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

The following section provides a summary of both dry weather and wet weather monitoring events completed during the fifth year of monitoring for Toxicity, OC Pesticides, Nutrients, Salts, and Metals. Each event summary includes general data on the date of sampling, sites completed or not sampled, specific deviations from standard SOPs as outlined in the QAPP, and a general narrative of post event follow-up activities. Attachment 2 of this report includes field measurements and analytical results for each event. Event summaries for the additional monitoring related to the calibration of continuous salts sensors is provided in Appendix B.[1]

DRY WEATHER EVENTS

Dry weather sampling events required during the fifth year of TMDL monitoring included quarterly sampling events (Events 34, 35, 37, and 38). The following section details each dry weather event.

[1] In-stream water column samples for salt constituents were collected during wet and quarterly dry events at five receiving water compliance sites. However, the resulting data are not used to determine compliance with salts targets, but are used to develop statistical relationships between salt constituents and EC.

Event 34 – August 2012

Event 34 included sampling of the freshwater sites for water quality, sediment, and fish tissue. Mugu Lagoon was only sampled for water quality this year as outlined in the QAPP. A summary of each monitoring effort is included below.

Mugu Lagoon Water Quality

Sampled – August 16, 2012

Table 1. Event 34 Mugu Lagoon Water Quality Sites Sampled

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

Table 2. Event 34 Mugu Lagoon Water Quality Deviations from QAPP

Site ID	Deviation
01_SG_74 Central Lagoon S. of Drain #7	In order to avoid harassment of harbor seals and comply with a NBVC biologist's request, site was accessed by land. Sampled south of the usual location, but consistent with previous samples.

Freshwater Water Quality

Sampled – August 28 and 29, 2012

Table 3. Event 34 Freshwater Water Quality Sites Sampled

	Water Chemistry Constituents					
Site ID	**General WQ Parameters**	**Toxicity**	**PCBs, OP, OC, and Pyrethroid Pesticides**	**Nutrients**	**Metals**	**Salts**
01T_ODD2_DCH	X		X	X	X	
02_PCH	X			X		
03_UNIV	X	X	X	X	X	X
04_WOOD	X	X	X	X	X	X
04D_VENTURA	X		X		X	X
05_CENTR	X			X		
05D_SANT_VCWPD	X		X	X	X	
06_SOMIS	X	X	X	X		
07_MADER	X			X		
07_HITCH	X	X	X	X		
07_HITCH-S [1]	X					X
07D_SIMI [2]	X		X	X	X	X
07D_CTP	X		X			X
07T_DC_H	X		X			
9A_HOWAR	X			X		X
9AD_CAMA [3]	X		X	X	X	X
9B_ADOLF	X	X	X	X		
9BD_ADOLF	X		X		X	X
9BD_GERRY	X		X	X	X	X
9B_BARON	X					X
10_GATE	X		X	X		
10D_HILL [4]	X		X	X	X	X
12_PARK	X			X		
13_BELT	X		X	X		
13_SB_HILL	X		X			X

1. HITCH-S samples collected at Hitch Salts site, upstream of HITCH (34.269°, -118.908°)
2. SIMI POTW samples collected on August 7 by treatment plant staff.
3. CAMA POTW samples collected on August 1 by treatment plant staff.
4. HILL POTW samples collected on August 9 by treatment plant staff.

Table 4. Event 34 Freshwater Water Quality Sites Not Sampled

Site ID	Reason for Omission
02D_BROOM	Site dry, no samples taken
03D_CAMR	Treatment plant not discharging, no sample taken
04D_WOOD	Site dry, no samples taken
06D_MOOR	Treatment plant not discharging, no sample taken
06T_FC_BR	Site dry, no samples taken
07D_HITCH_LEVEE_2	Site dry, no samples taken

Table 5. Event 34 Freshwater Water Quality 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 µS/cm) was greater than the accepted range for the designated test species (Ceriodaphnia dubia). The QAPP requires the use of Americamysis bahia. However, Hylella 4zteca 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 Agricultural Irrigated Lands Group which conducts monitoring in the watershed. To maintain consistency with an existing watershed program, the toxicity testing lab (Pacific EcoRisk) utilized Hyalella 4zteca in place of Americamysis bahia.
04D_VENTURA	Intermediate container (Ziploc bag) used to fill sample bottles.
9BD_ADOLF	Intermediate container (Ziploc bag) used to fill sample bottles.
9BD_GERRY	Intermediate container (Ziploc bag) used to fill sample bottles.
9B_BARON	Weir created just upstream of driving bridge; water too high to take flow readings. Flow taken downstream of weir and upstream of bridge.
07D_CTP	Intermediate container (Ziploc bag) used to fill sample bottles.
06_SOMIS	Intermediate container (Ziploc bag) used to fill sample bottles.
07T_DC_H	Intermediate container (Ziploc bag) used to fill sample bottles.

Freshwater Sediment

Sampled – August 29 and 30, 2012

Table 6. Event 34 Freshwater Sediment Sites

	Sediment Constituents		
Site ID	General Parameters	Toxicity	PCBs, OP, OC, and Pyrethroid Pesticides
04_WOOD	X	X	X
02_PCH	X	X	X
03_UNIV	X	X	X
9B_ADOLF	X		X
9A_HOWAR	X	X	X
06_SOMIS	X		X
07_HITCH	X		X

Freshwater Tissue

Sampled – August 30, 2012

Table 7. Event 34 Freshwater Tissue Sites Sampled

Site ID	Fish collected at Site?	Tissue Constituents			
		% Lipids	PCBs and OC Pesticides	Mercury and Selenium	Chlorpyrifos
04_WOOD	Yes	X	X	X	X
03_UNIV	Yes	X	X		

Table 8. Event 34 Freshwater Tissue Sites Not Sampled

Site ID	Deviation
9B_ADOLF	No fish of sufficient size captured.
06_SOMIS	No fish of sufficient size captured. Insufficient flow
07_HITCH	No fish of adequate size captured.

Event 35

Event 35 sampling included Mugu Lagoon and freshwater quality sampling. A summary of each monitoring effort is described below.

Mugu Lagoon Water Quality

Sampled – November 7, 2012

Table 9. Event 35 Mugu Lagoon Water Quality Sites Sampled

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

Table 10. Mugu Lagoon Water Quality Deviations from QAPP

Site ID	Deviation
01_SG_74 Central Lagoon S. of Drain #7	Site 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 south of the usual location because of an aggregation of harbor seals, but consistent with previous samples in the area delineated by the site description.

Freshwater Water Quality

Sampled – November 6 and 7, 2012

Table 11. Event 35 Freshwater Water Quality Sites Sampled

	Constituents					
Site ID	General Parameters	Toxicity	PCBs, OP, OC, and Pyrethroid Pesticides	Nutrients	Metals	Salts
01T_ODD2_DCH	X		X	X	X	
02_PCH	X			X		
02D_BROOM	X		X	X	X	
03_UNIV	X	X	X	X	X	X
04_WOOD	X	X	X	X	X	X
04D_WOOD	X		X	X	X	X
04D_VENTURA	X		X		X	X
05_CENTR	X			X		
05D_SANT_VCWPD	X		X	X	X	
06_SOMIS	X	X	X	X		
06T_FC_BR	X		X	X		
07_MADER	X			X		
07_HITCH	X	X	X	X		
07_TIERRA	X					X
07D_CTP	X		X			X
07D_SIMI[1]	X		X	X	X	X
07T_DC_H	X		X			
9A_HOWAR	X			X		X
9B_ADOLF	X	X	X	X		
9BD_ADOLF	X		X		X	X
9B_BARON	X					X
9AD_CAMA[2]	X		X	X	X	X
10D_HILL[3]	X		X	X	X	X
10_GATE	X			X		
12_PARK	X			X		
13_BELT	X			X		
13_SB_HILL	X		X			X

1. SIMI POTW samples collected on November 13 by treatment plant staff.
2. CAMA POTW samples collected on November 7 by treatment plant staff.
3. HILL POTW samples collected on November 8 by treatment plant staff.

Table 12. Event 35 Freshwater Water Quality Sites Not Sampled

Site ID	Reason for Omission
9BD_GERRY	Site dry, no samples taken
07_HITCH_LEVEE_2	Site dry, no samples taken
03D_CAMR	Treatment plant not discharging during sampling event.
06D_MOOR	Treatment plant not discharging during sampling event.

Table 13. Event 35 Freshwater Water Quality Deviations from QAPP

Site ID	Deviation
02_PCH	Flow was not measured due to strong tidal influence.
03_UNIV	Original toxicity sample unable to be analyzed, second Toxicity sample taken on 11/7/12 at 14:15. Field measurements recorded for both.
04_WOOD	The conductivity at the site (>3000 µS/cm) was greater than the accepted range for the designated test species (*Ceriodaphnia dubia*). The QAPP requires the use of *Americamysis bahia*. However, *Hyalella 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 Agricultural Irrigated Lands Group which conducts monitoring in the watershed. To maintain consistency with an existing watershed program, the toxicity testing lab (Pacific EcoRisk) utilized *Hyalella azteca* in place of *Americamysis bahia*. Original Toxicity sample unable to be analyzed, second Toxicity sample taken on 11/7/12 at 17:40. Field measurements recorded for both.
04D_VENTURA	Intermediate container (Ziploc bag) used to fill sample bottles.
06_SOMIS	Original toxicity sample unable to be analyzed, second toxicity sample taken on 11/7/12 at 16:30. Field measurements recorded for both.
9BD_ADOLF	Intermediate container (Ziploc bag) used to fill sample bottles.
9B_ADOLF	Original toxicity sample unable to be analyzed, second toxicity sample taken on 11/7/12 at 16:10. Field measurements recorded for both.
9B_BARON	Flow taken upstream of bridge.
07D_CTP	Intermediate container (Ziploc bag) used to fill sample bottles.
07_HITCH	Original toxicity sample unable to be analyzed, second toxicity sample taken on 11/7/12 at 16:50. Field measurements recorded for both.
07T_DC_H	Intermediate container (Ziploc bag) used to fill sample bottles.

Event 37

Event 37 sampling included Mugu Lagoon and freshwater quality sampling. A summary of each monitoring effort is described below.

Mugu Lagoon Water Quality

Sampled – February 12, 2013

Table 14. Event 37 Mugu Lagoon Water Quality Sites Sampled

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

Table 15. Event 37 Mugu Lagoon Water Quality Deviations from QAPP

Site ID	Deviation
01_SG_74 Central Lagoon S. of Drain #7	Site 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 south of the usual location because of an aggregation of harbor seals, but consistent with previous samples in the area delineated by the site description.

Freshwater Water Quality

Sampled – February 5 and 6, 2013

Table 16. Event 37 Freshwater Water Quality Sites Sampled

	Constituents					
Site ID	General Parameters	Toxicity	PCBs, OP, OC, and Pyrethroid Pesticides	Nutrients	Metals	Salts
01T_ODD2_DCH	X		X	X	X	
02_PCH	X			X		
02D_BROOM	X		X	X	X	
03_UNIV	X	X	X	X	X	X
04_WOOD	X	X	X	X	X	X
04D_WOOD	X		X	X	X	X
04D_VENTURA	X		X		X	X
05_CENTR	X			X		
05D_SANT_VCWPD	X		X	X	X	
06_SOMIS	X	X	X	X		
07_MADER	X			X		
07_HITCH	X	X	X	X		
07_TIERRA	X					X
07D_SIMI [1]	X		X	X	X	X
07D_CTP	X		X			X
07T_DC_H	X		X			
9A_HOWAR	X			X		X
9AD_CAMA [2]	X		X	X	X	X
9B_ADOLF	X	X	X	X		
9BD_ADOLF	X		X		X	X
9B_BARON	X					X
10D_HILL [3]	X		X	X	X	X
10_GATE	X			X		
12_PARK	X			X		
13_BELT	X			X		
13_SB_HILL	X		X			X

1. SIMI POTW samples collected on February 5, by treatment plant staff.
2. CAMA POTW samples collected on February 6, by treatment plant staff.
3. HILL POTW samples collected on February 7, by treatment plant staff.

Table 17. Event 37 Freshwater Water Quality Sites Not Sampled

Site ID	Reason for Omission
9BD_GERRY	Site dry, no samples taken.
07D_HITCH_LEVEE_2	Site dry, no samples taken.
06T_FC_BR	Site dry, no samples taken.
03D_CAMR	Treatment plant not discharging during sampling event.
06D_MOOR	Treatment plant not discharging during sampling event.

Table 18. Event 37 Freshwater Water Quality Deviations from QAPP

Site ID	Deviation
02_PCH	Flow was not measured due to strong tidal influence.
04_WOOD	The conductivity at the site (> 3,000 µS/cm) was greater than the accepted range for the designated test species (*Ceriodaphnia dubia*). The QAPP requires the use of *Americamysis bahia*. However, *Hyalella 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 Agricultural Irrigated Lands Group which conducts monitoring in the watershed. To maintain consistency with an existing watershed program, the toxicity testing lab (Pacific EcoRisk) utilized *Hyalella azteca* in place of *Americamysis bahia*.
9B_BARON	Flow taken before the bridge.
04D_VENTURA	Intermediate container (Ziploc bag) used to fill sample bottles.
04D_WOOD	Intermediate container (Ziploc bag) used to fill sample bottles.
07D_CTP	Intermediate container (Ziploc bag) used to fill sample bottles.
9BD_ADOLF	Intermediate container (Ziploc bag) used to fill sample bottles.

Event 38

Event 38 sampling included Mugu Lagoon and freshwater water quality sampling. A summary of each monitoring effort is described below.

Mugu Lagoon Water Quality

Sampled – May 23, 2013

Table 19. Event 38 Mugu Lagoon Water Quality Sites Sampled

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

Table 20. Event 38 Mugu Lagoon Water Quality Deviations from QAPP

Site ID	Deviation
01_SG_74 Central Lagoon S. of Drain #7	Site 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.

A fire east of Point Mugu that burned during the first week of May led to the postponement of sampling until later in the month. What became known as the Springs Fire burned a significant area of the watershed from Newbury Park and the Conejo Grade, down into Camarillo and Oxnard, through Point Mugu State Park. No fire damage on the Navy base was visible to the field crew. However, effects of this fire may be detected in the subsequent sampling results.

