Appendix 3-2: Annual Permit Report for the Non-Everglades Construction Project

Permit Report (May 1, 2012–April 30, 2013)
Permit Number: 0237803
(Original Permit Number: 06, 502590709)

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SUMMARY

Based on Florida Department of Environmental Protection (FDEP) permit reporting guidelines, **Table 1** lists key permit-related information associated with this report. **Table 2** lists the attachments included with this report. **Table A-1** in Attachment A lists specific pages, tables, graphs, and attachments where project status and annual reporting requirements are addressed. This annual report satisfies the reporting requirements specified in the permit.

Table 1. Key permit-related information.

Project Name:	Non-Everglades Construction Project
Permit Number:	0237803 (Original Permit: 06,502590709)
Other Related Permit:	0306639-001 (S-197 Structure Replacement)
Issue and Expiration Dates: Permit 06,502590709 (Original): Permit 0237803 (Reissue):	 Issued: 4/20/1998; Expired: 4/20/2003 Issued: 4/21/2003; Expires: Administratively extended in 2008 until the Long-Term Compliance Permit required by the Everglades Forever Act is issued.
Permit 0306639-001 (S-197 Structure Replacement):	Issued: 8/9/2011; Expires: 8/9/2016
Project Phase:	Operation
Permit Specific Condition Requiring Annual Report:	5 (Non-ECP Permit), and 25 (S-197 Structure Replacement Permit)
Reporting Period:	May 1, 2012–April 30, 2013
Report Lead:	Shi Kui Xue: sxue@sfwmd.gov, 561-682-2333
Permit Coordinator:	Laura Reilly: lreilly@sfwmd.gov, 561-681-2563

Table 2. Attachments included with this report.

Attachment	Title
A	Specific Conditions and Cross-References
B	Water Quality Data
C	Hydrologic Data
D	Non-Everglades Construction Project/S-197 Structure Replacement Project Water Quality Sampling Sites, Monitoring Schedule and Flow Volumes
E	Summary Statistics of Non-Everglades Construction Project Water Quality Monitoring Data for Water Year 2013
F	Time-Series and Trend Plots of Total Phosphorus at Non-Everglades Construction Project Monitoring Sites for Water Year 2013 and Earlier Periods
G	Annual Permit Compliance Monitoring Report for Mercury in Downstream Receiving Waters of the Everglades Protection Area
H	Statements of Authenticity for Analytical and Sampling Programs

During Water Year 2013 (WY2013) (May 1, 2012–April 30, 2013), there were no excursions for Class III water quality standards for the Non-Everglades Construction Project (Non-ECP) monitoring sites. There were 710 excursions among the 936 samples at individual stations compared with the 5 milligrams per liter (mg/L) criterion (**Table 5**). However, only four stations (S9, S9A, S332DX and S344) failed the site-specific alternative criteria (SSAC). There is no impact on SSAC of dissolved oxygen (DO) for the downstream marsh stations; therefore, there is no concern for DO for Non-ECP structures.

The highest flow-weighted mean (FWM) total phosphorus (TP) concentrations for the "into" structures were observed at S-190 (Feeder Canal Basin) and S-140 (L-28 Basin), at 97 and 50 parts per billion [ppb, or micrograms per liter (µg/L)], respectively. In the C-11 West Basin, the S-9 and S-9A structures had FWM TP concentrations of 16 and 11 ppb, respectively. The Feeder Canal Basin and L-28 Basin are designated as sites of "concern" for TP, and C-11 West basins are designated as sites of "potential concern" for TP. The lowest FWM TP concentrations were observed in the C-111 Basin, which is the subject of interim and long-term compliance limits stipulated in the federal Everglades Settlement Agreement. Currently, annual FWM TP concentrations are less than 10 ppb and there is no concern for TP in the C-111 Basin.

Four surface water samples were collected at each site and were analyzed for all parameters. Pesticides with concentrations greater than their respective Class III criteria or toxicity limits were assigned to the "concern" excursion category, whereas those higher than the practical quantitation limit (PQL) were assigned to the "potential concern" excursion category. The chlorpyrifos ethyl detection at S-178, from a sample collected on January 28, 2013, was at a level of concern. The concentration detected is greater than the calculated chronic toxicity for *Daphnia magna* and, at this level, exposure can cause impacts to macroinvertebrate populations. However, the pulsed nature of agricultural runoff releases to the canal system precludes drawing any conclusions about the effects of long-term average exposures. Two sediment samples were collected at each site and were analyzed for all parameters. Pesticides with concentrations greater than the PQL were assigned to the "potential concern" excursion category. Dichlorodiphenyldichloroethylene (DDE), the environmental dehydrochlorination product of DDT was detected at three locations (S-9, S-177, and S-178) at a level of "potential concern."

In this report, data from compliance monitoring under the Non-ECP permit for atmospheric mercury (Hg) influx and bioaccumulation in fish from the downstream receiving waters of the Everglades Protection Area (EPA) are summarized for the reporting period (see Attachment G). As a result of higher than average rainfall, total annual wet deposition of Hg was higher in Calendar Year 2012 (CY2012) than CY2011. During WY2013, The average basin-wide concentration of mosquitofish (*Gambusia holbrooki*) in WY2013 was 66 nanograms per gram (ng/g), representing a 28 percent average decrease from the basin-wide mean concentration in WY2012. The basin-wide average concentration for sunfish (*Lepomis* spp.) in WY2013 was 173 ng/g, representing a 21 percent decrease from WY2012. Fillets from individual largemouth bass (*Micropterus salmoides*) in WY2013 had tissue total mercury (THg) concentrations ranging from a minimum of 63 ng/g (age 1) to a maximum of 1,900 ng/g (age 4), both of which are significantly lower than in WY2012. Based on guidance from the U.S. Fish and Wildlife Service (USFWS) and the U.S. Environmental Protection Agency (USEPA) on Hg concentrations in fish, localized populations of fish-eating birds and mammals continue to be at potential risk from adverse effects due to Hg exposure, depending on their respective foraging areas. As such, most of South Florida remains under fish consumption advisories for the protection of human health.

S-197 structure replacement construction continued through WY2012, and most of WY2013. S-197 discharged 11,303 acre-feet (ac-ft) of water from August 26 to August 30, 2012, successfully achieving its flood control objectives. The S-197 authorized construction impacted 0.06 acres of mangroves within the project area. Adverse impacts to mangroves were offset by planting approximately 160 red mangroves (*Rhizophora mangle*) within 0.11 acres along the east canal bank of the C-111 downstream of the S-197 structure, in November 2012. Mitigation monitoring reports are submitted under separate cover and can be provided upon request. No problems were encountered, and the structure replacement project was completed in December 2012. There is no water quality concern at S-197, and water quality monitoring results are summarized in this report.

INTRODUCTION

The Non-ECP permit (FDEP Permit Number 0237803) authorizes the South Florida Water Management District (SFWMD or District) to operate and maintain 37 structures, and specifies reporting requirements in Specific Conditions 5 and 12. The S-197 Structure Replacement Project permit (0306639-001) was issued under the authority of Part IV of Chapter 373, Florida Statutes (F.S.), and Title 62, Florida Administrative Code (F.A.C.) and specifies a reporting requirement in Specific Condition 25.

METHODS

WATER QUALITY AND HYDROLOGIC DATA

The water quality and hydrologic data evaluated in this report were retrieved from the District's DBHYDRO database. Before water quality data are entered into the database, the District follows strict quality assurance/quality control (QA/QC) procedures outlined in the District's Chemistry Laboratory Quality Manual (SFWMD, 2012) and Field Sampling Quality Manual (SFWMD, 2011). The laboratory manual was developed in accordance with National Environmental Laboratory Accreditation Conference requirements, and both the laboratory and the field manuals in accordance with the FDEP Quality Assurance Rule (Chapter 62-160, F.A.C.). These quality manuals describe procedures that the water quality monitoring program follows to obtain accurate data to assess progress being made toward achieving water quality standards.

The standards used to evaluate the accuracy of the rating for flow calculations are consistent with the SFWMD's Standard Operating Procedures for Flow Data Management in the District Hydrologic Database (Akpoji et al., 2003) and the U.S. Geological Survey's approach as outlined by Novak (1985). Four accuracy classifications are adopted to assess a rating's accuracy. The rating is classified as (1) "excellent" when about 95 percent of the predicted flow rates are within ±5 percent of the measured discharges, (2) "good" if they are within ±10 percent, (3) "fair" if they are within ±15, and (4) "poor" when they are not within ±15 percent.

PERMIT SAMPLING SITES

In addition to authorizing operation and maintenance of Non-ECP structures, the Non-ECP permit requires a routine water quality monitoring program to characterize the quality of water discharged through District structures. Currently, the Non-ECP permit requires monitoring at four additional C-111 Basin structures (upstream) that are controlled by the District.

The District typically collects water quality samples on the upstream side of a structure or at a nearby location representative of the quality of water flowing through a structure. Structure locations are shown in **Figure 1**. In accordance with Specific Condition 16, the District submitted a monitoring locations report to the FDEP on July 15, 1998, that included detailed information on the specific locations for sample collection for 44 structures. On August 9, 2001, the District submitted a minor modification to the Non-ECP permit to include Phase I of the Western C-11 Basin Critical Restoration Project (including operation and maintenance of the S-9A pump station). Various modifications have been made, and the current monitoring program encompasses 37 locations that provide the representative information to characterize the quality of water discharged through the 37 structures. The structure names, representative water quality monitoring location names, sampling frequencies of the various categories of chemical constituents and physical properties required by the monitoring schedule denoted in the permit, and monthly and annual flow volumes are shown in Attachment D, Table D-3, of this report.

During construction of the S-197 replacement structure, S-18C was used as a monitoring proxy site in accordance with the S-197 replacement structure permit to represent S-197 water quality. From May through December 2012, S-197 water quality was represented by S-18C, which was followed by sampling resumption, when construction was complete, directly at S-197 for the remainder of the water year.

PERMIT DATA ANALYSIS PERIODS

Specific Condition 12 requires the District to submit annual monitoring reports providing updates on water quality data and associated comparisons with state water quality standards. The water quality characterization evaluates compliance with Class III criteria for each monitoring location representative of a Non-ECP structure. This report provides the annual update of the Non-ECP permit monitoring program (Specific Condition 12) and a comparison of water quality data at Non-ECP structures to state water quality standards from WY2013, the sixteenth year of Non-ECP data, and previous periods (WY1998–WY2012). These comparisons fulfill the Non-ECP permit requirements to measure progress toward achieving and maintaining compliance with state water quality standards.

Method Detection Limits

Each water quality constituent has a method detection limit (MDL) that essentially defines the minimum concentration, or level, at which the presence of the constituent can be positively verified. It is usually twice the background noise level associated with a test. The MDL does not represent a level at which an exact measurement can be determined. The PQL represents the lowest level at which a measurement can be considered quantifiably reliable for a constituent that

is achievable (among laboratories within specified limits during routine laboratory operations). Generally, the PQL is four times the MDL, although different laboratories may establish PQLs at two to five times the MDL. In this report, trace metal data that were reported to be less than the MDL were assigned a value equal to the MDL. TP data that were less than the MDL of 2.0 µg/L (or ppb) were assigned a value of 2.0 ppb to provide a conservative basis for statistical analysis. For pesticide detections, concentrations greater than the PQL were considered reliable.

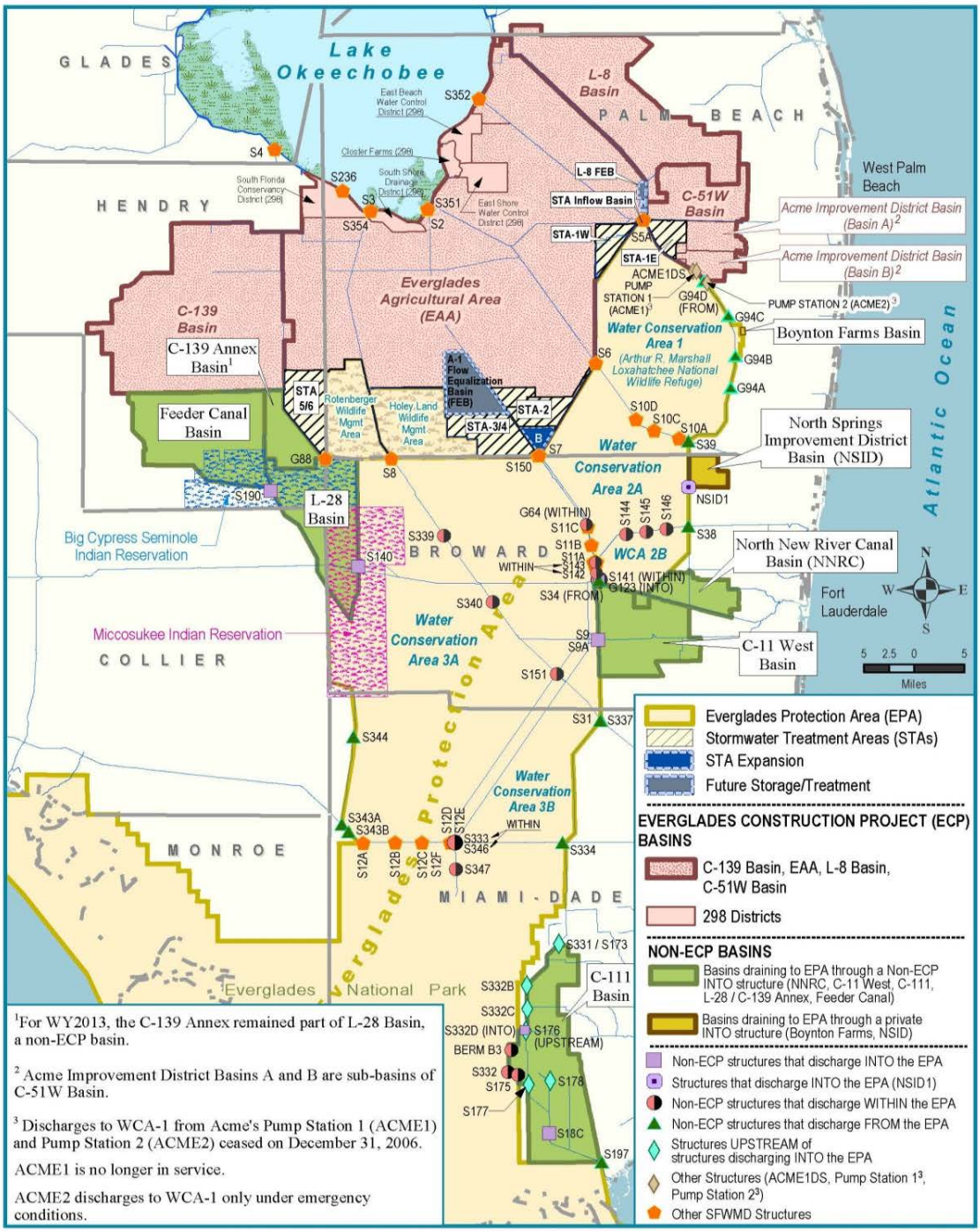


Figure 1. Non-ECP discharge structures and additional upstream structures.

EXCURSION ANALYSIS FOR CLASS III CONSTITUENTS AND PESTICIDES

To evaluate compliance with water quality criteria in WY2013, constituent concentrations were compared to their respective Class III numeric criteria. If a constituent concentration exceeded its numeric criterion, then an excursion was recorded and the total number of excursions and the percent of excursions for the Non-ECP structures were tabulated in Attachment E, Table E-3.

Total Phosphorus

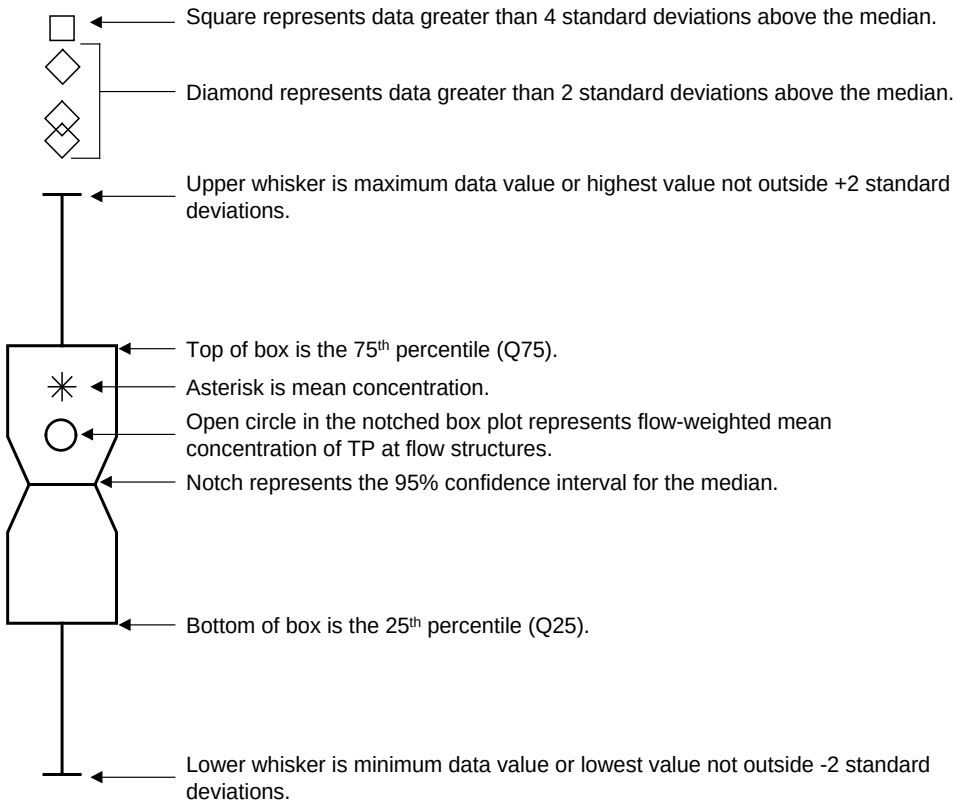
The data for TP are presented in this report in time series plots and statistical box plots. For TP, any site with data greater than 50 ppb is viewed as a concern, any site with data greater than 10 ppb is viewed as a potential concern, and any site with data less than 10 ppb is viewed as no concern. This approach is consistent with the federal Everglades Settlement Agreement (i.e., Settlement Agreement dated July 26, 1991, entered in Case No. 88-1886-Civ-Hoeveler, U.S. District Court for the Southern District of Florida, as modified by the Omnibus Order entered in the case on April 27, 2001). The Settlement Agreement indicates that the Everglades Stormwater Treatment Areas (STAs) are located and sized to deliver a uniform, long-term, annual FWM TP concentration of 50 ppb or less at each inflow point to the EPA. Additionally, the Everglades Forever Act (EFA) mandates that the default TP criterion shall be 10 ppb in the EPA, in the event that the FDEP did not adopt by rule such a criterion by December 31, 2003. Because final agency action by the FDEP did not occur prior to December 31, 2003, as a result of unresolved legal challenges, a default TP criterion of 10 ppb became effective, as specified by the EFA. There are additional TP concentration compliance limits for inflows to the Everglades National Park (ENP) by way of Shark River Slough (S-12s and S-333), and the coastal basin (S-18C) outlined in Appendix A of the Settlement Agreement. However, this annual Non-ECP report does not track compliance with the long-term TP concentration limits set forth in the Settlement Agreement.

The District's categories of concern, potential concern, and no concern are based on a common sense understanding of water resources protection. These terms, however, are not intended to be interpretations of state water quality standards or state water quality law. The FDEP, not the District, is responsible for interpreting whether a given constituent violates the numeric criterion, the narrative criterion, a water body's designated uses, or the anti-degradation policy.

DESCRIPTION OF NOTCHED BOX-AND-WHISKER PLOTS

Notched box-and-whisker plots were created to summarize data for each constituent that exceeded its numeric criteria. These plots also summarize the TP data collected at all monitoring locations. A notched box-and-whisker plot summarizes selected statistical properties of the data sets. Notched box-and-whisker plots can be used to test for statistical significance between data sets at roughly a 95 percent confidence interval to detect changes in constituent concentration variability over time and to determine if trends exist. The notched box-and-whisker plots used for these summaries are based on McGill et al. (1978) (**Figure 2**).

The objective of providing trend plots is to compare data from WY2013 to data from previous individual permit water years (WY1998–WY2012) and previously established baseline data sets for the Non-ECP discharge structures.



1. Notches surrounding the medians provide a measure of the significance of differences between notched-box plots. If the notches surrounding two medians do not overlap, then the medians are significantly different at about a 95 percent confidence level.
2. At times, the variability in a data set may be quite high. When highly variable data are presented in a notched box-and-whisker plot, the width of the notch may be greater than the 25th or 75th percentile. When this occurs, the box plot appears as if it is folded from the end of the notch back towards the median. This is done automatically by the statistics program to save space within the figure being presented.
3. Notches are calculated using the following equation:

$$Notch = Median \pm \frac{1.58(Q75 - Q25)}{\sqrt{n}}$$

Where n = number of data points shown on the bottom of **Figures 3a-3d**

Figure 2. Description of notched box-and-whisker plots used in this report.

RESULTS: WATER QUALITY EVALUATION AND EXCURSION ANALYSIS

In accordance with Specific Conditions 5 and 12(h) of the Non-ECP permit and Specific Condition 25 of the S-197 Structure Replacement Permit, this section presents an update of constituent concentrations and physical properties measured during WY2013, the sixteenth year of Non-ECP permit monitoring. For standards with numeric criteria, data from the structures were assessed for compliance with those standards using the procedures in Rule 62-4.246, F.A.C. For parameters that have narrative water quality criteria, the concentrations obtained at each structure were reported using plots and summary statistics.

MONITORING OF PHYSICAL PARAMETERS, NUTRIENTS AND MAJOR IONS

Descriptive Statistics

A summary of the data begins with a presentation of descriptive statistics for all water quality constituent concentrations and physical properties (excluding pesticides and priority pollutants) measured for Non-ECP monitoring locations during WY2013 (Attachment E, Table E-2). The descriptive statistics (summary tables) are presented by monitoring location for each water quality parameter collected for the site. A reference is also provided in Attachment E, Table E-1, reflecting current state Class III criteria.

The statistical summary tables report the range of constituent concentrations, median values, the number of sample observations, selected data percentiles (25^{th} and 75^{th}), and flag parameters exhibiting excursions from Class III numeric criteria. Concentrations observed to be less than the lower limit of the analytical method (MDL) were set equal to the MDL for statistical analysis.

For parameters such as nutrients that have only narrative criteria, the tables provide basic information to assist with identifying water quality constituents that might be of concern. TP is the nutrient deemed to be of particular concern for Non-ECP structures.

Excursions from Class III Criteria (Numeric)

Further analysis of excursions from Class III criteria was accomplished by summarizing the excursions, plotting the data for parameters exhibiting the excursions, discussing the parameters, and noting which ones are a concern. The excursion analysis is based on seven water quality parameters with numeric criteria, shown in **Table 3**, that were collected for the Non-ECP monitoring program, and can be compared with applicable Class III water quality criteria listed in Rule 62-302.530, F.A.C.

Of the seven parameters listed in **Table 3**, one parameter, DO, exhibited excursions during WY2013. Non-ECP annual monitoring summary tables that show the total number of excursions by individual monitoring location are presented in previous annual consolidated reports. **Table 3** summarizes the previously reported information and compares those annual results to WY2013. A summary of observed excursions from Class III criteria for individual Non-ECP monitoring locations during WY2013 is presented in **Table 4**. The monitoring locations are categorized in the table as "into," "within," "from," or C-111 Basin locations, as defined by the Non-ECP permit.

Table 3. Summary of total number of excursions from state Class III criteria for all Non-ECP monitoring sites during WY2013 and previous periods.

Parameter	Total Alkalinity	Dissolved Oxygen	Specific Conductance	pH	Turbidity	Un-Ionized Ammonia	Total Iron	Total Cadmium	Total Lead	Total Copper	Total Zinc
EFA Baseline	(1:2677)	(1694:2615)	(59:2615)	(6:2586)	(10:2637)	(12:2548)	(5:836)	(9:362)	(1:364)	(1:373)	(3:363)
Non-ECP Baseline	(0:2845)	(2177:3018)	(12:3058)	(37:3008)	(12:2842)	(10:2661)	(5:1655)	(4:785)	(2:785)	(0:779)	(2:786)
WY1998	(0:525)	(459:551)	(3:551)	(12:551)	(0:527)	(7:448)	(0:261)	(1:127)	(0:120)	(0:127)	(0:127)
WY1999	(0:502)	(485:581)	(0:589)	(10:589)	(4:504)	(20:501)	(1:244)	(0:126)	(0:112)	(0:126)	(0:125)
WY2000	(0:559)	(558:697)	(5:698)	(1:698)	(3:645)	(1:622)	(0:270)	(0:133)	(0:119)	(0:132)	(0:129)
WY2001	(0:490)	(455:637)	(2:637)	(1:637)	(1:489)	(3:485)	(1:186)	(0:101)	(0:77)	(0:101)	(0:100)
WY2002	(0:475)	(456:597)	(0:600)	(1:611)	(2:479)	(0:478)	(0:74)	(0:30)	(ND)	(0:29)	(0:25)
WY2003	(1:471)	(436:649)	(1:664)	(2:666)	(1:470)	(0:477)	(0:72)	(0:31)	(ND)	(0:35)	(0:31)
WY2004	(0:506)	(577:793)	(3:761)	(1:812)	(0:519)	(0:522)	(0:70)	(0:31)	(ND)	(0:35)	(0:31)
WY2005	(0:447)	(584:886)	(0:862)	(4:485)	(2:523)	(1:514)	(0:89)	(0:38)	(0:2)	(0:40)	(0:36)
WY2006	(0:443)	(718:905)	(1:907)	(1:919)	(0:569)	(0:562)	(0:74)	(0:32)	(ND)	(0:32)	(0:32)
WY2007	(0:373)	(543:927)	(0:929)	(0:943)	(2:462)	(0:541)	(0:62)	(0:28)	(ND)	(0:28)	(0:44)
WY2008	(0:154)	(510:872)	(0:900)	(2:902)	(3:354)	(0:229)	(0:16)	(ND)	(ND)	(ND)	(ND)
WY2009	(0:2)	(555:871)	(1:882)	(0:882)	(0:317)	(ND)	(ND)	(ND)	(ND)	(ND)	(ND)
WY2010	(ND)	(644:916)	(0:936)	(0:931)	(ND)	(ND)	(0 :11)	(ND)	(ND)	(ND)	(ND)
WY2011	(0:76)	Pass*	(0:879)	(0:871)	(0:318)	(0:112)	(0 :16)	(ND)	(ND)	(ND)	(ND)
WY2012	(0:79)	Pass*	(2:787)	(2:786)	(0:317)	(0:136)	(0 :16)	(ND)	(ND)	(ND)	(ND)
WY2013[†]	(0:99)	(710:936)	(0:952)	(0:952)	(0:344)	(0:160)	(0 :17)	(ND)	(ND)	(ND)	(ND)

WY2013 (May 1, 2012–April 30, 2013) through WY1998 (May 1, 1997–April 30, 1998); Non-ECP Baseline (October 1, 1988–April 30, 1997); and EFA Baseline (October 1, 1978–September 30, 1988). See 2000–2004 Everglades Consolidated Reports and 2005-2011 South Florida Environmental Reports for previous periods (available on the District's website at www.sfwmd.gov/sfer).

*Excursion reporting under the DO limit was adjusted from the fixed 5 mg/L criterion to the Everglades DO SSAC from WY2011 to WY2012 and was adjusted back to 5 mg/L in WY2013.

[†]Due to logistical sampling constraints, a fourth quarter sample for S-197 was collected on May 14, 2013. The results are included in the reporting period for WY2013.

Table 4. Summary of excursions from state Class III surface water criteria for individual non-ECP monitoring sites and additional upstream monitoring locations during WY2013.

Area	Structure	Sampling Site	Alkalinity	Dissolved Oxygen	Specific Conductance	pH	Turbidity	Un-Ionized Ammonia
Into	G-123	G123	-ND-	(**8 : 12**)	(0 : 12)	(0 : 12)	(0 : 14)	-ND-
	S-9	S9	-ND-	(**48 : 52**)	(0 : 53)	(0 : 53)	(0 : 22)	-ND-
	S-9A	S9A	(0:1)	(**52 : 53**)	(0 : 54)	(0 : 54)	(0 : 19)	(0 : 2)
	S-18C*	S18C	-ND-	(**26:52**)	(0 : 52)	(0 : 52)	(0 : 5)	-ND-
	S-332D	S332DX	-ND-	(**43:52**)	(0 : 52)	(0 : 52)	(0 : 6)	-ND-
	S-140	S140	-ND-	(**35:51**)	(0 : 53)	(0 : 53)	(0 : 25)	-ND-
	S-190	S190	-ND-	(**7:52**)	(0 : 53)	(0 : 53)	(0 : 21)	-ND-
Within	G-64	G64	-ND-	(0:1)	(0 : 1)	(0 : 1)	(0 : 1)	-ND-
	S-346, S-347	S12D	-ND-	(**38:40**)	(0 : 41)	(0 : 41)	-ND-	-ND-
	S-141	S34	S34 used as a surrogate for this station)					
	S-142	S142	-ND-	(**9:12**)	(0 : 12)	(0 : 12)	(0 : 12)	-ND-
	S-143	S11A	(0 : 26)	(**8:25**)	(0 : 27)	(0 : 27)	(0 : 26)	(0 : 26)
	S-144, S-145, S146	S145	(0 : 21)	(**14:20**)	(0 : 21)	(0 : 21)	(0 : 21)	(0 : 21)
	S-151	S151	(0:1)	(**33:36**)	(0 : 36)	(0 : 36)	(0 : 21)	(0:1)
	S-333	S333	-ND-	(**50:51**)	(0 : 52)	(0 : 52)	(0 : 4)	-ND-
	S-339, S-340	C123SR84	-ND-	(**7:11**)	(0 : 12)	(0 : 12)	(0 : 12)	-ND-
	S-175	S175	-ND-	-ND-	-ND-	-ND-	-ND-	-ND-
	S-332	S332	-ND-	-ND-	-ND-	-ND-	-ND-	-ND-
	BERMB3	BERMB3	-ND-	(**10:15**)	(0 : 15)	(0 : 15)	(0 : 3)	(0 : 1)
From	G-94A, G-94B, G-94C	G94B	-ND-	(**12:14**)	(0 : 15)	(0 : 15)	(0 : 15)	-ND-
	G-94D	G94D	(0 : 1)	(**1:1**)	(0 : 1)	(0 : 1)	(0 : 1)	-ND-
	S-31, S-337	S31	(0 : 1,)	(**13:15**)	(0 : 15)	(0 : 15)	(0 : 17)	(0:1)
	S-34	S34	-ND-	(**8:20**)	(0 : 20)	(0 : 20)	(0 : 20)	-ND-
	S-38	S38	(0 : 26)	(**21:24**)	(0 : 26)	(0 : 26)	(0 : 26)	(0 : 26)
	S-39	S39	(0 : 22)	(**11:21**)	(0 : 23)	(0 : 23)	(0 : 23)	(0 : 22)
	S-197†	S-197	-ND-	(0:2)	(0 : 2)	(0 : 2)	(0 : 2)	-ND-
	S-334	S356-334	-ND-	(**47:51**)	(0 : 52)	(0 : 52)	(0 : 4)	-ND-
	S-343A, S-343B	US41-25	-ND-	(**21:22**)	(0 : 21)	(0 : 21)	(0 : 6)	-ND-
	S-344	S344	-ND-	(**4:4**)	(0 : 4)	(0 : 4)	(0 : 4)	-ND-
C-111 Basin	S-176	S332DX	S332DX used as surrogate for this station"					
	S-177	S177	-ND-	(**29:44**)	(0 : 44)	(0 : 44)	(0 : 5)	(0 : 38)
	S-178	S178	-ND-	(**12:27**)	(0 : 27)	(0 : 27)	(0 : 5)	(0 : 22)
	S-331, S-173	S331-173	-ND-	(**48:52**)	(0 : 52)	(0 : 52)	(0 : 4)	-ND-
Totals			(0 : 99)	(**710:936**)	(0 : 952)	(0:951 : 952)	(0 : 344)	(0 : 160)

1st number in parenthesis indicates number of excursions.

2nd number in parenthesis indicates total number of samples collected.

Bold numbers indicate excursions from state Class III criteria.

-ND- indicates that no data were collected.

* S-18C served as a proxy site for monitoring S-197 water quality under the S-197 Structure Replacement Project Permit (Permit Number 0306639-001) from May until December 2012.

† Due to logistical sampling constraints, a fourth quarter sample for S-197 was collected on May 14, 2013. The results are included in the reporting period for WY2013.

Dissolved Oxygen

The Class III surface water standard for DO is 5 mg/L, and was used to evaluate DO data for WY2013. Because of the naturally warm water conditions found in South Florida, even unimpacted areas of the Everglades commonly have DO concentrations that are below the 5 mg/L standard. If Class III excursions are observed at upstream structures, the SSAC for DO can be used to determine impacts (if any) on the receiving waters of the downstream marsh. Because natural levels commonly fall below the existing standard, the FDEP has adopted a SSAC for DO in the EPA that better reflects naturally occurring conditions (see Volume I, Chapter 3A). Since a single-value criterion does not adequately account for the wide-ranging natural daily fluctuations observed in the Everglades marshes, the SSAC provides a mechanism to account for the major factors (e.g., time of day and season) that influence natural background DO variation in the Everglades (Weaver, 2004). The SSAC is based on an algorithm that uses sample collection time and water temperature to model the observed natural sinusoidal diel cycle and seasonal variability. This model provides a lower DO limit (DOL) for an individual monitoring station, and is described by the following equation:

$$DOL = [-3.70 - \{1.50 \cdot \sin(2\pi/1440 \cdot t_i) - (0.30 \cdot \sin[4\pi/1440 \cdot t_i])\} + 1/(0.0683 + 0.00198 \cdot C_i + 5.24 \cdot 10^{-6} \cdot C_i^2)] - 1.1$$

Where:

DOL_i = lower limit for the i^{th} annual DO measurement in mg/L

t_i = sample collection time in minutes (Eastern Standard Time) since midnight of the i^{th} annual DO measurement

C_i = water temperature associated with the i^{th} annual DO measurement in degrees Celsius (°C)

The SSAC is assessed based on a comparison between the annual average measured DO concentration and the average of the corresponding DO limits specified by the equation above. DO conditions for the Non-ECP were compared to the Everglades DO SSAC in WY2011 and WY2012. Although 710 excursions from the 5.0 mg/L criteria were observed for 936 samples collected at individual structure monitoring station, all downstream marsh stations met the DO SSAC criterion. Therefore, it appears that discharges from the upstream structures did not impact any downstream marsh monitoring stations.

Specific Conductance

During WY2013, specific conductance was measured in 952 samples collected from the monitoring sites. The criteria for Class III waters requires that specific conductance not exceed a level greater than 50 percent above background, or 1,275 micromhos per centimeter (µmhos/cm), whichever is greater. There were no Class III criterion excursions for specific conductance.

pH

The pH of a solution is defined as the negative base-10 logarithm of the hydrogen ion activity, and can range from 0 (very acidic) to 14 (very alkaline). For freshwater systems, the Class III criterion for pH ranges from 6.0 to 8.5 units. For WY2013, no sample exhibited an excursion for the pH criterion among 952 samples collected.

Alkalinity

The criterion for Class III waters requires that alkalinity not be below 20 mg/L. Alkalinity was deleted from the ENP Inflows East (PIE) monitoring plan, dated April 1, 2008; none of the 99 sample values were flagged as a potential excursion in previous years. Alkalinity does not appear to be a parameter of concern, as excursions have only occurred once during the past 16 water years.

Turbidity

The criterion for Class III waters requires that turbidity not exceed 29 nephelometric turbidity units (NTU) above natural background conditions. In general, the median value can be used to determine the average background levels on a site-to-site basis for the Non-ECP monitoring locations to compare the measured turbidity at a site with Class III criteria. For instance, if background levels at a particular location indicate a median turbidity level of approximately 3 NTU, and a turbidity measurement of 30 NTU was measured, this would indicate that the measurement is 27 NTU above background levels. This measurement would not be considered an excursion, although the 30 NTU measurement might be construed as exceeding the criterion in the absence of sufficient background data to calculate a median value for comparison. There were no excursions for turbidity for 344 samples collected during WY2013, as shown in **Table 4**.

Evaluation of Total Phosphorus

The Non-ECP permit established the monitoring schedule shown in Attachment D for the collection of TP at Non-ECP structures. Sample collection is accomplished mainly through a grab sample collection program. Grab samples are collected biweekly for a majority of the structures when flow is occurring at the structure; otherwise, collection is conducted at least once a month. A few exceptions exist for some Non-ECP structures, where sampling is conducted biweekly only during flow events. Nutrients are the most frequently sampled parameters in the Non-ECP monitoring program. Since October 2009, grab samples were taken biweekly at S-38, S-39, S-145, and S-11A when there was recorded flow.

During WY2013, autosamplers collected TP samples at the S-9, S-9A, S-18C, S-190, S-140, and S-332D structures. Deployment of autosamplers at these locations was previously identified as an improvement in the monitoring program for collecting TP data at "into structures." TP concentration data collected for all monitoring locations during WY2013 are plotted in time series in Attachment F. The plots provide a comparison of TP concentration data between WY2013 and previous periods (WY1998–WY2012, EFA baseline, and Non-ECP baseline) to detect changes and trends in TP concentrations at Non-ECP monitoring locations. To assist with evaluation of the TP concentration data for a particular location discharging into, within, or from the EPA, horizontal lines representing the 10 ppb and 50 ppb concentration levels were added to the TP time series plots. TP concentrations are reported in ppb (or µg/L), unless otherwise noted.

For WY2013, a statistical comparison of TP concentration data for all monitoring locations is presented as notched box-and-whisker plots in **Figures 3** through **6**, which are provided in the following subsections. The figures represent "into" (**Figure 3**), "within" (**Figure 4**), and "from" (**Figure 5**) monitoring locations. Additionally, notched box-and-whisker plots were constructed for TP concentration data for the upstream C-111 Basin monitoring locations (**Figure 6**). Summary statistics of TP data collected for all monitoring locations are presented separately as Attachment E, Table E-3 (grab and autosampler data are reported separately).

"Into" Structures

The highest TP concentrations for Non-ECP structures discharging directly to the EPA during WY2013 were observed for the monitoring locations at Feeder Canal (S-190), followed by the S-140 (L-28 Basin), with median TP concentrations of 32 ppb (grab) and 47.5 ppb (auto) at S-190, and 32.5 ppb (grab) and 34 ppb (auto) at S-140. During WY2013, structures S-190 and S-140 discharged 25,154 and 73,311 ac-ft, respectively, into the western portion of Water Conservation Area (WCA)-3A.

The lowest TP concentrations were observed at structures in the C-111 Basin at S-177, S-331–S-173, and S-332D. The S-332D structure is an "into" structure, and S-174 was plugged in September 2007. S-175, S-332, and BERMB3 were modified as "within" structures in December 2003. These structures discharge to the southeastern portion of ENP via the C-111 Canal and Taylor Slough. TP data for these monitoring locations had median concentrations of 4 ppb (grab) and 7 ppb (auto) for S-18C, 6 ppb (grab) and 6 ppb (auto) for S-332D, with 75 percent of the samples having concentrations below 5 ppb (grab), 10 ppb (auto) for S-18C, and 6 ppb (grab) and 7 ppb (auto) for S-332D. During WY2013, the structure discharged 133,137 ac-ft from S-332D, a significant increase from last year (65,550 ac-ft). The S-18C structure discharged approximately 149,225 ac-ft to the lower C-111 Canal, which was also a significant increase from last year (104,721 ac-ft). S-178 had a median concentration of 13 ppb for grab samples–the highest TP concentration in the C-111 Basin. The structure discharged 2,455 ac-ft in WY2013.

Structures S-9, S-9A (C-11 West Basin), and G-123 (North New River Canal Basin) discharge directly to the eastern side of WCA-3A. The notched box-and-whisker plot for S-9, which is based on grab sample data, indicates a TP concentration of less than 12 ppb for 75 percent of the data, a median concentration of 10 ppb, and a maximum concentration of 35 ppb (**Figure 3**). Seventy-five percent of the data collected by the auto-sampler at S-9 was below 14 ppb, with a median concentration of 12 ppb, and a maximum concentration of 33 ppb. The notched box-and-whisker plot for S-9A, which is based on grab-sample data, indicates a TP concentration of less than 10 ppb for 75 percent of the data, a median concentration of 10 ppb, and a maximum concentration of 33 ppb (**Figure 3**). Seventy-five percent of the data collected by the auto-sampler at S-9A was below 12 ppb, with a median concentration of 10 ppb and a maximum concentration of 26 ppb. The monitoring schedule for structure G-123 requires biweekly grab sampling during flow events; otherwise, the samples are collected monthly. There was no flow during WY2013 at G-123; therefore, no sample was collected from the auto-sampler. During WY2013, 12 grab samples were collected. The grab samples at G-123 had a median TP concentration of 15 ppb. Seventy-five percent of the data collected by grab samples at G-123 was below 20 ppb, with a maximum concentration of 27 ppb.

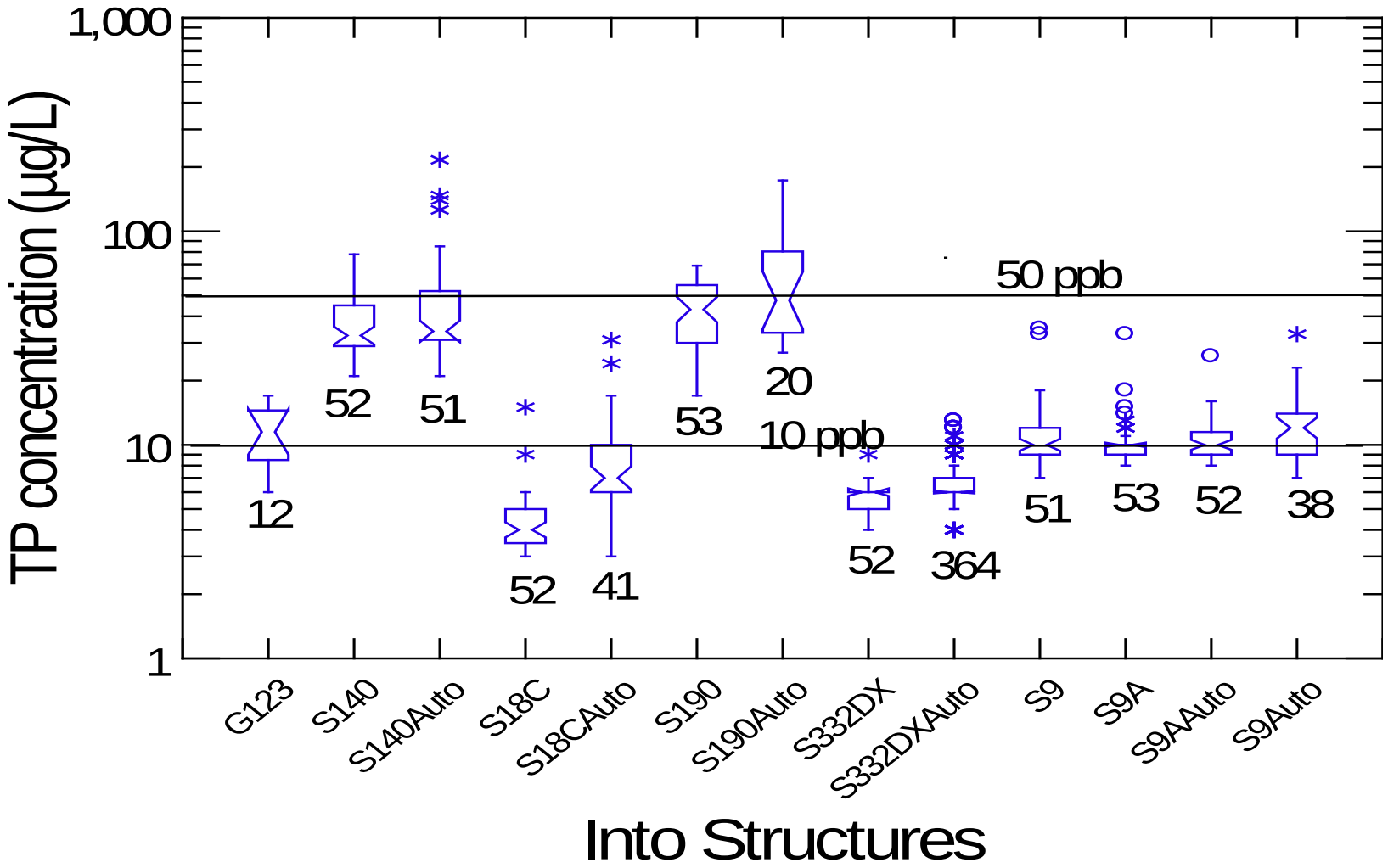


Figure 3. Comparison of TP concentrations (flow and no flow) for "into" structures during WY2013.

"Within" Structures

For structures discharging within the EPA during WY2013, low TP concentrations were observed for structures S-12D and S-333, which convey discharges from WCA-3A to ENP (**Figure 4**). The monitoring location for S-12D serves as a surrogate monitoring location for Non-ECP permit structures S-346 and S-347. Median TP concentrations at these monitoring locations were 8 ppb at S-12D, and 9 ppb at S-333, with 75 percent of the data below 9 ppb at S-12D, and 10 ppb at S-333. The maximum concentration observed was 17 ppb for S-12D, and 19 ppb at S-333. Discharge volumes for the period were 334,110 ac-ft for S-346 and S-347, and 152,438 ac-ft for S-333.

Structures S-144, S-145, and S-146 convey discharges from WCA-2A to WCA-2B. The structures usually operate simultaneously. The maximum concentration was 46 ppb, the median was 7 ppb, and 75 percent of the data (25 samples) were below 11 ppb at S-145. Discharge volumes ranged from 15,695 ac-ft at S-146, to 43,907 ac-ft at S-145.

In addition to monitoring the water quality at S-34, the data from this location are considered representative of water quality conditions for S-141, which conveys discharges from WCA-2B to the North New River Canal just upstream of S-34. TP concentrations from S-34 ranged from 9 ppb to 17 ppb, with a median value of 13 ppb. S-142 discharged 9 ac-ft water with a FWM TP concentration of 17 ppb.

The highest TP concentrations were observed at monitoring site C123SR84 (the surrogate location for structures S-339 and S-340), with levels ranging from 8 to 36 ppb, with a median value of 24 ppb. S-151 discharged approximately 160,427 ac-ft during WY2013. TP concentrations ranged from 7 to 23 ppb, with a median value of 10 ppb. S-339 did not discharge, and S-340, located upstream of S-151 in the Miami Canal, discharged 25,069 ac-ft in WY2013.

During WY2013, TP concentration was not monitored at S-332 because there was just 1 ac-ft flow at this site. S-175 discharged 4 ac-ft, with a FWM TP concentration of 6 ppb. 14 grab samples were collected at BERMB3, with an average TP concentration of 45 ppb. There was no discharge at BERMB3 during the reporting period.

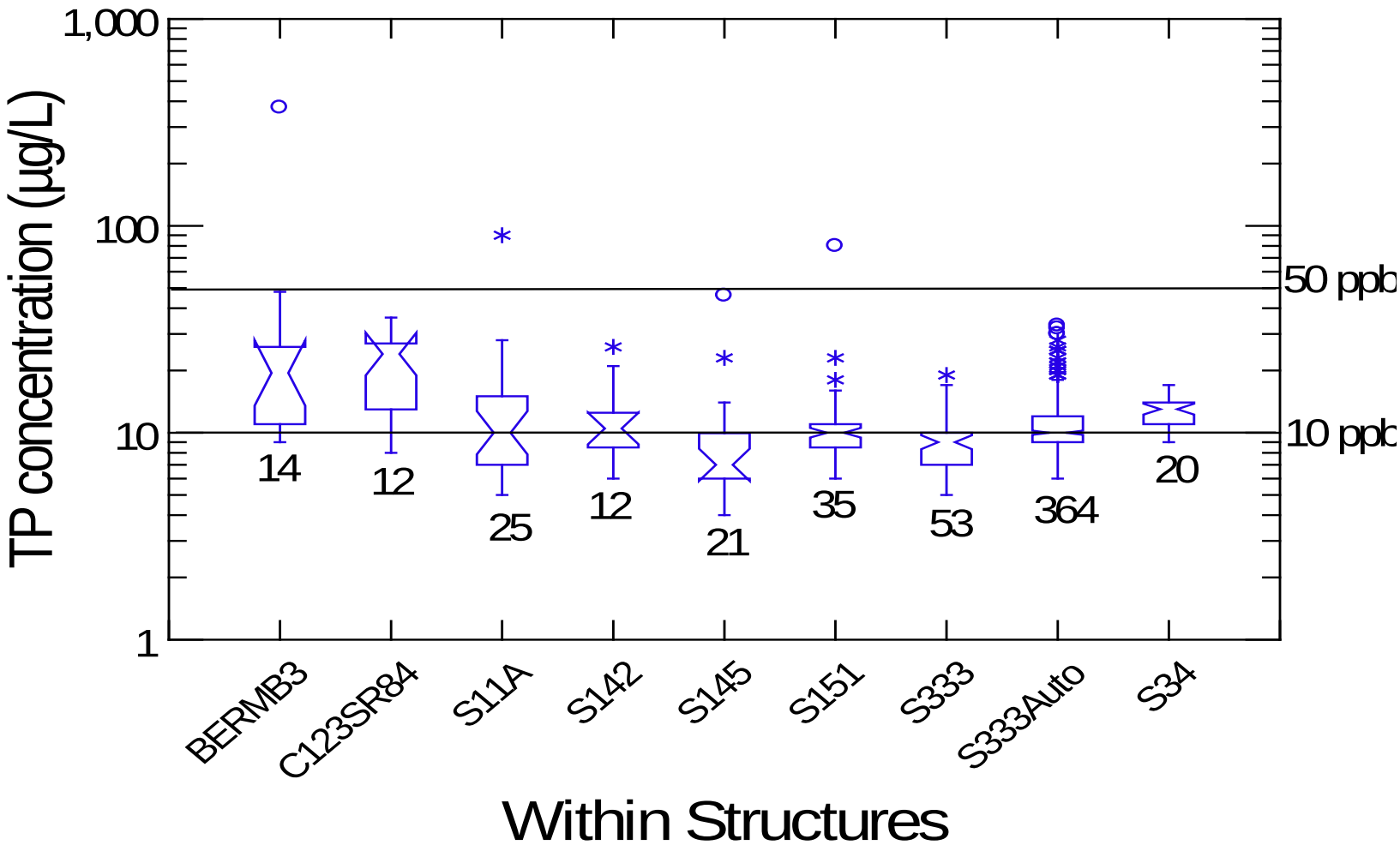


Figure 4. Comparison of TP concentrations (flow and no flow) for "within" structures during WY2013.

