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

Calleguas Creek Watershed TMDL Monitoring Program
Post Event Summary
Event 39: Quarterly and Sediment Sampling

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

Aug 21, 2013

- **Crew #1:** Greg Cotten (KLI), Justin Martos (Fugro)
- **Crew #2:** Amy Howk (KLI), Tim Nicely (Fugro)

Aug 22, 2013

- **Crew #1:** Greg Cotten (KLI), Tim Nicely (Fugro)
- **Crew #2:** Amy Howk (KLI), Justin Martos (Fugro)

Sampling Dates: **Receiving water and land use sites:** August 21st and 22nd, 2013

Sediment sampling: August 21st and 22nd, 2013

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

SITES SAMPLED

Site ID		Constituents					
	Sample Date	General Parameters	Toxicity	Metals	Nutrients	PCBs, OP, OC, and Pyrethroid Pesticides	Salts
01T_ODD2_DCH	8-22-13	X		X	X	X	
02_PCH	8-22-13	X			X		
03_UNIV	8-21-13	X	X	X	X	X	X
04_WOOD	8-21-13	X	X	X	X	X	X
04D_VENTURA	8-22-13	X		X		X	X
05_CENTR	8-22-13	X			X		
05D_SANT_VCWPD	8-22-13	X		X	X	X	
06_SOMIS	8-21-13	X	X		X	X	
07_MADER	8-22-13	X			X		
07_HITCH	8-21-13	X	X		X	X	
07_TIERRA	8-22-13	X					X
07D_CTP	8-22-13	X				X	X
07T DC H	8-22-13	X				X	
9A_HOWAR	8-21-13	X			X		X
9B_ADOLF	8-21-13	X	X		X	X	

Site ID		Constituents					
	Sample Date	General Parameters	Toxicity	Metals	Nutrients	PCBs, OP, OC, and Pyrethroid Pesticides	Salts
9BD_ADOLF	8-22-13	X		X		X	X
9B_BARON	8-22-13	X					X
10_GATE	8-21-13	X	X		X	X	
12_PARK	8-22-13	X			X		
13_BELT	8-21-13	X	X		X	X	
13_SB_HILL	8-22-13	X				X	X

SITES NOT SAMPLED

Site ID	Reason for Omission
02D_BROOM	Dry
04D_WOOD	Dry
06T_FC_BR	Dry
07D_HITCH_LEVEE2	Dry
9BD_GERRY	Dry

SEDIMENT SAMPLED

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

DEVIATIONS FROM QAPP

Site ID	Deviation
02_PCH	Flow was not measured due to strong tidal influence.
04_WOOD	The conductivity at the site (>3000 uS/cm) was greater than the accepted range for the designated test species (*Ceriodaphnia dubia*). The QAPP requires the use of *Americamysis bahia*. However, *Hylella azteca* is identified by SWAMP as an appropriate water test species when conductivity is greater than 3,000 us/cm and is currently utilized by the Ventura County Irrigated Lands Group which conducts monitoring in the watershed. To maintain consistency with an existing watershed program, the toxicity testing lab (Pacific EcoRisk) utilized *Hylella azteca* in place of *Americamysis bahia*.
04D_VENTURA	Intermediate container (Ziploc bag) used to fill sample bottles.
05D_SANT_VCWPD	Intermediate container (Ziploc bag) used to fill sample bottles.
06_SOMIS	Intermediate container (Ziploc bag) used to fill sample bottles.
07D_CTP	Intermediate container (Ziploc bag) used to fill sample bottles.
07T_DC_H	Intermediate container (Ziploc bag) used to fill sample bottles.
9BD_ADOLF	Intermediate container (Ziploc bag) used to fill sample bottles.

FOLLOW UP ACTIONS

None

ADDITIONAL COMMENTS

- Salt samples at sites 07 TIERRA, 9B BARON, 04 WOOD, 03 UNIV and 9A HOWAR were taken next to the installed sensor.
- Sediment chemistry at tox sites: WOOD and UNIV were from samples collected alongside the bulk sediment collection and is not an aliquot of the tox sediment itself.

Prepared by:	Amy Howk, KLI	Date:	September 3, 2013
Approved by:	Greg Cotten, KLI	Date:	September 13, 2013
Approved by:	Michael Marson, LWA	Date:	September 16, 2013

Calleguas Creek Watershed TMDL Monitoring Program
Post Event Summary
Event 39: Freshwater Tissue

Sampling Crew: Cardno ENTRIX: J. Mulder, M. Olesen

Sampling Date: August 27-28, 2013

Sampling Type: Tissue Chemistry - Freshwater

SITES SAMPLED

Site ID	Fish collected at Site?	Constituents			
		% Lipids	PCBs and OC Pesticides	Mercury and Selenium	Chlorpyrifos
04_WOOD	Yes	X	X	X	X
03_UNIV	Yes	X	X		
9B_ADOLF	Yes	X	X		
06_SOMIS	No	X	X		
07_HITCH	Yes	X	X		

SITES NOT SAMPLED

06_SOMIS

DEVIATIONS FROM QAPP

None

FOLLOW UP ACTIONS

None

ADDITIONAL COMMENTS

Prepared by:	Amy Storm, LWA	Date:	September 16, 2014
Approved by:	Michael Marson, LWA	Date:	September 18, 2014

Calleguas Creek Watershed TMDL Monitoring Program
Post Event Summary
Event 39: Mugu Lagoon Water

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

Sampling Date: 22 August 2013

Sampling Type: Water Chemistry

SITES SAMPLED

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

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

SITES NOT SAMPLED

None

DEVIATIONS FROM QAPP

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

FOLLOW UP ACTIONS

None

Prepared by:	David Vilas, MBC	Submittal Date:	26 August 2013
Approved by:	Michael Marson, LWA	Submittal Date:	August 26, 2013

Calleguas Creek Watershed TMDL Monitoring Program
Post Event Summary
Event 40: Quarterly Sampling

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

Crew #1: Greg Cotten (KLI), Jon Toal (KLI)
Crew #2: Tim Nicely (Fugro), Joe Reeves (Fugro), Gabriella Baeza-Costaneda (Fugro)

Sampling Dates: **Receiving water and land use sites:** November 5th and 6th, 2013

Sampling Type: Water Chemistry, Toxicity, and Salts

SITES SAMPLED

Site ID		Constituents					
	Sample Date	General Parameters	Toxicity	Metals	Nutrients	PCBs, OP, OC, and Pyrethroid Pesticides	Salts
04D_WOOD	11/5/13	X		X	X	X	X
04_WOOD	11/5/13	X	X	X	X	X	X
04D_VENTURA	11/5/13	X		X		X	X
01T_ODD2_DCH	11/6/13	X		X	X	X	
02_PCH	11/5/13	X			X		
02D_BROOM	11/6/13	X		X	X	X	
03_UNIV	11/5/13	X	X	X	X	X	X
9B_BARON	11/5/13	X					X
9B_ADOLF	11/5/13	X	X		X	X	
9BD_ADOLF	11/5/13	X		X		X	X
9A_HOWAR	11/6/13	X			X		X
05D_SANT_VCWPD	11/5/13	X		X	X	X	
05_CENTR	11/6/13	X			X		
13_SB_HILL	11/6/13	X				X	X
10_GATE	11/6/13	X			X		
12_PARK	11/6/13	X			X		

Site ID		Constituents					
	Sample Date	General Parameters	Toxicity	Metals	Nutrients	PCBs, OP, OC, and Pyrethroid Pesticides	Salts
13_BELT	11/5/13	X	X		X	X	
06T_FC_BR	11/6/13	X			X	X	
06_SOMIS	11/5/13	X	X		X	X	
07_HITCH	11/5/13	X	X		X	X	
07_MADER	11/6/13	X			X		
07D_CTP	11/6/13	X				X	X
07T_DC_H	11/6/13	X				X	
07_TIERRA	11/5/13	X					X

SITES NOT SAMPLED

Site ID	Reason for Omission
07D_HITCH_LEVEE	Site was dry.
9BD_GERRY	Site was dry.

DEVIATIONS FROM QAPP

Site ID	Deviation
02_PCH	Flow was not measured due to tidal influence.
04_WOOD	The conductivity at the site (3,710 uS/cm) was greater than the accepted range for the designated test species (*Ceriodaphnia dubia*). The QAPP requires the use of *Americamysis bahia*. However, *Hylella azteca* is identified by SWAMP as an appropriate water test species when conductivity is greater than 3,000 us/cm and is currently utilized by the Ventura County Irrigated Lands Group which conducts monitoring in the watershed. To maintain consistency with an existing watershed program, the toxicity testing lab (Pacific EcoRisk) utilized *Hylella azteca* in place of *Americamysis bahia*.
04D_VENTURA	Intermediate container (Ziploc bag) used to fill sample bottles.
07D_CTP	Intermediate container (Ziploc bag) used to fill sample bottles.
06_SOMIS	Intermediate container (1L HDPE) used to fill sample bottles
9BD_ADOLF	Intermediate container (Ziploc bag) used to fill sample bottles.

FOLLOW UP ACTIONS

None

ADDITIONAL COMMENTS

06T_FC_BR turbidity was above 2000 NTU, the field meters limit of accuracy. This analysis was added to the COC for measurement at Physis.

04D_WOOD dissolved oxygen was recorded as 2.14 mg/L and 21.3% Sat. T.Nicely (Fugro) reports the meter was deployed correctly and the probe was properly submerged.

Prepared by:	Greg Cotten, KLI	Date:	November 11th, 2013
Reviewed by:	Amy Howk, KLI	Date:	November 15th, 2013
Approved by:	Michael Marson, LWA	Date:	November 26th, 2013

Calleguas Creek Watershed TMDL Monitoring Program
Post Event Summary
Event 40: Mugu Lagoon Water

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

Sampling Date: 5 November 2013

Sampling Type: Water Chemistry

SITES SAMPLED

Site ID	Constituents						
	General Water Quality Parameters	**TOC**	**DOC**	**TSS**	**PCBs, OP, OC, and Pyrethroid Pesticides**	**Nutrients**	**Metals w/ Hg**
01_BPT_14 Central Western Arm	X		X	X			X
01_BPT_15 Central Lagoon	X		X	X			X
01_BPT_3 Eastern Arm	X		X	X			X
1_BPT_6 East Western Arm	X		X	X			X
01_RR_BR Ronald Reagan Bridge	X		X	X	X[1]	X[2]	X
01_SG_74 Central Lagoon S. of Drain #7	X		X	X			X

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

SITES NOT SAMPLED

None

DEVIATIONS FROM QAPP

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

FOLLOW UP ACTIONS

None

Prepared by:	David Vilas, MBC	Submittal Date:	7 November 2013
Approved by:	Amy Storm, LWA	Submittal Date:	17 November 2013

Calleguas Creek Watershed TMDL Monitoring Program
Post Event Summary
Event 41: Quarterly Sampling

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

Crew #1: KLI: Greg Cotten, Spencer Johnson
Crew #2: Fugro: Tim Nicely, Joe Reeves

Sampling Dates: **Receiving water and land use sites:** February 19th and 20th, 2014

Sampling Type: Water Chemistry, Toxicity, and Salts

SITES SAMPLED

Site ID		Constituents					
	Sample Date	General Parameters	Toxicity	Metals	Nutrients	PCBs, OP, OC, Triazines and Pyrethroid Pesticides	Salts
04_WOOD	02/19	X	X	X	X	X	X
04D_VENTURA	02/19	X		X		X	X
01T_ODD2_DCH	02/19	X		X	X	X	
02_PCH	02/20	X			X		
02D_BROOM	02/19	X		X	X	X	
03_UNIV	02/19	X	X	X	X	X	X
9B_BARON	02/19	X					X
9B_ADOLF	02/19	X	X		X	X	
9BD_ADOLF	02/19	X		X		X	X
9A_HOWAR	02/20	X			X		X
05D_SANT_VCWPD	02/19	X		X	X	X	
05_CENTR	02/20	X			X		
13_SB_HILL	02/20	X				X	X
10_GATE	02/19	X	X		X	X	
12_PARK	02/19	X			X		
13_BELT	02/19	X			X		

Site ID		Constituents					
	Sample Date	General Parameters	Toxicity	Metals	Nutrients	PCBs, OP, OC, Triazines and Pyrethroid Pesticides	Salts
06_SOMIS	02/19	X	X		X	X	
07_HITCH	02/19	X	X		X	X	
07_MADER	02/20	X			X		
07D_CTP	02/20	X				X	X
07T_DC_H	02/20	X				X	
07_TIERRA	02/19	X					X

SITES NOT SAMPLED

Site ID	Reason for Omission
04D_WOOD	Site was dry.
06T_FC_BR	Site was dry.
07D_HITCH_LEVEE	Site was dry.
9BD_GERRY	Site was dry.

DEVIATIONS FROM QAPP

Site ID	Deviation
02_PCH	Flow was not measured due to tidal influence. Site was sampled near low tide to maximize watershed water. TSS container used as intermediate container.
04_WOOD	The conductivity at the site (3,420 uS/cm) was greater than the accepted range for the designated test species (*Ceriodaphnia dubia*). The QAPP requires the use of *Americamysis bahia*. However, *Hylella azteca* is identified by SWAMP as an appropriate water test species when conductivity is greater than 3,000 us/cm and is currently utilized by the Ventura County Irrigated Lands Group which conducts monitoring in the watershed. To maintain consistency with an existing watershed program, the toxicity testing lab (Pacific EcoRisk) utilized *Hylella azteca* in place of *Americamysis bahia*.
04D_VENTURA	Intermediate container (Ziploc bag) used to fill sample bottles.
07D_CTP	Intermediate container (Ziploc bag) used to fill sample bottles.
07T_DC_H	Intermediate container (Ziploc bag) used to fill sample bottles.
9BD_ADOLF	Intermediate container (Ziploc bag) used to fill sample bottles.

FOLLOW UP ACTIONS

None

ADDITIONAL COMMENTS

None

Prepared by:	Greg Cotten, KLI	Date:	April 11, 2014
Reviewed by:	Amy Howk, KLI	Date:	April 14, 2014

Calleguas Creek Watershed TMDL Monitoring Program
Post Event Summary
Event 41: Mugu Lagoon Water

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

Sampling Date: 3 February 2014

Sampling Type: Water Chemistry

SITES SAMPLED

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

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

SITES NOT SAMPLED

None

DEVIATIONS FROM QAPP

Between 0.02 and 0.04 inches of rain fell in the study area in 24 hours previous to sampling, however, flow in Calleguas Creek was at baseline condition at the time of sampling. Station 01_SG_74 Central Lagoon S. of Drain #7 was accessed by land in compliance with the NBVC biologist's request that the field team conduct walk-in sampling at that station on a permanent basis to avoid harassment of harbor seals. The collection at this site was consistent with previous samples in the area. GPS coordinates of the sample collection locations are provided on the field log sheet.

FOLLOW UP ACTIONS

None

Prepared by:	David Vilas, MBC	Submittal Date:	4 February 2014
Approved by:	Michael Marson, LWA	Submittal Date:	February 5, 2014

Calleguas Creek Watershed TMDL Monitoring Program
Post Event Summary
Event 42: Wet Weather Sampling

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

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

Sampling Dates: **Receiving water and land use sites:** February 28, 2014

Sampling Type: Water Chemistry, Toxicity, and Salts

SITES SAMPLED

Site ID		Constituents					
	Sample Date	General Parameters	Toxicity	Metals	Nutrients	PCBs, OP, OC, and Pyrethroid Pesticides	Salts
04D_WOOD	02-28-14	X		X	X	X	X
04_WOOD	02-28-14	X	X	X	X	X	X
04D_VENTURA	02-28-14	X		X		X	X
01T_ODD2_DCH	02-28-14	X		X	X	X	
02D_BROOM	02-28-14	X		X	X	X	
03_UNIV	02-28-14	X	X	X	X	X	X
9B_BARON	02-28-14	X					X
9B_ADOLF	02-28-14	X	X		X	X	
9BD_ADOLF	02-28-14	X		X		X	X
9BD_GERRY	02-28-14	X		X	X	X	X
9A_HOWAR	02-28-14	X					X
05D_SANT_VCWPD	02-28-14	X		X	X	X	
05_CENTR	02-28-14	X			X		
13_SB_HILL	02-28-14	X				X	X
10_GATE	02-28-14	X	X		X	X	

Site ID		Constituents					
	Sample Date	General Parameters	Toxicity	Metals	Nutrients	PCBs, OP, OC, and Pyrethroid Pesticides	Salts
13_BELT	02-28-14	X	X			X	
06T_FC_BR	02-28-14	X			X	X	
06_SOMIS	02-28-14	X	X		X	X	
07D_HITCH_LEVEE2	02-28-14	X			X	X	X
07_HITCH	02-28-14	X	X		X	X	
07_MADER	02-28-14	X			X		
07D_CTP	02-28-14	X				X	X
07T_DC_H	02-28-14	X				X	
07_TIERRA	02-28-14	X					X

SITES NOT SAMPLED

Site ID	Reason for Omission
	All sites sampled.