Freshwater Water Quality

Sampled – May 22 and 23, 2013

Table 21. Event 38 Freshwater Water Quality Sites Sampled

	Constituents					
Site ID	**General Parameters**	**Toxicity**	**PCBs, OP, OC, and Pyrethroid Pesticides**	**Nutrients**	**Metals**	**Salts**
01T_ODD2_DCH	X		X	X	X	
02_PCH	X			X		
02D_BROOM	X		X	X	X	
03_UNIV	X	X	X	X	X	X
04_WOOD	X	X	X	X	X	X
04D_VENTURA	X		X		X	X
05_CENTR	X			X		
05D_SANT_VCWPD	X		X	X	X	
07_MADER	X			X		
07_HITCH	X	X	X	X		
07_TIERRA	X					X
07D_HITCH_LEVEE_2	X		X	X		X
07D_CTP	X		X			X
07T_DC_H	X		X			
07D_SIMI [1]	X		X	X	X	X
9A_HOWAR	X			X		X
9AD_CAMA [2]	X		X	X	X	X
9B_ADOLF	X	X	X	X		
9B_BARON	X					X
9BD_ADOLF	X		X		X	X
9BD_GERRY	X		X	X	X	X
10D_HILL [3]	X		X	X	X	X
10_GATE	X	X	X	X		
12_PARK	X			X		
13_BELT	X	X	X	X		
13_SB_HILL	X		X			X

1. SIMI POTW samples were collected on May 7, by treatment plant staff.
2. CAMA POTW samples were collected on May 1, by treatment plant staff.
3. HILL POTW samples were collected on May 16, by treatment plant staff.

Table 22. Event 38 Freshwater Water Quality Sites Not Sampled

Site ID	Reason for Omission
04D_WOOD	Site was dry.
06_SOMIS	Site was dry (disappearing, non-continuous flow).
06T_FC_BR	Site was dry.
07D_HITCH_LEVEE_2	Low flow stopped during sampling. Deemed ‘not representative’.
03D_CAMR	Treatment plant not discharging during sampling event.
06D_MOOR	Treatment plant not discharging during sampling event.

Table 23. Event 38 Freshwater Water Quality Deviations from QAPP

Site ID	Deviation
02_PCH	Flow was not measured due to strong tidal influence.
04_WOOD	The conductivity at the site (>3,000 µS/cm) was greater than the accepted range for the designated test species (*Ceriodaphnia dubia*). The QAPP requires the use of *Americamysis bahia*. However, *Hyalella azteca* is identified by SWAMP as an appropriate water test species when conductivity is greater than 3,000 µs/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 *Hyalella 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.
9BD_GERRY	Intermediate container (Ziploc bag) used to fill sample bottles.

TDS and EC samples collected on May 22 were inadvertently picked up by the wrong lab (Physis Laboratories). Due to shipping errors and a holiday weekend, things got complicated for TDS/EC analysis. Some of the samples were analyzed by Physis in lieu of FGL and some samples were run out of temperature but within hold times. The May 23 samples were received and handled by FGL without issue. From a verbal statement from Physis and FGL, this is how the analyses were handled.

Sites analyzed within hold time and within 4 degrees C (analytical lab in parenthesis):

- 04D_VENTURA (Physis)
- 07_TIERRA (Physis)
- 07D_CTP (Physis)
- 03_UNIV (Physis)
- 04_WOOD (FGL)
- 9BD_ADOLF (FGL)
- 13_SB_HILL (FGL)

Sites analyzed within hold times but out of temperature (all by FGL). Note, that bold sites below were analyzed by both labs.

- **04D_VENTURA**
- **07_TIERRA**
- **07D_CTP**
- 9B_BARON
- 9BD_GERRY
- 9A_HOWARD (QA site)
- All the blind spiked blanks
- Three sites (9B_BARON, 9BD_GERRY, and 9A_HOWAR) were analyzed by one lab and above the temperature threshold. These sites were re-visited and sampled again during the following salts calibration event on June 4, 2013.

WET WEATHER EVENTS

As outlined in the QAPP, beyond the required dry weather quarterly sampling events, efforts were made to include two wet weather water sampling events for compliance monitoring for the OC Pesticides, Toxicity, Nutrients and Metals TMDLs during targeted storm events. Wet weather sampling efforts only covered water column monitoring and POTW sampling was not a requirement.

Event 36 was the only wet weather storm monitoring effort, due to not having a second storm where sufficient rainfall across the whole watershed was produced.

The monitoring effort for the 2012-2013 period covered by this report only covers the one storm (Event 36). Since this was not an ideal storm, the fractionation analyses of the samples were not conducted. The following section includes a brief summary of the storm event and a description of the sampling effort.

Event 36

Storm Summary

A short period of wet weather started in the area early January 23, 2013 and lasted a short period of time. USGS rain Gauge 11106550 near Camarillo, CA, at CSUCI University Road crossing reported flows of up to 400 cubic feet per second (cfs) on January 24th. With rain still in the forecast, the decision to sample this wet weather was decided and teams were mobilized. By the morning of January 25, 2013, the storm had passed over yet there was another storm in the forecast and streams were still elevated. Monitoring was conducted during the day of January 25, 2013 while the second storm died out and never materialized. At the end of the day, a decision was made to go ahead and submit the samples as a wet weather event, but not to conduct the fractionation analysis on the pesticide samples.

Total rainfall during this event was fairly evenly spread across the watershed ranging from 0.86 inches in the upper watershed (VCWPD Rain Gauge 246A, Simi Valley Sanitation Plant, 1/24/13 – 1/25/13 48 hour rainfall) to 0.66 inches in the lower area of the watershed (VCWPD Gauge 194A, Camarillo Sanitation Plant, 1/24/13 - 1/25/13 48 hour rainfall). There were some areas with slightly lower rainfall totals, but all areas exhibited flows significantly greater than base flow conditions, meeting the requirements for classification as a wet weather sampling event.

Stormwater Water Quality

Sampled January 25, 2013.

Table 24. Event 36 Stormwater Water Quality Sites Sampled

	Constituents					
Site ID	General Parameters	Toxicity	PCBs, OP, OC, and Pyrethroid Pesticides	Nutrients	Metals	Salts
01T_ODD2_DCH	X		X	X	X	
02D_BROOM	X		X	X	X	
03_UNIV	X	X	X	X	X	X
04_WOOD	X	X	X	X	X	X
04D_WOOD	X		X	X	X	X
04D_VENTURA	X		X		X	X
05_CENTR	X			X		
05D_SANT_VCWPD	X		X	X	X	
06_SOMIS	X	X	X	X		
06T_FC_BR	X		X	X		
07_HITCH	X	X	X	X		
07_MADER	X			X		
07_TIERRA	X					X
07D_CTP	X		X			X
07D_HITCH_LEVEE_2	X		X	X		X
07T_DC_H	X		X			
9A_HOWAR	X					X
9B_ADOLF	X	X	X	X		
9B_BARON	X					X
9BD_ADOLF	X		X		X	X
10_GATE	X			X		
13_SB_HILL	X		X			X
01_RR_BR	X		X	X	X	

Table 25. Event 36 Stormwater Quality Sites Not Sampled

Site ID	Reason for Omission
9BD_GERRY	Site was dry.
13_BELT	Site not included in wet weather sampling
12_PARK	Site not included in wet weather sampling
02_PCH	Site not included in wet weather sampling

Table 26. Event 36 Stormwater Water Quality Deviations from QAPP

Site ID	Deviation
All sites	Flow measurements were only taken where it was safe to do so.
03_UNIV 04_WOOD 04D_WOOD 02D_BROOM 01T_ODD2_DCH	Team 4's field meter failed to calibration, so extra grab samples were taken and field measurements were recorded later with a calibrated meter.
04_WOOD	The conductivity at the site (3,960 uS/cm) was greater than the accepted range for the designated test species (*Ceriodaphnia dubia*). The QAPP requires the use of *Americamysis bahia*. However, *Hyalella 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 Agricultural Irrigated Lands Group which conducts monitoring in the watershed. To maintain consistency with an existing watershed program, the toxicity testing lab (Pacific EcoRisk) utilized *Hyalella azteca* in place of *Americamysis bahia.*
07D_CTP	Intermediate container (Ziplock bag) used to fill sample bottles.
07D_HITCH_LEVEE_2	Intermediate container (Ziplock bag) used to fill sample bottles.
9BD_ADOLF	Intermediate container used to fill sample bottles.
05D_SANT_VCWPD	Field chemistry measurements were re-measured again at 17:15 because of improper earlier measurement. Intermediate container used to fill sample bottles.
05_CENTR	Field chemistry measurements were re-measured again at 17:40 because of improper earlier measurement. Intermediate container used to fill sample bottles.

Event Summary Conclusions

In summary, all required monitoring events were completed as required in the QAPP at all sites where adequate flow was present to allow sampling. Deviations from the QAPP were limited to sample collection using secondary containers, toxicity testing species adjustments to account for high conductivity conditions, and access to one Mugu Lagoon site has been permanently changed from boat to walk-in to avoid any harassment of harbor seals. Fish tissue analysis was not performed at some of the sites because crews were not able to catch fish needed for analysis. This was also the first year of CCW TMDL monitoring when only one storm sampling event took place due to a lack of significant rainfall.

Appendix B:
Calibration Event Summary for Salts TMDL

This section provides a summary of the monthly events conducted to calibrate the continuous sensors for electrical conductivity (EC) and to maintain the stage/discharge relationships (rating curves) for the depth sensors at the five Salts TMDL compliance sites (03_UNIV, 04_WOOD, 9A_HOWAR, 9B_BARON, and 07_TIERRA). These events were distinct from the quarterly dry and wet weather events conducted during the fifth year of monitoring, during which grab samples for salts were obtained to maintain EC/salt surrogate relationships.

SUMMARY OF MONTHLY CALIBRATION EVENTS

EC, temperature, and discharge were measured during the monthly calibration events. Discharge was measured using a Marsh McBirney Flo-Mate Model 2000. EC and temperature were measured using a Hach sensION5 meter. Compliance monitoring for the Salts TMDL was not required until September 9, 2012. Continuous monitors for depth and EC were already in place and being maintained at two compliance sites (04_WOOD and 03_UNIV) prior to the TMDL deadline; sensor site visits associated with the pre-compliance period are reflected in the table below.

Table 1. Monthly Calibration Events

Site ID	Date Visited	EC	Discharge
04_WOOD	07/03/2012	X	X
03_UNIV	07/03/2012	X	
04_WOOD	07/25/2012	X	
04_WOOD	08/01/2012	X	X
03_UNIV	08/01/2012	X	
04_WOOD	08/20/2012	X	X
04_WOOD	09/05/2012	X	X
03_UNIV	09/05/2012	X	
04_WOOD	09/20/2012	X	
04_WOOD	10/01/2012	X	X
03_UNIV	10/01/2012	X	X
9B_BARON	10/01/2012	X	X
9A_HOWAR	10/01/2012	X	X (x2)
07_TIERRA	10/01/2012	X	X
04_WOOD	10/25/2012		X (x11)
9A_HOWAR	10/25/2012		X (x10)
07_TIERRA	11/01/2012	X (x2)	X (x3)
04_WOOD	11/14/2012	X	X (x2)
03_UNIV	11/14/2012	X	X (x2)
9B_BARON	11/14/2012	X	X (x2)
9A_HOWAR	11/14/2012	X	X (x2)
07_TIERRA	11/14/2012	X	X (x2)
9B_BARON	11/19/2012		X (x3)
03_UNIV	11/19/2012		X (x2)
9A_HOWAR	11/19/2012		X (x2)
04_WOOD	12/06/2012	X	X (x2)
03_UNIV	12/06/2012	X	X (x2)
9B_BARON	12/06/2012	X	X (x2)
9A_HOWAR	12/06/2012	X	X (x2)
07_TIERRA	12/06/2012	X	X (x2)
04_WOOD	01/08/2013	X	X (x2)
03_UNIV	01/08/2013	X	X (x2)
9B_BARON	01/08/2013	X	X (x2)
9A_HOWAR	01/08/2013	X	X (x2)
07_TIERRA	01/08/2013	X	X (x2)
9B_BARON	01/19/2013		X (x4)
9B_BARON	01/23/2013		X (x7)

Site ID	Date Visited	EC	Discharge
04_WOOD	02/06/2013	X	X (x2)
03_UNIV	02/06/2013	X	X (x2)
9B_BARON	02/06/2013	X	X (x2)
9A_HOWAR	02/06/2013	X	X (x2)
07_TIERRA	02/06/2013	X	X (x2)
04_WOOD	03/07/2013	X	X (x2)
03_UNIV	03/07/2013	X	X (x2)
9B_BARON	03/07/2013	X	X (x2)
9A_HOWAR	03/07/2013	X	X (x2)
07_TIERRA	03/07/2013	X	X (x2)
9A_HOWAR	03/15/2013		X (x3)
04_WOOD	04/04/2013	X	X (x2)
03_UNIV	04/04/2013	X	X (x2)
9B_BARON	04/04/2013	X	X (x2)
9A_HOWAR	04/04/2013	X	X (x2)
07_TIERRA	04/04/2013	X	X (x2)
04_WOOD	05/01/2013	X	X (x2)
03_UNIV	05/01/2013	X	X (x2)
9B_BARON	05/01/2013	X	X (x2)
9A_HOWAR	05/01/2013	X	X (x2)
07_TIERRA	05/01/2013	X	X (x2)
07_TIERRA	05/20/2013		X
07_TIERRA	05/28/2013		X (x2)
04_WOOD	06/04/2013	X	X (x2)
03_UNIV	06/04/2013	X	X (x2)
9B_BARON	06/04/2013	X	X (x2)
9A_HOWAR	06/04/2013	X	X (x2)
07_TIERRA	06/04/2013	X	X (x2)
9BD_GERRY	06/04/2013	X	X

Appendix C:
Rating Curves and EC/Salt Relationships for Salts TMDL Compliance Sites for Monitoring Year July 2012-June 2013

RATING CURVES

Rating curves are the stage/discharge relationships used to estimate discharge from the continuous depth sensors installed at the Salts TMDL compliance sites. Base rating curves were established using a subset of available data, based on best professional judgement. Rating curves for all sites took the form $Q = c^* (Lvl + a + C)^b$ where,

Q = discharge (cfs)

Lvl = water column height above depth sensor (cm)

a = constant adjusting for vertical difference between depth sensor and estimated stage at zero discharge (cm)

b = constant determined by regression analysis

C = stage shift (cm).

