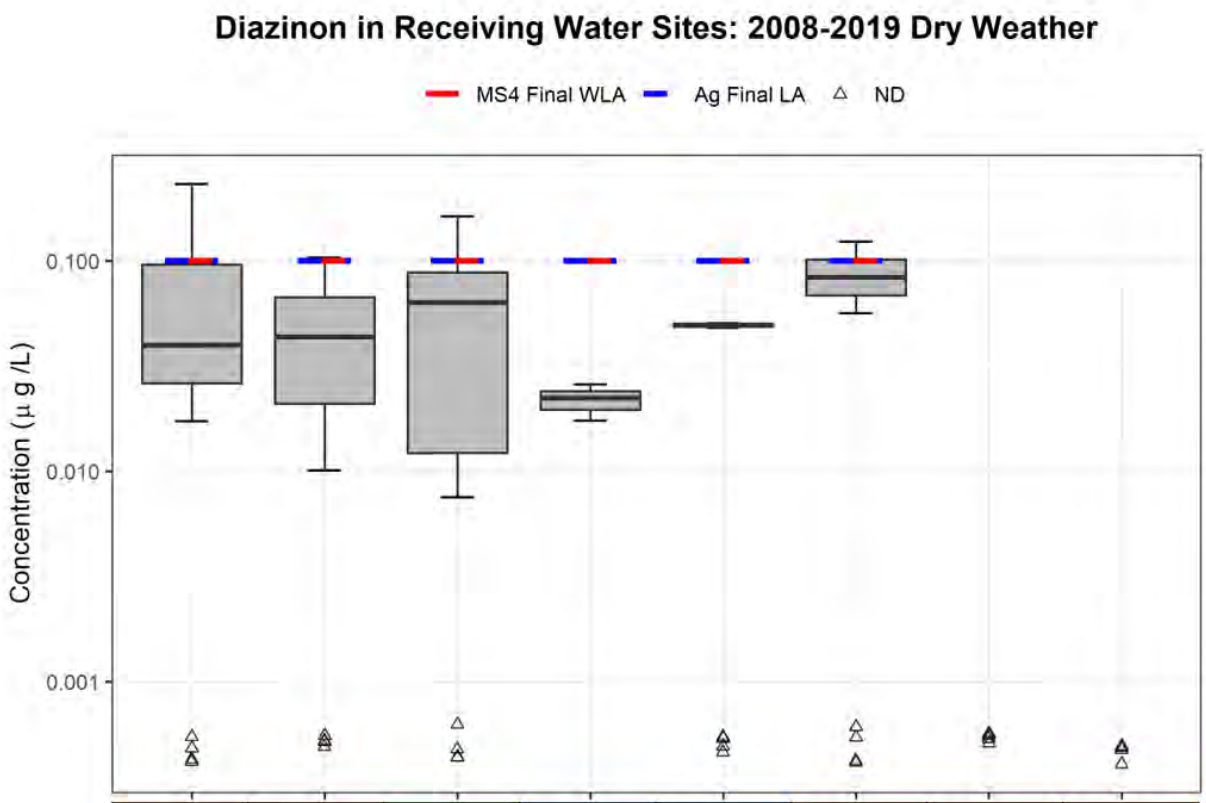
Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE	07D_MPK	07D_SIM_BUS	9BD_ADOLF	13_SB_HILL	01T_ODD2_DCH	02D_BROOM	04D_WOOD	05D_SANT_VCWPD	06T_FC_BR	07D_HITCH_LEVEE_2	9BD_GERRY	07D_SIMI	9AD_CAMA	10D_HILL
Aug-18	Dry	68	--	--	--	<0.0005	<0.0005	<0.0005	0.0032	--	--	<0.0005	--	--	--	0.0036	<0.0005	<0.0005
Nov-18	Dry	69	--	--	<0.0005	<0.0005	<0.0005	<0.0005	0.0035	--	0.0034	0.0084	--	--	0.0071	*0.0006*	*0.0007*	<0.0005
Mar-19	Dry	72	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	--	0.0277	0.0032	--	<0.0005	--	0.0134	<0.0005	<0.0005
May-19	Dry	73	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	--	0.0035	0.0096	--	--	--	0.0025	<0.0005	<0.0005

Figure 47. Chlorpyrifos Dry Weather Concentrations in Urban, Ag, and POTW Sites: 2008-2019



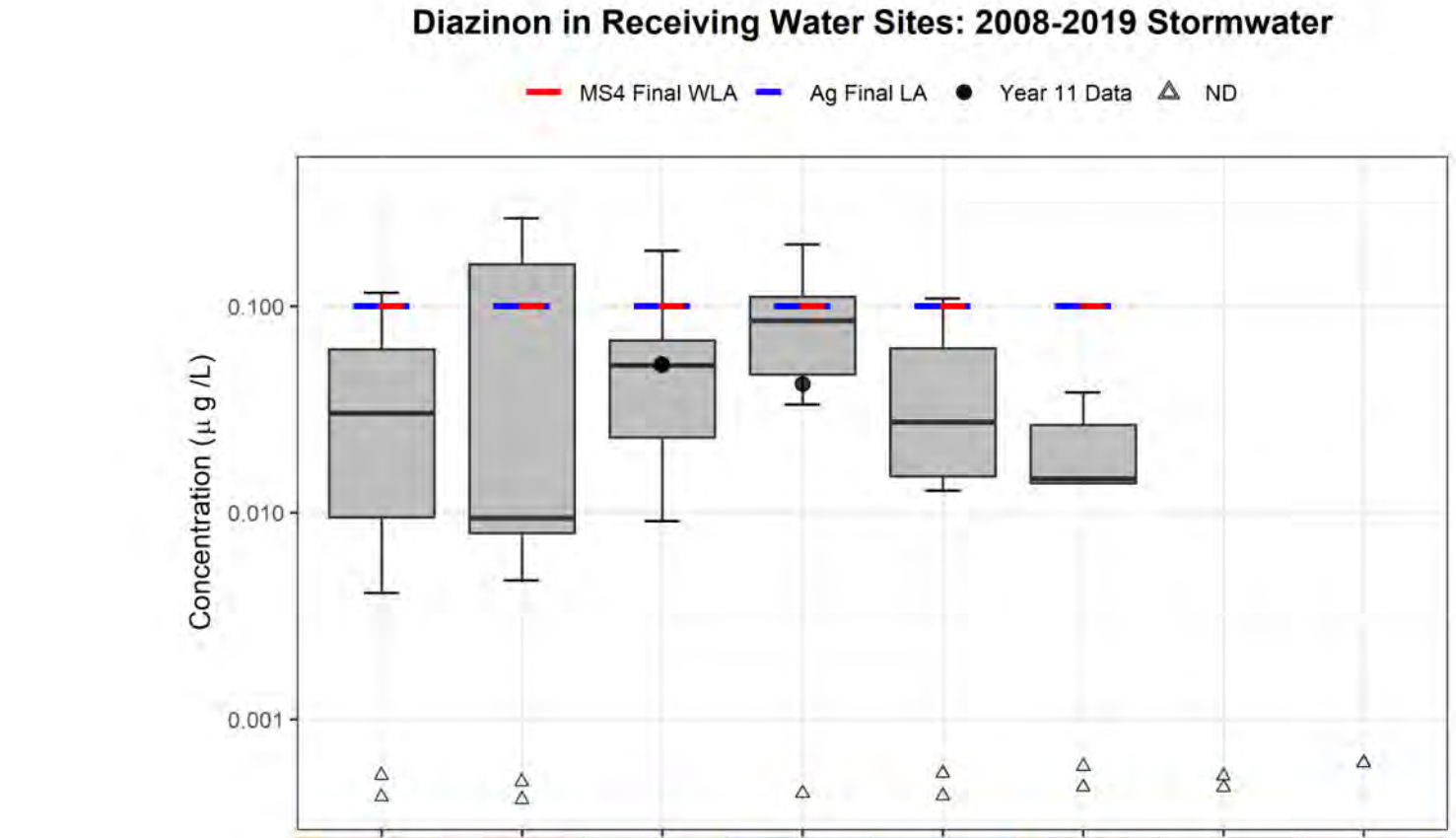
Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE	07D_MPK	07D_SIM_BUS	9BD_ADOLF	13_SB_HILL	01T_ODD2_DCH	02D_BROOM	04D_WOOD	05D_SANT_VCWPD	06T_FC_BR	07D_HITCH_LEVEE_2	9BD_GERRY
Nov-18	Storm	70	--	--	<0.0005	<0.0005	0.0016	<0.0005	0.0070	--	0.0414	8.99	--	<0.0005	0.0072
Jan-19	Storm	71	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0622	--	0.4640	1.31	0.0050	0.0060	0.0055

Figure 48. Chlorpyrifos Stormwater Concentrations in Urban and Ag Sites: 2008-2019



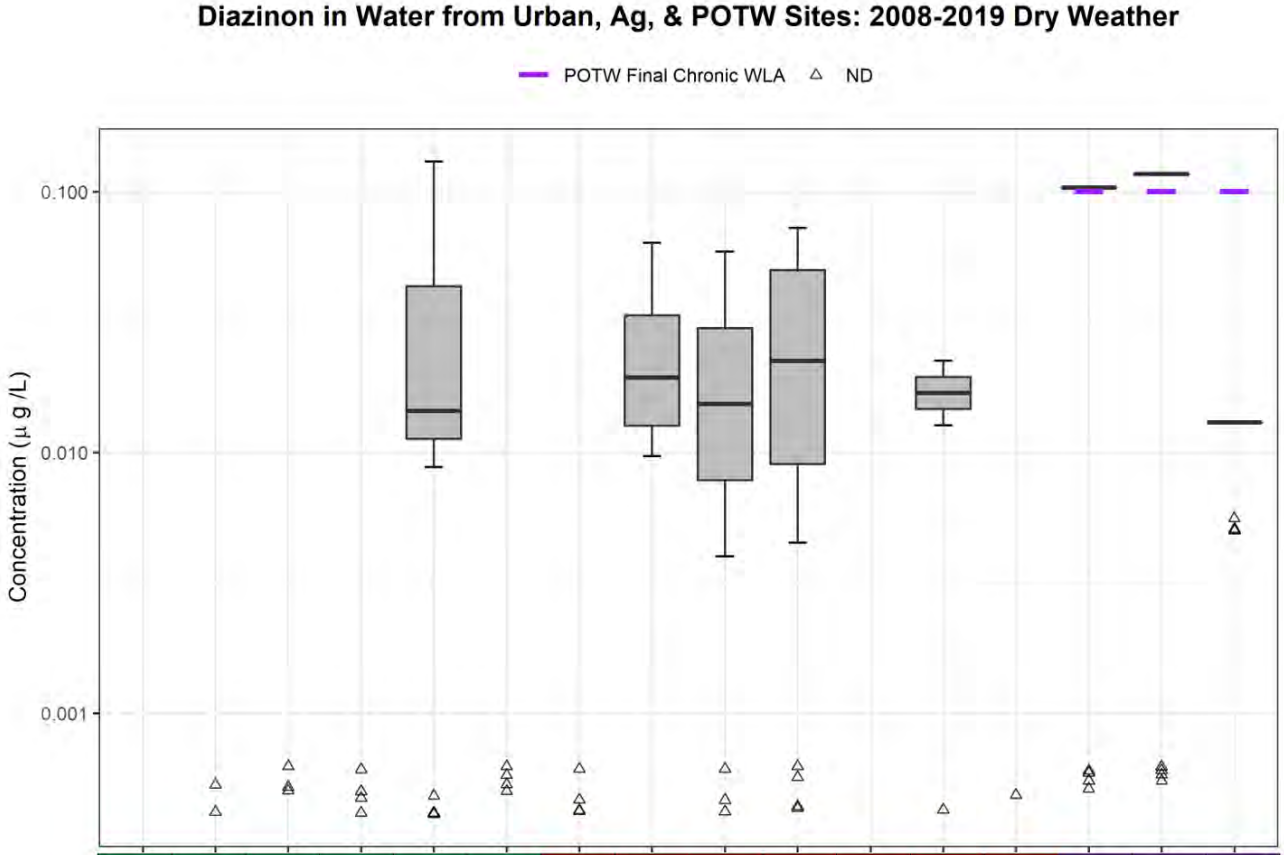
Date	Type	Event	01_RR_BR	03_UNIV	04_WOOD	06_UPLAND	07_HITCH	9B_ADOLF	10_GATE	13_BELT
Aug-18	Dry	68	<0.0005	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005
Nov-18	Dry	69	<0.0005	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005
Mar-19	Dry	72	<0.0005	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005
May-19	Dry	73	<0.0005	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005

Figure 49. Diazinon Dry Weather Concentrations in Receiving Water Sites: 2008-2019



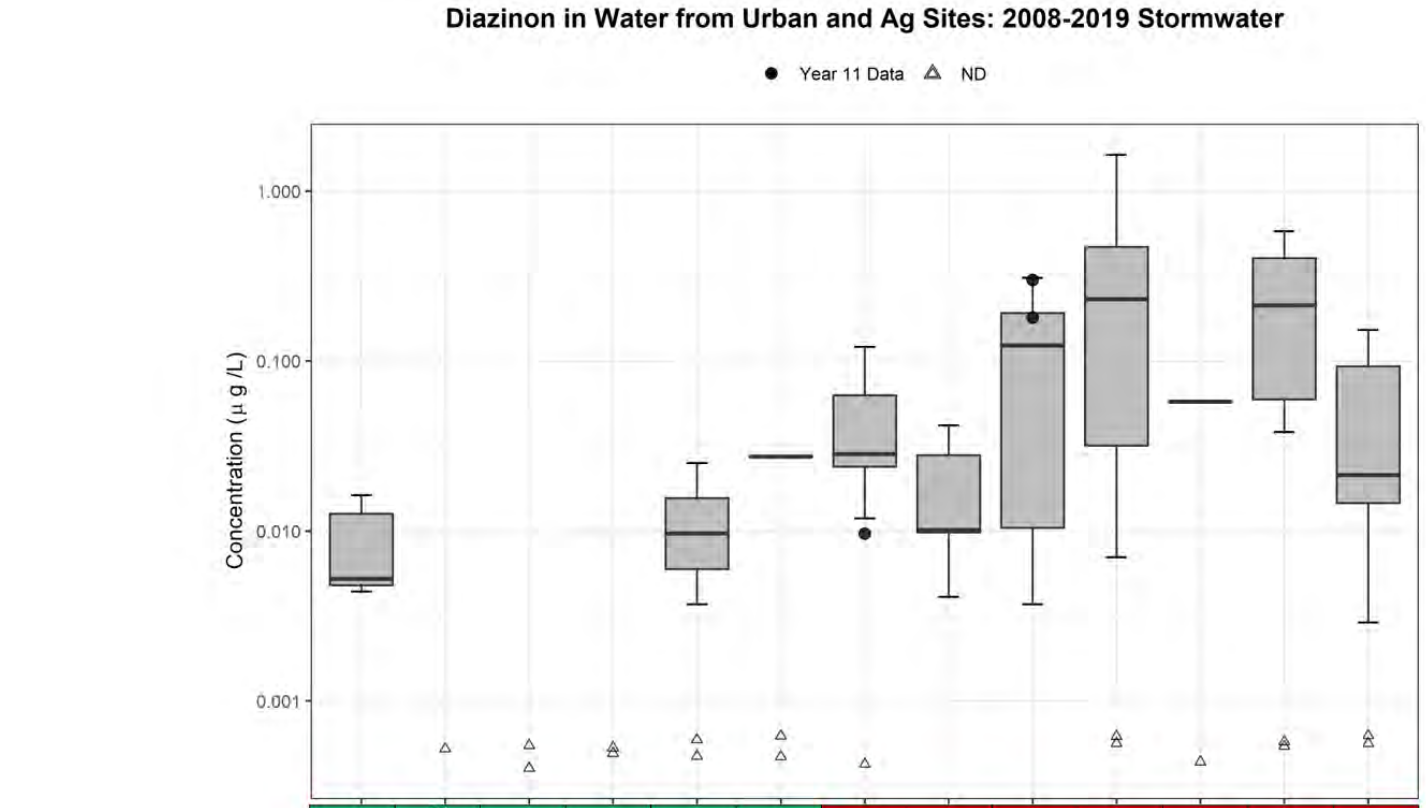
Date	Type	Event	01_RR_BR	03_UNIV	04_WOOD	06_UPLAND	07_HITCH	9B_ADOLF	10_GATE	13_BELT
Nov-18	Storm	70	<0.0005	<0.0005	0.0528	0.0420	<0.0005	<0.0005	<0.0005	<0.0005
Jan-19	Storm	71	<0.0005	<0.0005	0.0517	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Figure 50. Diazinon Stormwater Concentrations in Receiving Water Sites: 2008-2019



Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE	07D_MPK	07D_SIM_BUS	9BD_ADOLF	13_SB_HILL	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-18	Dry	68	--	--	--	<0.0005	<0.0005	<0.0005	<0.0005	--	--	<0.0005	--	--	--	<0.0005	<0.0005	<0.0052
Nov-18	Dry	69	--	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	--	<0.0005	<0.0005	--	--	<0.0005	<0.0005	<0.0005	<0.0052
Mar-19	Dry	72	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	--	<0.0005	<0.0005	--	<0.0005	--	<0.0005	<0.0005	<0.0052
May-19	Dry	73	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	--	<0.0005	<0.0005	--	--	--	<0.0005	<0.0005	<0.0052

Figure 51. Diazinon Dry Weather Concentrations in Urban, Ag, and POTW Sites: 2008-2019



Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE	07D_MPK	07D_SIM_BUS	9BD_ADOLF	13_SB_HILL	01T_ODD2 _DCH	02D_BROOM	04D_WOOD	05D_SANT _VCWPD	06T_FC_BR	07D_HITCH _LEVEE_2	9BD_GERRY
Nov-18	Storm	70	--	--	<0.0005	<0.0005	<0.0005	<0.0005	0.0119	--	0.3080	0.0005	--	<0.0005	<0.0005
Jan-19	Storm	71	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	--	0.1650	<0.0005	<0.0005	<0.0005	<0.0005

Figure 52. Diazinon Stormwater Concentrations in Urban and Ag Sites: 2008-2019

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. Data collected during year eleven, 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 (2008-2019). This was done to allow for easy comparison between recent data and what have been collected overall. The eleventh year data are presented in tabular form below each box plot. 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.