DEVIATIONS FROM QAPP

Site ID	Deviation
9BD_GERRY	Intermediate container (Ziploc bag) used to fill sample bottles.
06_SOMIS	Intermediate container (bucket) used to fill sample bottles from bridge.
05D_SANT_VCWPD	Intermediate container (TSS bottle) used to fill sample bottles.
05_CENTR	Intermediate container (TSS bottle) used to fill sample bottles.
9BD_ADOLF	Intermediate container (TSS bottle) used to fill sample bottles.

FOLLOW UP ACTIONS

None

ADDITIONAL COMMENTS

The following sites' flow were estimated or had incomplete measurements due to high conditions: 07_TIERRA, 07_MADER, 07D_CTP, 07_HITCH, 9B_BARON, 9A_HOWAR, 10_GATE, 13_BELT, 13_SB_HILL, 9B_ADOLF, 05D_SANT_VCWPD, 05_CENTR, 03_UNIV, 04_WOOD, 04D_VENTURA, 02D_BROOM

Water quality meters

- Team 2's meter screen failed after their 2nd site. Grabs were taken at the sites after the screen failed. These grabs were stored on ice and measured less than 7 hours later by meter 3760 which passed post calibration testing. These sites are: 9B_BARON, 9BD_GERRY, 10_GATE, and 13_BELT. The sites measured before the screen failure were: 13_SB_HILL and 9A_HOWAR. The meter easily passed initial calibration and apparently functioned normally up to the point of screen failure.
- Team 1's turbidity sensor failed initial calibration. Grab samples were collected and measured with meter 3760 within 7hrs 30 minutes of sample time. These sites were: 07T_DCH, 07_MADER, 07D_CTP, 07_TIERRA, 07D_HITCH_LEVEE2, 07_HITCH.

Analytical additions: Turbidity measured by lab because exceeded meter capabilities (>1000 NTU): 07_HITCH, 06T_FC_BR, 06_SOMIS, 05D_SANT_VCWPD, 05_CENTR, 03_UNIV, 04_WOOD, 01T_ODD2_DCH,

Meter assignments:

Team 1 (KLI): Hach Quanta #2692

Team 2 (KLI): YSI Sonde # 6920 w/ handheld readout

Team 3 (Fugro): Hach Quanta #3760

Team 4 (Fugro): Hach Quanta #3755

Prepared by:	Greg Cotten, KLI	Date:	March 18, 2014
Reviewed by:	Amy Howk, KLI	Date:	March 24, 2014
Reviewed by:	Michael Marson, LWA	Date:	April 03, 2014

Calleguas Creek Watershed TMDL Monitoring Program
Post Event Summary
Event 43: Quarterly Sampling

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

Crew #1: Greg Cotten (KLI), Amy Howk (KLI)
Crew #2: Tim Nicely (Fugro), Joe Reeves (Fugro)

Sampling Dates: **Receiving water and land use sites:** May 28th and 29th, 2014

Sampling Type: Water Chemistry, Toxicity, and Salts

SITES SAMPLED

Site ID		Constituents					
	Sample Date	General Parameters	Toxicity	Metals	Nutrients	PCBs, OP, OC, and Pyrethroid Pesticides	Salts
04_WOOD	5-29-14	X	X	X	X	X	X
04D_VENTURA	5-28-14	X		X		X	X
01T_ODD2_DCH	5-28-14	X		X	X	X	
02_PCH	5-29-14	X			X		
02D_BROOM	5-28-14	X		X	X	X	
03_UNIV	5-29-14	X	X	X	X	X	X
9B_BARON	5-28-14	X					X
9B_ADOLF	5-29-14	X	X		X	X	
9BD_ADOLF	5-28-14	X		X		X	X
9BD_GERRY	5-28-14	X		X	X	X	X
9A_HOWAR	5-28-14	X			X		X
05D_SANT_VCWPD	5-28-14	X		X	X	X	
05_CENTR	5-29-14	X			X		
13_SB_HILL	5-28-14	X				X	X
10_GATE	5-29-14	X	X		X	X	
12_PARK	5-28-14	X			X		
13_BELT	5-29-14	X	X		X	X	

Site ID		Constituents					
	Sample Date	General Parameters	Toxicity	Metals	Nutrients	PCBs, OP, OC, and Pyrethroid Pesticides	Salts
07D_HITCH_LEVEE	5-28-14	X			X	X	X
07_HITCH	5-29-14	X	X		X	X	
07_MADER	5-28-14	X			X		
07D_CTP	5-28-14	X				X	X
07T_DC_H	5-28-14	X				X	
07_TIERRA	5-28-14	X					X

SITES NOT SAMPLED

Site ID	Reason for Omission
04D_WOOD	Site was dry.
06T_FC_BR	Site was dry.
06_SOMIS	Site was dry.

DEVIATIONS FROM QAPP

Site ID	Deviation
02_PCH	Flow was not measured due to tidal influence. Site was sampled near low tide to maximize watershed water.
04D_VENTURA	Intermediate container (Ziploc bag©) used to fill sample bottles.
07D_CTP	Intermediate container (Ziploc bag) used to fill sample bottles.
07D_HITCH_LEVEE2	Intermediate container (Ziploc bag) used to fill sample bottles.
07T_DC_H	Intermediate container used to fill sample bottles.
9BD_ADOLF	Intermediate container (Ziploc bag) used to fill sample bottles.

ADDITIONAL COMMENTS

05D_SANT_VCWPD: Site was being scraped by county 'skip loader' upon first site visit. Water was turbid and not usual conditions so it wasn't sampled. Crew returned 3 hours later and determined it had apparently returned to base flow conditions and water quality 'looked clear with even flow.' Location was sampled at this time.

05_CENTR was sampled by field crew. Just after chemistry samples but before field meter measurements were taken, 'flow and turbidity increased, obviously due to upstream work…'. Lab was not able to reconcile the turbidity measurement as usual because the grab sample wouldn't have reflected it.

FOLLOW UP ACTIONS

None

Prepared by:	Greg Cotten, KLI	Date:	June 09, 2014
Reviewed by:	Amy Howk, KLI	Date:	June 20,2014
Approved by:	Michael Marson, LWA	Date:	July 18, 2014

Calleguas Creek Watershed TMDL Monitoring Program
Post Event Summary
Event 43: Mugu Lagoon Water

Sampling Crew: MBC *Applied Environmental Sciences*: James Nuñez, Wayne Dossett

Sampling Date: 13 May 2014

Sampling Type: Water Chemistry

SITES SAMPLED

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

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

SITES NOT SAMPLED

None

DEVIATIONS FROM QAPP

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

FOLLOW UP ACTIONS

None

Prepared by:	David Vilas, MBC	Submittal Date:	16 May 2014
Approved by:	Michael Marson, LWA	Submittal Date:	03 June 2014

Appendix B:
Calibration Event Summary for Salts TMDL

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

SUMMARY OF MONTHLY EVENTS

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

Table 1. Monthly sensor site visits

Site ID	Date Visited	EC	Discharge
04_WOOD	08/09/2013	X	X
03_UNIV	08/09/2013	X	X
07_TIERRA	08/09/2013	X	X
9A_HOWAR	08/09/2013	X	X
9B_BARON	08/09/2013	X	X
07_TIERRA	08/21/2013		X
04_WOOD	09/23/2013	X	X
03_UNIV	09/24/2013	X	X
07_TIERRA	09/23/2013	X	X
9A_HOWAR	09/23/2013	X	X
9B_BARON	09/24/2013	X	X
9A_HOWAR	09/26/2013	X	X
04_WOOD	09/26/2013	X	X
04_WOOD	10/15/2013	X	X
03_UNIV	10/15/2013	X	X
07_TIERRA	10/15/2013	X	X
9A_HOWAR	10/15/2013	X	X
9B_BARON	10/15/2013	X	X
04_WOOD	11/06/2013	X	X
03_UNIV	11/06/2013	X	X
07_TIERRA	11/06/2013	X	X
9A_HOWAR	11/06/2013	X	X
9B_BARON	11/06/2013	X	X
04_WOOD	12/05/2013	X	X
03_UNIV	12/05/2013	X	X
07_TIERRA	12/05/2013	X	X
9A_HOWAR	12/05/2013	X	X
9B_BARON	12/05/2013	X	X
04_WOOD	01/07/2014	X	X
03_UNIV	01/07/2014	X	X
07_TIERRA	01/07/2014	X	X
9A_HOWAR	01/07/2014	X	X
9B_BARON	01/07/2014	X	X
04_WOOD	02/04/2014	X	X
03_UNIV	02/04/2014	X	X
07_TIERRA	02/04/2014	X	X
9A_HOWAR	02/04/2014	X	X
9B_BARON	02/04/2014	X	X
04_WOOD	02/19/2014		X

Site ID	Date Visited	EC	Discharge
04_WOOD	03/06/2014	X	X
03_UNIV	03/06/2014	X	X
07_TIERRA	03/14/2014	X	X
9A_HOWAR	03/06/2014	X	X
9B_BARON	03/14/2014	X	X
9A_HOWAR	03/14/2014	X	X
04_WOOD	04/03/2014	X	X
03_UNIV	04/03/2014	X	X
07_TIERRA	04/03/2014	X	X
9A_HOWAR	04/03/2014	X	X
9B_BARON	04/03/2014	X	X
04_WOOD	05/06/2014	X	X
03_UNIV	05/06/2014	X	X
07_TIERRA	05/06/2014	X	X
9A_HOWAR	05/06/2014	X	X
9B_BARON	05/06/2014	X	X
04_WOOD	06/05/2014	X	X
03_UNIV	06/05/2014	X	X
07_TIERRA	06/05/2014	X	X
9A_HOWAR	06/05/2014	X	X
9B_BARON	06/05/2014	X	X
04_WOOD	07/10/2014	X	X
03_UNIV	07/10/2014	X	X
07_TIERRA	07/10/2014	X	X
9A_HOWAR	07/10/2014	X	X
9B_BARON	07/10/2014	X	X
04_WOOD	07/16/2014	X	X
04_WOOD	07/25/2014	X	X
9A_HOWAR	07/25/2014	X	X

Appendix C:
Rating Curves and EC/Salt Relationships for Salts TMDL Compliance Sites for Monitoring Year July 2013-June 2014

RATING CURVES

Continuous water level time series data (5-min intervals) was converted to flow time series in cubic feet per second (cfs) using the United States Geological Society (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 curve equations for all sites took the form: $Q = c^* (Lvl + a + S)^b$ where,

Q = discharge (cfs)

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

c = scaling coefficient

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

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

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

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

Table 1. Rating Curves for Salts TMDL Compliance Sites for Monitoring Year July 2013-June 2014

Site	Rating Curve
03_UNIV	Level < 50 cm: $Q = 0.142*(Lvl - 29.5 + C)^{2.0}$
	Level > 50 cm: $Q = 0.188*(Lvl - 30.0 + C)^{2.1}$
04_WOOD	$Q = 0.0169*(Lvl + 4 + C)^{1.65}$
07_TIERRA	$Q = 0.0228*(Lvl - 21.5 + C)^{1.9}$
9A_HOWAR	$Q = 0.065*(Lvl - 14.0 + C)^{1.9}$
9B_BARON	$Q = 0.1*(Lvl - 10 + C)^{1.65}$

EC/SALT RELATIONSHIPS

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

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

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

A = slope

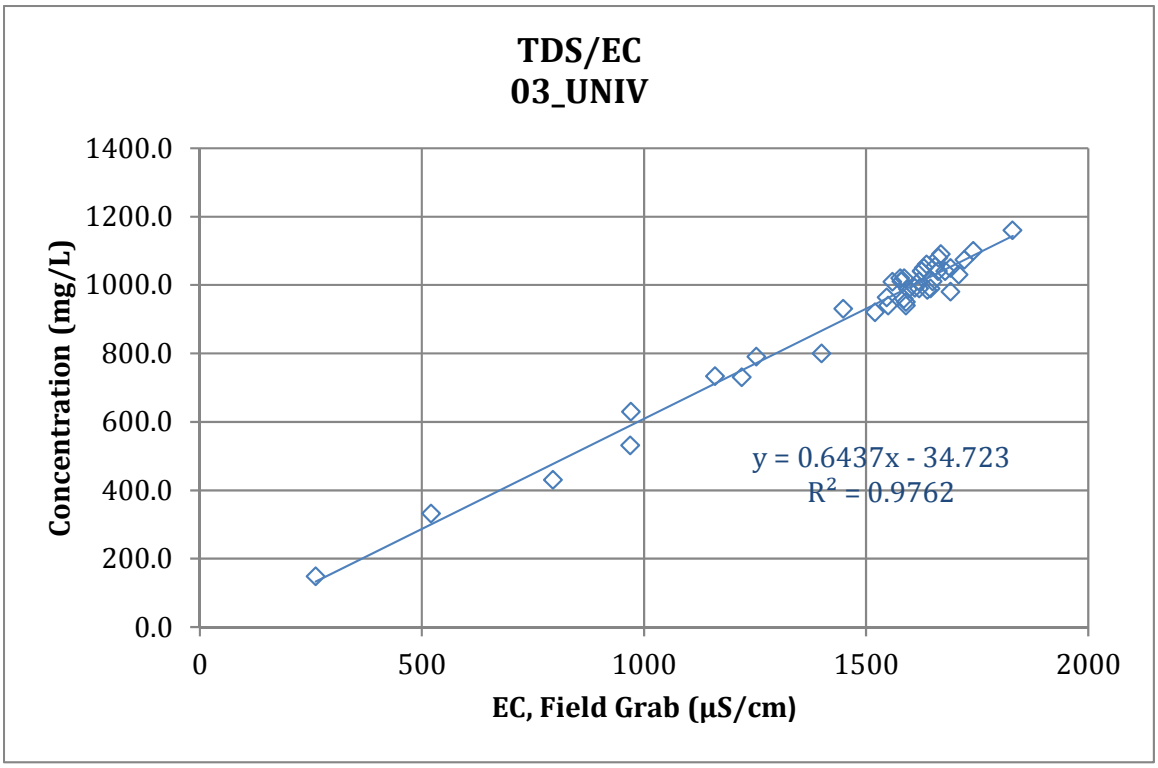
EC = specific conductivity (µS/cm)