In order to account for minor changes in the stage/discharge relationship that occurred during the monitoring year owing to minor changes in channel bathymetry (e.g., sand migration or scouring after storm runoff), monthly manual measurements of discharge were performed at all sites, and used to determine whether "shifts" ("C" in the equation above) were required for portions of the time series of depth data. Rating curve equations are provided in Table 1.

Table 1. Rating Curves for Salts TMDL Compliance Sites for Monitoring Year July 2012-July 2013

Site	Rating Curve
03_UNIV	$Q = 0.188*(Lvl - 30.0 + C)^{2.1}$
04_WOOD	$Q = 0.029*(Lvl + 0 + C)^{1.7}$
07_TIERRA	$Q = 0.039*(Lvl - 0.5 + C)^{1.8}$
9A_HOWAR	$Q = 0.03542*(Lvl - 12.0 + C)^{1.9}$
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 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

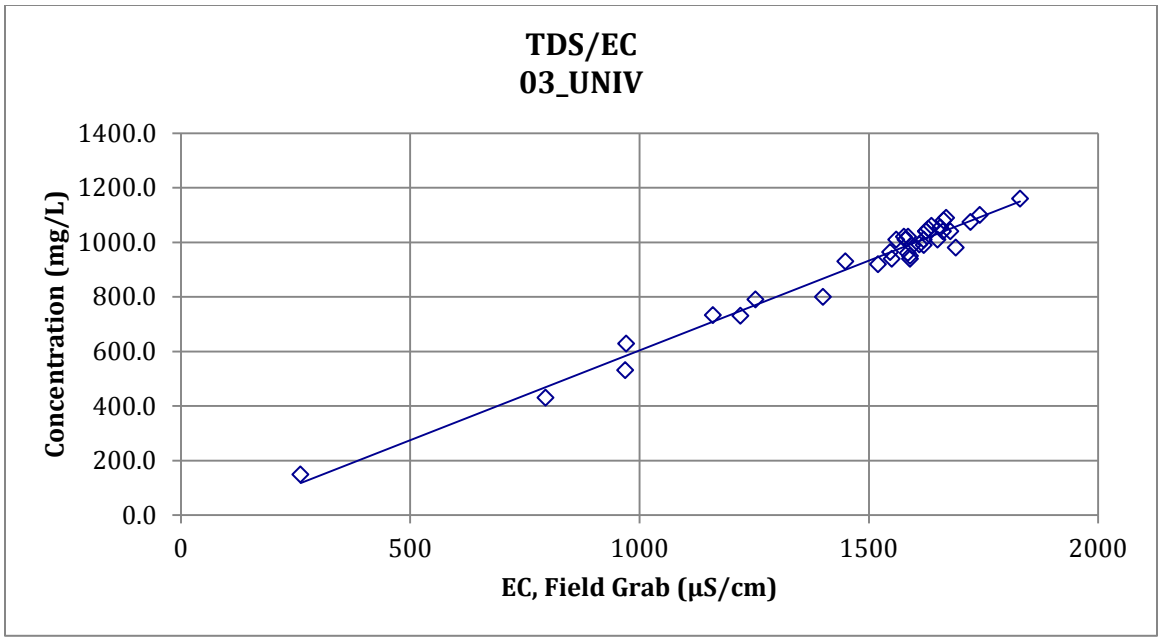
EC = specific conductivity (µS/cm)

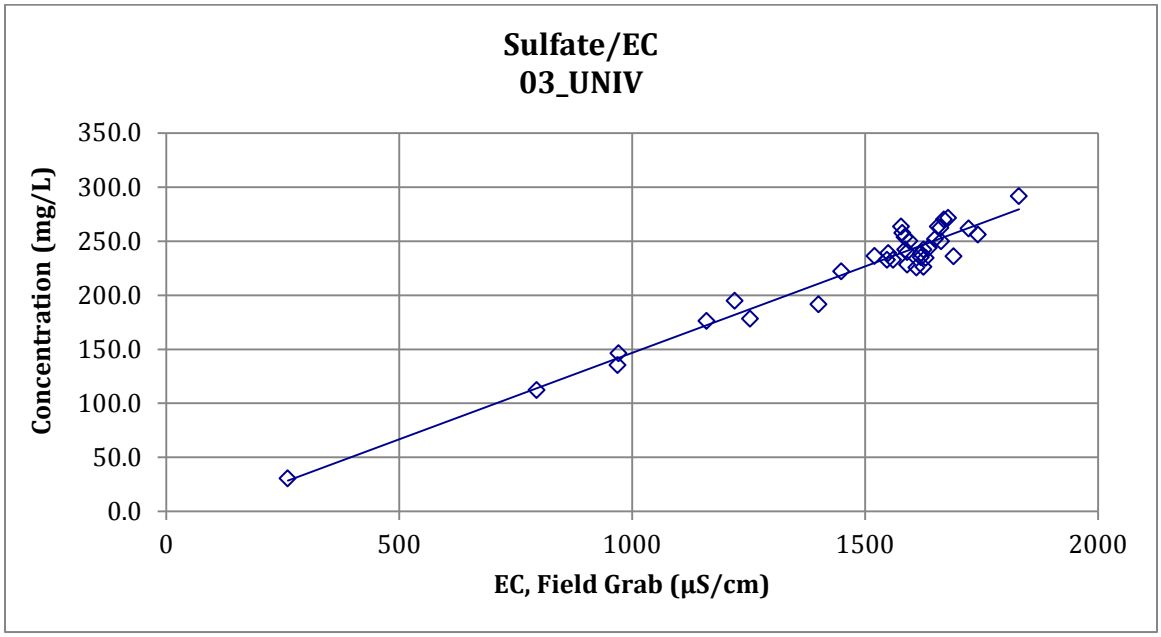
B = y intercept

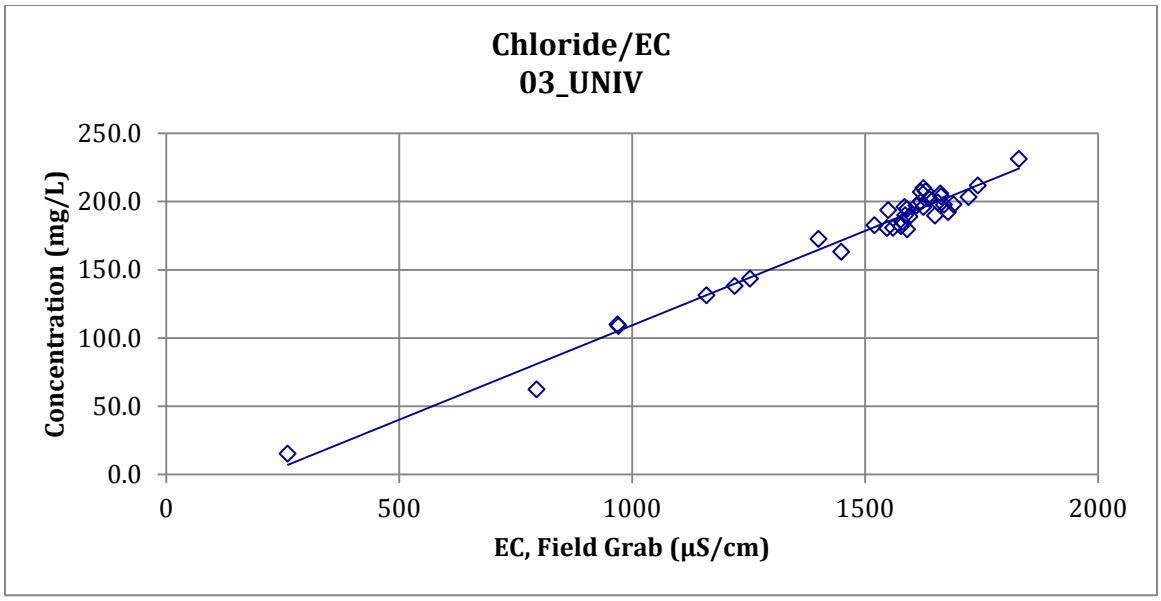
Evaluation of data from monitoring year July 2012-June 2013 indicated that EC/salt relationships at the Salts TMDL compliance sites had not significantly changed from those obtained during a one-year pilot study in 2011. Consequently, surrogate relationships were derived from all available field data starting between January 2011 and June 2013, and used to convert EC sensor data for monitoring year July 2012-June 2013 to salt concentrations. Parameters for the surrogate relationships are reported in Table 2. The surrogate relationships are illustrated in figures following Table 2.

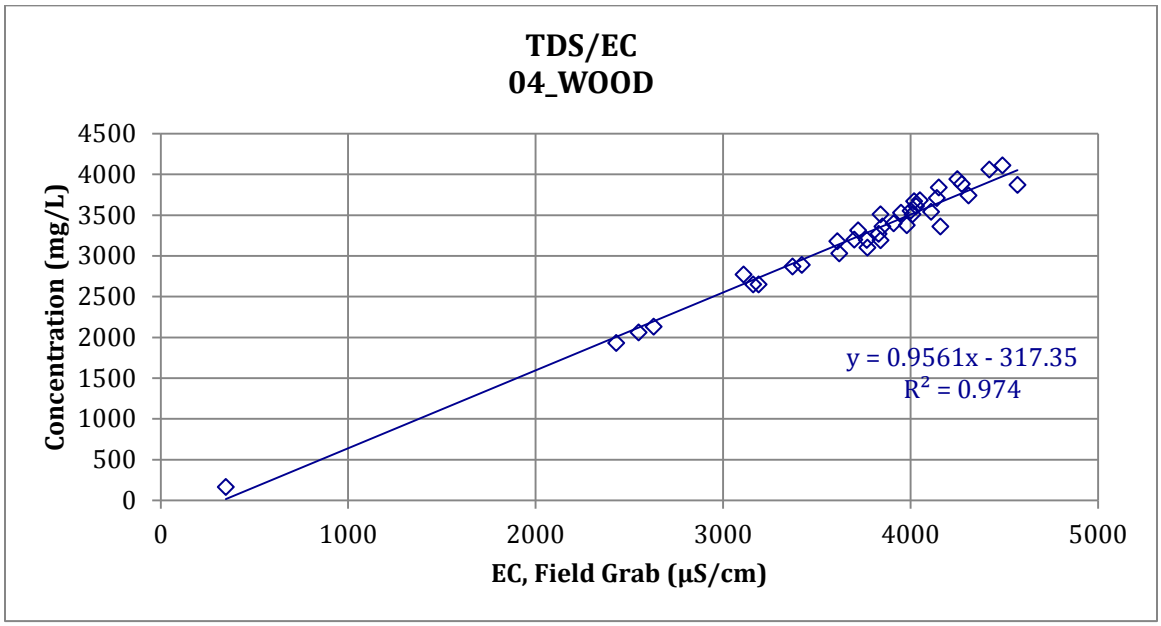
Table 2. Parameters for surrogate relationships used to derive salt concentrations from EC sensor data for monitoring year July 2012-June 2013.

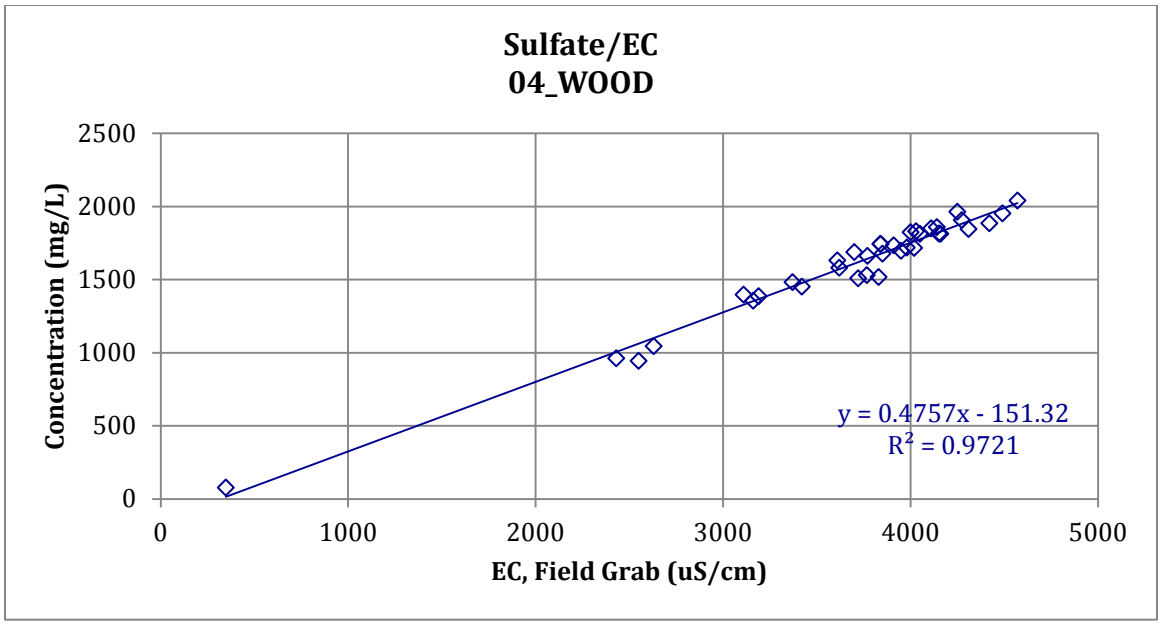
		TDS	Cl	SO4	B
03_UNIV	A	0.65813518	0.13844296	0.15995710	
	B	-54.1124	-29.1182	-13.2841	
	R2	0.9739	0.9725	0.9490	
	Count	37	37	37	
04_WOOD	A	0.95605616	0.04570320	0.47567962	0.00044812
	B	-317.3485	-6.8456	-151.3167	0.0028
	R2	0.9740	0.9296	0.9721	0.7470
	Count	37	36	36	37
07_TIERRA	A	0.76290931	0.10778107	0.29506949	0.00046580
	B	-142.9161	-20.5869	-68.9747	-0.0784
	R2	0.9770	0.9636	0.9655	0.9074
	Count	26	26	26	26
9A_HOWAR	A	0.62912043	0.12984227	0.16112853	
	B	-28.1790	-13.3370	-13.1668	
	R2	0.9815	0.9616	0.9215	
	Count	27	26	26	
9B_BARON	A	0.61678534	0.11922295	0.16396686	
	B	-24.1096	-1.1878	-28.6316	
	R2	0.9532	0.8617	0.9283	
	Count	27	26	26	