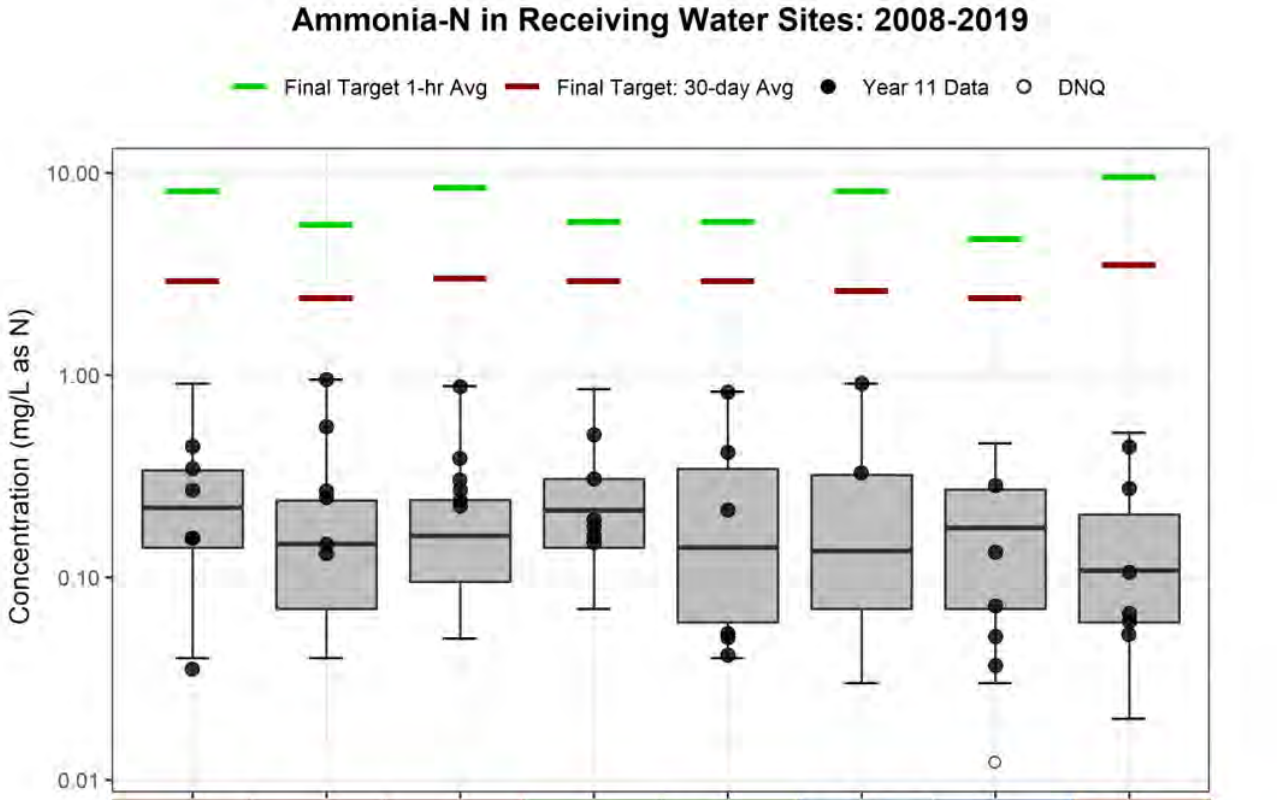
Table 15 shows a summary of monitoring events for the Nutrients TMDL receiving water monitoring sites, and **Table 16** shows a summary of monitoring events for Nutrients TMDL land use monitoring sites. For both tables, shaded cells indicate sites that were not sampled in accordance with the QAPP, values identifies as "x" in the tables indicate that samples were collected at this site, and values identified as "Dry" indicate that samples were not collected at this site due to dry conditions.

Table 15. Nutrients TMDL Receiving Water Monitoring Sites Event Summary - Year 11

Subwatershed	Reach	Site ID	Year 11 Events					
			68	69	70	71	72	73
			18-Aug	18-Nov	18-Nov	19-Jan	19-Feb	19-May
Mugu Lagoon	Reach 1	01_BPT_14						
		01_BPT_15						
		01_BPT_3						
		01_BPT_6						
		01_RR_BR	x	x	x	x	x	x
		01_SG_74						
Calleguas	Reach 2	02_PCH	x	x	x	x	x	x
	Reach 3	03_UNIV	x	x	x	x	x	x
	Reach 9B	9A_HOWAR						
Revolon Slough	Reach 4	04_WOOD	x	x	x	x	x	x
	Reach 5	05_CENTR	x	x	x	x	x	x
Las Posas	Reach 6	06_UPLAND	Dry	Dry	x	x	Dry	Dry
Arroyo Simi	Reach 7	07_HITCH	x	x	x	x	x	x
		07_TIERRA						
Conejo	Reach 9A	9B_ADOLF	x	x	x	x	x	x
	Reach 9A	9B_BARON						
	Reach 10	10_GATE						
	Reach 12	12_PARK						
	Reach 13	13_BELT						

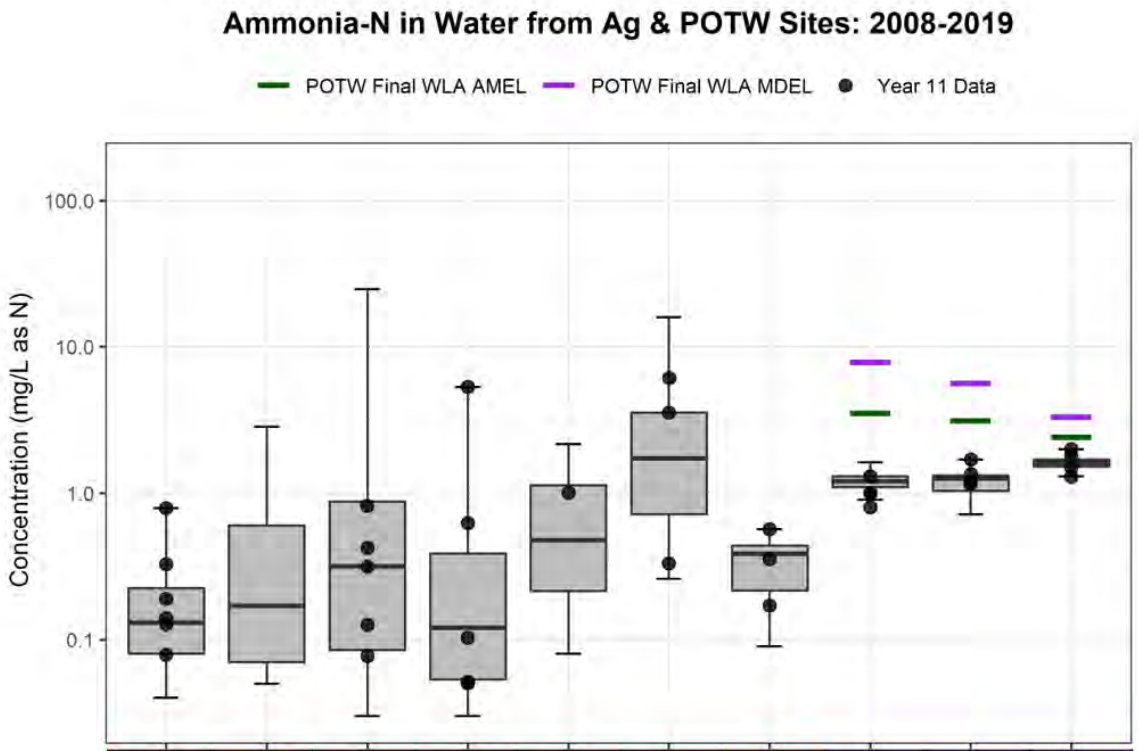
Table 16. Nutrients TMDL Land Use Monitoring Sites Event Summary - Year 11

Land Use Type	Reach	Site ID	Year 11 Events					
			68	69	70	71	72	73
			18-Aug	18-Nov	18-Nov	19-Jan	19-Feb	19-May
Urban (MS4) Sites	Reach 4	04D_VENTURA						
	Reach 4	04D_SPRINGVILLE						
	Reach 7	07D_MPK						
	Reach 7	07D_SIM_BUS						
	Reach 9A	9BD_ADOLF						
	Reach 13	13_SB_HILL						
Agriculture Sites	Reach 1	01T_ODD2_DCH	x	x	x	x	x	x
	Reach 2	02D_BROOM	Dry	Dry	Dry	Dry	Dry	Dry
	Reach 4	04D_WOOD	Dry	x	x	x	x	x
	Reach 5	05D_SANT_VCWPD	x	x	x	x	x	x
	Reach 6	06T_FC_BR	Dry	Dry	Dry	x	Dry	Dry
	Reach 7	07D_HITCH_LEVEE_2	Dry	Dry	x	x	x	Dry
	Reach 9A	9BD_GERRY	Dry	x	x	x	Dry	Dry
POTW Sites	Reach 7	07D_SIMI	x	x			x	x
	Reach 9B	9AD_CAMA	x	x			x	x
	Reach 10	10D_HILL	x	x			x	x



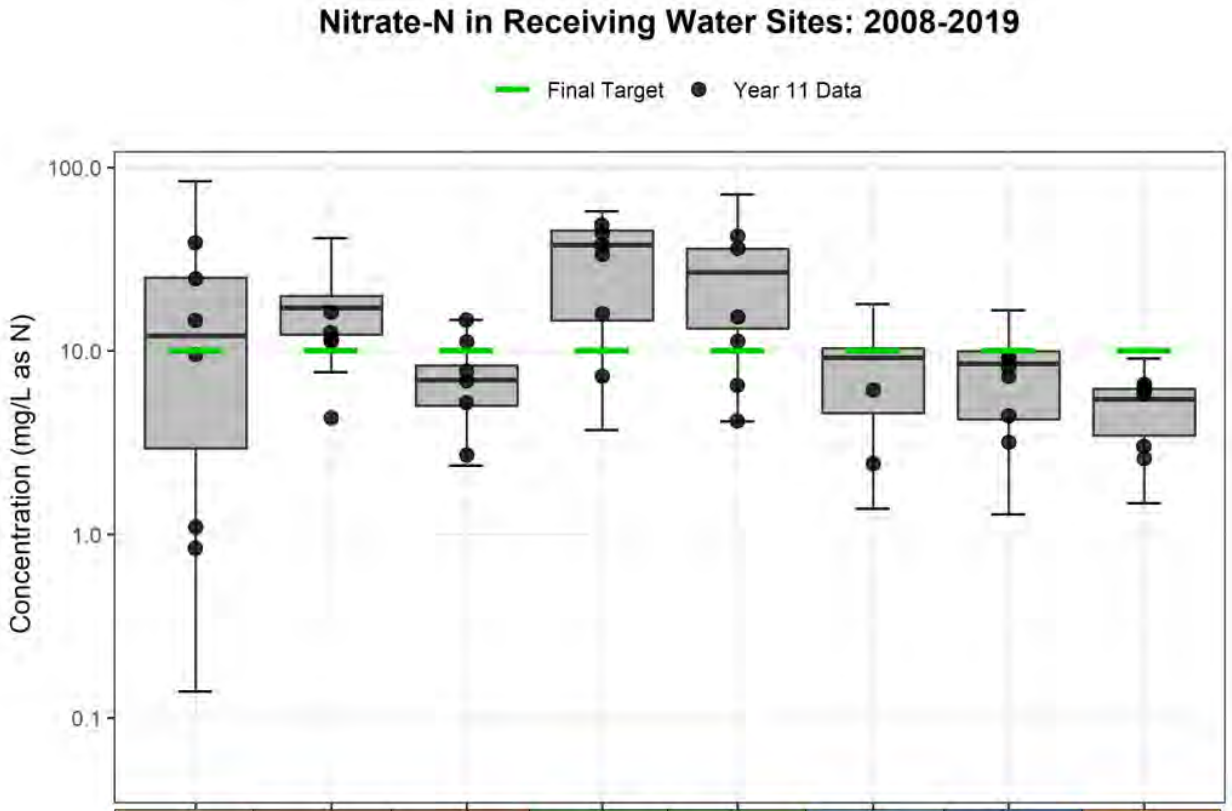
Date	Type	Event	01_RR_BR	02_PCH	03_UNIV	04_WOOD	05_CENTR	06_UPLAND	07_HITCH	9B_ADOLF
Aug-18	Dry	68	0.445	0.950	0.241	0.177	0.053	--	0.036	0.052
Nov-18	Dry	69	0.347	0.131	0.389	0.307	0.050	--	0.022	0.060
Nov-18	Storm	70	0.156	0.249	0.304	0.507	0.826	0.910	0.286	0.442
Jan-19	Storm	71	0.156	0.146	0.271	0.149	0.215	0.329	0.133	0.276
Mar-19	Dry	72	0.271	0.267	0.225	0.160	0.041	--	0.051	0.106
May-19	Dry	73	0.035	0.555	0.880	0.193	0.415	--	0.072	0.066