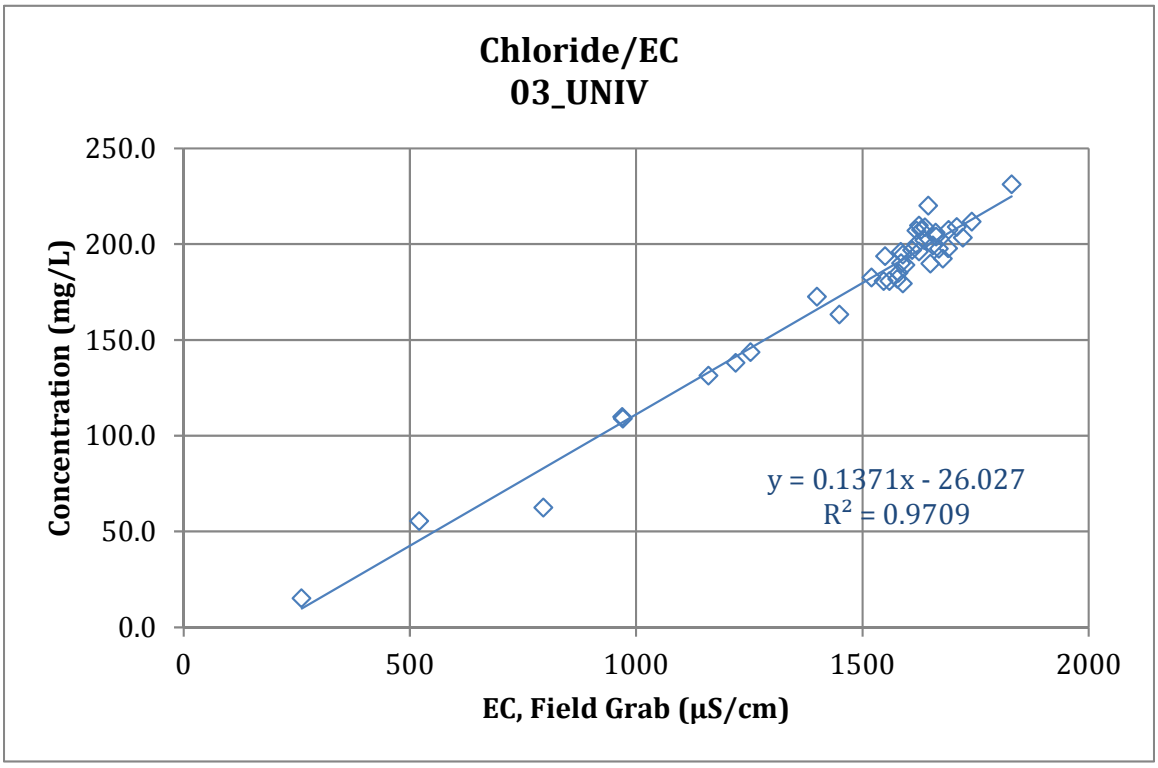
B = y intercept

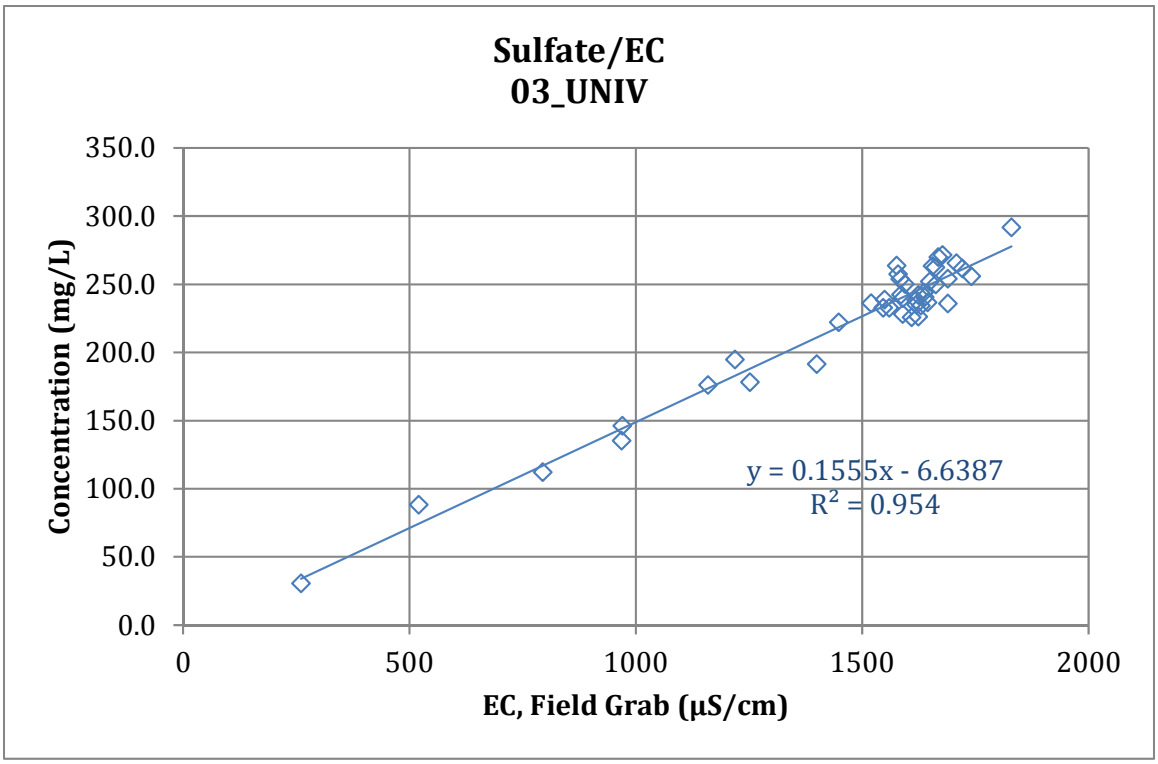
Evaluation of data from July 2012-June 2014 indicated that EC vs. salt relationships at most of the Salts TMDL compliance sites had not significantly changed from those obtained during a one-year pilot study in 2011. Consequently, most surrogate relationships used to convert EC sensor data for monitoring year July 2013-June 2014 to salt concentrations were derived from all available field data between January 2011 and June 2014. However, an analysis of covariance (ANCOVA) indicated that the surrogate relationships for EC-vs.-Chloride and EC-vs.-Sulfate at 9B_BARON had shifted. New surrogate relationships for these two cases were derived using data collected after July 2012, and used to convert EC sensor data for July 2013-June 2014. Parameters for the surrogate relationships are reported in **Table 2**. The surrogate relationships are illustrated in figures following **Table 2**.

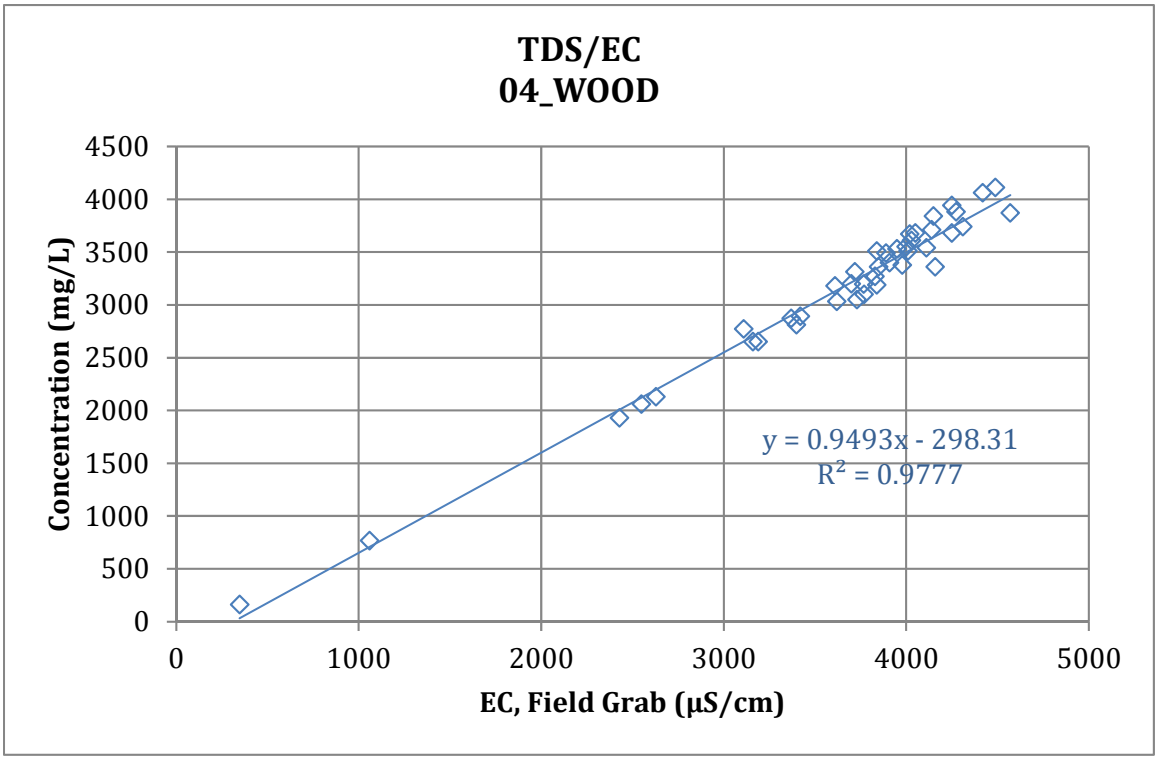
Table 2. Parameters for surrogate relationships used to derive salt concentrations from EC sensor data for monitoring year July 2013-June 2014. Date ranges are for the field data that were used to construct the relationship.

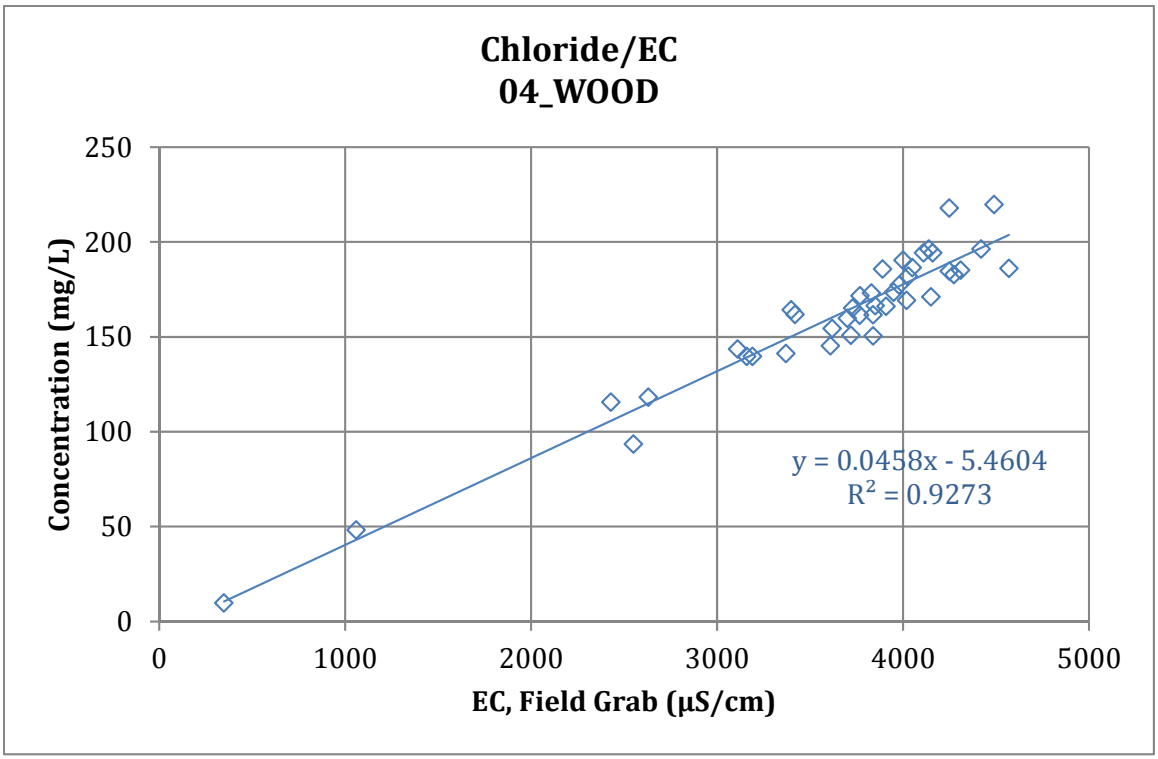
		TDS	Cl	SO4	B
03_UNIV	A	0.64372492	0.13714246	0.15545597	
	B	-34.7232	-26.0269	-6.6387	
	R2	0.9762	0.9709	0.9540	
	Count	42	42	42	
	Date Range	1/31/2011 – 5/29/2014			
04_WOOD	A	0.94933064	0.04578293	0.47514864	0.00046804
	B	-298.3071	-5.4604	-145.4058	-0.0718
	R2	0.9777	0.9273	0.9717	0.8005
	Count	42	41	41	42
	Date Range	1/31/2011 – 5/29/2014			
07_TIERRA	A	0.73313906	0.10622834	0.28464300	0.00044982
	B	-98.7443	-16.6708	-54.5589	-0.0604
	R2	0.9787	0.9663	0.9683	0.9115
	Count	31	31	31	31
	Date Range	1/31/2011 – 5/28/2014			
9A_HOWAR	A	0.62411152	0.13259620	0.15951796	
	B	-20.3903	-15.4805	-11.6112	
	R2	0.9849	0.9604	0.9396	
	Count	32	31	31	
	Date Range	1/31/2011 – 5/28/2014			
9B_BARON	A	0.62368123	0.15471268	0.12645454	
	B	-32.0803	-23.9806	-0.6176	
	R2	0.9694	0.9811	0.9207	
	Count	32	10	10	
	Date Range	1/31/2011-5/28/2014	8/29/2012 – 5/28/2014		

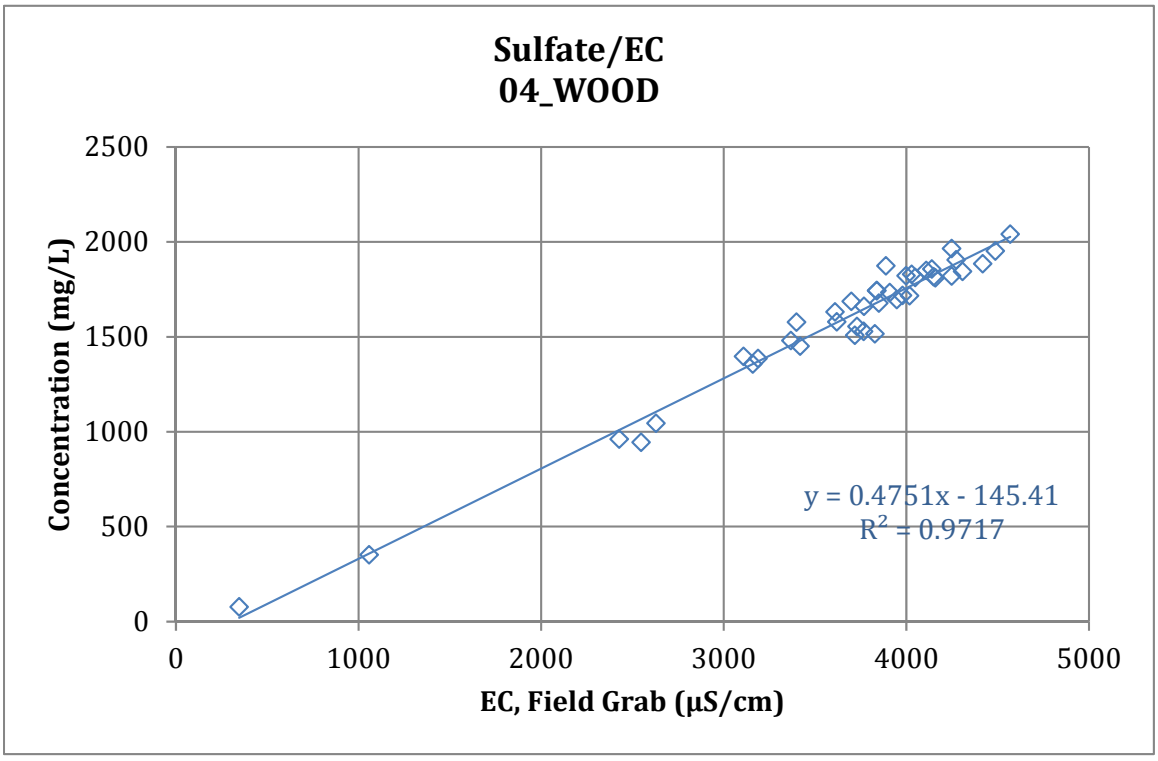

TDS/EC
03_UNIV
Concentration (mg/L)
1400.0
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.6437x - 34.723
R² = 0.9762

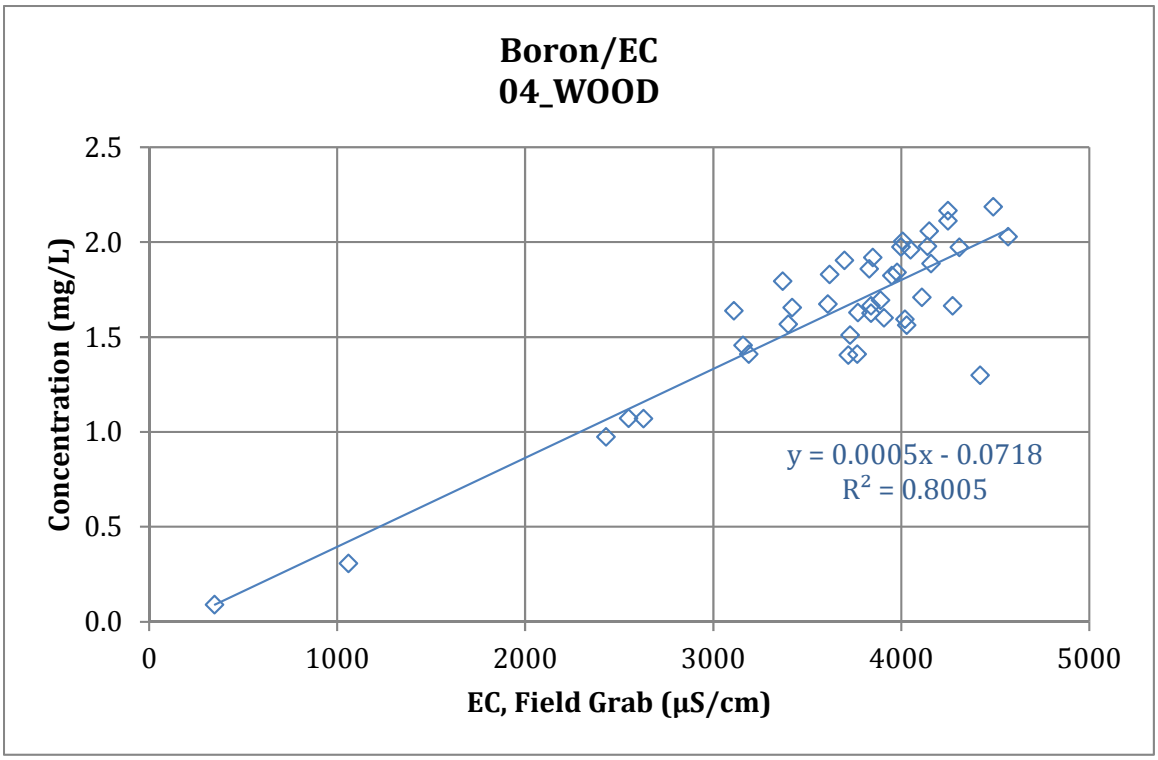

Chloride/EC
03_UNIV
Concentration (mg/L)
250.0
200.0
150.0
100.0
50.0
0.0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.1371x - 26.027
R² = 0.9709