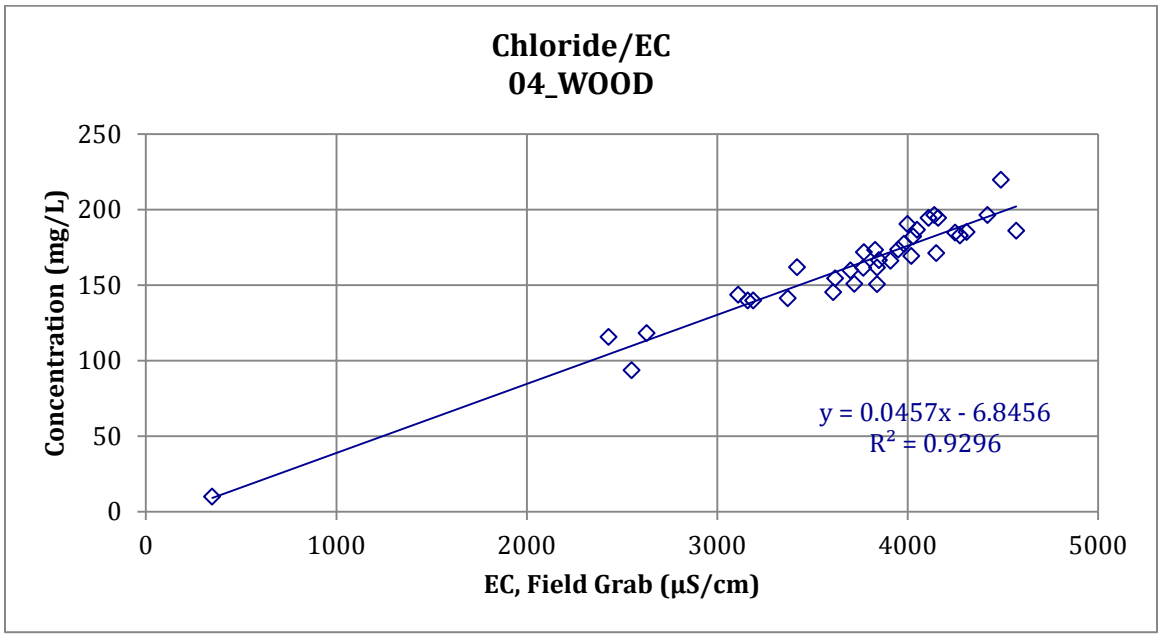

TDS/EC
03_UNIV
Concentration (mg/L)
1400.0
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)

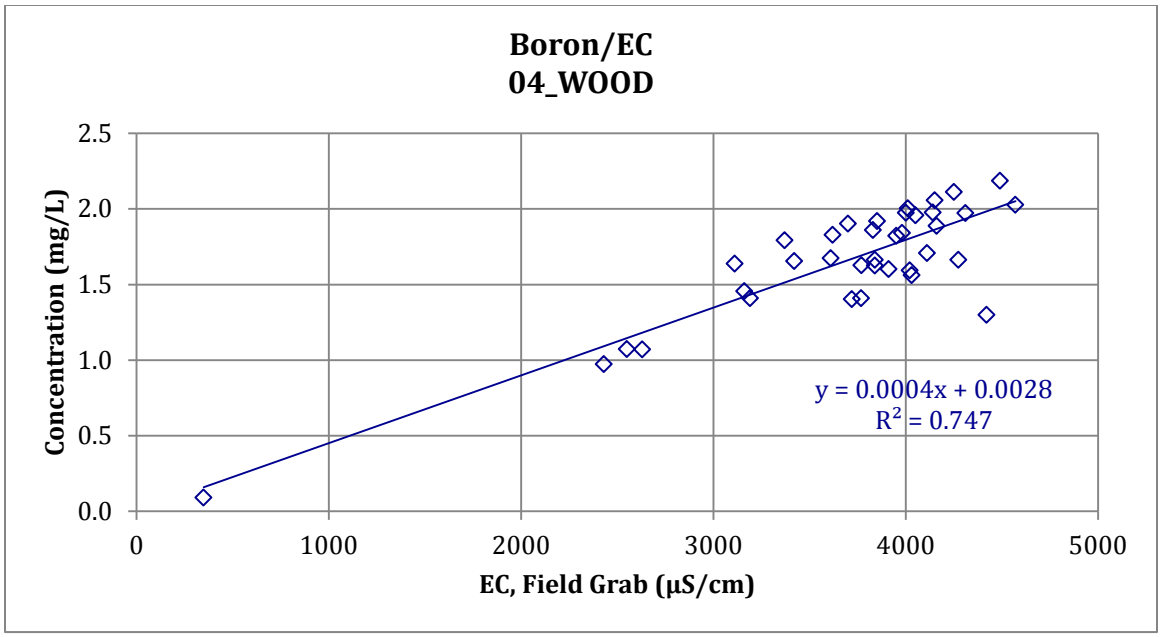

Sulfate/EC
03_UNIV
Concentration (mg/L)
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)

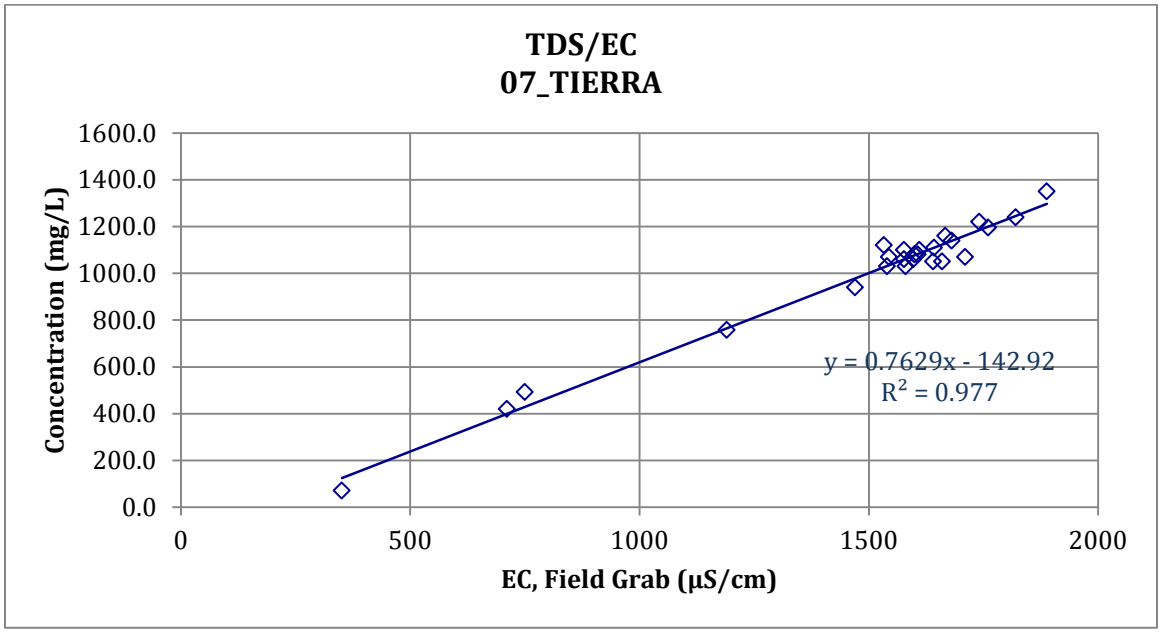

Chloride/EC
03_UNIV
Concentration (mg/L)
250.0
200.0
150.0
100.0
50.0
0.0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)

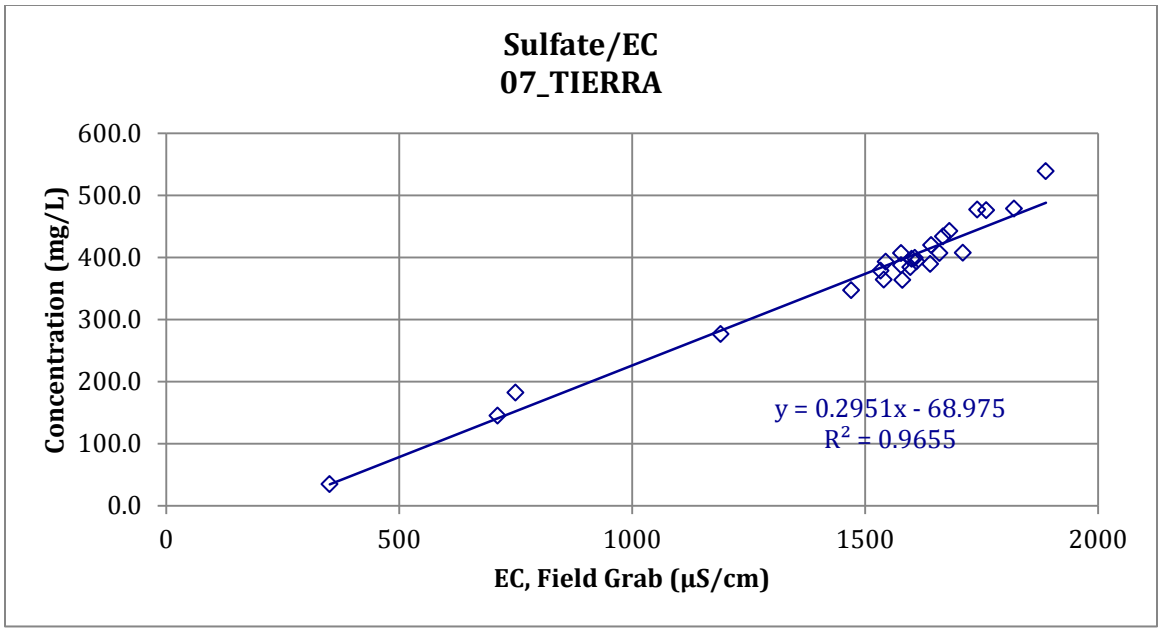

TDS/EC
04_WOOD
Concentration (mg/L)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
0
1000
2000
3000
4000
5000
EC, Field Grab (µS/cm)
y = 0.9561x - 317.35
R² = 0.974

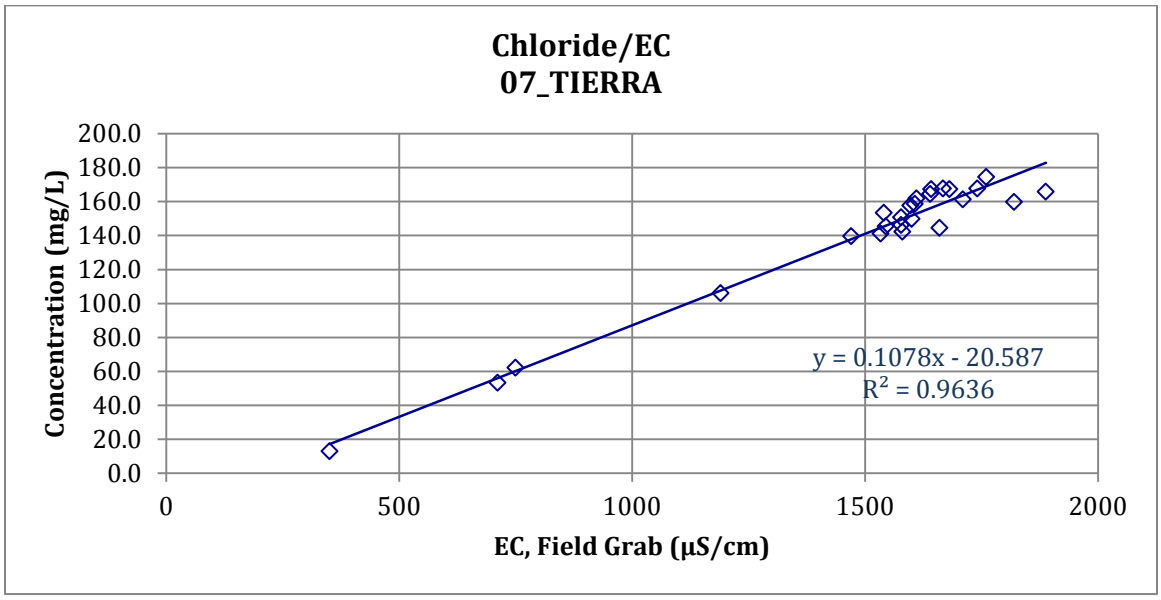

Sulfate/EC
04_WOOD
Concentration (mg/L)
2500
2000
1500
1000
500
0
0
1000
2000
3000
4000
5000
EC, Field Grab (uS/cm)
y = 0.4757x - 151.32
R² = 0.9721