Figure 53. Ammonia-N Concentrations in Receiving Water Sites: 2008-2019



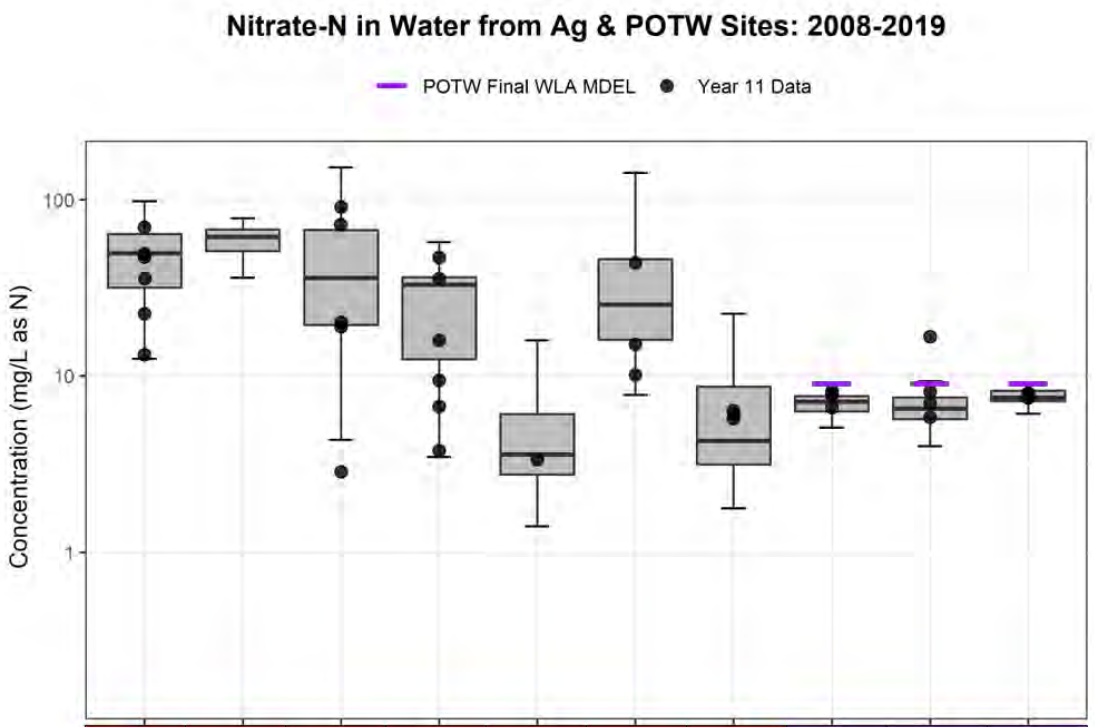
Date	Type	Event	01T_ODD2_DCH	02D_BROOM	04D_WOOD	05D_SANT_VCWPD	06T_FC_BR	07D_HITCH_LEVEE_2	9BD_GERRY	07D_SIMI	9AD_CAMA	10D_HILL
Aug-18	Dry	68	0.127	--	--	0.050	--	--	--	1.3	1.7	1.5
Nov-18	Dry	69	0.791	--	0.822	0.051	--	--	0.171	1.0	1.2	1.8
Nov-18	Storm	70	0.327	--	0.422	0.625	--	3.54	0.566	--	--	--
Jan-19	Storm	71	0.189	--	0.126	0.103	1.01	0.33	0.355	--	--	--
Mar-19	Dry	72	0.078	--	0.077	0.051	--	6.11	--	0.8	1.35	2.0
May-19	Dry	73	0.140	--	0.316	5.330	--	--	--	1.0	1.16	1.3

Figure 54. Ammonia-N Concentrations in Ag and POTW Sites: 2008-2019



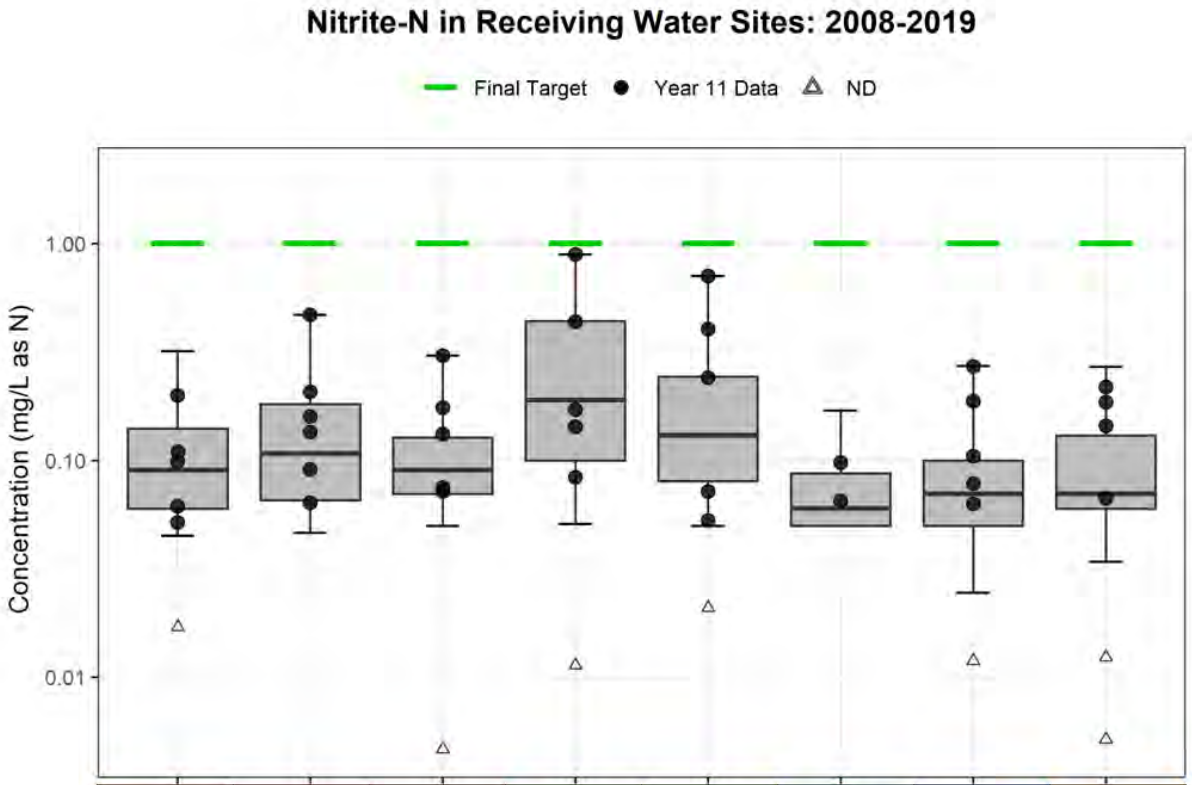
Date	Type	Event	01_RR_BR	02_PCH	03_UNIV	04_WOOD	05_CENTR	06_UPLAND	07_HITCH	9B_ADOLF
Aug-18	Dry	68	1.10	**11.40**	**14.80**	**37.90**	**36.40**	--	9.24	6.33
Nov-18	Dry	69	9.59	**12.60**	6.88	**43.60**	**11.30**	--	9.10	6.59
Nov-18	Storm	70	0.84	**16.20**	5.26	**16.00**	6.47	6.17	4.44	3.03
Jan-19	Storm	71	**14.70**	4.33	2.72	7.29	4.15	2.43	3.18	2.60
Mar-19	Dry	72	**38.90**	**11.30**	7.76	**48.80**	**42.40**	--	8.18	5.83
May-19	Dry	73	**24.70**	**11.60**	**11.30**	**33.70**	**15.40**	--	7.29	6.09

Figure 55. Nitrate-N Concentrations in Receiving Water Sites: 2008-2019



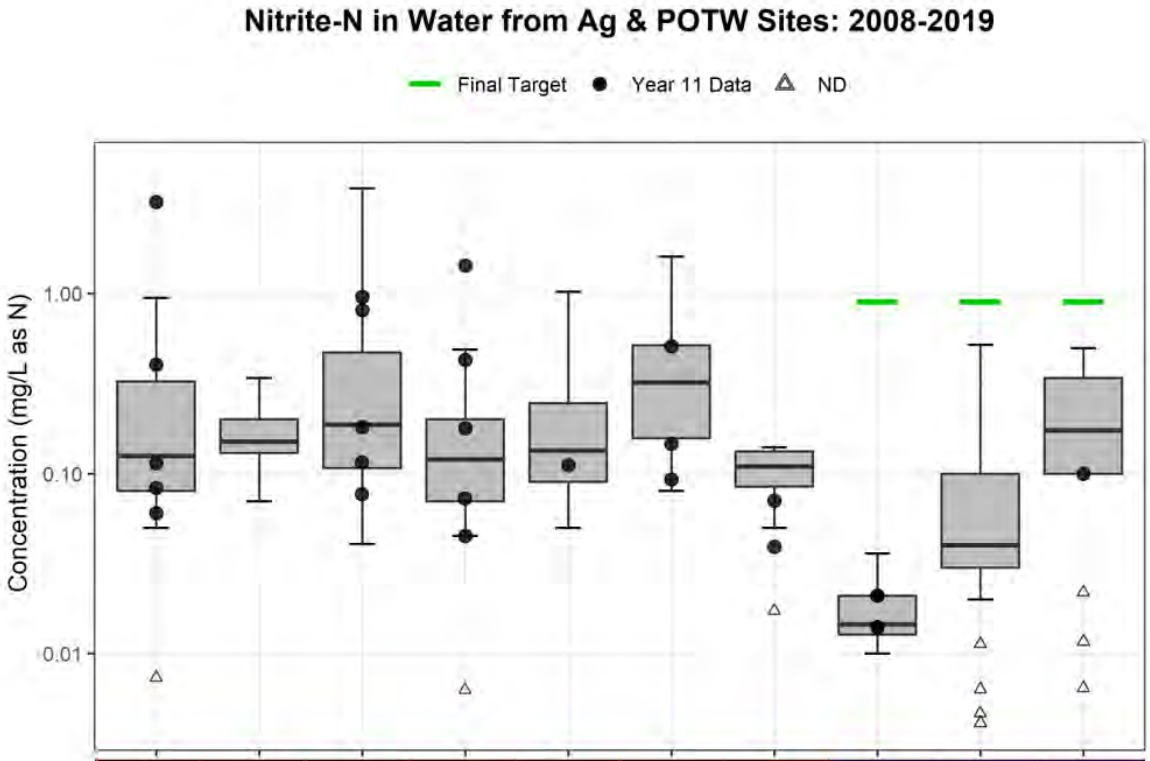
Date	Type	Event	01T_ODD2 _DCH	02D_BROOM	04D_WOOD	05D_SANT _VCWPD	06T_FC_BR	07D_HITCH _LEVEE_2	9BD_GERRY	07D_SIMI	9AD_CAMA	10D_HILL
Aug-18	Dry	68	22.6	--	--	35.60	--	--	--	7.7	**16.7**	8.0
Nov-18	Dry	69	49.4	--	19.00	9.45	--	--	5.72	8.2	5.8	7.5
Nov-18	Storm	70	35.7	--	20.10	6.70	--	43.7	6.08	--	--	--
Jan-19	Storm	71	13.2	--	72.10	3.76	3.36	10.1	6.37	--	--	--
Mar-19	Dry	72	69.7	--	90.70	47.00	--	15.1	--	6.6	7.0	7.8
May-19	Dry	73	47.3	--	2.86	15.90	--	--	--	7.9	8.1	7.5

Figure 56. Nitrate-N Concentrations in Ag and POTW Sites: 2008-2019



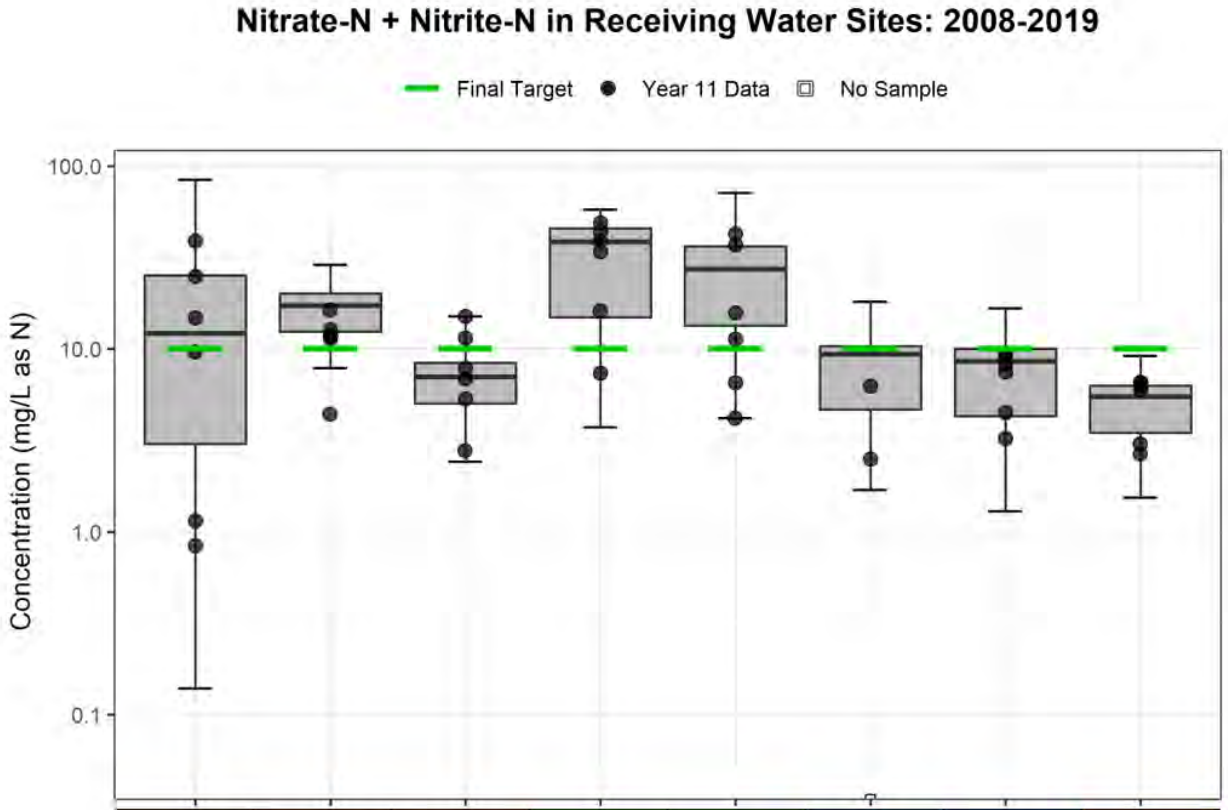
Date	Type	Event	01_RR_BR	02_PCH	03_UNIV	04_WOOD	05_CENTR	06_UPLAND	07_HITCH	9B_ADOLF
Aug-18	Dry	68	0.05	0.47	0.30	0.89	0.70	--	0.27	0.21
Nov-18	Dry	69	0.06	0.20	<0.01	<0.01	<0.01	--	<0.01	<0.01
Nov-18	Storm	70	<0.01	0.13	0.07	0.14	0.07	0.09	0.06	<0.01
Jan-19	Storm	71	0.09	0.09	0.07	0.08	0.05	0.06	0.07	0.06
Mar-19	Dry	72	0.11	0.06	0.13	0.17	0.24	--	0.10	0.14
May-19	Dry	73	0.20	0.15	0.17	0.43	0.40	--	0.18	0.18

Figure 57. Nitrite-N Concentrations in Receiving Water Sites: 2008-2019



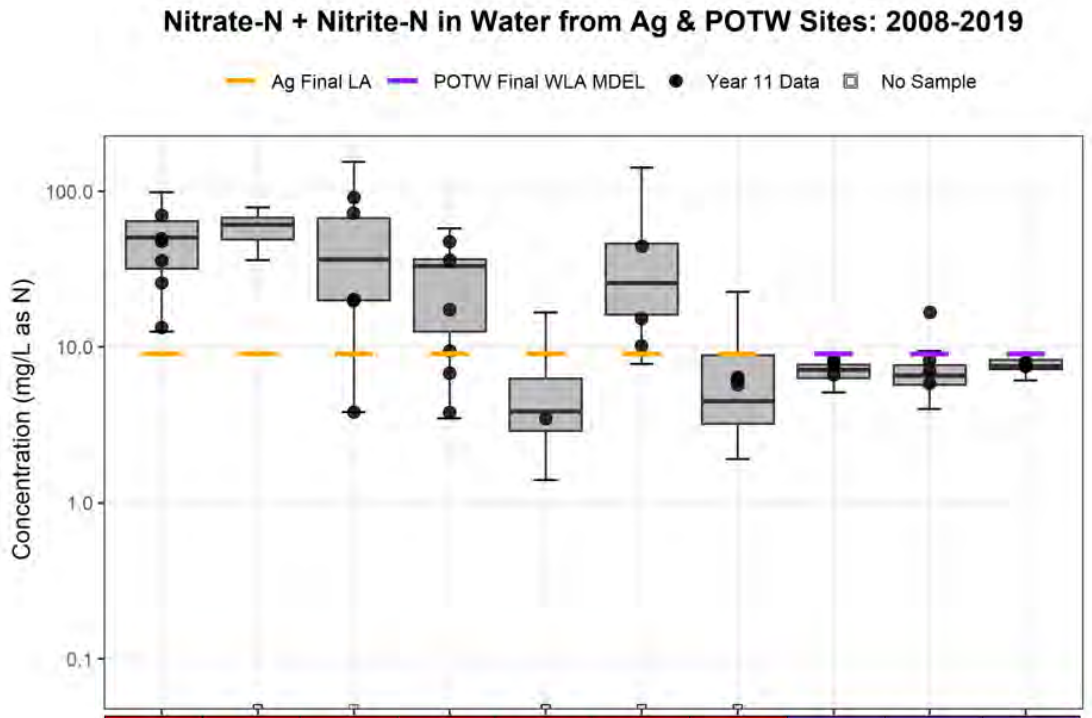
Date	Type	Event	01T_ODD2_DCH	02D_BROOM	04D_WOOD	05D_SANT_VCWPD	06T_FC_BR	07D_HITCH_LEVEE_2	9BD_GERRY	07D_SIMI	9AD_CAMA	10D_HILL
Aug-18	Dry	68	3.22	--	--	0.42	--	--	--	0.021	<0.01	<0.01
Nov-18	Dry	69	<0.01	--	0.81	<0.01	--	--	<0.01	0.014	<0.01	<0.01
Nov-18	Storm	70	0.06	--	0.11	0.07	--	0.51	0.07	--	--	--
Jan-19	Storm	71	0.08	--	0.07	0.04	0.11	0.09	0.03	--	--	--
Mar-19	Dry	72	0.11	--	0.18	0.17	--	0.14	--	0.014	<0.01	0.10
May-19	Dry	73	0.40	--	0.96	1.44	--	--	--	0.021	<0.01	<0.01