"From" Structures

TP concentrations observed during WY2013 for structures classified as "from" are summarized in the notched box-and-whisker plot shown in **Figure 5**. One water quality sample was collected at structure G-94D (although there was no flow at this structure), with a measured TP concentration of 139 ppb. G-94B exhibited the highest TP concentrations, which ranged from 15 to 61 ppb. The median TP concentration at G-94B was 23 ppb, with 75 percent of the data below 30 ppb. G-94B is also the surrogate sampling site for G-94A and G-94C. All three structures, which are owned and maintained by the District, but operated by the Lake Worth Drainage District (LWDD), are located at the L-40 levee on the eastern side of the Arthur R. Marshall Loxahatchee National Wildlife Refuge (LNWR), and provide water supply releases from LNWR to the LWDD. When open, G-94A, G-94B, and G-94C allow interior LWDD canals to fill. The direction of flow typically has been toward the LWDD canal system. Water supply releases to LWDD canals during WY2013 were 4,561 ac-ft at G-94C, 8 ac-ft at G-94B, and no flow at G-94C and G-94D. Maintenance for structures G-94A, G-94C, and G-94D was performed from June to October 2013. G-94B is slated for removal, after which two new stations will be added to monitor G-94A and G-94C individually.

In WY2013, TP concentrations observed at S-39 ranged from 10 to 67 ppb, with a median value of 14 ppb. The structure discharged approximately 73,946 ac-ft. During this period, 53 grab samples and 346 samples from the auto sampler were collected at S-356-334. At this location, TP concentrations ranged from 2 to 22 ppb (grab) and from 5 to 71 ppb (auto), with a median concentration of 10 ppb for grab and 9 ppb for auto. The TP concentrations observed at S-31 ranged from 7 to 15 ppb, with a median value of 10 ppb. The structure has no discharges. TP concentrations observed at S-34 ranged from 9 to 17 ppb, with a median value of 13 ppb. The structure discharged approximately 4,386 ac-ft. TP concentrations observed at S-38 ranged from 5 to 38 ppb, with a median value of 9 ppb. The structure discharged approximately 153,778 ac-ft. TP concentrations observed at US41-25—a surrogate station for the S-343A and S-343B structures—ranged from 5 to 27 ppb, with a median value of 11 ppb. Structure G-343A discharged 16,150 ac-ft, and S343B discharged 21,166 ac-ft during WY2013. S-344 had the highest TP concentration. 75 percent of TP concentrations observed at S-344 were below 35 ppb, with a median of 20 ppb.

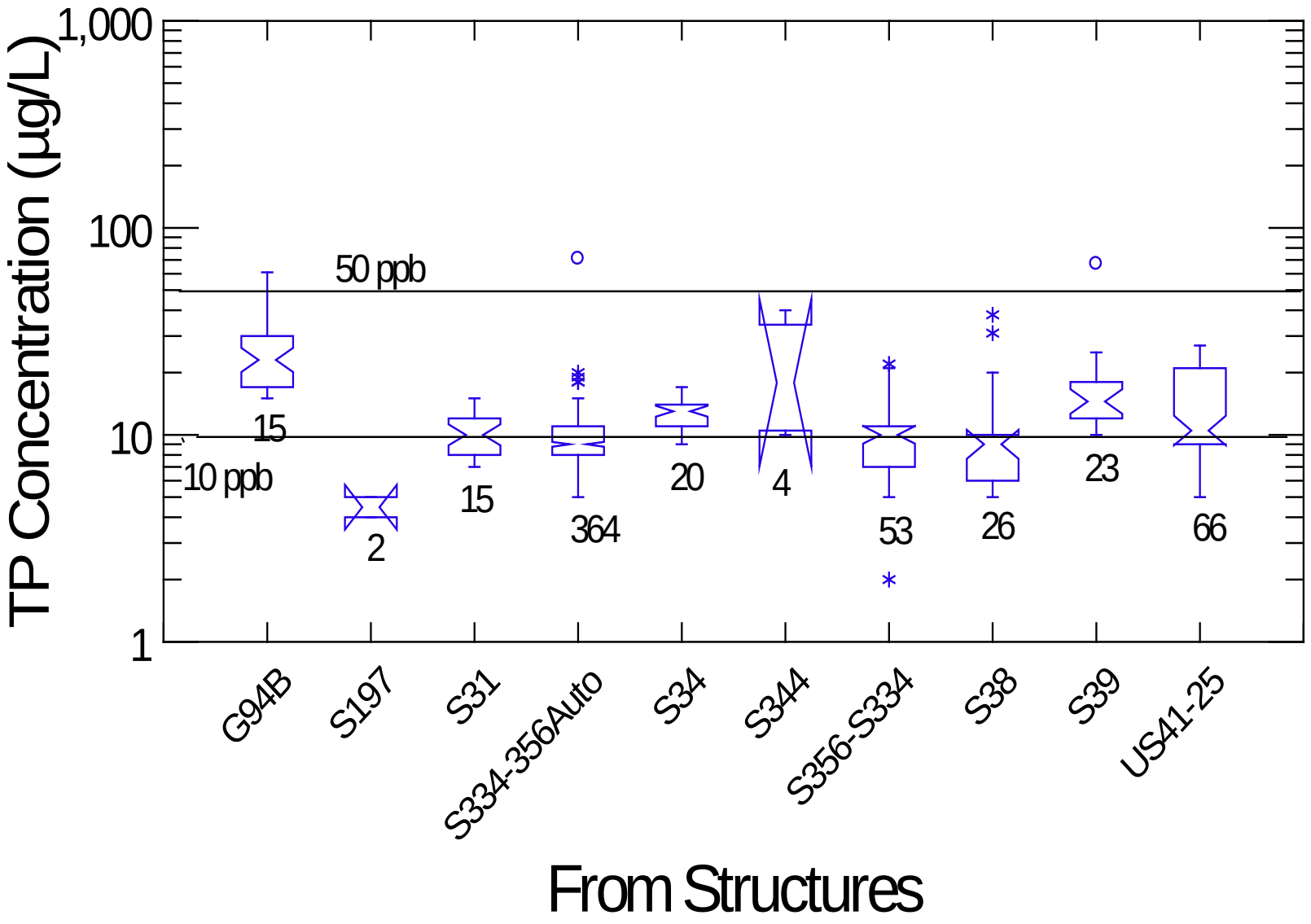


Figure 5. Comparison of TP concentrations (flow and no flow) for "from" structures during WY2013.

C-111 Basin Upstream Structures

S-176, S-177, S-178, and S-331/S-173, shown in **Figure 6**, are C-111 Basin structures located upstream of "into" structures S-18C and S-332D. Auto-samplers were installed at sites S-331/173. For S-331/S-173, 75 percent of the TP concentration data collected for this structure was below 8 ppb for grab, and 9 ppb for auto, with the median value of 6 ppb for grab, and 7 ppb for auto. S332DX is a surrogate of S-176. 75 percent of TP data collected was below 6 ppb for grab and 7 ppb for auto, with a median of 6 ppb for both auto and grab. For S-177, 75 percent of the TP data was below 7 ppb, with a median of 6 ppb. The maximum TP measured at S-178 was 77 ppb, with a median TP concentration of 13 ppb for grab samples, which was higher than the rest of the C-111 Basin upstream structures. In WY2013, 2,455 ac-ft was discharged at S-178. Grab samples were collected upstream of the structure.

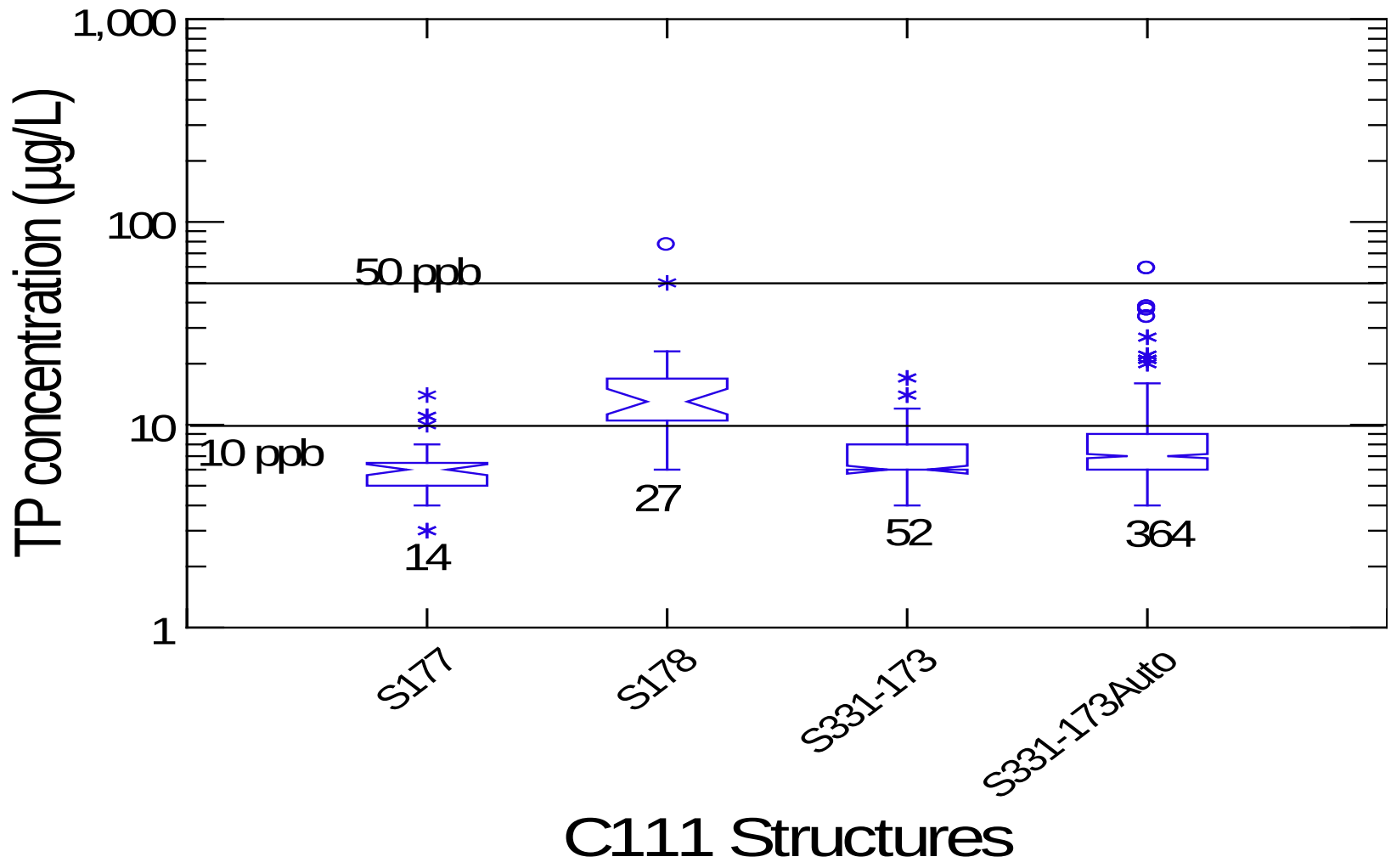


Figure 6. Comparison of TP concentrations (flow and no flow) for C-111 structures during WY2013.

Flow-Weighted Mean Total Phosphorus Concentrations for All Structures

Extending the analysis from previous water years, FWM TP concentrations were calculated for Non-ECP structures during WY2013. FWM TP concentrations were collected only for those structures having sufficient TP data and available flow data for WY2013. The annual FWM TP concentrations and monthly and annual flow volumes for the "into," "within," "from," and C-111 Basin structures during WY2013 are provided in Attachment D, Table D-3**.** A more detailed analysis of the WY2013 annual FWM TP concentration data for each into structure is shown in **Table 5**. The calculations use an estimation algorithm to determine TP concentrations on all days with positive flow for which no observed values are available.

Table 5 presents the results for the FWM TP concentrations at "into" sites during WY2013. The highest FWM TP concentration for the "into" structures during WY2013 was observed in the Feeder Canal Basin at S-190 (97 ppb), and at the L-28 Basin at S-140 (50 ppb). S-9 and S-9A had FWM TP concentrations of 16 and 11 ppb, respectively, which are slightly lower than the WY2012 FWM TP of 16 ppb at S-9 and 14 ppb at S-9A, due to the Tropical Storm Isaac in WY2013, and the impact of water supply from Lake Okeechobee during the WY2012 dry season. The Feeder Canal and L-28 are designated as sites of concern for TP, and the C-11 West basin is designated as a site of potential concern for TP.

The lowest FWM TP concentrations were observed in the C-111 Basin at S-332D (6 ppb) and at S-18C (10 ppb). These monitoring locations are the subject of interim and long-term compliance limits stipulated in the federal Settlement Agreement. Currently, there is no concern for TP in the C-111 Basin.

Table 5. Annual flow-weighted mean TP concentrations and TP loads for WY2013.

Basin	Structure	Water Quality Station	Total Flow (ac-ft)	Days with Positive Flow	Sample Type	Sample Size (Grab)	Arithmetic Average (Grab) (ppb)	Sample Size (Auto)	Arithmetic Average (Flow) (ppb)	Arithmetic Average (Non-Flow) (ppb)	Flow-Weighted Mean Concentration (ppb)	TP Load (kilo-grams)
North New River	G-123	G123	0	0	Auto[2] & Grab[1]	12	16	0	N/F[3]	16	N/F[3]	0
C-11 West	S-9	S9	166,720	187	Auto[2] & Grab[1]	51	11	38	12	10	16	3,252
	S-9A	S9A	80,763	336	Auto[2] & Grab[1]	53	11	52	10	20	11	1,059
C-111	S-332D	S332DX	133,137	270	Auto[2] & Grab[1]	52	6	52	6	6	6	1,039
	S-18C	S18C	149,225	322	Auto[2] & Grab[1]	52	4	41	7	4	10	1,786
L-28	S-140	S140	73,311	298	Auto[2] & Grab[1]	52	37	51	44	31	50	4,478
Feeder Canal	S-190	S190	25,154	135	Auto[2] & Grab[1]	53	45	20	63	33	97	3,016

Notes:
1) Grab indicates samples collected by grab sampling methodology.
2) Auto indicates that samples were collected by automatic composite samplers.
3) N/F indicates no flow.

Pesticides in Surface Water and Sediment

Quarterly surface water and semiannual sediment pesticide sampling events at the 13 Non-ECP sites (**Figure 7**) for WY2013 were conducted during June 2012, July 2012, October 2012, and January 2013. The Non-ECP requirement for sampling at S-142 is only during discharge or flow events. For this reporting period, samples were not collected at S-142 for any of the sampling events. Representative MDLs and PQLs for the pesticide analytes are listed in **Table 6**. The FDEP Central Laboratory in Tallahassee, Florida performed all the pesticide analyses. Refer to the Quality Assurance Evaluation section of the individual pesticide event reports for a summary of any limitations on data validity that might influence the utility of these data. The individual reports can be found online on the District's website at www.sfwmd.gov, under the *Scientist & Engineers, Environmental Monitoring* section, and the *Pesticide Reports* link.

To evaluate potential impacts on aquatic life resulting from intermittent pesticide exposure, the maximum observed concentration is compared to the criterion maximum concentration published by the USEPA under Section 304 (a) of the Clean Water Act, and as promulgated in Chapter 62-302, F.A.C. For compounds not specifically listed, Rule 62-302.200, F.A.C., allows for acute and chronic toxicity standards. These standards are calculated as one-third and one-twentieth, respectively, of the amount lethal to 50 percent of the test organisms in 96 hours, where the 96-hour EC_{50} or LC_{50} is the lowest value determined for a species significant to the indigenous aquatic community. **Table 7** lists representative toxicity levels for selected freshwater aquatic invertebrates and fishes.

Table 8 lists the pesticides detected in surface water samples collected during WY2013. Four surface water samples were collected at each site and were analyzed for all parameters. Pesticides with concentrations greater than their respective Class III criteria or toxicity limits were assigned to the "concern" excursion category, whereas those higher than the PQL were assigned to the "potential concern" excursion category. The chlorpyrifos ethyl detection at S-178 from a sample collected on January 28, 2013 was at a level of concern. The concentration detected is greater than the calculated chronic toxicity for *Daphnia magna* and, at this level, exposure can cause impacts to macroinvertebrate populations. However, the pulsed nature of agricultural runoff releases to the canal system precludes drawing any conclusions about the effects of long-term average exposures.

Table 9 lists the pesticides detected in the sediment samples collected during WY2013. Two sediment samples were collected at each site and were analyzed for all parameters. Pesticides with concentrations greater than the PQL were assigned to the "potential concern" excursion category. DDE, the environmental dehydrochlorination product of DDT, was detected at three locations (S-9, S-177, and S-178) at a level of "potential concern."

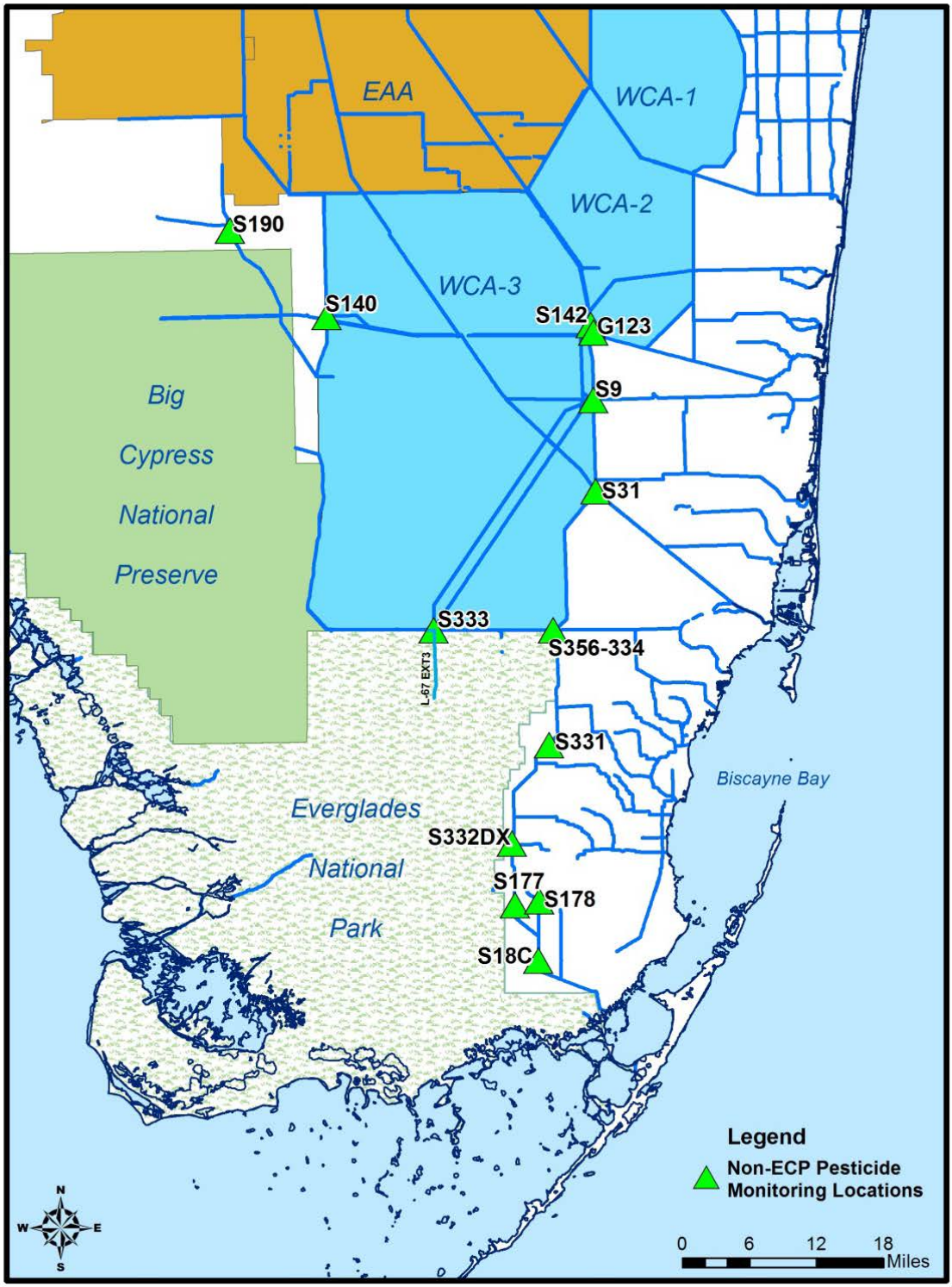


Figure 7. Pesticide monitoring network for non-ECP structures.

Table 6. MDLs and PQLs for pesticides determined in January 2013. [Note: µg/Kg – micrograms per kilograms; µg/L – micrograms per liter; N/A - not analyzed.]

Pesticide or Metabolite	Water: Range of MDLs - PQLs (µg/L)	Sediment: Range of MDLs - PQLs (µg/Kg)	Pesticide or Metabolite	Water: Range of MDLs - PQLs (µg/L)	Sediment: Range of MDLs - PQLs (µg/Kg)
2,4-D	0.2 - 0.62	10 - 120	endrin aldehyde	0.0038 - 0.016	1 - 17
2,4,5-T	0.2 - 0.62	10 - 120	ethion	0.0094 - 0.04	2.6 - 42
2,4,5-TP (silvex)	0.2 - 0.62	10 - 120	ethoprop	0.0047 - 0.02	1.3 - 21
acifluorfen	0.2 - 0.62	10 - 120	fenamiphos	0.028 - 0.12	5.2 - 83
alachlor	0.056 - 0.24	19 - 300	fonofos	0.0094 - 0.04	1.3 - 21
aldrin	0.0019 - 0.008	0.52 - 8.3	heptachlor	0.0019 - 0.008	0.52 - 8.3
ametryn	0.0094 - 0.04	2.6 - 57	heptachlor epoxide	0.0019 - 0.008	0.52 - 8.3
atrazine	0.0094 - 0.072	2.6 - 42	hexazinone	0.028 - 0.12	7.9 - 120
atrazine desethyl	0.0094 - 0.04	0.04 - 2.4	imidacloprid	0.21 - 0.68	0.008 - 0.48
atrazine desisopropyl	0.0094 - 0.04	0.13 - 2.4	linuron	0.21 - 0.68	9.4 - 110
azinphos methyl (guthion)	0.019 - 0.08	7.9 - 120	malathion	0.0094 - 0.04	2.6 - 42
α-BHC (alpha)	0.0019 - 0.008	0.52 - 8.3	metalaxyl	0.038 - 0.16	0.68 - 8.6
β-BHC (beta)	0.0019 - 0.008	0.52 - 8.3	methamidophos	N/A	10 - 170
δ-BHC (delta)	0.0019 - 0.008	0.52 - 8.3	methoxychlor	0.0094 - 0.04	3.7 - 58
γ-BHC (gamma) (lindane)	0.0019 - 0.008	0.52 - 8.3	metolachlor	0.056 - 0.24	16 - 250
bromacil	0.038 - 0.16	16 - 250	metribuzin	0.019 - 0.08	5.2 - 83
butylate	0.019 - .08	0.008 - 0.48	mevinphos	0.0094 - 0.04	2.6 - 42
carbophenothion (trithion)	0.0056 - 0.024	1.6 - 25	mirex	0.0038 - 0.016	1 - 17
chlordane	0.019 - 0.08	5.2 - 110	monocrotophos	N/A	3.1 - 50
chlorothalonil	0.0075 - 0.032	1.6 - 25	naled	0.038 - 0.16	10 - 170
chlorpyrifos ethyl	0.0094 - 0.04	2.6 - 42	norflurazon	0.028 - 0.12	7.9 - 120
chlorpyrifos methyl	0.0094 - 0.04	2.6 - 42	parathion ethyl	0.019 - 0.08	2.6 - 42
cypermethrin	0.011 - 0.048	2.6 - 42	parathion methyl	0.0094 - 0.04	2.6 - 42
DDD-P,P'	0.0038 - 0.016	1 - 23	PCB-1016	0.019 - 0.08	5.2 - 83
DDE-P,P'	0.0038 - 0.016	1 - 23	PCB-1221	0.019 - 0.08	10 - 170
DDT-P,P'	0.0038 - 0.016	1.6 -34	PCB-1232	0.019 - 0.08	5.2 - 83
demeton	0.023 - 0.096	3.1 - 50	PCB-1242	0.019 - 0.08	5.2 - 83
diazinon	0.0094 - 0.04	2.6 - 42	PCB-1248	0.019 - 0.08	5.2 - 83
dicofol (kelthane)	0.023 - 0.096	6.3 - 100	PCB-1254	0.019 - 0.08	7.9 - 120
dieldrin	0.0019 - 0.008	0.52 - 8.3	PCB-1260	0.019 - 0.08	5.2 - 83
disulfoton	0.0047 - 0.02	1.3 - 21	permethrin	0.0094 - 0.04	2.6 - 42
diuron	0.21 - 0.68	9.4 - 110	phorate	0.0047 - 0.02	2.6 - 42
α-endosulfan (alpha)	0.0019 - 0.016	0.52 - 8.3	prometryn	0.019 - 0.08	5.2 - 83
β-endosulfan (beta)	0.0019 - 0.016	0.52 - 8.3	prometon	0.019 - 0.08	0.04 - 2.4
endosulfan sulfate	0.0038 - 0.016	1 - 17	simazine	0.0094 - 0.04	2.6 - 42
endrin	0.0038 - 0.016	1.7 - 27	toxaphene	0.094 - 0.4	31 - 500
			trifluralin	0.0075 - 0.008	2.1 - 33

Table 7. Toxicity of pesticides (in µg/L) to selected freshwater aquatic invertebrates and fishes.

Common Name	48 hr EC_{50} Water flea *Daphnia magna*		Acute Toxicity (*)	Chronic Toxicity (*)	96 hr LC_{50} Fathead Minnow (#) *Pimephales promelas*		Acute Toxicity (*)	Chronic Toxicity (*)	96 hr LC_{50} Bluegill *Lepomis macrochirus*		Acute Toxicity (*)	Chronic Toxicity (*)	96 hr LC_{50} Largemouth Bass *Micropterus salmoides*		Acute Toxicity (*)	Chronic Toxicity (*)	96 hr LC_{50} Rainbow Trout (#) *Oncorhynchus mykiss*		Acute Toxicity (*)	Chronic Toxicity (*)	96 hr LC_{50} Channel Catfish *Ictalurus punctatus*		Acute Toxicity (*)	Chronic Toxicity (*)
2,4-D	25,000	(5)	8,333	1,250	133,000	(5)	44,333	6,650	180,000	(6)	60,000	9,000	-		-	-	100,000	(2)	33,333	5,000	-		-	-
	-		-	-	-		-	-	900 (48 hr)	(4)	-	-	-		-	-	110,000	(5)	36,667	5,500	-		-	-
ametryn	28,000	(5)	9333	1400	-		-	-	4,100	(2)	1	205	-		-	-	8,800	(2)	2933	440	-		-	-
atrazine	6900	(5)	2,300	345	15,000	(5)	5,000	750	16,000	(2)	5,333	800	-		-	-	8,800	(2)	2,933	440	7,600	(2)	2,533	380
	-		-	-	-		-	-	-		-	-	-		-	-	5,300	(7)	1,767	265	-		-	-
chlorpyrifos	1.7	(5)	0.57	0.085	203	(5)	68	10	2.6	(2)	0.87	0.13	-		-	-	11	(2)	3.7	0.55	280	(5)	93	14
ethyl	0.1	(5)	0.03	0.005	-		-	-	5.8	(5)	1.93	0.29	-		-	-	-		-	-	-		-	-
	0.1	(10)	0.03	0.005	-		-	-	1.8	(10)	0.60	0.09	-		-	-	-		-	-	-		-	-
DDD-p,p'	3,200	(4)	1,067	160	4,400	(1)	1,467	220	42	(1)	14	2.1	42	(1)	14	2.1	70	(1)	23.3	3.5	1,500	(1)	500	75
DDE-p,p'	-		-	-	-		-	-	240	(1)	80	12	-		-	-	32	(1)	10.7	1.6	-		-	-
DDT-p,p'	-		-	-	19	(3)	6.3	0.95	8	(3)	2.7	0.4	2	(3)	0.7	0.10	7	(3)	2.3	0.35	16	(3)	5.3	0.8
diuron	1,400	(5)	467	70	14,200	(5)	4,733	710	5,900	(2)	1,967	295	-		-	-	5,600	(2)	1,867	280	-		-	-
	1,400	(8)	467	70	14,000	(8)	4,667	700	-		-	-	-		-	-	-		-	-	-		-	-
hexazinone	151,600	(5)	50,533	7,580	274,000	(2)	91,333	13,700	100,000	(5)	33,333	5,000	-		-	-	180,000	(5)	60,000	9,000	-		-	-
	151,600	(9)	50,533	7,580	274,000	(9)	91,333	13,700	505,000	(9)	168,333	25,250	-		-	-	>320,000	(9)	>106,667	>16,000	-		-	-
norflurazon	15,000	(5)	5,000	750	-		-	-	16,300	(5)	5,433	815	-		-	-	8,100	(5)	2,700	405	>200,000	(2)	>67,000	>10,000
	>15000	(11)	>5,000	>750	-		-	-	16,300	(11)	5,433	815	-		-	-	8,100	(11)	2,700	405	-		-	-

(*)62-302.200, F.A.C., for compounds not specifically listed, acute and chronic toxicity standards are calculated as one-third and one-twentieth, respectively, of the amount lethal to 50% of the test organisms in 96 hours, where the 96 hour LC_{50} is the lowest value which has been determined for a species significant to the indigenous aquatic community.
(#) Species is not indigenous. Information is given for comparison purposes only.
(-) No data available.

(1) Johnson and Finley (1980).
(2) Hartley and Kidd. (Eds.) (1987).
(3) Montgomery (1993).
(4) Verschueren (1983).
(5) USEPA (1991).
(6) Mayer and Ellersieck (1986).
(7) USEPA (2006).
(8) USEPA (2003).
(9) USEPA (1994).
(10) USEPA (2002).
(11) USEPA (1996).

Table 8. Pesticide detections and excursions for surface water samples collected from June 2012 to January 2013.[1]

Structure	2,4-D	ametryn	atrazine	atrazine desethyl	chlorpyrifos ethyl	diuron	hexazinone	norflurazon
G-123	--	--	--	--	--	--	--	--
S-9	1:0:0*	--	0:3:0	1:0:0	--	1:0:0	--	--
S-18C	--	--	--	--	--	--	--	--
S-140	--	--	--	--	--	--	0:2:0	1:0:0
S-190	--	--	1:1:0	--	--	--	--	1:0:0
S-31	--	--	1:2:0	--	--	--	--	--
S-332DX	--	--	--	--	--	--	--	--
S-177	--	--	--	--	0:0:1	--	--	--
S-178	--	--	0:1:0	0:1:0	--	--	--	--
S-331	--	--	--	--	--	--	--	--
S-333	--	0:1:0	1:2:0	--	--	--	--	--
S-356/S-334	--	--	0:1:0	--	--	--	--	--

[1] Four samples were collected for each site and analyzed for all parameters. Table cells only represent concentrations above the detection limit.

* Number of samples ≤ PQL (no concern); number of samples > PQL (potential concern); and number of samples exceeding criterion or toxicity limit (concern).

Table 9. Pesticide detections and excursions for sediment samples collected in July 2012 and January 2013.[1]

Structure	DDD-p,p'	DDE-p,p'	DDT-p,p'
G-123	-	2:0*	-
S-9	-	0:1	-
S-18C	-	-	-
S-140	-	-	-
S-190	-	-	-
S-31	-	-	-
S-332DX	-	-	-
S-177	1:0	1:1	1:0
S-178	-	1:1	-
S-331	-	1:0	-

[1] Two sediment samples were collected for each site (except S-142) and analyzed for all parameters. Table cells only represent concentrations above the detection limit.

* Number of samples < PQL (no concern); and number of samples > PQL (potential concern).

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Attachment A: Specific Conditions and Cross-References

Table A-1. Specific conditions, actions taken, and cross-references presented in this report for the Non-Everglades Construction Project (EFA permit 0237803[1]).

Specific Condition	Description	Applicable Phase	Action Taken	Reported in the 2014 SFER, App. 3-2 in *(All references are to Volume III, unless noted: "V1" = Volume 1, "V2" = Volume 2)*			
				Narrative (page #s)	**Figure**	**Table**	**Attachment**
1	Sovereign Lands	Operation	Not Needed				
2	Historical or Archaeological Artifacts	Operation	Not Needed				
3	Water Quality Certification	Operation	Not Needed				
4	New Permit and Permit Modification	Operation	No modification this year				
5	Non-ECP Annual Reports	Operation	Done annually as required	1-28	1-7	1-9	All
6	Land Acquisition and Water Treatment Facility Status Updates	Operation	Done every other year as required	V2: Ch. 6A			
7	Data Evaluations	Operation	Not Needed				
8	Regulatory Action	Operation	Done annually as required	V1: Ch. 4			
9	Schedule and Strategies	Operation	Not Needed				
10	Data Quality Assurance	Operation	Done annually as required	27, SFWMD. 2012. Chemistry Laboratory Quality Manual			H
11	Mercury Screening Program	Operation	Done annually as required	92-1119			G
12(a)	Permit number	Operation	Done annually as required	1		1	
12(b)	Sampling and analysis dates or code	Operation	Done annually as required	34			B
12(c)	Description of methods for collection, handling, storage and analysis of samples	Operation	Done annually as required	34			B
12(d)	Map indicating sampling locations	Operation	Done annually as required	5 and 23	1 and 7		
12(e)	Statement by the individual responsible for implementation of sampling program concerning authenticity, precision, detection limits, and accuracy of data and MDL	Operation	Done annually as required	121-122			H
12(f)	Documentation that lab performing sampling and analyses has an approved Comprehensive Quality Assurance Plan on file with FDEP	Operation	Done annually as required	27, SFWMD. 2012. Chemistry Laboratory Quality Manual; SFWMD. 2011, Field Sampling Quality Manual.			H

Table A-1. Continued.

Specific Condition	Description	Applicable Phase	Action Taken	Reported in the 2014 SFER, App. 3-2 in *(All references are to Volume III, unless noted: "V1" = Volume 1, "V2" = Volume 2)*			
				Narrative (page #s)	**Figure**	**Table**	**Attachment**
12(g)i-iii	Sampling collection data for each sample taken: i, time of day samples taken; ii average stage or depth of water body; iii depth of sample	Operation	Done annually as required	34			B
12(g)iv	Weather conditions at time of sampling	Operation		34			B
12(g)v	Flow period preceding sampling	Operation	Done annually as required	34			H
12(g)vi	Monthly flow volumes	Operation	Done annually as required	39-40		D-3	D
12(h)	Evaluation of water quality data, including comparison of samples with applicable water quality standards	Operation	Done annually as required	1-29, 36-91	1-7	3-10	D - F
12(i)	Recommendations for improving water quality monitoring	Operation	No recommendations for this reporting period.				
12(j)	Recommendations and evaluations regarding implementation of strategies and schedules in the permit, as appropriate	Operation	Done annually as required	V1: Ch. 4 and App. 4-3			
13	Sampling of Flow Events	Operation	Done annually as required	21		5	
14	Reporting Flow and Non-Flow Samples	Operation	Done annually as required	21		5	
15	Accessibility of Monitoring Sites	Operation	There have been no accessibility issues during this reporting period.				
16	Monitoring Location Report	Operation	Not needed this year				
17	Removal of Parameters	Operation	There was no removal of parameters this year				
18	Additional of Parameters	Operation	There was no addition of parameters this year				
19	Additional Schedule and Strategies	Operation	There was no additional schedule and strategies this year				
20	Emergency Suspension of Sampling	Operation	There was no emergency suspension of sampling this year				

Table A-2. Specific conditions, actions taken, and cross-references presented in this report for the S-197 Structure Replacement Project (ERP permit 0306639-001).

Specific Condition	Description	Applicable Phase	Action Taken	Reported in the 2014 SFER, App. 3-2 in *(All references are to Volume III, unless noted: "V1" = Volume 1, "V2" = Volume 2)*			
				Narrative (page #s)	**Figure**	**Table**	**Attachment**
1	Addresses	Operation	Report will be submitted to the Program Coordination and Regulatory Section.				
2	Threatened and Endangered Species	Construction	No action caused concerns of Threatened and Endangered Species				
3	Contaminated Sites and Residual Agrichemicals	Construction	No contaminated sites and Residual Agrichemicals.				
4	Wetland Impact and Restoration	Construction	Discussed in this report	3			
5	Authorized Construction	Construction	Discussed in this report	3			
6	Instructions to Contractors	Construction	Done during the construction				
7	Site Inspections	Construction	Done during the construction				
8	Construction Best Management Practices	Construction	Done during the construction	3			
9	Adjacent Wetlands	Construction	Done during the construction				
10	Vegetation Removal and Temporary wetland Impacts	Construction	Done during the construction				
11	Water Quality Standard	Construction and Operation	Discussed in this report	12	5	4	E
12	Dewater	Construction	Done during the construction				
13	Turbidity Monitoring	Construction	Done during the construction				
14	Manatee Protection During construction	Construction	Done during the construction				
15	NPDES Generic Permit for Stormwater Discharge from Large and Small Construction Activities	Construction	Not applicable				
16	NPDES Generic Permit for the Discharge of Produced Ground Water from any Non-Contaminated Site Activity	Construction	Not applicable				
17	Temporary Operations	Construction and Operation	Done during the construction and operation				
18	Temporary Monitoring	Construction	Done during the construction and operation				

Table A-2. Continued.

Specific Condition	Description	Applicable Phase	Action Taken	Reported in the 2014 SFER, App. 3-2 in (All references are to Volume III, unless noted: "V1" = Volume 1, "V2" = Volume 2)			
				Narrative (page #s)	**Figure**	**Table**	**Attachment**
19	Operation and Maintenance	Construction and Operation	Done during the construction and operation				
20	Water quality and Flooding Impact	Construction and Operation	Done during the construction and annually during operation				
21	Factors Outside the Permittee's Control	Construction and Operation	Not applicable this Water Year				
22	Water Quality Monitoring	Operation	Done as required	12	3-5		E
23	Construction Status Report	Construction	Done	3			
24	As-Built Certification and Record Drawings	Construction	Done				
25	Annual Report	Operation	Done annually in this report				
25(A)	General Information	All	Done as required	1, 3		1	
25(B)	Construction/Operation Summary	Construction and Operation	Done as required	3			
25(C)	Water Quality Data	Operation	Done as required	8-21	3-5	4, 5, D-2,D-3,E-2, E-3, F-34	B - F
25(E)	Implementation Schedule	Operation	Done as required				
26	Permit Renewal	Operation	Not applicable this Water Year				
27	Permit Modification	Operation	Not applicable this Water Year				
28	Department Review and Approval	Operation	Done annually				

Attachment B: Water Quality Data

This project information is required by Specific Conditions 12(b), 12(c), and 12(g) of the Non-ECP permit (0237803), and 25(C) of S-197 Structure Replacement Permit (0306639-001) and is available upon request.

Attachment C: Hydrologic Data

This project information is required by Specific Condition 12(g) of the Non-ECP permit (0237803), and 25(C) of S-197 Structure Replacement Permit (0306639-001) and is available upon request.

Attachment D: Non-Everglades Construction Project Water Quality Sampling Sites, Monitoring Schedule and Flow Volumes

Shi Kui Xue

Table D-1. Water quality monitoring schedule for Non-ECP discharge structures and additional upstream monitoring locations.

Area	Non-ECP Permit Structure	Water Quality Site	Water Quality Monitoring Schedule					Water Quality Comments
			Physical	Nutrients	Major Ions	Pesticides in Water	Pesticides in Sediment	
Into	G-123	G123	BWF/M	BWF/M	QTR	QTR	SA	
	S-9	S9	BWF/M	Weekly Flowing (auto-sampler)	QTR	QTR	SA	TP collected by autosampler.
	S-9A	S9A	BWF/M	BWF/M except TP-WF/M Grab (auto-sampler)	QTR			Sampling started in WY2003
	S-332D	S332DX	WF/M	WF/M	QTR	QTR	SA	
	S-18C	S18C	WF/M	WF/M	QTR	QTR	SA	
	S-140	S140	BWF/M	BWF/M	QTR	QTR	SA	TP collected by autosampler, nitrogen species collected by grab
	S-190	S190	BWF/M	BWF/M	QTR	QTR	SA	TP collected by autosampler, nitrogen species collected by grab
Within	G-64	G64	BWF	BWF	QTRF			Monitoring Fe, Mg, Ca phased out *
	S-346, S-347	S333	WF/M	WF/M	QTR			Monitoring Fe, Mg, Ca phased out *
	S-141	S34	BWF/M	BWF/M	QTR			Monitoring Fe, Mg, Ca phased out *
	S-142	S142	BWF/M	BWF/M	QTR	QTR	SA	Monitoring Fe, Mg, Ca phased out *
	S-143	S11A	BWF/M	BWF/M	QTR			Monitoring Fe, Mg, Ca phased out *
	S-144	S145						Discontinued sampling in favor of surrogate location at S-145 *
	S-145	S145	BWF/M	BWF/M	QTR			Monitoring Fe, Mg, Ca phased out *
	S-146	S145						Discontinued sampling in favor of surrogate location at S-145 *
	S-151	S151	BWF/M	BWF/M	QTR			Monitoring Fe, Mg, Ca phased out *
	S-333	S333	WF/M	WF/M	QTR			
	S-339, S-340	C123SR84	BWF/M	BWF/M	QTR			Monitoring Fe, Mg, Ca phased out *
	S-175	S175	BWF	BWF	QTRF			
	S-332	S332	BWF	BWF	QTRF			
	Berm B3	BermB3	BWF/M	BWF/M	QTR			
From	G-94A, G-94B, G-94C	G94B	BWF/M	BWF/M	QTR			Monitoring Fe, Mg, Ca phased out *
	G-94D	G94D	BWF	BWF	BWF			
	S-31	S31	BWF/M	BWF/M	QTR	QTR	SA	Monitoring Fe, Mg, Ca phased out *
	S-34	S34	BWF/M	BWF/M	QTR			Monitoring Fe, Mg, Ca phased out *
	S-38	S38	BWF/M	BWF/M	QTR			Monitoring Fe, Mg, Ca phased out *
	S-39	S39	BWF/M	BWF/M	QTR			Monitoring Fe, Mg, Ca phased out *
	S-197	S197	BWF/QTR	BWF/QTR	QTRF			Monitoring Fe, Mg, Ca phased out *
	S-334	S356-334	WF/M	WF/M	QTR			Monitoring Fe, Mg, Ca phased out *
	S-337	S31	BWF/M	BWF/M	QTR			Monitoring Fe, Mg, Ca phased out *
	S-343A, S-343B	US41-25	BWF/M	BWF/M	QTR			Monitoring Fe, Mg, Ca phased out *
	S-344	S344	QTR	QTR	QTR			Monitoring Fe, Mg, Ca phased out *
C-111 Basin	S-176 +	S332DX						
	S-177 +	S177	WF/M	WF/M	QTR	QTR	SA	
	S-178 +	S178	WF/M	WF/M	QTR	QTR	SA	
	S-331 +, S-173 +	S331-173	WF/M	WF/M	QTR	QTR	SA	S173 is not listed in Permit, but is adjacent to and flows in same direction as S331

Notes:
1) Water quality sample site is located on upstream side of permitted structure, unless otherwise noted with different representative sampling location.
2) Structure names with a "+" are upstream of Non-ECP INTO structures and are additional monitoring locations.
3) * indicates monitoring requirement eliminated in the November 1999 Non-ECP Permit Modification.
4) Table Legend:
BWF/M = Biweekly if Flowing/Otherwise Monthly
BWF = Biweekly if Flowing
QTR = Quarterly
SA = Semiannually
WF/M = Weekly if flow or monthly if not flowing
WF = Weekly if flow
QTRF, Quarterly if Flowing

Table D-2. Water quality monitoring schedule for S-197 Replacement Project discharge structure.*

Parameter	Unit	Sample Type	Sampling Frequency
Turbidity	NTU	G	QTR
pH	SU	G	BWF
Water Temperature	°C	G	BWF
Dissolved Oxygen	Mg/L	G	BWF
Conductance	µmhos	G	BWF
Total Suspended Solids	mg/L	G	BWF/QTR
Nitrogen KJEL	mg/L	G	BWF/QTR
Phosphorus Total	mg/L	G	BWF/QTR
Nitrite-Nitrate as Nitro.	mg/L	G	BWF/QTR
Ortho-phosphorus	mg/L	G	BWF/QTR
Sulfate	mg/L	G	QTR
Calcium Dissolved	mg/L	G	BWF/QTR
Chloride Dissolved	mg/L	G	BWF/QTR

SU=Standard Units (pH)

°C=Degrees Celsius

mg/L=Milligrams per liter

NTU=Nephelometric turbidity units

µmhos=µ (micro) mhos at 25 °C

G=Grab sample

QTR=Quarterly

BWF=Biweekly if flowing

BWF/QTR=Biweekly if flowing, otherwise quarterly

* Due to unsafe conditions and access issues during construction of the S-197 structure, S-18C served as a proxy site for monitoring S-197 water quality under the S-197 Structure Replacement Project Permit (Permit Number 0306639-001) from May until December 2012. Upon completion of construction at S-197, sampling resumed directly at S-197 in January 2013. Due to logistical sampling constraints, a fourth quarter sample for S-197 was collected on May 14, 2013. The results are included in the reporting period for WY2013.

Table D-3. Flow volume, TP loads, and annual flow-weighted mean TP concentrations for non-ECP structures during WY2013.

Area	Non-ECP Permit Structure	Water Quality Site	Flow		Monthly Flow Volumes (ac-ft) (May 1, 2012–April 30, 2013)												Total Flow Volume (ac-ft)	Total TP Load (kilogram)	Annual Flow-Weighted Mean TP (ppb)
			Station	DBKEY	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr			
Into	G-123	G123	G123_P	K5481	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N/F
	S-9	S9	S9_P	K5483	29,294	26,421	13,559	34,250	21,712	30,684	1,699	3,551	2,131	795	0	2,625	166,720	3,252	16
	S-9A	S9A	S-9A_P	TA415	5,347	4,949	6,930	5,481	11,161	6,006	7,986	7,090	6,562	6,946	6,215	6,089	80,763	1,059	11
	S-332D	S332DX	S-332D_P	TA413	4,822	7,942	14,736	18,714	24,100	24,354	18,533	13,788	6,135	0	0	13	133,137	1,039	6
	S-18C	S18C	S18C_S	15760	21,057	23,450	24,207	24,792	20,434	18,858	8,718	4,826	1,594	707	356	227	149,225	1,786	10
	S-140	S140	S140_TOT	06754	4,069	4,362	3,164	6,777	12,142	19,074	6,149	4,447	3,621	2,507	2,268	4,729	73,311	4,478	50
	S-190	S190	S190_S	K5501	4	0	42	1,099	4,038	15,411	1,428	2,164	941	10	0	19	25,154	3,016	97
Within	G-64	G64	G64_C	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		n/a
	S-346, S-347	S333	S12D_S	FE774	10,566	30,837	37,047	31,803	44,753	63,947	50,676	42,073	13,232	7,269	1,718	188	334,110	4,440	11
	S-141	S34	S141_W	K5493/MC700	0	0	0	0	634	187	0	0	0	0	0	0	821	11	11
	S-142	S142	S142_C	K5494/F9554/ AI344	0	0	0	0	0	9	0	0	0	0	0	0	9	0	17
	S-143	S11A	S143_C	K5495/JM599	3	0	0	0	0	10	1,700	1,030	0	3	0	0	2,746	19	6
	S-144	S145	S144_C	K5497/VM880	0	2,873	2,187	4,222	0	0	4,542	0	0	1,414	369	1,687	17,295	186	9
	S-145	S145	S145_C	K5498/VM881	4,800	4,939	2,557	4,428	0	0	8,864	8,306	5,823	1,463	438	2,289	43,907	445	8
	S-146	S145	S146_C	K5499/VM882	0	1,708	694	2,150	0	0	3,417	3,015	4,020	481	13	196	15,695	139	7
	S-151	S151	S151_C	K5500/JM155	9,203	22,216	28,148	16,450	35,109	21,523	20,617	0	0	542	3,945	2,672	160,427	2,210	11
	S-333	S333	S333_S	15042	18,500	28,319	12,425	3,459	6,095	1,594	22,570	8,209	18,886	8,514	14,037	9,830	152,438	2,455	13
	S-339	C123SR84	S339_S	K5506/15563	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N/F
	S-340	C123SR84	S340_S	K5507/15666	0	0	0	0	0	16,473	8,596	0	0	0	0	0	25,069	371	12
	S-175	S175	S175_C	15752	0	1	1	0	0	0	0	2	0	0	0	0	4	0	6
	S-332	S332	S332_P	15753	0	0	0	0	0	0	0	0	1	0	0	0	1	0	13
	BERMB3	BERMB3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		n/a

Notes:
1) Water quality sample site is located on upstream side of permitted structure, unless otherwise noted with different sampling location.
2) n/a indicates that flow and/or stage data are not available, or that structure is not appropriately instrumented to capture information.
3) Structure names with a "+" are upstream of non-ECP "into" structures and are additional monitoring locations or are listed in Emergency Order Number 9.
4) N/F indicates no positive flow
5) S-331 and S-173 flow records were combined to determine the annual flow-weighted mean TP concentration.

Table D-3. Continued.