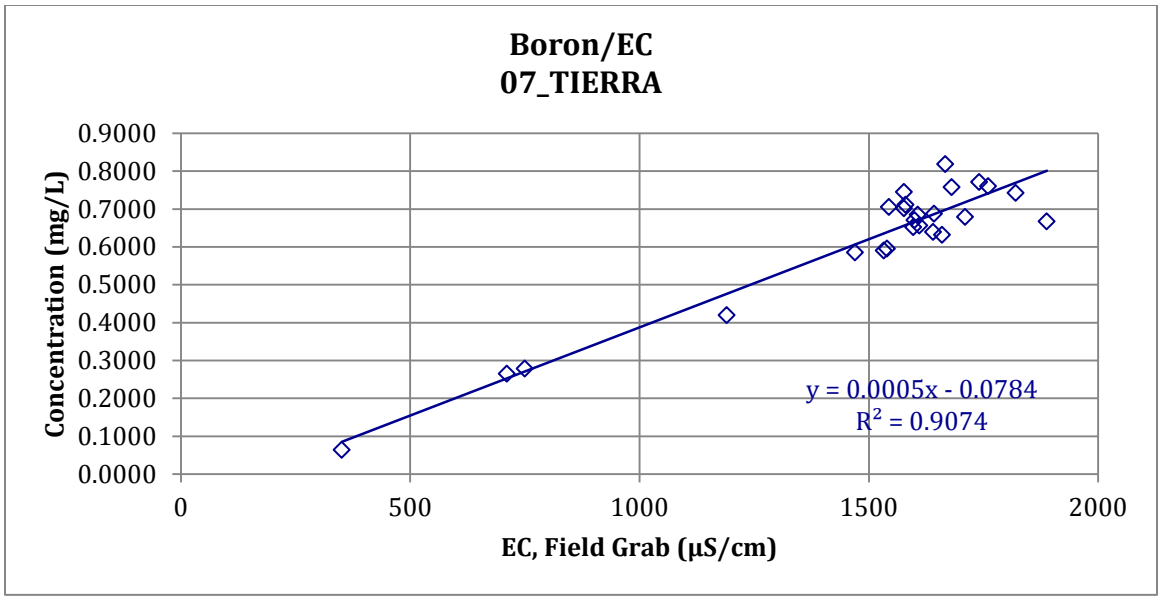

Chloride/EC
04_WOOD
Concentration (mg/L)
250
200
150
100
50
0
0
1000
2000
3000
4000
5000
EC, Field Grab (µS/cm)
y = 0.0457x - 6.8456
R² = 0.9296

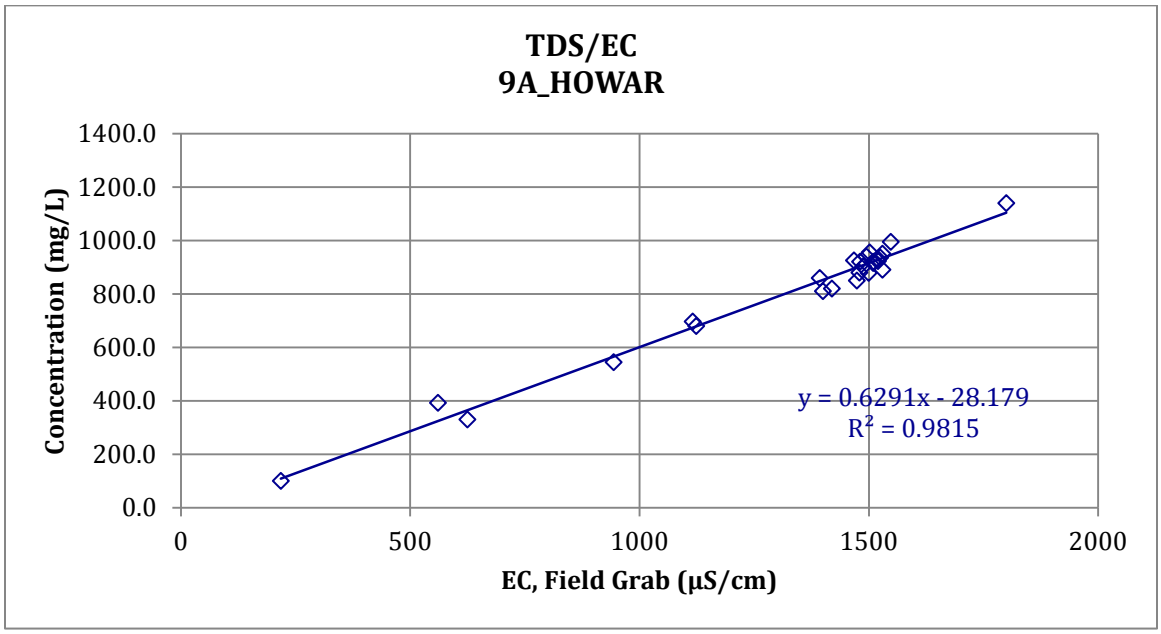

Boron/EC
04_WOOD
Concentration (mg/L)
2.5
2.0
1.5
1.0
0.5
0.0
0
1000
2000
3000
4000
5000
EC, Field Grab (µS/cm)
y = 0.0004x + 0.0028
R² = 0.747

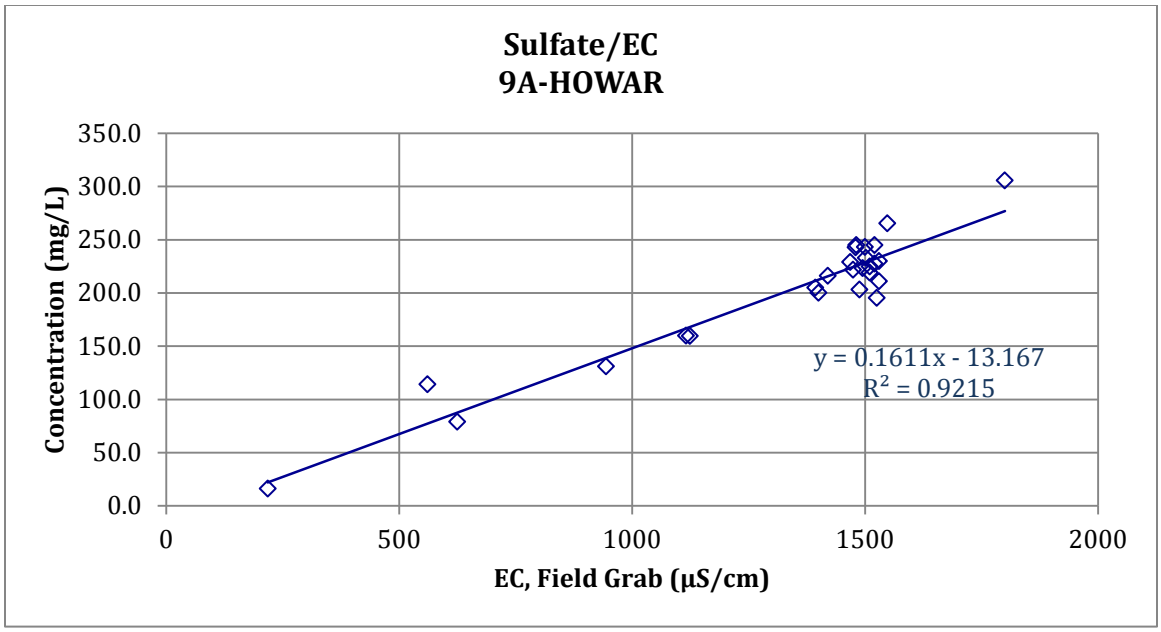

TDS/EC
07_TIERRA
Concentration (mg/L)
1600.0
1400.0
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.7629x - 142.92
R² = 0.977

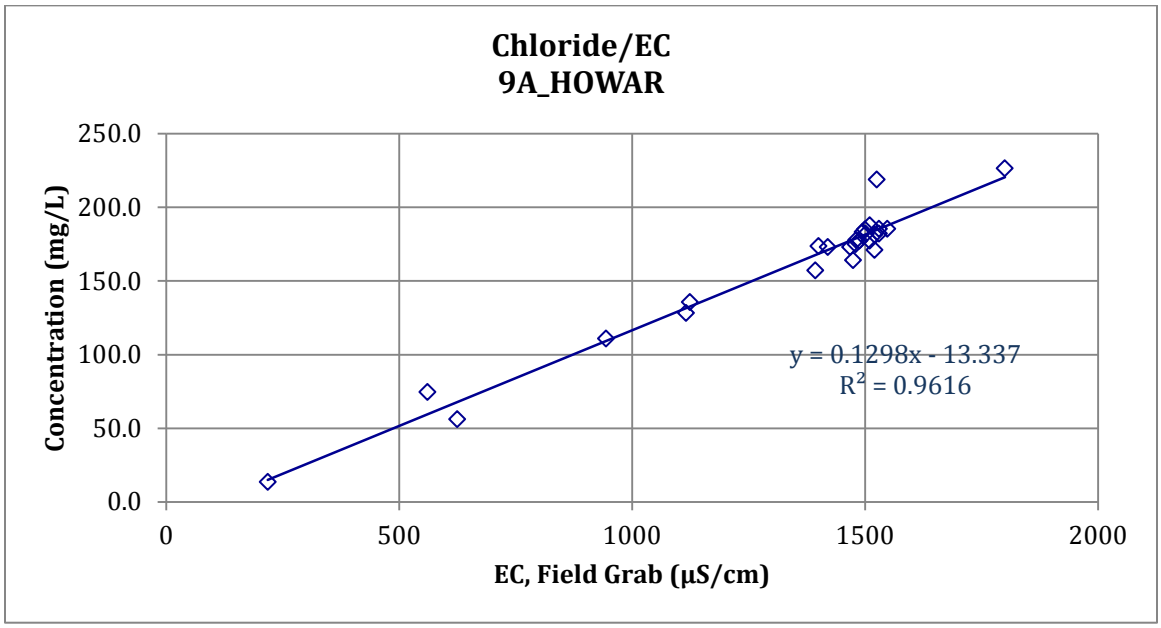

Sulfate/EC
07_TIERRA
Concentration (mg/L)
600.0
500.0
400.0
300.0
200.0
100.0
0.0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.2951x - 68.975
R² = 0.9655

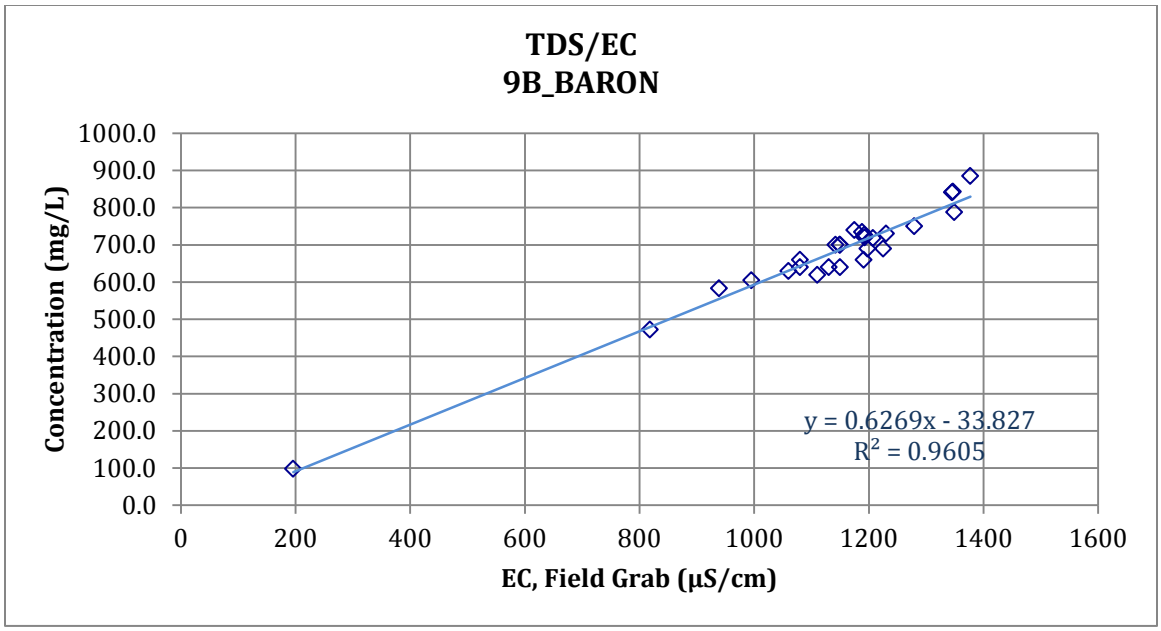

Chloride/EC
07_TIERRA
Concentration (mg/L)
200.0
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.1078x - 20.587
R² = 0.9636

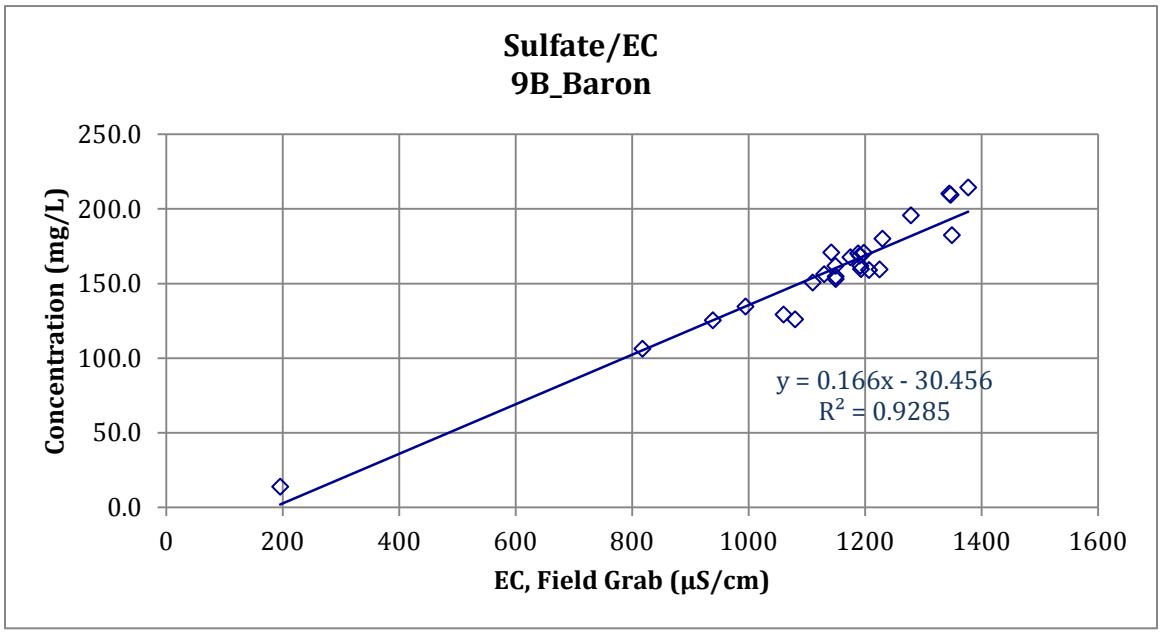

Boron/EC
07_TIERRA
Concentration (mg/L)
0.9000
0.8000
0.7000
0.6000
0.5000
0.4000
0.3000
0.2000
0.1000
0.0000
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.0005x - 0.0784
R² = 0.9074