Figure 58. Nitrite-N Concentrations in Ag and POTW Sites: 2008-2019



Date	Type	Event	01_RR_BR	02_PCH	03_UNIV	04_WOOD	05_CENTR	06_UPLAND	07_HITCH	9B_ADOLF
Aug-18	Dry	68	1.2	**11.9**	**15.1**	**38.8**	**37.1**	--	9.5	6.5
Nov-18	Dry	69	9.7	**12.8**	6.9	**43.6**	**11.3**	--	9.1	6.6
Nov-18	Storm	70	0.8	**16.3**	5.3	**16.1**	6.5	6.3	4.5	3.0
Jan-19	Storm	71	**14.8**	4.4	2.8	7.4	4.2	2.5	3.3	2.7
Mar-19	Dry	72	**39.0**	**11.4**	7.9	**49.0**	**42.6**	--	8.3	6.0
May-19	Dry	73	**24.9**	**11.8**	**11.5**	**34.1**	**15.8**	--	7.5	6.3

Figure 59. Nitrate-N + Nitrite-N Concentrations in Receiving Water Sites: 2008-2019

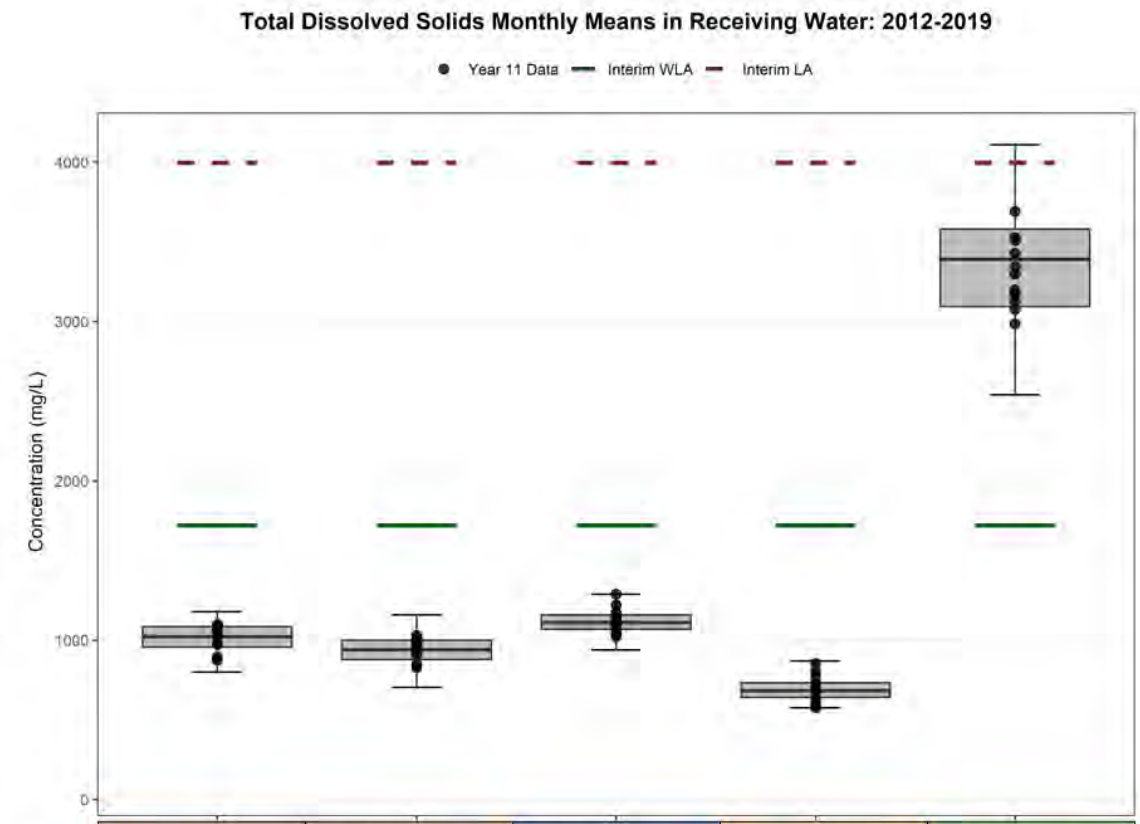


Date	Type	Event	01T_ODD2_DCH	02D_BROOM	04D_WOOD	05D_SANT_VCWPD	06T_FC_BR	07D_HITCH_LEVEE_2	9BD_GERRY	07D_SIMI	9AD_CAMA	10D_HILL
Aug-18	Dry	68	**25.8**	--	--	**36.0**	--	--	--	7.7	**16.7**	8.0
Nov-18	Dry	69	**49.4**	--	**19.8**	**9.5**	--	--	5.7	8.2	5.8	7.5
Nov-18	Storm	70	**35.8**	--	**20.2**	6.8	--	**44.2**	6.2	--	--	--
Jan-19	Storm	71	**13.3**	--	**72.2**	3.8	3.5	**10.2**	6.4	--	--	--
Mar-19	Dry	72	**69.8**	--	**90.9**	**47.2**	--	**15.2**	--	6.6	7.0	7.9
May-19	Dry	73	**47.7**	--	3.8	**17.3**	--	--	--	7.9	8.2	7.5

Figure 60. Nitrate-N + Nitrite-N Concentrations in Ag and POTW Sites: 2008-2019

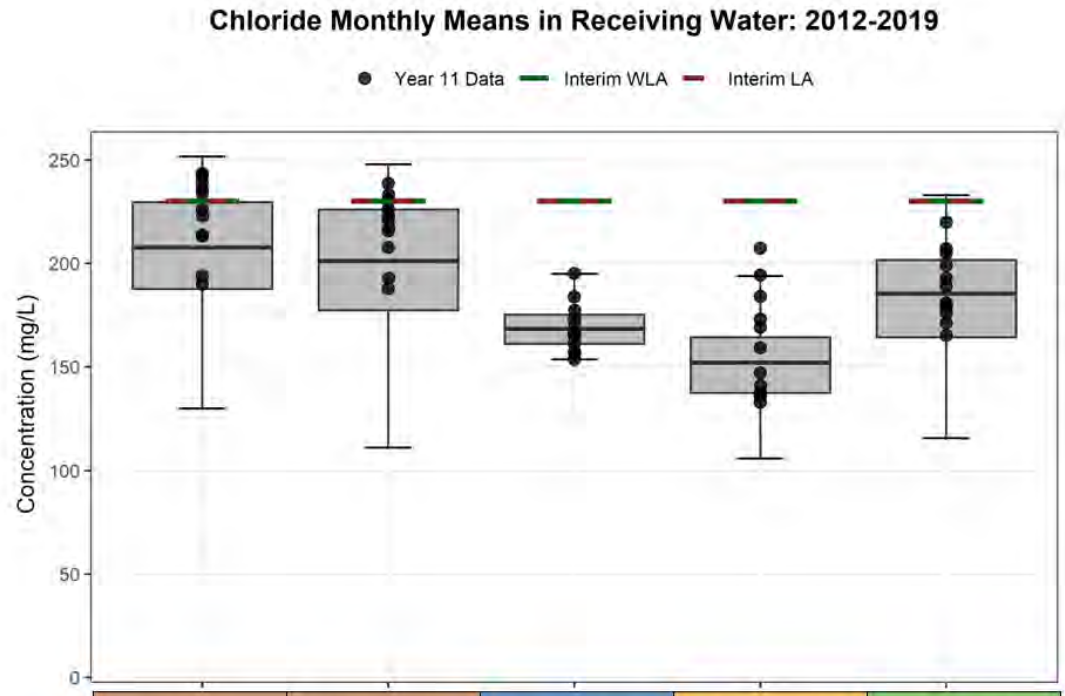
SALTS TMDL

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. The box plots include all of the data collected during this program. Data collected during year eleven, which is the reporting period for this document, have been overlain on the box plots as circles. This was done to allow for easy comparison between recent data and what have been collected overall. The eleventh year data are presented in tabular form below each box plot. Bolded values in the tables within each figure indicate the concentration was above the interim MS4 wasteload allocation and the interim load allocation for that constituent. Italicized values in the tables within each figure indicate the concentration was above the interim MS4 wasteload allocation for that constituent but below the interim load allocation. 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.



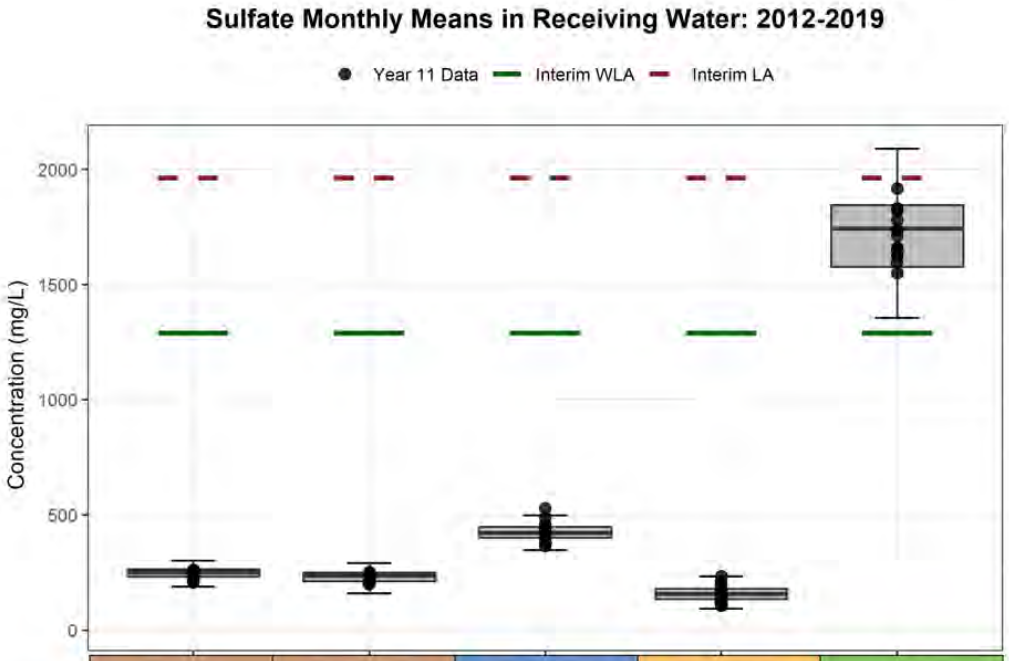
Date	03_UNIV	9A_HOWAR	07_TIERRA	9B_BARON	04_WOOD
Jul-18	1097	1031	1092	592	*3509*
Aug-18	1084	1010	1041	576	*3298*
Sep-18	1070	980	1022	587	*3346*
Oct-18	1027	969	1040	591	*3075*
Nov-18	972	909	1066	605	*3172*
Dec-18	874	828	1101	629	*3526*
Jan-19	895	848	1100	674	*3691*
Feb-19	976	940	1290	854	*3427*
Mar-19	1015	961	1221	804	*3199*
Apr-19	1099	999	1175	767	*2986*
May-19	1061	942	1134	726	*3127*
Jun-19	1095	996	1144	711	*3175*

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



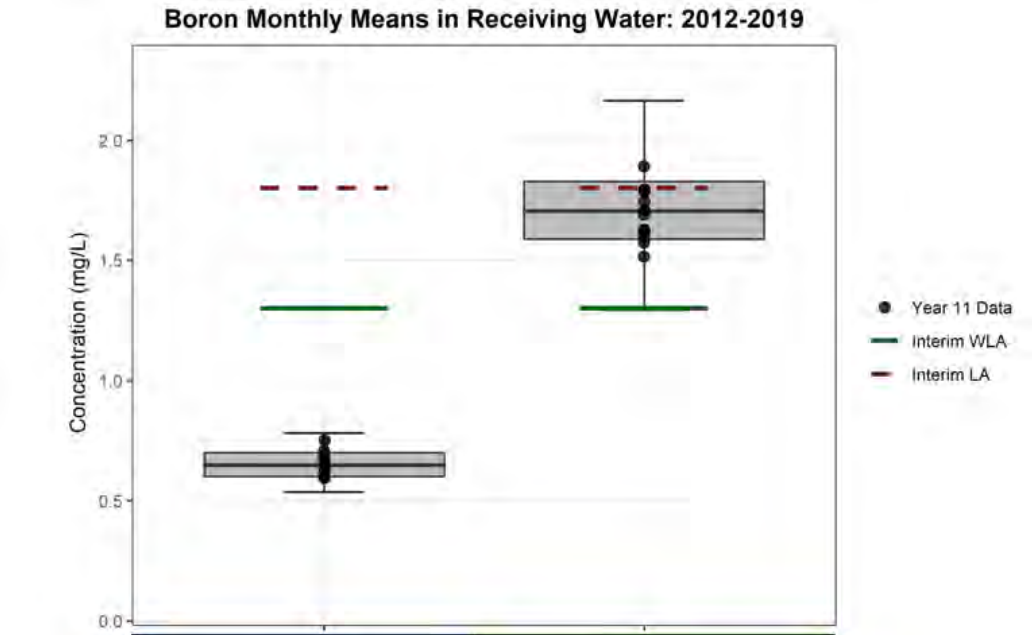
Date	03_UNIV	9A_HOWAR	07_TIERRA	9B_BARON	04_WOOD
Jul-18	**243**	**239**	165	138	205
Aug-18	**239**	**233**	157	133	189
Sep-18	**236**	226	154	136	193
Oct-18	226	223	157	137	171
Nov-18	213	208	161	141	179
Dec-18	190	188	166	147	207
Jan-19	194	193	166	159	220
Feb-19	214	216	195	207	199
Mar-19	223	221	184	194	181
Apr-19	**243**	**231**	177	184	165
May-19	**234**	217	171	173	176
Jun-19	**242**	**230**	173	169	180

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



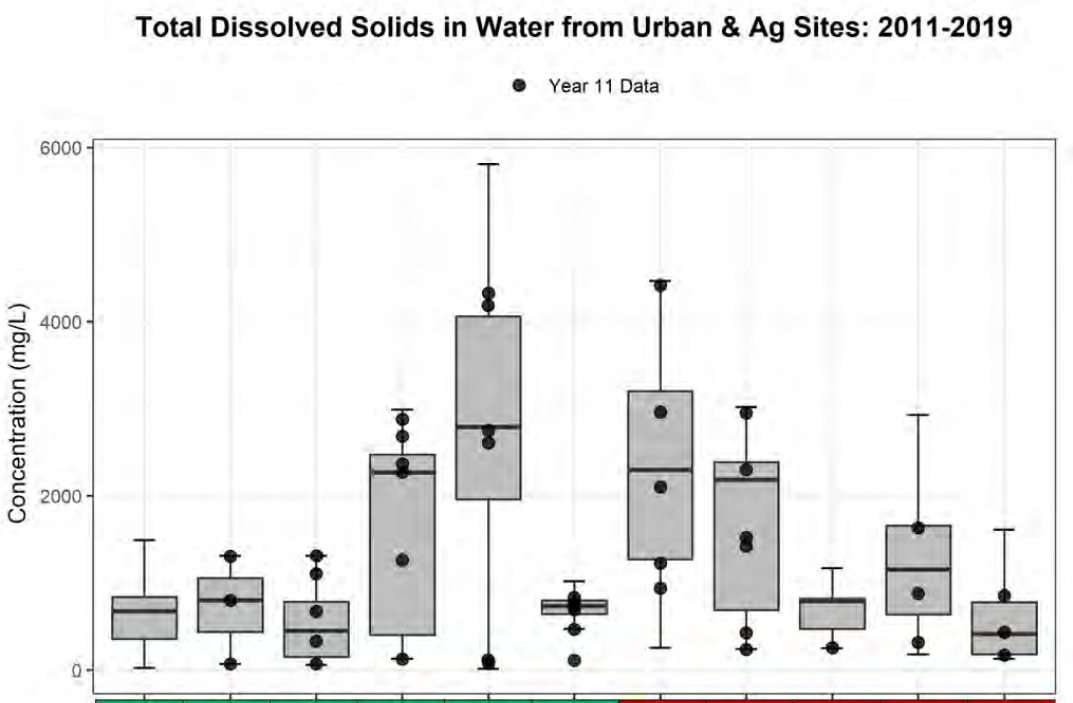
Date	03_UNIV	9A_HOWAR	07_TIERRA	9B_BARON	04_WOOD
Jul-18	261	252	409	113	*1821*
Aug-18	258	247	378	106	*1712*
Sep-18	254	239	366	111	*1736*
Oct-18	244	236	377	113	*1596*
Nov-18	231	220	393	119	*1646*
Dec-18	207	199	415	130	*1830*
Jan-19	212	204	415	151	*1916*
Feb-19	232	228	529	233	*1779*
Mar-19	241	234	487	210	*1660*
Apr-19	261	244	459	193	*1549*
May-19	252	229	434	174	*1623*
Jun-19	260	243	440	167	*1648*