Area	Non-ECP Permit Structure	Water Quality Site	Flow		Monthly Flow Volumes (acre-ft) (May 1, 2012 - April 30, 2013)												Total Flow Volume (acre-ft)	Total TP Load (kg)	Annual Flow-Weighted Mean TP (ppb)
			Station	DBKEY	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr			
From	G-94A	G94B	G94A_C	TA422/VB272	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N/F
	G-94B	G94B	G94B_C	TA423/V7591	0	7	0	0	0	0	0	0	0	0	0	0	8	0	46
	G-94C	G94B	G94C_C	TA424/OR446	0	0	0	0	0	0	2,083	865	17	253	848	495	4,561	106	19
	G-94D	G94D	ACME2	OH648/15023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N/F
	S-31	S31	S31_C	K5486/S1494	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N/F
	S-34	S34	S34_C	K5487/15954	1	0	1	0	679	2,249	1,023	418	0	0	16	0	4,386	57	10
	S-38	S38	S38_C	K5488/06760	4,230	16,645	18,306	2,177	23,654	24,835	13,452	4,500	13,966	11,981	11,327	8,703	153,778	1,684	9
	S-39	S39	S39_S	K5489/06733	2,070	10,826	4,789	313	30,327	14,328	0	113	886	2,586	5,856	1,853	73,946	2,492	27
	S-197	S197	S197_C	15763	0	0	0	11,302	0	0	0	0	0	0	0	0	11,303	63	5
	S-334	S356-334	S334_S	FB752	3,463	14,273	11,694	17	6,294	1,942	22,151	16	22	276	11,800	9,358	81,305	1,051	10
	S-337	S31	S337_C	K5505/SP560	0	1	0	1	0	0	0	0	0	0	0	0	2	0	9
	S-343A	US41-25	S343A_C	K5508/16193	0	0	0	0	2,535	13,614	0	0	0	0	0	0	16,150	131	7
	S-343B	US41-25	S343B_C	K5509/16196	0	0	0	0	4,634	16,374	37	46	44	34	0	0	21,168	177	7
	S-344	S344	S344_C	K5511/16199	0	0	4,678	7,510	9,757	13,169	0	0	0	0	0	0	35,114	432	10
C-111 Basin	S-176 +	S332DX	S176_S	15762/12286	2,674	5,588	2,811	1,903	73	181	0	13	1,060	2,261	4,125	725	21,414	184	7
	S-177 +	S177	S177_S	15772/13156	13,149	15,093	12,105	8,450	827	3,340	44	0	949	1,714	1,709	382	57,760	442	6
	S-178 +	S178	S178_C	SO632/PT624	989	329	273	432	199	192	42	0	0	0	0	0	2,455	76	25
	S-331 +	S331-173	S331_P	P6935	14,252	39,617	41,399	28,158	31,726	42,957	39,121	21,471	6,618	31	67	86	265,504	2,760	8
	S-173 +	S331-173	S173_C	FB759/P7712	232	33	0	73	0	0	2	393	3,669	4,149	5,754	1,931	16,236	153	8

Notes:
1) Water quality sample site is located on upstream side of permitted structure, unless otherwise noted with different sampling location.
2) n/a indicates that flow and/or stage data are not available, or that structure is not appropriately instrumented to capture information.
3) Structure names with a "+" are upstream of Non-ECP INTO structures and are additional monitoring locations or are listed in Emergency Order Number 9.
4) N/F indicates no positive flow
5) S-331 and S-173 flow records were combined to determine the annual flow-weighted mean TP concentration.

Attachment E: Summary Statistics of Non-Everglades Construction Project Water Quality Monitoring Data for Water Year 2013

Shi Kui Xue and Steven Hill

Summary statistics are tabulated in **Table E-3** of this attachment for all parameters collected during Water Year 2013 (WY2013) (May 1, 2012–April 30, 2013) at the Non-ECP water quality monitoring sites. **Table E-1** of this attachment presents the water quality parameters associated with the summary statistics and their associated Florida Class III Fresh Surface Water Criteria (Section 62-302.530, F.A.C.). Additionally, the parameter summary statistics shown in **Table E-3** are sequenced according to the order shown in **Table E-1**. The monitoring sites are sequenced based on the order shown in **Table E-2**. The Non-ECP structure locations are depicted in **Figure 1** of this report.

Table E-1. Class III surface water criteria reference table for water quality parameters presented in summary statistics on **Table E-3**.

Parameter	Abbreviation	Units	SFWMD Test Number	Class III Criteria Predominantly Fresh Surface Waters Section 62-302.530, F.A.C.
PHYSICAL				
Dissolved Oxygen	DO	mg/L	8	Site-specific alternative criterion (SSAC)
Specific Conductance (Field)	FLDCOND	µmhos/cm	9	Not greater than 50% above background or 1,275 µmhos/cm, whichever is greater
pH (Field)	PH	Units	10	Not less than 6.0 or greater than 8.5
Turbidity	TURBIDITY	Ntu	12	Less than or equal to 29 NTU above natural background
Total Suspended Solids	TSS	mg/L	16	None
Hardness	HARDNESS	mg/L as $CaCO_3$	35	None
Temperature	TEMP	Centigrade	7	None
Alkalinity	ALKALINITY	mg/L	67	Not less than 20 mg/L
NUTRIENTS				
Total Nitrogen	TN	mg N/L	80	narrative criteria
Nitrite + Nitrate	NOX	mg N/L	18;180	narrative criteria
Ammonium	NH4	mg N/L	182	narrative criteria
Un-Ionized Ammonia	UN-IONIZED AMMONIA	mg/L as NH_3	NONE	Less than or equal to 0.02 mg/L
Inorganic Nitrogen	NNH4	mg N/L	92	narrative criteria
Organic Nitrogen	ORGN	mg N/L	79	narrative criteria
Total Kjeldahl Nitrogen	TKN	mg N/L	21	narrative criteria
Ortho-Phosphorus	OPO4	mg P/L	23	narrative criteria
Total Phosphorus	TP	mg P/L	25	narrative criteria
MAJOR IONS				
Dissolved Calcium	DIS. CA	mg/L	30	None
Dissolved Potassium	DIS. K	mg/L	29	None
Dissolved Magnesium	DIS. MG	mg/L	31	None
Dissolved Sodium	DIS. NA	mg/L	28	None
Dissolved Silica	DIS. SILICA	mg/L	27	None
Total Sulfate	TOT. SO4	mg/L	33	None
Total Chlorides	TOT. CL	mg/L	32	None
TRACE ELEMENTS				
Total Mercury	TOT. HG	µg/L	102	Less than or equal to .012 µg/L
Total Iron	TOT. FE	mg/L	177	Less than or equal to 1.0 mg/L

Table E-2. Table for cross-referencing water quality monitoring sites with Non-ECP discharge structures and the monitoring data summary statistics shown in Table C-3.

Structure Category	Non-ECP Permit Structure	Water Quality Sampling Site	Comments
Into	G-123	G123	Auto-sampler installed upstream of pump station during WY2001
	S-9	S9	Auto-sampler installed upstream of pump station during WY2000
	S-9A	S9A	Water quality data available in WY2003
	S-332D	S-332DX	The site is a new Non-ECP structure
	S-18C	S18C	Auto-sampler installed upstream of pump station during WY2003
	S-140	S140	Auto-sampler installed upstream of pump station during WY2001
	S-190	S190	Auto-sampler installed upstream of pump station during WY2001
Within	G-64	G64	
	S-346, S-347	S12D	
	S-141	S34	
	S-142	S142	
	S-143	S11A	
	S-144	S145	
	S-145	S145	
	S-146	S145	
	S-151	S151	
	S-333	S333	
	S-339, S-340	C123SR84	
	S-175	S175	
	S-332	S332	
	Burm-B3	BurmB3	
From	G-94A, G-94B, G-94C	G94B	
	G-94D	G94D	
	S-31, S-337	S31	
	S-34	S34	
	S-38	S38	
	S-39	S39	
	S-197	S197	Use S-18C as a surrogate from May through December 2012
	S-334	S356-334	
	S-343A, S-343B	US41-25	
	S-344	S344	
C-111 Basin	S-176 +	S332DX	
	S-177 +	S177	
	S-178 +	S178	
	S-331 +, S-173 +	S331-173	

Notes:

1) Water quality sample site is located on upstream side of permitted structure; unless otherwise noted with different representative sampling location.

2) Structure names with a "+" are upstream of Non-ECP Into structures and are additional monitoring locations.