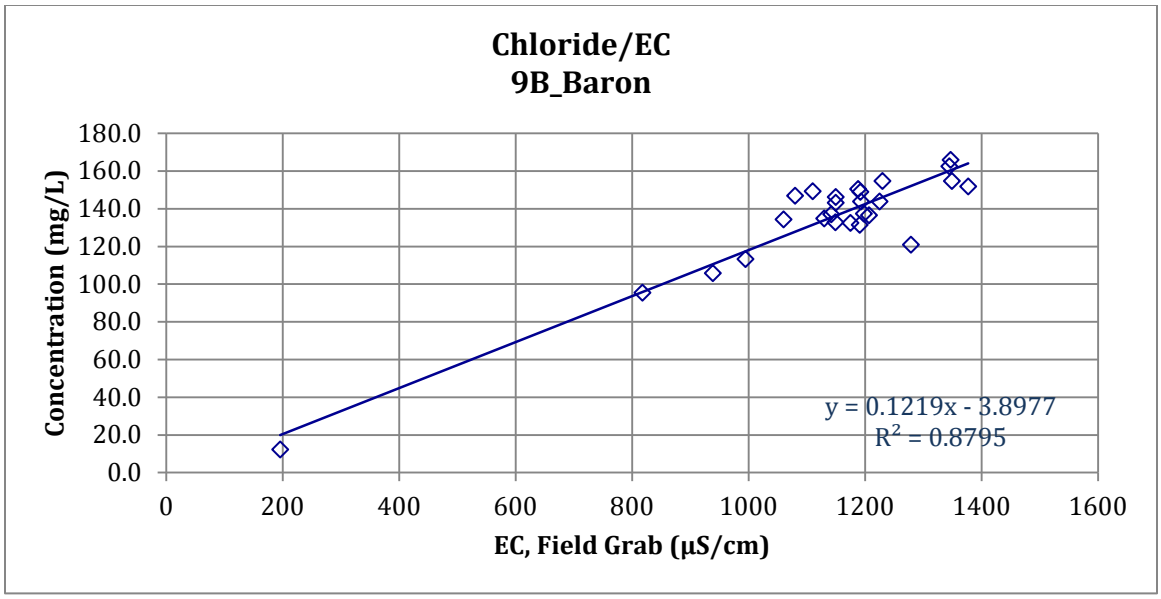

TDS/EC
9A_HOWAR
Concentration (mg/L)
1400.0
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
0
500
1000
1500
2000
EC, Field Grab (µS/cm)
y = 0.6291x - 28.179
R² = 0.9815


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 = 0.1611x - 13.167
R² = 0.9215


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 = 0.1298x - 13.337
R² = 0.9616


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 = 0.6269x - 33.827
R² = 0.9605


Sulfate/EC
9B_Baron
Concentration (mg/L)
250.0
200.0
150.0
100.0
50.0
0.0
0
200
400
600
800
1000
1200
1400
1600
EC, Field Grab (µS/cm)
y = 0.166x - 30.456
R² = 0.9285


Chloride/EC
9B_Baron
Concentration (mg/L)
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
0
200
400
600
800
1000
1200
1400
1600
EC, Field Grab (µS/cm)
y = 0.1219x - 3.8977
R² = 0.8795

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

TOXICITY TESTING PROCEDURES

For the 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 SOPs followed by field crews collecting applicable samples and laboratory analysis are found in the QAPP.

For the CCWTMP toxicity measures, standard test species were utilized for toxicity testing. *Ceriodaphnia dubia* was used for the aquatic toxicity testing, *Hyalella azteca* for the bulk sediment and porewater toxicity testing. *Eohaustorius estuarius* was used for aquatic, bulk sediment, and porewater toxicity at sampling locations where salinity levels adversely affect the other test species. *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. *Americamysis bahia* (formerly *Mysidopsis bahia*) was used for aquatic toxicity testing if sample salinity exceeded 15 PPT. All test species are standard 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] Similar thresholds for the reburial of *Eohaustorius estuarius* after test treatments are utilized in the final decision to initiate a TIE effort. 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

[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.

samples exhibiting toxic effects consistent with carbofuran, diazinon, or chlorpyrifos, TIE procedures follow those documented in Bailey *et al*.[6] To address toxicity of unknown causes in sediment, sediment porewater was extracted and tested for toxicity when significant toxicity, defined as at least 50% mortality, was observed in the bulk sediment sample. If the subsequent sediment porewater toxicity testing resulted in greater than 50% mortality, a Phase 1 TIE was initiated on the sediment porewater.

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 were 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

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[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.

[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.

- 10_GATE
- 13_BELT

Toxicity samples for sediment were collected at the freshwater sites during dry weather Event 34. Water column toxicity testing was conducted during all four dry weather events (Events 34, 35, 37, and 38), and the one wet weather event (Events 36). 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 34 Sediment Toxicity

Table 1. Freshwater Sediment Toxicity Event 34 - *Hyalella azteca*

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

Event 34 Water Column Toxicity

Table 2. Freshwater Water Column Toxicity Event 34 - *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
04_WOOD				NO
9B_ADOLF	NO	NO	NO	
03_UNIV	NO	NO	-*	
06_SOMIS	NO	NO	NO	
07_HITCH	NO	NO	NO	

*-The reduction endpoint was not assessed for this test

Event 34 Toxicity and TIE Summary

Freshwater sites exhibited significant mortality in all sediment samples, but toxicity was not sufficient (mean % survival <50%) for a TIE to be performed. Freshwater water column did not exhibit significant reductions to mortality or reproduction at any of the monitoring locations during this event.

Event 35 Water Quality Toxicity

Table 3. Water Quality Toxicity Event 35 - *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
04_WOOD				NO
9B_ADOLF	NO	NO	NO	
03_UNIV	NO	NO	NO	
06_SOMIS	NO	NO	NO	
07_HITCH	NO	NO	**YES**	

Event 35 Toxicity and TIE Summary

- There was no observed toxicity effects on *Hyalella azteca* at the 04_WOOD, the one site sampled for this organism.
- No significant reductions in survival were observed for either test organism at the five sample sites during the sampling event.
- Significant reductions in reproduction were observed for *Ceriodaphnia dubia* at one of the four sites tested for this organism.

Event 36 Water Quality Toxicity

Table 4. Water Quality Toxicity Event 36 - *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			**YES**	NO
9B_ADOLF	NO	NO		
03_UNIV	NO	NO		
06_SOMIS	NO	NO		
07_HITCH	NO	NO		

Event 36 Toxicity and TIE Summary

- No significant survival or reproductive reductions were observed in the test species *Ceriodaphnia dubia* at any of the sites.
- Significant reduced survival was observed for *Hyalella azteca* at 04_WOOD. A Phase I TIE was not initiated because continued TIE efforts at the 04_WOOD have been suspended for the quarterly sampling efforts. Toxicity has been observed multiple times at this site and stakeholders have chosen to invest resources into source control measures (in lieu of TIE efforts) to address the identified toxicity issue, primarily resulting from pesticides.

Event 37 Water Quality Toxicity

Table 5. Water Quality Toxicity Event 37 - *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
04_WOOD				NO
9B_ADOLF	NO	NO	NO	
03_UNIV	**YES**	**YES**	**YES**	
06_SOMIS	NO	NO	NO	
07_HITCH	NO	NO	NO	

Event 37 Toxicity and TIE Summary

- No significant reductions in survival were observed for *Hyalella azteca* tests.
- The only significant reductions in mortality and reproduction were observed at the 03_UNIV monitoring site for *Ceriodaphnia dubia*.
- A Targeted Phase I TIE was performed on the 03_UNIV to investigate the presence of organics in the sample. Analysis was carried out using *Ceriodaphnia dubia.* The results of the investigation are as follows:
    - The baseline evaluation showed a reduction in toxicity from the initial toxicity test, likely related to natural degradation processes or decrease in bioavailability of the contaminant.
    - Centrifugation completely removed toxicity, indicating that the compound(s) are associated with suspended particulates.
    - The addition of Piperonyl Butoxide (PBO) resulted in the complete removal of toxicity from the sample, indicating compound(s) that are activated by the Cytochrome-P450 system (e.g., OP-pesticides) are likely contributing to the sample toxicity.
    - Though the Phase I TIE did not conclusively identify a source of toxicity, the decrease in toxicity in the Baseline testing is indicative of organic compounds, as metals would likely be conserved in the sample. 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.

Event 38 Water Quality Toxicity

Table 6. Water Quality Toxicity Event 38 - *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
04_WOOD				NO
9B_ADOLF	NO	NO	NO	
03_UNIV	NO	NO	NO	
07_HITCH	NO	NO	NO	
10_GATE	NO	NO	NO	
13_BELT	NO	NO	NO	

Event 38 Toxicity and TIE Summary

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

Toxicity Review

The following is a summary of the toxicity results to date for water column and sediment at the freshwater sampling sites.

Table 7. Water Column Toxicity for All Monitoring Events and Sites
(Significant mortality denoted by "X", bolded events are wet-weather events)

CCWMTP Year	Site ID / Events	04_WOOD	9B_ADOLF	03_UNIV	10_GATE[1]	06_SOMIS	13_BELT[1]	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	34							
	35							
	36	**X**						
	37			X				
	38							

1. 10_GATE and 13_BELT are also toxicity investigation monitoring sites. During year 5 these sites were only sampled during event 38.

Table 8. Sediment Toxicity For All CCWTMP Freshwater Monitoring Events and Sites
(Significant mortality denoted by "X")

CCWMTP Year	Site ID / Events	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	NS	X	NS

NS – Not Sampled; sites were not sampled during the corresponding monitoring year.
1. 02_PCH and 9A_HOWAR are also toxicity investigation monitoring sites.

Table 7 displays significant water column mortality test results for five years of CCWTMP events, including both dry and storm (bolded text) weather events. Significant mortality found in freshwater sediments is shown in Table 8.

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

During dry weather water column sampling, four monitoring sites other than 04_WOOD have been identified as having significant mortality (03_UNIV, 9B_ADOLF, 10_GATE, and 06_SOMIS for one event each). Toxicity has been identified during wet weather monitoring at all sites, except for 10_GATE and 13_BELT.

A water column TIE has been initiated as described previously, and outcomes of this effort has had limited success in identifying the true cause of toxicity. While not identifying the specific constituents causing toxicity, the TIE has identified:

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

The results of future CCWTMP toxicity testing will continue to assist in the identification of when and where conditions are toxic in the Calleguas Creek watershed, and help the stakeholders better target areas in the watershed that show continual toxicity and focus limited resources to address the problems. It is important to note that instances of observed mortality in water samples have generally been decreasing since the beginning of the CCWTMP. There were nine instances of significant mortality in water column samples during the first year of monitoring, with eight occurrences in the second year, three in the third year, five in the fourth year, and two in the fifth year.

As per the third year annual monitoring report recommendation, toxicity investigation monitoring was ceased during year five. Therefore, sediment toxicity sampling at 02_PCH and

9A_HOWAR did not take place during this monitoring year. Water column toxicity sampling did not take place at 10_GATE or 13_BELT until event 38. Toxicity investigation sampling was resumed at that time and will continue in order to support delisting of these reaches.

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), 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), 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 2012-2013 monitoring year and any associated qualifiers and comments.

Blank Contamination

Overall there was very little blank contamination detected during this fifth year of monitoring. A large majority of the field blank hits were found in metals samples, the rest were found in the nutrients, except for two DOC samples. There was only one equipment blank that had a detection, but this was below the reporting limit (RL) for chlorpyrifos. There were three laboratory blanks that were detected, but below the RL, all in the metals group. Values between the minimum detection limit (MDL) and the RL are considered estimated. Details of all the blank hits are reported in Table 1. The following lists a basic summary of the blank contamination results:

- Field Blanks – 483 analyzed – 40 detections above the RL (8.28%) (does not include surrogates)
- Laboratory Blanks – 1181 analyzed – 3 detections above the MDL (0.25%) (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 (MS) duplicates. QA failures for precision are noted when the RPD between a sample and its duplicate are greater than the acceptance value. The following list summarizes the precision analysis results:

- Field Duplicates – 597 analyzed – 29 failed RPD (4.9%) (does not include surrogates)
- Laboratory Duplicates – 428 analyzed – 17 failed RPD (4.0%) (includes surrogates)
- Blank Spike/LCS Duplicates – 930 analyzed – 12 failed RPD (1.3%) (includes surrogates)
- Matrix Spike Duplicates – 319 analyzed – 6 failed RPD (1.9%) (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 that fell outside the acceptable range, 1 was from the metals group and the rest were pesticides. The failures were about evenly spaced throughout the monitoring year, no single event had a higher proportion of constituent detections in blank samples. For the matrix spike samples that fell outside the acceptable range, more than half of them were from the first event of the year, and of those, most where from tissue samples. For the remainder, about one third occurred during the storm event. The MS failures, by relative frequency, occurred mostly in pesticides samples, followed by nutrients, and then metals. 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 – 1699 Analyzed – 4 fell outside the range (0.24%) (does not include surrogates)
- Matrix Spike Samples – 609 Analyzed – 59 fell outside the range (9.69%) (does not include surrogates)

Table 1. Blank Contamination Observed

Constituent	Matrix	Event	Lab Batch	Field Blank	Method Blank	Program Qualifier	Comments
General Water Quality							
Dissolved Organic Carbon (mg/L)	Water	34	_2081722_W_DOC	0.94		U	Associated environmental samples less than 10 times the blank concentration are qualified
Dissolved Organic Carbon (mg/L)	Water	35	_2110726_W_DOC	0.29		U	Associated environmental samples less than 10 times the blank concentration are qualified
Dissolved Organic Carbon (mg/L)	Water	37	_3021830_W_DOC	0.088			
Dissolved Organic Carbon (mg/L)	Water	38	_3052910_W_DOC	0.69		U	Associated environmental samples less than 10 times the blank concentration are qualified
Metals & Selenium							
Dissolved Copper (µg/L)	Water	34	Physis E-4090 W	0.04		FD RPD	Detected environmental samples were qualified due to field duplicate RPD not met.
Dissolved Copper (µg/L)	Water	35	Physis E-4155 W	0.02		U	Associated environmental samples less than 5 times the blank concentration are qualified
Dissolved Copper (µg/L)	Water	37	Physis E-5041 W	0.099			
Dissolved Copper (µg/L)	Water	37	Physis E-5048 W	0.024			
Dissolved Copper (µg/L)	Water	38	Physis E-5088 W	0.007			
Dissolved Copper (µg/L)	Water	38	W3E1291		0.16		
Dissolved Mercury (µg/L)	Water	38	Physis E-6008 W	0.0009		U	Associated environmental samples less than 5 times the blank concentration are qualified
Dissolved Mercury (µg/L)	Water	38	W3E0882		0.008	U	Associated environmental samples less than 5 times the blank concentration are qualified
Dissolved Nickel (µg/L)	Water	35	Physis E-4155 W	0.061		U	Associated environmental samples less than 5 times the blank concentration are qualified