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



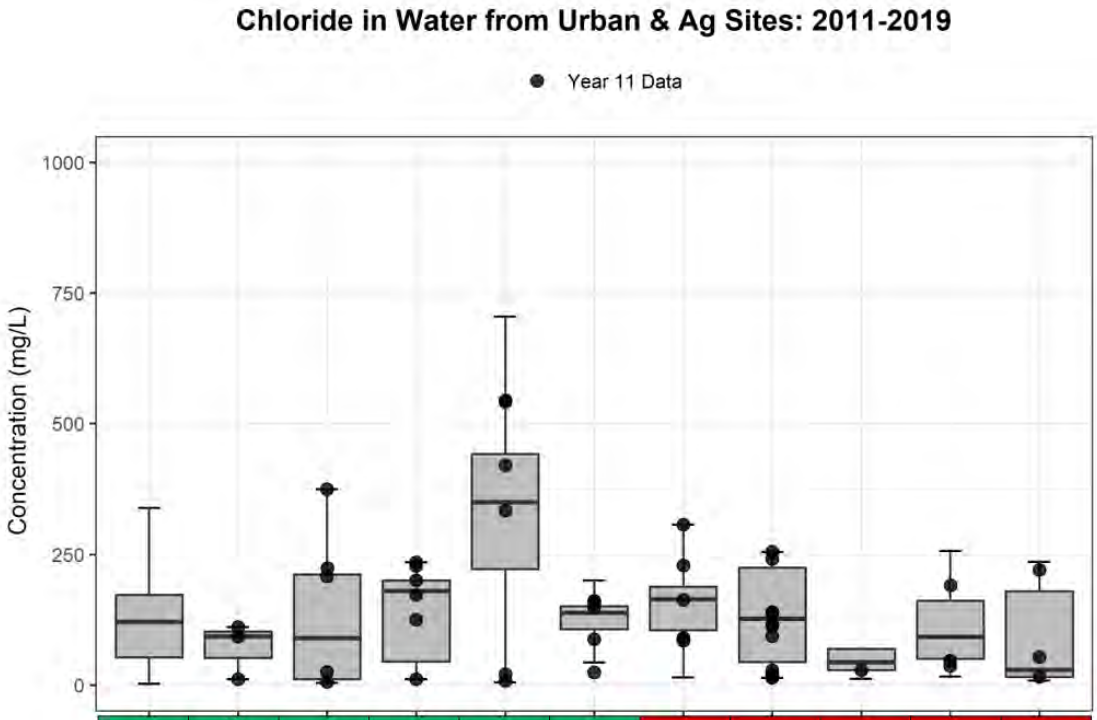
Date	07_TIERRA	04_WOOD
Jul-18	0.6	1.8
Aug-18	0.6	1.7
Sep-18	0.6	1.7
Oct-18	0.6	1.6
Nov-18	0.6	1.6
Dec-18	0.6	**1.8**
Jan-19	0.6	**1.9**
Feb-19	0.8	**1.8**
Mar-19	0.7	1.6
Apr-19	0.7	1.5
May-19	0.7	1.6
Jun-19	0.7	1.6

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



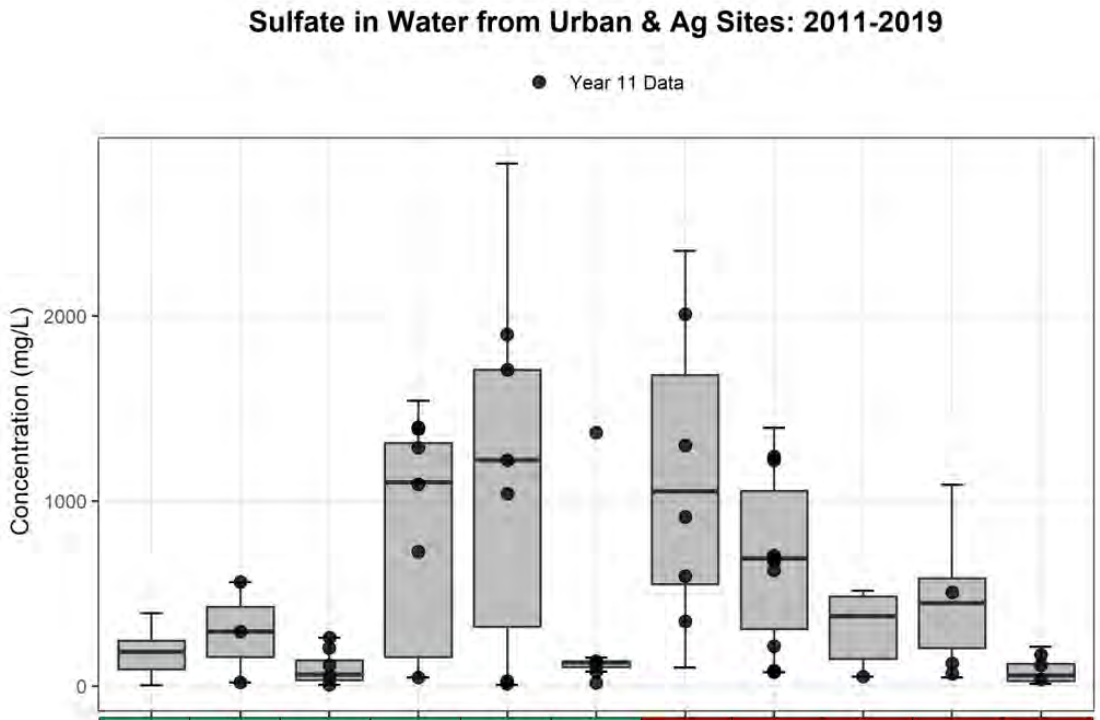
Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE	07D_MPK	07D_SIM_BUS	9BD_ADOLF	13_SB_HILL	04D_WOOD	05D_SANT_VCWPD	06T_FC_BR	07D_HITCH_LEVEE_2	9BD_GERRY
Aug-18	Dry	68	--	--	--	2370	2750	750	--	2300	--	--	--
Nov-18	Dry	69	--	--	670	2270	2610	830	2100	1420	--	--	850
Nov-18	Storm	70	--	--	330	130	120	110	1230	430	--	1630	430
Jan-19	Storm	71	--	70	70	1260	70	470	2960	240	250	320	170
Mar-19	Dry	72	--	1310	1100	2880	4330	760	4420	2950	--	880	--
May-19	Dry	73	--	800	1310	2680	4190	690	940	1520	--	--	--

Figure 65. Total Dissolved Solids in Water from Urban and Ag Sites: 2011-2019



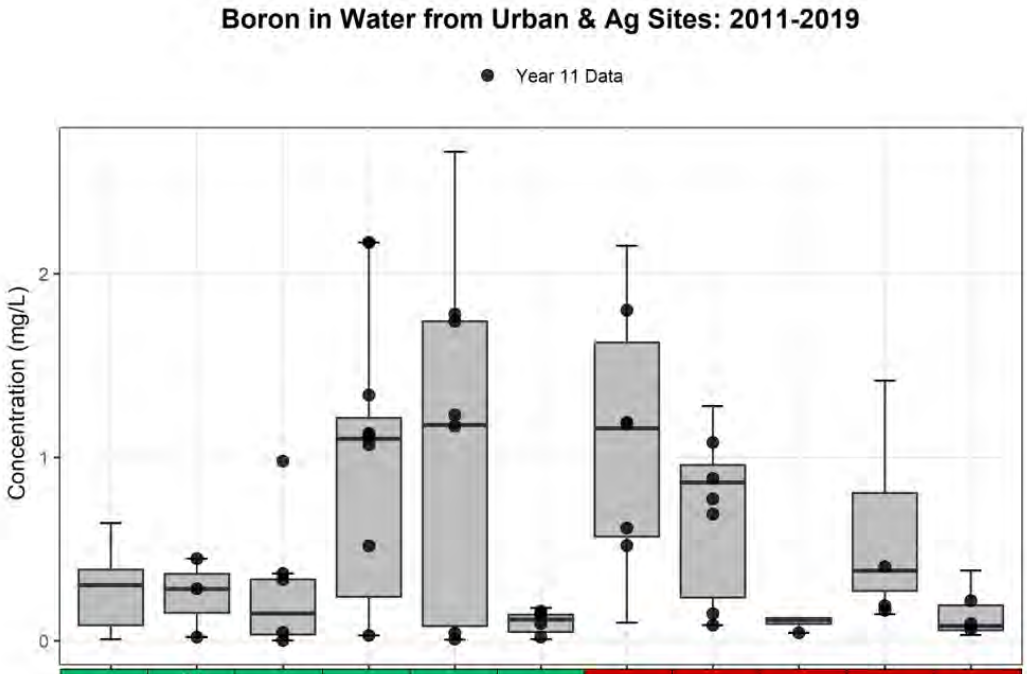
Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE	07D_MPK	07D_SIM_BUS	9BD_ADOLF	13_SB_HILL	04D_WOOD	05D_SANT_VCWPD	06T_FC_BR	07D_HITCH_LEVEE_2	9BD_GERRY
Aug-18	Dry	68	--	--	--	200	421	161	--	255	--	--	--
Nov-18	Dry	69	--	--	208	173	334	156	163	93.4	--	--	220
Nov-18	Storm	70	--	--	25	11	21	24	85	29	--	191	54
Jan-19	Storm	71	--	10.9	5.9	125	7.47	87.6	229	66.4	28.7	36.3	16
Mar-19	Dry	72	--	111	224	235	542	149	307	241	--	46.6	--
May-19	Dry	73	--	93.1	375	228	545	160	90	508	--	--	--

Figure 66. Chloride in Water from Urban & Ag Sites: 2011-2019



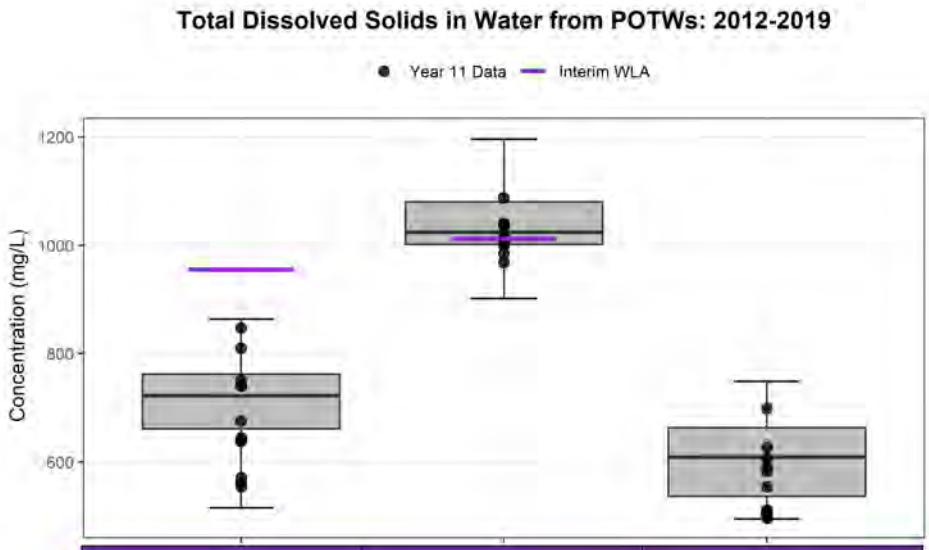
Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE	07D_MPK	07D_SIM_BUS	9BD_ADOLF	13_SB_HILL	04D_WOOD	05D_SANT_VCWPD	06T_FC_BR	07D_HITCH_LEVEE_2	9BD_GERRY
Aug-18	Dry	68	--	--	--	1290	1220	131	--	1220	--	--	--
Nov-18	Dry	69	--	--	112	1090	1040	126	915	626	--	--	113
Nov-18	Storm	70	--	--	56	47	27	17	595	215	--	506	168
Jan-19	Storm	71	--	17	6	725	10	78	1300	318	49	65	36
Mar-19	Dry	72	--	561	205	1390	1710	134	2010	1240	--	121	--
May-19	Dry	73	--	294	260	1400	1900	1370	349	2760	--	--	--

Figure 67. Sulfate in Water from Urban & Ag Sites: 2011-2019



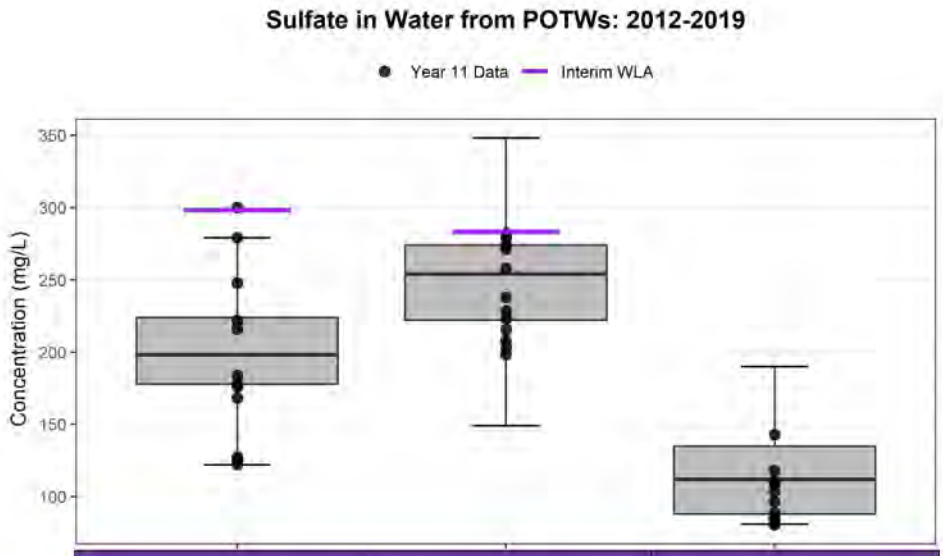
Date	Type	Event	04D_VENTURA	04D_SPRINGVILLE	07D_MPK	07D_SIM_BUS	9BD_ADOLF	13_SB_HILL	04D_WOOD	05D_SANT_VCWPD	06T_FC_BR	07D_HITCH_LEVEE_2	9BD_GERRY
Aug-18	Dry	68	--	--	--	1.07	1.17	0.14	--	0.88	--	--	--
Nov-18	Dry	69	--	--	0.34	6.58	1.23	0.14	1.19	0.77	--	--	0.22
Nov-18	Storm	70	--	--	0.05	0.03	0.04	0.02	0.61	0.15	--	0.40	0.10
Jan-19	Storm	71	--	0.02	0.00	0.52	0.01	0.09	1.18	0.09	0.05	0.17	0.06
Mar-19	Dry	72	--	0.45	0.37	1.34	1.74	0.16	1.80	1.08	--	0.19	--
May-19	Dry	73	--	0.28	0.98	1.13	1.78	0.15	0.52	0.69	--	--	--