Table E-3. Summary statistics and excursions of Non-ECP water quality monitoring data (physical parameters, nutrients, major ions, and trace metals) collected during WY2013. Highlighted cells have values that are discussed in the report.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
G123	DO	mg/L	8	15MAY2012 - 16APR2013	12	3.464167	1.944963	0.65	1.36	3.85	5.22	5.86	0	8	66.67%
G123	FLDCOND.	UMHOS/CM	9	15MAY2012 - 16APR2013	12	729.05	78.86543	484.3	736	744	762.1	786	0	0	0.00%
G123	PH	UNITS	10	15MAY2012 - 16APR2013	12	7.433333	0.344656	7	7.1	7.5	7.7	7.9	0	0	0.00%
G123	TURBIDITY	NTU	12	15MAY2012 - 16APR2013	14	2.885714	2.816942	0.6	1.6	2.1	3	11	0	0	0.00%
G123	HARDNESS	mg/L CACO3	35	10JUL2012 - 16APR2013	4	257.275	4.067247	251.3	254.75	258.8	259.8	260.2	0	0	0.00%
G123	TEMP	CENT	7	15MAY2012 - 16APR2013	12	25.58333	2.641912	21.7	23.4	25.75	28	29.5	0	0	0.00%
G123	TN	mg N/L	80	15MAY2012 - 16APR2013	12	1.419917	0.152421	1.005	1.3725	1.4405	1.5115	1.579	0	0	0.00%
G123	NOX	mg N/L	18;180	15MAY2012 - 16APR2013	12	0.03575	0.052065	0.005	0.005	0.0075	0.046	0.159	0	0	0.00%
G123	TKN	mg N/L	21	15MAY2012 - 16APR2013	12	1.385833	0.137475	1	1.365	1.4	1.445	1.56	0	0	0.00%
G123	OPO4	mg P/L	23	15MAY2012 - 16APR2013	12	0.002083	0.000289	0.002	0.002	0.002	0.002	0.003	0	0	0.00%
G123	TP	mg P/L	25	15MAY2012 - 16APR2013	12	0.015833	0.005589	0.009	0.011	0.015	0.0195	0.027	0	0	0.00%
G123	DIS. CA	mg/L	30	10JUL2012 - 16APR2013	4	75.975	1.040433	74.6	75.2	76.15	76.75	77	0	0	0.00%
G123	DIS. K	mg/L	29	10JUL2012 - 16APR2013	4	4.125	0.189297	4	4	4.05	4.25	4.4	0	0	0.00%
G123	DIS. MG	mg/L	31	10JUL2012 - 16APR2013	4	16.4	0.583095	15.8	16.05	16.3	16.75	17.2	0	0	0.00%
G123	DIS. NA	mg/L	28	10JUL2012 - 16APR2013	4	54.325	3.683635	51.6	51.8	53.05	56.85	59.6	0	0	0.00%
G123	TOT. CL	mg/L	32	10JUL201 - 16APR2013	6	52.86667	38.11937	2.8	4.9	73.7	80.3	81.8	0	0	0.00%
G123	TOT. SO4	mg/L	33	10JUL2012 - 16APR2013	4	1.525	0.298608	1.2	1.3	1.5	1.75	1.9	0	0	0.00%
G123	CA_I	mg/L	188	25JUL2012 - 30JAN2013	2	5	0.989949	4.3	4.3	5	5.7	5.7	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S9	DO	mg/L	8	01MAY2012 - 29APR2013	52	2.466154	1.32504	0.38	1.78	2.275	3.08	7.11	0	48	92.31%
S9	FLDCOND.	UMHOS/CM	9	01MAY2012 - 29APR2013	53	726.3415	63.99518	502	684	727	781	814	0	0	0.00%
S9	PH	UNITS	10	01MAY2012 - 29APR2013	53	7.3	0.137281	7.1	7.2	7.3	7.4	7.8	0	0	0.00%
S9	TURBIDITY	NTU	12	01MAY2012 - 15APR2013	22	3.018182	2.334143	1.1	2	2.75	3.1	13	0	0	0.00%
S9	HARDNESS	mg/L CACO3	35	10JUL2012 - 15APR2013	4	257.325	12.88652	245.3	249.65	254.2	265	275.6	0	0	0.00%
S9	TEMP	CENT	7	01MAY2012 - 29APR2013	53	25.40943	2.553374	20.7	23	25.7	27.9	29.3	0	0	0.00%
S9	TN	mg N/L	80	01MAY2012 - 15APR2013	20	1.4242	0.137528	1.241	1.344	1.3975	1.462	1.7	0	0	0.00%
S9	NOX	mg N/L	18;180	01MAY2012 - 15APR2013	19	0.064421	0.037481	0.01	0.034	0.062	0.088	0.159	0	0	0.00%
S9	TKN	mg N/L	21	01MAY2012 - 15APR2013	20	1.363	0.155262	1.17	1.255	1.34	1.39	1.69	0	0	0.00%
S9	OPO4	mg P/L	23	01MAY2012 - 15APR2013	19	0.002	0	0.002	0.002	0.002	0.002	0.002	0	0	0.00%
S9	TP	mg P/L	25	01MAY2012 - 29APR2013	51	0.011176	0.005098	0.007	0.009	0.01	0.012	0.035	0	0	0.00%
S9	DIS. CA	mg/L	30	10JUL2012 - 15APR2013	4	80.075	3.339037	76.4	77.95	79.7	82.2	84.5	0	0	0.00%
S9	DIS. K	mg/L	29	10JUL2012 - 15APR2013	4	3.45	0.264575	3.2	3.25	3.4	3.65	3.8	0	0	0.00%
S9	DIS. MG	mg/L	31	10JUL2012 - 15APR2013	4	13.925	1.189888	13.2	13.25	13.4	14.6	15.7	0	0	0.00%
S9	DIS. NA	mg/L	28	10JUL2012 - 15APR2013	4	52.85	3.396567	48.6	50.65	52.95	55.05	56.9	0	0	0.00%
S9	TOT. CL	mg/L	32	10JUL2012 - 15APR2013	6	56.2	39.91055	1.6	8.7	78	80.1	90.8	0	0	0.00%
S9	TOT. SO4	mg/L	33	10JUL2012 - 15APR2013	4	1.6	0.60553	0.9	1.1	1.65	2.1	2.2	0	0	0.00%
S9	CA_I	mg/L	188	26JUL2012 - 05FEB2013	2	2.37	2.729432	0.44	0.44	2.37	4.3	4.3	0	0	0.00%
S9Auto	TN	mg N/L	80	01MAY2012 - 22APR2013	39	1.410795	0.110825	1.2	1.341	1.382	1.5	1.657	0	0	0.00%
S9Auto	NOX	mg N/L	18;180	01MAY2012 - 22APR2013	36	0.064472	0.031116	0.01	0.042	0.0635	0.0875	0.126	0	0	0.00%
S9Auto	TKN	mg N/L	21	01MAY2012 - 22APR2013	39	1.351282	0.125618	1.17	1.25	1.34	1.46	1.64	0	0	0.00%
S9Auto	TP	mg P/L	25	01MAY2012 - 22APR2013	38	0.012553	0.004572	0.007	0.009	0.012	0.014	0.033	0	0	0.00%
S9A	DO	mg/L	8	01MAY2012 - 29APR2013	53	2.520377	1.057144	0.84	1.72	2.27	2.91	5.37	0	52	98.11%
S9A	FLDCOND.	UMHOS/CM	9	01MAY2012 - 29APR2013	54	729.4667	58.71713	526	689	732.5	775	807	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S9A	PH	UNITS	10	01MAY2012 - 29APR2013	54	7.312963	0.113348	7.1	7.2	7.3	7.4	7.6	0	0	0.00%
S9A	TURBIDITY	NTU	12	15MAY2012 - 29APR2013	19	2.315789	0.922113	1.1	1.5	2	2.9	4.5	0	0	0.00%
S9A	HARDNESS	mg/L CACO3	35	10JUL2012 - 15APR2013	3	257.3333	14.52217	247.4	247.4	250.6	274	274	0	0	0.00%
S9A	TEMP	CENT	7	01MAY2012 - 29APR2013	54	25.35185	2.467964	20.9	23.2	25.7	27.7	29.3	0	0	0.00%
S9A	ALKALINITY	mg/L	67	15OCT2012 - 15OCT2012	1	237		237	237	237	237	237	0	0	0.00%
S9A	TN	mg N/L	80	15MAY2012 - 29APR2013	19	1.515316	0.129319	1.365	1.4	1.47	1.629	1.74	0	0	0.00%
S9A	NOX	mg N/L	18;180	15MAY2012 - 29APR2013	18	0.041444	0.033188	0.005	0.013	0.036	0.065	0.126	0	0	0.00%
S9A	NO2	mg N/L	19	01OCT2012 - 15OCT2012	2	0.0065	0.00495	0.003	0.003	0.0065	0.01	0.01	0	0	0.00%
S9A	NO3	mg N/L	78	01OCT2012 - 15OCT2012	2	0.0335	0.013435	0.024	0.024	0.0335	0.043	0.043	0	0	0.00%
S9A	NH4	mg N/L	20	01OCT2012 - 15OCT2012	2	0.344	0.024042	0.327	0.327	0.344	0.361	0.361	0	0	0.00%
S9A	UN-IONIZED AMMONIA	mg/L	NONE	01MAY2012 - 29APR2013	2	0.005091	5.69E-05	0.005051	0.00505	0.0050914	0.00513	0.0051316	0	0	0.00%
S9A	NNH4	mg N/L	92	01OCT2012 - 15OCT2012	2	0.384	0.042426	0.354	0.354	0.384	0.414	0.414	0	0	0.00%
S9A	ORGN	mg N/L	79	01OCT2012 - 15OCT2012	2	1.036	0.066468	0.989	0.989	1.036	1.083	1.083	0	0	0.00%
S9A	TKN	mg N/L	21	15MAY2012 - 29APR2013	19	1.476316	0.151188	1.29	1.33	1.45	1.6	1.74	0	0	0.00%
S9A	OPO4	mg P/L	23	15MAY2012 - 29APR2013	19	0.002	0	0.002	0.002	0.002	0.002	0.002	0	0	0.00%
S9A	TP	mg P/L	25	01MAY2012 - 29APR2013	53	0.010547	0.003672	0.008	0.009	0.01	0.01	0.033	0	0	0.00%
S9A	DIS. CA	mg/L	30	10JUL2012 - 15APR2013	3	79.73333	3.523256	77.6	77.6	77.8	83.8	83.8	0	0	0.00%
S9A	DIS. K	mg/L	29	10JUL2012 - 15APR2013	3	3.5	0.43589	3.2	3.2	3.3	4	4	0	0	0.00%
S9A	DIS. MG	mg/L	31	10JUL2012 - 15APR2013	3	14.13333	1.474223	13	13	13.6	15.8	15.8	0	0	0.00%
S9A	DIS. NA	mg/L	28	10JUL2012 - 15APR2013	3	54.03333	2.516611	51.7	51.7	53.7	56.7	56.7	0	0	0.00%
S9A	TOT. CL	mg/L	32	10JUL2012 - 15APR2013	4	80.975	6.203964	74.3	77.05	80.15	84.9	89.3	0	0	0.00%
S9A	TOT. SO4	mg/L	33	10JUL2012 - 15APR2013	3	1.6	0.519615	1.3	1.3	1.3	2.2	2.2	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S9AAuto	TP	mg P/L	25	01MAY2012 - 29APR2013	52	0.010942	0.002775	0.008	0.009	0.01	0.0115	0.026	0	0	0.00%
S18C	DO	mg/L	8	08MAY2012 - 30APR2013	52	5.471154	2.327765	1.69	3.475	5.115	7.8	8.85	0	26	50.00%
S18C	FLDCOND.	UMHOS/CM	9	08MAY2012 - 30APR2013	52	530.4615	15.05215	504	518	527.5	540	567	0	0	0.00%
S18C	PH	UNITS	10	08MAY2012 - 30APR2013	52	7.55	0.371272	7	7.25	7.5	7.9	8.2	0	0	0.00%
S18C	TURBIDITY	NTU	12	11JUL2012 - 28JAN2013	5	6.18	7.139468	0.8	1	1.1	14	14	0	0	0.00%
S18C	TSS	mg/L	16	08MAY2012 - 16APR2013	44	3	0	3	3	3	3	3	0	0	0.00%
S18C	HARDNESS	mg/L CACO3	35	08MAY2012 - 16APR2013	44	205.9545	6.917839	191.8	201.9	204.95	210.55	223.5	0	0	0.00%
S18C	TEMP	CENT	7	08MAY2012 - 30APR2013	52	25.14231	2.302288	20.8	23.7	25.5	26.85	29.8	0	0	0.00%
S18C	TN	mg N/L	80	08MAY2012 - 16APR2013	44	0.631659	0.075591	0.46	0.597	0.628	0.6795	0.808	0	0	0.00%
S18C	NOX	mg N/L	18;180	08MAY2012 - 16APR2013	43	0.109837	0.058992	0.027	0.063	0.091	0.157	0.28	0	0	0.00%
S18C	TKN	mg N/L	21	08MAY2012 - 16APR2013	44	0.524318	0.073624	0.39	0.49	0.505	0.56	0.75	0	0	0.00%
S18C	OPO4	mg P/L	23	08MAY2012 - 16APR2013	44	0.002	0	0.002	0.002	0.002	0.002	0.002	0	0	0.00%
S18C	TP	mg P/L	25	08MAY2012 - 30APR2013	52	0.004462	0.001894	0.003	0.0035	0.004	0.005	0.015	0	0	0.00%
S18C	DIS. CA	mg/L	30	08MAY2012 - 16APR2013	44	72.97045	3.453787	65.3	70.55	73.9	75.35	78.7	0	0	0.00%
S18C	DIS. K	mg/L	29	08MAY2012 - 16APR2013	44	4.734091	0.705112	3.4	4.2	4.75	5.2	6.3	0	0	0.00%
S18C	DIS. MG	mg/L	31	08MAY2012 - 16APR2013	44	5.772727	1.09531	4.4	4.9	5.4	6.6	8.2	0	0	0.00%
S18C	DIS. NA	mg/L	28	08MAY2012 - 16APR2013	44	25.78182	4.240353	19.5	22.4	24.75	28.4	35.7	0	0	0.00%
S18C	TOT. CL	mg/L	32	08MAY2012 - 16APR2013	46	39.65	9.316884	10	36.2	39.25	43.6	58	0	0	0.00%
S18C	TOT. SO4	mg/L	33	11JUL2012 - 08JAN2013	3	8.1	2.718455	5.8	5.8	7.4	11.1	11.1	0	0	0.00%
S18CAuto	TN	mg N/L	80	08MAY2012 - 16APR2013	41	0.661488	0.119062	0.468	0.58	0.64	0.705	1.11	0	0	0.00%
S18CAuto	NOX	mg N/L	18;180	08MAY2012 - 16APR2013	38	0.104105	0.054009	0.005	0.06	0.0865	0.145	0.247	0	0	0.00%
S18CAuto	TKN	mg N/L	21	08MAY2012 - 16APR2013	41	0.565122	0.099853	0.41	0.51	0.54	0.6	0.96	0	0	0.00%
S18CAuto	TP	mg P/L	25	08MAY2012 - 16APR2013	41	0.008732	0.005604	0.003	0.006	0.007	0.01	0.031	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S18C	CA_I	mg/L	188	23JUL2012 - 28JAN2013	2	3.5	0.565685	3.1	3.1	3.5	3.9	3.9	0	0	0.00%
S140	FLDCOND.	UMHOS/CM	9	01MAY2012 - 30APR2013	53	601.4811	86.60071	355.7	561.1	597	655	765	0	0	0.00%
S140	PH	UNITS	10	01MAY2012 - 30APR2013	53	7.486792	0.19018	7	7.4	7.5	7.6	7.9	0	0	0.00%
S140	TURBIDITY	NTU	12	15MAY2012 - 30APR2013	25	1.652	0.835225	0.7	1	1.5	2.2	4	0	0	0.00%
S140	HARDNESS	mg/L CACO3	35	10JUL2012 - 16APR2013	4	216.5	20.75492	190.1	199.95	220.85	233.05	234.2	0	0	0.00%
S140	TEMP	CENT	7	01MAY2012 - 30APR2013	53	25.03208	3.521624	19.1	21.9	25.7	28.2	31	0	0	0.00%
S140	TN	mg N/L	80	15MAY2012 - 30APR2013	23	1.229957	0.089956	1.083	1.155	1.22	1.315	1.382	0	0	0.00%
S140	NOX	mg N/L	18;180	15MAY2012 - 30APR2013	23	0.046696	0.032029	0.005	0.021	0.046	0.062	0.115	0	0	0.00%
S140	TKN	mg N/L	21	15MAY2012 - 30APR2013	23	1.183913	0.09144	1.03	1.11	1.15	1.27	1.37	0	0	0.00%
S140	OPO4	mg P/L	23	15MAY2012 - 30APR2013	23	0.018348	0.013667	0.002	0.009	0.016	0.022	0.056	0	0	0.00%
S140	TP	mg P/L	25	08MAY2012 - 30APR2013	52	0.037077	0.011995	0.021	0.029	0.0325	0.045	0.078	0	0	0.00%
S140	DIS. CA	mg/L	30	10JUL2012 - 16APR2013	4	75.65	6.22495	67.8	70.65	77.05	80.65	80.7	0	0	0.00%
S140	DIS. K	mg/L	29	10JUL2012 - 16APR2013	4	4.975	0.221736	4.7	4.8	5	5.15	5.2	0	0	0.00%
S140	DIS. MG	mg/L	31	10JUL2012 - 16APR2013	4	6.7	1.311488	5	5.7	6.9	7.7	8	0	0	0.00%
S140	DIS. NA	mg/L	28	10JUL2012 - 16APR2013	4	42.325	10.51677	27.1	35.4	45.95	49.25	50.3	0	0	0.00%
S140	TOT. CL	mg/L	32	10JUL2012 - 16APR2013	6	41.25	33.15809	1.2	1.3	50.95	69.8	73.3	0	0	0.00%
S140	TOT. SO4	mg/L	33	10JUL2012 - 16APR2013	4	12.925	4.105586	6.9	10.5	14.35	15.35	16.1	0	0	0.00%
S140	CA_I	mg/L	188	25JUL2012 - 30JAN2013	2	0.89	0.296985	0.68	0.68	0.89	1.1	1.1	0	0	0.00%
S140Auto	TP	mg P/L	25	01MAY2012 - 23APR2013	51	0.04902	0.036434	0.021	0.031	0.034	0.054	0.216	0	0	0.00%
S190	DO	mg/L	8	01MAY2012 - 30APR2013	52	7.167115	1.812392	2.75	6.33	7.565	8.015	13.2	0	7	13.46%
S190	FLDCOND.	UMHOS/CM	9	01MAY2012 - 30APR2013	53	589.4585	41.71821	487	570	590	611	681	0	0	0.00%
S190	PH	UNITS	10	01MAY2012 - 30APR2013	53	7.966038	0.280757	7.1	7.8	8	8.2	8.4	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S190	TURBIDITY	NTU	12	08MAY2012 - 09APR2013	21	3.561905	2.048286	1.7	2.1	3.1	4.1	9.8	0	0	0.00%
S190	HARDNESS	mg/L CACO3	35	17JUL2012 - 09APR2013	4	230.075	25.61268	209.2	210.6	223.3	249.55	264.5	0	0	0.00%
S190	TEMP	CENT	7	01MAY2012 - 30APR2013	53	25.3	3.937444	19	21.5	26.3	29	31.7	0	0	0.00%
S190	TN	mg N/L	80	08MAY2012 - 09APR2013	19	1.309842	0.265017	0.97	1.037	1.26	1.51	1.81	0	0	0.00%
S190	NOX	mg N/L	18;180	08MAY2012 - 09APR2013	19	0.009842	0.011062	0.005	0.005	0.005	0.009	0.043	0	0	0.00%
S190	TKN	mg N/L	21	08MAY2012 - 09APR2013	19	1.303684	0.267004	0.97	1.02	1.26	1.51	1.81	0	0	0.00%
S190	OPO4	mg P/L	23	08MAY2012 - 09APR2013	19	0.009526	0.019024	0.002	0.002	0.002	0.007	0.082	0	0	0.00%
S190	TP	mg P/L	25	01MAY2012 - 30APR2013	53	0.044906	0.03686	0.021	0.025	0.032	0.043	0.174	0	0	0.00%
S190	DIS. CA	mg/L	30	17JUL2012 - 09APR2013	4	79.625	12.03256	65.7	70.8	79.2	88.45	94.4	0	0	0.00%
S190	DIS. K	mg/L	29	17JUL2012 - 09APR2013	4	3.525	0.788987	3	3.1	3.2	3.95	4.7	0	0	0.00%
S190	DIS. MG	mg/L	31	17JUL2012 - 09APR2013	4	7.575	2.397742	5.4	6.15	6.95	9	11	0	0	0.00%
S190	DIS. NA	mg/L	28	17JUL2012 - 09APR2013	4	29.875	12.48502	19.4	22.6	26.05	37.15	48	0	0	0.00%
S190	TOT. CL	mg/L	32	17JUL2012 - 09APR2013	6	30.33333	25.91267	2.7	5.3	31.25	38	73.5	0	0	0.00%
S190	TOT. SO4	mg/L	33	17JUL2012 - 09APR2013	4	10.45	0.772442	9.6	9.8	10.5	11.1	11.2	0	0	0.00%
S190	CA_I	mg/L	188	25JUL2012 - 30JAN2013	2	2.05	0.494975	1.7	1.7	2.05	2.4	2.4	0	0	0.00%
S190Auto	TN	mg N/L	80	18DEC2012 - 18DEC2012	1	1.08		1.08	1.08	1.08	1.08	1.08	0	0	0.00%
S190Auto	NOX	mg N/L	18;180	18DEC2012 - 18DEC2012	1	0.01		0.01	0.01	0.01	0.01	0.01	0	0	0.00%
S190Auto	TKN	mg N/L	21	18DEC2012 - 18DEC2012	1	1.07		1.07	1.07	1.07	1.07	1.07	0	0	0.00%
S190Auto	TP	mg P/L	25	30AUG2012 - 16APR2013	20	0.06555	0.045142	0.027	0.0335	0.0475	0.0825	0.173	0	0	0.00%
S332DX	DO	mg/L	8	08MAY2012 - 29APR2013	52	2.631154	1.856638	0.58	1.26	1.755	4.02	7.28	0	43	82.69%
S332DX	FLDCOND.	UMHOS/CM	9	08MAY2012 - 29APR2013	52	550.3654	40.09158	503	527	541.5	558.5	741	0	0	0.00%
S332DX	PH	UNITS	10	08MAY2012 - 29APR2013	52	7.321154	0.233756	6.8	7.2	7.35	7.45	7.8	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S332DX	TURBIDITY	NTU	12	10JUL2012 - 15APR2013	6	5.05	6.164008	0.7	0.9	1.35	13	13	0	0	0.00%
S332DX	TSS	mg/L	16	08MAY2012 - 15APR2013	49	3	0	3	3	3	3	3	0	0	0.00%
S332DX	HARDNESS	mg/L CACO3	35	08MAY2012 - 15APR2013	49	203.7837	12.68113	180.9	196	200.5	212	232.5	0	0	0.00%
S332DX	TEMP	CENT	7	08MAY2012 - 29APR2013	52	25.63462	1.853866	21.4	24.65	25.7	27.2	28.3	0	0	0.00%
S332DX	TN	mg N/L	80	08MAY2012 - 15APR2013	50	0.86286	0.219107	0.5	0.72	0.7675	1.009	1.282	0	0	0.00%
S332DX	NOX	mg N/L	18;180	08MAY2012 - 15APR2013	40	0.0347	0.033471	0.005	0.0075	0.018	0.058	0.116	0	0	0.00%
S332DX	TKN	mg N/L	21	08MAY2012 - 15APR2013	49	0.843061	0.188582	0.56	0.72	0.76	0.99	1.21	0	0	0.00%
S332DX	OPO4	mg P/L	23	08MAY2012 - 15APR2013	48	0.002	0	0.002	0.002	0.002	0.002	0.002	0	0	0.00%
S332DX	TP	mg P/L	25	08MAY2012 - 29APR2013	52	0.005712	0.000825	0.004	0.005	0.006	0.006	0.009	0	0	0.00%
S332DX	DIS. CA	mg/L	30	08MAY2012 - 15APR2013	49	68.5898	4.362064	58.7	65.4	67.7	71.7	77	0	0	0.00%
S332DX	DIS. K	mg/L	29	08MAY2012 - 15APR2013	49	2.608163	0.243958	2.3	2.5	2.6	2.7	3.5	0	0	0.00%
S332DX	DIS. MG	mg/L	31	08MAY2012 - 15APR2013	49	7.893878	0.906092	7	7.3	7.6	8.3	11.8	0	0	0.00%
S332DX	DIS. NA	mg/L	28	08MAY2012 - 15APR2013	49	32.1102	4.098894	27.3	29.5	30.5	34.6	47.4	0	0	0.00%
S332DX	TOT. CL	mg/L	32	08MAY2012 - 15APR2013	51	48.19804	10.1873	10	44.8	47.4	53.8	74	0	0	0.00%
S332DX	TOT. SO4	mg/L	33	10JUL2012 - 15APR2013	4	1.9	0.886942	0.8	1.2	2	2.6	2.8	0	0	0.00%
S332DX	TOT. ULTRA TRACE HG	µg/L	207	26JUL2012 - 16APR2013	4	0.000333	0.000208	0.0002	0.00021	0.000245	0.00046	0.00064	0	0	0.00%
S332DX	TOT. MTHY HG	µg/L	203	26JUL2012 - 16APR2013	3	0.000023	1.73E-06	0.000022	2.2E-05	0.000022	2.5E-05	0.000025	0	0	0.00%
S332DX	CA_I	mg/L	188	23JUL2012 - 28JAN2013	2	2.7	0	2.7	2.7	2.7	2.7	2.7	0	0	0.00%
S332DX	DIS. ORGAN. C	mg/L	89;181	10JUL2012 - 15APR2013	4	11.6	2.19545	9.9	10.05	10.9	13.15	14.7	0	0	0.00%
S332DXAuto	TN	mg N/L	80	08MAY2012 - 29APR2013	364	0.876629	0.213541	0.613	0.7105	0.7955	1.0015	1.402	0	0	0.00%
S332DXAuto	NOX	mg N/L	18;180	08MAY2012 - 29APR2013	285	0.030642	0.032928	0.005	0.007	0.012	0.052	0.116	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S332DXAuto	TKN	mg N/L	21	08MAY2012 - 29APR2013	364	0.853022	0.18852	0.58	0.71	0.78	0.975	1.31	0	0	0.00%
S332DXAuto	TP	mg P/L	25	08MAY2012 - 29APR2013	364	0.006555	0.001512	0.004	0.006	0.006	0.007	0.013	0	0	0.00%
G64	DO	mg/L	8	08JAN2013 - 08JAN2013	1	5.2		5.2	5.2	5.2	5.2	5.2	0	0	0.00%
G64	FLDCOND.	UMHOS/CM	9	08JAN2013 - 08JAN2013	1	889		889	889	889	889	889	0	0	0.00%
G64	PH	UNITS	10	08JAN2013 - 08JAN2013	1	7.4		7.4	7.4	7.4	7.4	7.4	0	0	0.00%
G64	TURBIDITY	NTU	12	08JAN2013 - 08JAN2013	1	0.9		0.9	0.9	0.9	0.9	0.9	0	0	0.00%
G64	TEMP	CENT	7	08JAN2013 - 08JAN2013	1	21.9		21.9	21.9	21.9	21.9	21.9	0	0	0.00%
G64	TN	mg N/L	80	08JAN2013 - 08JAN2013	1	1.682		1.682	1.682	1.682	1.682	1.682	0	0	0.00%
G64	NOX	mg N/L	18;180	08JAN2013 - 08JAN2013	1	0.022		0.022	0.022	0.022	0.022	0.022	0	0	0.00%
G64	TKN	mg N/L	21	08JAN2013 - 08JAN2013	1	1.66		1.66	1.66	1.66	1.66	1.66	0	0	0.00%
G64	TP	mg P/L	25	08JAN2013 - 08JAN2013	1	0.011		0.011	0.011	0.011	0.011	0.011	0	0	0.00%
G64	TOT. SO4	mg/L	33	08JAN2013 - 08JAN2013	1	32.9		32.9	32.9	32.9	32.9	32.9	0	0	0.00%
S12D	DO	mg/L	8	09MAY2012 - 11MAR2013	40	3.4625	0.872805	2.16	2.85	3.39	3.995	6.57	0	38	95.00%
S12D	FLDCOND.	UMHOS/CM	9	09MAY2012 - 11MAR2013	41	508.6512	103.079	347.9	403.7	516	573	712.8	0	0	0.00%
S12D	PH	UNITS	10	09MAY2012 - 11MAR2013	41	7.304878	0.134073	7.1	7.2	7.3	7.4	7.6	0	0	0.00%
S12D	TEMP	CENT	7	09MAY2012 - 11MAR2013	41	24.95854	4.014597	18.8	21.4	26.8	28.6	30.5	0	0	0.00%
S12D	TP	mg P/L	25	09MAY2012 - 11MAR2013	41	0.008463	0.00255	0.005	0.007	0.008	0.009	0.017	0	0	0.00%
S34	DO	mg/L	8	15MAY2012 - 16APR2013	20	5.074	1.60752	1.32	3.92	5.63	6.32	7.34	0	8	40.00%
S34	FLDCOND.	UMHOS/CM	9	15MAY2012 - 16APR2013	20	642.58	152.8026	347	560.5	582	809.25	867	0	0	0.00%
S34	PH	UNITS	10	15MAY2012 - 16APR2013	20	7.63	0.240832	7	7.55	7.7	7.75	8	0	0	0.00%
S34	TURBIDITY	NTU	12	15MAY2012 - 16APR2013	20	1.755	0.690137	0.7	1.35	1.6	2.25	3.6	0	0	0.00%
S34	HARDNESS	mg/L CACO3	35	10JUL2012 - 16APR2013	4	231.775	35.16119	183.9	205.55	241	258	261.2	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S34	TEMP	CENT	7	15MAY2012 - 16APR2013	20	25.295	3.915485	18.8	21.95	26.75	28.55	29.8	0	0	0.00%
S34	TN	mg N/L	80	15MAY2012 - 16APR2013	20	1.33015	0.316639	0.76	1.138	1.18	1.6585	1.84	0	0	0.00%
S34	NOX	mg N/L	18;180	15MAY2012 - 16APR2013	20	0.04215	0.035987	0.005	0.012	0.031	0.063	0.135	0	0	0.00%
S34	TKN	mg N/L	21	15MAY2012 - 16APR2013	20	1.2885	0.30384	0.76	1.11	1.155	1.6	1.79	0	0	0.00%
S34	OPO4	mg P/L	23	15MAY2012 - 16APR2013	20	0.00205	0.000224	0.002	0.002	0.002	0.002	0.003	0	0	0.00%
S34	TP	mg P/L	25	15MAY2012 - 16APR2013	20	0.0128	0.002093	0.009	0.011	0.013	0.014	0.017	0	0	0.00%
S34	DIS. CA	mg/L	30	10JUL2012 - 16APR2013	4	62.2	7.311635	51.4	58.15	64.9	66.25	67.6	0	0	0.00%
S34	DIS. K	mg/L	29	10JUL2012 - 16APR2013	4	5.725	1.76706	4.1	4.2	5.7	7.25	7.4	0	0	0.00%
S34	DIS. MG	mg/L	31	10JUL2012 - 16APR2013	4	18.575	4.628445	13.5	14.65	19.15	22.5	22.5	0	0	0.00%
S34	DIS. NA	mg/L	28	10JUL2012 - 16APR2013	4	59.7	15.20154	43.2	47	60.05	72.4	75.5	0	0	0.00%
S34	TOT. CL	mg/L	32	10JUL2012 - 16APR2013	4	90.85	24.77546	65	69.7	92.2	112	114	0	0	0.00%
S34	TOT. SO4	mg/L	33	10JUL2012 - 16APR2013	4	18.725	16.44453	4	4.65	17.55	32.8	35.8	0	0	0.00%
S142	DO	mg/L	8	14MAY2012 - 16APR2013	12	4.561667	1.382789	2.83	3.57	4.245	5.03	7.79	0	9	75.00%
S142	FLDCOND.	UMHOS/CM	9	14MAY2012 - 16APR2013	12	799.475	188.4125	405	692.35	825.3	934.5	1092	0	0	0.00%
S142	PH	UNITS	10	14MAY2012 - 16APR2013	12	7.508333	0.188092	7.3	7.4	7.5	7.6	8	0	0	0.00%
S142	TURBIDITY	NTU	12	14MAY2012 - 16APR2013	12	1.483333	0.502418	0.9	1.1	1.4	1.7	2.5	0	0	0.00%
S142	HARDNESS	mg/L CACO3	35	09JUL2012 - 13NOV2012	2	219.55	38.11306	192.6	192.6	219.55	246.5	246.5	0	0	0.00%
S142	TEMP	CENT	7	14MAY2012 - 16APR2013	12	24.9	4.869572	16.5	21.1	26.75	29.55	30	0	0	0.00%
S142	TN	mg N/L	80	14MAY2012 - 16APR2013	12	1.760417	0.405991	1.068	1.5315	1.7075	1.961	2.605	0	0	0.00%
S142	NOX	mg N/L	18;180	14MAY2012 - 16APR2013	12	0.037917	0.045272	0.01	0.014	0.0175	0.047	0.167	0	0	0.00%
S142	TKN	mg N/L	21	14MAY2012 - 16APR2013	12	1.7225	0.402631	1	1.51	1.69	1.875	2.54	0	0	0.00%
S142	TP	mg P/L	25	14MAY2012 - 16APR2013	12	0.012083	0.005823	0.006	0.0085	0.0105	0.0125	0.026	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S142	DIS. CA	mg/L	30	09JUL2012 - 13NOV2012	2	56.05	10.25305	48.8	48.8	56.05	63.3	63.3	0	0	0.00%
S142	DIS. K	mg/L	29	09JUL2012 - 13NOV2012	2	5.8	1.272792	4.9	4.9	5.8	6.7	6.7	0	0	0.00%
S142	DIS. MG	mg/L	31	09JUL2012 - 13NOV2012	2	19.35	3.040559	17.2	17.2	19.35	21.5	21.5	0	0	0.00%
S142	DIS. NA	mg/L	28	09JUL2012 - 13NOV2012	2	68.05	3.181981	65.8	65.8	68.05	70.3	70.3	0	0	0.00%
S142	TOT. SO4	mg/L	33	09JUL2012 - 16APR2013	4	31.925	12.09969	14.7	23.55	35.85	40.3	41.3	0	0	0.00%
S11A	DO	mg/L	8	14MAY2012 - 30APR2013	25	5.7368	1.449873	2.96	4.78	5.6	6.77	8.74	0	8	32.00%
S11A	FLDCOND.	UMHOS/CM	9	14MAY2012 - 30APR2013	27	792.3222	205.9209	434	602	821	941.8	1158	0	0	0.00%
S11A	PH	UNITS	10	14MAY2012 - 30APR2013	27	7.692593	0.195971	7.3	7.6	7.7	7.8	8.1	0	0	0.00%
S11A	TURBIDITY	NTU	12	14MAY2012 - 30APR2013	26	1.784615	0.832679	0.6	1.4	1.6	2.4	4.6	0	0	0.00%
S11A	TSS	mg/L	16	14MAY2012 - 30APR2013	26	3.269231	0.77757	3	3	3	3	6	0	0	0.00%
S11A	HARDNESS	mg/L CACO3	35	14MAY2012 - 30APR2013	26	222.4038	60.55563	110.7	173	228.5	274.9	328.2	0	0	0.00%
S11A	TEMP	CENT	7	14MAY2012 - 30APR2013	27	24.56296	4.642707	15	21	25	29	30.7	0	0	0.00%
S11A	ALKALINITY	mg/L	67	14MAY2012 - 30APR2013	26	185.5385	46.40709	115	145	181	223	287	0	0	0.00%
S11A	TN	mg N/L	80	14MAY2012 - 30APR2013	26	1.688731	0.406523	1	1.41	1.697	1.91	2.865	0	0	0.00%
S11A	NOX	mg N/L	18;180	14MAY2012 - 30APR2013	26	0.015077	0.016977	0.005	0.005	0.0055	0.025	0.078	0	0	0.00%
S11A	NH4	mg N/L	20	14MAY2012 - 30APR2013	26	0.025615	0.021242	0.005	0.016	0.022	0.026	0.118	0	0	0.00%
S11A	UN-IONIZED AMMONIA	mg/L	NONE	14MAY2012 - 30APR2013	26	0.000781	0.000506	0.000225	0.00048	0.0006469	0.00084	0.0024136	0	0	0.00%
S11A	NNH4	mg N/L	92	14MAY2012 - 30APR2013	26	0.037808	0.03273	0.007	0.019	0.025	0.049	0.163	0	0	0.00%
S11A	ORGN	mg N/L	79	14MAY2012 - 30APR2013	26	1.650923	0.390286	0.984	1.395	1.6285	1.886	2.702	0	0	0.00%
S11A	TKN	mg N/L	21	14MAY2012 - 30APR2013	26	1.676154	0.405049	1	1.41	1.67	1.91	2.82	0	0	0.00%
S11A	OPO4	mg P/L	23	14MAY2012 - 30APR2013	26	0.002154	0.000613	0.002	0.002	0.002	0.002	0.005	0	0	0.00%
S11A	TP	mg P/L	25	14MAY2012 - 30APR2013	26	0.015192	0.016371	0.005	0.007	0.0105	0.016	0.09	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S11A	DIS. CA	mg/L	30	14MAY2012 - 30APR2013	26	55.12308	14.17952	28.7	44.8	54.6	64.8	80.6	0	0	0.00%
S11A	DIS. K	mg/L	29	14MAY2012 - 30APR2013	26	6.896154	2.249174	2.7	5.4	7.1	8.7	10	0	0	0.00%
S11A	DIS. MG	mg/L	31	14MAY2012 - 30APR2013	26	20.59231	6.427934	9.5	14.8	21.6	26.1	30.8	0	0	0.00%
S11A	DIS. NA	mg/L	28	14MAY2012 - 30APR2013	26	72.09231	20.52491	38.8	57.8	73.05	83.4	116.8	0	0	0.00%
S11A	TOT. CL	mg/L	32	14MAY2012 - 30APR2013	25	110.328	34.22967	53	87.7	113	127	180	0	0	0.00%
S11A	TOT. SO4	mg/L	33	14MAY2012 - 30APR2013	25	30.644	14.58218	5.3	24.6	33.1	40.3	51	0	0	0.00%
S11A	DIS. SILICA	mg/L	27	14MAY2012 - 30APR2013	26	12.08731	4.131938	5.57	9.5	11.7	13.8	23.5	0	0	0.00%
S11A	TOT. FE	mg/L	177	09JUL2012 - 25APR2013	5	0.019	0.011895	0.005	0.009	0.022	0.025	0.034	0	0	0.00%
S11A	DIS. KJEL N	mg N/L	22	14MAY2012 - 30APR2013	26	1.590769	0.337922	0.95	1.36	1.6	1.81	2.24	0	0	0.00%
S11A	DIS. ORGAN. C	mg/L	89;181	14MAY2012 - 30APR2013	26	26.88462	6.169388	14.3	23.4	26.9	31.4	37.6	0	0	0.00%
S11A	TOT. DIS. P	mg P/L	26	14MAY2012 - 30APR2013	26	0.0055	0.003547	0.002	0.003	0.004	0.007	0.015	0	0	0.00%
S11A	TOT. ORGAN. C	mg/L	100	14MAY2012 - 30APR2013	26	27.08077	6.336625	13.8	23	27.6	32	38.6	0	0	0.00%
S145	DO	mg/L	8	14MAY2012 - 30APR2013	20	4.2575	2.098192	1.83	2.61	4.265	5.29	10.5	0	14	70.00%
S145	FLDCOND.	UMHOS/CM	9	14MAY2012 - 30APR2013	21	621.2333	230.5181	278	415	516.7	847	953	0	0	0.00%
S145	PH	UNITS	10	14MAY2012 - 30APR2013	21	7.419048	0.193956	7.1	7.3	7.4	7.6	7.7	0	0	0.00%
S145	TURBIDITY	NTU	12	14MAY2012 - 30APR2013	21	1.252381	0.781421	0.6	0.8	1	1.4	3.9	0	0	0.00%
S145	TSS	mg/L	16	14MAY2012 - 30APR2013	21	3	0	3	3	3	3	3	0	0	0.00%
S145	HARDNESS	mg/L CACO3	35	14MAY2012 - 30APR2013	21	167.8143	59.9939	65.3	108	169	223.9	248.2	0	0	0.00%
S145	TEMP	CENT	7	14MAY2012 - 30APR2013	21	24.82381	4.526909	16.3	21.2	26.2	28.7	30.9	0	0	0.00%
S145	ALKALINITY	mg/L	67	14MAY2012 - 30APR2013	21	145.9524	48.62044	58	100	145	196	210	0	0	0.00%
S145	TN	mg N/L	80	14MAY2012 - 30APR2013	21	1.560286	0.471796	0.898	1.17	1.32	1.9	2.592	0	0	0.00%
S145	NOX	mg N/L	18;180	14MAY2012 - 30APR2013	21	0.011	0.014792	0.005	0.005	0.006	0.011	0.073	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S145	NH4	mg N/L	20	14MAY2012 - 30APR2013	21	0.033095	0.051157	0.005	0.011	0.021	0.03	0.245	0	0	0.00%
S145	UN-IONIZED AMMONIA	mg/L	NONE	14MAY2012 - 30APR2013	21	0.000672	0.001139	6.01E-05	0.00018	0.0003829	0.00068	0.0053425	0	0	0.00%
S145	NNH4	mg N/L	92	14MAY2012 - 30APR2013	21	0.041238	0.05345	0.007	0.014	0.028	0.045	0.257	0	0	0.00%
S145	ORGN	mg N/L	79	14MAY2012 - 30APR2013	21	1.519048	0.440217	0.89	1.159	1.306	1.878	2.335	0	0	0.00%
S145	TKN	mg N/L	21	14MAY2012 - 30APR2013	21	1.551429	0.473743	0.89	1.17	1.32	1.9	2.58	0	0	0.00%
S145	OPO4	mg P/L	23	14MAY2012 - 30APR2013	21	0.002	0	0.002	0.002	0.002	0.002	0.002	0	0	0.00%
S145	TP	mg P/L	25	14MAY2012 - 30APR2013	21	0.010429	0.009217	0.004	0.006	0.007	0.011	0.046	0	0	0.00%
S145	DIS. CA	mg/L	30	14MAY2012 - 30APR2013	21	43.2619	13.12823	18	30.3	46.3	54.3	61.3	0	0	0.00%
S145	DIS. K	mg/L	29	14MAY2012 - 30APR2013	21	5.857143	2.543928	2	3.1	5.5	8.1	9.4	0	0	0.00%
S145	DIS. MG	mg/L	31	14MAY2012 - 30APR2013	21	14.52381	6.7375	5	7.9	13	21.3	23.3	0	0	0.00%
S145	DIS. NA	mg/L	28	14MAY2012 - 30APR2013	21	59.29524	24.7145	26.2	38.6	49.8	79.4	97.2	0	0	0.00%
S145	TOT. CL	mg/L	32	30MAY2012 - 30APR2013	20	91.845	41.22193	40.8	56.15	70.4	129.5	157	0	0	0.00%
S145	TOT. SO4	mg/L	33	30MAY2012 - 30APR2013	20	17.125	10.82409	4	5.1	18.3	22.85	37.2	0	0	0.00%
S145	DIS. SILICA	mg/L	27	14MAY2012 - 30APR2013	21	10.20571	3.915344	4.1	7.23	9.98	13.7	16.5	0	0	0.00%
S145	TOT. FE	mg/L	177	09JUL2012 - 16APR2013	4	0.00975	0.0025	0.007	0.008	0.0095	0.0115	0.013	0	0	0.00%
S145	DIS. KJEL N	mg N/L	22	14MAY2012 - 30APR2013	21	1.489048	0.419379	0.92	1.11	1.29	1.84	2.26	0	0	0.00%
S145	DIS. ORGAN. C	mg/L	89;181	14MAY2012 - 30APR2013	21	25.20952	6.11072	14.8	20.6	22.9	30.9	35.1	0	0	0.00%
S145	TOT. DIS. P	mg P/L	26	14MAY2012 - 30APR2013	21	0.003571	0.001568	0.002	0.002	0.003	0.004	0.007	0	0	0.00%
S145	TOT. ORGAN. C	mg/L	100	14MAY2012 - 30APR2013	21	25.00476	6.213652	14.1	19.7	22.2	30.9	35	0	0	0.00%
S151	DO	mg/L	8	14MAY2012 - 29APR2013	36	3.689722	1.084152	1.53	2.765	3.755	4.345	7.11	0	33	91.67%
S151	FLDCOND.	UMHOS/CM	9	14MAY2012 - 29APR2013	36	740.15	134.5674	470	644	766	809.8	952	0	0	0.00%
S151	PH	UNITS	10	14MAY2012 - 29APR2013	36	7.458333	0.138099	7.2	7.4	7.5	7.5	7.8	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S151	TURBIDITY	NTU	12	14MAY2012 - 29APR2013	21	1.666667	0.859845	0.8	1	1.5	1.9	4	0	0	0.00%
S151	TSS	mg/L	16	01OCT2012 - 01OCT2012	1	3		3	3	3	3	3	0	0	0.00%
S151	COLOR	UNITS	13	01OCT2012 - 01OCT2012	1	74		74	74	74	74	74	0	0	0.00%
S151	HARDNESS	mg/L CACO3	35	09JUL2012 - 15APR2013	4	234.25	30.57641	197.6	209.4	237.5	259.1	264.4	0	0	0.00%
S151	TEMP	CENT	7	14MAY2012 - 29APR2013	36	24.375	3.866957	18.2	20.95	23.15	28.3	30.1	0	0	0.00%
S151	ALKALINITY	mg/L	67	01OCT2012 - 01OCT2012	1	142		142	142	142	142	142	0	0	0.00%
S151	TN	mg N/L	80	14MAY2012 - 29APR2013	21	1.520667	0.260403	1.074	1.399	1.504	1.628	2.221	0	0	0.00%
S151	NOX	mg N/L	18;180	14MAY2012 - 29APR2013	20	0.0527	0.03103	0.023	0.0295	0.043	0.0695	0.133	0	0	0.00%
S151	NO2	mg N/L	19	01OCT2012 - 01OCT2012	1	0.003		0.003	0.003	0.003	0.003	0.003	0	0	0.00%
S151	NO3	mg N/L	78	01OCT2012 - 01OCT2012	1	0.02		0.02	0.02	0.02	0.02	0.02	0	0	0.00%
S151	NH4	mg N/L	20	01OCT2012 - 01OCT2012	1	0.044		0.044	0.044	0.044	0.044	0.044	0	0	0.00%
S151	UN-IONIZED AMMONIA	mg/L	NONE	14MAY2012 - 29APR2013	1	0.001241		0.001241	0.00124	0.0012414	0.00124	0.0012414	0	0	0.00%
S151	NNH4	mg N/L	92	01OCT2012 - 01OCT2012	1	0.067		0.067	0.067	0.067	0.067	0.067	0	0	0.00%
S151	ORGN	mg N/L	79	01OCT2012 - 01OCT2012	1	1.116		1.116	1.116	1.116	1.116	1.116	0	0	0.00%
S151	TKN	mg N/L	21	14MAY2012 - 29APR2013	21	1.470476	0.249869	1.05	1.37	1.44	1.57	2.13	0	0	0.00%
S151	OPO4	mg P/L	23	14MAY2012 - 29APR2013	21	0.002	0	0.002	0.002	0.002	0.002	0.002	0	0	0.00%
S151	TP	mg P/L	25	14MAY2012 - 29APR2013	35	0.010886	0.003554	0.007	0.008	0.01	0.012	0.023	0	0	0.00%
S151	DIS. CA	mg/L	30	09JUL2012 - 15APR2013	4	65.4	10.5978	52.4	57.5	65.85	73.3	77.5	0	0	0.00%
S151	DIS. K	mg/L	29	09JUL2012 - 15APR2013	4	5.375	0.579511	4.6	5	5.45	5.75	6	0	0	0.00%
S151	DIS. MG	mg/L	31	09JUL2012 - 15APR2013	4	17.225	1.826426	15.7	15.95	16.7	18.5	19.8	0	0	0.00%
S151	DIS. NA	mg/L	28	09JUL2012 - 15APR2013	4	58.6	5.8714	50.1	55.15	60.35	62.05	63.6	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S151	TOT. CL	mg/L	32	09JUL2012 - 15APR2013	5	85.78	17.10415	59.6	77.8	93	97.5	101	0	0	0.00%
S151	TOT. SO4	mg/L	33	09JUL2012 - 15APR2013	4	20.2	7.5131	13	13.75	20.1	26.65	27.6	0	0	0.00%
S151Auto	TN	mg N/L	80	04FEB2013 - 04MAR2013	3	1.758667	0.101933	1.685	1.685	1.716	1.875	1.875	0	0	0.00%
S151Auto	NOX	mg N/L	18;180	04FEB2013 - 04MAR2013	3	0.052	0.011269	0.045	0.045	0.046	0.065	0.065	0	0	0.00%
S151Auto	TKN	mg N/L	21	04FEB2013 - 04MAR2013	3	1.706667	0.109697	1.62	1.62	1.67	1.83	1.83	0	0	0.00%
S151Auto	TP	mg P/L	25	01OCT2012 - 04MAR2013	22	0.012773	0.015115	0.006	0.009	0.009	0.011	0.08	0	0	0.00%
S356-334	DO	mg/L	8	01MAY2012 - 29APR2013	51	2.976667	1.471945	0.57	1.51	3.1	4.14	5.69	0	47	92.16 %
S356-334	FLDCOND.	UMHOS/CM	9	01MAY2012 - 29APR2013	52	560.5962	63.7749	455.4	522	555.95	587	795.7	0	0	0.00%
S356-334	PH	UNITS	10	01MAY2012 - 29APR2013	52	7.265385	0.166727	7	7.2	7.2	7.4	7.6	0	0	0.00%
S356-334	TURBIDITY	NTU	12	24JUL2012 - 15APR2013	4	1.125	0.386221	0.7	0.8	1.15	1.45	1.5	0	0	0.00%
S356-334	TSS	mg/L	16	01MAY2012 - 29APR2013	33	3.484848	1.543559	3	3	3	3	10	0	0	0.00%
S356-334	HARDNESS	mg/L CACO3	35	01MAY2012 - 29APR2013	33	195.5697	20.60556	171	180.6	189.5	203	254	0	0	0.00%
S356-334	TEMP	CENT	7	01MAY2012 - 29APR2013	52	26.03846	2.877032	20.7	23.9	26.45	28.75	30.1	0	0	0.00%
S356-334	TN	mg N/L	80	01MAY2012 - 29APR2013	33	1.283939	0.139407	1.128	1.184	1.25	1.318	1.645	0	0	0.00%
S356-334	NOX	mg N/L	18;180	01MAY2012 - 29APR2013	29	0.033103	0.032307	0.005	0.016	0.024	0.045	0.166	0	0	0.00%
S356-334	TKN	mg N/L	21	01MAY2012 - 29APR2013	33	1.255152	0.123291	1.11	1.17	1.24	1.28	1.6	0	0	0.00%
S356-334	OPO4	mg P/L	23	01MAY2012 - 29APR2013	33	0.002	0	0.002	0.002	0.002	0.002	0.002	0	0	0.00%
S356-334	TP	mg P/L	25	01MAY2012 - 29APR2013	53	0.009943	0.00387	0.002	0.007	0.01	0.011	0.022	0	0	0.00%
S356-334	DIS. CA	mg/L	30	01MAY2012 - 29APR2013	33	61.83939	7.069562	49.8	56.6	61.7	66.3	77.8	0	0	0.00%
S356-334	DIS. K	mg/L	29	01MAY2012 - 29APR2013	33	3.190909	0.961237	1.7	2.4	3.3	3.7	5.4	0	0	0.00%
S356-334	DIS. MG	mg/L	31	01MAY2012 - 29APR2013	33	9.993939	2.634381	6.2	7.8	9.5	11.4	16.2	0	0	0.00%
S356-334	DIS. NA	mg/L	28	01MAY2012 - 29APR2013	33	38.80303	8.594674	24	32.8	38.9	42.4	60.6	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S356-334	TOT. CL	mg/L	32	01MAY2012 - 29APR2013	33	59.1303	14.42848	34.6	48	59.6	66.8	92.4	0	0	0.00%
S356-334	TOT. SO4	mg/L	33	24JUL2012 - 15APR2013	4	1.75	2.313007	0.3	0.45	0.75	3.05	5.2	0	0	0.00%
S356-334Auto	TN	mg N/L	80	01MAY2012 - 29APR2013	346	1.302488	0.116594	1.016	1.22	1.29	1.378	1.651	0	0	0.00%
S356-334Auto	NOX	mg N/L	18;180	01MAY2012 - 29APR2013	306	0.024268	0.022503	0.005	0.005	0.0185	0.033	0.161	0	0	0.00%
S356-334Auto	TKN	mg N/L	21	01MAY2012 - 29APR2013	346	1.281994	0.116481	1	1.19	1.275	1.36	1.54	0	0	0.00%
S356-334Auto	TP	mg P/L	25	01MAY2012 - 29APR2013	346	0.009584	0.00404	0.005	0.008	0.009	0.011	0.071	0	0	0.00%
S333	DO	mg/L	8	01MAY2012 - 29APR2013	51	3.528235	0.874525	2.08	2.91	3.51	4.24	5.27	0	50	98.04%
S333	FLDCOND.	UMHOS/CM	9	01MAY2012 - 29APR2013	52	580.8615	115.1269	360	505.5	570.25	666.55	825	0	0	0.00%
S333	PH	UNITS	10	01MAY2012 - 29APR2013	52	7.353846	0.140673	7	7.25	7.35	7.4	7.7	0	0	0.00%
S333	TURBIDITY	NTU	12	24JUL2012 - 15APR2013	4	0.975	0.15	0.8	0.85	1	1.1	1.1	0	0	0.00%
S333	TSS	mg/L	16	01MAY2012 - 29APR2013	52	3.096154	0.693375	3	3	3	3	8	0	0	0.00%
S333	HARDNESS	mg/L CACO3	35	01MAY2012 - 29APR2013	52	187.1942	33.29859	117.9	160.3	179.85	211.35	257.2	0	0	0.00%
S333	TEMP	CENT	7	01MAY2012 - 29APR2013	52	25.14038	3.878511	18.9	21.65	26.75	28.65	30.6	0	0	0.00%
S333	TN	mg N/L	80	01MAY2012 - 29APR2013	52	1.230462	0.194992	0.863	1.0765	1.2125	1.3445	1.687	0	0	0.00%
S333	NOX	mg N/L	18;180	01MAY2012 - 29APR2013	45	0.045867	0.027563	0.005	0.025	0.041	0.06	0.138	0	0	0.00%
S333	TKN	mg N/L	21	01MAY2012 - 29APR2013	52	1.190769	0.182755	0.84	1.04	1.18	1.31	1.63	0	0	0.00%
S333	OPO4	mg P/L	23	01MAY2012 - 29APR2013	52	0.002	0	0.002	0.002	0.002	0.002	0.002	0	0	0.00%
S333	TP	mg P/L	25	01MAY2012 - 29APR2013	53	0.009415	0.003016	0.005	0.007	0.009	0.01	0.019	0	0	0.00%
S333	DIS. CA	mg/L	30	01MAY2012 - 29APR2013	52	54.50385	7.567577	36.8	50	52.55	59.3	71.2	0	0	0.00%
S333	DIS. K	mg/L	29	01MAY2012 - 29APR2013	52	4.194231	1.243873	1.6	3.6	4.1	5.15	6.6	0	0	0.00%
S333	DIS. MG	mg/L	31	01MAY2012 - 29APR2013	52	12.40769	4.203679	4	10.55	12	14.9	21.2	0	0	0.00%
S333	DIS. NA	mg/L	28	01MAY2012 - 29APR2013	52	46.26731	12.81858	21.4	41.3	44.95	53.5	75.8	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S333	TOT. CL	mg/L	32	01MAY2012 - 29APR2013	52	70.89808	19.66724	32.8	62.45	70.1	82.65	117	0	0	0.00%
S333	TOT. SO4	mg/L	33	24JUL2012 - 15APR2013	4	11.4	7.889656	0.6	5.8	13.05	17	18.9	0	0	0.00%
S333Auto	TN	mg N/L	80	01MAY2012 - 29APR2013	364	1.252434	0.188129	0.88	1.1125	1.22	1.3525	1.896	0	0	0.00%
S333Auto	NOX	mg N/L	18;180	01MAY2012 - 29APR2013	308	0.044727	0.028205	0.005	0.026	0.04	0.057	0.165	0	0	0.00%
S333Auto	TKN	mg N/L	21	01MAY2012 - 29APR2013	364	1.214615	0.174817	0.87	1.09	1.19	1.32	1.86	0	0	0.00%
S333Auto	TP	mg P/L	25	01MAY2012 - 29APR2013	364	0.011091	0.004186	0.006	0.009	0.01	0.012	0.033	0	0	0.00%
C123SR84	DO	mg/L	8	15MAY2012 - 16APR2013	11	4.27	1.66242	1.52	2.68	4.34	5.72	6.56	0	7	63.64%
C123SR84	FLDCOND.	UMHOS/CM	9	15MAY2012 - 16APR2013	12	605.075	77.0304	434.2	571.6	607	664.7	721	0	0	0.00%
C123SR84	PH	UNITS	10	15MAY2012 - 16APR2013	12	7.4	0.190693	7.1	7.25	7.4	7.6	7.7	0	0	0.00%
C123SR84	TURBIDITY	NTU	12	15MAY2012 - 16APR2013	12	1.766667	1.149967	0.6	0.9	1.6	2.3	4.7	0	0	0.00%
C123SR84	HARDNESS	mg/L CACO3	35	10JUL2012 - 16APR2013	4	195.4	25.18505	166.4	178.3	193.85	212.5	227.5	0	0	0.00%
C123SR84	TEMP	CENT	7	15MAY2012 - 16APR2013	12	25.325	3.998665	18.7	21.35	27.15	28.8	29.8	0	0	0.00%
C123SR84	TN	mg N/L	80	15MAY2012 - 16APR2013	12	1.346833	0.11541	1.06	1.3005	1.357	1.41	1.51	0	0	0.00%
C123SR84	NOX	mg N/L	18;180	15MAY2012 - 16APR2013	12	0.021	0.035035	0.005	0.005	0.009	0.0175	0.129	0	0	0.00%
C123SR84	TKN	mg N/L	21	15MAY2012 - 16APR2013	12	1.3275	0.111202	1.06	1.275	1.34	1.385	1.51	0	0	0.00%
C123SR84	OPO4	mg P/L	23	15MAY2012 - 16APR2013	12	0.002	0	0.002	0.002	0.002	0.002	0.002	0	0	0.00%
C123SR84	TP	mg P/L	25	15MAY2012 - 16APR2013	12	0.021583	0.008339	0.008	0.013	0.024	0.027	0.036	0	0	0.00%
C123SR84	DIS. CA	mg/L	30	10JUL2012 - 16APR2013	4	63.725	9.262244	54.3	57.1	62.25	70.35	76.1	0	0	0.00%
C123SR84	DIS. K	mg/L	29	10JUL2012 - 16APR2013	4	4.55	0.768115	3.4	4.15	4.9	4.95	5	0	0	0.00%
C123SR84	DIS. MG	mg/L	31	10JUL2012 - 16APR2013	4	8.825	0.997914	7.5	8.15	8.95	9.5	9.9	0	0	0.00%
C123SR84	DIS. NA	mg/L	28	10JUL2012 - 16APR2013	4	36.125	8.800521	23.6	30.2	38.65	42.05	43.6	0	0	0.00%
C123SR84	TOT. CL	mg/L	32	10JUL2012 - 16APR2013	4	58.275	14.8657	37.9	48.05	61.15	68.5	72.9	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
C123SR84	TOT. SO4	mg/L	33	10JUL2012 - 16APR2013	4	5.575	1.129528	4.2	4.65	5.8	6.5	6.5	0	0	0.00%
G94B	DO	mg/L	8	17MAY2012 - 16APR2013	14	3.653571	1.090248	1.21	2.93	3.89	4.27	5.37	0	12	85.71%
G94B	FLDCOND.	UMHOS/CM	9	17MAY2012 - 16APR2013	15	371.3333	119.8943	201.2	262	356	455	601.7	0	0	0.00%
G94B	PH	UNITS	10	17MAY2012 - 16APR2013	15	7.206667	0.268506	6.8	7	7.2	7.3	7.9	0	0	0.00%
G94B	TURBIDITY	NTU	12	17MAY2012 - 16APR2013	15	1.14	0.413694	0.6	0.8	1.1	1.3	1.9	0	0	0.00%
G94B	HARDNESS	mg/L CACO3	35	14JUN2012 - 13NOV2012	3	83.33333	25.63149	66.2	66.2	71	112.8	112.8	0	0	0.00%
G94B	TEMP	CENT	7	17MAY2012 - 16APR2013	15	24.56	4.088451	19.1	21	23.6	29.1	30.2	0	0	0.00%
G94B	TN	mg N/L	80	17MAY2012 - 16APR2013	15	1.051133	0.254863	0.689	0.795	1.105	1.277	1.49	0	0	0.00%
G94B	NOX	mg N/L	18;180	17MAY2012 - 16APR2013	15	0.010133	0.008643	0.005	0.005	0.007	0.01	0.037	0	0	0.00%
G94B	TKN	mg N/L	21	17MAY2012 - 16APR2013	15	1.042	0.251544	0.68	0.79	1.09	1.24	1.49	0	0	0.00%
G94B	TP	mg P/L	25	17MAY2012 - 16APR2013	15	0.025933	0.011991	0.015	0.017	0.023	0.03	0.061	0	0	0.00%
G94B	DIS. CA	mg/L	30	14JUN2012 - 13NOV2012	3	26.6	10.74616	20	20	20.8	39	39	0	0	0.00%
G94B	DIS. K	mg/L	29	14JUN2012 - 13NOV2012	3	2.433333	0.550757	1.9	1.9	2.4	3	3	0	0	0.00%
G94B	DIS. MG	mg/L	31	14JUN2012 - 13NOV2012	3	4.133333	0.416333	3.8	3.8	4	4.6	4.6	0	0	0.00%
G94B	DIS. NA	mg/L	28	14JUN2012 - 13NOV2012	3	22.96667	6.45936	17.3	17.3	21.6	30	30	0	0	0.00%
G94B	TOT. SO4	mg/L	33	14JUN2012 - 16APR2013	5	6.4	3.574213	1.9	5	5.1	9.2	10.8	0	0	0.00%
G94D	DO	mg/L	8	28AUG2012 - 28AUG2012	1	3.86		3.86	3.86	3.86	3.86	3.86	0	1	100.00%
G94D	FLDCOND.	UMHOS/CM	9	28AUG2012 - 28AUG2012	1	214		214	214	214	214	214	0	0	0.00%
G94D	PH	UNITS	10	28AUG2012 - 28AUG2012	1	7.3		7.3	7.3	7.3	7.3	7.3	0	0	0.00%
G94D	TURBIDITY	NTU	12	28AUG2012 - 28AUG2012	1	3.8		3.8	3.8	3.8	3.8	3.8	0	0	0.00%
G94D	TSS	mg/L	16	28AUG2012 - 28AUG2012	1	5		5	5	5	5	5	0	0	0.00%
G94D	HARDNESS	mg/L CACO3	35	28AUG2012 - 28AUG2012	1	82.3		82.3	82.3	82.3	82.3	82.3	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
G94D	TEMP	CENT	7	28AUG2012 - 28AUG2012	1	25.1		25.1	25.1	25.1	25.1	25.1	0	0	0.00%
G94D	ALKALINITY	mg/L	67	28AUG2012 - 28AUG2012	1	72		72	72	72	72	72	0	0	0.00%
G94D	TN	mg N/L	80	28AUG2012 - 28AUG2012	1	0.853		0.853	0.853	0.853	0.853	0.853	0	0	0.00%
G94D	NOX	mg N/L	18;180	28AUG2012 - 28AUG2012	1	0.053		0.053	0.053	0.053	0.053	0.053	0	0	0.00%
G94D	TKN	mg N/L	21	28AUG2012 - 28AUG2012	1	0.8		0.8	0.8	0.8	0.8	0.8	0	0	0.00%
G94D	OPO4	mg P/L	23	28AUG2012 - 28AUG2012	1	0.095		0.095	0.095	0.095	0.095	0.095	0	0	0.00%
G94D	TP	mg P/L	25	28AUG2012 - 28AUG2012	1	0.139		0.139	0.139	0.139	0.139	0.139	0	0	0.00%
G94D	DIS. CA	mg/L	30	28AUG2012 - 28AUG2012	1	29.5		29.5	29.5	29.5	29.5	29.5	0	0	0.00%
G94D	DIS. K	mg/L	29	28AUG2012 - 28AUG2012	1	2.5		2.5	2.5	2.5	2.5	2.5	0	0	0.00%
G94D	DIS. MG	mg/L	31	28AUG2012 - 28AUG2012	1	2.1		2.1	2.1	2.1	2.1	2.1	0	0	0.00%
G94D	DIS. NA	mg/L	28	28AUG2012 - 28AUG2012	1	9.6		9.6	9.6	9.6	9.6	9.6	0	0	0.00%
G94D	TOT. CL	mg/L	32	28AUG2012 - 28AUG2012	1	15.5		15.5	15.5	15.5	15.5	15.5	0	0	0.00%
G94D	TOT. SO4	mg/L	33	28AUG2012 - 28AUG2012	1	6.2		6.2	6.2	6.2	6.2	6.2	0	0	0.00%
S31	DO	mg/L	8	14MAY2012 - 15APR2013	15	3.274667	1.584094	1.26	2.2	2.71	4.32	7.53	0	13	86.67%
S31	FLDCOND.	UMHOS/CM	9	14MAY2012 - 15APR2013	15	665.1333	78.19378	504	632	712	719	741	0	0	0.00%
S31	PH	UNITS	10	14MAY2012 - 15APR2013	15	7.44	0.145406	7.2	7.4	7.4	7.6	7.7	0	0	0.00%
S31	TURBIDITY	NTU	12	14MAY2012 - 15APR2013	17	2.170588	2.615283	0.6	0.9	1.1	2.1	11	0	0	0.00%
S31	TSS	mg/L	16	01OCT2012 - 01OCT2012	1	3		3	3	3	3	3	0	0	0.00%
S31	COLOR	UNITS	13	01OCT2012 - 01OCT2012	1	70		70	70	70	70	70	0	0	0.00%
S31	HARDNESS	mg/L CACO3	35	09JUL2012 - 15APR2013	4	226.95	23.23797	199.1	207.9	230.05	246	248.6	0	0	0.00%
S31	TEMP	CENT	7	14MAY2012 - 15APR2013	15	25.44667	3.506701	19.4	22	26	28.9	29.5	0	0	0.00%
S31	ALKALINITY	mg/L	67	01OCT2012 - 01OCT2012	1	155		155	155	155	155	155	0	0	0.00%
S31	TN	mg N/L	80	14MAY2012 - 15APR2013	15	1.289533	0.1	1.164	1.202	1.285	1.351	1.485	0	0	0.00%
S31	NOX	mg N/L	18;180	14MAY2012 - 15APR2013	15	0.0342	0.014877	0.012	0.026	0.034	0.039	0.065	0	0	0.00%
S31	NO2	mg N/L	19	01OCT2012 - 01OCT2012	1	0.003		0.003	0.003	0.003	0.003	0.003	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S31	NO3	mg N/L	78	01OCT2012 - 01OCT2012	1	0.031		0.031	0.031	0.031	0.031	0.031	0	0	0.00%
S31	NH4	mg N/L	20	01OCT2012 - 01OCT2012	1	0.067		0.067	0.067	0.067	0.067	0.067	0	0	0.00%
S31	UN-IONIZED AMMONIA	mg/L	NONE	14MAY2012 - 15APR2013	1	0.001852		0.001852	0.00185	0.0018525	0.00185	0.0018525	0	0	0.00%
S31	NNH4	mg N/L	92	01OCT2012 - 01OCT2012	1	0.101		0.101	0.101	0.101	0.101	0.101	0	0	0.00%
S31	ORGN	mg N/L	79	01OCT2012 - 01OCT2012	1	1.063		1.063	1.063	1.063	1.063	1.063	0	0	0.00%
S31	TKN	mg N/L	21	14MAY2012 - 15APR2013	15	1.255333	0.100205	1.13	1.16	1.22	1.32	1.45	0	0	0.00%
S31	OPO4	mg P/L	23	14MAY2012 - 15APR2013	15	0.002267	0.000799	0.002	0.002	0.002	0.002	0.005	0	0	0.00%
S31	TP	mg P/L	25	14MAY2012 - 15APR2013	15	0.010067	0.002251	0.007	0.008	0.01	0.012	0.015	0	0	0.00%
S31	DIS. CA	mg/L	30	09JUL2012 - 15APR2013	4	67.1	10.4604	54.6	58.5	68.55	75.7	76.7	0	0	0.00%
S31	DIS. K	mg/L	29	09JUL2012 - 15APR2013	4	4.45	0.472582	4.1	4.1	4.3	4.8	5.1	0	0	0.00%
S31	DIS. MG	mg/L	31	09JUL2012 - 15APR2013	4	14.45	0.723418	13.8	13.85	14.35	15.05	15.3	0	0	0.00%
S31	DIS. NA	mg/L	28	09JUL2012 - 15APR2013	4	51.8	5.363457	47.1	47.75	50.55	55.85	59	0	0	0.00%
S31	TOT. CL	mg/L	32	09JUL2012 - 15APR2013	7	56.42857	36.93421	2.4	5.5	73.6	82.8	89.8	0	0	0.00%
S31	TOT. SO4	mg/L	33	09JUL2012 - 15APR2013	4	11.9	8.26922	5.3	6.25	9.3	17.55	23.7	0	0	0.00%
S31	CA_I	mg/L	188	24JUL2012 - 29JAN2013	2	4.25	2.192031	2.7	2.7	4.25	5.8	5.8	0	0	0.00%
S38	DO	mg/L	8	14MAY2012 - 30APR2013	24	3.047917	1.361265	1.21	1.85	3.025	3.815	5.83	0	21	87.50%
S38	FLDCOND.	UMHOS/CM	9	14MAY2012 - 30APR2013	26	472.3231	211.4278	236	314.9	403.5	604	986	0	0	0.00%
S38	PH	UNITS	10	14MAY2012 - 30APR2013	26	7.226923	0.255433	6.9	7	7.2	7.4	7.7	0	0	0.00%
S38	TURBIDITY	NTU	12	14MAY2012 - 30APR2013	26	1.273077	0.661851	0.4	0.8	1	1.7	3	0	0	0.00%
S38	TSS	mg/L	16	14MAY2012 - 30APR2013	26	3	0	3	3	3	3	3	0	0	0.00%
S38	HARDNESS	mg/L CACO3	35	14MAY2012 - 30APR2013	26	126.9885	54.30143	74.7	92.1	102.65	161.2	264.2	0	0	0.00%
S38	TEMP	CENT	7	14MAY2012 - 30APR2013	26	24.37692	4.363146	16.4	21.1	24.85	28	30.4	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S38	ALKALINITY	mg/L	67	14MAY2012 - 30APR2013	26	113.1154	45.40954	67	86	96.5	137	223	0	0	0.00%
S38	TN	mg N/L	80	14MAY2012 - 30APR2013	26	1.268962	0.428673	0.7	0.92	1.155	1.503	2.193	0	0	0.00%
S38	NOX	mg N/L	18;180	14MAY2012 - 30APR2013	26	0.016077	0.048524	0.005	0.005	0.005	0.006	0.253	0	0	0.00%
S38	NH4	mg N/L	20	14MAY2012 - 30APR2013	26	0.022538	0.02175	0.005	0.008	0.013	0.03	0.089	0	0	0.00%
S38	UN-IONIZED AMMONIA	mg/L	NONE	14MAY2012 - 30APR2013	26	0.000349	0.000534	3.84E-05	6.8E-05	0.0001474	0.00038	0.002148	0	0	0.00%
S38	NNH4	mg N/L	92	14MAY2012 - 30APR2013	26	0.034962	0.051617	0.005	0.01	0.017	0.037	0.253	0	0	0.00%
S38	ORGN	mg N/L	79	14MAY2012 - 30APR2013	26	1.234192	0.404386	0.693	0.901	1.137	1.42	2.117	0	0	0.00%
S38	TKN	mg N/L	21	14MAY2012 - 30APR2013	26	1.256154	0.422451	0.7	0.92	1.155	1.45	2.18	0	0	0.00%
S38	OPO4	mg P/L	23	14MAY2012 - 30APR2013	26	0.002	0	0.002	0.002	0.002	0.002	0.002	0	0	0.00%
S38	TP	mg P/L	25	14MAY2012 - 30APR2013	26	0.011423	0.007976	0.005	0.006	0.009	0.013	0.038	0	0	0.00%
S38	DIS. CA	mg/L	30	14MAY2012 - 30APR2013	26	34.15769	12.60353	20.5	25.3	29	44.1	65.9	0	0	0.00%
S38	DIS. K	mg/L	29	14MAY2012 - 30APR2013	26	4.515385	2.189008	2.2	3.1	3.55	6	9.4	0	0	0.00%
S38	DIS. MG	mg/L	31	14MAY2012 - 30APR2013	26	10.12692	5.625269	4.6	6.3	7.55	12.4	24.2	0	0	0.00%
S38	DIS. NA	mg/L	28	14MAY2012 - 30APR2013	26	44.05	23.58364	15.8	27.3	34.55	58.5	96.3	0	0	0.00%
S38	TOT. CL	mg/L	32	14MAY2012 - 30APR2013	26	70.56538	38.91251	23.6	40.6	54.65	97.2	152	0	0	0.00%
S38	TOT. SO4	mg/L	33	14MAY2012 - 30APR2013	26	10.29615	7.292214	3.2	5.8	7.55	12.3	28	0	0	0.00%
S38	DIS. SILICA	mg/L	27	14MAY2012 - 30APR2013	26	7.151154	2.619542	2.78	4.96	7.41	9.07	12	0	0	0.00%
S38	TOT. FE	mg/L	177	09JUL2012 - 16APR2013	4	0.0135	0.003109	0.009	0.0115	0.0145	0.0155	0.016	0	0	0.00%
S38	DIS. KJEL N	mg N/L	22	14MAY2012 - 30APR2013	26	1.194231	0.382216	0.64	0.88	1.115	1.36	1.95	0	0	0.00%
S38	DIS. ORGAN. C	mg/L	89;181	14MAY2012 - 30APR2013	26	21.21923	6.012588	12.1	16.2	20.05	23.6	33.2	0	0	0.00%
S38	TOT. DIS. P	mg P/L	26	14MAY2012 - 30APR2013	26	0.004	0.001766	0.002	0.003	0.003	0.004	0.009	0	0	0.00%
S38	TOT. ORGAN. C	mg/L	100	14MAY2012 - 30APR2013	26	21.15769	6.145123	12.3	16.6	19.9	23.4	34	0	0	0.00%
S39	DO	mg/L	8	17MAY2012 - 30APR2013	21	5.521905	2.000496	2.88	3.86	4.92	7.08	8.74	0	11	52.38%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S39	FLDCOND.	UMHOS/CM	9	17MAY2012 - 30APR2013	23	377.3522	111.4577	220	282	350	466.8	648	0	0	0.00%
S39	PH	UNITS	10	17MAY2012 - 30APR2013	23	7.508696	0.457178	6.9	7.1	7.6	7.9	8.5	0	0	0.00%
S39	TURBIDITY	NTU	12	17MAY2012 - 30APR2013	23	1.226087	1.500369	0.5	0.7	0.9	1.1	8	0	0	0.00%
S39	TSS	mg/L	16	31MAY2012 - 30APR2013	22	4.272727	5.96962	3	3	3	3	31	0	0	0.00%
S39	HARDNESS	mg/L CACO3	35	31MAY2012 - 30APR2013	22	95.54545	26.87478	52.8	73.3	91.65	111.9	140	0	0	0.00%
S39	TEMP	CENT	7	17MAY2012 - 30APR2013	23	25.25217	4.202474	17.6	22.1	26.9	29	30.8	0	0	0.00%
S39	ALKALINITY	mg/L	67	31MAY2012 - 30APR2013	22	81.72727	21.31885	45	67	78	93	120	0	0	0.00%
S39	TN	mg N/L	80	17MAY2012 - 30APR2013	23	1.024348	0.159476	0.8	0.87	1.04	1.154	1.302	0	0	0.00%
S39	NOX	mg N/L	18;180	17MAY2012 - 30APR2013	23	0.007174	0.003393	0.005	0.005	0.005	0.011	0.015	0	0	0.00%
S39	NH4	mg N/L	20	31MAY2012 - 30APR2013	22	0.016909	0.009596	0.005	0.01	0.0155	0.019	0.045	0	0	0.00%
S39	UN-IONIZED AMMONIA	mg/L	NONE	17MAY2012 - 30APR2013	22	0.000468	0.000477	8.02E-05	0.00015	0.000329	0.00053	0.0017901	0	0	0.00%
S39	NNH4	mg N/L	92	31MAY2012 - 30APR2013	22	0.020955	0.012726	0.005	0.012	0.0175	0.028	0.056	0	0	0.00%
S39	ORGN	mg N/L	79	31MAY2012 - 30APR2013	22	1.000364	0.155979	0.785	0.858	1.0215	1.121	1.274	0	0	0.00%
S39	TKN	mg N/L	21	17MAY2012 - 30APR2013	23	1.02	0.156873	0.8	0.87	1.04	1.14	1.29	0	0	0.00%
S39	OPO4	mg P/L	23	17MAY2012 - 30APR2013	22	0.003409	0.005297	0.002	0.002	0.002	0.003	0.027	0	0	0.00%
S39	TP	mg P/L	25	17MAY2012 - 30APR2013	23	0.017217	0.01156	0.01	0.012	0.014	0.018	0.067	0	0	0.00%
S39	DIS. CA	mg/L	30	31MAY2012 - 30APR2013	22	27.38636	7.188039	15.3	21.3	27.15	31.3	41.1	0	0	0.00%
S39	DIS. K	mg/L	29	31MAY2012 - 30APR2013	22	3.263636	1.400526	1.6	2.3	2.75	4.1	7.3	0	0	0.00%
S39	DIS. MG	mg/L	31	31MAY2012 - 30APR2013	22	6.595455	2.504563	3.1	4.5	6.2	8.6	11.8	0	0	0.00%
S39	DIS. NA	mg/L	28	31MAY2012 - 30APR2013	22	36.73182	14.5287	14.3	25.8	33.2	47.6	75	0	0	0.00%
S39	TOT. CL	mg/L	32	17MAY2012 - 30APR2013	23	56.46957	21.37363	23.7	38.9	53.1	70.9	117	0	0	0.00%
S39	TOT. SO4	mg/L	33	17MAY2012 - 30APR2013	23	12.15217	6.969275	1.8	6.3	11.4	18	24.2	0	0	0.00%
S39	DIS. SILICA	mg/L	27	31MAY2012 - 30APR2013	22	4.216818	2.458527	1.02	2.16	3.845	5.54	9.52	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S39	TOT. FE	mg/L	177	26JUL2012 - 16APR2013	4	0.028	0.021	0.010	0.015	0.022	0.041	0.059	0	0	0.00%
S39	DIS. KJEL N	mg N/L	22	31MAY2012 - 30APR2013	22	0.932	0.169	0.580	0.780	0.930	1.040	1.220	0	0	0.00%
S39	DIS. ORGAN. C	mg/L	89;181	31MAY2012 - 30APR2013	22	17.255	3.223	9.900	15.200	17.900	19.400	23.600	0	0	0.00%
S39	TOT. DIS. P	mg P/L	26	31MAY2012 - 30APR2013	22	0.008	0.006	0.005	0.005	0.006	0.009	0.032	0	0	0.00%
S39	TOT. ORGAN. C	mg/L	100	31MAY2012 - 30APR2013	22	17.355	3.359	9.500	15.000	17.950	19.500	23.400	0	0	0.00%
S197	DO	mg/L	8	08JAN2013 – 14MAY2013	2	8.445	0.205	8.240	8.343	8.445	8.548	8.650	0	0	0.00%
S197	FLDCOND.	UMHOS/CM	9	08JAN2013 – 14MAY2013	2	489	1	488	488	489	489	489	0	0	0.00%
S197	PH	UNITS	10	08JAN2013 – 14MAY2013	2	8.1	0.1	8	8.05	8.1	8.15	8.2	0	0	0.00%
S197	TURBIDITY	NTU	12	08JAN2013 – 14MAY2013	2	1.1	0.1	1	1.05	1.1	1.15	1.2	0	0	0.00%
S197	TSS	mg/L	16	08JAN2013 – 14MAY2013	2	3.00	0	3	3.00	3.00	3.00	3	2	0	0.00%
S197	HARDNESS	mg/L CACO3	35	08JAN2013 – 14MAY2013	2	174.35	10.85	163.5	168.925	174.35	179.775	185.2	0	0	0.00%
S197	TEMP	CENT	7	08JAN2013 – 14MAY2013	2	25.8	3.1	22.7	24.25	25.8	27.35	28.9	0	0	0.00%
S197	TN	mg N/L	80	08JAN2013 – 14MAY2013	2	0.547	0.038	0.509	0.528	0.547	0.566	0.585	0	0	0.00%
S197	NOX	mg N/L	18;180	08JAN2013 – 14MAY2013	2	0.042	0.037	0.005	0.0235	0.042	0.0605	0.079	0	0	0.00%
S197	TKN	mg N/L	21	08JAN2013 – 14MAY2013	2	0.505	0.075	0.43	0.4675	0.505	0.5425	0.58	0	0	0.00%
S197	OPO4	mg P/L	23	08JAN2013 – 14MAY2013	2	0.002	0	0.002	0.002	0.002	0.002	0.002	2	0	0.00%
S197	TP	mg P/L	25	08JAN2013 – 14MAY2013	2	0.0045	0.0005	0.004	0.00425	0.0045	0.00475	0.005	0	0	0.00%
S197	DIS. CA	mg/L	30	08JAN2013 – 14MAY2013	2	60.1	5.7	54.4	57.25	60.1	62.95	65.8	0	0	0.00%
S197	DIS. K	mg/L	29	08JAN2013 – 14MAY2013	2	4	0.2	3.8	3.9	4	4.1	4.2	0	0	0.00%
S197	DIS. MG	mg/L	31	08JAN2013 – 14MAY2013	2	5.9	0.8	5.1	5.5	5.9	6.3	6.7	0	0	0.00%
S197	DIS. NA	mg/L	28	08JAN2013 – 14MAY2013	2	27.75	2.85	24.9	26.325	27.75	29.175	30.6	0	0	0.00%
S197	TOT. CL	mg/L	32	08JAN2013 – 14MAY2013	2	44.25	5.05	39.2	41.725	44.25	46.775	49.3	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S197	TOT. SO4	mg/L	33	08JAN2013 – 14MAY2013	2	5.1	0.5	4.6	4.85	5.1	5.35	5.6	0	0	0.00%
US41-25	DO	mg/L	8	02MAY2012 - 15APR2013	22	2.875	1.097	1.29	2.18	2.775	3.5	5.53	0	21	95.45%
US41-25	FLDCOND.	UMHOS/CM	9	02MAY2012 - 15APR2013	21	376.805	74.699	212.3	337.3	384.7	436.4	482.9	0	0	0.00%
US41-25	PH	UNITS	10	02MAY2012 - 15APR2013	21	7.171	0.182	6.7	7.1	7.2	7.3	7.6	0	0	0.00%
US41-25	TURBIDITY	NTU	12	24JUL2012 - 15APR2013	6	2.167	2.312	0.7	0.8	1.4	1.9	6.8	0	0	0.00%
US41-25	TSS	mg/L	16	02MAY2012 - 15APR2013	22	3.000	0.000	3	3	3	3	3	0	0	0.00%
US41-25	HARDNESS	mg/L CACO3	35	02MAY2012 - 15APR2013	22	161.482	45.363	87.7	120.7	164.35	205.8	229.1	0	0	0.00%
US41-25	TEMP	CENT	7	02MAY2012 - 15APR2013	22	24.459	3.705	19.2	21.1	23.9	27.8	29.5	0	0	0.00%
US41-25	TN	mg N/L	80	02MAY2012 - 15APR2013	22	0.839	0.143	0.558	0.74	0.846	0.94	1.067	0	0	0.00%
US41-25	NOX	mg N/L	18;180	11JUL2012 - 15APR2013	18	0.030	0.022	0.005	0.011	0.022	0.047	0.072	0	0	0.00%
US41-25	OPO4	mg P/L	23	02MAY2012 - 15APR2013	22	0.002	0.000	0.002	0.002	0.002	0.002	0.003	0	0	0.00%
US41-25	TP	mg P/L	25	02MAY2012 - 15APR2013	22	0.014	0.007	0.005	0.009	0.0105	0.021	0.027	0	0	0.00%
US41-25	DIS. CA	mg/L	30	02MAY2012 - 15APR2013	22	59.386	17.859	32.1	41.9	61.45	76.8	85.8	0	0	0.00%
US41-25	DIS. K	mg/L	29	02MAY2012 - 15APR2013	22	0.795	0.421	0.4	0.5	0.6	0.9	1.9	0	0	0.00%
US41-25	DIS. MG	mg/L	31	02MAY2012 - 15APR2013	22	3.200	0.873	1.8	2.6	3.15	3.6	5.5	0	0	0.00%
US41-25	DIS. NA	mg/L	28	02MAY2012 - 15APR2013	22	13.255	3.886	7.3	10.7	13.05	14.4	22.7	0	0	0.00%
US41-25	TOT. CL	mg/L	32	02MAY2012 - 15APR2013	24	18.563	7.662	0.9	14.7	19.5	21.95	35.3	0	0	0.00%
US41-25	TOT. SO4	mg/L	33	25JUL2012 - 15APR2013	4	0.425	0.650	0.1	0.1	0.1	0.75	1.4	0	0	0.00%
US41-25	CA_I	mg/L	188	24JUL2012 - 29JAN2013	2	1.445	1.351	0.49	0.49	1.445	2.4	2.4	0	0	0.00%
S344	DO	mg/L	8	18JUN2012 - 13MAR2013	4	2.200	0.779	1.47	1.59	2.065	2.81	3.2	0	4	100.00%
S344	FLDCOND.	UMHOS/CM	9	18JUN2012 - 13MAR2013	4	293.500	52.131	226	260	297.5	327	353	0	0	0.00%
S344	PH	UNITS	10	18JUN2012 - 13MAR2013	4	7.150	0.191	7	7	7.1	7.3	7.4	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S344	TURBIDITY	NTU	12	18JUN2012 - 13MAR2013	4	1.9	0.668331	1.1	1.35	2	2.45	2.5	0	0	0.00%
S344	HARDNESS	mg/L CACO3	35	18JUN2012 - 17SEP2012	2	117.5	25.31442	99.6	99.6	117.5	135.4	135.4	0	0	0.00%
S344	TEMP	CENT	7	18JUN2012 - 13MAR2013	4	24.3	4.318179	19.5	20.65	24.85	27.95	28	0	0	0.00%
S344	TN	mg N/L	80	18JUN2012 - 13MAR2013	4	1.1435	0.291449	0.889	0.917	1.08	1.37	1.525	0	0	0.00%
S344	NOX	mg N/L	18;180	18JUN2012 - 13MAR2013	4	0.0335	0.054366	0.005	0.005	0.007	0.062	0.115	0	0	0.00%
S344	TKN	mg N/L	21	18JUN2012 - 13MAR2013	4	1.11	0.246171	0.88	0.91	1.075	1.31	1.41	0	0	0.00%
S344	TP	mg P/L	25	18JUN2012 - 13MAR2013	4	0.0225	0.014572	0.01	0.0105	0.02	0.0345	0.04	0	0	0.00%
S344	DIS. CA	mg/L	30	18JUN2012 - 17SEP2012	2	43.55	9.545942	36.8	36.8	43.55	50.3	50.3	0	0	0.00%
S344	DIS. K	mg/L	29	18JUN2012 - 17SEP2012	2	0.35	0.070711	0.3	0.3	0.35	0.4	0.4	0	0	0.00%
S344	DIS. MG	mg/L	31	18JUN2012 - 17SEP2012	2	2.15	0.353553	1.9	1.9	2.15	2.4	2.4	0	0	0.00%
S344	DIS. NA	mg/L	28	18JUN2012 - 17SEP2012	2	7.75	2.05061	6.3	6.3	7.75	9.2	9.2	0	0	0.00%
S344	TOT. SO4	mg/L	33	18JUN2012 - 13MAR2013	4	0.1	0	0.1	0.1	0.1	0.1	0.1	0	0	0.00%
S177	DO	mg/L	8	08MAY2012 - 16APR2013	44	3.9575	2.069368	1.27	2.03	3.31	5.845	8.3	0	29	65.91%
S177	FLDCOND.	UMHOS/CM	9	08MAY2012 - 16APR2013	44	533.6364	30.77079	482	503.5	538	554.5	620	0	0	0.00%
S177	PH	UNITS	10	08MAY2012 - 16APR2013	44	7.363636	0.246926	6.9	7.2	7.4	7.5	7.9	0	0	0.00%
S177	TURBIDITY	NTU	12	11JUL2012 - 28JAN2013	5	6.04	6.40492	0.8	1.5	1.9	12	14	0	0	0.00%
S177	TSS	mg/L	16	08MAY2012 - 16APR2013	42	3.02381	0.154303	3	3	3	3	4	0	0	0.00%
S177	HARDNESS	mg/L CACO3	35	08MAY2012 - 16APR2013	42	199.5048	12.69061	173.6	188	199.5	208.8	228.4	0	0	0.00%
S177	TEMP	CENT	7	08MAY2012 - 16APR2013	44	25.41591	1.88876	21.1	24.5	25.8	26.6	29.4	0	0	0.00%
S177	TOTAL DEPTH	METERS	99	25JUN2012 - 25JUN2012	1	9		9	9	9	9	9	0	0	0.00%
S177	TN	mg N/L	80	08MAY2012 - 16APR2013	42	0.662	0.184483	0.477	0.537	0.586	0.694	1.146	0	0	0.00%
S177	NOX	mg N/L	18;180	08MAY2012 - 16APR2013	34	0.071735	0.052676	0.005	0.037	0.051	0.107	0.186	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S177	NH4	mg N/L	20	08MAY2012 - 16APR2013	38	0.047184	0.029922	0.005	0.025	0.046	0.067	0.125	0	0	0.00%
S177	UN-IONIZED AMMONIA	mg/L	NONE	08MAY2012 - 16APR2013	38	0.000756	0.000414	7.87E-05	0.00049	0.000749	0.00099	0.00193	0	0	0.00%
S177	NNH4	mg N/L	92	08MAY2012 - 16APR2013	31	0.115161	0.062493	0.005	0.073	0.095	0.163	0.243	0	0	0.00%
S177	ORGN	mg N/L	79	08MAY2012 - 16APR2013	38	0.562684	0.160244	0.425	0.46	0.4825	0.62	1.006	0	0	0.00%
S177	TKN	mg N/L	21	08MAY2012 - 16APR2013	42	0.604048	0.146255	0.44	0.51	0.55	0.62	1.02	0	0	0.00%
S177	OPO4	mg P/L	23	08MAY2012 - 16APR2013	42	0.002024	0.000154	0.002	0.002	0.002	0.002	0.003	0	0	0.00%
S177	TP	mg P/L	25	08MAY2012 - 16APR2013	44	0.006	0.002167	0.003	0.005	0.006	0.0065	0.014	0	0	0.00%
S177	DIS. CA	mg/L	30	08MAY2012 - 16APR2013	42	68.95952	3.76991	61	65.8	69.3	72.4	74.8	0	0	0.00%
S177	DIS. K	mg/L	29	08MAY2012 - 16APR2013	42	3.707143	0.656448	2.4	3.2	4	4.2	4.6	0	0	0.00%
S177	DIS. MG	mg/L	31	08MAY2012 - 16APR2013	42	6.633333	1.39278	4.8	5.7	6.1	7	10.6	0	0	0.00%
S177	DIS. NA	mg/L	28	08MAY2012 - 16APR2013	42	29.87143	4.455815	25.7	27.1	27.7	30.5	43.4	0	0	0.00%
S177	TOT. CL	mg/L	32	08MAY2012 - 16APR2013	44	45.22727	10.19802	9.6	42.45	43.55	47.6	65.5	0	0	0.00%
S177	TOT. SO4	mg/L	33	11JUL2012 - 08JAN2013	3	2.233333	0.288675	1.9	1.9	2.4	2.4	2.4	0	0	0.00%
S177	CA_I	mg/L	188	23JUL2012 - 28JAN2013	2	3.5	1.555635	2.4	2.4	3.5	4.6	4.6	0	0	0.00%
S178	DO	mg/L	8	08MAY2012 - 16APR2013	27	5.89	2.503333	2.07	4.02	5.62	7.27	12.8	0	12	44.44%
S178	FLDCOND.	UMHOS/CM	9	08MAY2012 - 16APR2013	27	520.6667	71.20501	369	460	544	571	596	0	0	0.00%
S178	PH	UNITS	10	08MAY2012 - 16APR2013	27	7.444444	0.348991	7	7.2	7.4	7.7	8.4	0	0	0.00%
S178	TSS	mg/L	16	08MAY2012 - 16APR2013	27	5.148148	8.30062	3	3	3	3	46	0	0	0.00%
S178	HARDNESS	mg/L CACO3	35	08MAY2012 - 16APR2013	27	183.2778	43.80119	85.7	174.4	200.7	212.6	230.2	0	0	0.00%
S178	TEMP	CENT	7	08MAY2012 - 16APR2013	27	25.88148	3.203488	17.3	25.1	26.8	28.2	29.2	0	0	0.00%
S178	TN	mg N/L	80	08MAY2012 - 16APR2013	27	0.753667	0.353341	0.407	0.559	0.665	0.808	2.031	0	0	0.00%
S178	NOX	mg N/L	18;180	08MAY2012 - 16APR2013	25	0.23336	0.346015	0.005	0.017	0.121	0.264	1.581	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S178	NH4	mg N/L	20	08MAY2012 - 16APR2013	22	0.018818	0.011333	0.006	0.012	0.016	0.021	0.063	0	0	0.00%
S178	UN-IONIZED AMMONIA	mg/L	NONE	08MAY2012 - 16APR2013	22	0.000449	0.000343	7.58E-05	0.00023	0.0003525	0.00062	0.001338	0	0	0.00%
S178	NNH4	mg N/L	92	08MAY2012 - 16APR2013	20	0.1745	0.210247	0.011	0.0335	0.1	0.254	0.831	0	0	0.00%
S178	ORGN	mg N/L	79	08MAY2012 - 16APR2013	22	0.543455	0.217206	0.364	0.406	0.4955	0.6	1.398	0	0	0.00%
S178	TKN	mg N/L	21	08MAY2012 - 16APR2013	27	0.537778	0.20173	0.38	0.42	0.46	0.58	1.41	0	0	0.00%
S178	OPO4	mg P/L	23	08MAY2012 - 16APR2013	27	0.00337	0.006535	0.002	0.002	0.002	0.002	0.036	0	0	0.00%
S178	TP	mg P/L	25	08MAY2012 - 16APR2013	27	0.016852	0.014565	0.006	0.01	0.013	0.019	0.077	0	0	0.00%
S178	DIS. CA	mg/L	30	08MAY2012 - 16APR2013	27	64.58148	17.44896	25.6	61.6	71.2	76.2	82.4	0	0	0.00%
S178	DIS. K	mg/L	29	08MAY2012 - 16APR2013	27	12.6963	1.008228	10.6	12	12.6	13.4	15.3	0	0	0.00%
S178	DIS. MG	mg/L	31	08MAY2012 - 16APR2013	27	5.344444	0.242318	4.8	5.2	5.4	5.5	5.9	0	0	0.00%
S178	DIS. NA	mg/L	28	08MAY2012 - 16APR2013	27	23.67407	2.389334	19.2	22.4	23.2	25.3	28.9	0	0	0.00%
S178	TOT. CL	mg/L	32	08MAY2012 - 16APR2013	29	40.63448	10.53495	4.2	39.7	42.2	44.3	53.1	0	0	0.00%
S178	TOT. SO4	mg/L	33	11JUL2012 - 08JAN2013	3	25.43333	2.914332	23.1	23.1	24.5	28.7	28.7	0	0	0.00%
S178	CA_I	mg/L	188	23JUL2012 - 28JAN2013	2	10.3	3.818377	7.6	7.6	10.3	13	13	0	0	0.00%
S331-173	DO	mg/L	8	07MAY2012 - 29APR2013	52	2.394038	1.353501	0.46	1.385	2.065	3.32	5.6	0	48	92.31%
S331-173	FLDCOND.	UMHOS/CM	9	07MAY2012 - 29APR2013	52	563.1923	37.11669	496	547	559	578.5	690	0	0	0.00%
S331-173	PH	UNITS	10	07MAY2012 - 29APR2013	52	7.359615	0.157505	7	7.25	7.4	7.5	7.7	0	0	0.00%
S331-173	TURBIDITY	NTU	12	10JUL2012 - 15APR2013	4	1.15	0.635085	0.5	0.7	1.05	1.6	2	0	0	0.00%
S331-173	TSS	mg/L	16	07MAY2012 - 29APR2013	49	3	0	3	3	3	3	3	0	0	0.00%
S331-173	HARDNESS	mg/L CACO3	35	07MAY2012 - 29APR2013	49	208.7347	14.36858	183.9	199.9	207.5	218.5	244.6	0	0	0.00%
S331-173	TEMP	CENT	7	07MAY2012 - 29APR2013	52	25.11731	2.201757	20.7	23.35	25.3	27.15	28.3	0	0	0.00%
S331-173	TN	mg N/L	80	07MAY2012 - 29APR2013	49	1.164796	0.141433	0.81	1.079	1.149	1.271	1.46	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S331-173	NOX	mg N/L	18;180	18JUN2012 - 29APR2013	38	0.025395	0.023958	0.005	0.008	0.018	0.03	0.102	0	0	0.00%
S331-173	TKN	mg N/L	21	07MAY2012 - 29APR2013	49	1.14551	0.137781	0.81	1.06	1.14	1.26	1.41	0	0	0.00%
S331-173	OPO4	mg P/L	23	07MAY2012 - 29APR2013	49	0.002	0	0.002	0.002	0.002	0.002	0.002	0	0	0.00%
S331-173	TP	mg P/L	25	07MAY2012 - 29APR2013	52	0.007038	0.002292	0.004	0.006	0.006	0.008	0.017	0	0	0.00%
S331-173	DIS. CA	mg/L	30	07MAY2012 - 29APR2013	49	69.54286	5.333034	58.2	64.8	70.3	73.2	82	0	0	0.00%
S331-173	DIS. K	mg/L	29	07MAY2012 - 29APR2013	49	2.655102	0.383548	2.1	2.4	2.6	2.9	4.4	0	0	0.00%
S331-173	DIS. MG	mg/L	31	07MAY2012 - 29APR2013	49	8.510204	1.306912	6.5	7.5	8.5	9.2	14	0	0	0.00%
S331-173	DIS. NA	mg/L	28	07MAY2012 - 29APR2013	49	34.39592	5.205324	25.8	30.1	33.7	37.5	52	0	0	0.00%
S331-173	TOT. CL	mg/L	32	07MAY2012 - 29APR2013	49	53.13061	8.452667	40.5	46.6	52.2	58.7	81.8	0	0	0.00%
S331-173	TOT. SO4	mg/L	33	10JUL2012 - 15APR2013	4	2.4	1.966384	0.6	0.9	2	3.9	5	0	0	0.00%
S331-173	DIS. ORGAN. C	mg/L	89;181	10JUL2012 - 15APR2013	4	15.025	2.157738	12.6	13.35	14.95	16.7	17.6	0	0	0.00%
S331-173Auto	TN	mg N/L	80	07MAY2012 - 29APR2013	364	1.165533	0.129372	0.76	1.0865	1.153	1.2505	1.62	0	0	0.00%
S331-173Auto	NOX	mg N/L	18;180	14MAY2012 - 29APR2013	290	0.027617	0.024318	0.005	0.01	0.019	0.043	0.165	0	0	0.00%
S331-173Auto	TKN	mg N/L	21	07MAY2012 - 29APR2013	364	1.144093	0.128451	0.76	1.075	1.13	1.23	1.57	0	0	0.00%
S331-173Auto	TP	mg P/L	25	07MAY2012 - 29APR2013	364	0.008448	0.004865	0.004	0.006	0.007	0.009	0.059	0	0	0.00%
BERMB3	DO	mg/L	8	29MAY2012 - 11DEC2012	15	4.83	2.282546	2.27	3.1	4.15	6.55	8.95	0	10	66.67%
BERMB3	FLDCOND.	UMHOS/CM	9	29MAY2012 - 11DEC2012	15	377.6	73.62822	282	330	372	416	575	0	0	0.00%
BERMB3	PH	UNITS	10	29MAY2012 - 11DEC2012	15	7.5	0.236039	7.2	7.3	7.5	7.6	8.1	0	0	0.00%
BERMB3	TURBIDITY	NTU	12	26JUN2012 - 15OCT2012	3	1.166667	0.57735	0.5	0.5	1.5	1.5	1.5	0	0	0.00%
BERMB3	TSS	mg/L	16	26JUN2012 - 13NOV2012	11	3	0	3	3	3	3	3	0	0	0.00%
BERMB3	HARDNESS	mg/L CACO3	35	26JUN2012 - 13NOV2012	11	143.6182	11.72474	124.3	138.3	143.2	152.9	164.3	0	0	0.00%
BERMB3	TEMP	CENT	7	29MAY2012 - 11DEC2012	15	27.88	3.253833	20.6	26.4	28.9	30.2	31.8	0	0	0.00%