Constituent	Matrix	Event	Lab Batch	Field Blank	Method Blank	Program Qualifier	Comments
Dissolved Nickel (µg/L)	Water	37	Physis E-5041 W	0.02			
Dissolved Nickel (µg/L)	Water	37	Physis E-5048 W	0.0229			
Dissolved Nickel (µg/L)	Water	38	Physis E-5088 W	0.0046			
Dissolved Selenium (µg/L)	Water	35	Physis E-5007 W	0.02		U	Associated environmental samples less than 5 times the blank concentration are qualified
Dissolved Zinc (µg/L)	Water	35	Physis E-4155 W	0.299		U, FD RPD	Associated environmental samples less than 5 times the blank concentration are qualified. Detected environmental samples were qualified due to field duplicate RPD not met.
Dissolved Zinc (µg/L)	Water	35	Physis E-5007 W	0.29		U, FD RPD	Associated environmental samples less than 5 times the blank concentration are qualified. Detected environmental samples were qualified due to field duplicate RPD not met.
Dissolved Zinc (µg/L)	Water	36	Physis E-5027 W	0.3		U	Associated environmental samples less than 5 times the blank concentration are qualified
Dissolved Zinc (µg/L)	Water	37	Physis E-5041 W	0.77		U	Associated environmental samples less than 5 times the blank concentration are qualified
Dissolved Zinc (µg/L)	Water	37	Physis E-5048 W	1.9793		U	Associated environmental samples less than 5 times the blank concentration are qualified
Dissolved Zinc (µg/L)	Water	38	Physis E-5088 W	2.4144		U	Associated environmental samples less than 5 times the blank concentration are qualified
Dissolved Zinc (µg/L)	Water	38	W3E1291		2.01		
Total Copper (µg/L)	Water	35	Physis E-4155 W	0.03		U	Associated environmental samples less than 5 times the blank concentration are qualified
Total Copper (µg/L)	Water	35	Physis E-5007 W	0.07		U	Associated environmental samples less than 5 times the blank concentration are qualified

Constituent	Matrix	Event	Lab Batch	Field Blank	Method Blank	Program Qualifier	Comments
Total Copper (µg/L)	Water	37	Physis E-5041 W	0.027			
Total Copper (µg/L)	Water	37	Physis E-5048 W	0.049		U	Associated environmental samples less than 5 times the blank concentration are qualified
Total Copper (µg/L)	Water	38	Physis E-5088 W	0.018		FD RPD	Detected environmental samples were qualified due to field duplicate RPD not met.
Total Nickel (µg/L)	Water	34	Physis E-4090 W	0.007			
Total Nickel (µg/L)	Water	35	Physis E-4155 W	0.072		U	Associated environmental samples less than 5 times the blank concentration are qualified
Total Nickel (µg/L)	Water	37	Physis E-5041 W	0.02			
Total Nickel (µg/L)	Water	37	Physis E-5048 W	0.028			
Total Zinc (µg/L)	Water	34	Physis E-4090 W	0.306		FD RPD	Detected environmental samples were qualified due to field duplicate RPD not met.
Total Zinc (µg/L)	Water	34	Physis E-4111 W	0.3			
Total Zinc (µg/L)	Water	35	Physis E-4155 W	0.587		U	Associated environmental samples less than 5 times the blank concentration are qualified
Total Zinc (µg/L)	Water	35	Physis E-5007 W	0.49		U	Associated environmental samples less than 5 times the blank concentration are qualified
Total Zinc (µg/L)	Water	36	Physis E-5027 W	0.71		U	Associated environmental samples less than 5 times the blank concentration are qualified
Total Zinc (µg/L)	Water	37	Physis E-5041 W	1.02		U	Associated environmental samples less than 5 times the blank concentration are qualified
Total Zinc (µg/L)	Water	37	Physis E-5048 W	2.3933		LD RPD, U	Detected environmental samples were qualified due to lab duplicate RPD not met, Associated environmental samples less than 5 times the blank concentration are qualified

Constituent	Matrix	Event	Lab Batch	Field Blank	Method Blank	Program Qualifier	Comments
Total Zinc (µg/L)	Water	38	Physis E-5087 W	0.72		U	Associated environmental samples less than 5 times the blank concentration are qualified
Total Zinc (µg/L)	Water	38	Physis E-5088 W	31.4667		U, FD RPD	Associated environmental samples less than 5 times the blank concentration are qualified. Detected environmental samples were qualified due to field duplicate RPD not met.
Nutrients							
Ammonia as N (mg/L)	Water	36	Physis C-11008 W	0.03		MS >UL, U, FD RPD	Matrix Spike recovery failed the upper limits, Associated environmental samples less than 5 times the blank concentration are qualified, Field Duplicate RPD failed
Ammonia as N (mg/L)	Water	37	Physis C-11040 W	0.15			
Nitrate as N (mg/L)	Water	34	Physis C-9040 W	0.09			
Nitrate as N (mg/L)	Water	34	Physis C-9042 W	0.1			
Nitrate as N (mg/L)	Water	37	Physis C-11023 W	0.02			
Nitrate as N (mg/L)	Water	38	C-12106	0.01			
Nitrite as N (mg/L)	Water	34	Physis C-9041 W	0.05		U	Associated environmental samples less than 10 times the blank concentration are qualified
OrthoPhosphate as P (mg/L)	Water	34	Physis C-9041 W	0.297		U	Associated environmental samples less than 10 times the blank concentration are qualified
Total Kjeldahl Nitrogen (mg/L)	Water	34	_2091011_W_TKN	2.48		U	Associated environmental samples less than 10 times the blank concentration are qualified
Total Kjeldahl Nitrogen (mg/L)	Water	35	_2111220_W_TKN	0.197		U	Associated environmental samples less than 10 times the blank concentration are qualified
OC Pesticides							
None							

Constituent	Matrix	Event	Lab Batch	Field Blank	Method Blank	Program Qualifier	Comments
OP Pesticides							
Total Chlorpyrifos (µg/L)	Water	34	Physis O-3094 W				
PCB's							
Total PCB 119 (µg/L)	Water	38	Physis O-4109 W	0.1503			
Pyrethroid Pesticides							
Total Bifenthrin (µg/L)	Water	34	Physis O-3094 W	0.0012		U	Associated environmental samples less than 10 times the blank concentration are qualified

Table 2. Precision QA/QC Issues

Constituent	Matrix	Event	Lab Batch	Site	RPD Limit	Field Dup RPD	Lab Dup RPD	BS/ BSD RPD	MS/ MSD RPD	Program Qualifier	Comments
General Water Quality											
Clay <0.0039 mm (%)	Sediment	34	IIRMES_GC-01-142_S_GS	03_UNIV	30		***100***			LD RPD, FD RPD	LabDup RPD failed, FieldDup RPD failed
Clay <0.0039 mm (%)	Sediment	34	IIRMES_GC-01-142_S_GS	07_HITCH	30	***108***				LD RPD, FD RPD	LabDup RPD failed, FieldDup RPD failed
Dissolved Organic Carbon (mg/L)	samplewater	38	_3052910_W_DOC	01_SG_74	20	11	***22.7***			U	Blanks failed and samples were <10 times the blank
Total Suspended Solids (mg/L)	Samplewater	34	Physis C-8128 W	01_BPT_15	30	***129***				FD RPD	FieldDup RPD failed
Total Suspended Solids (mg/L)	Samplewater	34	Physis C-9068 W	10_GATE	30	***43***				FD RPD	FieldDup RPD failed
Metals & Selenium											
Copper Dissolved (µg/L)	Samplewater	34	Physis E-4090 W	01_BPT_15	30	***72***				FD RPD	FieldDup RPD failed
Copper Total (µg/L)	Samplewater	34	Physis E-4090 W	01_BPT_15	30	***69***		0		FD RPD	FieldDup RPD failed
Copper Total (µg/L)	Samplewater	38	Physis E-5088 W	01_SG_74	30	***38***		1		FD RPD	FieldDup RPD failed
Mercury Dissolved (µg/L)	Samplewater	34	Physis M-1134 W	01T_ODD2_DCH	30	***35***	11		11		
Mercury Dissolved (µg/L)	Samplewater	37	Physis E-06004 W	03_UNIV	30	***31***		3		LD RPD	LabDup RPD failed
Mercury Dissolved (µg/L)	Samplewater	37	Physis E-06004 W	9BD_ADOLF	30		***100***	3		LD RPD	LabDup RPD failed
Mercury Dissolved (µg/L)	Samplewater	38	Physis E-6008 W	01_SG_74	30	***33***		1		U	Blanks failed and samples were <5 times the blank
Mercury Total (µg/L)	Samplewater	34	Physis M-1134 W	04_WOOD	30		***44***	2		LD RPD	LabDup RPD failed
Mercury Total (µg/L)	Samplewater	37	Physis E-06004 W	9AD_CAMA	30		***74***				
Mercury Total (µg/L)	Samplewater	38	Physis E-6008 W	01_SG_74	30	***52***				FD RPD	FieldDup RPD failed

Constituent	Matrix	Event	Lab Batch	Site	RPD Limit	Field Dup RPD	Lab Dup RPD	BS/ BSD RPD	MS/ MSD RPD	Program Qualifier	Comments
Nickel Dissolved (µg/L)	Samplewater	34	Physis E-4090 W	01_BPT_15	30	***31***				FD RPD	FieldDup RPD failed
Nickel Total (µg/L)	Samplewater	38	Physis E-5088 W	01_SG_74	30	***31***		1		FD RPD	FieldDup RPD failed
Selenium Dissolved (µg/L)	Samplewater	37	Physis E-5041 W	9AD_CAMA	30		***62***		1		
Selenium Dissolved (µg/L)	Samplewater	37	Physis E-5048 W	01_BPT_14	30		***32***				
Selenium Dissolved (µg/L)	Samplewater	38	Physis E-5088 W	01_RR_BR	30		***42***				
Selenium Total (µg/L)	Samplewater	37	Physis E-5048 W	01_BPT_14	30		***42***	2			
Selenium Total (µg/L)	Samplewater	38	Physis E-5078 W	9AD_CAMA	30		***57***	4		LD RPD	LabDup RPD failed
Zinc Dissolved (µg/L)	Samplewater	34	Physis E-4090 W	01_BPT_15	30	***170***				FD RPD	FieldDup RPD failed
Zinc Dissolved (µg/L)	Samplewater	34	Physis E-4090 W	01_RR_BR	30		***65***			LD RPD, FD RPD	LabDup RPD failed, FieldDup RPD failed
Zinc Dissolved (µg/L)	Samplewater	35	Physis E-4155 W	01_BPT_3	30	***31***				FD RPD	FieldDup RPD failed
Zinc Dissolved (µg/L)	Samplewater	35	Physis E-5007 W	04_WOOD	30	***36***				U, FD RPD	Blanks failed and samples were <5 times the blank, FieldDup RPD failed
Zinc Total (µg/L)	Samplewater	34	Physis E-4090 W	01_BPT_15	30	***51***		1		FD RPD	FieldDup RPD failed
Zinc Total (µg/L)	Samplewater	34	Physis E-4090 W	01_RR_BR	30		***38***	1		LD RPD, FD RPD	LabDup RPD failed, FieldDup RPD failed
Zinc Total (µg/L)	Samplewater	37	Physis E-5048 W	01_BPT_14	30		***39***	3		LD RPD, U	LabDup RPD failed, Blanks failed and samples were <5 times the blank
Zinc Total (µg/L)	Samplewater	38	Physis E-5088 W	01_SG_74	30	***34***		2		U, FD RPD	Blanks failed and samples were <5 times the blank, FieldDup RPD failed
Nutrients											
Ammonia as N (mg/dry kg)	Sediment	34	Physis C-9066 W	07_HITCH	30	***62***	16	2	12	FD RPD	FieldDup RPD failed

Constituent	Matrix	Event	Lab Batch	Site	RPD Limit	Field Dup RPD	Lab Dup RPD	BS/ BSD RPD	MS/ MSD RPD	Program Qualifier	Comments
Ammonia as N (mg/L)	Samplewater	34	Physis C-9053 W	01T_ODD2_ DCH	30	***50***	0	6	4		
Ammonia as N (mg/L)	Samplewater	35	Physis C-10019 W	07_HITCH	30	***110***		4		FD RPD	FieldDup RPD failed
Ammonia as N (mg/L)	Samplewater	36	Physis C-11008 W	03_UNIV	30	***38***		0		MS >UL, U, FD RPD	MS failed upper limit, Blanks failed and samples were <10 times the blank, FieldDup RPD failed
Ammonia as N (mg/L)	Samplewater	38	C-11149	01_RR_BR	30		***40***	9	0		
Nitrite as N (mg/L)	Samplewater	34	Physis C-9039 W	01T_ODD2_ DCH	30	0	11	11	***32***	EST MS/MSD	Estimate due to MS/MSD RPD Failed
OrthoPhosphate as P (mg/L)	Samplewater	34	Physis C-9039 W	01T_ODD2_ DCH	30	1	***48***	4	3	MS <LL	MS failed lower limit
Total Kjeldahl Nitrogen (mg/L)	samplewater	35	_2111220_W_TKN	07_HITCH	20	***64***				U	Blanks failed and samples were <10 times the blank
OC Pesticides											
Chlordane, gamma- Total (µg/L)	blankwater	36	Physis O-4039 W	LABQA	30			***31***			
DDD(p,p') Total (µg/L)	Samplewater	35	Physis O-3145 W	04_WOOD	30	***67***		4			
DDE(p,p') (µg/dry g)	Sediment, 63µm to 2mm	34-2	Physis O-3096 W	07_HITCH	30	***107***					
DDE(p,p') (ng/wet g)	Tissue	34	Physis O-3109 W	04_WOOD	30		2	1	***78***	MS >UL, EST MS/MSD	MS failed upper limit, Estimate due to MS/MSD RPD Failed
Endrin Total (µg/L)	blankwater	35	Physis O-3152 W	LABQA	30			***63***			
Endrin Aldehyde (ng/wet g)	blankwater	34	Physis O-3109 W	LABQA	30			***110***			