Figure 68. Boron in Water from Urban & Ag Sites: 2011-2019



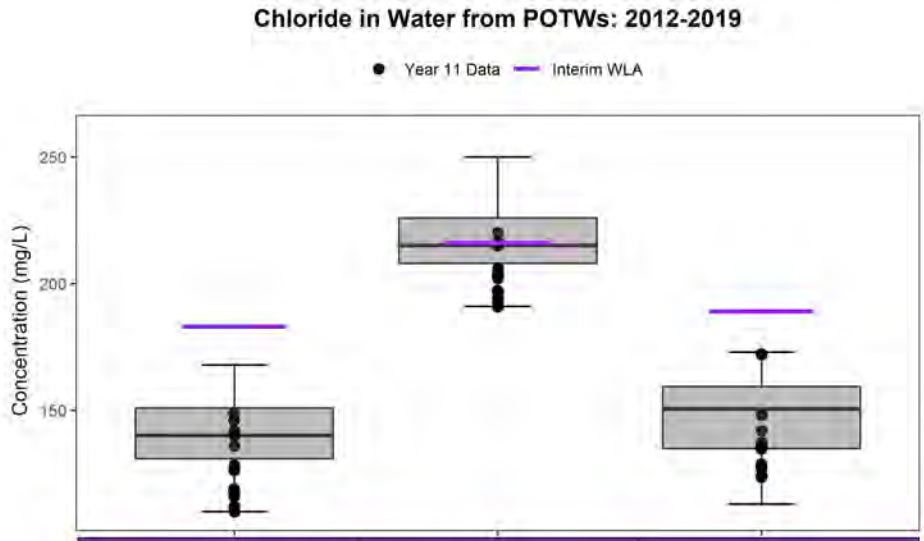
Date	07D_SIMI	9AD_CAMA	10D_HILL
Jul-18	638	968	511
Aug-18	638	**1040**	495
Sept-18	561	**1016**	505
Oct-18	571	**1016**	504
Nov-18	554	1002	509
Dec-18	675	984	500
Jan-19	644	1000	554
Feb-19	740	**1040**	698
Mar-19	848	**1036**	626
April-19	810	**1088**	590
May-19	751	**1012**	583
Jun-19	742	1006	605

Figure 69. Total Dissolved Solids in Water from POTW Sites: 2012-2019



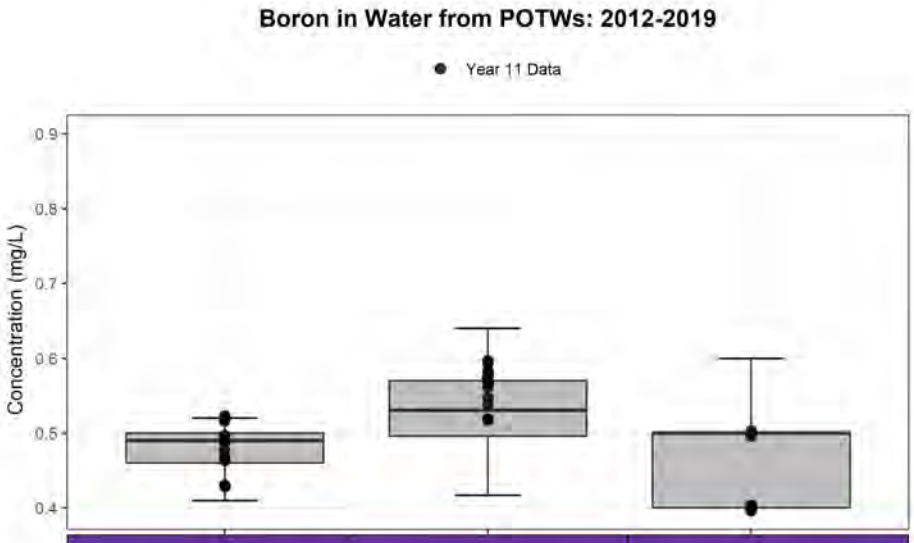
Date	07D_SIMI	9AD_CAMA	10D_HILL
Jul-18	178	216	82
Aug-18	168	228	81
Sept-18	127	198	84
Oct-18	122	203	85
Nov-18	125	223	89
Dec-18	184	208	97
Jan-19	176	238	104
Feb-19	**300**	271	143
Mar-19	279	274	118
April-19	248	279	110
May-19	216	258	109
Jun-19	222	282	111

Figure 70. Sulfate in Water from POTW Sites: 2012-2019



Date	07D_SIMI	9AD_CAMA	10D_HILL
Jul-18	119	197	129
Aug-18	118	**220**	124
Sept-18	112	192	127
Oct-18	110	194	124
Nov-18	116	202	137
Dec-18	128	197	135
Jan-19	126	206	136
Feb-19	136	191	172
Mar-19	146	203	142
April-19	140	204	136
May-19	142	**216**	135
Jun-19	149	215	148

Figure 71. Chloride in Water from POTW Sites: 2012-2019



Date	07D_SIMI	9AD_CAMA	10D_HILL
Jul-18	0.5	0.6	0.4
Aug-18	0.5	0.5	0.4
Sept-18	0.5	0.6	0.5
Oct-18	0.5	0.6	0.5
Nov-18	0.4	0.6	0.4
Dec-18	0.5	0.5	0.4
Jan-19	0.4	0.6	0.4
Feb-19	0.5	0.5	0.4
Mar-19	0.5	0.6	0.4
April-19	0.5	0.6	0.4
May-19	0.5	0.6	0.4
Jun-19	0.5	0.6	0.4

Figure 72. Boron in Water from POTW Sites: 2012-2019

FISH TISSUE DATA

Tissue data is provided in the following tables for the freshwater monitoring locations. Tissue samples are only collected in Mugu Lagoon every three years. The last tissue collection in the lagoon took place in Year 10 and the associated data can be found in the Year 10 Calleguas Creek Watershed Annual Monitoring Report. For all tables, only those constituents that have been detected in at least one sample are included.

Table 17. Conejo Creek – Adolfo Road (9B_ADOLF) Fish Tissue Data[1]

Date	Fish		Lipids	OC Pesticides							PCBs
			Percent Lipids	Chlordane -alpha	Chlordane -gamma	2,4'-DDD	4,4'-DDD	4,4'-DDE	4,4'-DDT	Toxaphene	Total PCBs
			%	ng/g	ng/g	ng/g	ng/g	ng/g	ng/g	ng/g	ng/g
4/8/19	Common Carp	# 1	0.90	2.05	0.99	1.71	8.64	216	1.27	22.80	30.90
		# 2	5.06	6.55	0.68	ND	ND	213	ND	44.50	37.20
		# 3	4.84	14.50	4.47	ND	ND	300	ND	48.20	36.10

1. Only constituents with detected values are included in the table.

Table 18. Revolon Slough – Wood Road (04_WOOD) Fish Tissue Data[1]

Date	Fish		Lipids	OC Pesticides										PCBs
			Percent Lipids	Chlordane -alpha	Chlordane -gamma	Chlorpyrifos	2,4'-DDD	2,4'-DDE	2,4'-DDT	4,4'-DDD	4,4'-DDE	4,4'-DDT	Toxaphene	Total PCBs
			%	ng/g	ng/g	ng/g	ng/g	ng/g	ng/g	ng/g	ng/g	ng/g	ng/g	ng/g
4/8/19	Common Carp	#1	4.41	51.5	8.73	2.13	74.2	29.1	10.1	491	4870	118	727	320
		#2	7.39	45.5	14.7	14.5	76.0	24.9	42.6	278	2950	223	667	65.6

1. Only constituents with detected values are included in the table.

Table 19. Revolon Slough – Wood Road (04_WOOD) Metals Fish Tissue Data

Date	Fish		Lipids	Metals	
			Percent Lipids	Methyl Mercury	Total Selenium
			%	µg/g	µg/g
4/8/19	Common Carp	#1	4.41	0.0135	1.2
		#2	7.39	0.0077	1.38

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 4**), including the optional toxicity investigation sites (**Table 6**). **Table 20** displays significant water column mortality test results for the eleven years of CCWTMP events on record, including both dry weather and storm (bolded text) events. Significant mortality found in freshwater sediments is shown in**Table 21**.

Toxicity was frequently identified during the first two monitoring years in water column samples, but the occurrence of toxicity has generally been decreasing over the course of monitoring. For dry weather water column sampling, toxicity has been identified historically at all sampled sites except 13_BELT. For wet weather water column sampling, toxicity has been identified at all sites, except for 10_GATE and 13_BELT. Freshwater sediment toxicity is consistently found at the 04_WOOD site and occasionally at two of the three other freshwater toxicity monitoring sites: 02_PCH and 03_UNIV.

Water column TIEs were initiated as prescribed in the QAPP, and outcomes of these efforts 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.

Based on the toxicity found at 04_WOOD during the first two years of monitoring and the results of the TIE studies, the Stakeholders chose to invest resources into source control efforts to address sources potentially contributing to the toxicity issue, rather than invest resources in continuing TIE studies at this monitoring site. This is being accomplished through the implementation of the Water Quality Management Plan (WQMP) developed by the Ventura County Agricultural Irrigated Lands Group (VCAILG) as part of the Ag Waiver.

During the eleventh year of monitoring, significant survival toxicity in the water column was observed during Events 70 and 73 at the 04_WOOD site. No freshwater sediment toxicity was observed at any of the monitoring sites.

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. This will help the Stakeholders target source control efforts in areas of the watershed where toxicity is consistently observed and more effectively utilize their limited resources to address toxicity.

Table 20. 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/ UPLAND	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]				[8]	[12]	

CCWMTP Year	Event	Site ID						
		04_WOOD	9B_ADOLF	03_UNIV	10_GATE	06_SOMIS/ UPLAND	13_BELT	07_HITCH
Year 8 [13]	50					[8]		
	51							
	52	**X[2]**						
	53	**X[2]**						
	54							
	55							
Year 9	56							
	57							
	58							
	59							
	60							
	61				[14]			
Year 10	62							
	63							
	64							
	65	**X[2]**						
	66							
	67							
Year 11	68							
	69							
	70	**X[2]**						
	71							
	72							
	73	X[2]						

1. 10_GATE and 13_BELT are optional 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. Optional toxicity testing was not performed at the 10_GATE site for Event 40.
5. Optional 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 because the site was dry.
9. Optional 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. Optional toxicity testing was not performed at the 13_BELT site for Event 49.
13. During year 8 site access to 06_SOMIS was revoked by the landowner beginning with Event 52.
14. There were no statistically significant reductions in survival in this sample as compared to the control. However, based on the observation of greater than 50 percent mortality in the 100 percent concentration of the 10_GATE ambient water sample, a TIE targeted for organics was performed on the sample.

Table 21. 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	
Year 8	50	X			
Year 9	56	X	X		
Year 10	62	X	X		
Year 11	68				

1. 02_PCH and 9A_HOWAR are optional 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.

Exceedance Evaluation and Discussion

As outlined in the QAPP, data applicable to targets or allocations were reviewed for this report. The collected data were compared to the applicable interim and final targets or allocations outlined in the TMDL implementation schedule and this comparison will be used by the various agencies to determine necessary actions in accordance with their permit or Ag Waiver. The comparison does not provide a determination of compliance with any TMDL provision of an individual permit or Ag Waiver, as some permit/waiver conditions may vary from the comparisons provided in this section. For the comparison, various procedures were used depending on whether 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.

POTW effluent data were compared to the relevant waste load allocations (interim or final, as appropriate).

For the Metals TMDL, the following comparisons were conducted:

1. For POTWs, the final waste load allocations became currently effective in March 2017. As a result, effluent monitoring results were compared to the final allocations for the analysis.
2. For agricultural dischargers and MS4 dischargers, final load allocations and wasteload allocations are not yet effective. As such, applicable receiving water data at the compliance locations (base of each subwatershed) were compared to the interim load allocations and wasteload allocations.

For the Nitrogen TMDL, the following 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 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 currently effective. As a result, applicable receiving water data at the compliance locations (base of each subwatershed) were compared to the final load allocation. If an exceedance of the applicable load allocation for a particular event 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 final 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.

For the Salts TMDL, the following comparisons were conducted:

1. For POTWs, interim wasteload allocations are currently effective. As a result, effluent concentrations were compared to the interim wasteload allocations.
2. For agricultural and MS4 dischargers, final load allocations and wasteload allocations are not yet effective. As such, monthly dry weather mean salt concentrations at the Salts TMDL receiving water compliance sites were compared to the interim load and wasteload allocations. Appropriate land use data was evaluated in the instance of an exceedance to assess potential cause and contribution.

The following tables compare the applicable allocations based on the 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 comparison.

RECEIVING WATER SITE COMPARISON

Table 22. OC Pesticides, PCBs, & Siltation in Sediment

Site & Constituent	Units	Interim WLA & LA [1]	Event 68 Aug-2018
Calleguas Creek – Hwy 1 Bridge (02_PCH)			
Total Chlordane [2]	ng/g dw	17	DNQ
4,4'-DDD	ng/g dw	66	1.2
4,4'-DDE	ng/g dw	470	4.7
4,4'-DDT	ng/g dw	110	1.8
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	3.7
4,4'-DDD	ng/g dw	400	8.7
4,4'-DDE	ng/g dw	1600	52.1
4,4'-DDT	ng/g dw	690	17.8
Dieldrin	ng/g dw	5.7	ND
PCBs [3]	ng/g dw	7600	ND
Toxaphene	ng/g dw	790	83.2
Calleguas Creek – Camarillo Street CSUCI (03_UNIV)			
Total Chlordane [2]	ng/g dw	17	DNQ
4,4'-DDD	ng/g dw	66	0.9
4,4'-DDE	ng/g dw	470	4.7
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
Conejo Creek – Adolfo Road (9B_ADOLF)			
Total Chlordane [2]	ng/g dw	3.4	2.3
4,4'-DDD	ng/g dw	5.3	1.7
4,4'-DDE	ng/g dw	20	6.1
4,4'-DDT	ng/g dw	2	**20.1**
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 68 Aug-2018
Arroyo Las Posas – Upland Road (06_UPLAND)			
Total Chlordane [2]	ng/g dw	3.3	DNQ
4,4'-DDD	ng/g dw	290	ND
4,4'-DDE	ng/g dw	950	4.8
4,4'-DDT	ng/g dw	670	7.0
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	2.5
4,4'-DDT	ng/g dw	25	1.4
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).

Results in **bold red type** exceed the applicable wasteload allocation and load allocation.
Results in green type are below the applicable allocations.

Table 23. Nitrogen Compounds in Water

Site & Constituent	Units	Target [1]	Event 68 Dry Aug-18	Event 69 Dry Nov-18	Event 70 Wet Nov-18	Event 71 Wet Jan-19	Event 72 Dry Mar-19	Event 73 Dry May-19
Mugu Lagoon - Ronald Reagan Bridge (01_RR_BR)								
Ammonia-N	mg/L	8.1	0.45	0.35	0.16	0.16	0.27	0.04
Nitrate-N	mg/L	10	1.1	9.59	0.84	**14.70**	**38.90**	**24.70**
Nitrite-N	mg/L	1	0.05	0.06	ND	0.10	0.11	0.20
Nitrate-N + Nitrite-N	mg/L	10	1.15	9.65	0.84	**14.80**	**39.01**	**24.90**
Calleguas Creek – Hwy 1 Bridge (02_PCH)								
Ammonia-N	mg/L	5.5	0.95	0.13	0.25	0.15	0.27	0.56
Nitrate-N	mg/L	10	**11.40**	**12.60**	**16.20**	4.33	**11.30**	**11.60**
Nitrite-N	mg/L	1	0.47	0.21	0.14	0.09	0.06	0.16
Nitrate-N + Nitrite-N	mg/L	10	**11.87**	**12.81**	**16.34**	4.42	**11.36**	**11.76**
Calleguas Creek – Camarillo Street CSUCI (03_UNIV)								
Ammonia-N	mg/L	8.4	0.24	0.39	0.30	0.27	0.23	0.88
Nitrate-N	mg/L	10	**14.80**	6.88	5.26	2.72	7.76	**11.30**
Nitrite-N	mg/L	1	0.31	ND	0.07	0.08	0.13	0.18
Nitrate-N + Nitrite-N	mg/L	10	**15.11**	6.88	5.33	2.80	7.89	**11.48**
Revolon Slough – Wood Road (04_WOOD)								
Ammonia-N	mg/L	5.7	0.18	0.31	0.51	0.15	0.16	0.19
Nitrate-N	mg/L	10	**37.90**	**43.60**	**16.00**	7.29	**48.80**	**33.70**
Nitrite-N	mg/L	1	0.89	ND	0.14	0.08	0.17	0.44
Nitrate-N + Nitrite-N	mg/L	10	**38.79**	**43.60**	**16.14**	7.37	**48.97**	**34.14**
Beardsley Wash – Central Avenue (05_CENTR)								
Ammonia-N	mg/L	5.7	0.05	0.05	0.83	0.22	0.04	0.42
Nitrate-N	mg/L	10	**36.40**	**11.30**	6.47	4.15	**42.40**	**15.40**
Nitrite-N	mg/L	1	0.71	ND	0.07	0.05	0.24	0.40
Nitrate-N + Nitrite-N	mg/L	10	**37.11**	**11.30**	6.54	4.20	**42.64**	**15.80**
Arroyo Las Posas – Upland Road (06_UPLAND)								
Ammonia-N	mg/L	8.1	NS	NS	0.91	0.33	NS	NS
Nitrate-N	mg/L	10	NS	NS	6.17	2.43	NS	NS
Nitrite-N	mg/L	1	NS	NS	0.10	0.07	NS	NS
Nitrate-N + Nitrite-N	mg/L	10	NS	NS	6.27	2.50	NS	NS

Site & Constituent	Units	Target [1]	Event 68 Dry Aug-18	Event 69 Dry Nov-18	Event 70 Wet Nov-18	Event 71 Wet Jan-19	Event 72 Dry Mar-19	Event 73 Dry May-19
Arroyo Simi – Hitch Boulevard (07_HITCH)								
Ammonia-N	mg/L	4.7	0.04	DNQ	0.29	0.13	0.05	0.07
Nitrate-N	mg/L	10	9.24	9.10	4.44	3.18	8.18	7.29
Nitrite-N	mg/L	1	0.27	ND	0.06	0.08	0.11	0.19
Nitrate-N + Nitrite-N	mg/L	10	9.51	9.10	4.50	3.26	8.29	7.48
Conejo Creek – Adolfo Road (9B_ADOLF)								
Ammonia-N	mg/L	9.5	0.05	0.06	0.44	0.28	0.11	0.07
Nitrate-N	mg/L	10	6.33	6.59	3.03	2.60	5.83	6.09
Nitrite-N	mg/L	1	0.22	ND	ND	0.07	0.15	0.19
Nitrate-N + Nitrite-N	mg/L	10	6.55	6.59	3.03	2.67	5.98	6.28

NS=no sample, dry; ND=not detected

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

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

Results in green type are below the applicable allocations.