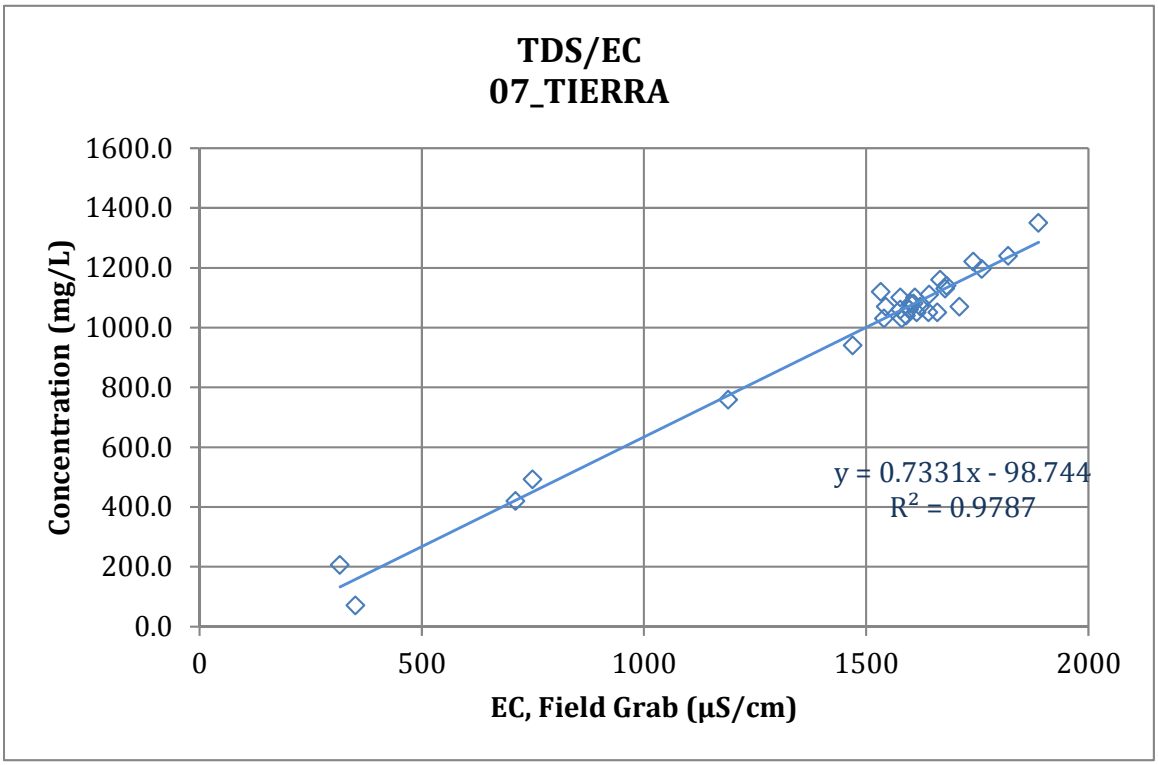

Sulfate/EC
03_UNIV
Concentration (mg/L)
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.1555x - 6.6387
R² = 0.954

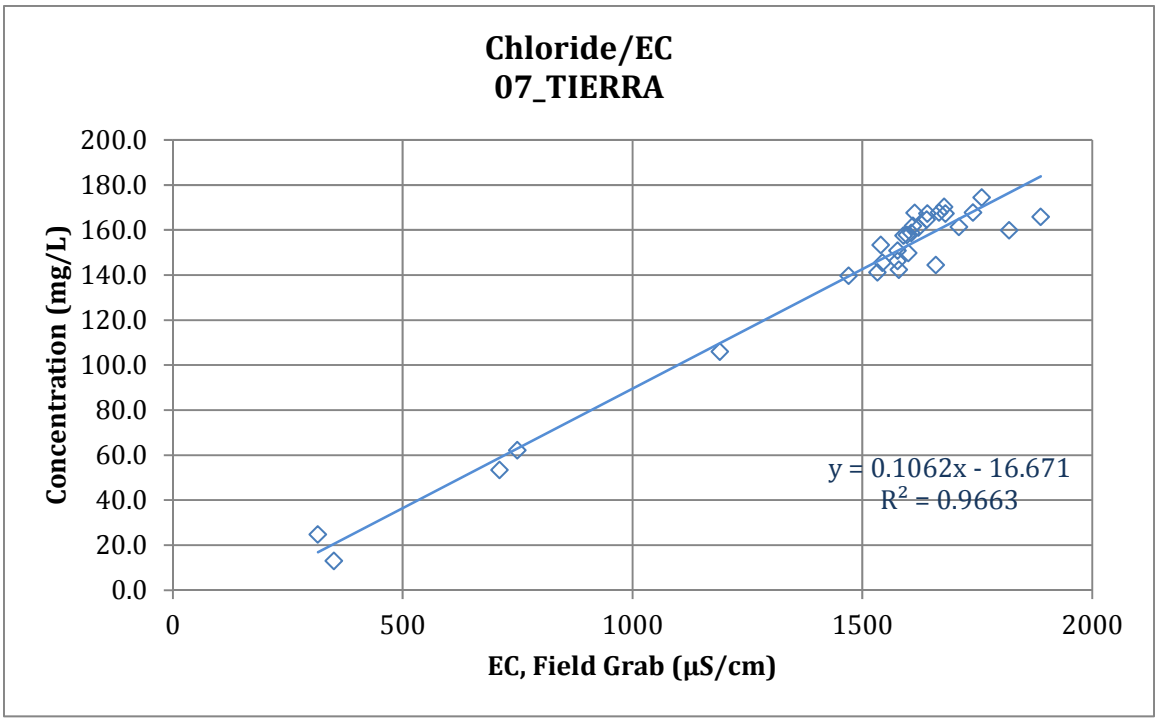

TDS/EC
04_WOOD
Concentration (mg/L)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
0
1000
2000
3000
4000
5000
EC, Field Grab (µS/cm)
y = 0.9493x - 298.31
R² = 0.9777

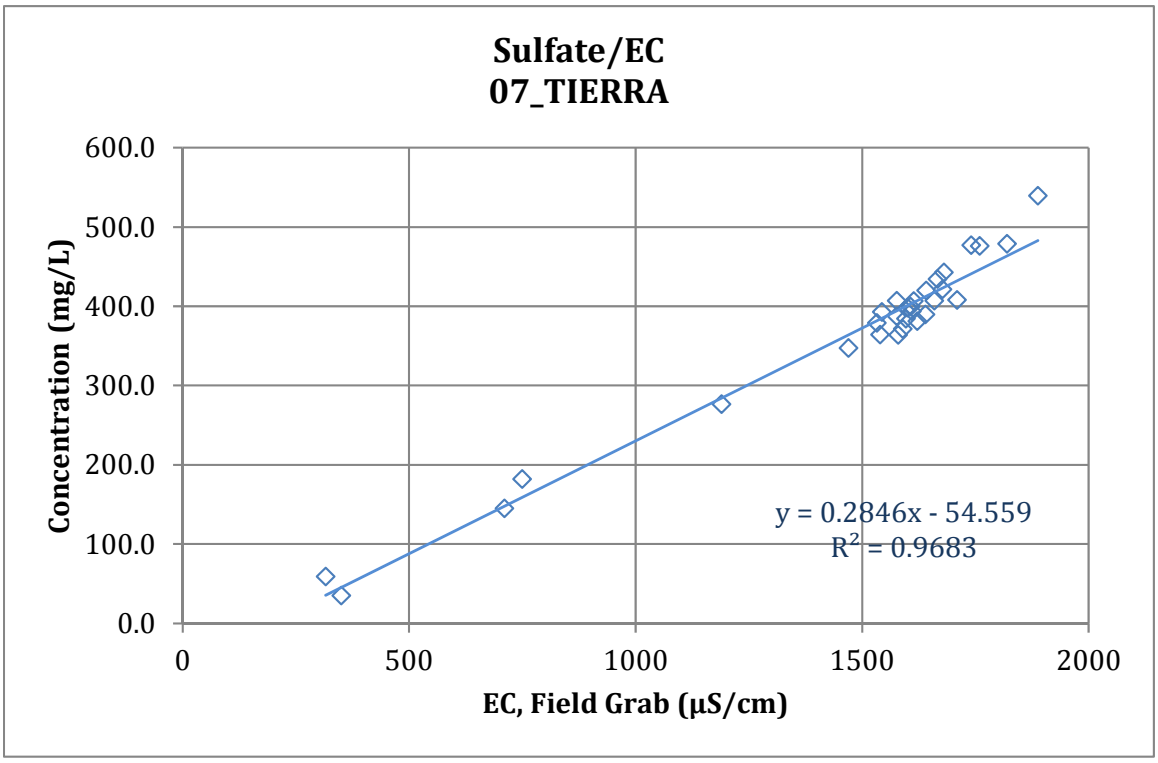

Chloride/EC
04_WOOD
Concentration (mg/L)
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
EC, Field Grab (µS/cm)
y = 0.0458x - 5.4604
R² = 0.9273

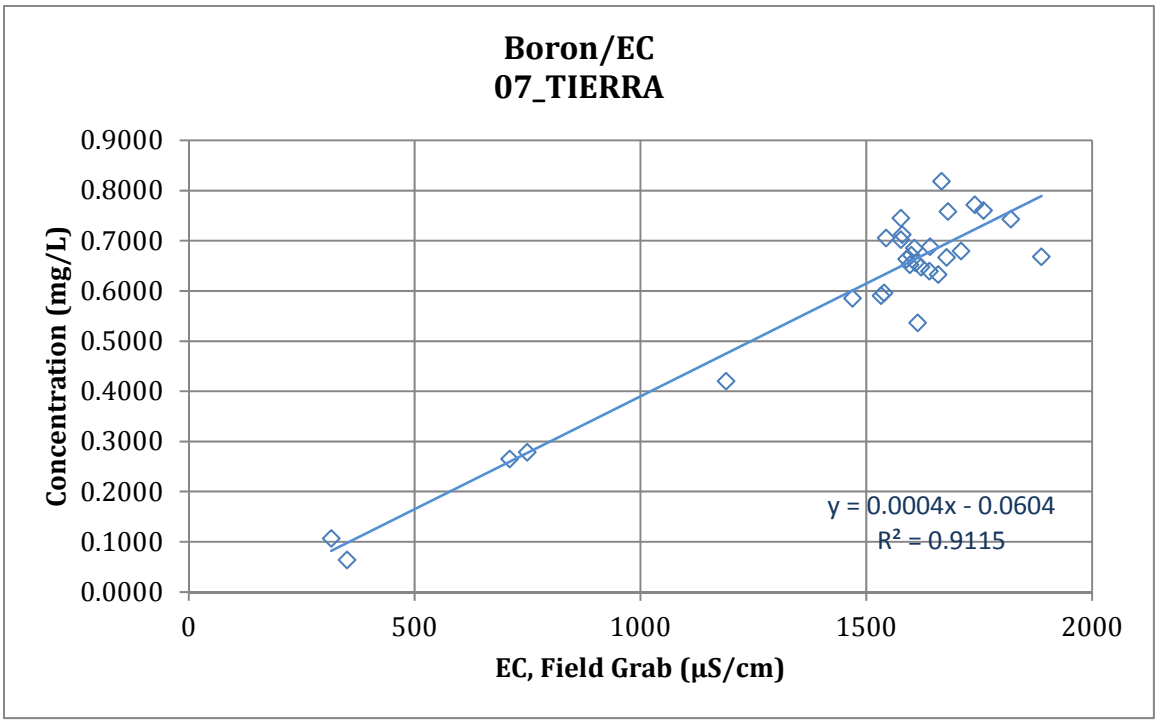

Sulfate/EC
04_WOOD
Concentration (mg/L)
2500
2000
1500
1000
500
0
0
1000
2000
3000
4000
5000
EC, Field Grab (µS/cm)
y = 0.4751x - 145.41
R² = 0.9717

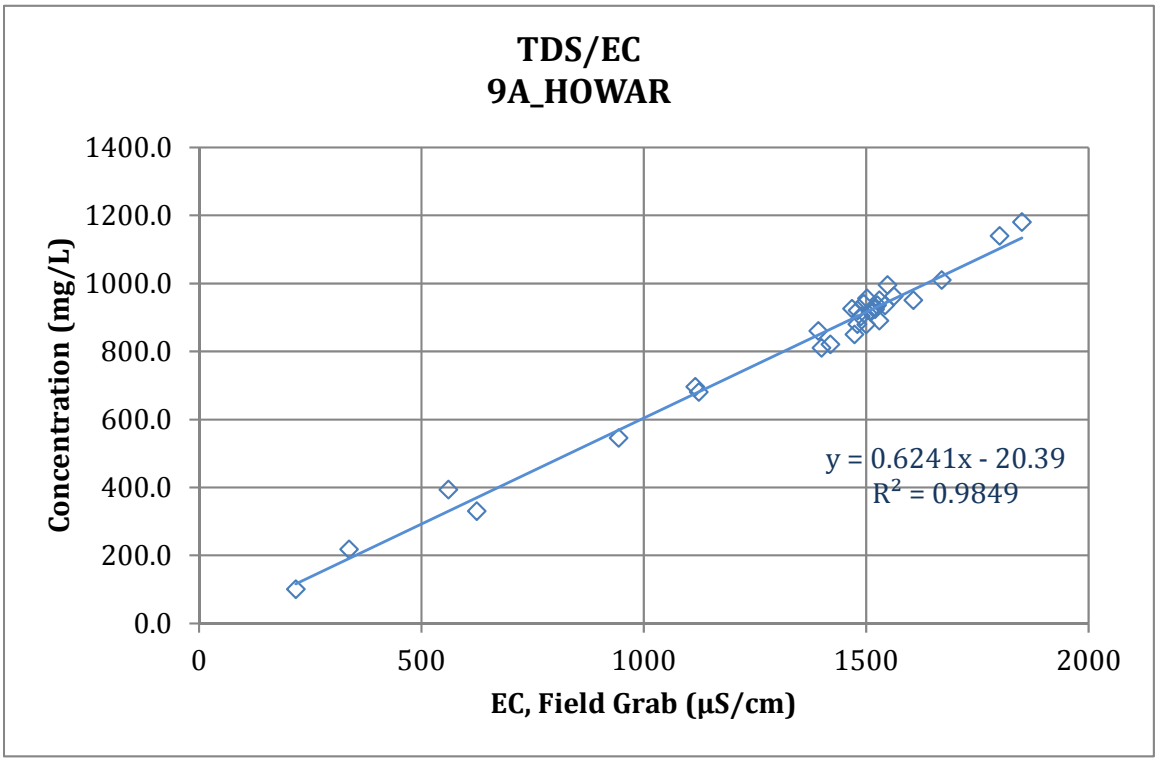

Boron/EC
04_WOOD
Concentration (mg/L)
2.5
2.0
1.5
1.0
0.5
0.0
0
1000
2000
3000
4000
5000
EC, Field Grab (µS/cm)
y = 0.0005x - 0.0718
R² = 0.8005

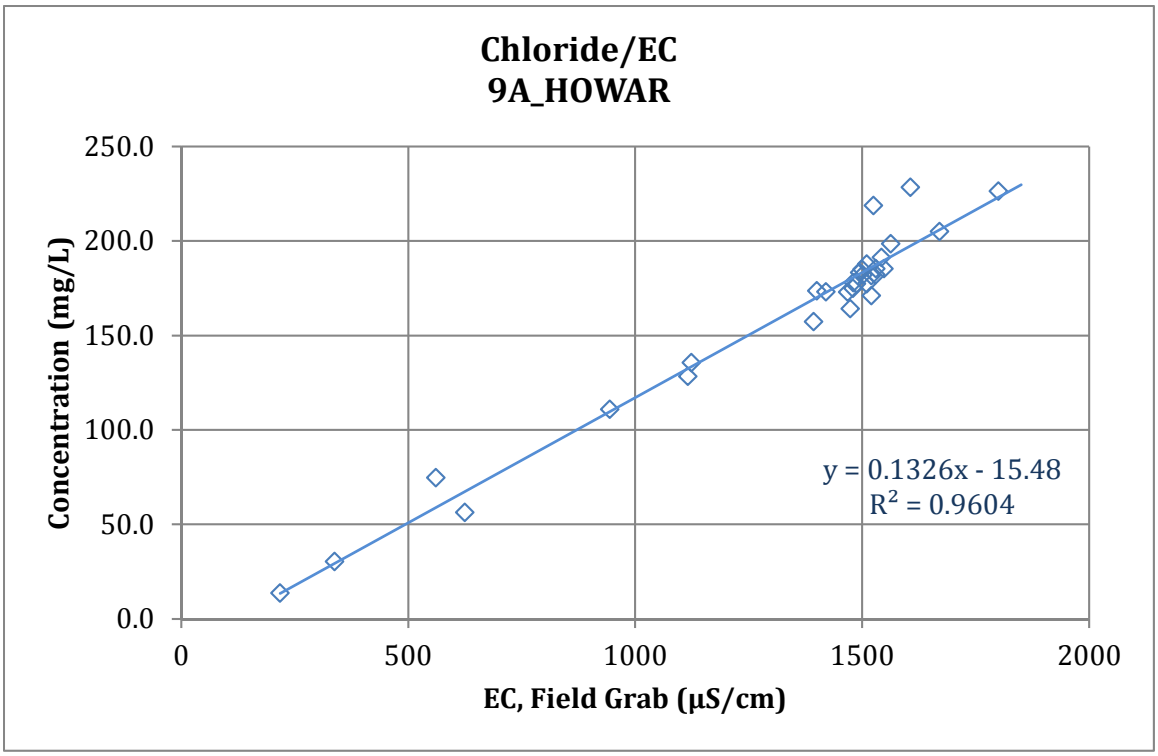

TDS/EC
07_TIERRA
Concentration (mg/L)
1600.0
1400.0
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.7331x - 98.744
R² = 0.9787