Table E-3. Continued.

STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
BERMB3	TOTAL DEPTH	METERS	99	05JUN2012 - 11DEC2012	13	0.314615	0.091707	0.13	0.25	0.31	0.38	0.46	0	0	0.00%
BERMB3	TN	mg N/L	80	26JUN2012 - 13NOV2012	11	0.776364	0.162621	0.54	0.67	0.73	0.91	1.06	0	0	0.00%
BERMB3	NOX	mg N/L	18;180	26JUN2012 - 13NOV2012	11	0.005	0	0.005	0.005	0.005	0.005	0.005	0	0	0.00%
BERMB3	NH4	mg N/L	20	29AUG2012 - 29AUG2012	1	0.014		0.014	0.014	0.014	0.014	0.014	0	0	0.00%
BERMB3	UN-IONIZED AMMONIA	mg/L	NONE	29MAY2012 - 11DEC2012	1	0.000511		0.000511	0.00051	0.000511	0.00051	0.000511	0	0	0.00%
BERMB3	NNH4	mg N/L	92	29AUG2012 - 29AUG2012	1	0.014		0.014	0.014	0.014	0.014	0.014	0	0	0.00%
BERMB3	ORGN	mg N/L	79	29AUG2012 - 29AUG2012	1	0.526		0.526	0.526	0.526	0.526	0.526	0	0	0.00%
BERMB3	TKN	mg N/L	21	26JUN2012 - 13NOV2012	11	0.776364	0.162621	0.54	0.67	0.73	0.91	1.06	0	0	0.00%
BERMB3	OPO4	mg P/L	23	26JUN2012 - 13NOV2012	11	0.002091	0.000302	0.002	0.002	0.002	0.002	0.003	0	0	0.00%
BERMB3	TP	mg P/L	25	05JUN2012 - 11DEC2012	14	0.044857	0.095049	0.009	0.011	0.0195	0.026	0.373	0	0	0.00%
BERMB3	DIS. CA	mg/L	30	26JUN2012 - 13NOV2012	11	50.40909	4.564746	45.2	46.5	49.9	52.2	58.9	0	0	0.00%
BERMB3	DIS. K	mg/L	29	26JUN2012 - 13NOV2012	11	2.536364	0.728386	1.6	1.8	2.5	2.8	3.8	0	0	0.00%
BERMB3	DIS. MG	mg/L	31	26JUN2012 - 13NOV2012	11	4.309091	1.370733	2.8	3.3	3.8	5.7	6.8	0	0	0.00%
BERMB3	DIS. NA	mg/L	28	26JUN2012 - 13NOV2012	11	16.15455	8.20882	6.1	8	14.8	25.9	28	0	0	0.00%
BERMB3	TOT. CL	mg/L	32	26JUN2012 - 13NOV2012	11	25.52727	12.90086	7.8	13.3	25.3	40.3	43.4	0	0	0.00%
BERMB3	TOT. SO4	mg/L	33	26JUN2012 - 15OCT2012	3	0.133333	0.057735	0.1	0.1	0.1	0.2	0.2	0	0	0.00%

Attachment F: Time-Series and Trend Plots of Total Phosphorus at Non-Everglades Construction Project Monitoring Sites for Water Year 2013 and Earlier Periods

Shi Kui Xue

Graphs in this attachment depict annual FWM TP concentration data collected from May 1, 1997 through April 30, 2013 for the Non-ECP water quality monitoring sites. The graph sequencing follows the station order shown in Attachment D, **Tables D-1 and D-2**. Non-ECP structure locations are depicted in **Figure 1** of the report.

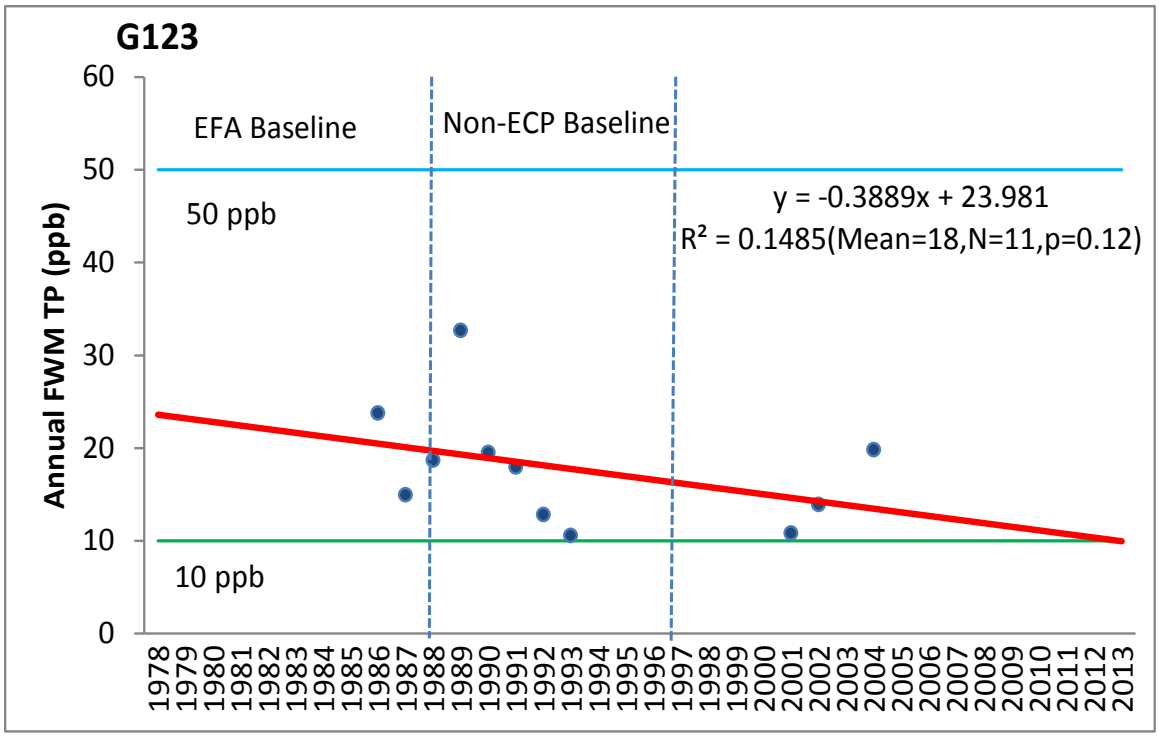

Figure F-1. Annual FWM TP concentration trend at the G-123 structure.

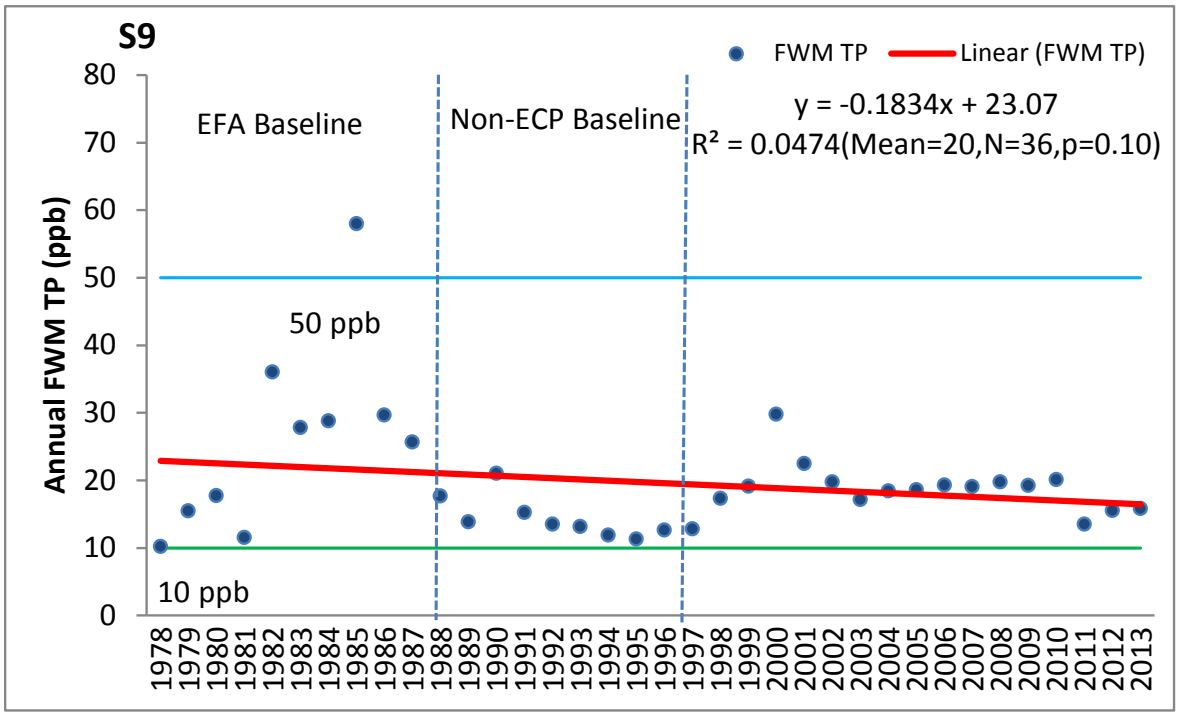

Figure F-2. Annual FWM TP concentration trend at the S-9 structure.

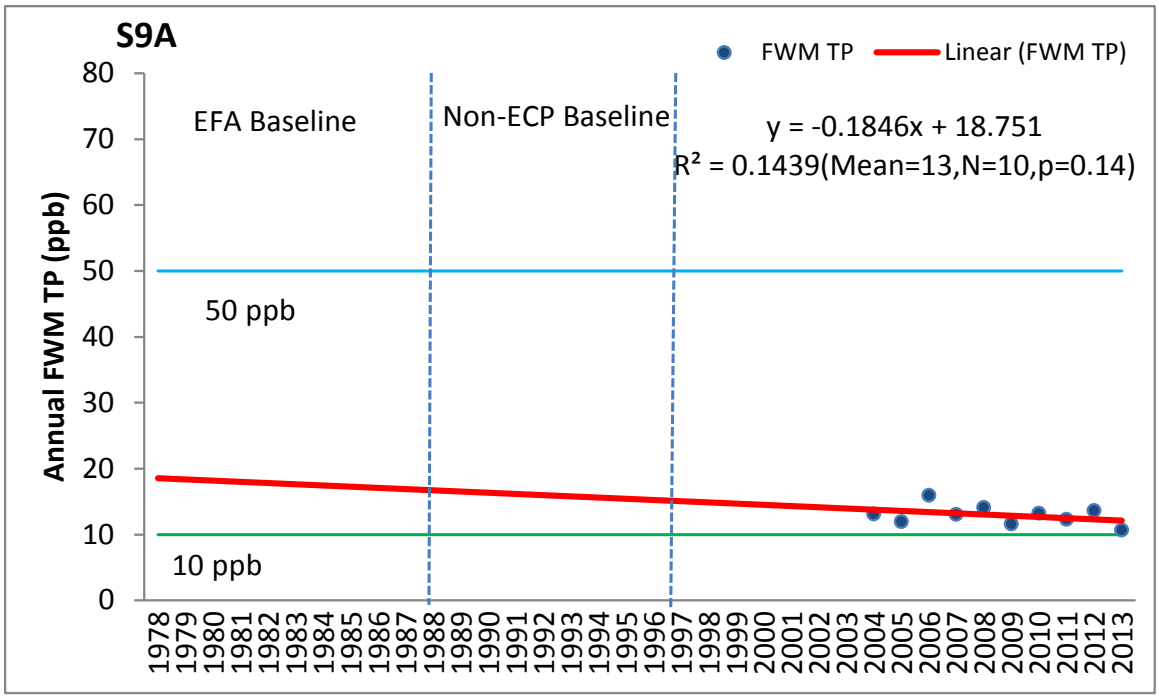

Figure F-3. Annual FWM TP concentration trend at the S-9A structure.

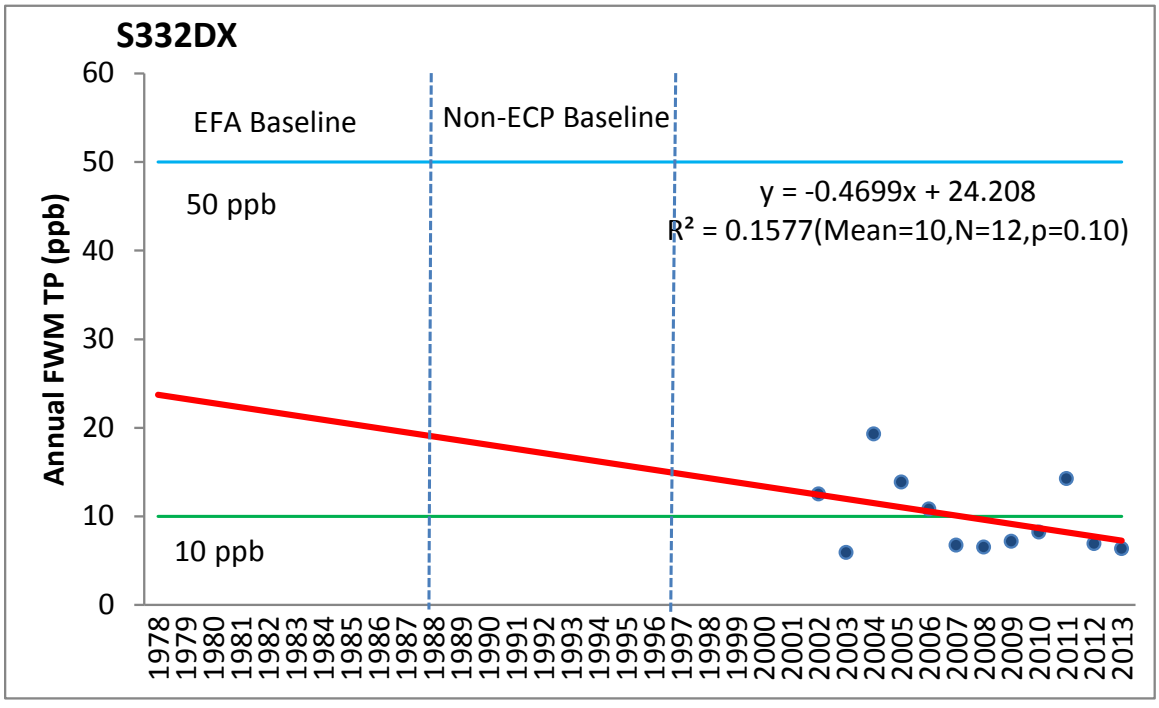

Figure F-4. Annual FWM TP concentration trend at the S-332DX structure.

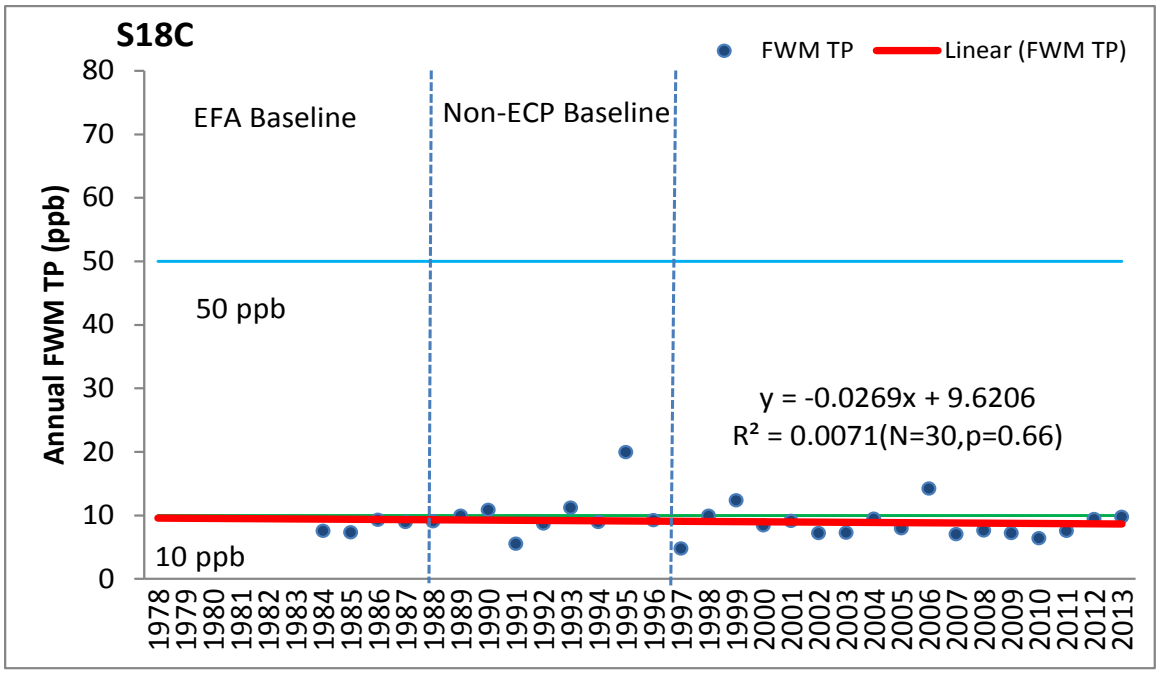

Figure F-5. Annual FWM TP concentration trend at the S-18C structure.

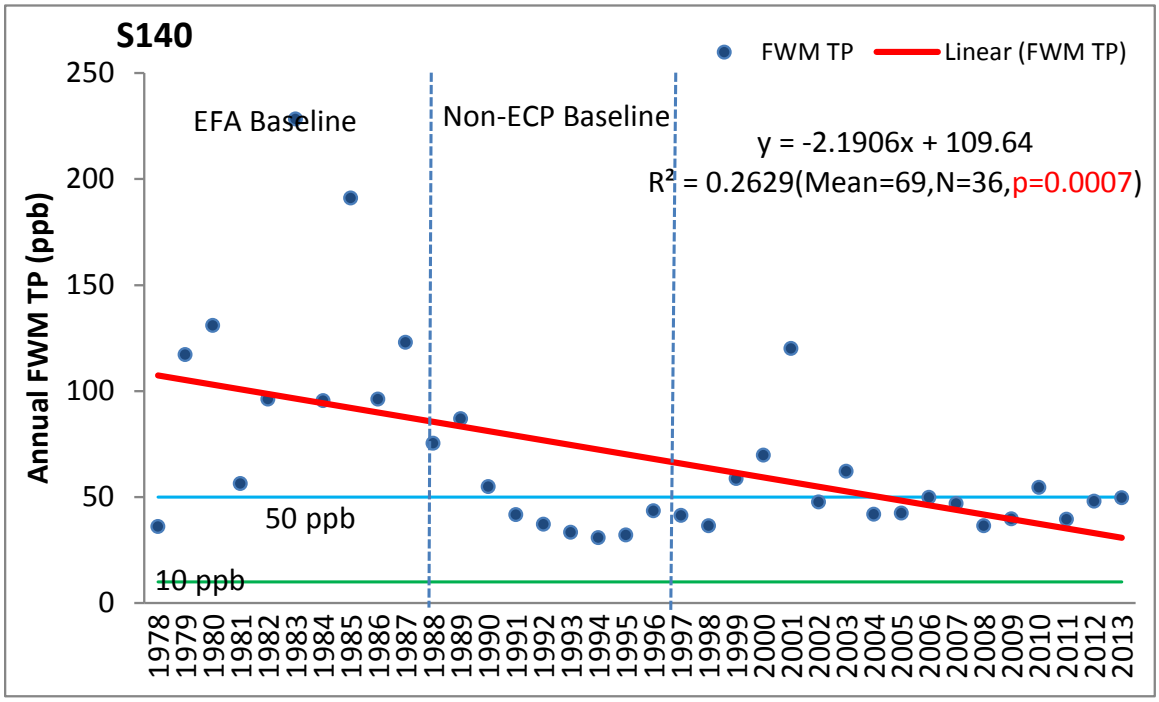

Figure F-6. Annual FWM TP concentration trend at the S-140 structure.

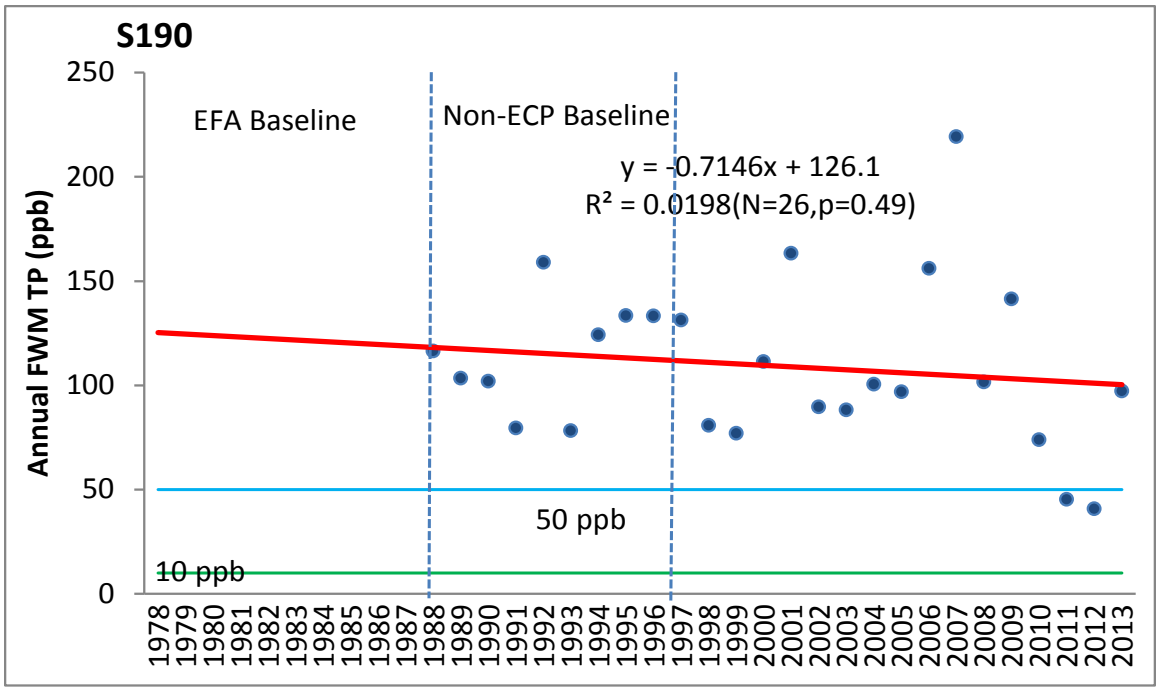

Figure F-7. Annual FWM TP concentration trend at the S-190 structure.

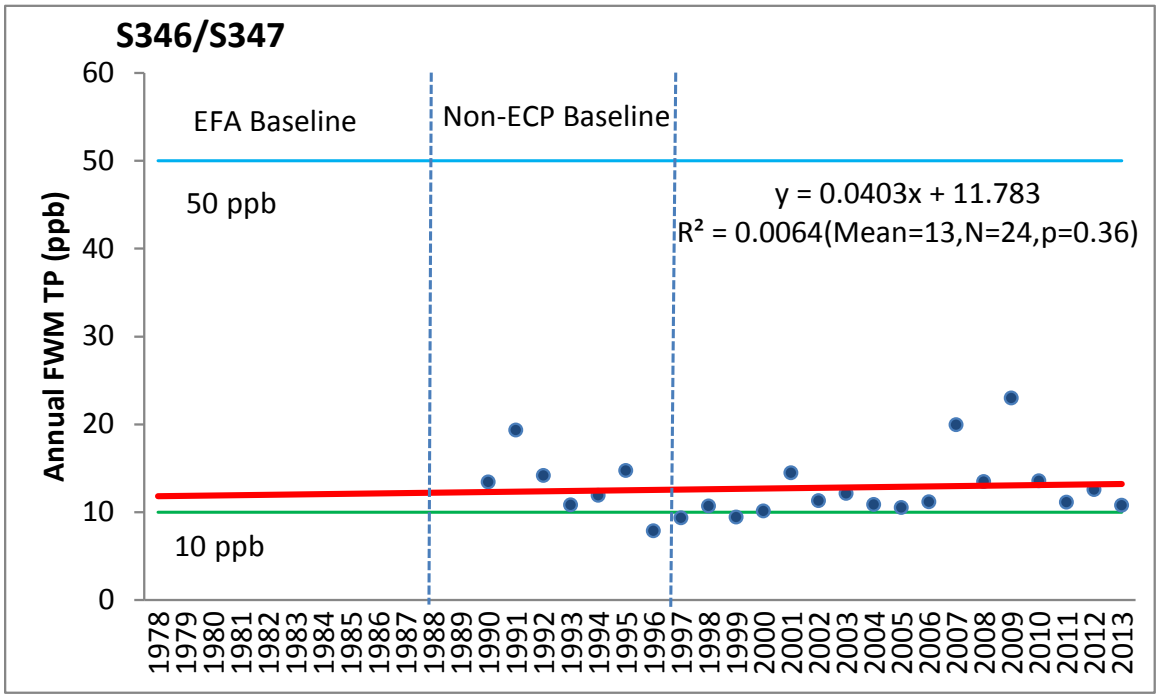

Figure F-8. Annual FWM TP concentration trend at the S-346/S-347 structures.

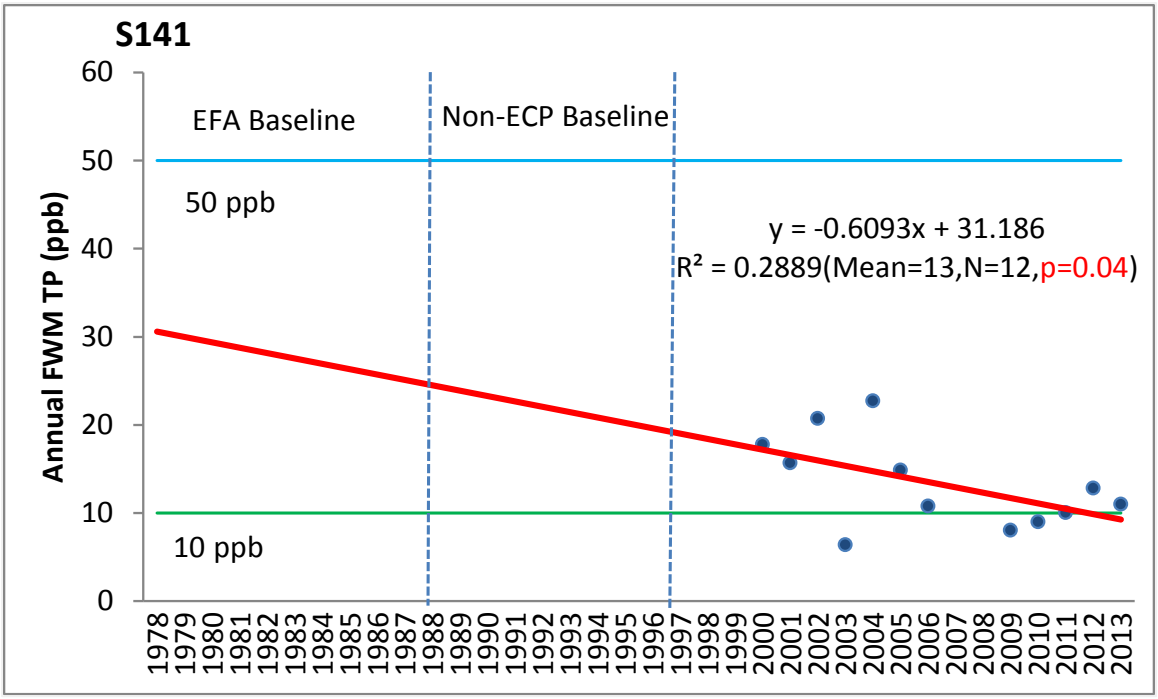

Figure F-9. Annual FWM TP concentration trend at the S-141 structure.

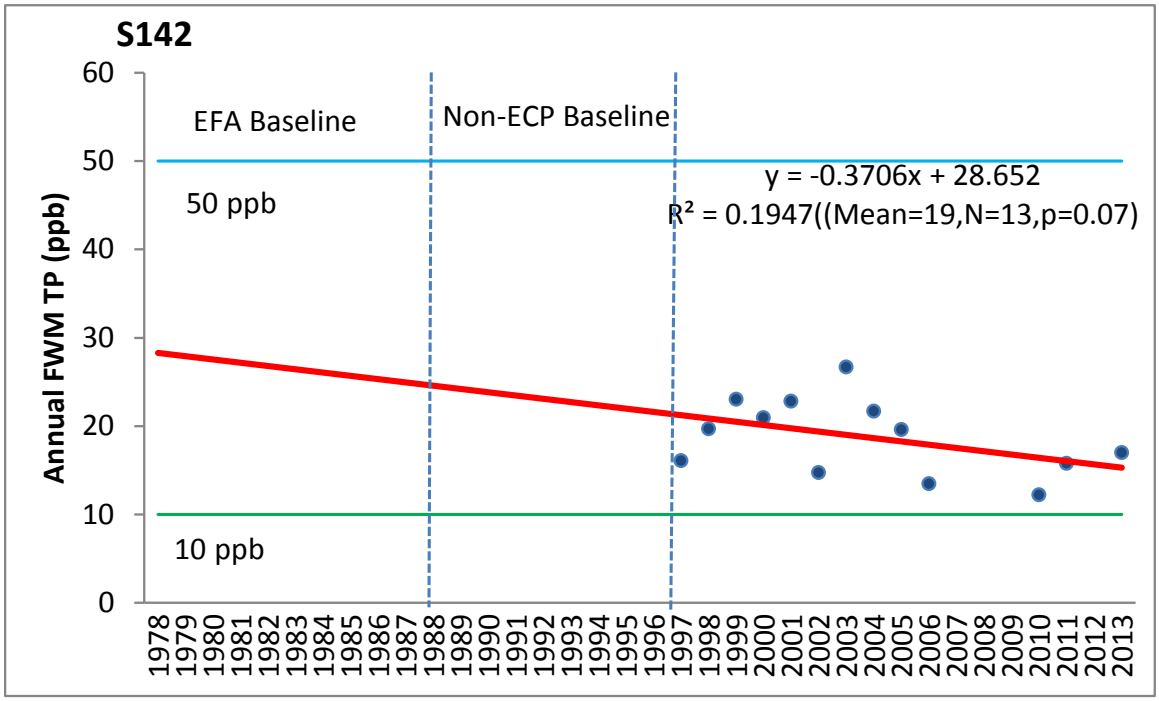

Figure F-10. Annual FWM TP concentration trend at the S-142 structure.

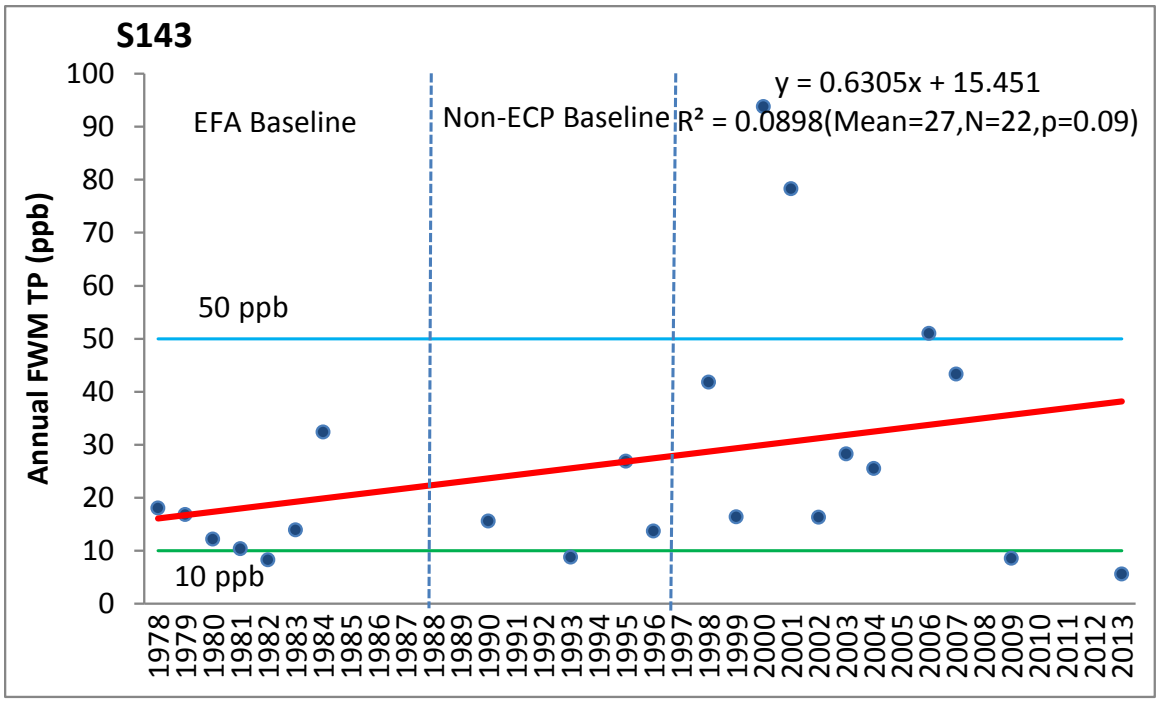

Figure F-11. Annual FWM TP concentration trend at the S-143 structure.

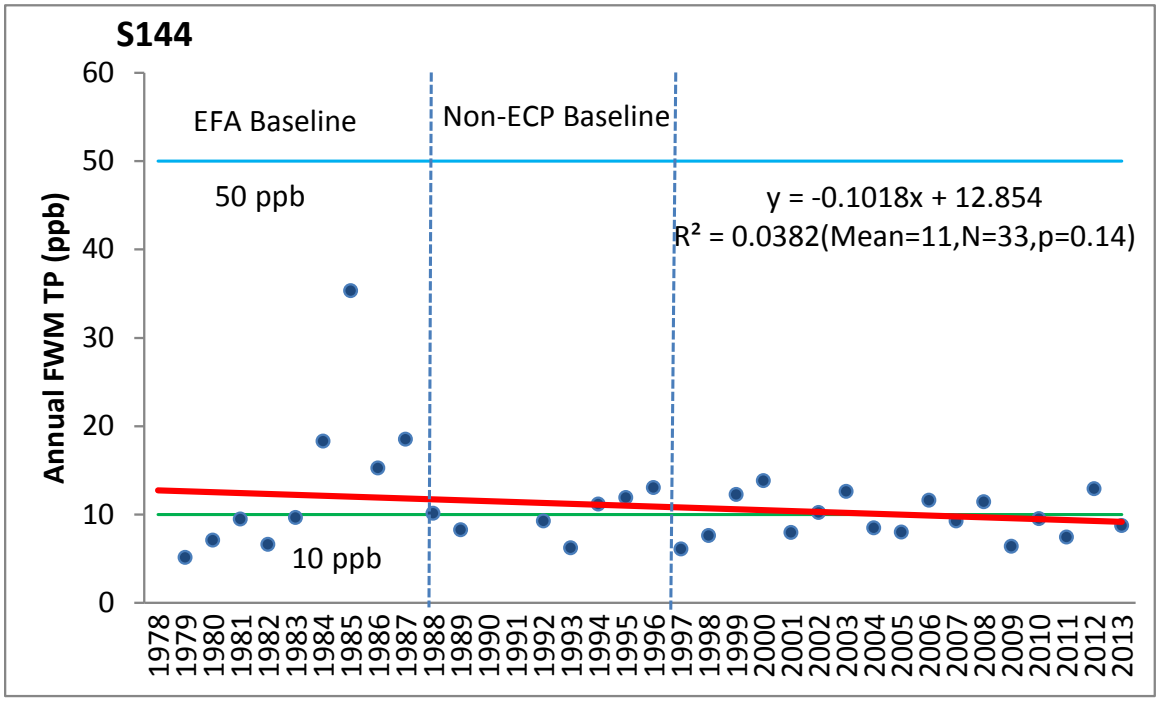

Figure F-12. Annual FWM TP concentration trend at the S144 structure

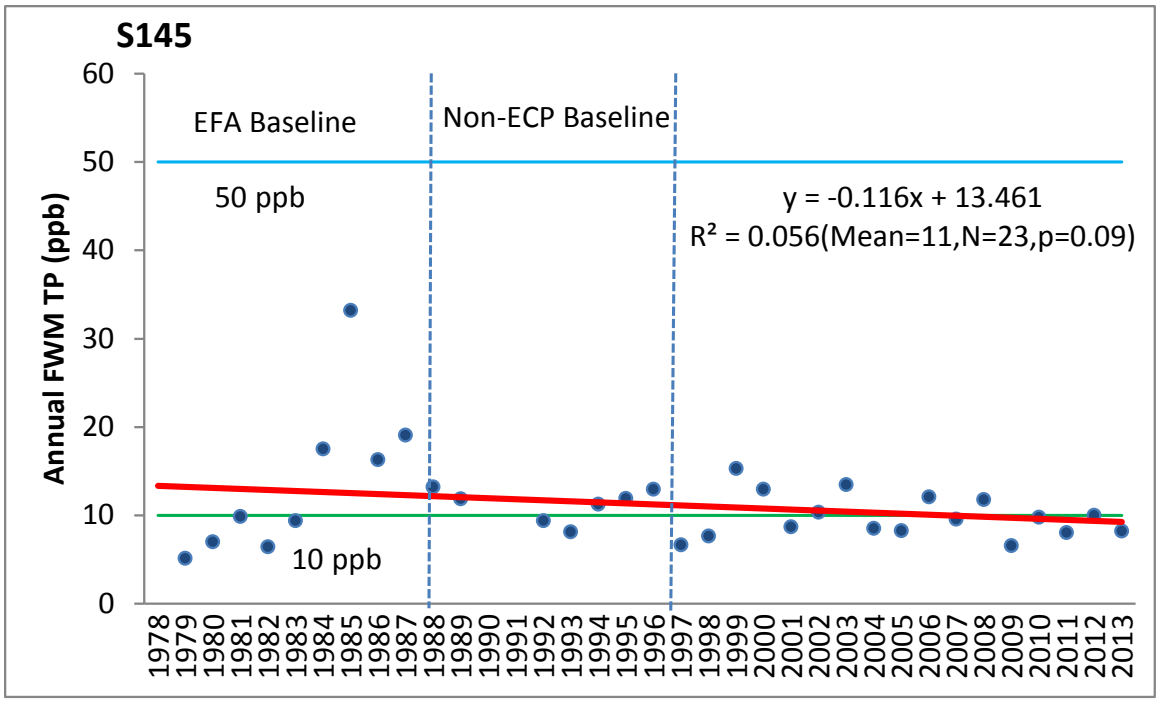

Figure F-13. Annual FWM TP concentration trend at S145 structure.

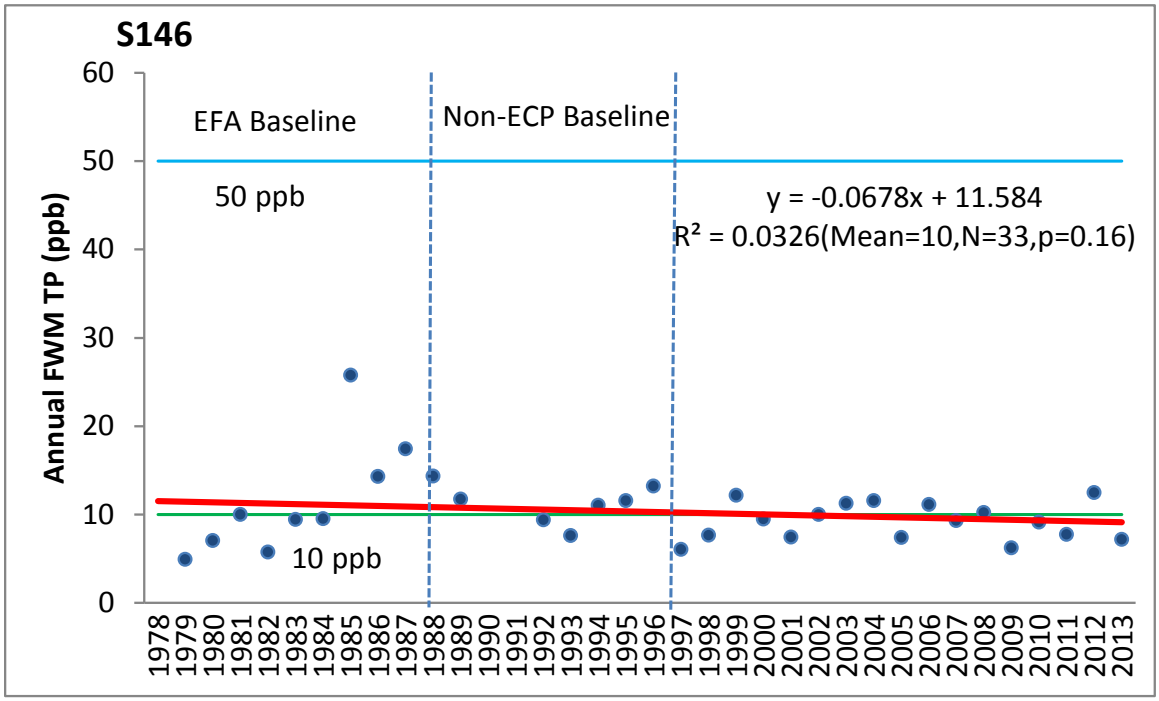

Figure F-14. Annual FWM TP concentration trend at the S-146 structure.