Table 24. Toxicity, Diazinon, and Chlorpyrifos in Water

Site & Constituent	Units	Dry WLA [1]	Dry LA [2]	Event 68 Dry Aug-18	Event 69 Dry Nov-18	Event 72 Dry Mar-19	Event 73 Dry May-19	Wet WLA [1]	Wet LA [2]	Event 70 Wet Nov-18	Event 71 Wet Jan-19
Mugu Lagoon – Ronald Reagan Bridge (01_RR_BR)											
Chlorpyrifos	ug/L	0.014	0.014	ND	ND	0.0016	DNQ	0.014	0.025	DNQ	**0.0411**
Diazinon	ug/L	0.1	0.1	ND	ND	ND	ND	0.1	0.1	ND	ND
Calleguas Creek – Camarillo Street CSUCI (03_UNIV)											
Chlorpyrifos	ug/L	0.014	0.0133	ND	ND	ND	ND	0.014	0.024	**0.0176**	0.0034
Diazinon	ug/L	0.1	0.1	ND	ND	ND	ND	0.1	0.1	ND	ND
Revolon Slough – Wood Road (04_WOOD)											
Chlorpyrifos	ug/L	0.014	0.0133	0.0051	**0.0142**	0.0055	0.0020	0.014	0.024	**0.259**	**0.379**
Diazinon	ug/L	0.1	0.1	ND	ND	ND	ND	0.1	0.1	0.0528	0.0517
Arroyo Las Posas – Upland Road (06_UPLAND)											
Chlorpyrifos	ug/L	0.014	0.014	NS	NS	NS	NS	0.014	0.025	**0.0525**	**0.0237**
Diazinon	ug/L	0.1	0.1	NS	NS	NS	NS	0.1	0.1	0.04	ND
Arroyo Simi – Hitch Boulevard (07_HITCH)											
Chlorpyrifos	ug/L	0.014	0.014	ND	ND	0.0012	ND	0.014	0.025	0.0042	0.0057
Diazinon	ug/L	0.1	0.1	ND	ND	ND	ND	0.1	0.1	ND	ND
Conejo Creek – Adolfo Road (9B_ADOLF)											
Chlorpyrifos	ug/L	0.014	0.014	ND	ND	ND	ND	0.014	0.025	ND	0.0019
Diazinon	ug/L	0.1	0.1	ND	ND	ND	ND	0.1	0.1	ND	ND
Conejo Creek – Hill Canyon Below N Fork (10_GATE)											
Chlorpyrifos	ug/L	0.014	0.014	ND	0.0012	ND	ND	0.014	0.025	ND	ND
Diazinon	ug/L	0.1	0.1	ND	ND	ND	ND	0.1	0.1	ND	ND
Conejo Creek – S Fork Behind Belt Press Build (13_BELT)											
Chlorpyrifos	ug/L	0.014	0.014	ND	ND	ND	ND	0.014	0.025	ND	ND
Diazinon	ug/L	0.1	0.1	ND	ND	ND	ND	0.1	0.1	ND	ND

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

1. Final Dry and Wet Weather wasteload allocations for Stormwater Dischargers effective as of March 24, 2008 (R4-2005-009).
2. Final Dry and Wet Weather load allocations for Irrigated Agriculture; effective as of March 24, 2016 (R4-2005-009).

Results in **bold red type** exceed applicable final wasteload allocation and load allocation.
Results in **bold purple type** exceed the final wasteload allocation, but not the final load allocation
Results in green type are below the applicable allocations.

Table 25. Metals and Selenium in Water

Constituent	Units	Dry Interim WLA [1]	Dry Interim LA [2]	Event 68 Dry Aug-2018	Event 69 Dry Nov-2018	Event 72 Dry Mar-2019	Event 73 Dry May-2019	Wet Interim WLA [1]	Wet Interim LA [2]	Event 70 Wet Nov-2018	Event 71 Wet Jan-2019	Annual Average [3]
Revolon Slough – Wood Road (04_WOOD)												
Total Copper	µg/L	19	19	4.70	3.32	4.28	4.13	204	1390	16.90	32.00	
Total Nickel	µg/L	13	42	8.39	7.52	9.14	6.48	74 [4]	74 [4]	9.73	21.60	
Total Selenium	µg/L	13	6	**27.80**	**16.60**	**17.80**	**18.30**	290 [4]	290 [4]	7.06	2.45	
Total Mercury [5]	lbs/yr	1.7	2					--	--			0.21
Calleguas Creek – Camarillo Street CSUCI (03_UNIV)												
Total Copper	µg/L	19	19	2.54	1.89	2.56	3.16	204	1390	20.8	37.9	
Total Nickel	µg/L	13	42	7.98	6.97	5.81	6.39	74 [4]	74 [4]	13.6	30.4	
Total Selenium	µg/L	--	--	0.64	0.18	2.11	0.82	--	--	1.01	0.96	
Total Mercury [5]	lbs/yr	3.3	3.9					--	--			0.84

1. Interim wasteload allocations for Stormwater Dischargers; effective until March 2022 (R4-2006-0012)
2. Interim load allocations 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 wasteload allocations and load allocations are expressed as annual loads. Total annual flow for 07/01/18 to 06/30/19 into Mugu Lagoon from Calleguas Creek is calculated as 10,715 Mgal/yr. Total annual flow for 07/01/18 to 06/30/19 into Mugu Lagoon from Revolon Slough is calculated as 2,563 Mgal/yr. As such, the interim wasteload allocation and load allocation shown for both Calleguas Creek and Revolon Slough 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 wasteload allocation and load allocation.
Results in **bold purple type** exceed the interim wasteload allocation, but not the interim load allocation.
Results in green type are below the applicable allocations.

Table 26. Monthly Mean Salts Concentrations

	Units	Interim Limit WLA	Interim Limit LA	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
Revolon Slough – Wood Road (04_WOOD)															
TDS	mg/L	1720	3995	**3509**	**3298**	**3346**	**3075**	**3172**	**3526**	**3691**	**3427**	**3199**	**2986**	**3127**	**3175**
Chloride	mg/L	230	230	205	189	193	171	179	207	220	199	181	165	176	180
Sulfate	mg/L	1289	1962	**1821**	**1712**	**1736**	**1596**	**1646**	**1830**	**1916**	**1779**	**1660**	**1549**	**1623**	**1648**
Boron	mg/L	1.3	1.8	**1.8**	**1.7**	**1.7**	**1.6**	**1.6**	**1.8**	**1.9**	**1.8**	**1.6**	**1.5**	**1.6**	**1.6**
Calleguas Creek – University Drive CSUCI (03_UNIV)															
TDS	mg/L	1720	3995	1097	1084	1070	1027	972	874	895	976	1015	1099	1061	1095
Chloride	mg/L	230	230	**243**	**239**	**236**	226	213	190	194	214	223	**243**	**234**	**242**
Sulfate	mg/L	1289	1962	261	258	254	244	231	207	212	232	241	261	252	260
Conejo Creek – Howard Road Bridge (9A_HOWAR)															
TDS	mg/L	1720	3995	1031	1010	980	969	909	828	848	940	961	999	942	996
Chloride	mg/L	230	230	**239**	**233**	226	223	208	188	193	216	221	**231**	217	**230**
Sulfate	mg/L	1289	1962	252	247	239	236	220	199	204	228	234	244	229	243
Conejo Creek – Baron Brothers Nursery (9B_BARON)															
TDS	mg/L	1720	3995	592	576	587	591	605	629	674	854	804	767	726	711
Chloride	mg/L	230	230	138	133	136	137	141	147	159	207	194	184	173	169
Sulfate	mg/L	1289	1962	113	106	111	113	119	130	151	233	210	193	174	167
Arroyo Simi – Tierra Rejada Road (07_TIERRA)															
TDS	mg/L	1720	3995	1092	1041	1022	1040	1066	1101	1100	1290	1221	1175	1134	1144
Chloride	mg/L	230	230	165	157	154	157	161	166	166	195	184	177	171	173
Sulfate	mg/L	1289	1962	409	378	366	377	393	415	415	529	487	459	434	440
Boron	mg/L	1.3	1.8	0.63	0.60	0.59	0.60	0.62	0.64	0.64	0.75	0.71	0.68	0.66	0.67

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, 2018-June 30, 2019) was used as the flow-related threshold for distinguishing wet and dry days for all five compliance sites. Daily precipitation records for 24 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 wasteload allocation and load allocation. Results in **bold purple type** exceed the interim wasteload allocation, but not the interim load allocation. Results in green type are below the applicable allocations.

POTW DATA COMPARISON

Table 27. Nitrogen Compounds – POTWs

Site & Constituent	Units	Final WLA [1]	Event 68 Dry Aug-2018	Event 69 Dry Nov-2018	Event 72 Dry Feb-2019	Event 73 Dry May-2019
Camarillo Water Reclamation Plan (9AD_CAMA)						
Ammonia-N	mg/L	3.1 [2], 5.6 [3]	1.70	1.20	1.35	1.16
Nitrate-N	mg/L	9	**16.70**	5.84	7.00	8.16
Nitrite-N	mg/L	0.9	ND	ND	ND	ND
Nitrate-N + Nitrite-N	mg/L	9	**16.70**	5.84	7.00	8.16
Hill Canyon Wastewater Treatment Plant (10D_HILL)						
Ammonia-N	mg/L	2.4 [2], 3.3 [3]	1.50	1.80	2.00	1.30
Nitrate-N	mg/L	9	8.00	7.50	7.80	7.50
Nitrite-N	mg/L	0.9	ND	ND	0.10	ND
Nitrate-N + Nitrite-N	mg/L	9	8.00	7.50	7.90	7.50
Simi Valley Water Quality Control Plant (07D_SIMI)						
Ammonia-N	mg/L	3.5 [2], 7.8 [3]	1.30	1.00	0.80	1.00
Nitrate-N	mg/L	9	7.70	8.20	6.60	7.90
Nitrite-N	mg/L	0.9	0.02	0.01	0.01	0.02
Nitrate-N + Nitrite-N	mg/L	9	7.72	8.21	6.61	7.92

ND=constituent not detected at the MDL.
1. The effective date for these wasteload allocations was July 16, 2007 (R4-2008-009)
2. Wasteload allocations as Average Monthly Effluent Limit
3. Wasteload allocations as Maximum Daily Effluent Limit
Results in **bold red type** exceed the applicable wasteload allocations.
Results in green type are below the applicable allocations.

Table 28. OC Pesticides, PCBs, and Siltation - POTWs

POTW & Constituent	Units	Final WLA [1]	Event 68 Dry Aug-2018	Event 69 Dry Nov-2018	Event 72 Dry Feb-2019	Event 73 Dry May-2019
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	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

ND=constituent not detected at the MDL.

1. Final wasteload allocations 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).

Results in green type are below the applicable allocations.

Results in **bold red type** exceed applicable wasteload allocation.

Table 29. Toxicity, Chlorpyrifos, and Diazinon - POTWs

POTW & Constituent	Units	Final WLA	Event 68 Dry Aug-2018	Event 69 Dry Nov-2018	Event 72 Dry Feb-2019	Event 73 Dry May-2019
Camarillo Water Reclamation Plant (9AD_CAMA)						
Chlorpyrifos	µg/L	0.0133	ND	DNQ	ND	ND
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	0.0036	DNQ	0.0134	0.0025
Diazinon	µg/L	0.1	ND	ND	ND	ND

ND=constituent not detected at MDL.
Results in green type are below the applicable allocations.
Results in **bold red type** exceed applicable wasteload allocation.

Table 30. Metals - POTWs

POTW & Constituent	Units	Final Daily Max WLA[1]	Final Monthly Avg WLA [1]	Final WLA [1]	Event 68 Dry Aug-2018	Event 69 Dry Nov-2018	Event 72 Dry Feb-2019	Event 73 Dry May-2019
Camarillo Water Reclamation Plant (9AD_CAMA)								
Total Copper	µg/L	--	9.0	--	4.74	1.85	5.59	4.19
	lbs/day [2]	--	--	0.54	0.06	0.03	0.15	0.03
Total Nickel	µg/L	--	--	--	4.63	2.66	4.98	3.35
	lbs/day [2]	--	--	0.2	0.06	0.04	0.13	0.02
Total Mercury [3]	lbs/month [4]	--	--	0.015	0.0005	0.00001	0.0004	0.0003
Hill Canyon Wastewater Treatment Plant (10D_HILL)								
Total Copper	µg/L	--	6.0	--	2.2	3.6	3.2	3.5
	lbs/day [2]	--	--	0.7	0.14	0.25	0.35	0.25
Total Nickel	µg/L	--	--	--	2.4	2.1	2.8	2.4
	lbs/day [2]	--	--	0.3	0.15	0.15	0.30	0.17
Total Mercury	lbs/month [4]	--	--	0.022	ND[5]	ND[5]	ND[5]	ND[5]
Simi Valley Water Quality Control Plant (07D_SIMI)								
Total Copper	µg/L	31.0	30.5	--	7.48	7.23	2.72	7.75
Total Nickel	µg/L	960	169	--	2.16	1.80	1.96	2.05
Total Mercury [3]	lbs/month [4]	--	--	0.031	0.0023	0.00003	0.0022	0.0044

1. Final wasteload allocations effective as of March 26, 2017 (R16-007).
2. During load calculation, the daily mean flow on the date of sampling was multiplied by the concentration of total copper or total nickel to yield the daily total copper or total nickel in pounds.
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.
5. All dry weather event samples returned non-detected results, therefore, the monthly total mercury load in pounds was not calculated.

Results in green type are below the applicable allocations.
Results in **bold red type** exceed applicable wasteload allocation.

Table 31. Salts - POTWs

POTW & Constituent	Units	Monthly Avg Interim WLA	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
Camarillo Water Reclamation Plant (9AD_CAMA) [1]														
Boron	mg/L	N/A	0.58	0.54	0.55	0.57	0.60	0.52	0.57	0.52	0.58	0.56	0.57	0.59
Chloride	mg/L	216	197	**220**	192	194	202	197	206	191	203	204	**216**	215
Sulfate	mg/L	283	216	228	198	203	223	208	238	271	274	279	258	282
Total Dissolved Solids	mg/L	1012	968	**1040**	**1016**	**1016**	1002	984	1000	**1040**	**1036**	**1088**	**1012**	1006
Hill Canyon Wastewater Treatment Plant (10D_HILL)														
Boron	mg/L	N/A	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Chloride	mg/L	189	129	124	127	124	137	135	136	172	142	136	135	148
Sulfate	mg/L	N/A	82	81	84	85	89	97	104	143	118	110	109	111
Total Dissolved Solids	mg/L	N/A	511	495	505	504	509	500	554	698	626	590	583	605
Simi Valley Water Quality Control Plant (07D_SIMI)														
Boron	mg/L	N/A	0.5	0.52	0.46	0.48	0.43	0.49	0.43	0.47	0.52	0.49	0.52	0.52
Chloride	mg/L	183	119	118	112	110	116	128	126	136	146	140	142	149
Sulfate	mg/L	298	178	168	127	122	125	184	176	**300**	279	248	216	222
Total Dissolved Solids	mg/L	955	638	638	561	571	554	675	644	740	848	810	751	742

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 wasteload allocation.