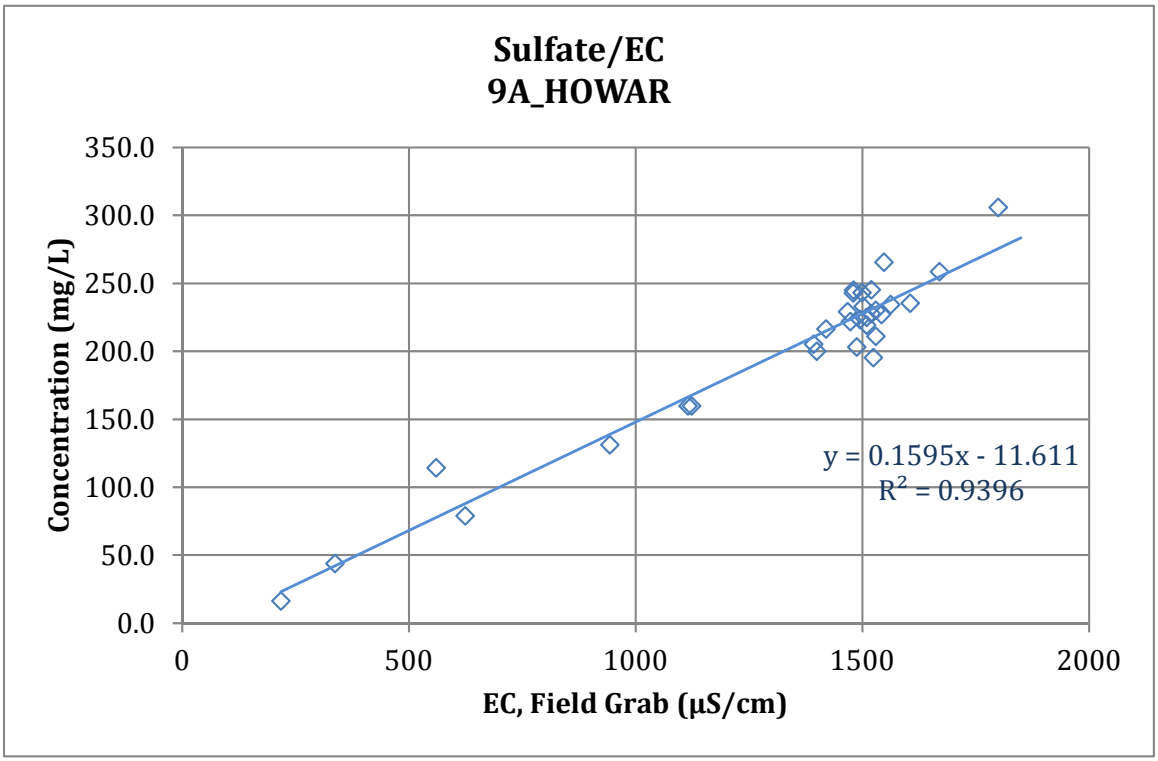

Chloride/EC
07_TIERRA
Concentration (mg/L)
200.0
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.1062x - 16.671
R² = 0.9663

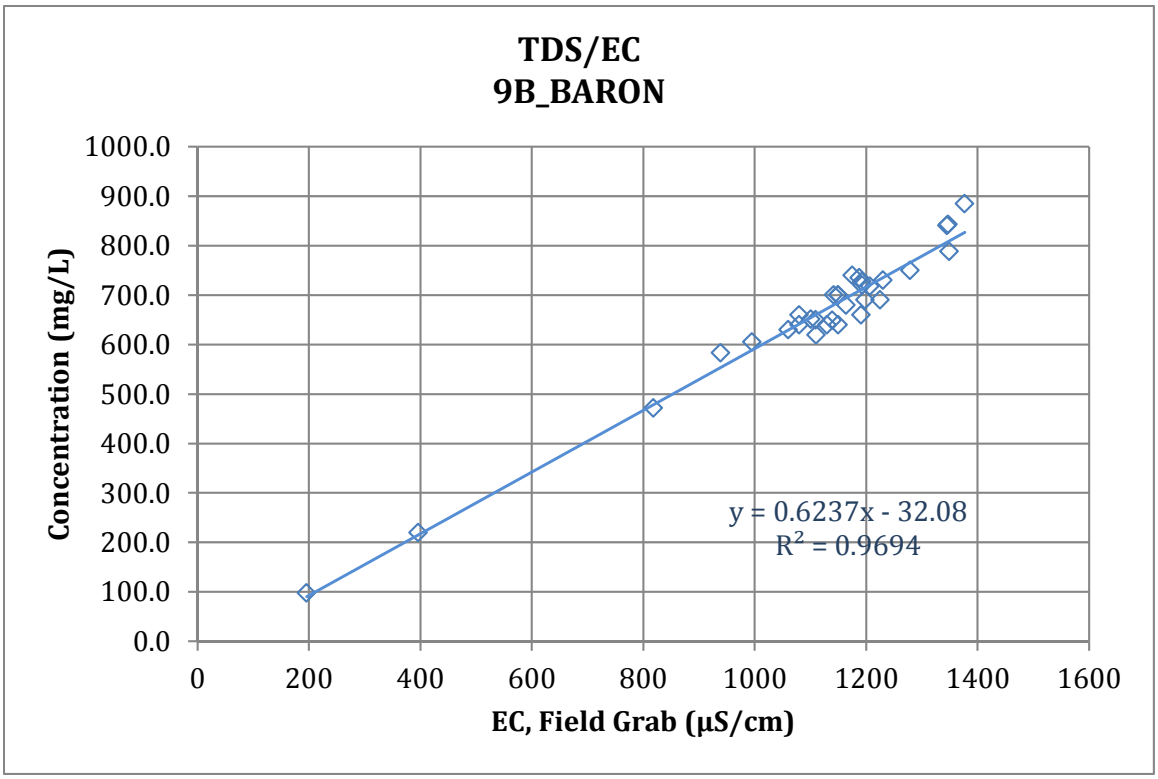

Sulfate/EC
07_TIERRA
Concentration (mg/L)
600.0
500.0
400.0
300.0
200.0
100.0
0.0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.2846x - 54.559
R² = 0.9683

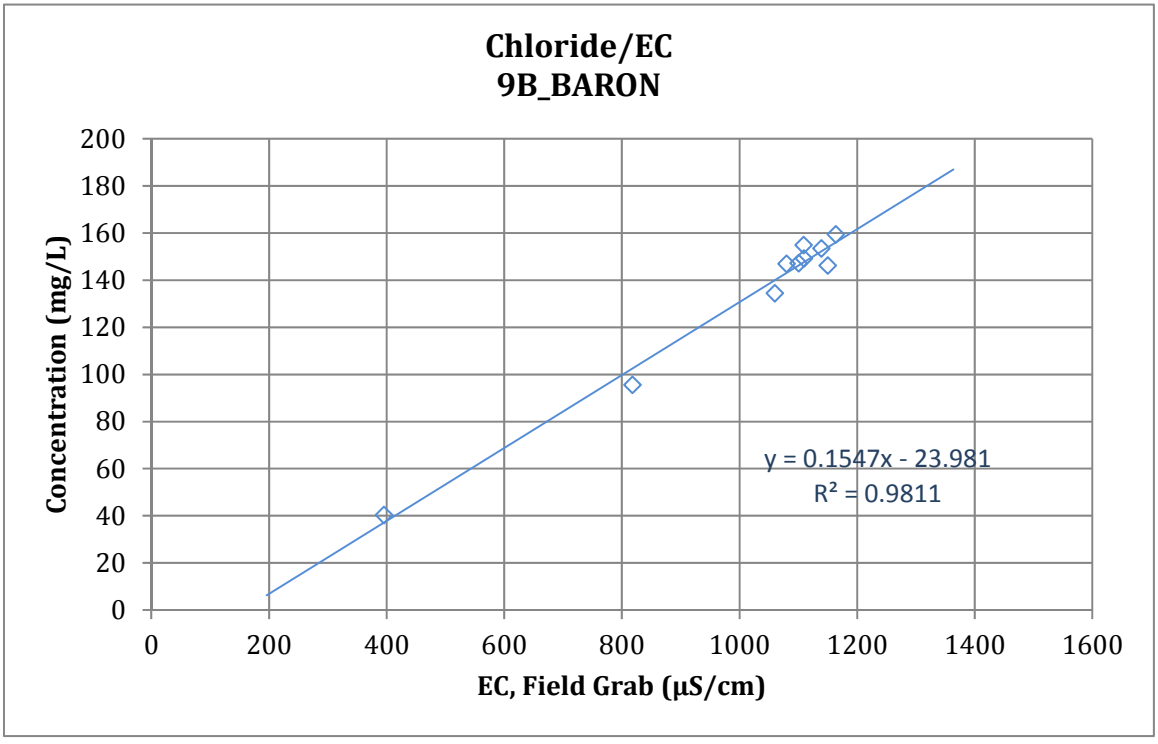

Boron/EC
07_TIERRA
Concentration (mg/L)
0.9000
0.8000
0.7000
0.6000
0.5000
0.4000
0.3000
0.2000
0.1000
0.0000
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.0004x - 0.0604
R² = 0.9115

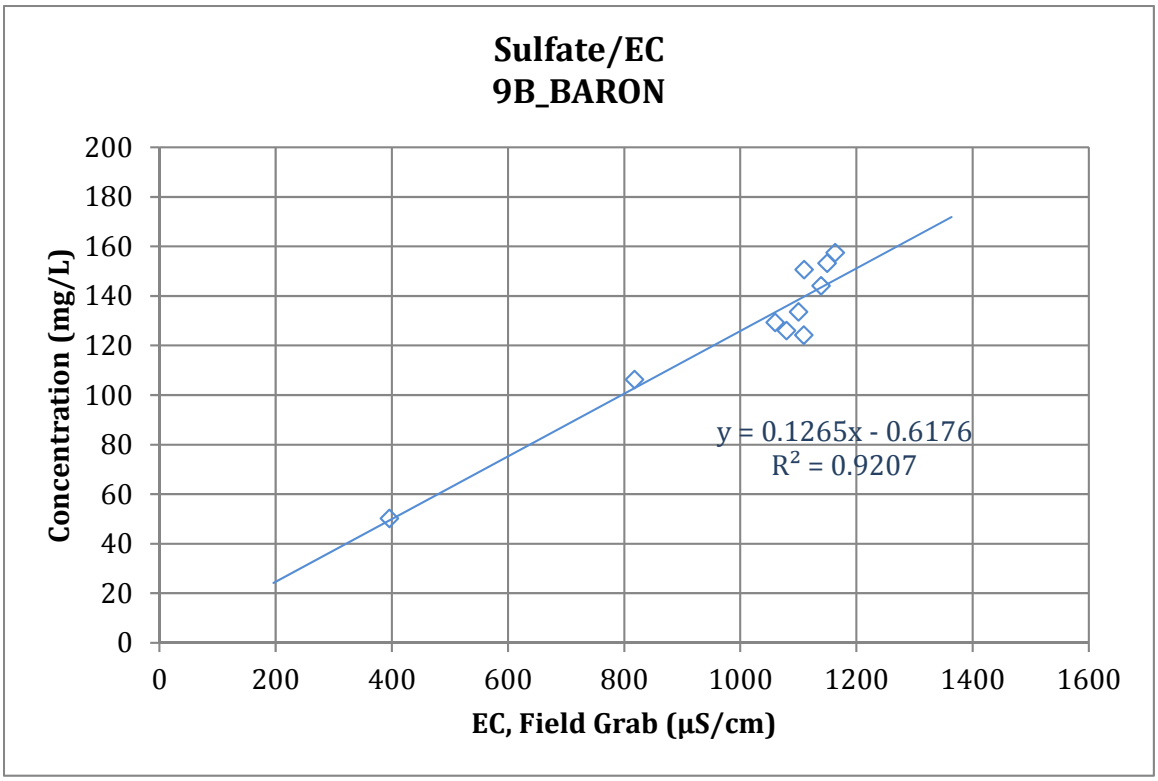

TDS/EC
9A_HOWAR
Concentration (mg/L)
1400.0
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.6241x - 20.39
R² = 0.9849


Chloride/EC
9A_HOWAR
Concentration (mg/L)
250.0
200.0
150.0
100.0
50.0
0.0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.1326x - 15.48
R² = 0.9604


Sulfate/EC
9A_HOWAR
Concentration (mg/L)
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.1595x - 11.611
R² = 0.9396


TDS/EC
9B_BARON
Concentration (mg/L)
1000.0
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
0
200
400
600
800
1000
1200
1400
1600
EC, Field Grab (µS/cm)
y = 0.6237x - 32.08
R² = 0.9694


Chloride/EC
9B_BARON
Concentration (mg/L)
200
180
160
140
120
100
80
60
40
20
0
0
200
400
600
800
1000
1200
1400
1600
EC, Field Grab (µS/cm)
y = 0.1547x - 23.981
R² = 0.9811


Sulfate/EC
9B_BARON
Concentration (mg/L)
EC, Field Grab (µS/cm)
y = 0.1265x - 0.6176
R² = 0.9207
0
20
40
60
80
100
120
140
160
180
200
0
200
400
600
800
1000
1200
1400
1600

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

TOXICITY TESTING PROCEDURES

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

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

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

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

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

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

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

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

TOXICITY RESULTS SUMMARY

Freshwater sediment toxicity samples are collected annually during the first event of each monitoring year. Water column toxicity samples are collected at freshwater sites during each of the quarterly and wet weather events. Monitored sites include the following:

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

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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.

Toxicity samples for sediment were collected at the freshwater sites during dry weather Event 39. Water column toxicity testing was conducted during all four dry weather events (Events 39, 40, 41, and 43), and the one wet weather event (Event 42). 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 39 Sediment Toxicity

Table 1. Freshwater Sediment Toxicity Event 39 - *Hyalella azteca*

Site ID	Toxicity Results		
	Observed Significant Mortality	TIE Initiated	Observed Significant Reduced Growth
04_WOOD	**YES**	NO [1]	**YES**
03_UNIV	**YES**	**YES** [2]	**YES**

1. Although the reduction in the survival response at this treatment was statistically significant, there was <50% reduction relative to the Control and no follow-up testing was performed.
2. There was >50% reduction in *H. azteca* survival; as a result, a TIE targeted for organics was performed.

Event 39 Water Column Toxicity

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

Site ID	Toxicity Results			
	Ceriodaphnia dubia			***Hyalella azteca***
	Observed Significant Mortality	TIE Initiated	Observed Significant Reduced Reproduction	Observed Significant Mortality
03_UNIV	NO	NO	**YES**	
9B_ADOLF	NO	NO	NO	
10_GATE	NO	NO	NO	
13_BELT	NO	NO	NO	
06_SOMIS	NO	NO	**YES**	
07_HITCH	NO	NO	**YES**	
04_WOOD				**YES**

Event 39 Toxicity and TIE Summary

Freshwater sites exhibited significant mortality in all sediment samples, but toxicity at the 04_WOOD site was not sufficient (mean % survival <50%) for a TIE to be performed. As such, TIEs for sediment porewater and bulk sediment were performed only at the 03_UNIV site. The results of the sediment porewater TIE suggest there are multiple compounds (organics and/or ammonia) contributing to sediment porewater toxicity. The results of the bulk sediment TIE suggest there are multiple compounds contributing to bulk sediment toxicity including non-polar organics and to a lesser extent, metals. However, the bulk sediment TIE results suggest that ammonia is not a cause of bulk sediment toxicity. This may also suggest that ammonia is not a cause of sediment porewater toxicity as the pH of porewater increases as it is removed from the sediment, which increases toxicity (i.e., the increase in pH accounts for the toxicity rather than the ammonia concentration).

Freshwater water column did not exhibit significant reductions to mortality or reproduction at any of the monitoring locations during this event.