Constituent	Matrix	Event	Lab Batch	Site	RPD Limit	Field Dup RPD	Lab Dup RPD	BS/ BSD RPD	MS/ MSD RPD	Program Qualifier	Comments
HCH, gamma (ng/wet g)	Tissue	34	Physis O-3109 W	04_WOOD	30		0	6	***57***	MS <LL, EST MS/MSD	MS failed lower limit, Estimate due to MS/MSD RPD Failed
HCH, gamma Total (µg/L)	Samplewater	36	Physis O-4039 W	01_RR_BR	30		0	4	***90***	MS >UL, EST MS/MSD	MS failed upper limit, Estimate due to MS/MSD RPD Failed
Tetrachloro-m-xylene-2,4,5,6 (Surrogate) Total (%)	Samplewater	36	Physis O-4039 W	01_RR_BR	30		***49***	***56***	0		
Tetrachloro-m-xylene-2,4,5,6 (Surrogate) Total (%)	Samplewater	36	Physis O-4039 W	13_SB_HILL	30	***73***		***56***			
Toxaphene Total (µg/L)	Samplewater	35	Physis O-3145 W	04_WOOD	30	***107***		6		FD RPD	FieldDup RPD failed
OP Pesticides											
Chlorpyrifos (µg/L)	Blankwater	35	W2K0452	LABQA	25			***28***		EST BS/BSD	Estimate due to BS/BSD RPD Failed
Chlorpyrifos Total (µg/L)	Samplewater	36	Physis O-4039 W	03_UNIV	30	***38***		4		MS >UL, FD RPD	MS failed upper limit, FieldDup RPD failed
PCBs											
PCB 030 (Surrogate) Total (%)	Samplewater	36	Physis O-4039 W	01_RR_BR	30		***32***	20	3		
PCB 030 (Surrogate) Total (%)	Samplewater	36	Physis O-4039 W	13_SB_HILL	30	***67***		20			
PCB 112 (Surrogate) (%)	Tissue	34	Physis O-3109 W	04_WOOD	30		10	0	***31***		
PCB 112 (Surrogate) Total (%)	blankwater	38	Physis O-4111 W	LABQA	30			***41***			
PCB 112 (Surrogate) Total (%)	Samplewater	36	Physis O-4039 W	13_SB_HILL	30	***68***		12			
PCB 198 (Surrogate) (%)	Sediment, <63µm	34-<	Physis O-3101 W	07_HITCH	30	***36***		8			

Constituent	Matrix	Event	Lab Batch	Site	RPD Limit	Field Dup RPD	Lab Dup RPD	BS/ BSD RPD	MS/ MSD RPD	Program Qualifier	Comments
PCB 198 (Surrogate) Total (%)	blankwater	38	Physis O-4111 W	LABQA	30			***39***			
PCB 198 (Surrogate) Total (%)	Samplewater	36	Physis O-4039 W	01_RR_BR	30		***37***	7	8		
Pyrethroid Pesticides											
Bifenthrin (µg/dry g)	Sediment, <63µm	34-<	Physis O-3101 W	07_HITCH	30	***41***		0		FD RPD	FieldDup RPD failed
Bifenthrin Total (µg/L)	Samplewater	35	Physis O-3145 W	04_WOOD	30	***92***		3		FD RPD	FieldDup RPD failed
Bifenthrin Total (µg/L)	Samplewater	36	Physis O-4039 W	13_SB_HILL	30	***38***		11		MS >UL, FD RPD	MS failed upper limit, FieldDup RPD failed
Cyfluthrin, total (µg/dry g)	Sediment	34	Physis O-3105 W	03_UNIV	30		0	3	***34***	MS <LL, EST MS/MSD	MS failed lower limit, Estimate due to MS/MSD RPD Failed
Cypermethrin, total (µg/dry g)	Sediment	34	Physis O-3105 W	03_UNIV	30		0	9	***37***	MS <LL, EST MS/MSD	MS failed lower limit, Estimate due to MS/MSD RPD Failed
Cypermethrin, total (µg/dry g)	Sediment, <63µm	34-<	Physis O-3101 W	07_HITCH	30	***67***		10			
Deltamethrin Total (µg/L)	blankwater	35	Physis O-3147 W	LABQA	30			***34***			
Deltamethrin Total (µg/L)	blankwater	38	Physis O-4109 W	LABQA	30			***97***		EST BS/BSD	Estimate due to BS/BSD RPD Failed
Deltamethrin Total (µg/L)	Samplewater	34	Physis O-3093 W	01T_ODD2_ DCH	30	***59***		10		FD RPD	FieldDup RPD failed
Deltamethrin Total (µg/L)	Samplewater	36	Physis O-4039 W	01_RR_BR	30		0	16	***33***	MS >UL, EST MS/MSD	MS failed upper limit, Estimate due to MS/MSD RPD Failed
Permethrin, cis- (µg/dry g)	Sediment, <63µm	34-<	Physis O-3101 W	07_HITCH	30	***107***		19			

Constituent	Matrix	Event	Lab Batch	Site	RPD Limit	Field Dup RPD	Lab Dup RPD	BS/ BSD RPD	MS/ MSD RPD	Program Qualifier	Comments
Permethrin, cis- Total (µg/L)	blankwater	37	Physis O-4047 W	LABQA	30			***35***		EST BS/BSD	Estimate due to BS/BSD RPD Failed
Permethrin, trans- (µg/dry g)	Sediment, <63µm	34-<	Physis O-3101 W	07_HITCH	30	***108***		11			

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											
Metals & Selenium											
Dissolved Mercury (µg/L)	Samplewater	35	Physis M-1155 W	80	120	114	117	110	***129***	MS >UL	MS failed upper limit
Dissolved Mercury (µg/L)	Samplewater	38	Physis E-6009 W	75	125	93	95	***65***	***67***	MS <LL	MS failed lower limit
Dissolved Mercury (µg/L)	Samplewater	38	Physis E-6009 W	75	125	93	95	***67***	***68***	MS <LL	MS failed lower limit
Dissolved Mercury (µg/L)	Samplewater	38	Physis E-6009 W	75	125	89	89	***59***	***62***	MS <LL	MS failed lower limit
Dissolved Mercury (µg/L)	Samplewater	38	Physis E-6010 W	75	125	86	89	***58***	***62***	MS <LL	MS failed lower limit
Total Mercury (µg/L)	blankwater	35	Physis M-1154 W	80	120	117	***123***	x	x	BS >UL	BS failed upper limit
Nutrients											
Ammonia as N (mg/L)	Samplewater	36	Physis C-11008 W	70	130	96	96	120	***136***	MS >UL, FD RPD	MS failed upper limit, FieldDup RPD failed
Nitrate as N (mg/L)	Samplewater	35	Physis C-10015 W	70	130	113	113	***68***	78	MS <LL	MS failed lower limit
Nitrate as N (mg/L)	Samplewater	37	Physis C-12007 W	70	130	100	100	***53***	***49***	MS <LL	MS failed lower limit
Nitrite as N (mg/L)	Samplewater	34	Physis C-9041 W	70	130	107	107	***6.7***	***6.7***	MS <LL	MS failed lower limit
Nitrite as N (mg/L)	Samplewater	37	Physis C-11024 W	70	130	100	100	***53***	***53***	MS <LL	MS failed lower limit
Nitrite as N (mg/L)	Samplewater	37	Physis C-11025 W	70	130	100	100	***153***	***153***	MS >UL	MS failed upper limit
OrthoPhosphate as P (mg/L)	Samplewater	34	Physis C-9039 W	70	130	101	97	***67***	***65***	MS <LL	MS failed lower limit
OC Pesticieds											
Chlordane, alpha- (ng/wet g)	Tissue	34	Physis O-3109 W	50	150	100	101	***159***	***175***		

Constituent	Matrix	Event	Lab Batch	LCL	UCL	LCS % Rec	LCSD % Rec	MS % Rec	MSD % Rec	Program Qualifier	Comments
Chlordane, gamma- (ng/wet g)	Tissue	34	Physis O-3109 W	50	150	107	105	***159***	***188***		
DDD(o,p') (ng/wet g)	Tissue	34	Physis O-3109 W	50	150	87	88	***168***	***163***		
DDD(p,p') (ng/wet g)	Tissue	34	Physis O-3109 W	50	150	89	91	***219***	***241***		
DDE(o,p') (ng/wet g)	Tissue	34	Physis O-3109 W	50	150	86	85	140	***176***		
DDE(p,p') (ng/wet g)	Tissue	34	Physis O-3109 W	50	150	86	87	***224***	***512***	MS >UL, EST MS/MSD	MS failed upper limit, Estimate due to MS/MSD RPD Failed
DDT(o,p') (µg/dry g)	blankwater	34	Physis O-3101 W	25	125	***130***	123	x	x	BS >UL	BS failed upper limit
DDT(o,p') (µg/dry g)	blankwater	34	Physis O-3101 W	25	125	***130***	123	x	x	BS >UL	BS failed upper limit
DDT(o,p') (ng/wet g)	Tissue	34	Physis O-3109 W	50	150	88	89	***0***	***-8***	MS <LL	MS failed lower limit
Endosulfan I (ng/wet g)	Tissue	34	Physis O-3109 W	50	150	54	55	***0***	***0***	MS <LL	MS failed lower limit
Endosulfan II (ng/wet g)	Tissue	34	Physis O-3109 W	50	150	75	80	***0***	***0***	MS <LL	MS failed lower limit
Endrin (ng/wet g)	Tissue	34	Physis O-3109 W	50	150	84	87	***154***	132		
HCH, beta (µg/dry g)	Sediment	34	Physis O-3096 W	50	150	54	53	52	***49***	MS <LL	MS failed lower limit
HCH, beta (µg/dry g)	Sediment	34	Physis O-3105 W	50	150	54	52	***44***	52	MS <LL	MS failed lower limit
HCH, beta (ng/wet g)	Tissue	34	Physis O-3109 W	50	150	66	67	***0***	***0***	MS <LL	MS failed lower limit
HCH, delta (ng/wet g)	Tissue	34	Physis O-3109 W	50	150	115	114	***0***	***0***	MS <LL	MS failed lower limit
HCH, gamma (ng/wet g)	Tissue	34	Physis O-3109 W	50	150	104	98	79	***44***	MS <LL, EST MS/MSD	MS failed lower limit, Estimate due to MS/MSD RPD Failed

Constituent	Matrix	Event	Lab Batch	LCL	UCL	LCS % Rec	LCSD % Rec	MS % Rec	MSD % Rec	Program Qualifier	Comments
HCH, gamma (µg/L)	Samplewater	36	Physis O-4039 W	50	150	138	144	***307***	116	MS >UL, EST MS/MSD	MS failed upper limit, Estimate due to MS/MSD RPD Failed
Toxaphene (µg/dry g)	Sediment	34	Physis O-3096 W	50	150	83	67	***38***	***33***	MS <LL	MS failed lower limit
OP Pesticides											
Chlorpyrifos (µg/L)	Samplewater	36	Physis O-4039 W	50	150	125	120	***167***	***168***	MS >UL, FD RPD	MS failed upper limit, FieldDup RPD failed
Diazinon (µg/dry g)	Sediment	34	Physis O-3096 W	50	150	143	145	***155***	***157***		
Malathion (µg/L)	Samplewater	36	Physis O-4039 W	50	150	***167***	130	***240***	***232***	MS >UL, BS >UL	MS failed upper limit, BS failed upper limit
PCBs											
None											
Pyrethroid Pesticides											
Bifenthrin (µg/L)	Samplewater	36	Physis O-4039 W	50	150	128	143	150	***155***	MS >UL, FD RPD	MS failed upper limit, FieldDup RPD failed
Cyfluthrin, total (µg/dry g)	Sediment	34	Physis O-3105 W	50	150	70	68	58	***41***	MS <LL, EST MS/MSD	MS failed lower limit, Estimate due to MS/MSD RPD Failed
Cypermethrin, total (µg/dry g)	Sediment	34	Physis O-3105 W	50	150	70	64	58	***40***	MS <LL, EST MS/MSD	MS failed lower limit, Estimate due to MS/MSD RPD Failed
Deltamethrin (µg/dry g)	Sediment	34	Physis O-3105 W	50	150	71	63	***25***	***19***	MS <LL	MS failed lower limit
Deltamethrin (µg/L)	Samplewater	36	Physis O-4039 W	50	150	108	92	141	***197***	MS >UL, EST MS/MSD	MS failed upper limit, Estimate due to MS/MSD RPD Failed
Deltamethrin/Tralomethrin (µg/L)	Samplewater	38	W3E1021	30	200	134	x	***216***	***215***		
Permethrin, cis- (µg/L)	blankwater	35	Physis O-3145 W	50	150	***46***	55	x	x	BS <LL	BS failed lower limit

Constituent	Matrix	Event	Lab Batch	LCL	UCL	LCS % Rec	LCSD % Rec	MS % Rec	MSD % Rec	Program Qualifier	Comments
Permethrin, cis- (µg/L)	blankwater	35	Physis O-3152 W	50	150	***45***	56	x	x	BS <LL	BS failed lower limit
Permethrin, cis- (µg/L)	Samplewater	36	Physis O-4039 W	50	150	120	118	***151***	***177***	MS >UL	MS failed upper limit
Permethrin, trans- (µg/L)	Samplewater	36	Physis O-4039 W	50	150	136	148	***161***	***190***	MS >UL	MS failed upper limit

MS = Matrix Spike
MSD = Matrix Spike Duplicate
LCS = Lab Control Spike
LCSD = Lab Control Spike Duplicate
%Rec. = Percent Recovery