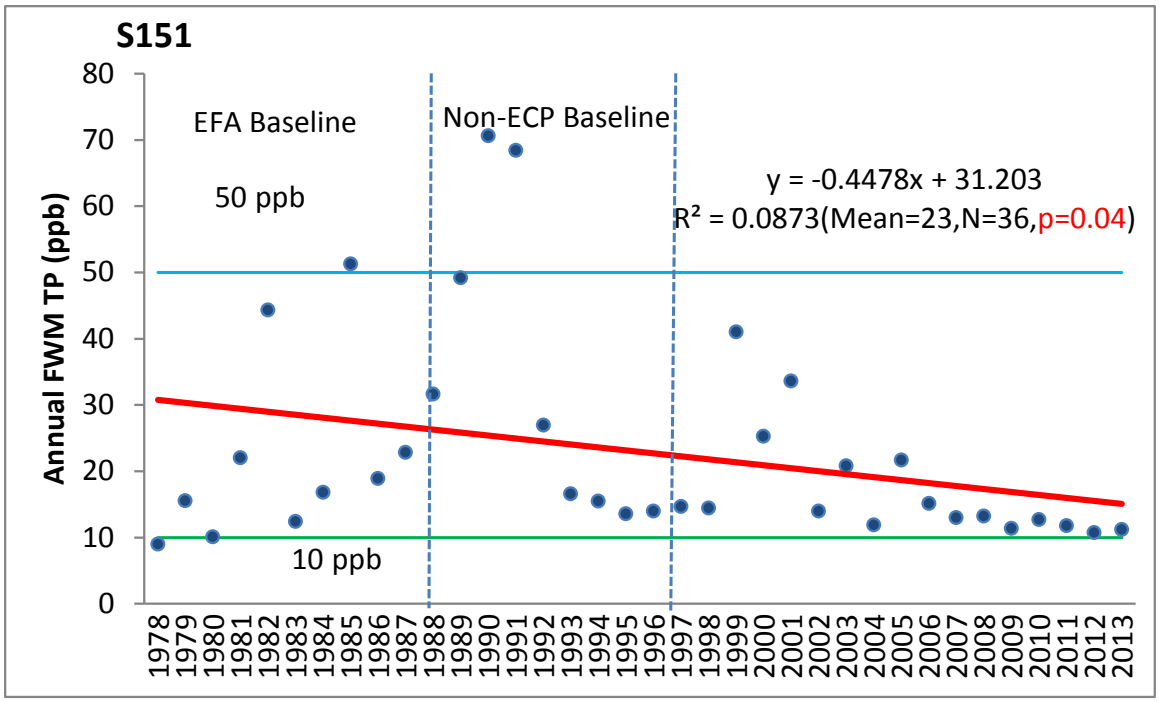

Figure F-15. Annual FWM TP concentration trend at the S-151 structure.

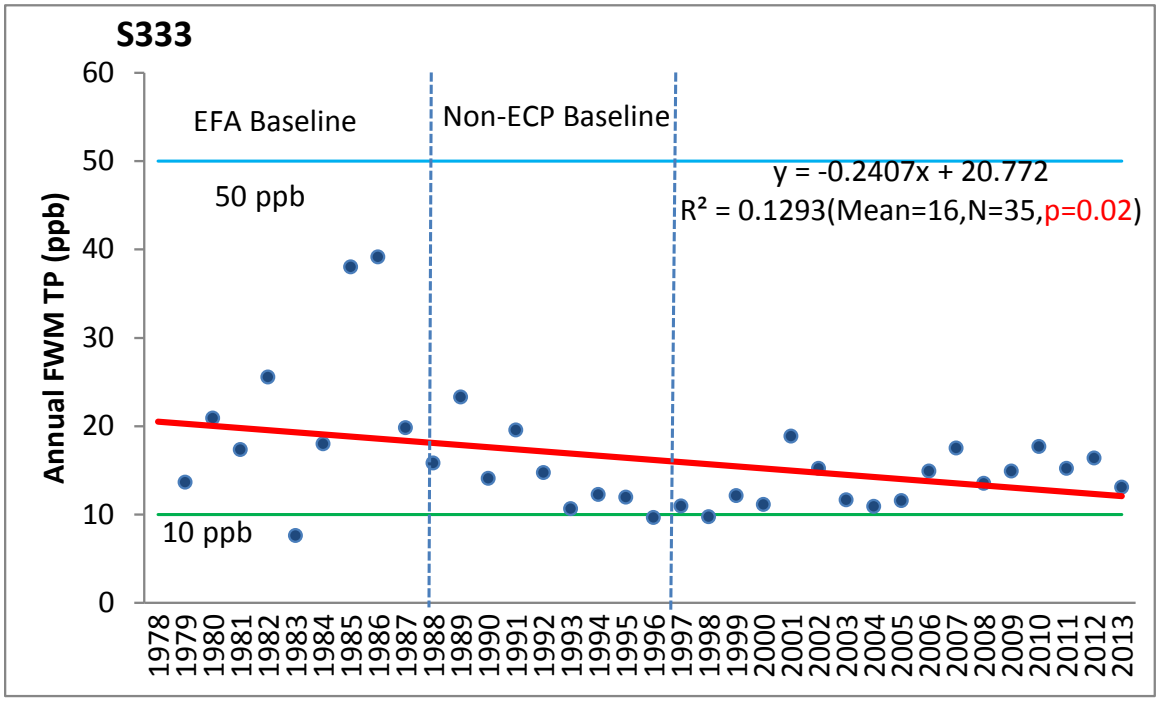

Figure F-16. Annual FWM TP concentration trend at the S-333 structure.

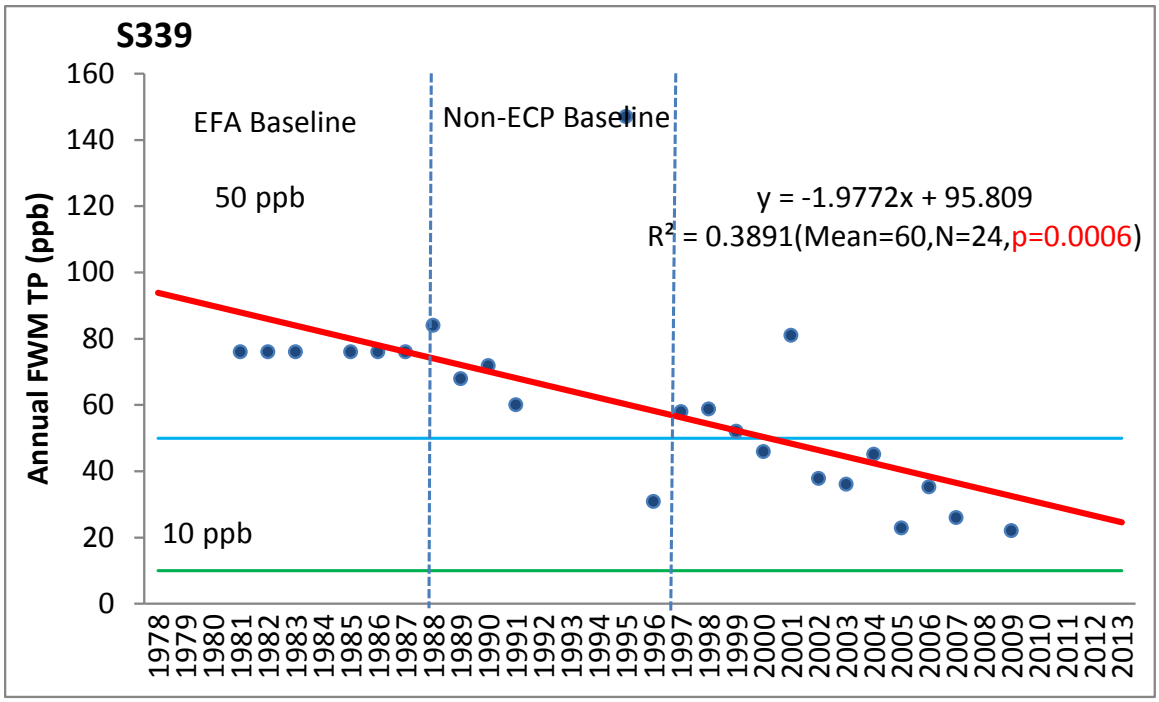

Figure F-17. Annual FWM TP concentration trend at the S-339 structure.

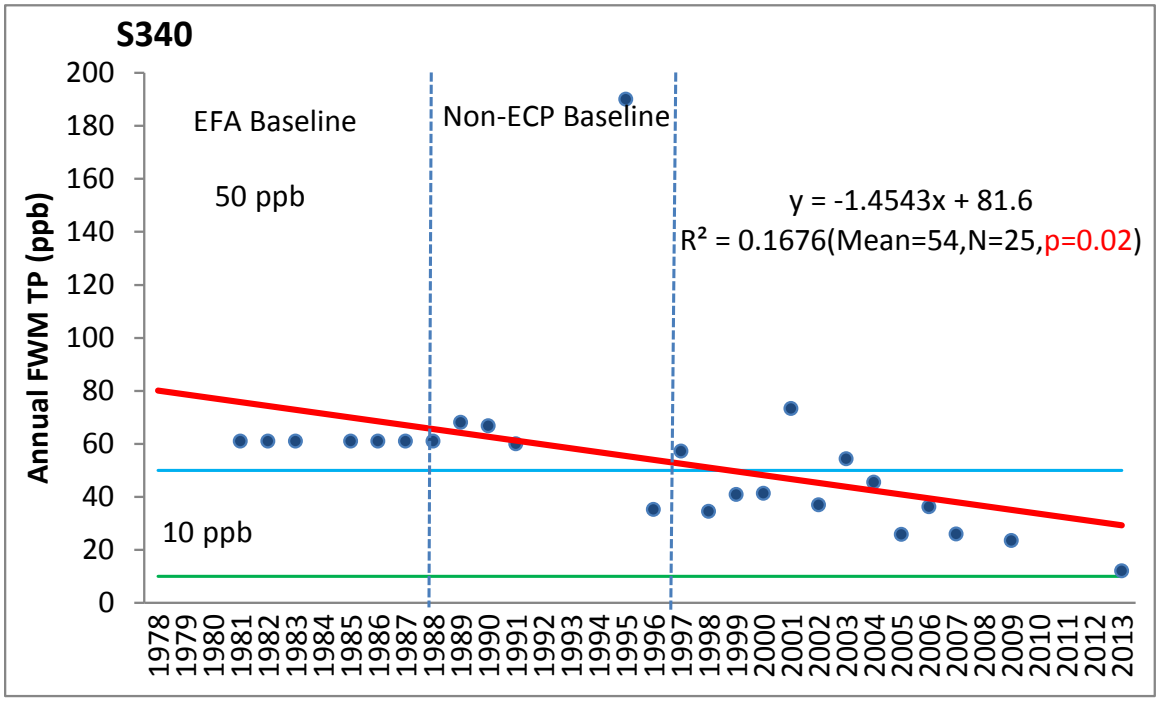

Figure F-18. Annual FWM TP concentration trend at the S-340 structure.

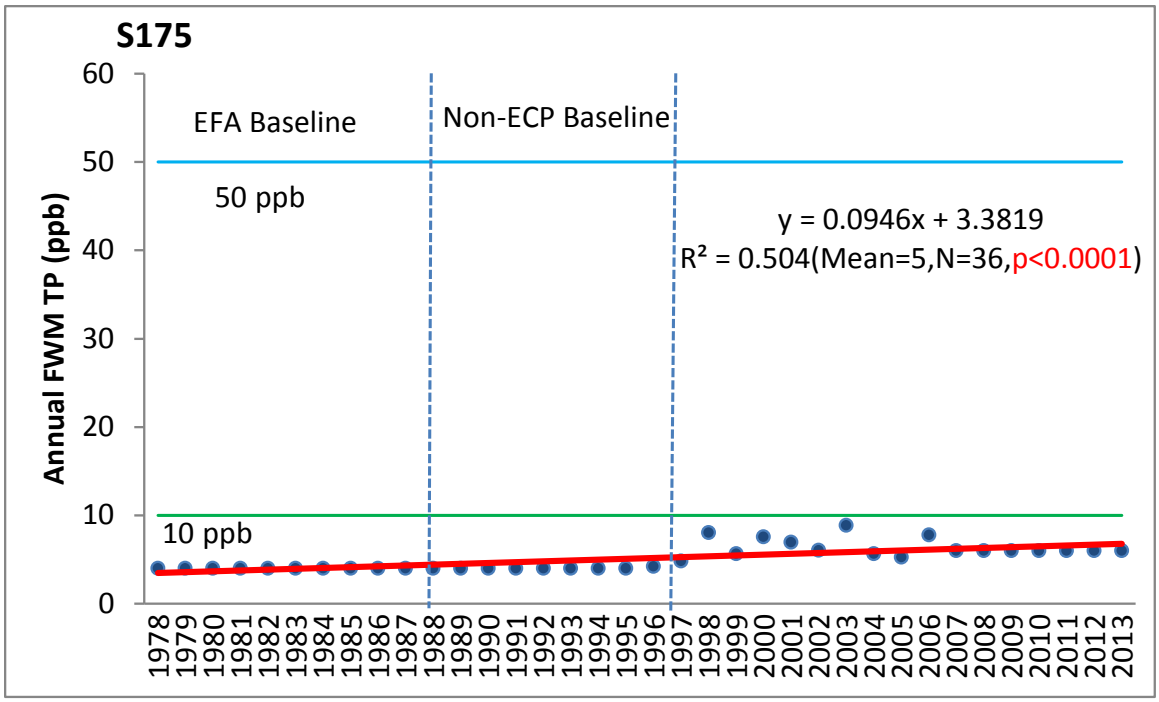

Figure F-19. Annual FWM TP concentration trend at the S-175 structure.

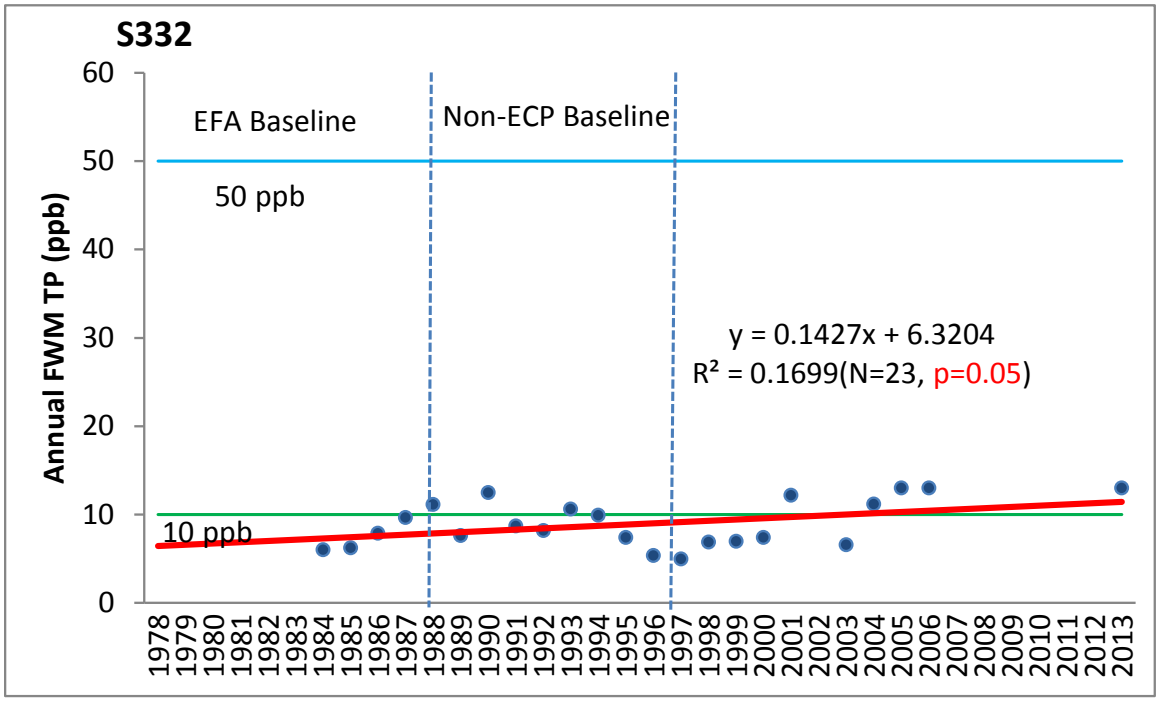

Figure F-20. Annual FWM TP concentration trend at the S-332 structure.

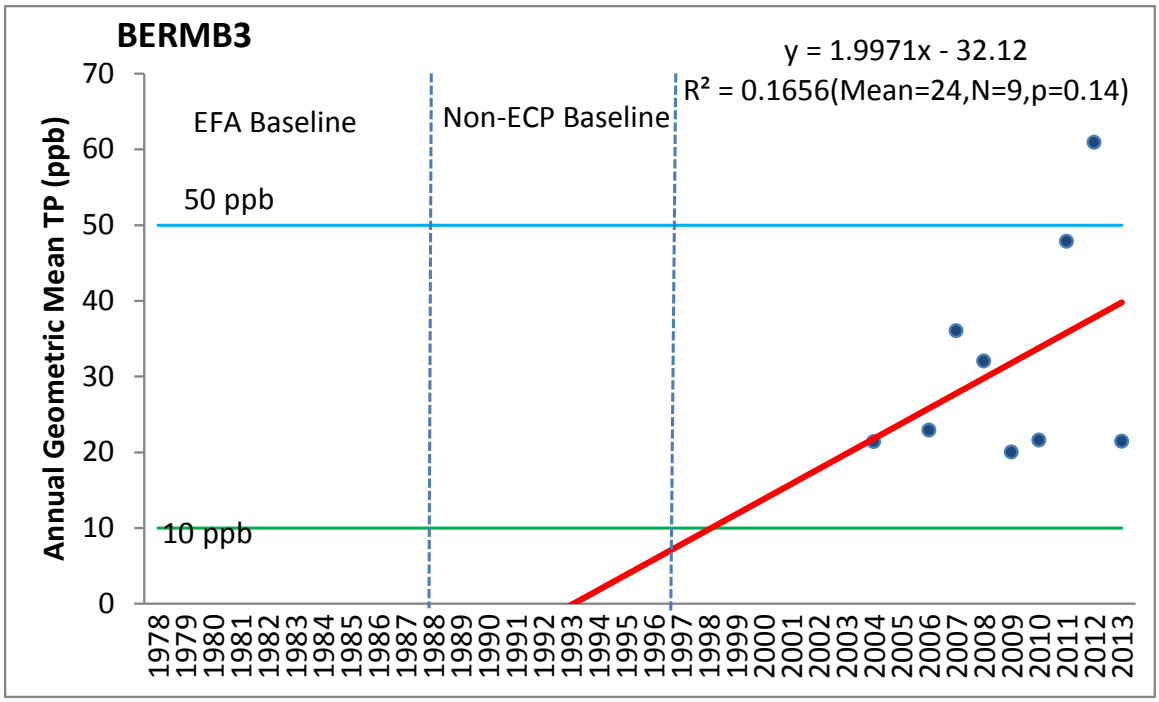

Figure F-21. Annual Geometric Mean TP concentration trend at the BERMB3 structure.

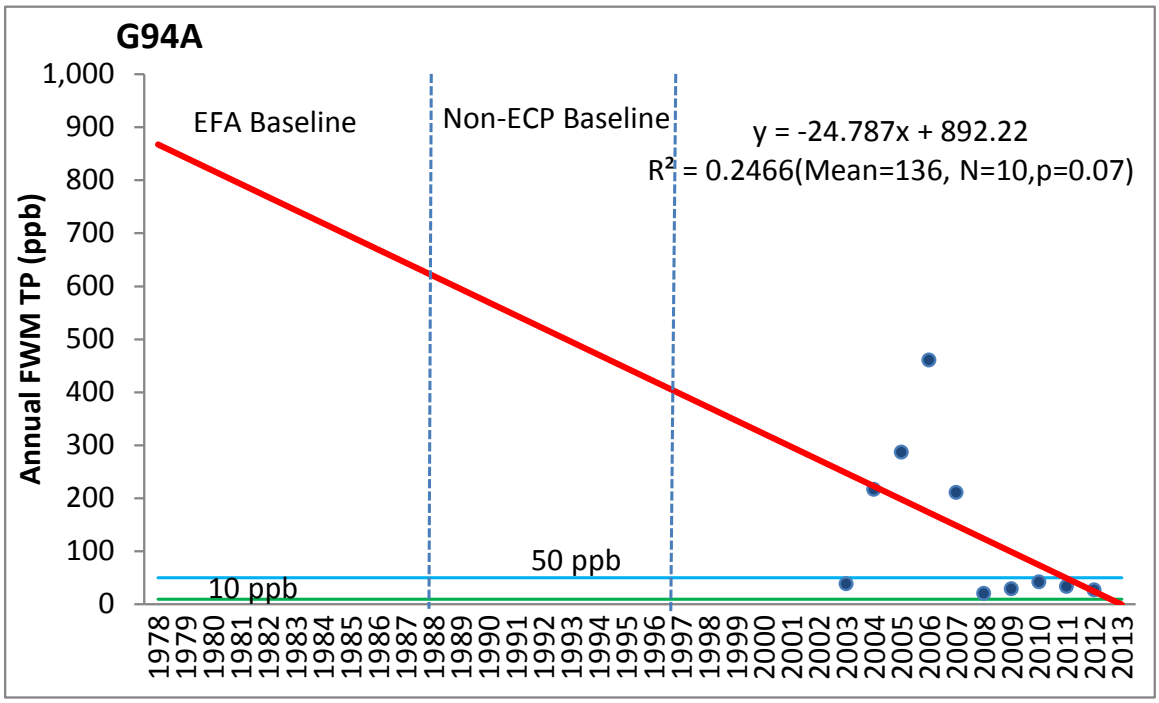

Figure F-22. Annual FWM TP concentration trend at the G-94A structure.

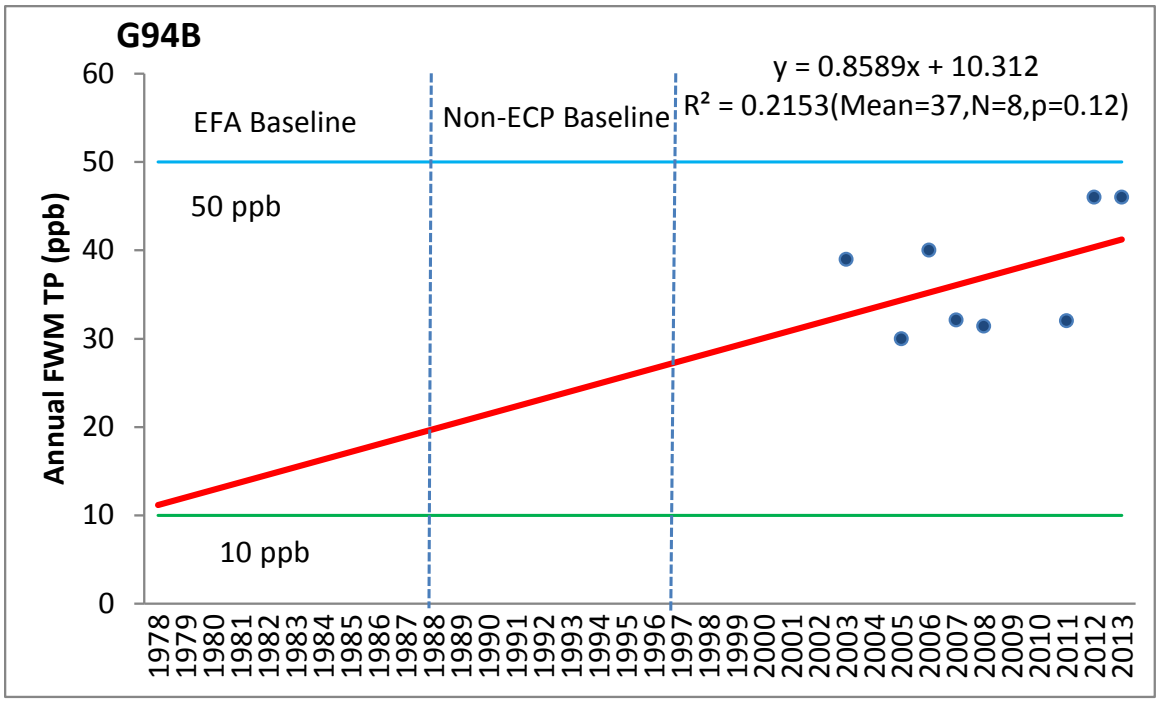

Figure F-23. Annual FWM TP concentration trend at the G-94B structure.

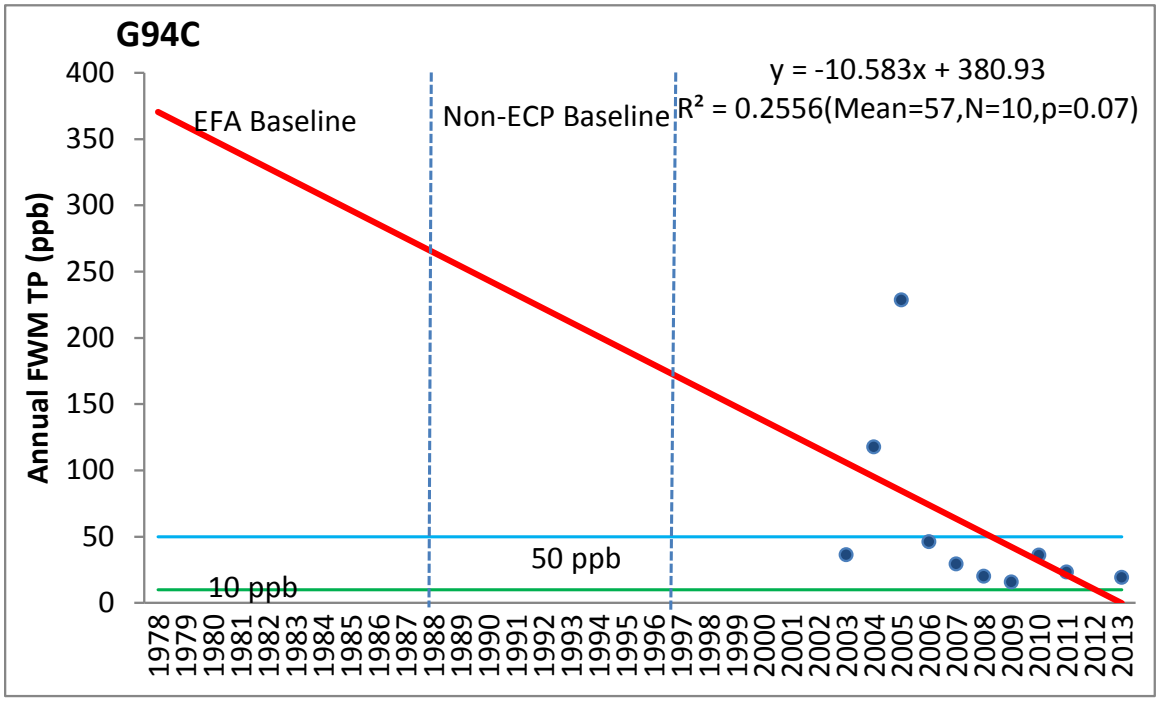

Figure F-24. Annual FWM TP concentration trend at the G-94C structure.

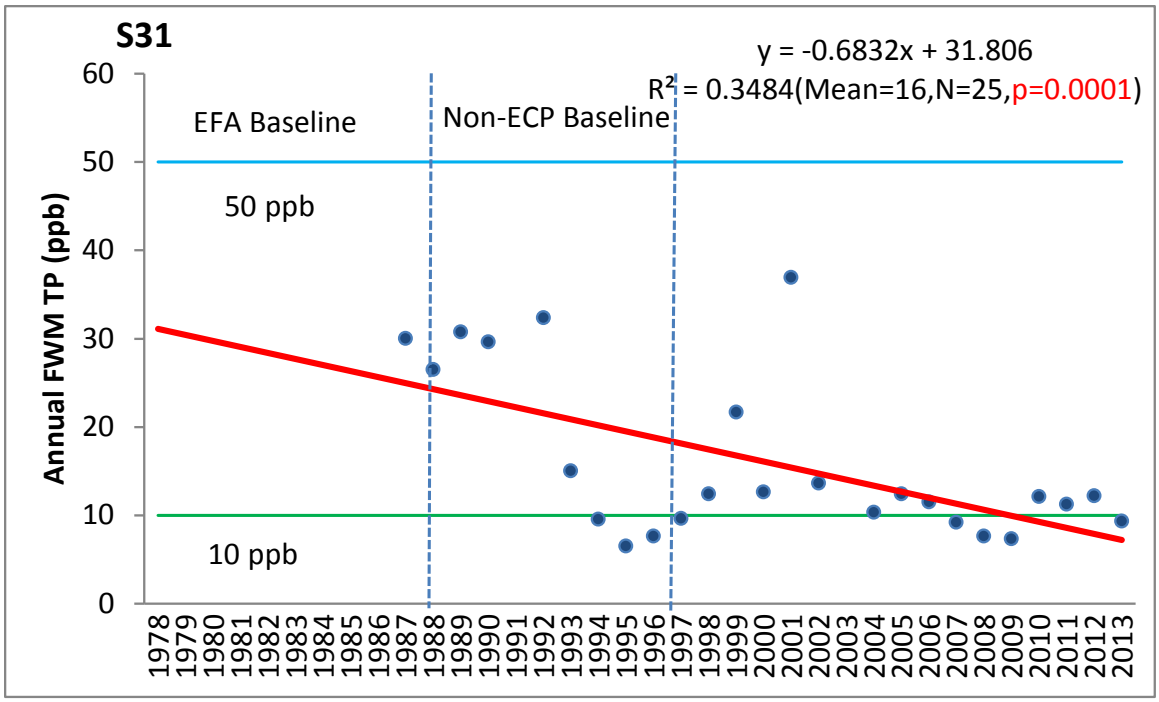

Figure F-25. Annual FWM TP concentration trend at the S-31 structure.

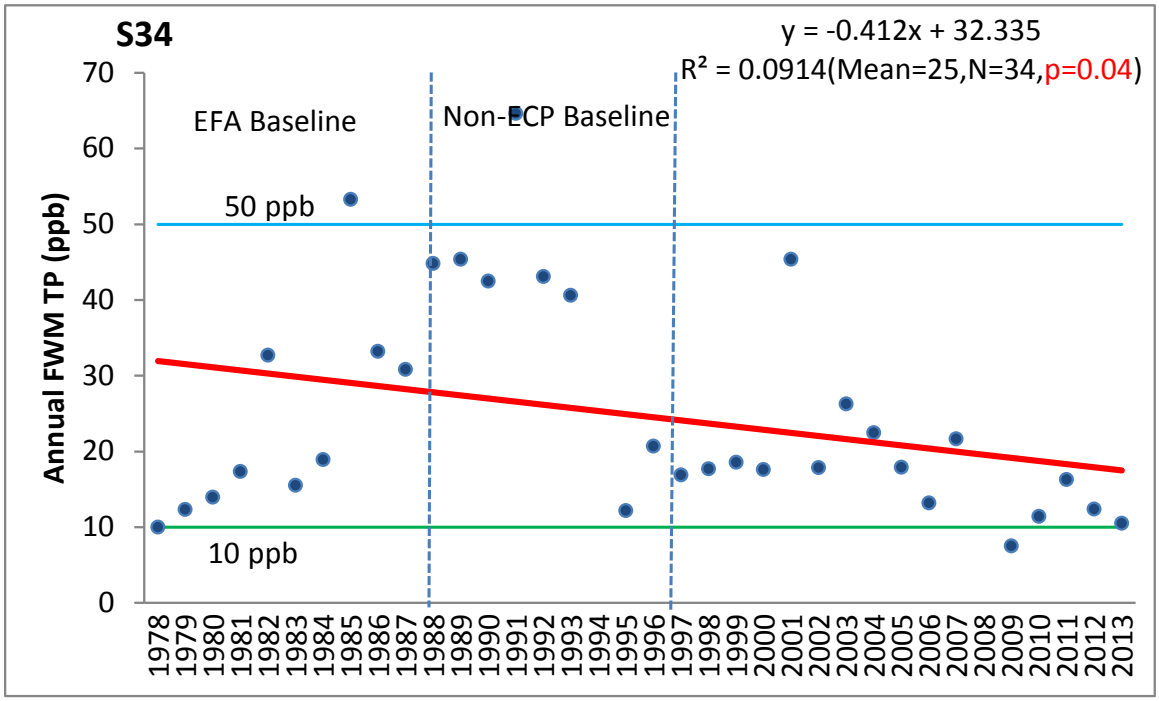

Figure F-26. Annual FWM TP concentration trend at the S-34 structure.

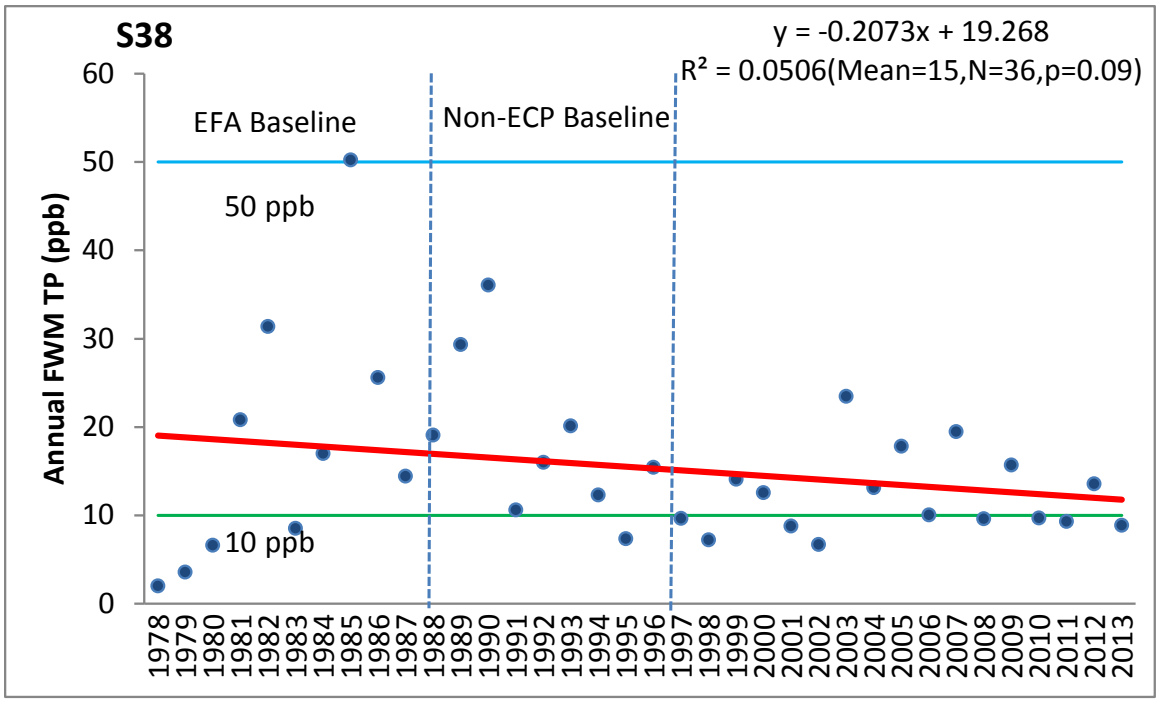

Figure F-27. Annual FWM TP concentration trend at the S-38 structure.

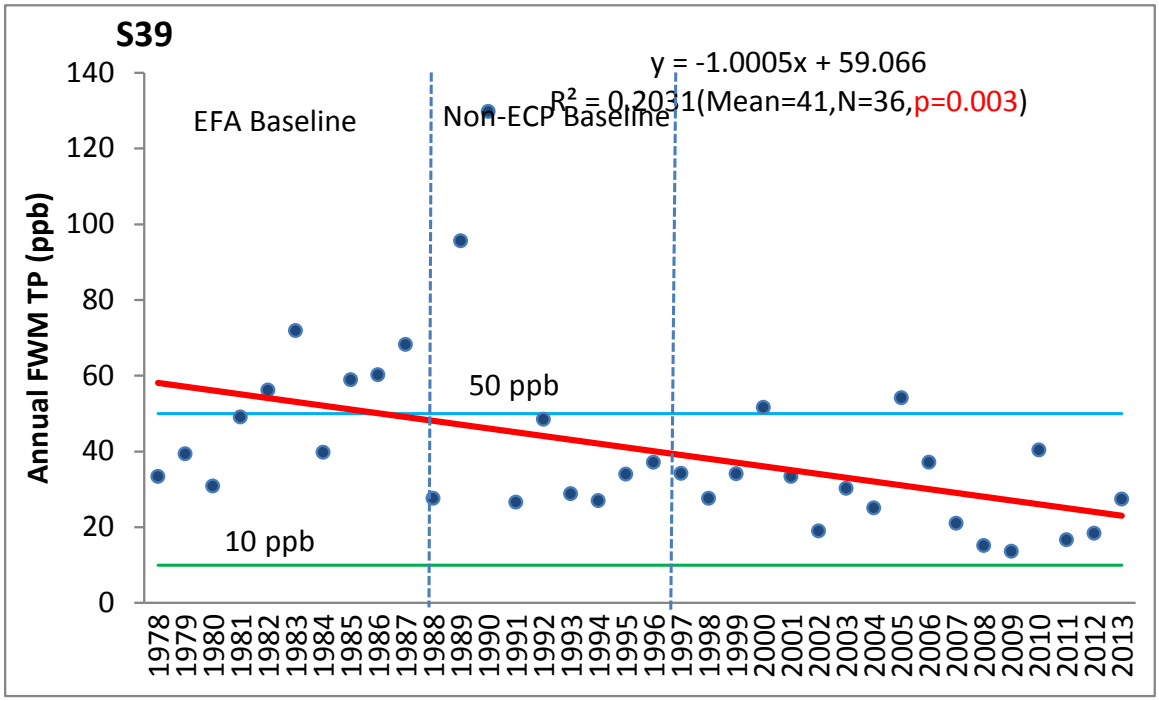

Figure F-28. Annual FWM TP concentration trend at the S-39 structure.

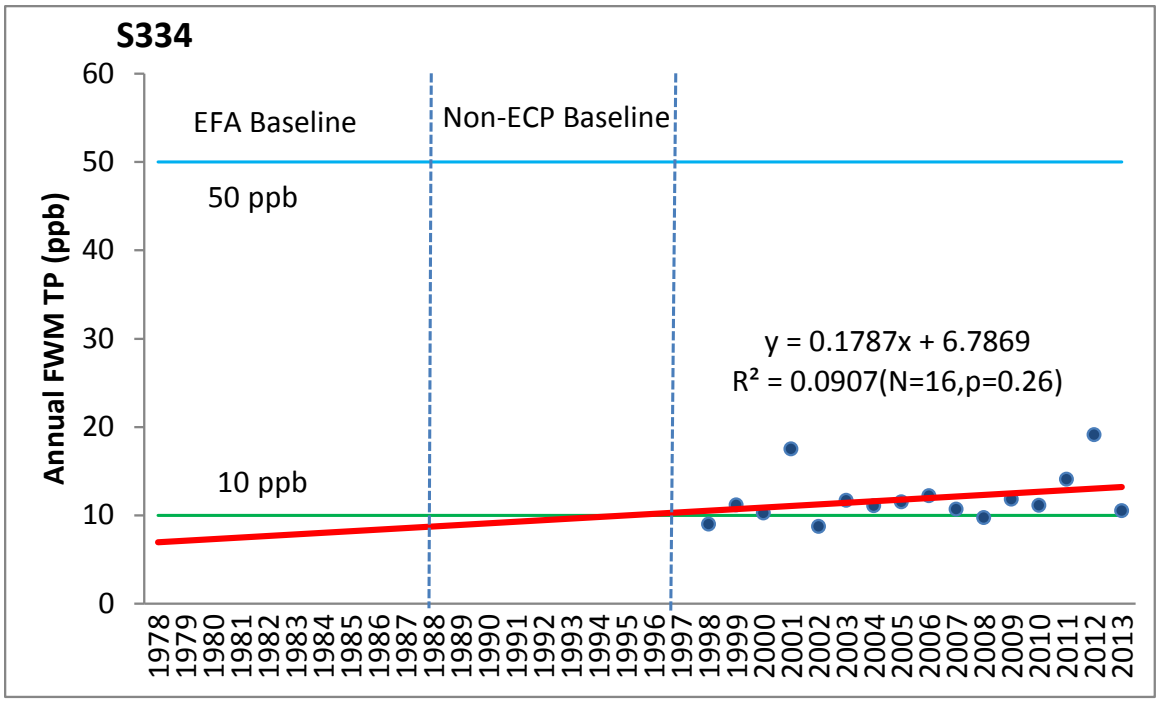

Figure F-29. Annual FWM TP concentration trend at the S-334 structure.

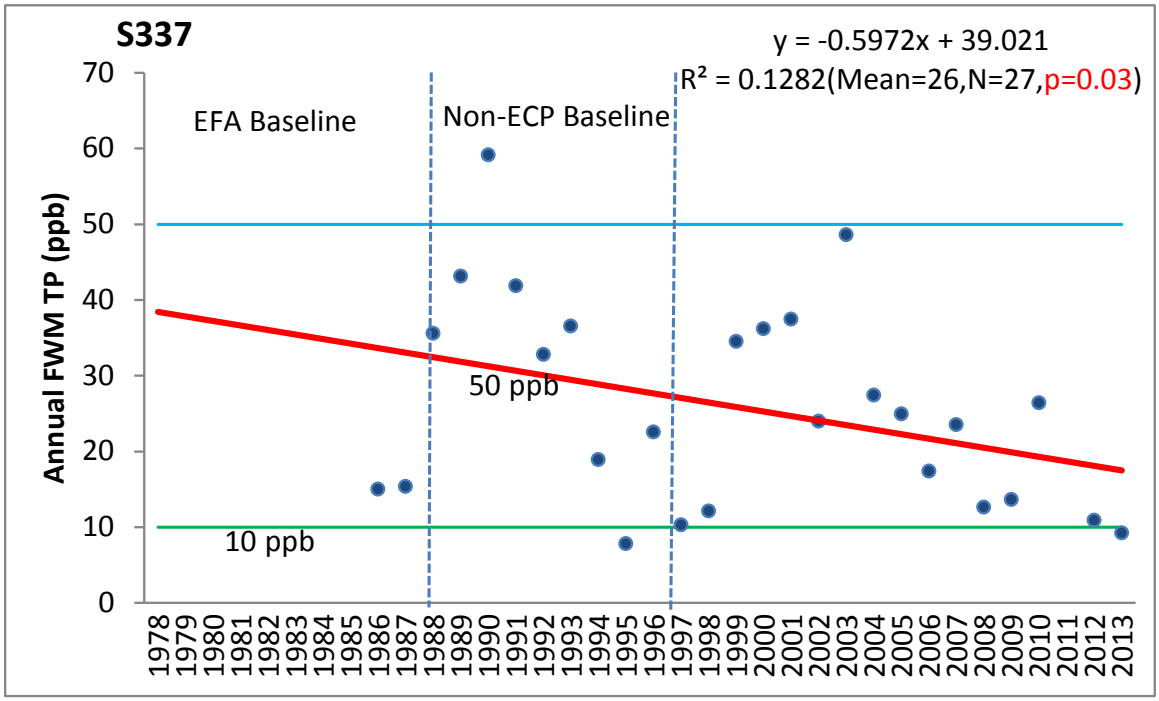

Figure F-30. Annual FWM TP concentration trend at the S-337 structure.

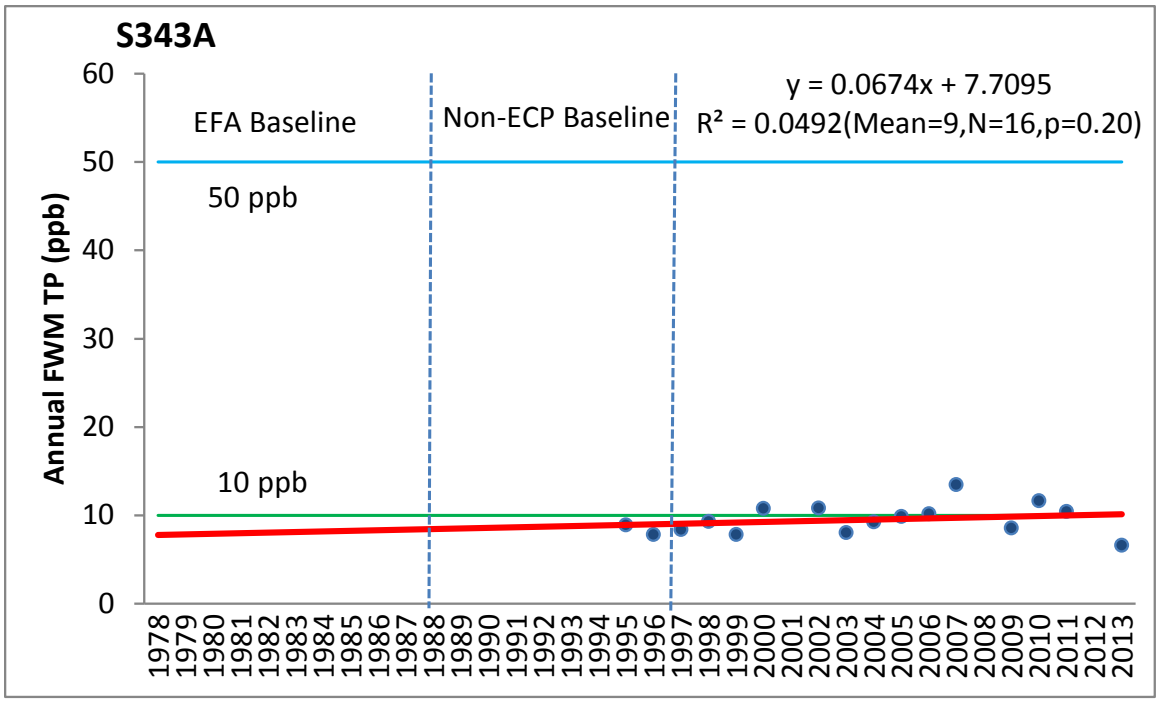

Figure E-31. Annual FWM TP concentration trend at the S-343A structure.

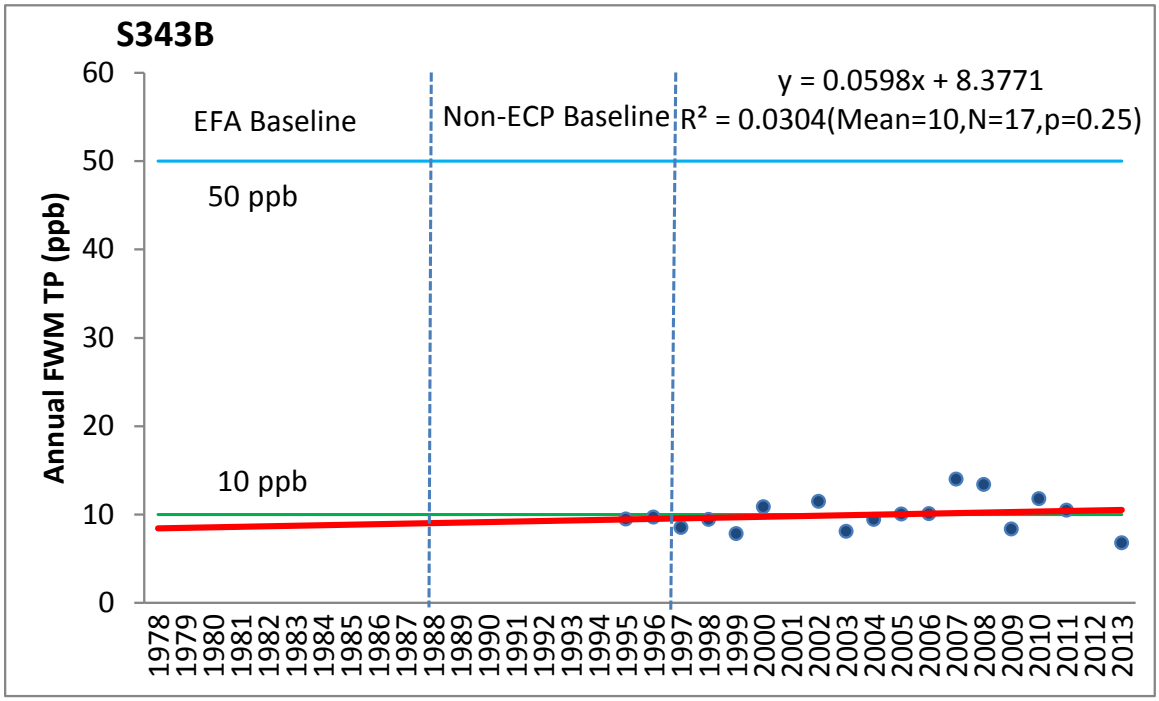

Figure F-32. Annual FWM TP concentration trend at the S-343B structure.