Event 40 Water Quality Toxicity

Table 3. Water Quality Toxicity Event 40 - *Ceriodaphnia dubia* and *Hyalella azteca*

Site ID	Toxicity Results			
	Ceriodaphnia dubia			*Hyalella azteca*
	Observed Significant Mortality	TIE Initiated	Observed Significant Reduced Reproduction	Observed Significant Mortality
03_UNIV	NO	NO	NO	
9B_ADOLF	NO	NO	YES	
13_BELT	NO	NO	YES	
06_SOMIS	NO	NO	YES	
07_HITCH	NO	NO	YES	
04_WOOD				NO

Event 40 Toxicity and TIE Summary

- No significant reductions in survival were observed for either test organism at the six sample sites during the sampling event.
- Significant reductions in reproduction were observed for *Ceriodaphnia dubia* at four of the five sites tested for this organism.
- No TIEs were performed on samples collected for this sampling event.

Event 41 Water Quality Toxicity

Samples were collected at sites: 9B_ADOLF, 03_UNIV, 10_GATE, 06_SOMIS, and 07_HITCH, in addition to 04_WOOD. Successful toxicity testing on event 41 samples was only completed for 04_WOOD. Low conductivity sites testing could not be completed due to a decline in the *C. dubia* laboratory culture.

Table 4. Water Quality Toxicity Event 41 - *Ceriodaphnia dubia and Hyalella azteca*

Site ID	Toxicity Results			
	Ceriodaphnia dubia		*Hyalella azteca*	
	Observed Significant Mortality	Observed Significant Reduced Reproduction	Observed Significant Mortality	TIE
04_WOOD			NO	NO

Event 41 Toxicity and TIE Summary

- Significant mortality was not observed for *Hyalella azteca* at 04_WOOD.
- TIEs were not performed on any samples collected during this sampling event.

Event 42 Water Quality Toxicity

Table 5. Water Quality Toxicity Event 42 - *Ceriodaphnia dubia*

Site ID	Toxicity Results		
	Ceriodaphnia dubia		
	Observed Significant Mortality	Observed Significant Reduced Reproduction	TIE Initiated
03_UNIV	NO	NO	NO
9B_ADOLF	NO	NO	NO
13_BELT	NO	NO	NO
06_SOMIS	NO	**YES**	NO
07_HITCH	NO	NO	NO
04_WOOD	NO	**YES**	NO
10_GATE	NO	**YES**	NO

Event 42 Toxicity and TIE Summary

- No significant reductions in survival were observed for *Ceriodaphnia dubia* tests.
- Significant reduced reproduction was observed for the 06_SOMIS, 04_WOOD, and 10_GATE sites.
- A TIE was not performed on any samples collected during the sampling event.

Event 43 Water Quality Toxicity

Table 6. Water Quality Toxicity Event 43 - *Ceriodaphnia dubia* and *Hyalella azteca*

Site ID	Toxicity Results			
	Ceriodaphnia dubia			*Hyalella azteca*
	Observed Significant Mortality	Observed Significant Reduced Reproduction	TIE Initiated	Observed Significant Mortality
03_UNIV	NO	NO	NO	
9B_ADOLF	NO	NO	NO	
10_GATE	NO	NO	NO	
13_BELT	NO	NO	NO	
07_HITCH	NO	NO	NO	
04_WOOD				NO

Event 43 Toxicity and TIE Summary

- No significant reductions in survival or reproduction were observed for *Ceriodaphnia dubia* or *Hyalella azteca* for all sites.

Appendix E:
Laboratory QA/QC Results and Discussion

QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance and quality control (QA/QC) measures are built into the CCWTMP to assure that collected data are credible. Two types of quality controls were conducted. Field quality controls (to test for field contamination and precision) were conducted by the field crews and include: equipment blanks, field blanks, and field duplicates and laboratory quality controls (to test for laboratory contamination and precision) were conducted by the labs and include: method blanks, blank spikes, blank spike duplicates, lab duplicates, matrix spikes, matrix spike duplicates, laboratory control samples, and surrogates (organics only). Equipment blanks only apply to the shovels used in sediment sample collection. All field protocols for the collection of clean samples were followed according to the QAPP. The following section lists the quality control failures that occurred during the 2013-2014 monitoring year and any associated qualifiers and comments.

Blank Contamination

During the sixth year of monitoring, a majority of the blank failures were in the metals field blanks. There were very few blank detections for other constituents. There were no equipment blank hits and the lab blank hits were mostly for metals as well. Details of all the blank hits are reported in Table 1 below. The following lists a basic summary of the blank contamination results:

- Field Blanks – 1566 analyzed – 55 detections above the RL (3.51%) (does not include surrogates)
- Equipment Blanks – 121 analyzed – 0 detections above RL (0.0%) (does not include lab duplicates or surrogates)
- Laboratory Blanks – 4858 analyzed – 17 detections above RL (0.35%) (does not include surrogates)

Precision

The purpose of analyzing duplicates is to demonstrate precision of sample collection, preparation, and analytical methods. The relative percent difference (RPD) is reported for field duplicates, lab duplicates, blank spike duplicates, laboratory control spike (LCS) duplicates, and matrix spike duplicates. 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 – 2470 analyzed – 83 failed RPD (3.36%) (does not include surrogates)
- Laboratory Duplicates – 1253 analyzed – 44 failed RPD (3.51%) (includes surrogates)
- Blank Spike/LCS Duplicates – 4177 analyzed – 27 failed RPD (0.65%) (includes surrogates)
- Matrix Spike Duplicates – 742 analyzed – 17 failed RPD (2.29%) (includes surrogates)

Accuracy

Percent recoveries of blank spike samples (BS), laboratory control spike samples (LCS), and matrix spike samples (MS) check the accuracy of lab reported sample concentrations. For the BS and LCS, a majority of the percent recoveries that fell outside the acceptable range were for pesticides constituents, with more than half occurring in the August event from both sediment and water samples. For the rest of the failed BS, they were scattered across the entire monitoring year. For the matrix spike samples that fell outside the acceptable range, half of them were from the first event of the year in sediment, tissue, and water samples. About a quarter of the samples that fell outside the acceptable range were metals samples, two thirds were from pesticides, and the rest were from the nutrients category. 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 – 8231 Analyzed – 43 fell outside the range (0.52%) (does not include surrogates)
- Matrix Spike Samples – 1470 Analyzed – 99 fell outside the range (6.73%) (does not include surrogates)

Table 1. Blank Contamination Observed

Constituent	Matrix	Event	Lab Batch	Equip Blank	Field Blank	Lab Blank	Program Qualifier	Comments
General Water Quality								
Dissolved Organic Carbon (mg/L)	Water	39	_3082616_W_DOC		0.42			
Total Hardness (calc) (mg/L)	Water	40	Physis E-7036 W		0.2			
Nutrients								
Ammonia as N (mg/L)	Water	40	Physis C-14132 W		0.02		FD RPD	FieldDup RPD failed
OC Pesticieds								
None								
PCBs								
None								
OP Pesticides								
None								
Pyrethroid Pesticides								
Sumithrin (ng/l)	Water	40	W3K0500			4.53		
Metals & Selenium								
Total Chromium (µg/L)	Water	39	Physis E-5134 W		0.01			
Total Chromium (µg/L)	Water	39	Physis E-5137 W		0.0331			
Total Chromium (µg/L)	Water	40	Physis E-7041 W		0.0472		U	Upper Limit due to analyte found in blank
Total Chromium (µg/L)	Water	41	Physis E-7054 W		0.0398			
Total Chromium (µg/L)	Water	43	Physis E-7101 W		0.03		FD RPD	FieldDup RPD failed
Dissolved Copper (µg/L)	Water	40	Physis E-7036 W		0.059			
Dissolved Copper (µg/L)	Water	40	Physis E-7041 W		0.018		FD RPD	FieldDup RPD failed
Dissolved Copper (µg/L)	Water	41	W4B0593			0.278		
Dissolved Copper (µg/L)	Water	42	Physis E-7067 W		0.653		U	Upper Limit due to analyte found in blank
Dissolved Copper (ug/l)	Water	40	W3K0917			0.115		

Constituent	Matrix	Event	Lab Batch	Equip Blank	Field Blank	Lab Blank	Program Qualifier	Comments
Total Copper (µg/L)	Water	39	Physis E-5134 W		0.051			
Total Copper (µg/L)	Water	40	Physis E-7036 W		0.094			
Total Copper (µg/L)	Water	40	Physis E-7041 W		0.011		U	Upper Limit due to analyte found in blank
Total Copper (µg/L)	Water	41	Physis E-7054 W		0.022			
Total Copper (µg/L)	Water	42	Physis E-7067 W		0.075			
Total Iron (µg/L)	Water	41	Physis E-7054 W		0.7			
Total Iron (µg/L)	Water	43	Physis E-7101 W		1.32		FD RPD	FieldDup RPD failed
Total Iron (µg/L)	Water	43	Physis E-7102 W		0.5			
Dissolved Lead (µg/L)	Water	42	Physis E-7067 W		0.006		LD RPD	LabDup RPD failed
Total Lead (µg/L)	Water	39	Physis E-5137 W		0.0078			
Total Lead (µg/L)	Water	42	Physis E-7067 W		0.071			
Dissolved Manganese (µg/L)	Water	39	Physis E-5134 W		0.096			
Dissolved Manganese (µg/L)	Water	41	Physis E-7061 W		0.012			
Total Manganese (µg/L)	Water	39	Physis E-5134 W		0.01			
Total Manganese (µg/L)	Water	39	Physis E-5137 W		0.04			
Total Manganese (µg/L)	Water	41	Physis E-7054 W		0.02			
Total Manganese (µg/L)	Water	41	Physis E-7061 W		0.033			
Total Manganese (µg/L)	Water	42	Physis E-7067 W		0.03			
Total Manganese (µg/L)	Water	43	Physis E-7102 W		0.02			
Dissolved Mercury (µg/L)	Water	41	W4B0290			0.005		
Dissolved Mercury (µg/L)	Water	42	Physis E-6064 W		0.0008	0.001	U, U	Upper Limit due to analyte found in lab and field blank
Dissolved Mercury (µg/L)	Water	43	W4E0632			0.013		
Total Mercury (µg/L)	Water	42	Physis E-6064 W		0.0008	0.0009	U, U	Upper Limit due to analyte found in lab and field blank
Dissolved Molybdenum (µg/L)	Water	39	Physis E-5134 W		0.19			
Dissolved Molybdenum (µg/L)	Water	39	Physis E-5137 W		0.015			
Dissolved Molybdenum (µg/L)	Water	40	Physis E-7036 W		0.09			

Constituent	Matrix	Event	Lab Batch	Equip Blank	Field Blank	Lab Blank	Program Qualifier	Comments
Dissolved Molybdenum (µg/L)	Water	41	Physis E-7061 W		0.04			
Dissolved Molybdenum (µg/L)	Water	43	Physis E-7101 W		0.1			
Dissolved Molybdenum (µg/L)	Water	43	Physis E-7102 W		0.019			
Total Molybdenum (µg/L)	Water	39	Physis E-5134 W		0.12			
Total Molybdenum (µg/L)	Water	39	Physis E-5137 W		0.012			
Total Molybdenum (µg/L)	Water	40	Physis E-7036 W		0.05			
Total Molybdenum (µg/L)	Water	41	Physis E-7061 W		0.04			
Total Molybdenum (µg/L)	Water	43	Physis E-7101 W		0.09			
Total Molybdenum (µg/L)	Water	43	Physis E-7102 W		0.012			
Dissolved Nickel (µg/L)	Water	39	Physis E-5137 W		0.006			
Dissolved Nickel (µg/L)	Water	40	Physis E-7041 W		0.0034			
Dissolved Nickel (µg/L)	Water	41	Physis E-7054 W		0.0081			
Dissolved Nickel (µg/L)	Water	41	W4B0593			0.166		
Dissolved Nickel (µg/L)	Water	43	Physis E-7101 W		0.01			
Total Nickel (µg/L)	Water	39	Physis E-5137 W		0.0057			
Total Nickel (µg/L)	Water	40	Physis E-7041 W		0.0038		U	Upper Limit due to analyte found in blank
Total Nickel (µg/L)	Water	41	Physis E-7054 W		0.0037			
Total Nickel (µg/L)	Water	42	Physis E-7067 W		0.03			
Total Nickel (µg/L)	Water	43	Physis E-7101 W		0.03			
Dissolved Silver (µg/L)	Water	43	Physis E-7101 W		0.02		MS <LL, EST MS/MSD, U	MS failed lower limit, Estimate due to MS/MSD RPD failure, Upper Limit due to analyte found in blank
Total Silver (µg/L)	Water	39	Physis E-5137 W		0.02			
Total Silver (µg/L)	Water	40	Physis E-7041 W		0.03		U	Upper Limit due to analyte found in blank
Total Silver (µg/L)	Water	43	Physis E-7101 W		0.04			
Total Silver (µg/L)	Water	43	Physis E-7102 W		0.03			
Dissolved Strontium (µg/L)	Water	39	Physis E-5134 W		0.15			

Constituent	Matrix	Event	Lab Batch	Equip Blank	Field Blank	Lab Blank	Program Qualifier	Comments
Total Strontium (µg/L)	Water	39	Physis E-5134 W		0.11			
Total Strontium (µg/L)	Water	43	Physis E-7101 W		0.24			
Total Tin (µg/L)	Water	41	Physis E-7054 W		0.01			
Dissolved Zinc (µg/L)	Water	39	Physis E-5134 W		1.1			
Dissolved Zinc (µg/L)	Water	40	Physis E-7036 W		0.44			
Dissolved Zinc (µg/L)	Water	41	Physis E-7054 W		0.0808			
Dissolved Zinc (µg/L)	Water	41	Physis E-7061 W		1.33			
Dissolved Zinc (µg/L)	Water	41	W4B0593			2.47		
Dissolved Zinc (µg/L)	Water	42	Physis E-7067 W		0.32			
Dissolved Zinc (µg/L)	Water	43	Physis E-7101 W		3.54		FD RPD, U	FieldDup RPD Failed, Upper Limit due to analyte found in blank
Dissolved Zinc (ug/l)	Water	40	W3K0917			2.09		
Total Zinc (µg/L)	Water	39	Physis E-5134 W		1.5			
Total Zinc (µg/L)	Water	40	Physis E-7036 W		0.64			
Total Zinc (µg/L)	Water	40	Physis E-7041 W		0.2178		U, FD RPD	FieldDup RPD Failed, Upper Limit due to analyte found in blank
Total Zinc (µg/L)	Water	41	Physis E-7054 W		0.2474			
Total Zinc (µg/L)	Water	41	Physis E-7061 W		2.03			
Total Zinc (µg/L)	Water	42	Physis E-7067 W		1.71			
Total Zinc (µg/L)	Water	43	Physis E-7101 W		3.14		U	Upper Limit due to analyte found in blank

Table 2. Precision QA/QC Issues

Constituent	Matrix	Event	Lab Batch	Site	BS/ BSD RPD	Field Dup RPD	Lab Dup RPD	MS/ MSD RPD	Program Qualifier	Comments
General Water Quality										
Clay - <0.0039 mm (%)	sediment	39	IIRMES_GC-02-027_S_GS	04_WOOD		***33***	0			
Sand 0.0625 to <2.0 mm (%)	Water	42	1011002-096	04D_WOOD			***92***			
Silt - 0.0039 to <0.0625 mm (%)	sediment	39	IIRMES_GC-02-027_S_GS	04_WOOD		***31***	13			
Total Suspended Solids (mg/L)	Water	39	Physis C-13125 W	04_WOOD		***35***			FD RPD	FieldDup RPD Failed
Total Suspended Solids (mg/L)	Water	39	Physis C-13126 W	07_MADER		***67***				
Total Suspended Solids (mg/L)	Water	41	Physis C-15066 W	01_BPT_3		***65***			FD RPD	FieldDup RPD Failed
Nutrients										
Ammonia as N (mg/L)	Water	39	Physis C-14024 W	LABQA	***40***					
Ammonia as N (mg/L)	Water	39	Physis C-14015 W	04_WOOD				***33***		
Ammonia as N (mg/L)	Water	40	Physis C-14132 W	01T_ODD2_DC H		***150***		25	FD RPD	FieldDup RPD Failed
Ammonia as N (mg/L)	Water	41	Physis C-15142 W	03_UNIV		***35***			MS <LL, FD RPD	MS failed lower limit, FieldDup RPD Failed
Ammonia as N (mg/L)	Water	41	Physis C-15142 W	10_GATE		***35***			MS <LL, FD RPD	MS failed lower limit, FieldDup RPD Failed
OrthoPhosphate as P (mg/L)	Water	40	Physis C-14104 W	01T_ODD2_DC H		***197***	0	3	FD RPD	FieldDup RPD Failed
Phosphorus, Total as P (mg/L)	Water	40	Physis C-14111 W	07_HITCH		3	1	***48***		
Total Kjeldahl Nitrogen (mg/L)	Water	41	Associated_QC1144224_W_CON	03_UNIV		***33***				
OC Pesticides										