Results in green type are below the applicable allocations.

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). Interim limits set by the TSO are as follows: TDS 1242 mg/L, sulfate 359 mg/L, and chloride 351 mg/L, all of which were met during the entire monitoring year.

EXCEEDANCE EVALUATION DISCUSSION

OC Pesticides, Toxicity, Metals, Nutrients, and Salts

The data comparisons shown in **Table 22** through **Table 31** above demonstrate that for the most part, the CCW is meeting the applicable interim or final wasteload allocations and load allocations currently in effect for the Nutrients, OC Pesticides, Toxicity, Salts, and Metals TMDLs. While this report provides a comparison of water quality monitoring results to applicable TMDL allocations and targets, it does not reflect an assessment of compliance with individual permit or Conditional Waiver for Irrigated Agricultural Lands (Ag Waiver) TMDL requirements for the responsible parties. The following observations summarize the comparison of monitoring results with applicable TMDL allocations:

1. Exceedances of the interim wasteload allocation and load allocations for 4,4-DDT were observed in sediment samples collected at 9B_ADOLF. No other exceedances were observed in either receiving water sediment or POTW effluent relative to the wasteload allocations and load allocations set by the OC Pesticides, PCBs, and Siltation TMDL.
2. Exceedances of numeric targets for Nitrate-N and Nitrate-N + Nitrite-N were observed at compliance sites in the following subwatersheds: Mugu Lagoon, Calleguas Creek, Revolon Slough, and Beardsley Wash. Most of the exceedances occurred during dry events, but there were a total of six wet weather exceedances in Mugu Lagoon, Calleguas Creek, and Revolon Slough. Two exceedances of the final nutrient wasteload allocation was observed at 9AD_CAMA.
3. There were six exceedances of the final chlorpyrifos allocations during wet weather, and one exceedance during dry weather in the receiving water. No exceedances of the diazinon final allocations were observed. These exceedances were considered in concert with urban and agricultural land use monitoring data. There were no exceedances of the final wasteload allocations for chlorpyrifos or diazinon at any POTW.
4. There were four exceedances of the interim load allocation and interim wasteload allocation for total selenium measured during the dry weather sampling events 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. This monitoring year only one site exhibited significant survival toxicity in the water column. Toxicity was observed during one wet weather and event and one dry weather event at the 04_WOOD receiving water site in Revolon Slough. None of the sediment samples collected exhibited significant survival toxicity.
6. Two Salts TMDL compliance sites met interim wasteload and load allocations for all salts constituents, 9B_BARON and 07_TIERRA. Another two sites met interim allocations except for chloride, those were 03_UNIV and 9A_HOWAR. One final compliance site, 04_WOOD, had exceedances for all the salts constituents except for chloride. This site generally met the interim load allocations but exceeded the interim wasteload allocations. POTWs are meeting interim salts wasteload allocations, with the exception of Camarillo Water Reclamation Plant (WRP), which experienced exceedances of chloride and TDS. Additionally, one exceedance of sulfate was observed at the Simi

Valley Water Quality Control Plant. The exceedances of interim salts wasteload allocations 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. Because the process for addressing salts is a watershed effort involving significant capital investments, the Camarillo WRP received an amended Time Schedule Order in December 2015 (R4-2011-0126-A03) to adjust the interim limits for TDS, sulfate and chloride (TSO limits: 1242 mg/L TDS, 359 mg/L sulfate, 351 mg/L chloride). This TSO was amended again in January 2019 (R4-2011-0126-AO5) and is now set to expire on December 31, 2019. As a result, the interim limits in the TMDL are not the current applicable interim limits for the Camarillo WRP discharge and the TSO limits were met during the entire monitoring year.

Nutrients

Exceedances of numeric targets for Nitrate-N and Nitrate-N + Nitrite-N were observed in Mugu Lagoon, Revolon Slough, Beardsley Wash, and Calleguas Creek. Nitrate-N exceedances are summarized in **Table 32** 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 for every event.

Table 32. Exceedances of Nitrate-N Numeric TMDL Target of 10 mg/L

Nitrogen TMDL Compliance Sites	Event 68 Dry Aug-18	Event 69 Dry Nov-18	Event 70 Wet Nov-18	Event 71 Wet Jan-19	Event 72 Dry Mar-19	Event 73 Dry May-19
01_RR_BR	No	No	No	**Yes**	**Yes**	**Yes**
02_PCH	**Yes**	**Yes**	**Yes**	No	**Yes**	**Yes**
03_UNIV	**Yes**	No	No	No	No	**Yes**
04_WOOD	**Yes**	**Yes**	**Yes**	No	**Yes**	**Yes**
05_CENTR	**Yes**	**Yes**	No	No	**Yes**	**Yes**
06_UPLAND	NS	NS	No	No	NS	NS
07_HITCH	No	No	No	No	No	No
9B_ADOLF	No	No	No	No	No	No

NR=not required, NS=no sample, dry
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 attainment with the TMDL targets and urban discharges were determined to be negligible during the TMDL analysis and therefore do not have TMDL allocations. The final nitrogen load allocations for agriculture became effective in July 2010. Under the 2016 Conditional Waiver (Order No. R4-2016-0143), agricultural dischargers have until October 14, 2025 to comply with the nitrogen load allocations. The Water Quality Management Plans developed by VCAILG for compliance with the Ag Waiver specifies steps and milestones that work towards achieving these load allocations through the implementation of management practices.

Chlorpyrifos

Further examination of the chlorpyrifos exceedances at receiving water sites was needed to determine whether urban or agricultural dischargers were contributing. The final wasteload allocations for urban dischargers and final load allocations for agriculture are in effect and per the TMDL attainment is to be assessed in the receiving waters.

Monitoring data at urban land use sites from each subwatershed for which an exceedance was observed in the receiving water was compared to the wasteload allocation to determine if MS4 discharges significantly contributed to the exceedance. If the urban land use data were below the wasteload allocation, the MS4 dischargers were considered to be meeting allocations. If the urban land use data were above the wasteload allocation, the MS4 could be contributing to the exceedance in the receiving water. The results are shown in **Table 33**.

Monitoring data at agricultural land use sites from each subwatershed for which an exceedance was observed in the receiving water was compared to the load allocation to determine if agricultural discharges significantly contributed to the exceedance. If the agricultural land use data were below the load allocation, the agricultural dischargers were considered to be meeting allocations. If the agricultural land use data were above the load allocation, the agricultural dischargers could be contributing to the exceedance in the receiving water. The results are shown in **Table 34.** Under the 2016 Conditional Waiver (Order No. R4-2016-0143), agricultural dischargers have until March 24, 2022 to comply with the chlorpyrifos load allocations. The Water Quality Management Plans developed by VCAILG for compliance with the Ag Waiver specifies steps and milestones that work towards achieving these load allocations through the implementation of management practices. In addition to the current farm management efforts to minimize chlorpyrifos transport, the sale of chlorpyrifos to California farmers will end on February 6, 2020. After December 31, 2021 it will be illegal for farmers to possess or use chlorpyrifos in the state. There is an exception to the ban, which is some granular forms of the pesticide can remain in use. At this time, these granular forms make up less than one percent of the agricultural applications of chlorpyrifos.

Table 33. Compliance and Land Use Sites Comparison to Determine Attainment of MS4 Chlorpyrifos Wasteload Allocations

Sites Exceeding WLAs	Constituent	Event 68 Dry Aug-18	Event 69 Dry Nov-18	Event 70 Wet Nov-18	Event 71 Wet Jan-19	Event 72 Dry Mar-19	Event 73 Dry May-19
01_RR_BR	Chlorpyrifos				NA		
03_UNIV	Chlorpyrifos			NA			
04_WOOD	Chlorpyrifos		No[1]	No[1]	No		
06_UPLAND	Chlorpyrifos			NA	NA		

NA = there are no urban land use sites within this reach
No = none of the urban land use site for the subwatershed exceeded the MS4 wasteload allocation during the monitoring event.
Yes = the urban land use site for the subwatershed exceeded the MS4 wasteload allocation during the monitoring event.
Blank cells indicate that a wasteload allocation exceedance did not occur at the compliance monitoring site during a particular event.
1. The land use site was dry during this event.

Table 34. Compliance and Land Use Sites Comparison to Determine Attainment of Ag Chlorpyrifos Load Allocations

Sites Exceeding WLAs	Constituent	Event 68 Dry Aug-18	Event 69 Dry Nov-18	Event 70 Wet Nov-18	Event 71 Wet Jan-19	Event 72 Dry Mar-19	Event 73 Dry May-19
01_RR_BR	Chlorpyrifos				Yes		
03_UNIV	Chlorpyrifos			NA			
04_WOOD	Chlorpyrifos		No	Yes	Yes		
06_UPLAND	Chlorpyrifos			No[1]			

NA = there are no agricultural land use sites within this reach
No = none of the agricultural land use site for the subwatershed exceeded the MS4 wasteload allocation during the monitoring event.
Yes = the agricultural land use site for the subwatershed exceeded the Ag load allocation during the monitoring event.
Blank cells indicate that a load allocation exceedance did not occur at the compliance monitoring site during a particular event.
1. The land use site was dry during this event.

Selenium

Total selenium concentrations in Revolon Slough at 04_WOOD exceeded the urban dischargers interim wasteload allocation and the agricultural dischargers interim load allocation 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 35** below.

Table 35. Total Selenium Monitoring Data (ug/L) in the Revolon Slough Subwatershed

Site ID	Use	Dry Weather Events					
		Interim		68	69	72	73
		WLA [1]	LA[1]	Aug-18	Nov-18	Mar-19	May-19
04_WOOD	RW	13	6	**27.8**	**16.6**	**17.8**	**18.3**
04D_WOOD	Ag		6	NS	2.51	**7.04**	0.27
05D_SANT_VCWPD	Ag		6	**54.8**	**13.5**	**56.9**	**24.2**
04D_VENTURA[2]	Urban	13		--	--	--	--
04D_SPRINGVILLE[3]	Urban	13		--	--	1.6	0.2

1. Interim WLAs for stormwater permittees and interim LAs for agricultural dischargers are effective until March 2022 (R4-2006-012).
2. Construction of a subterranean culvert has prevented access beginning with Event 68. The site was relocated to 04D SPRINGVILLE
3. The 04D_SPRINGVILLE replaced the 04D_VENTURA site beginning with Event 71.

RW – Receiving water compliance site; Ag – Agricultural Land Use Site; Urban – Urban Land Use Site

NS – Not sampled, site was 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 during all dry weather monitoring events at 05D_SANT_VCWPD, one of the agricultural land use sites in the Revolon Slough subwatershed. At the other agricultural land use site, 04D_WOOD, selenium concentrations above the interim load allocation were only observed during Event 72. No data were available for comparison from urban land use site 04D_VENTURA because this site was dry during the first two monitoring events and was then replaced by 04D_SPRINGVILLE beginning with Event 71. Selenium concentrations at 04D_SPRINGVILLE were well below the interim WLA during the two dry events sampled. As discussed in the TMDL, a primary source of selenium in this area is considered to be rising groundwater levels and the interim allocations were to be considered in this context.

Salts

A summary of monitoring results for total dissolved solids, sulfate, and boron at sites in the Revolon Slough subwatershed are shown in **Table 36** through **Table 38** and chloride in the Conejo Creek watershed in **Table 39** below.

Mean monthly dry weather TDS, sulfate, and boron concentrations in Revolon Slough at 04_WOOD exceeded their respective interim MS4 wasteload allocations during all twelve months of the monitoring period. However, concentrations of salts at 04D_VENTURA and its replacement site, 04D_SPRINGVILLE, which is an urban land use site in the upper Revolon Slough watershed, were consistently below the interim MS4 wasteload allocations for TDS, sulfate, and boron.

Mean monthly dry weather TDS, chloride, and sulfate concentrations in Revolon Slough at 04_WOOD did not exceed their respective load allocations during the monitoring period. Mean monthly dry weather boron concentrations exceeded load allocations in Revolon Slough at 04_WOOD on one occasion. Site 04D_WOOD represents agricultural discharge water quality in the Revolon Slough subwatershed. At this site, one exceedance of the interim LAs occurred.

Only mean monthly dry weather chloride concentrations in Conejo Creek at 9A_HOWAR exceeded the interim load allocation and interim MS4 wasteload allocation during four months of the monitoring period. Site 9BD_ADOLF represents urban discharge water quality in the Conejo Creek subwatershed. At this site, exceedances of the interim load allocation occurred during four sampling events, but only one corresponded with a receiving water exceedance of the chloride interim wasteload allocation. The agricultural site 9BD_GERRY for this subwatershed had no flow during two of the four dry weather sampling events, and did not exceed the interim wasteload allocation during the other two dry weather sampling events.

Mean monthly dry weather chloride concentrations in Calleguas Creek at 03_UNIV exceeded the interim load allocation and interim MS4 wasteload allocation during six months of the monitoring period. However, there are no land use monitoring sites located in Reach 3 of Calleguas Creek to compare land use water quality data to receiving water quality data.

Table 36. Total Dissolved Solids Monitoring Data (mg/L) in Revolon Slough

Site ID	Use	Interim Limits		Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
		WLA	LA												
04_WOOD [1]	RW	1720	3995	**3509**	**3298**	**3346**	**3075**	**3172**	**3526**	**3691**	**3427**	**3199**	**2986**	**3127**	**3175**
04D_WOOD [2]	Ag		3995		NS			2100		2960		**4420**		940	
04D_VENTURA [2]	Urban	1720			NS			NS		-		-		-	
04D_SPRINGVILLE[2]	Urban	1720			-			-		70		1310		800	

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 wasteload allocation or interim load allocation.

Table 37. Sulfate Monitoring Data (mg/L) in Revolon Slough

Site ID	Use	Interim Limits		Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
		WLA	LA												
04_WOOD [1]	RW	1289	1962	**1821**	**1712**	**1736**	**1596**	**1646**	**1830**	**1916**	**1779**	**1660**	**1549**	**1623**	**1648**
04D_WOOD [2]	Ag		1962		NS			915		1300		2010		349	
04D_VENTURA [2]	Urban	1289			NS			NS		--		--		--	
04D_SPRINGVILLE[2]	Urban	1289			--			--		17.8		561		294	

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 wasteload allocation or interim load allocation.

Table 38. Boron Monitoring Data (mg/L) in Revolon Slough

Site ID	Use	Interim Limits		Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
		WLA	LA												
04_WOOD [1]	RW	1.3	1.8	**1.8**	**1.7**	**1.7**	**1.6**	**1.6**	**1.8**	**1.9**	**1.8**	**1.6**	**1.5**	**1.6**	**1.6**
04D_WOOD [2]	Ag		1.8		NS			1.19		1.18		**1.8**		0.51	
04D_VENTURA [2]	Urban	1.3			NS			NS		--		--		--	
04D_SPRINGVILLE[2]	Urban	1.3			--			--		0.02		0.44		0.28	

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 wasteload allocation or interim load allocation

Table 39. Chloride Monitoring Data (mg/L) in Conejo Creek

Site ID	Use	Interim Limits		Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
		WLA	LA												
9A_HOWAR [1]	RW	230	230	**239**	**233**	226	223	208	188	193	216	221	**231**	217	**230**
9BD_GERRY [2]	Ag	230			NS			220		16		NS		NS	
9BD_ADOLF [2]	Urban		230		**421**			**334**		7.47		**542**		**545**	

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 wasteload allocation or interim load allocation.

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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 2018-2019 monitoring year was conducted per the revised QAPP.

In August 2018, during the first monitoring event of year 11, construction activities were observed at the monitoring site 04D_VENTURA. This is an urban land use site in the City of Camarillo. It was determined that a stretch of the stormwater channel is being enclosed directly up and downstream of the existing monitoring location. A new sampling site, 04D_SPRINGVILLE was selected to replace 04D_VENTURA for the remainder of the year 11 monitoring period. This site has been permanently relocated approximately 0.6 miles downstream from the original site, but still within the City of Camarillo's urban area.

The Stakeholders have submitted TMDL receiving water data to the California Environmental Data Exchange Network (CEDEN) going back to the beginning of the monitoring program in 2008. TMDL receiving water monitoring data will continue to be uploaded for future monitoring events, as well.