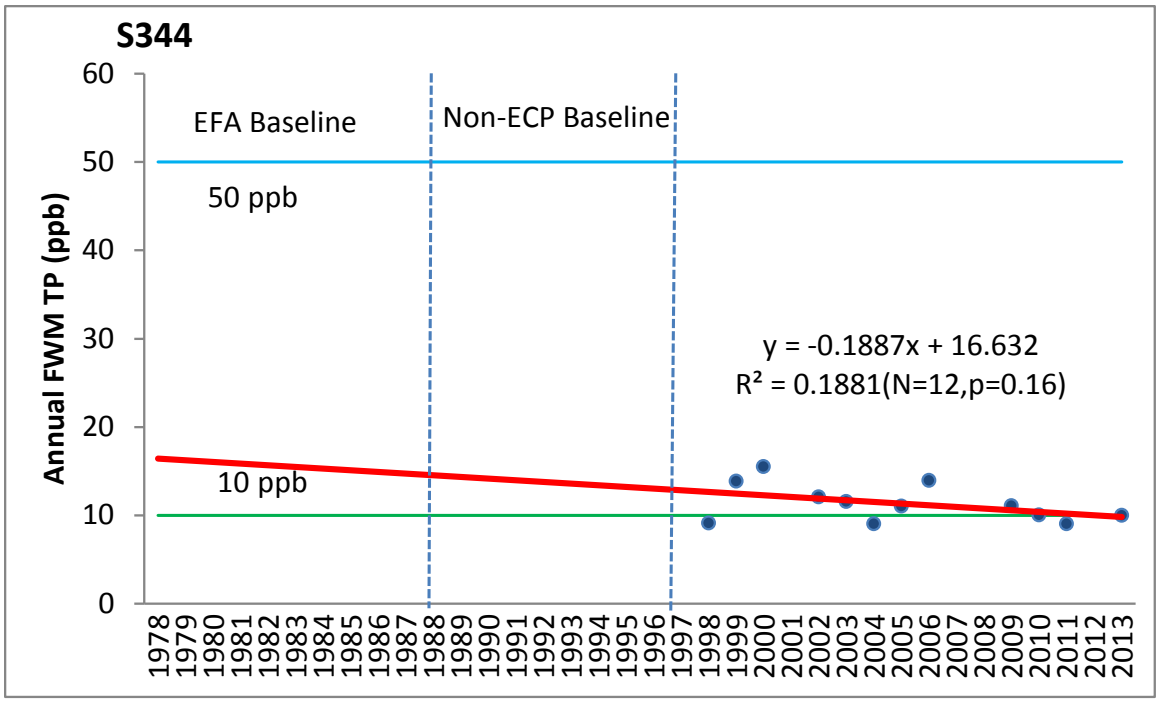

Figure F-33. Annual FWM TP concentration trend at the S-344 structure.

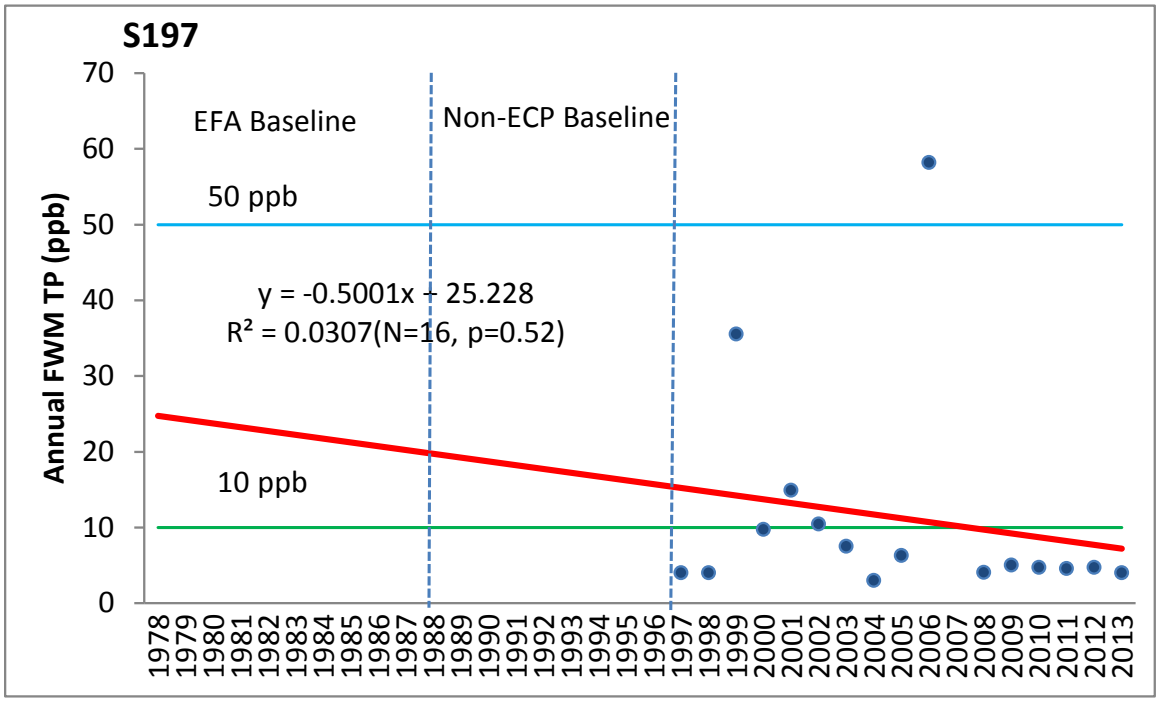

Figure F-34. Annual FWM TP concentration trend at the S-197 structure.

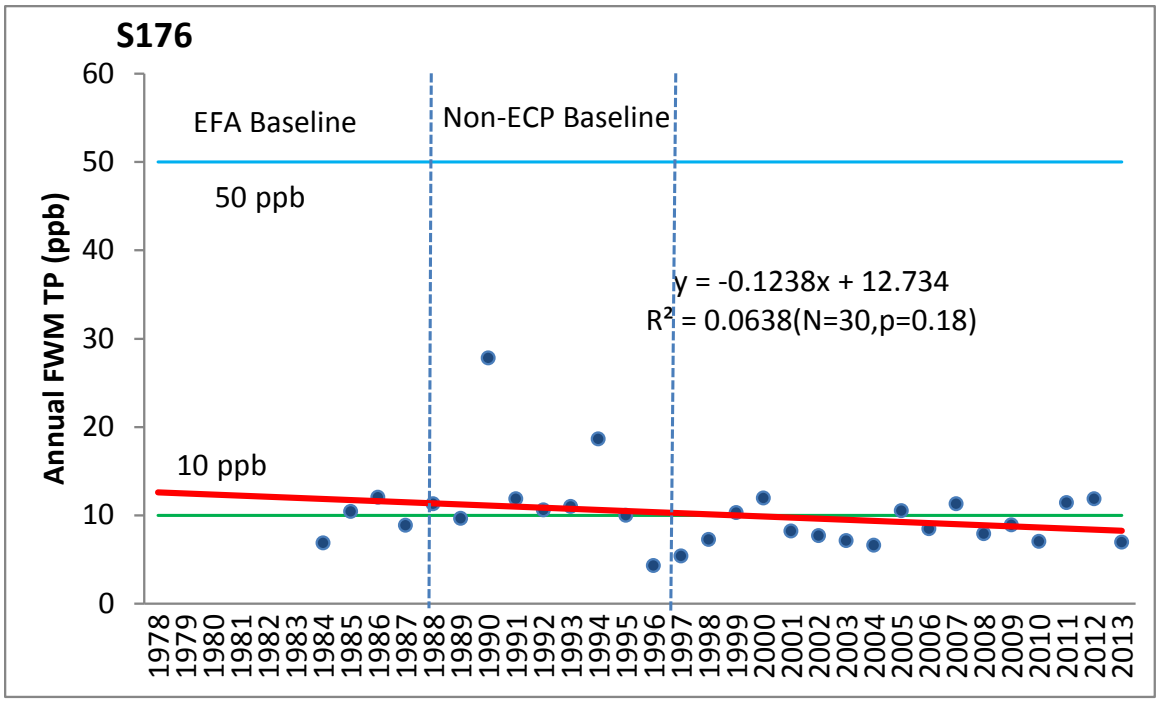

Figure F-35. Annual FWM TP concentration trend at the S-176 structure.

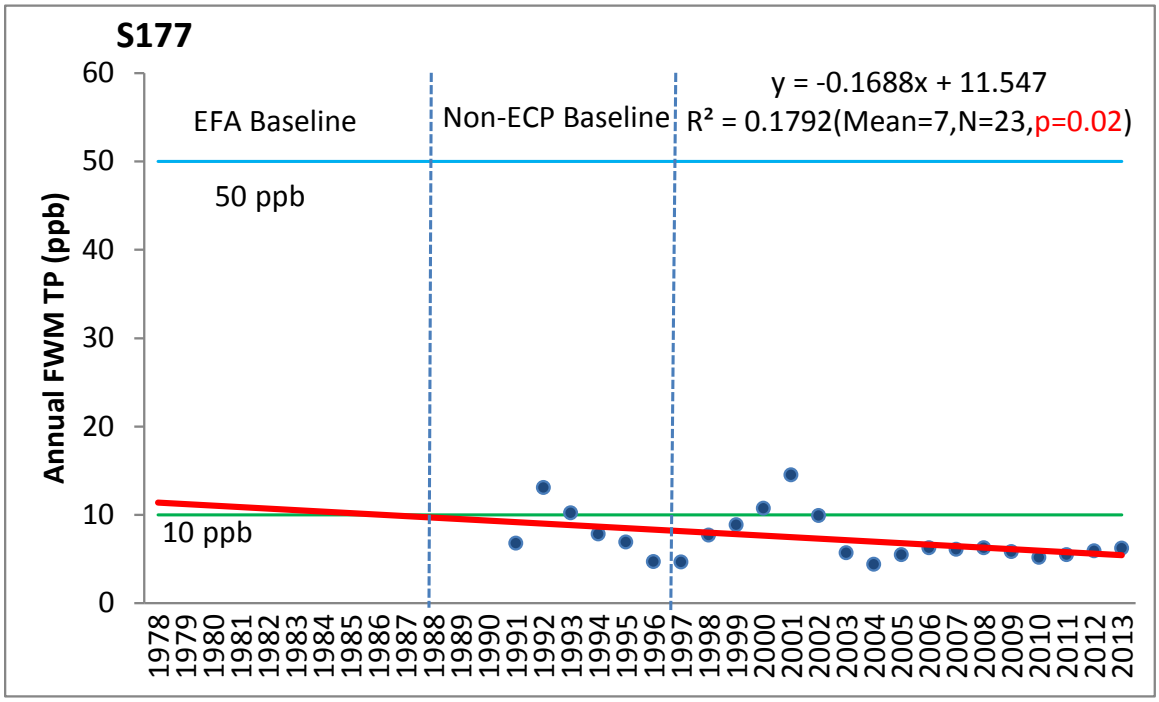

Figure F-36. Annual FWM TP concentration trend at the S-177 structure.

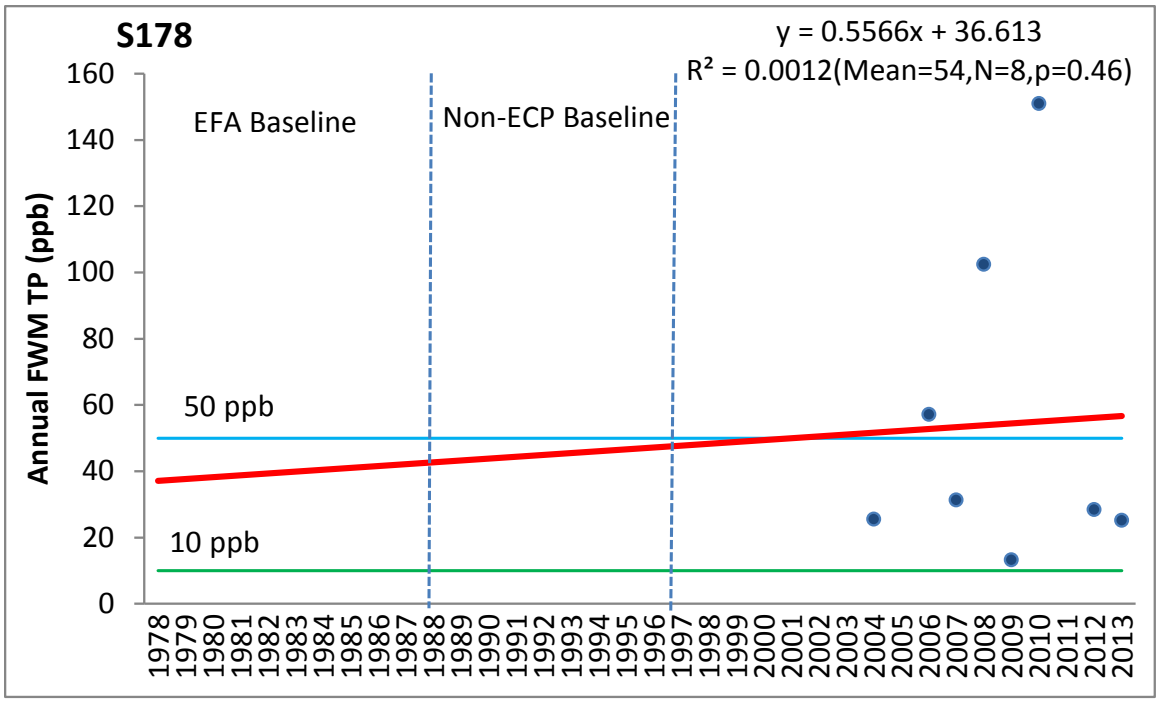

Figure F-37. Annual FWM TP concentration trend at the S-178 structure.

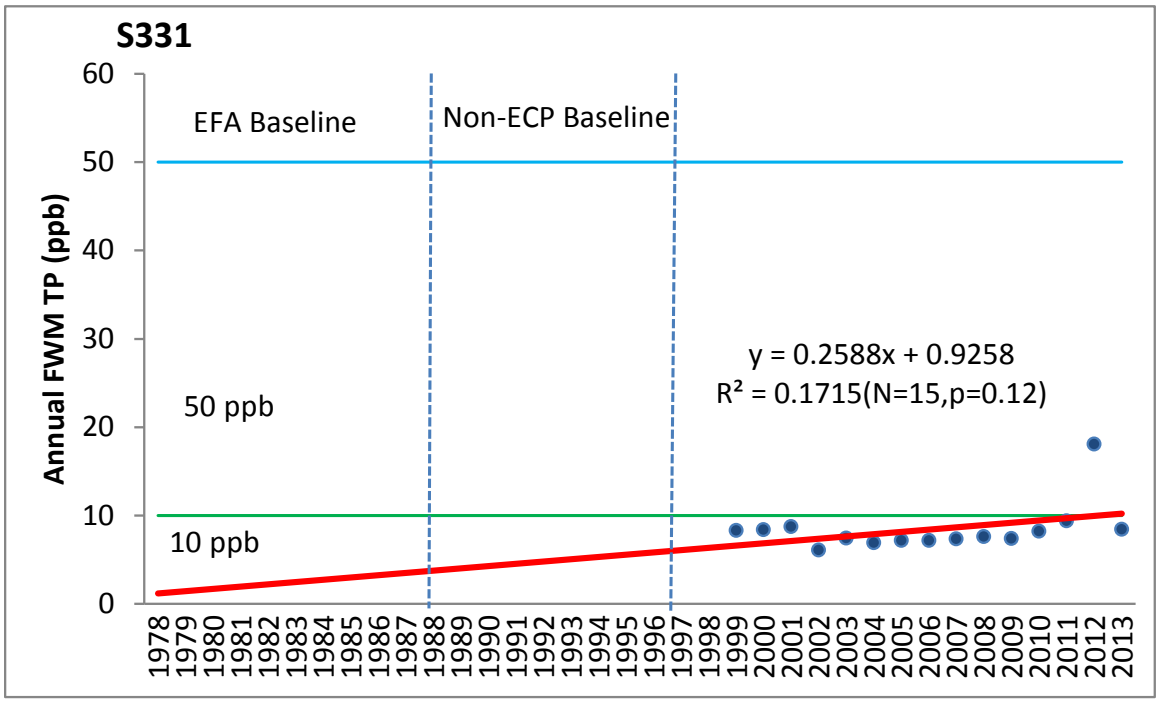

Figure F-38. Annual FWM TP concentration trend at the S-331 structure.

Attachment G: Non-ECP Annual Permit Compliance Monitoring Report for Mercury in Downstream Receiving Waters of the Everglades Protection Area

Ben Gu and Nicole Howard

Contributors: Joseph Claude, Deena Ruiz,
Richard Walker, Michael Wright,
and Yvette Rauscher

SUMMARY

This attachment summarizes data from compliance monitoring of mercury influx and bioaccumulation in the downstream receiving waters of the EPA. Results in this attachment are based on CY2012 for atmospheric wet deposition, and WY2012 for total mercury (THg) in fish.

Key findings presented in this attachment:

1. Total annual wet deposition for the EPA in CY2012 was 166 kilograms of mercury per year (kg Hg/yr), which is 10 kg Hg higher than CY2011. In CY2012, annual volume-weighted THg concentrations increased at all three stations since CY2011. Typically, missed samples occurred as a result of issues associated with sample handling, low collection volumes, and mechanical failures. Consequently, estimates for both the volume-weighted (wet) concentration and annual wet deposition should be considered along with these uncertainties.
2. Mosquitofish (*Gambusia holbrooki*) collected from downstream marsh sites had THg levels ranging from 10 ng/g at site WCA2F1 to 194 ng/g at site WCA2U3. The average basin-wide concentration in WY2013 was 66 ng/g, representing a 28 percent decrease from the basin-wide mean concentration in WY2012. The grand mean for the period of record (POR) (WY1999–WY2013) over all basins is 75 ng/g, which is below USEPA criterion for trophic level III fish. Compared to significant increases in mosquitofish THg level in WY2012, in WY2013, eleven of the twelve monitoring sites displayed decreases in THg level. The decline in mosquitofish THg concentration is likely associated with high rainfall in WY2013, which helped prevent soil oxidation that would have released mercury, organic matter and sulfate in the marsh area.
3. Sunfish (*Lepomis* spp.) collected from downstream sites had THg levels ranging from a minimum of 88 ng/g at site HOLYBC to a maximum of 284 ng/g at site CA35ALT. The basin-wide average concentration for sunfish in WY2013 was 173 ng/g, representing a 21 percent decrease from WY2012. In WY2013, sunfish continued to show marked

spatial variation in THg levels. Fish from sites LOXF4, CA35ALT, CA315, L67F1, and WCA2U3 showed the highest average concentrations, ranging from 178–278 ng/g.

4. Fillets from individual largemouth bass (*Micropterus salmoides*) (LMB) were collected from eight of the twelve downstream sites in WY2013, and had tissue THg concentrations ranging from a minimum of 63 ng/g (age 1) at site CA2NF to a maximum of 1,900 ng/g (age 4) at site L67F1, both of which are significantly lower than in WY2012. Site-specific, age-standardized concentrations (estimated for a three-year-old bass, EHg3) ranged from 540 ng/g at site CA2NF to 1,292 ng/g at site L67F1.
5. Collections of great egret *(Ardea alba*) feathers in WY2013 were attempted, but not obtainable, due to time constraints imposed by the Florida Fish and Wildlife Conservation Commission (FWC) scientific collecting permit. Since collections began in 1999, wading bird feathers were collected from thirteen locations in WCA-3A.
6. For WY2013, average THg concentrations decreased by 28 percent in mosquitofish, 21 percent in sunfish, and 28 percent in largemouth bass. Available data showed that the northernmost sites are still comparatively low in tissue THg concentration in LMB. L67F1 remains highest in LMB THg concentration, but showed a 42 percent decrease in WY2013. WCA-2U3 displayed a slight increase in LMB THg level. Based on guidance from USFWS and USEPA on mercury concentrations in fish, localized populations of fish-eating birds and mammals continue to be at potential risk from adverse effects due to mercury exposure, depending on their respective foraging areas. Consequently, most of South Florida remains under fish consumption advisories for the protection of human health.

INTRODUCTION

This attachment is the annual permit compliance report for CY2012 for atmospheric deposition, and WY2013 for fish, summarizing the results of mercury monitoring in the downstream receiving waters of the EPA. Following the past three years of feather data collection by the University of Florida, in both WY2012 and WY2013, the District brought feather collection back in-house; however, great egret data is again not available for this reporting period due to constraints imposed by the FWC scientific collecting permit. This report, along with Appendix 3-1, Attachment C of this volume, satisfies the mercury-related reporting requirements of the FDEP Non-ECP Permit Number 0237803-11.

BACKGROUND

In 1994, the Florida legislature enacted the EFA (Chapter 373.4592, F.S.), which established long-term water quality goals for the restoration and protection of the Everglades. To achieve these goals, the District implemented the Everglades Construction Plan. A crucial element of EFA implementation was wetland construction (Everglades STAs) to reduce phosphorus loading in runoff from the Everglades Agricultural Area (EAA). The original STAs were built mainly on formerly cultivated lands within the EAA, and total over 26,000 hectares (approximately 65,000 acres, equating to approximately 45,000 acres of effective treatment area). The downstream receiving waters to be restored and protected by the EFA are part of the EPA.

Despite legislation and related goals, concerns were expressed that the restoration effort might inadvertently worsen the Everglades mercury problem while reducing downstream eutrophication (Mercury Technical Committee, 1991). Mercury is a persistent, bioaccumulative, toxic pollutant that can build up in the food chain to levels harmful to human and wildlife health. Widespread elevated concentrations of mercury were first discovered in freshwater fish from the Everglades in 1989 (Ware et al., 1990). Based on the mercury levels observed in 1989, state fish

consumption advisories were issued for select species and locations [Florida Department of Health and Rehabilitative Services (FDOH) and Florida Game and Fresh Water Fish Commission (currently FWC), March 6, 1989]. Subsequently, elevated concentrations of mercury have also been found in predators, such as raccoons (*Procyon lotor*), alligators (*Alligator mississippiensis*), Florida panthers (*Felis concolor*), and wading birds (Fink et al., 1999).

A key to understanding the Everglades mercury problem is recognizing that it is primarily a methylmercury (MeHg) problem, not an inorganic or elemental mercury problem. MeHg is more toxic and bioaccumulative than the inorganic or elemental forms. Elsewhere in the world, industrial discharge or mine runoff (e.g., chlor-alkali plant in Lavaca Bay in Texas, New Idria Mine in California, and Idrija Mercury Mine in Slovenia) can contain THg concentrations much greater (in some areas three-hundredfold higher) than that found in the Everglades, but at the same time have lower MeHg concentrations. In the Everglades, atmospheric loading has been found to be the dominant, proximate source of inorganic mercury, with the ultimate source likely being coal-fired utility boilers (far field) and municipal and medical waste incinerators (Atkeson and Parks, 2002). After deposition, a portion of this inorganic mercury is then converted to MeHg by sulfate-reducing bacteria (SRB) in the sediments of aquatic systems (Gilmour et al., 1992; Gilmour et al., 1998; Jeremiason et al., 2006). This methylation process is extraordinarily effective in the Everglades due to the availability of sulfate, the large pool of labile dissolved organic matter, and high mercury input from atmospheric deposition (Gilmour and Krabbenhoft, 2001; Renner, 2001; Bates et al., 2002).

To provide assurance that EFA implementation was not exacerbating the mercury problem, construction and operation permits for the STAs, issued by the FDEP, required that the District monitor the levels of THg and MeHg in various abiotic (e.g., water and sediment) and biotic (e.g., fish and bird tissues) media within both the downstream receiving waters of the EPA and in the STAs (see Volume I, Chapter 5). The downstream system is monitored to track changes in mercury concentrations over space and time in response to the changes in hydrology and water quality associated with the EFA.

MERCURY MONITORING AND REPORTING PROGRAM

RAINFALL

From 1992 through 1996, the District, FDEP, USEPA, and a consortium of southeastern U.S. power companies sponsored the Florida Atmospheric Mercury Study. The study results, in comparison with monitoring of surface water inputs to the Everglades, showed that more than 95 percent of the annual mercury came from rainfall. As such, it was clear that the major source of mercury to the Everglades was from the atmosphere. Accordingly, the District continues to monitor atmospheric wet deposition of THg to the Everglades by collecting information from the National Atmospheric Deposition Program's (NADP) Mercury Deposition Network (MDN). Under MDN protocols, bulk rainfall samples are collected weekly at Stormwater Treatment Area 1 West (STA-1W) (station FL34), Western Broward County (station FL97), and ENP (station FL11) to measure wet deposition (i.e., dry deposition is not measured) (for locations, see **Figure G-1**). Surface measurements at the Broward County station began at the end of November 2006, replacing the former Andytown station (FL04).

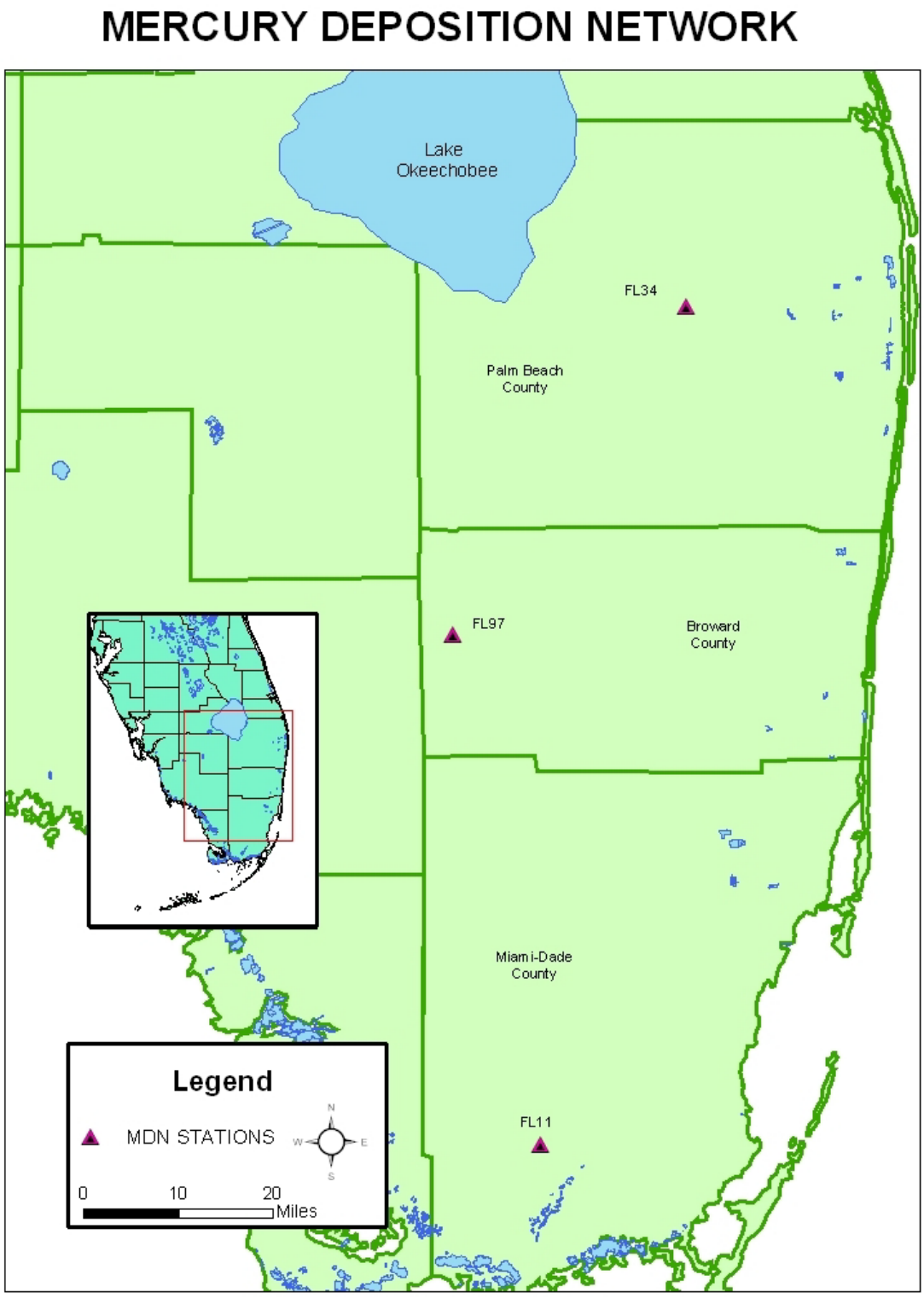

Figure G-1. Mercury Deposition Network sites in South Florida.

FISH

Grab samples of between 100 and 250 mosquitofish are collected with a dip net during single sampling events at 12 downstream interior marsh sites (**Figure G-2**). Mosquitofish are selected as a representative indicator of short-term, localized changes in water quality because of their small size range, short life span, and widespread occurrence in the Everglades. Mosquitofish become sexually mature at approximately three weeks of age and have an average life span of only four to five months (though some individual females may live up to 1.5 years); the life span of males is shorter than females (Haake and Dean, 1983; Haynes and Cashner, 1995; Cabral and Marques, 1999). After collection, the mosquitofish are homogenized, the homogenate is sub-sampled (aliquot), and each sub-sample is analyzed for THg. On March 5, 2002, the FDEP approved a reduction in the number of aliquots of the homogenate from five to three (correspondence from F. Nearhoof, FDEP). In March 2007, the District revised its use of three aliquots to one aliquot. In October 2007, the District began analyzing all fish types (mosquitofish and large-bodied fish) for THg that do not require pesticide analysis. Samples requiring both mercury and pesticide analysis are analyzed by the FDEP.

Up to 20 sunfish (*Lepomis* spp.) are collected at the same 12 downstream interior marsh sites using electroshocking techniques (**Figure G-2**). Sunfish are thought to have an average life span of four to seven years in the wild. Each whole fish is analyzed for THg. Sunfish are prevalent in the Everglades and are the preferred prey for several fish-eating species; therefore, this species was selected as an indicator of mercury exposure for wading birds and other fish-eating wildlife.

Using electroshocking techniques, up to 20 LMB are also collected at the 12 downstream interior marsh sites (**Figure G-2**); the fillets are analyzed for THg. Largemouth bass are long-lived (the oldest bass collected as part of this effort was nine years old) and have been monitored at several Everglades sites since 1989. Therefore, LMB were selected as an indicator of potential human exposure to mercury.

Tissue concentrations in each of these three monitored fish species reflect ambient MeHg levels; i.e., their exposure is a function of a combination of factors, including body size, age, rate of biomass turnover, and trophic position. Mosquitofish should respond rapidly to changing ambient MeHg concentrations due to their small size, lower trophic status, short life span, and rapid biomass turnover. Conversely, sunfish and LMB should take a greater amount of time to respond, in terms of tissue concentrations, to changes in ambient MeHg availability. Most importantly, sunfish and LMB represent exposure at higher trophic levels with a requisite time lag for trophic exchange. While focusing on three-year-old LMB is appropriate to evaluate exposure to fishermen, it complicates the data results by only interpreting tissue concentration integrated over a three-year period. The key is to use these species-related differences to better assess MeHg availability within the system.

More than 85 percent of the mercury found in the muscle tissue of fish is in the methylated form (Grieb et al., 1990; Bloom, 1992). Therefore, the analysis of fish tissue for THg, which is a more straightforward and less costly procedure than the analysis for MeHg, can be interpreted as being equivalent to the analysis of MeHg.

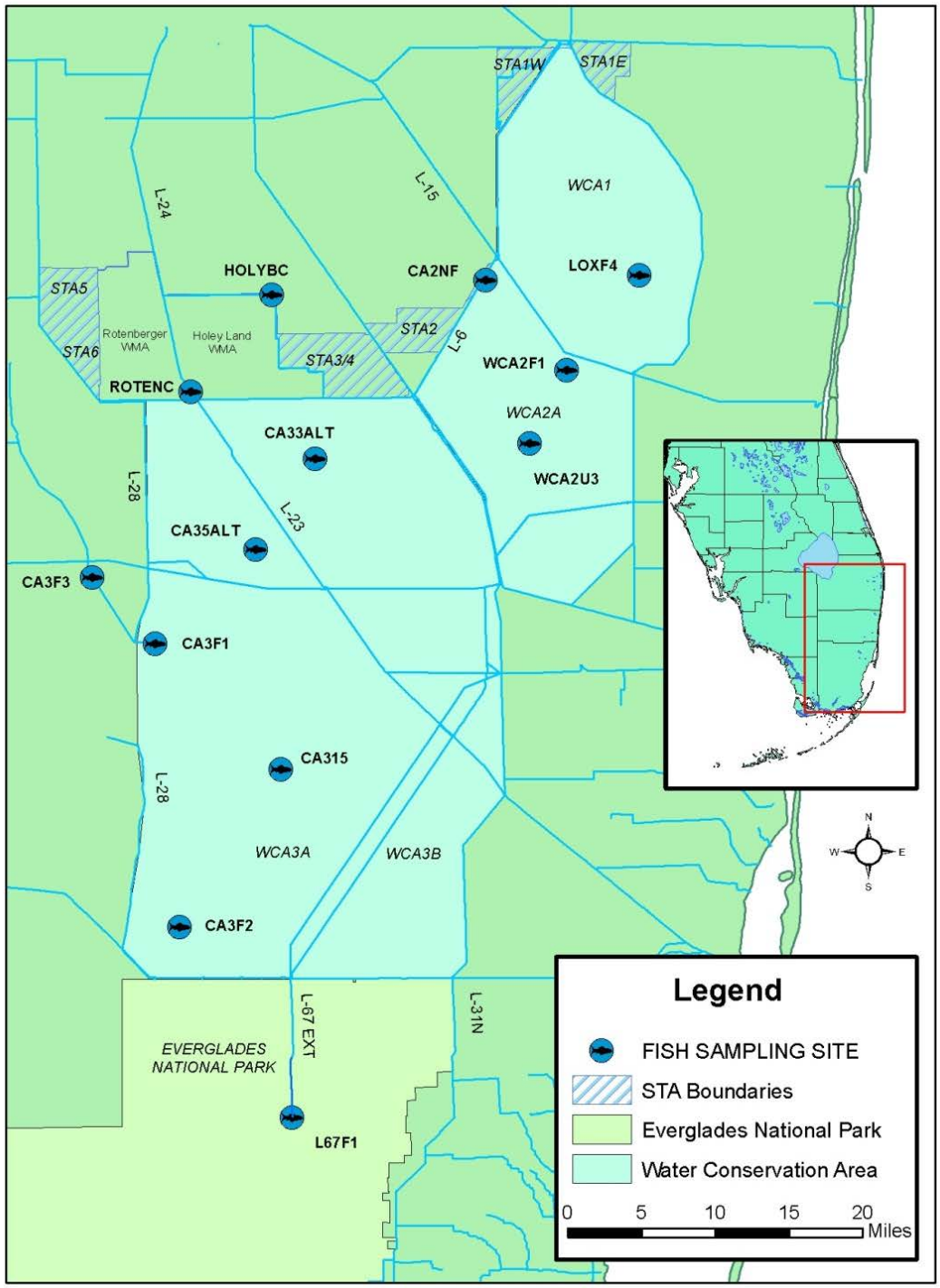

Figure G-2. Collection sites for monitoring THg levels in mosquitofish, sunfish, and LMB. CA3F1 was replaced with CA3F3 in WY2011 due to an accessibility problem with CA3F1, which is located in Tribal Land. CA3F3 is located in the L-28 Interceptor Canal within the Big Cypress National Preserve. Monitoring at station CA3F3 began on October 7, 2010. The District has been unable to request a modification to Non-ECP permit 0237803-11 to formally replace station CA3F1 with CA3F3 because the permit is on administrative hold until litigation issues are resolved.

FEATHERS

To monitor temporal trends in mercury bioaccumulation of fish-eating wildlife, the District collects feathers from great egret nestlings. The District's monitoring program has focused on two egret colonies, designated as JW1 and L67, which are located in WCA-3A (**Figure G-3**). These two colonies consistently showed the highest THg concentrations during background studies (Frederick et al., 1997; FTN Associates, 1999; Sepulveda et al., 1999). However, nesting at the JW1 colony has been erratic in recent years and, consequently, samples have been collected from another nearby colony designated Cypress City (**Figure G-3**). Under appropriate state and federal permits, feathers are collected (for THg analysis) from the oldest nestling in 10 nests in each of the two different nesting colonies. This sampling design (approved in permit modification 0237803-10, Exhibit E) is consistent with protocols used in the collection of background data (Frederick et al., 1997). From CY2009–CY2011, the District contracted the University of Florida to conduct annual juvenile great egret feathers collections. During that period, University of Florida researchers collected or attempted collection of feathers from the traditional District sites (Alley North, L67F1, Cypress City, and JW1), with additional collections from other areas within the WCAs (**Figure G-3**), as presented in previous permit reports. All sampling locations can be used for the purpose of evaluating spatial and temporal THg trends in juvenile great egrets. Since CY2012, the District brought the annual juvenile great egret feather collections back in-house; however, feather data for mercury analysis is not available for this reporting period due to constraints imposed by the FWC scientific collecting permit that was issued to the District. In addition to the monitoring program described above, in accordance with Condition 4.iv of the Mercury Monitoring Program, the District is required to "report changes in wading bird habitat and foraging patterns using data collected in ongoing studies conducted by the permittee and other agencies." Further details regarding rationales for sampling scheme, procedures, and data reporting requirements are in the District's Everglades Mercury Monitoring Plan revised in March 1999 (Appendix 1 of the Quality Assurance Protection Plan, June 7, 1999). Information about wading bird nesting activity is provided in Volume I, Chapter 6.

QUALITY ASSESSMENT FOR THE MERCURY MONITORING PROGRAM

Details on all quality assurance and quality control measurements for data collected under the EFA permits are provided in Appendix 3-1 Attachment C, of this volume.

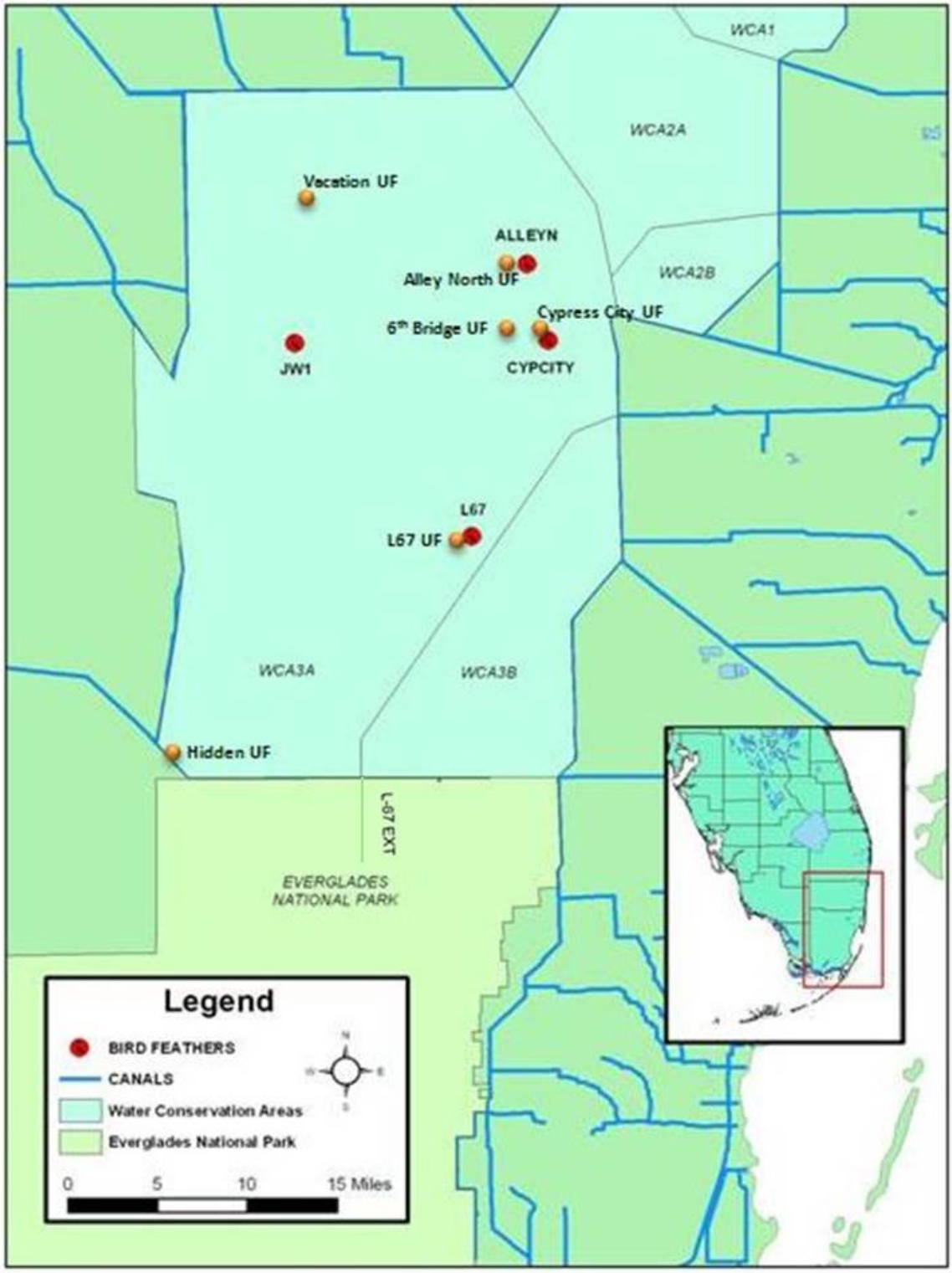

Figure G-3. Collection sites for great egret nestling feathers. Although efforts to collect repeatedly from the same colony are made, colonies are sometimes inactive or abandoned, requiring collection at an alternate colony.

STATISTICAL METHODS

Temporal trends in atmospheric THg deposition were evaluated using the Seasonal Kendall test (SAS; for macro see USEPA, 1993), which is a generalization of the Mann-Kendall trend test for trend detection (Gilbert, 1987). The test is applied to data sets exhibiting seasonality, and may be used even though there are missing, tied, or non-detect values. The validity of the test does not depend on the data being normally distributed. However, use of this analysis presupposes the presence of large, multiyear, multi-season data sets. Five years is the minimum data set for proper use of both the test and standard statistical tables. Consequently, the application of this test on quarterly obtained data, some of which were unusable due to fatal qualifiers, should be approached cautiously, and results should be viewed as approximations only.

Monitoring mercury concentrations in aquatic animals provides several advantages. However, interpretability of residue levels in animals can be problematic due to the confounding influences of age or species. For comparative purposes, special procedures are used to normalize the data. Standardization to size, age, or lipid content is a common practice (Wren and MacCrimmon, 1986; Hakanson, 1980). To be consistent with the reporting protocol used by the FWC (Lange et al., 1998, 1999), mercury concentrations in LMB were standardized to an expected mean concentration in three-year-old fish (EHg3) at a given site by regressing mercury on age (Lange et al., 1999). Because sunfish were not aged, age normalization was not available. Instead, arithmetic means were reported. However, efforts were made to estimate a least square mean (LSM) THg concentration based on the weight of the fish. Additionally, the distribution of the different species of sunfish, including warmouth (*L. gulosus*), spotted (*L. punctatus*), bluegill (*L. macrochirus*), and redear (*L. microlophus*), collected during electroshocking was also considered to be a potential confounding influence on THg concentrations prior to each comparison. To be consistent with the reporting protocol of Frederick et al. (1997; see also Sepulveda et al., 1999), THg concentrations in egret nestling feathers were similarly standardized for each site and were expressed as a least square mean (LSM) for chicks with a 7.1 centimeter bill.

Where appropriate, an analysis of covariance (ANCOVA; SAS GLM procedure) was used to evaluate spatial and temporal differences in mercury concentrations with age (LMB), weight (sunfish), or bill size (egret nestlings) as a covariate. However, the use of ANCOVA is predicated on several critical assumptions (Zar, 1996) including that regressions are simple linear functions and statistically significant (i.e., non-zero slopes); the covariate is a random, fixed variable; both the dependent variable and residuals are independent and normally distributed; and slopes of regressions are homogeneous (parallel). Where these assumptions were not met, standard analysis of variance (ANOVA) or Student's t-test was used; possible covariates were considered separately. If multi-group null hypotheses were rejected under ANOVA, then groups were compared using either Tukey Honestly Significant Difference (HSD; for equal-sized data sets) test or the Tukey-Kramer (for unequal-sized data sets). Assumptions of normality and equal variance were tested by the Kolmorogov-Smirnov and Levene Median tests, respectively. Data sets that either lacked homogeneity of variance or departed from normal distribution were natural-log transformed and reanalyzed. If transformed data met the assumptions, then they were used in ANOVA. If the assumptions were not met, then the raw data sets were evaluated using non-parametric Mann-Whitney or Kruskal-Wallis Rank sum tests. If the multi-group null hypothesis was rejected, then groups were compared using either Nemenyi test (for equal-sized data sets) or Dunn's Method (for unequal-sized data sets). Pearson Product moment (or the non-parametric equivalent, Spearman Rank Order) was used to evaluate the relationship between two parameters. Linear regression was used to develop a line of best fit (linear model) between two parameters.

MONITORING RESULTS

RAINFALL

Samples of rainfall were collected weekly under the protocols of the NADP MDN at STA-1W (FL34), the Baird Research Center in the Park (FL11), and the Western Broward County station (FL97) (**Figure G-1**). (For more information on MDN and to retrieve raw data, see nadp.sws.uiuc.edu/mdn). In 2004, difficulties were encountered due to the landfall of four hurricanes (Rumbold et al., 2006). In 2005, the pattern and difficulties continued with the landfall or near misses of three hurricanes. In 2004, the northernmost station, STA-1W, was most affected. In 2005, the southern station, ENP, was most significantly affected by the storms. During these events, the collectors recorded significant precipitation with little THg. All three collectors were non-functioning during Hurricane Wilma in 2005. Therefore, among-year differences in both volume-weighted concentration and deposition should be considered with these uncertainties. Missing samples at each station were due to a combination of no precipitation and mechanical failure.

Notwithstanding the uncertainties caused by tropical rainfall events and periodic mechanical failures, wet atmospheric deposition of THg to South Florida continues to be highly variable both spatially and temporally (**Table G-1**; **Figures G-4** and **G-5**). As observed in previous years, THg concentrations in precipitation were substantially higher during the summer months (**Figure G-4**), likely due to seasonal and tall, convective thunderclouds that can scavenge particulate mercury and water-soluble reactive gaseous mercury from the middle and upper troposphere. This is commonly understood, as observed with several studies, e.g., Guentzel (1997); Lai et al. (2007); Selin and Jacob (2008). Because both THg concentrations and rainfall volumes generally increase during summer, THg wet deposition typically peaks in mid-summer (**Figure G-4**).

In CY2012, the annual volume-weighted THg concentration decreased from the north (FL34) to the south site (**Table G-2**). The average of the three stations in CY2012 was 12.6 nanograms per liter (ng/L), which is strikingly similar to the average (12.5 ng/L) in CY2011. Annual THg deposition tracked annual precipitation depth closely (**Figure G-4**) and was highest at the north site and lowest at the mid-basin site (**Table G-3**). Compared to CY2011, annual deposition increased by nearly 8.6 micrograms per square meter ($\mu g/m^2$) in site FL34, decreased by 4.2 $\mu g/m^2$ in FL11, and decreased 0.7 $\mu g/m^2$ in FL97 (**Table G-3**).

Based on the average deposition rates measured at the three sites, wet-only atmospheric loading of THg to the EPA (9.01×10^9 square meters) was estimated at 166 kg Hg/yr, which is 10 kg Hg/yr higher than the annual deposition rate observed in CY2011 (**Table G-4**). While the focus is only on wet deposition, dry deposition likely adds 30 to 60 percent of wet deposition to the overall atmospheric load (FDEP, 2003; Marsik et al., 2007). It should be noted that the estimate of 166 kg Hg/yr has uncertainty as mechanical failure or collection efficiency issues are associated with several samples.

Seasonal Kendall analyses (of ranks) revealed a significant decreasing trend in monthly mean THg concentrations at FL34 (1998–2012; n = 192 months; Tau = -0.143; p = 0.0106); however, there was no trend for FL11 (1997–2012; n = 192 months; Tau = 0.024; p = 0.6657) or FL04/97 (2007–2012; n = 180 months; Tau = -0.081; p = 0.153). This is consistent with Nilles (2004) and previous District MDN investigations, which found no trends in volume-weight monthly averages from the three sites in South Florida. Mercury deposition shows no significant trend for the POR (all p>0.05). A slight decreasing trend of mercury deposition is found in FL11 (tau=0.0919, n=192 months, p=0.0887). There is no significant trend for monthly total rainfall at all sites for the POR (all p> 0.05).

Table G-1. THg concentration in ng/L (wet only) from compliance sites of the MDN in CY2012.