Constituent	Matrix	Event	Lab Batch	Site	BS/ BSD RPD	Field Dup RPD	Lab Dup RPD	MS/ MSD RPD	Program Qualifier	Comments
DDD(o,p') (µg/L)	Water	42	Physis O-6002 W	03_UNIV		***33***			H	Holdtime exceeded
DDD(o,p') (ng/dry g)	sediment	39	Physis O-5017 W	04_WOOD		19	***38***	1		
DDD(p,p') (µg/L)	Water	42	Physis O-5154 W	03_UNIV		***35***			H, FD RPD	Holdtime exceeded, FieldDup RPD Failed
DDD(p,p') (µg/L)	Water	42	Physis O-6002 W	03_UNIV		***39***			H	Holdtime exceeded
DDD(p,p') (ng/dry g)	sediment	39	Physis O-5017 W	04_WOOD				***32***		
DDD(p,p') (ng/dry g)	sediment	39	Physis O-5001 W	04_WOOD		***49***				
DDE(p,p') (µg/L)	Water	42	Physis O-5154 W	03_UNIV		***31***			H, FD RPD	Holdtime exceeded, FieldDup RPD Failed
DDE(p,p') (ng/dry g)	sediment	39	Physis O-5017 W	04_WOOD				***38***		
DDE(p,p') (ng/dry g)	sediment	39	Physis O-5017 W	04_WOOD		2	***31***		LD RPD, MS >UL, EST MS/MSD	LabDuplicate RPD Failed, MS failed upper limit, Estimate due to RPD failure between MS/MSD
DDE(p,p') (ng/dry g)	sediment	39	Physis O-5001 W	04_WOOD		***36***			FD RPD	FieldDup RPD Failed
DDE(p,p') (ng/wet g)	Tissue	39	Physis O-5019 W	04_WOOD				***69***		
Total DDE(p,p') (µg/L)	Water	40	Physis O-5037 W	07_HITCH		***57***				
DDT(o,p') (µg/L)	Water	42	Physis O-5154 W	03_UNIV		***137***			H, FD RPD	Holdtime exceeded, FieldDup RPD Failed
DDT(o,p') (ng/dry g)	sediment	39	Physis O-5017 W	04_WOOD		9	***38***		MS >UL, BS >UL	MS failed upper limit, BS failed upper limit
DDT(o,p') (ng/dry g)	sediment	39	Physis O-5017 W	04_WOOD		***32***			MS >UL, BS >UL	MS failed upper limit, BS failed upper limit
Total DDT(o,p') (µg/L)	Water	40	Physis O-5038 W	01T_ODD2_DCH		***48***				

Constituent	Matrix	Event	Lab Batch	Site	BS/ BSD RPD	Field Dup RPD	Lab Dup RPD	MS/ MSD RPD	Program Qualifier	Comments
DDT(p,p') (ng/dry g)	sediment	39	Physis O-5017 W	04_WOOD				***50***		
DDT(p,p') (ng/dry g)	sediment	39	Physis O-5001 W	04_WOOD		***73***			BS >UL	BS failed upper limit
DDT(p,p') (ng/dry g)	sediment	39	Physis O-5017 W	04_WOOD		***53***			EST MS/MSD	Estimate due to MS/MSD RPD failed
Chlordane, alpha- (ng/dry g)	sediment	39	Physis O-5001 W	04_WOOD		***31***				
Chlordane, gamma- (µg/L)	Water	42	Physis O-5154 W	03_UNIV		***34***			H	Holdtime exceeded
Chlordane, gamma- (ng/dry g)	sediment	39	Physis O-5001 W	04_WOOD		***43***				
Endosulfan I (ng/wet g)	Water	39	Physis O-5019 W	LABQA	***36***					
Endosulfan II (ng/dry g)	Water	39	Physis O-5017 W	LABQA	***33***					
Methoxychlor (ng/dry g)	sediment	39	Physis O-5017 W	04_WOOD				***42***		
Methoxychlor (ng/wet g)	Tissue	39	Physis O-5019 W	04_WOOD				***40***		
Toxaphene (µg/L)	Water	42	Physis O-5154 W	03_UNIV		***140***			H	Holdtime exceeded
PCBs										
PCB 003 (ng/dry g)	Water	39	Physis O-5017 W	LABQA	***87***					
PCB 008 (ng/dry g)	Water	39	Physis O-5017 W	LABQA	***42***					
PCB 138 (µg/L)	Water	42	Physis O-5154 W	03_UNIV		***47***			H	Holdtime exceeded
PCB 141 (µg/L)	Water	42	Physis O-5154 W	03_UNIV		***46***			H	Holdtime exceeded
PCB 151 (µg/L)	Water	42	Physis O-5154 W	03_UNIV		***52***			H	Holdtime exceeded
PCB 153 (µg/L)	Water	42	Physis O-5154 W	03_UNIV		***62***			H	Holdtime exceeded

Constituent	Matrix	Event	Lab Batch	Site	BS/ BSD RPD	Field Dup RPD	Lab Dup RPD	MS/ MSD RPD	Program Qualifier	Comments
PCB 194 (µg/L)	Water	42	Physis O-5154 W	03_UNIV		***134***			H, FD RPD	Holdtime exceeded, FieldDup RPD Failed
PCB 201 (µg/L)	Water	42	Physis O-5154 W	03_UNIV		***195***			H, FD RPD	Holdtime exceeded, FieldDup RPD Failed
PCB 206 (ng/dry g)	sediment	39	Physis O-5017 W	04_WOOD				***31***		
OP Pesticides										
Azinphos methyl (Guthion) (µg/L)	Water	41	W4B0333	LABQA				***26***		
Bolstar (µg/L)	Water	39	W3H0542	LabQA	***28***				EST BS/BSD	Estimate due to BS/BSD RPD failed
Chlorpyrifos (µg/L)	Water	42	Physis O-5154 W	03_UNIV		***156***			H, FD RPD	Holdtime exceeded, FieldDup RPD Failed
Chlorpyrifos (ng/dry g)	sediment	39	Physis O-5017 W	04_WOOD		***32***	8		MS >UL	MS failed upper limit
Chlorpyrifos (ng/dry g)	sediment	39	Physis O-5017 W	04_WOOD		***61***			MS >UL	MS failed upper limit
Total Chlorpyrifos (µg/L)	Water	42	Physis O-6002 W	LABQA	***32***				EST BS/BSD	Estimate due to BS/BSD RPD failed
Total Chlorpyrifos (µg/L)	Water	41	Physis O-5101 W	03_UNIV		***77***			H, FD RPD	Holdtime exceeded, FieldDup RPD Failed
Demeton-s (ng/dry g)	Water	39	Physis O-5001 W	LABQA	***37***					
Dichlorvos (µg/L)	Water	41	W4B0333	LABQA	***35***					
Dichlorvos (µg/L)	Water	41	W4B0333	LABQA				***36***		
Total Dimethoate (µg/L)	Water	42	Physis O-6002 W	LABQA	***44***				EST BS/BSD	Estimate due to BS/BSD RPD failed
Fensulfothion (µg/L)	Water	39	W3H0542	LabQA	***32***				EST BS/BSD	Estimate due to BS/BSD RPD failed
Total Fensulfothion (µg/L)	Water	41	Physis O-5107 W	LABQA	***41***				EST BS/BSD	Estimate due to BS/BSD RPD failed

Constituent	Matrix	Event	Lab Batch	Site	BS/ BSD RPD	Field Dup RPD	Lab Dup RPD	MS/ MSD RPD	Program Qualifier	Comments
Total Malathion (µg/L)	Water	42	Physis O-5134 W	03_UNIV		***66***			H, FD RPD	Holdtime exceeded, FieldDup RPD Failed
Total Malathion (µg/L)	Water	42	Physis O-5134 W	13_SB_HILL		***103***			H, FD RPD	Holdtime exceeded, FieldDup RPD Failed
Naled (µg/L)	Water	43	W4E0626	LABQA	***39***					
Total Tetrachlorvinphos (µg/L)	Water	41	Physis O-5092 W	LABQA	***34***				EST BS/BSD	Estimate due to BS/BSD RPD failed
Pyrethroid Pesticides										
Bifenthrin (µg/L)	Water	42	Physis O-6002 W	13_SB_HILL		***38***			H, FD RPD	Holdtime exceeded, FieldDup RPD Failed
Bifenthrin (ng/dry g)	sediment	39	Physis O-5017 W	04_WOOD		11	***54***		LD RPD, MS >UL	LabDuplicate RPD Failed, MS failed upper limit
Total Bifenthrin (µg/L)	Water	43	Physis O-6030 W	07_HITCH		***197***			FD RPD	FieldDup RPD Failed
Cyfluthrin, total (µg/L)	Water	42	Physis O-5154 W	03_UNIV		***60***			H, FD RPD	Holdtime exceeded, FieldDup RPD Failed
Cyfluthrin, total (µg/L)	Water	42	Physis O-6002 W	03_UNIV		***106***			H, FD RPD	Holdtime exceeded, FieldDup RPD Failed
Cyfluthrin, total (µg/L)	Water	42	Physis O-6002 W	13_SB_HILL		***33***			H, FD RPD	Holdtime exceeded, FieldDup RPD Failed
Cyfluthrin, total (ng/dry g)	sediment	39	Physis O-5017 W	04_WOOD				***74***		
Cypermethrin, total (µg/L)	Water	42	Physis O-5154 W	03_UNIV		***56***			H, FD RPD	Holdtime exceeded, FieldDup RPD Failed
Cypermethrin, total (µg/L)	Water	42	Physis O-6002 W	13_SB_HILL		***46***			H	Holdtime exceeded
Cypermethrin, total (ng/dry g)	sediment	39	Physis O-5001 W	04_WOOD		***33***				
Danitol (ng/dry g)	sediment	39	Physis O-5017 W	04_WOOD		2	***36***		LD RPD, MS >UL	LabDuplicate RPD Failed, MS failed upper limit
Danitol (ng/dry g)	sediment	39	Physis O-5001 W	04_WOOD		***60***			FD RPD	FieldDup RPD Failed

Constituent	Matrix	Event	Lab Batch	Site	BS/ BSD RPD	Field Dup RPD	Lab Dup RPD	MS/ MSD RPD	Program Qualifier	Comments
Esfenvalerate (µg/L)	Water	42	Physis O-5154 W	03_UNIV		***49***			H, FD RPD	Holdtime exceeded, FieldDup RPD Failed
Total Esfenvalerate (µg/L)	Water	40	Physis O-5038 W	01T_ODD2_DCH		***95***				
Fenvalerate (µg/L)	Water	42	Physis O-5154 W	03_UNIV		***50***			H	Holdtime exceeded
Total Fenvalerate (µg/L)	Water	40	Physis O-5038 W	01T_ODD2_DCH		***46***				
Total Fluvalinate (µg/L)	Water	40	Physis O-5038 W	01T_ODD2_DCH		***123***				
Total L-Cyhalothrin (µg/L)	Water	39	Physis O-4151 W	04_WOOD		***45***				
Total Prallethrin (µg/L)	Water	41	Physis O-5107 W	LABQA	***45***				EST BS/BSD	Estimate due to BS/BSD RPD failed
Total Prallethrin (µg/L)	Water	42	Physis O-6002 W	LABQA	***107***				BS <LL, EST BS/BSD	BS failed lower limit, Estimate due to BS/BSD RPD failed
Metals and Selenium										
Dissolved Aluminum (µg/L)	Water	43	Physis E-7101 W	01T_ODD2_DCH		***107***	0	0	FD RPD	FieldDup RPD Failed
Aluminum (µg/dry g)	sediment	39	Physis E-5149 W	LABQA			***59***			
Total Aluminum (µg/L)	Water	41	Physis E-7054 W	01_BPT_3		***32***			FD RPD	FieldDup RPD Failed
Total Aluminum (µg/L)	Water	43	Physis E-7101 W	01T_ODD2_DCH		***120***	5		FD RPD	FieldDup RPD Failed
Dissolved Beryllium (µg/L)	Water	40	Physis E-7041 W	01_BPT_14			***50***			
Dissolved Beryllium (µg/L)	Water	42	Physis E-7067 W	03_UNIV		***67***				
Total Beryllium (µg/L)	Water	40	Physis E-7041 W	01_BPT_15		***35***			U	Upper Limit due to analyte found in blank
Total Beryllium (µg/L)	Water	41	Physis E-7054 W	01_BPT_14			***33***			

Constituent	Matrix	Event	Lab Batch	Site	BS/ BSD RPD	Field Dup RPD	Lab Dup RPD	MS/ MSD RPD	Program Qualifier	Comments
Dissolved Cadmium (µg/L)	Water	40	Physis E-7036 W	05D_SANT_VC WPD			***113***		LD RPD	LabDuplicate RPD Failed
Dissolved Cadmium (µg/L)	Water	40	Physis E-7036 W	07D_SIMI			***53***		LD RPD	LabDuplicate RPD Failed
Dissolved Cadmium (µg/L)	Water	41	Physis E-7052 W	9AD_CAMA			***41***	0	LD RPD	LabDuplicate RPD Failed
Dissolved Cadmium (µg/L)	Water	43	Physis E-7101 W	9AD_CAMA			***34***	0		
Total Cadmium (µg/L)	Water	39	Physis M-5133 W	07D_SIMI			***50***		LD RPD	LabDuplicate RPD Failed
Total Cadmium (µg/L)	Water	40	Physis E-7036 W	9AD_CAMA			***82***			
Total Cadmium (µg/L)	Water	41	Physis E-7061 W	03_UNIV		***33***			FD RPD	FieldDup RPD Failed
Dissolved Chromium (µg/L)	Water	42	Physis E-7067 W	03_UNIV		***50***			FD RPD	FieldDup RPD Failed
Total Chromium (µg/L)	Water	43	Physis E-7101 W	01T_ODD2_DC H		***34***	13		FD RPD	FieldDup RPD Failed
Dissolved Copper (µg/L)	Water	40	Physis E-7041 W	01_BPT_14			***88***		LD RPD, U, FD RPD	LabDuplicate RPD Failed, Upper Limit due to analyte found in blank, FieldDuplicate RPD Failed
Dissolved Copper (µg/L)	Water	40	Physis E-7041 W	01_BPT_15		***43***			LD RPD, FD RPD	LabDuplicate RPD Failed, FieldDuplicate RPD Failed
Dissolved Copper (µg/L)	Water	41	Physis E-7054 W	01_BPT_3		***80***			FD RPD	FieldDup RPD Failed
Dissolved Copper (µg/L)	Water	43	Physis E-7102 W	01_BPT_14			***67***		LD RPD	LabDuplicate RPD Failed
Total Iron (µg/L)	Water	43	Physis E-7101 W	01T_ODD2_DC H		***47***	5		FD RPD	FieldDup RPD Failed
Dissolved Lead (µg/L)	Water	39	Physis E-5134 W	01T_ODD2_DC H			***44***	0		
Dissolved Lead (µg/L)	Water	39	Physis E-5137 W	01_BPT_14		12	***68***		LD RPD	LabDuplicate RPD Failed

Constituent	Matrix	Event	Lab Batch	Site	BS/ BSD RPD	Field Dup RPD	Lab Dup RPD	MS/ MSD RPD	Program Qualifier	Comments
Dissolved Lead (µg/L)	Water	40	Physis E-7041 W	01_BPT_15		***45***				
Dissolved Lead (µg/L)	Water	42	Physis E-7067 W	01_RR_BR			***88***	2	LD RPD	LabDuplicate RPD Failed
Dissolved Lead (µg/L)	Water	43	Physis E-7101 W	03_UNIV			***37***	0	LD RPD	LabDuplicate RPD Failed
Total Lead (µg/L)	Water	40	Physis E-7036 W	9AD_CAMA			***43***		LD RPD	LabDuplicate RPD Failed
Total Lead (µg/L)	Water	41	Physis E-7054 W	01_BPT_3		***39***			FD RPD	FieldDup RPD Failed
Total Lead (µg/L)	Water	43	Physis E-7101 W	01T_ODD2_DC H		***158***	19		LD RPD, FD RPD	LabDuplicate RPD Failed, FieldDuplicate RPD Failed
Total Lead (µg/L)	Water	43	Physis E-7101 W	07D_SIMI			***73***		LD RPD, FD RPD	LabDuplicate RPD Failed, FieldDuplicate RPD Failed
Dissolved Manganese (µg/L)	Water	42	Physis E-7067 W	03_UNIV		***97***			FD RPD	FieldDup RPD Failed
Total Manganese (µg/L)	Water	43	Physis E-7101 W	01T_ODD2_DC H		***41***	1		FD RPD	FieldDup RPD Failed
Dissolved Mercury (µg/L)	Water	43	Physis E-6069 W	01_BPT_14			***60***			
Dissolved Mercury (µg/L)	Water	43	Physis E-6069 W	01_BPT_6		***35***				
Total Mercury (µg/L)	Water	40	Physis E-6046 W	01_BPT_14			***33***			
Total Mercury (µg/L)	Water	40	Physis E-6048 W	03_UNIV			***33***	3		
Dissolved Selenium (µg/L)	Water	40	Physis E-7036 W	9AD_CAMA			***44***	0		
Dissolved Selenium (µg/L)	Water	40	Physis E-7041 W	01_BPT_14			***50***			
Dissolved Selenium (µg/L)	Water	41	Physis E-7052 W	9AD_CAMA			***40***	1		
Dissolved Selenium (µg/L)	Water	43	Physis E-7102 W	01_BPT_14			***33***			

Constituent	Matrix	Event	Lab Batch	Site	BS/ BSD RPD	Field Dup RPD	Lab Dup RPD	MS/ MSD RPD	Program Qualifier	Comments
Total Selenium (µg/L)	Water	41	Physis E-7054 W	01_BPT_14			***47***			
Total Selenium (µg/L)	Water	41	Physis E-7054 W	01_BPT_3		***55***				
Total Selenium (µg/L)	Water	42	Physis E-7067 W	01_RR_BR			***42***		LD RPD	LabDuplicate RPD Failed
Dissolved Silver (µg/L)	Water	39	Physis E-5137 W	01_BPT_14		29	***50***			
Dissolved Silver (µg/L)	Water	43	Physis E-7101 W	03_UNIV			***67***		MS <LL, EST MS/MSD, U	MS failed lower limit, Estimate due to RPD failure between MS/MSD, Upper Limit due to analyte found in blank
Dissolved Silver (µg/L)	Water	43	Physis E-7101 W	07D_SIMI				***31***	MS <LL, EST MS/MSD	MS failed lower limit, Estimate due to RPD failure between MS/MSD
Dissolved Silver (µg/L)	Water	43	Physis E-7101 W	9AD_CAMA			0	***45***	MS <LL, EST MS/MSD	MS failed lower limit, Estimate due to RPD failure between MS/MSD
Dissolved Silver (µg/L)	Water	43	Physis E-7102 W	01_BPT_6		***40***			FD RPD, EST MS/MSD	FieldDup RPD Failed, Estimate due to MS/MSD RPD failed
Silver (µg/dry g)	sediment	39	Physis E-5149 W	04_WOOD		0	***40***			
Total Silver (µg/L)	Water	40	Physis E-7041 W	01_BPT_15		***67***			U	Upper Limit due to analyte found in blank
Total Silver (µg/L)	Water	41	Physis E-7054 W	01_BPT_14			***67***			
Total Silver (µg/L)	Water	41	Physis E-7054 W	01_BPT_3		***40***				
Dissolved Strontium (µg/L)	Water	40	Physis E-7036 W	01T_ODD2_DCH		1	0	***74***	MS >UL, EST MS/MSD	MS failed upper limit, Estimate due to RPD failure between MS/MSD

Constituent	Matrix	Event	Lab Batch	Site	BS/ BSD RPD	Field Dup RPD	Lab Dup RPD	MS/ MSD RPD	Program Qualifier	Comments
Dissolved Strontium (µg/L)	Water	40	Physis E-7036 W	05D_SANT_VC WPD			2	***32***	MS >UL, EST MS/MSD	MS failed upper limit, Estimate due to RPD failure between MS/MSD
Dissolved Thallium (µg/L)	Water	40	Physis E-7041 W	01_BPT_14			***46***			
Dissolved Thallium (µg/L)	Water	41	Physis E-7052 W	9AD_CAMA			***40***	0		
Total Thallium (µg/L)	Water	39	Physis E-5134 W	04_WOOD		***67***				
Total Thallium (µg/L)	Water	40	Physis E-7041 W	01_BPT_14			***48***			
Total Thallium (µg/L)	Water	41	Physis E-7052 W	07D_SIMI			***100***			
Total Thallium (µg/L)	Water	41	Physis E-7052 W	9AD_CAMA			***40***			
Dissolved Tin (µg/L)	Water	39	Physis E-5137 W	01_BPT_14		***105***	18		FD RPD	FieldDup RPD Failed
Total Tin (µg/L)	Water	39	Physis E-5137 W	01_BPT_14		***78***	5		FD RPD	FieldDup RPD Failed
Total Tin (µg/L)	Water	40	Physis E-7041 W	01_BPT_15		***120***			FD RPD	FieldDup RPD Failed
Total Tin (µg/L)	Water	41	Physis E-7052 W	9AD_CAMA			***40***			
Total Tin (µg/L)	Water	42	Physis E-7067 W	01_RR_BR			***71***			
Total Tin (µg/L)	Water	42	Physis E-7067 W	03_UNIV		***42***				
Total Tin (µg/L)	Water	43	Physis E-7102 W	01_BPT_14			***31***			
Dissolved Titanium (µg/L)	Water	40	Physis E-7036 W	01T_ODD2_DC H		1	0	***62***	MS <LL, EST MS/MSD	MS failed lower limit, Estimate due to RPD failure between MS/MSD
Dissolved Zinc (µg/L)	Water	40	Physis E-7041 W	01_BPT_15		***36***			FD RPD	FieldDup RPD Failed

Constituent	Matrix	Event	Lab Batch	Site	BS/ BSD RPD	Field Dup RPD	Lab Dup RPD	MS/ MSD RPD	Program Qualifier	Comments
Dissolved Zinc (µg/L)	Water	43	Physis E-7101 W	01T_ODD2_DC H		***44***	1		FD RPD, U	FieldDup RPD Failed, Upper Limit due to analyte found in blank
Dissolved Zinc (µg/L)	Water	43	Physis E-7102 W	01_BPT_6		***45***			FD RPD	FieldDup RPD Failed
Total Zinc (µg/L)	Water	40	Physis E-7041 W	01_BPT_15		***62***			FD RPD	FieldDup RPD Failed

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

Table 3. Accuracy QA/QC Issues

Constituent	Matrix	Event	Lab Batch	LCL	UCL	LCS %Rec.	LCSD %Rec.	MS %Rec.	MSD %Rec.	Program Qualifier	Comments
General Water Quality											
None											
Nutrients											
Ammonia as N (mg/L)	Water	41	Physis C-15142 W	70	130	88	92	72	***68***	MS <LL, FD RPD	MS failed lower limit, FieldDup RPD failed
Ammonia as N (mg/L)	Water	43	Physis C-18017 W	70	130	120	112	***192***		MS >UL	MS failed upper limit
Ammonia as N (mg/L)	Water	43	Physis C-18019 W	70	130	116	100	***416***	***380***	MS >UL	MS failed upper limit
Nitrite as N (mg/L)	Water	40	Physis C-14104 W	70	130	100	93	***67***	73	MS <LL	MS failed upper limit
Nitrite as N (mg/L)	Water	42	Physis C-15152 W	70	130	100	93	***0***	***0***	MS <LL	MS failed upper limit
Nitrite as N (mg/L)	Water	43	Physis C-21029 W	70	130	93	93	***40***	***40***	MS <LL	MS failed upper limit
OrthoPhosphate as P (mg/L)	Water	41	Physis C-15093 W	70	130	114	112	***65***	***68***	MS <LL	MS failed upper limit
OC Pesticides											
Aldrin (ng/dry g)	Sediment	39	Physis O-5017 W	50	150	96	97	***20***	***26***		
DDE(p,p') (ng/dry g)	Sediment	39	Physis O-5017 W	50	150	104	113	***151***	103		
DDE(p,p') (ng/wet g)	Tissue	39	Physis O-5019 W	50	150	86	85	***1149***	***558***		
DDT(o,p') (ng/dry g)	Sediment	39	Physis O-5017 W	25	125	***129***	124	112	***129***		
DDT(p,p') (ng/dry g)	Water	39	Physis O-5001 W	25	125	116	***134***	X	X		
Endosulfan I (ng/dry g)	Sediment	39	Physis O-5017 W	50	150	107	121	***41***	55		
Endosulfan I (ng/wet g)	Tissue	39	Physis O-5019 W	50	150	***36***	52	87	67		

Constituent	Matrix	Event	Lab Batch	LCL	UCL	LCS %Rec.	LCSD %Rec.	MS %Rec.	MSD %Rec.	Program Qualifier	Comments
Endrin (ng/dry g)	Water	39	Physis O-5001 W	25	125	112	***131***	X	X		
Endrin (ng/dry g)	Water	39	Physis O-5001 W	25	125	112	***131***	X	X		
Heptachlor (ng/dry g)	Water	39	Physis O-5001 W	50	150	150	***153***	X	X		
Heptachlor (ng/dry g)	Water	39	Physis O-5001 W	50	150	150	***153***	X	X		
Hexachlorobenzene (ng/wet g)	Tissue	39	Physis O-5019 W	50	150	72	84	***175***	***217***		
Methoxychlor (ng/wet g)	Tissue	39	Physis O-5019 W	50	150	68	69	***33***	***22***		
Total Endrin (µg/L)	Water	41	Physis O-5107 W	25	125	***129***	121	X	X		
Total Perthane (µg/L)	Water	41	Physis O-5092 W	50	150	***45***	51	X	X	BS <LL	BS failed lower limit
PCBs											
PCB 003 (ng/dry g)	Sediment	39	Physis O-5017 W	50	150	***32***	81	107	100		
PCB 018 (ng/wet g)	Tissue	39	Physis O-5019 W	50	150	84	90	***154***	***152***		
Total PCB 168/132 (µg/L)	Water	43	Physis O-6022 W	50	150	***226***	***220***	X	X	BS >UL	BS failed upper limit
Total PCB 209 (µg/L)	Water	40	Physis O-5037 W	50	150	145	***153***	X	X		
OP Pesticides											
Chlorpyrifos (ng/dry g)	Sediment	39	Physis O-5017 W	50	150	141	143	***162***	140		
Demeton-s (ng/dry g)	Water	39	Physis O-5001 W	25	125	***22***	32	X	X		
Total Phorate (µg/L)	Water	39	Physis O-4151 W	50	150	***48***	53	X	X		
Total Phosmet (µg/L)	Water	43	Physis O-6022 W	50	150	***36***	X	X	X	BS <LL	BS failed lower limit
Total Fensulfothion (µg/L)	Water	42	Physis O-6002 W	50	150	137	***155***	X	X		

Constituent	Matrix	Event	Lab Batch	LCL	UCL	LCS %Rec.	LCSD %Rec.	MS %Rec.	MSD %Rec.	Program Qualifier	Comments
Total Tetrachlorvinphos (µg/L)	Water	42	Physis O-6002 W	50	150	***153***	133	X	X		
Pyrethroid Pesticides											
Allethrin (ng/dry g)	Sediment	39	Physis O-5017 W	50	150	107	91	***623***	***767***		
Bifenthrin (ng/dry g)	Sediment	39	Physis O-5017 W	50	150	77	79	***493***	***499***		
Cyfluthrin (µg/L)	Water	43	W4E0777	11	214	76	X	***249***	***281***		
Cyfluthrin, total (ng/dry g)	Sediment	39	Physis O-5017 W	50	150	141	150	***818***	***374***		
Cypermethrin (µg/L)	Water	43	W4E0777	20	206	86	X	***251***	***274***		
Cypermethrin, total (ng/dry g)	Sediment	39	Physis O-5017 W	50	150	145	141	***805***	***783***		
Danitol (ng/dry g)	Sediment	39	Physis O-5017 W	50	150	74	75	***506***	***512***		
Deltamethrin (ng/dry g)	Sediment	39	Physis O-5017 W	50	150	64	65	***197***	***236***		
Deltamethrin/Tralomethrin (µg/L)	Water	43	W4E0777	0.2	230	60	X	***245***	***283***		
Dichloran (ng/l)	Water	40	W3K0500	53	161	***52***	55	X	X		
Esfenvalerate (ng/dry g)	Sediment	39	Physis O-5017 W	50	150	54	56	***203***	***237***		
Fenvalerate (ng/dry g)	Sediment	39	Physis O-5017 W	50	150	58	61	***240***	***276***		
Fenvalerate/Esfenvalerate (µg/L)	Water	43	W4E0777	32	193	112	X	***251***	***285***		
Fluvalinate (ng/dry g)	Sediment	39	Physis O-5017 W	50	150	***49***	50	111	139		
L-Cyhalothrin (µg/L)	Water	43	W4E0777	61	209	177	X	***346***	***381***		
L-Cyhalothrin (ng/dry g)	Sediment	39	Physis O-5017 W	50	150	64	66	***250***	***274***		
Permethrin (µg/L)	Water	43	W4E0777	37	209	116	X	***223***	***232***		

Constituent	Matrix	Event	Lab Batch	LCL	UCL	LCS %Rec.	LCSD %Rec.	MS %Rec.	MSD %Rec.	Program Qualifier	Comments
Permethrin, cis- (ng/dry g)	Sediment	39	Physis O-5017 W	50	150	64	78	***565***	***575***		
Permethrin, trans- (ng/dry g)	Sediment	39	Physis O-5017 W	50	150	63	70	***530***	***566***		
Prallethrin (µg/L)	Water	39	W3H0879	54	148	83	X	147	***157***	MS >UL	MS failed upper limit
Prallethrin (ng/dry g)	Sediment	39	Physis O-5017 W	50	150	84	81	***488***	***562***		
Resmethrin (ng/dry g)	Sediment	39	Physis O-5017 W	50	150	70	52	***325***	***406***		
Sumithrin (µg/L)	Water	39	W3H0879	56	146	133	X	***172***	***200***	MS >UL	MS failed upper limit
Total Danitol (µg/L)	Water	41	Physis O-5101 W	50	150	144	***164***	X	X		
Total Prallethrin (µg/L)	Water	42	Physis O-6002 W	50	150	***33***	109	X	X	BS <LL, EST BS/BSD	BS failed lower limit, Estimate due to BS/BSD RPD failed
Total Resmethrin (µg/L)	Water	41	Physis O-5092 W	50	150	143	***151***	X	X		
Metals and Selenium											
Dissolved Iron (µg/L)	Water	40	Physis E-7036 W	75	125	X	X	83	***65***	MS <LL	MS failed upper limit
Dissolved Iron (µg/L)	Water	41	Physis E-7061 W	75	125	X	X	***46***	***44***	MS <LL	MS failed upper limit
Dissolved Selenium (µg/L)	Water	43	Physis E-7101 W	75	125	X	X	124	***126***	MS >UL	MS failed upper limit
Dissolved Silver (µg/L)	Water	39	Physis E-5134 W	75	125	X	X	***69***	***72***		
Dissolved Silver (µg/L)	Water	39	Physis E-5134 W	75	125	X	X	***64***	***59***		
Dissolved Silver (µg/L)	Water	40	Physis E-7036 W	75	125	X	X	***73***	80	MS <LL	MS failed upper limit
Dissolved Silver (µg/L)	Water	40	Physis E-7036 W	75	125	X	X	77	***73***	MS <LL	MS failed upper limit
Dissolved Silver (µg/L)	Water	40	Physis E-7036 W	75	125	X	X	***65***	80	MS <LL	MS failed upper limit

Constituent	Matrix	Event	Lab Batch	LCL	UCL	LCS %Rec.	LCSD %Rec.	MS %Rec.	MSD %Rec.	Program Qualifier	Comments
Dissolved Silver (µg/L)	Water	41	Physis E-7052 W	75	125	X	X	76	***68***	MS <LL	MS failed upper limit
Dissolved Silver (µg/L)	Water	41	Physis E-7061 W	75	125	X	X	***74***	***70***	MS <LL	MS failed upper limit
Dissolved Silver (µg/L)	Water	43	Physis E-7101 W	75	125	X	X	99	***62***	MS <LL, EST MS/MSD	MS failed lower limit, Estimate due to MS/MSD RPD failed
Dissolved Silver (µg/L)	Water	43	Physis E-7101 W	75	125	X	X	81	***69***	MS <LL, EST MS/MSD	MS failed lower limit, Estimate due to MS/MSD RPD failed
Dissolved Strontium (µg/L)	Water	39	Physis E-5134 W	75	125	X	X	***175***	***172***		
Dissolved Strontium (µg/L)	Water	39	Physis E-5134 W	75	125	X	X	***432***	***448***		
Dissolved Strontium (µg/L)	Water	40	Physis E-7036 W	75	125	X	X	***246***	***178***	MS >UL, EST MS/MSD	MS failed upper limit, Estimate due to MS/MSD RPD failed
Dissolved Strontium (µg/L)	Water	40	Physis E-7036 W	75	125	X	X	***332***	***152***	MS >UL, EST MS/MSD	MS failed upper limit, Estimate due to MS/MSD RPD failed
Dissolved Strontium (µg/L)	Water	41	Physis E-7061 W	75	125	X	X	***254***	***260***	MS >UL	MS failed upper limit
Dissolved Strontium (µg/L)	Water	42	Physis E-7067 W	75	125	X	X	***140***	***133***	MS >UL	MS failed upper limit
Dissolved Strontium (µg/L)	Water	43	Physis E-7101 W	75	125	X	X	***266***	***229***	MS >UL	MS failed upper limit
Dissolved Titanium (µg/L)	Water	40	Physis E-7036 W	75	125	X	X	87	***46***	MS <LL, EST MS/MSD	MS failed lower limit, Estimate due to MS/MSD RPD failed
Total Mercury (µg/L)	Water	43	Physis E-6069 W	75	125	96	91	***133***	***147***	MS >UL	MS failed upper limit

MS = Matrix Spike
MS = Matrix Spike Duplicate
LCS = Laboratory Control Spike
LCSD = Laboratory Control Spike Duplicate
%Rec = Percent Recovery