Site	Week Ending	THg (ng/L)	Site	Week Ending	THg (ng/L)	Site	Week Ending	THg (ng/L)
FL34	1/4/2012	5.6	FL97	1/3/2012	--	FL11	1/3/2012	--
FL34	1/10/2012	--	FL97	1/10/2012	--	FL11	1/10/2012	--
FL34	1/17/2012	--	FL97	1/17/2012	--	FL11	1/17/2012	--
FL34	1/24/2012	--	FL97	1/24/2012	--	FL11	1/24/2012	23.83
FL34	1/31/2012	7.44	FL97	1/31/2012	2.59	FL11	1/31/2012	8.86
FL34	2/7/2012	6.42	FL97	2/7/2012	14.6	FL11	2/7/2012	10.26
FL34	2/14/2012	11.33	FL97	2/14/2012	--	FL11	2/14/2012	--
FL34	2/21/2012	--	FL97	2/21/2012	--	FL11	2/21/2012	7.87
FL34	2/28/2012	--	FL97	2/28/2012	--	FL11	2/28/2012	--
FL34	3/6/2012	4.06	FL97	3/6/2012	--	FL11	3/6/2012	--
FL34	3/13/2012	8.14	FL97	3/13/2012	6.26	FL11	3/13/2012	8.69
FL34	3/20/2012	9.27	FL97	3/20/2012	--	FL11	3/20/2012	5.12
FL34	3/27/2012	3.13	FL97	3/27/2012	21.22	FL11	3/27/2012	--
FL34	4/3/2012	31.27	FL97	4/3/2012	--	FL11	4/3/2012	14.16
FL34	4/10/2012	13.07	FL97	4/10/2012	--	FL11	4/10/2012	5.49
FL34	4/17/2012	6.15	FL97	4/17/2012	--	FL11	4/17/2012	9.23
FL34	4/24/2012	17.89	FL97	4/24/2012	--	FL11	4/24/2012	2.32
FL34	5/1/2012	4.71	FL97	5/1/2012	--	FL11	5/1/2012	52.8
FL34	5/8/2012	11.37	FL97	5/8/2012	33.23	FL11	5/8/2012	27.42
FL34	5/15/2012	11.99	FL97	5/15/2012	--	FL11	5/15/2012	13.41
FL34	5/22/2012	9.01	FL97	5/22/2012	11.85	FL11	5/22/2012	7.71
FL34	5/29/2012	14.62	FL97	5/29/2012	15.88	FL11	5/29/2012	10.78
FL34	6/5/2012	11.25	FL97	6/5/2012	7.48	FL11	6/5/2012	36.38
FL34	6/12/2012	22.9	FL97	6/12/2012	45.06	FL11	6/12/2012	25.85
FL34	6/19/2012	19.71	FL97	6/19/2012	15.41	FL11	6/19/2012	4.1
FL34	6/26/2012	5.41	FL97	6/26/2012	5.01	FL11	6/26/2012	11.65
FL34	7/3/2012	13.78	FL97	7/3/2012	8.12	FL11	7/3/2012	20.3
FL34	7/10/2012	40.18	FL97	7/10/2012	51.51	FL11	7/10/2012	9.45
FL34	7/17/2012	15.09	FL97	7/17/2012	18.07	FL11	7/17/2012	9.99
FL34	7/24/2012	14.77	FL97	7/24/2012	--	FL11	7/24/2012	26.51
FL34	7/31/2012	47.62	FL97	7/31/2012	--	FL11	7/31/2012	30.67
FL34	8/7/2012	20.23	FL97	8/7/2012	36.48	FL11	8/7/2012	10.69
FL34	8/14/2012	12.85	FL97	8/14/2012	21.43	FL11	8/14/2012	18.6
FL34	8/22/2012	29.04	FL97	8/22/2012	20.58	FL11	8/21/2012	6.63
FL34	8/29/2012	3.6	FL97	8/29/2012	5.93	FL11	8/28/2012	19.54
FL34	9/4/2012	25.97	FL97	9/4/2012	17.24	FL11	9/4/2012	28.08
FL34	9/11/2012	19.54	FL97	9/11/2012	17.02	FL11	9/11/2012	4.25
FL34	9/18/2012	9.52	FL97	9/18/2012	6.52	FL11	9/18/2012	14.42
FL34	9/25/2012	15.83	FL97	9/25/2012	24.36	FL11	9/25/2012	23.93
FL34	10/2/2012	32.06	FL97	10/2/2012	5.82	FL11	10/2/2012	20.22
FL34	10/9/2012	13.94	FL97	10/9/2012	18.73	FL11	10/9/2012	20.07
FL34	10/16/2012	28.94	FL97	10/16/2012	7.87	FL11	10/16/2012	12.57
FL34	10/23/2012	6.58	FL97	10/23/2012	10.79	FL11	10/23/2012	2.02
FL34	10/30/2012	2.81	FL97	10/30/2012	4.56	FL11	10/30/2012	--
FL34	11/6/2012	--	FL97	11/6/2012	--	FL11	11/6/2012	6.03
FL34	11/13/2012	--	FL97	11/13/2012	12.12	FL11	11/13/2012	23.11
FL34	11/20/2012	15.25	FL97	11/20/2012	--	FL11	11/20/2012	--
FL34	11/27/2012	--	FL97	11/27/2012	--	FL11	11/27/2012	1.7
FL34	12/4/2012	19.53	FL97	12/4/2012	--	FL11	12/4/2012	4.6
FL34	12/11/2012	--	FL97	12/11/2012	19.17	FL11	12/11/2012	43.44
FL34	12/18/2012	12	FL97	12/18/2012	50.32	FL11	12/18/2012	--
FL34	12/31/2012	8.17	FL97	12/31/2012	--	FL11	12/26/2012	--

FL34: STA-1W; FL97: Broward County; FL11: Everglades National Park (ENP). --: data no available due to no precipitation.

Table G-2. Historic volume-weighted THg concentration (ng/L) from the compliance sites of the MDN in South Florida.

Year	STA-1W (FL34)	Broward (FL97)	ENP (FL11)
1997*	18.7	NA	14.7
1998*	11.4	13.8[b]	12.7
1999*	10.8	12.3[b]	11.6
2000*	13.7	15.8[b]	13.6
2001*	13.9	13.2[b]	13.1
2002*	12.3	14.2[b]	12.1
2003*	16.1	16.4[b]	16.4
2004*	13.7[a]	14.7[b]	14.7
2005*	11.7	13.7[b]	10.6
2006*	12.6	14.9[c]	12.4
2007	11.8	11.3	14.5
2008	10.8	13.5	13.7
2009	12.6	14.9	14.8
2010	14.6	13.9	11.4
2011	10.1	13.8	13.5
2012	14.9	17.8	15.7

*Adapted from 2008 South Florida Environmental Report – Volume I

Table G-3. Annual mercury deposition (µg/m^2) from the compliance sites of the MDN in South Florida.

Year	STA-1W (FL34)	Broward (FL97)	ENP (FL11)
1997*	32.4	NA	27.2
1998*	26.1	20.10[b]	20.3
1999*	12.1	17.50[b]	17.7
2000*	14.3	18.10[b]	20
2001*	21	21.10[b]	18
2002*	10.3[a]	18.70[b]	18.2
2003*	17.8	28.50[b]	26.8
2004*	a	18.30[b]	18.7
2005*	11.5	14.50[b]	17.5
2006*	14.4	NA[a,c]	15.4
2007	13.5	22.3	16.8
2008	17.8	24.7	21.9
2009	15.7	17.55	22.81
2010	21.5	17.0	15.7
2011	12.7	17.1	18.5
2012	21.3	12.9	17.2

*Adapted from 2008 South Florida Environmental Report – Volume I

[a] Rain gauge malfunction in 2004; several trips missed because of highly active tropical season (four hurricanes)

NA – Not available due to mechanical problems with collector, failure to meet quality control criteria, or no precipitation

NA[a] – No calculation due to (1) discontinuation of station FL04 and (2) not enough data existed for station FL97 to calculate annual deposition

[b] Data just from the Andytown station (FL04)

[c] Combination of data from the Andytown (FL04) and the Broward County stations (FL97)

Table G-4. Atmospheric THg loading to the EPA.

Calendar Year	Atmospheric Deposition (kg Hg/yr)
1994[a]	238
1995[a]	206
2003	161-258[b]
2004	172[d]
2005	131[e]
2006	134[f]
2007	157[g]
2008	193[g]
2009	167[g]
2010	163[g]
2011	156[g]
2012	166[g]

[a] USEPA (2001, as cited by FDEP, 2003) annual deposition derived from Florida Atmospheric Mercury Study, 1993–1996. Surface water loading derived from biweekly monitoring of into structures discharging from the EAA into the EPA

[b] Rumbold (2005)

[d] Rumbold et al. (2006)

[e] Value highly uncertain due to passage or near misses of Hurricanes Katrina (fourth week of August), Rita (third week of September), and Wilma (fourth week of October) in 2005

[f] Based on average annual loading from FL34 and FL11

[g] Based on an average annual loading from FL34, FL11, and FL97 and a total area of EPA (WCAs + ENP) of 7900 square kilometers.

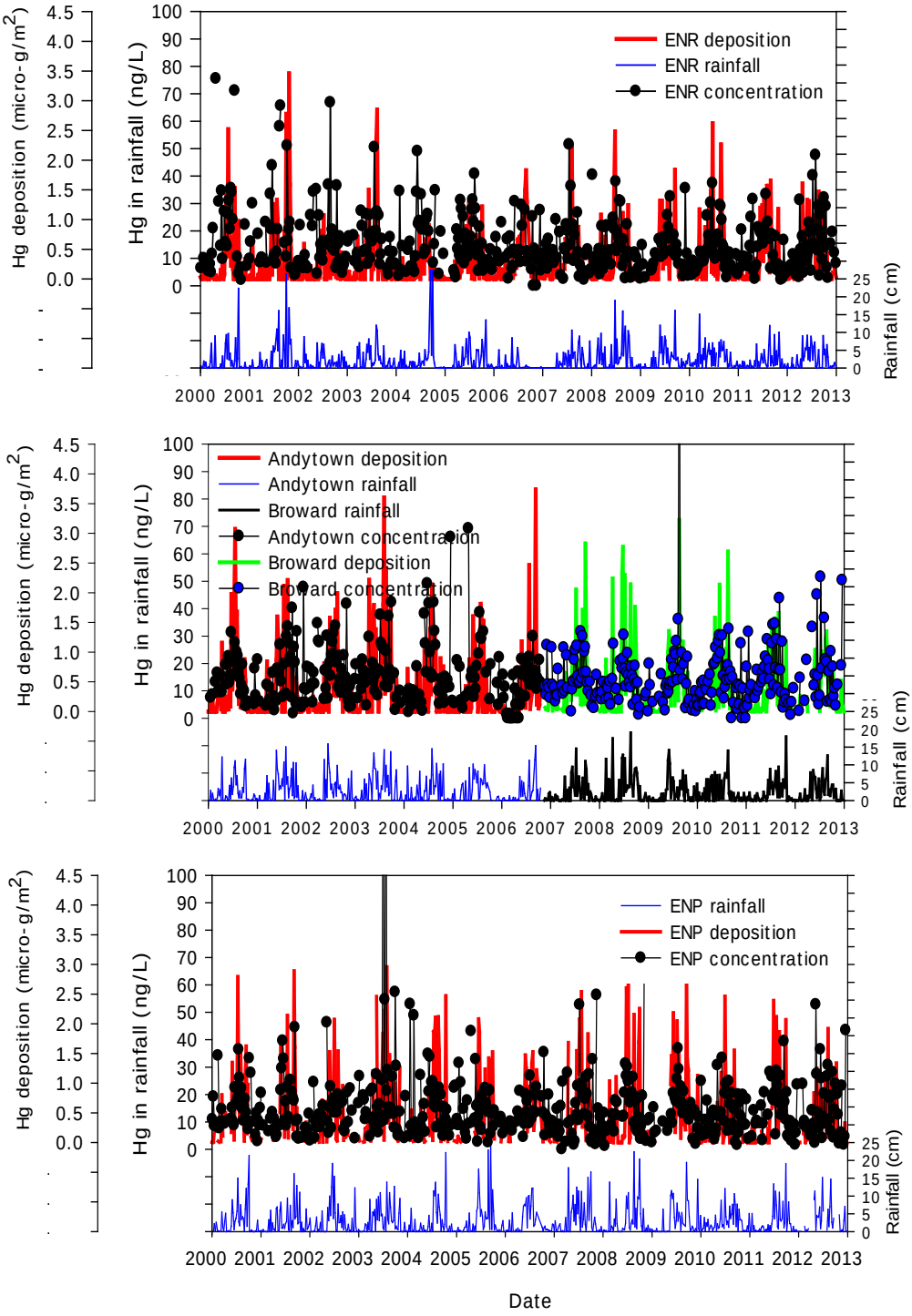

Figure G-4. Time series of rainfall, rainfall mercury concentrations, and wet mercury deposition at STA-1W (FL34), Andytown (FL04), ENP Bair Research Center (FL11), and Broward County (FL97), as reported by the MDN. STA-1W (FL34) is the same site as ENR.

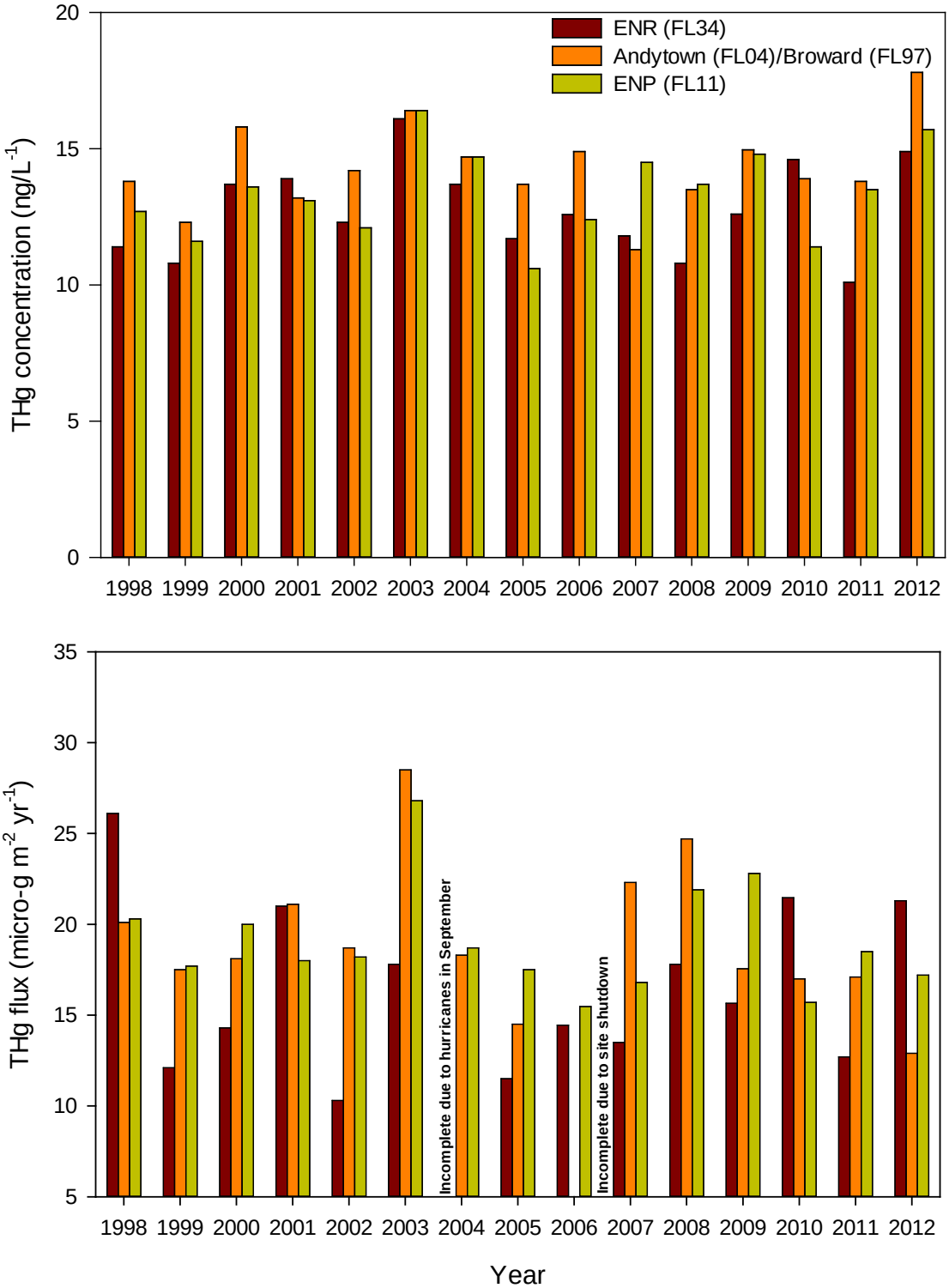

Figure G-5. Time series of annual volume-weighted concentration (top) and annual THg flux (bottom) at three MDN stations. The Andytown site (FL04) closed down in mid-2006 and was replaced with Broward County site FL97. STA-1W (FL34) is the same site as ENR.

FISH FROM NON-ECP INTERIOR MARSHES

Results from monitoring downstream interior marsh mosquitofish, sunfish, and LMB are summarized in **Tables G-5** through **G-7**, respectively. Raw data for individual fish is available on the District's website at www.sfwmd.gov/dbhydro. In WY2013, 12 downstream marsh sites in the interior of the WCAs and ENP (**Figure G-2**) were targeted for fish collections. Three of these sites (LOXF4, WCA2U3, and CA315) have been monitored by the FWC since 1993. If fish could not be collected from a targeted marsh site due to inaccessibility, poor habitat, or both, then collections defaulted to nearby marshes or, in some cases, canals where fish were more plentiful, if source water was similar (approval for these alternate sites was received from the FDEP on March 5, 2002; in correspondence from F. Nearhoof, FDEP). To preserve long-term data sets that are crucial for temporal trend assessment, reverting to the original target site will involve sampling at both the alternate and the original site for some period to assess spatial differences. Accordingly, sampling will revert to the original targeted site only after it has been established that long-term hydrologic and habitat restoration has occurred so that chances of finding fish year-to-year are high. Although this level of restoration may take several years at certain sites (e.g., WCA2F1, CA33ALT, and CA35ALT), waiting until fish are present consistently will prevent alternating collections between the two sites and the concomitant disruption of data continuity.

Fish collected in WY2013 showed both spatial and temporal patterns in tissue mercury concentrations. In keeping with the primary objective of the Mercury Monitoring Program, the focus is on temporal changes in mercury concentration in fish tissues to assess possible adverse effects from the EFA construction components and STA operations. Nevertheless, spatial patterns of tissue mercury concentrations are important, particularly if there has been a variation from pre-EFA conditions established by the FWC. Therefore, spatial patterns are reviewed in detail only where significant changes have occurred over time.

Table G-5. THg in ng/g wet weight in mosquitofish composites collected in WY2012–WY2013 from downstream sites. Value represents the concentration of one aliquot.

Site	2012	2013	Between Year Change (%)	Cumulative Mean
LOXF4	171	71	-58	71
WCA2F1	21	10	-52	9
CA2NF	32	29	-9	25
HOLYBC	50	49	-2	47
ROTENC	45	22	-51	58
WCA2U3	373	194	-48	124
CA33ALT	53	47	-11	55
CA35ALT	167	146	-13	90
CA3F1	37	67	81	52
CA315	149	50	-66	93
CA3F2	95	22	-77	57
L67F1	120	89	-26	89
Annual Mean	109	66	-28	64

Notes:

- Between Year Change [(2013–2012)/2012]*100.
- Cumulative mean is grand mean for POR (WY1999–2013); aliquots pooled across time and space.
- ± 95% confidence interval of mean: n = 666; 75 ± 64 ng/g; 50th, 75th, and 90th percentiles for POR were 57, 100, and 161 ng/g, respectively.
- Cumulative mean includes dropped stations no longer under permit.

Table G-6. THg (mean ± standard deviation, sample size) in ng/g wet weight in sunfish (*Lepomis* spp.) collected in WY2012–WY2013 from downstream of the STAs.

Site	2012	2013	Between Year Change (%)	Cumulative Mean
LOXF4	135 ± 48, 20	178 ± 75, 20	24	132
WCA2F1	59 ± 30, 20	ND	ND	45
CA2NF	100 ± 83, 20	97 ± 51, 20	-3	112
HOLYBC	182 ± 64, 20	88 ± 56, 20	-108	170
ROTENC	193 ± 115, 20	130 ± 47, 20	-49	197
WCA2U3	261 ± 103, 20	241 ± 115, 20	-8	205
CA33ALT	201 ± 64, 20	140 ± 22, 20	-43	209
CA35ALT	254 ± 91, 20	284 ± 138, 20	11	239
CA315	228 ± 81, 20	278 ± 279, 20	18	284
CA3F1/F3	162 ± 66, 20	95 ± 62, 20	-30	120
CA3F2	69 ± 22, 20	124 ± 53, 20	27	122
L67F1	371 ± 274, 20	249 ± 116, 20	-49	391
Annual Mean	185	173	-21	186

Notes:

- Cumulative mean is grandmean for POR (WY1999–WY2013).
- ± 95% confidence interval of mean: n = 3435; 186 ± 6 ng/g
- 50th, 75th, and 90th percentiles for POR were 140, 240, and 375 ng/g, respectively.
- Mean includes dropped stations no longer under permit.
- Between year change is [(2012–2013)/2013]*100.
- ND – Data not available due to low water or no fish available.

Table G-7. Age-standardized (EHg3) and arithmetic mean concentrations of THg in LMB fillets (ng/g wet weight) collected in WY2013 from non-EFA marsh sites. Arithmetic mean, standard deviation, and sample size are shown in parentheses.

Site	EHg3 ± 95th Confidence Interval (mean ± 1 standard deviation, sample) (ng/g wet)	Between Year Change (%) (WY2012 to WY2013)	Cumulative EHg3
LOXF4	540±39 (280±151,20)	NA	420
WCA2F1	NA	NA	259
CA2NF	NA (194±110, 20)	-16.5	426
HOLYBC	568±102 (542±247,20)	-1.6	599
ROTENC	NA (NA)	NA	806
WCA2U3	939±84 (555±209,16)	7.7	793
CA33ALT	NA (NA)	NA	1,311
CA3F3	(275±68,20)	-54.5	529
CA35ALT	NA	NA	NA
CA315	NA 548±370, 20	NA	835
CA3F2	NA (314±188,20)	-35.0	474
L67F1	1,292±132 (971±464,20)	-41.8	1,292

Notes:
Between year change is [(WY2013–WY2012)/WY2013]*100.

NA – Data not available due to low water or no fish available.

Cumulative mean for POR (WY1999–WY2013).

± 95% confidence interval of mean: n = 2631; 549 ± 18 ng/g; 50th, 75th, and 90th percentiles for POR were 430, 678, and 1,000 ng/g, respectively.

Mean includes dropped stations no longer under permit.

Mosquitofish

THg levels in mosquitofish collected from marsh sites in WY2013 ranged from 10 ng/g at site WCA2F1 to 194 ng/g at site WCA2U3 (**Table G-5**; **Figure G-6**). Both sites represent the lowest and highest THg concentration in the EPA in WY2012 and WY2013, with concentration reduction by 58 and 48 percent in the current water year. The average annual basin-wide THg concentration in mosquitofish collected in WY2013 was 66 ng/g (**Table G-5**; **Figure G-6**), which is 43 ng/g, or 28 percent less than the basin-wide mean concentration in WY2012 (109 ng/g). This is compared to a 119 percent increase in WY2012 above the basin-wide mean concentration in WY2011. The mean aliquot for tissue THg concentrations in mosquitofish for the POR (WY1999–WY2013; sample size = 666) was 75 ng/g. In WY2012, THg levels in mosquitofish increased at ten of the twelve sites (**Table G-5**). However, in WY2013, THg levels in mosquitofish decreased at eleven of the twelve monitoring sites (**Table G-5**). Similar to WY2012, mosquitofish THg concentration in WCA2U3 was the highest among the 12 monitoring sites at 194 ng/g which, however, was considerably lower than the historic high THg value (373 ng/g) in WY2012. **Figure G-7** shows that the spatial variability in mean mosquitofish THg levels is relatively high. A few stations reveal consistently low (e.g., WCA2F1, CA2NF, and CA3F2) or high (WCA2U3 and L67F1) levels. Several sites displayed marked changes in THg concentration in WY2013. However, none of the sites have shown statistically significant increases in THg level (Spearman Rank correlation, all $p > 0.05$). The average THg concentrations in mosquitofish for the POR and WY2013 were below USEPA trophic level 3 fish criterion (77 ng/g) for protection of wildlife.

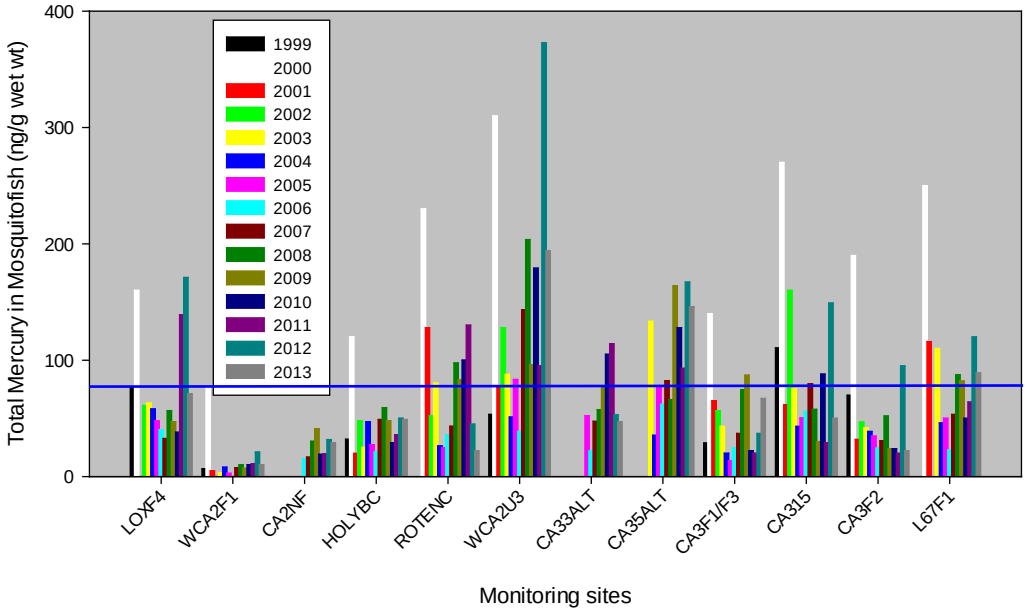

Figure G-6. THg concentrations in mosquitofish collected at current non-ECP marsh sites from WY1999–WY2013. Not all sites were sampled in all years. The blue line is the USEPA THg criterion (77 ng/g) for trophic level 3 fish. The trophic level 3 criterion is used as a surrogate for mosquitofish, which is considered to be representative of fish species between trophic levels 2 and 3.

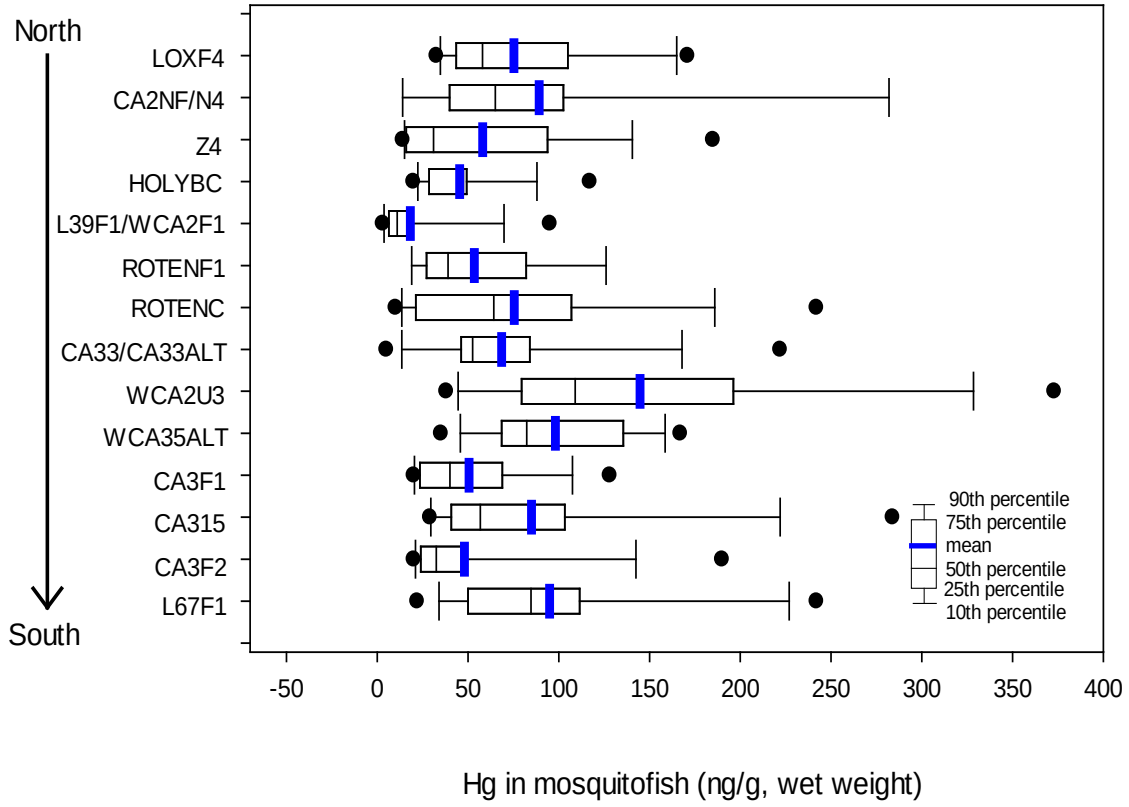

Figure G-7. THg concentration distributions in mosquitofish collected at non-ECP marsh sites from WY1999–WY2013. Not all sites were sampled in all years.

Sunfish

Four species of sunfish—bluegill, redear sunfish, spotted sunfish, and warmouth—have been sampled for THg analysis from across the EPA and Holey Land and Rotenberger wildlife management areas since WY1999. THg levels in sunfish collected from downstream sites in WY2012 (n = 216) ranged from 37 ng/g in a bluegill from WCA2F1 near the inflow in northern WCA-2 to a high of 1260 ng/g in a bluegill from L67F1 (**Table G-6**) in Shark River Slough within ENP. Long-term low levels remain in or around L39F1 (WCA2F1). The grandmean of all sites in WY2013 was 173 ng/g, compared to the grandmean of 185 ng/g in WY2012, indicating a slight decrease (T Test, p=0.746). In WY2013, seven of the 11 sites (no fish were collected at WCA2F1) showed decreases in THg concentration in sunfish, with a range from 3 (CA2NF) to 108 percent (HOLYBC). The average decrease was 21 percent, which is the same as the percent decrease in WY2012 (Gu and Howard 2013). Three monitoring sites showed increases in sunfish THg concentration, with a range from 11 to 27 percent. Site-specific correlation analysis between sampling years and the annual averages showed decreases in sunfish THg concentration at seven of the twelve currently monitored sites, although none of these declines is statistically significant (Spearman Rank Correlation, all $p > 0.05$). Significant increases in sunfish THg concentration over time were found at CA35ALT (Spearman Rank Correlation, $r = 0.673$, $p = 0.0209$, $n = 13$ years) and WCA2U3 ($r = 0.743$; $p = 0.001$, $n = 15$ years).

In WY2013, sunfish continued to show significant spatial variation in THg levels (**Table G-6**; **Figure G-8)**. One-way ANOVA on rank for sites showed significant differences among sites (df = 12; H = 77; p < 0.001). Fish from L67F1 contained the highest median concentrations (384 ng/g). WCA2NF showed the lowest THg in sunfish (102 ng/g). When data are pooled and analyzed by water impoundment, there is a clear north to south increasing trend in sunfish THg concentration (see Volume I, Chapter 3B).

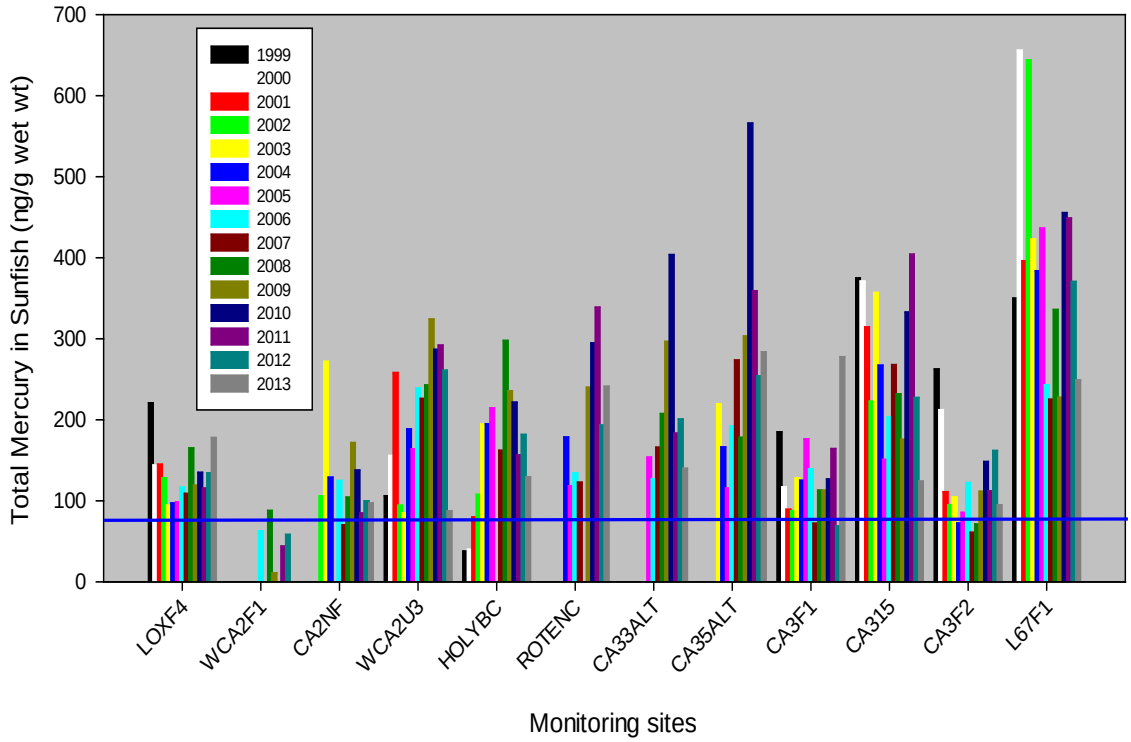

Figure G-8. THg concentration of whole sunfish collected at non-ECP marsh sites from WY1999–WY2013. Prior to 2006, collections were made at site Z4 (CA2NF/N4 after January 1, 2006). Collections on CA3F1 between 1999 and 2010 were replaced by CA3F3 since WY2011.

As observed over the past several years, in WY2013, fish species was a significant factor in tissue mercury concentrations when data were pooled across sites (Kruskal-Wallis One-Way ANOVA Analysis; df = 3; H = 15.97; p = 0.001). In WY2013, average THg levels were identical for spotted and bluegill sunfish (188 ng/g), lowest in redear (130 ng/g) and highest in warmouth (211 ng/g). The rank of THg based on data for the POR is redear sunfish (120 ng/g) <bluegill sunfish (191 ng/g) < warmouth (256 ng/g) < spotted sunfish (260 ng/g) (**Figure G-9**). The average THg concentrations in all species for the POR and WY2013 exceeded USEPA trophic level 3 fish criterion (77 ng/g) for protection of wildlife.

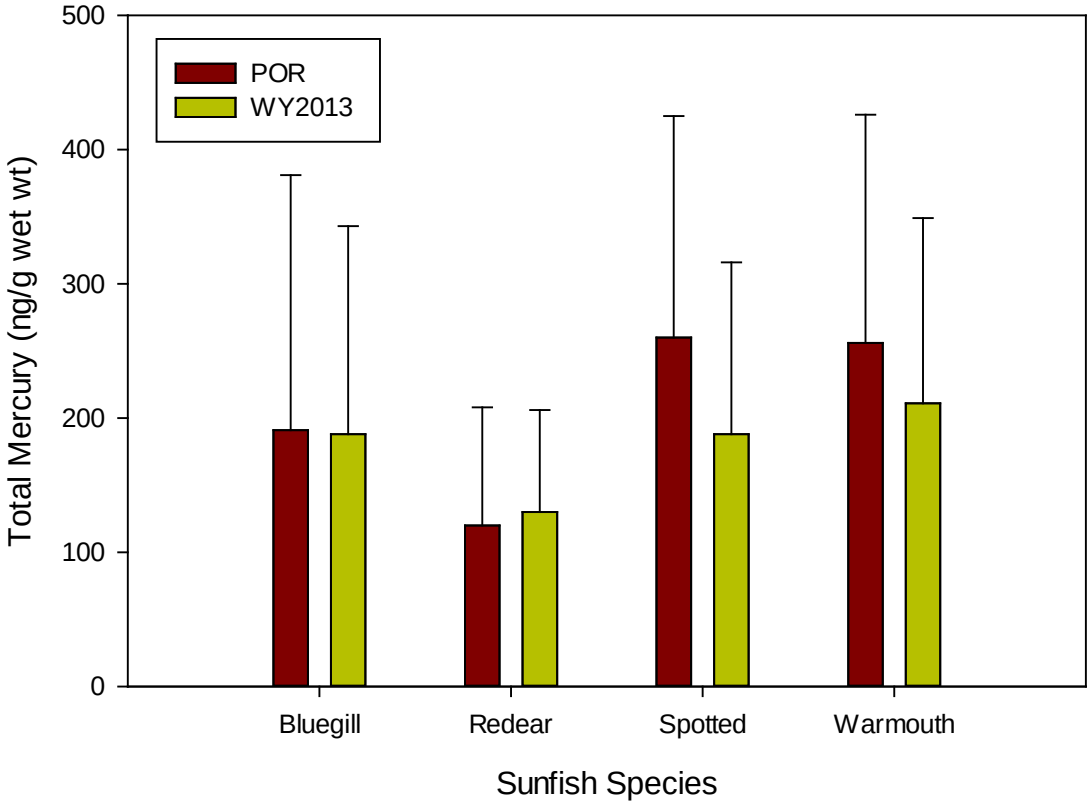

Figure G-9. Species-specific THg concentrations in whole sunfish collected at Non-ECP marsh sites. Data are presented for the POR and WY2013.

Largemouth Bass

During October–November 2012 (WY2013), 171 LMB were collected at 12 monitoring sites, which is considerably higher than the number of samples (102 fish) collected in WY2012. Despite higher than average rainfall in WY2013, LMB could not be collected from three of the 12 monitoring sites, including WCA2F1, ROTENC and CA33ALT. No LMB were collected from these three sites in WY2012 either. The lowest THg value was 63 ng/g in a one-year-old LMB collected from CA2NF, and the highest THg value was 1,900 ng/g, in a five-year-old LMB from L67F1. These same sites also had the lowest (153 ng/g) and the highest (2,350 ng/g) THg in LMB in WY2012. Site-specific, age-standardized concentrations (estimated for a three-year-old bass symbolized as EHg3) ranged from 540 ng/g at LOXF4 to 1,292 ng/g at L67F1 (**Table G-7** and **Figure G-10**). Based on sites where it was appropriate to calculate site-specific EHg3 and with sufficient data, the grandmean value was 835 ng/g in WY2013 while the arithmetic mean THg value for WY2013 was 461 ng/g. With the exception of LOXF4, all other sites with fish collected displayed an average THg level above the USEPA trophic level 4 fish MeHg criterion (365 ng/g) for wildlife protection. The average EHg3 level based on available data was two-fold greater than USEPA trophic level 4 fish criterion for wildlife protection.

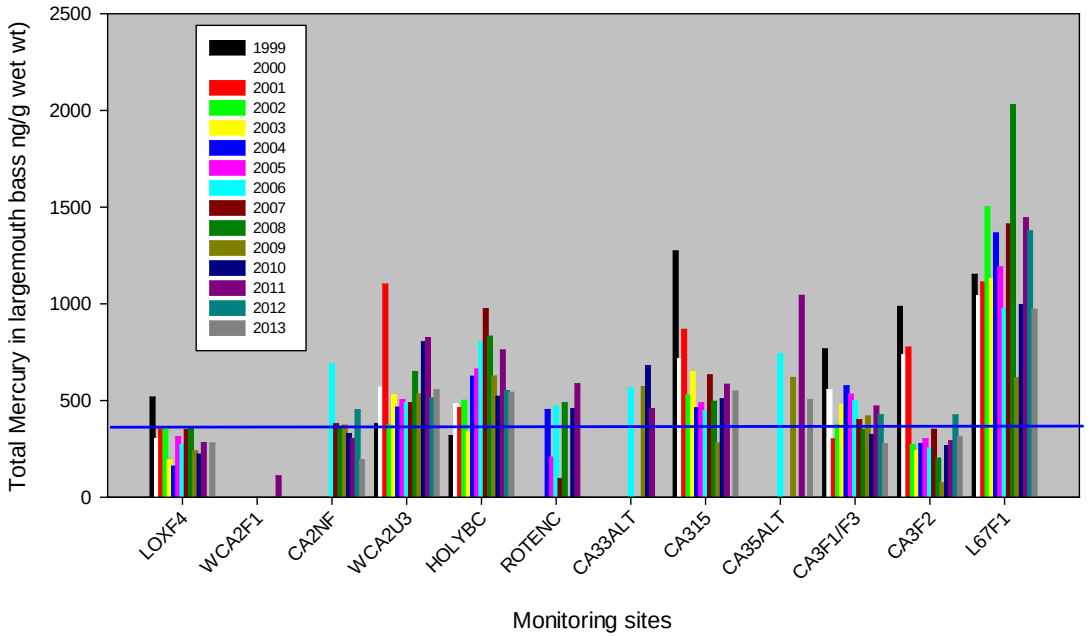

Figure G-10. THg concentrations in LMB collected at downstream sites from WY1999–WY2013. Site WCA2F1 is the same as L39F1. CA3F1 has been replaced by CA3F3 since WY2011.

Similar to previous years, in WY2013, LMB exhibited spatial patterns in tissue mercury concentrations (**Table G-6**; **Figure G-10**). The northernmost sites (CA2NF) had the lowest THg concentration while the southernmost site (L67F1) had the highest THg in LMB. A remarkable decline took place in WCA2U3 with EHg3 (estimated total mercury in three-year old LMB) concentration of 777 ng/g in WY2012 compared to 1,055 ng/g in WY2011. However, EHg3 in WY2013 was 939 ng/g which is 162 ng/g greater than WY2012. For the ENP monitoring site (L6F1), both arithmetic average and EHg3 level were lower in WY2013 than in WY2012. This is likely related to the site-specific mercury methylation rate. The high EHg3 concentrations were consistently observed in L67F1, exceeding 1,000 ng/g for all years except 2008. However, mosquitofish and sunfish THg concentrations at this site were not the highest among sites in WY2013 (**Figure G-11**). For the POR, both sunfish and LMB THg levels are highest in L67F1, but the mosquitofish THg level was highest at WCA2U3 (**Figure G-11**). Further data analysis using environmental information such as sulfate concentration, hydrology, and trophic ecology may help explain the mercury hotspots in the EPA.

For most monitoring sites, there are no increasing trends in THg concentration, which fluctuated during the monitoring period (**Figure G-10**) with two exceptions. LMB THg concentrations displayed a significant increasing trend at HOLYBC ($r = 0.546$, $p = 0.0339$, $n = 15$ years) and a significant decreasing trend at CA315 ($r = -0.600$, $p = 0.0223$, $n = 14$ years). THg concentrations in L67F1 displayed three consecutive years of increase from WY2006–WY2008, followed by a sudden drop in WY2009, with subsequent increases in WY2010 and WY2011. LMB THg decreased by an average of 145 ng/g in WY2012, and by 406 ng/g in WY2013. A similar pattern is also found in HOLYBC (**Figure G-11**).

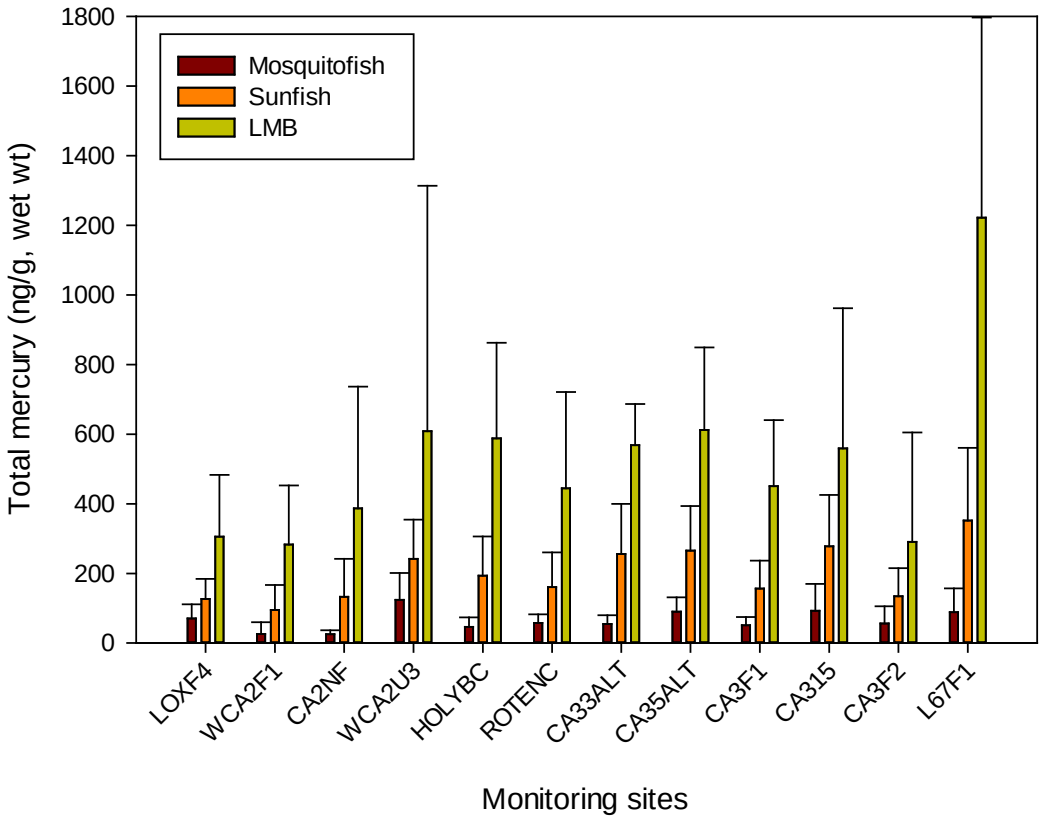

Figure G-11. THg concentrations in mosquitofish, sunfish, and LMB collected at downstream sites from WY1999–WY2013. Site WCA2F1 is the same as L39F1. CA3F1 has been replaced by CA3F3 since WY2011.

The elevated THg levels in fish can be related to drought conditions, which have been found to promote sulfate and mercury oxidation and, consequently, high rates of mercury methylation in the Everglades (Rumbold and Fink, 2006). The hydrology of South Florida was impacted by a La Niña event in WY2012. Corresponding to the dry season in WY2012, mosquitofish THg level increased in 10 of the 12 sites. Contrast to WY2012, however, WY2013 was a wet year with above average rainfall in the region (Abtew and Ciuca, 2014). THg levels in mosquitofish decreased at 11 of the 12 monitoring sites, likely a result of the high rainfall which prevented dryout and soil oxidation.

PREDATOR PROTECTION CRITERIA

Mercury levels in fish tissue can also be evaluated and put into perspective regarding mercury risk to wildlife. The USFWS has proposed a predator protection criterion of 100 ng/g of THg in prey species (Eisler, 1987). The USEPA has proposed criteria of 77 ng/g and 346 ng/g for trophic level 3 and 4 fish, respectively, for the protection of fish-eating avian and mammalian wildlife (USEPA, 1997).

In WY2012, 40 percent of all mosquitofish collected (considered to be tropic levels 2 and 3, depending on age; Loftus et al., 1998) exceeded both the USEPA criterion of 77 ng/g[1] and USFWS criterion of 100 ng/g. However, in WY2013, less than 20 percent of the mosquitofish composites exceeded the trophic level 3 fish criterion. These exceedances were from sites WCA2U3, CA35ALT, and L67F1 (**Table G-5**). In WY2013, nearly 80 percent of all sunfish, which are trophic level 3, exceeded the USEPA criterion of 77 ng/g, which is a 10 percent decrease from WY2012 (**Table G-6)**. As discussed in previous reports, these findings are significant because sunfish and mosquitofish are the preferred prey of many fish-eating species in the Everglades.

Based on the equation developed for whole-body weighted THg concentration (whole body THg = 0.695 x fillet THg (Lange et al., 1998), 44 percent of all LMB exceeded the trophic level 4 criteria in WY2013, which is a 13 percent decrease compared to WY2012. Exceedances in WY2013 were primarily at station L67F1 (85 percent, but 100 percent in WY2012), followed by HOLYBC and CA315 (50 percent), CA35ALT (45 percent), and WCA2U3 (35 percent). In WY2013, 12 percent of fish samples exceeded the USEPA human health criterion of 850 ng/g, which is a limited consumption criterion for women of childbearing age and young children. These samples came from station L67F1 (13 fish, but 20 fish in WY2013), HOLYBC and WCA2U3 (2 fish), CA315, CA35ALT and CA3F2 (1 fish each). No fish samples collected from L67F1 exceeded the FDOH human health no consumption advisory of 1,500 ng/g in WY2013. Further information on Florida fish consumption advisories is available on the FDOH website at www.doh.state.fl.us/floridafishadvice. Based on WY2013 findings, certain Everglades populations of fish-eating avian and mammalian wildlife continue to be at potential risk for adverse effects from mercury exposure, depending on where they forage.

WADING BIRD FEATHERS FROM WATER CONSERVATION AREA 3A

In WY2013, collection of wading bird feathers by the District field crew was unsuccessful due to time constraints specified in the FWC scientific collecting permit. Therefore, no mercury data for wading bird feathers are available during this reporting period.

Great egret feather mercury concentration data collected within WCA-3A from previous years have been published in the previous year's report (Gu and Nicole 2013).

OPTIMIZING THE MONITORING NETWORK

Non-ECP mercury monitoring networks are routinely reviewed to streamline costs, improve scientific findings, and adhere to compliance monitoring requirements. Specific changes to non-ECP monitoring during the reporting period are summarized below. Updates on permit compliance monitoring for mercury in the STAs are covered in Appendix 3-1 of this volume.

Downstream Fish Monitoring (Program HGFS)

- No changes or modifications in WY2013.

[1] Trophic level 3 criterion is used as a surrogate for mosquitofish, which is considered to be representative of fish species between trophic levels 2 and 3.

Downstream Great Egret Feather Monitoring (Program HGBM)

- No changes or modifications in CY2012.

MDN Monitoring

- No changes or modifications in CY2012.

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Attachment H: Statements of Authenticity for Analytical and Sampling Programs

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

STATEMENT OF AUTHENTICITY OF
ANALYTICAL PROGRAM

DATE: August 15, 2013

PROJECT: Non-ECP

PERMIT: FDEP Permit No. 06,502590709 (Non-ECP Permit)

SUBJECT: **Specific Permit Condition 12(e)**

The implementation of the analytical program is in compliance with the procedures for authenticity, precision, detection limits, and accuracy as described in the South Florida Water Management District's Quality Assurance Manual in accordance with the requirements under 62-160 F.A.C. and the National Environmental Laboratory Accreditation Program (NELAP).

David M. Struve
Director, Analytical Services Division
Restoration Sciences Department

8/15/13
Date

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Mailing Address: P.O. Box 24680, West Palm Beach, FL 33416-4680 • www.sfwmd.gov

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

STATEMENT OF AUTHENTICITY OF
SAMPLING PROGRAM

DATE: August 15, 2013

PROJECT: Non-ECP

PERMIT: FDEP Permit No. 06,502590709 (Non-ECP Permit)

SUBJECT: **Permit Specific Condition 12(e)**
Reporting Period-May 1, 2012 to April 30, 2013

The implementation of the sampling program is in compliance with the procedures for authenticity, precision, detection limits, and accuracy as described in the South Florida Water Management District's Quality Assurance Manual in accordance with the requirements under 62-160 F.A.C.

Signature Date

Aug. 15, 2013

Linda Crean
Administrator, Water Quality Monitoring Section
Water Quality Bureau

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