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

Permit Report (May 1, 2011–April 30, 2012)
Permit Number: 0237803
(Original Permit Number: 06,502590709)

Shi Kui Xue, Steven Hill, Richard Pfeuffer,
Binhe Gu and Nicole Howard

Contributors: Cordella Miessau and Laura Reilly

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)
Permit Application Date	September 30, 1994
Issue and Expiration Dates:	
Permit #: 06,502590709 (Original)	Issued: 4/20/1998; Expired: 4/20/2003
Permit #: 0237803 (Reissue)	Issued: 4/21/2003; Expires: The permit was administratively extended in 2008 until the Long-Term Compliance Permit required by the Everglades Forever Act (EFA) is issued.
Permit Specific Condition Requiring Annual Report:	5
Relevant Period of Record	May 1, 2011–April 30, 2012
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	Non-Everglades Construction Project Water Quality Sampling Sites, Monitoring Schedule and Flow Volumes
C	Summary Statistics of Non-Everglades Construction Project Water Quality Monitoring Data for Water Year 2012
D	Time-Series and Box Plots for Non-Everglades Construction Project Water Quality Monitoring Data Exhibiting Excursions from Class III Numeric Standards for Water Year 2012
E	Time-Series and Box Plots of Total Phosphorus at Non-Everglades Construction Project Monitoring Sites for Water Year 2012 and Earlier Periods
F	Annual Permit Compliance Monitoring Report for Mercury in Downstream Receiving Waters of the Everglades Protection Area
G	Statements of Authenticity for Analytical and Sampling Programs
H	Water Quality Data
I	Hydrological Data

During Water Year 2012 (WY2012) (April 1, 2011–May 30, 2012), there were two excursions (at G-94B and S-197) for specific conductance and two excursions (at S-333 and S-331–173) for pH for Class III water quality standards for the non-Everglades Construction Project (non-ECP) monitoring sites. The highest flow-weighted mean (FWM) total phosphorus (TP) concentrations for the "into" structures were observed at S-140 (L-28 Basin) and S-190 (Feeder Canal Basin) at 48 and 41 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 14 ppb, respectively. The Feeder Canal, L-28, 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.

Three surface water samples were collected on a quarterly basis at each site and analyzed for all designated pesticide parameters. Pesticides with surface water concentrations greater than their respective state 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. None of the pesticide detections were of concern. Two sediment samples were collected at each site and analyzed for all designated parameters. Pesticides with sediment concentrations greater than the PQL were assigned to the "potential concern" excursion category. Dichlorodiphenyldichloroethylene (DDE), the environmental dehydrochlorination product of DDT was detected at one location (S-177) 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 F**). Total annual wet deposition of Hg displayed the fourth consecutive year of decline. During WY2012, average total mercury (THg) concentrations doubled in mosquitofish (*Gambusia* *holbrooki*), decreased by 21 percent in sunfish (*Lepomis* spp.), and decreased by 15 percent in largemouth bass (*Micropterus salmoides*), respectively. 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 mercury exposure depending on their respective foraging areas. As such, most of South Florida remains under fish consumption advisories for the protection of human health.

INTRODUCTION

The non-Everglades Construction Project (non-ECP) permit [Florida Department of Environmental Protection (FDEP) No. 0237803] authorizes the South Florida Water Management District (SFWMD or District) to operate and maintain (37) structures, and specifies reporting requirements stated in Specific Conditions 5 and 12 of the permit.

METHODS

WATER QUALITY AND HYDROLOGIC DATA

The water quality and hydrologic data evaluated in this report were retrieved from the South Florida Water Management 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, 2011a) and Field Sampling Quality Manual (SFWMD, 2011b). The laboratory manual was developed in accordance with the National Laboratory Accreditation Conference (NELAC) requirements and both laboratory and the field manuals in accordance with Florida Department of Environmental Protection (FDEP) Quality Assurance Rule [Chapter 62-160, Florida Administrative Code (F.A.C.)]. The quality manuals describe the procedures that the water quality monitoring program follows to obtain accurate data to assess the 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 (SOP) 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 the 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, and sampling frequencies of the various categories of chemical constituents and physical properties required by the monitoring schedule denoted in the permit, monthly and annual flow volumes are shown in **Attachment B**, Table B-1, of this report.

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 Water Year 2012 (WY2012) (May 1, 2011–April 30, 2012), the fifteenth year of non-ECP data, and previous periods (WY1998–WY2011). 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 practical quantitation limit (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. Total phosphorus (TP) data that were less than the MDL of 2.0 micrograms per liter (µg/L) [or parts per billion (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.

EXCURSION ANALYSIS FOR CLASS III CONSTITUENTS AND PESTICIDES

To evaluate compliance with water quality criteria in WY2012, 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.

Total Phosphorus

The data for total phosphorus 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 flow-weighted mean (FWM) TP concentration of 50 ppb or less at each inflow point to the Everglades Protection Area (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 or Park) 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 interim or 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 datasets. Notched box-and-whisker plots can be used to test for statistical significance between datasets 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) (**Table 3**).

It is recognized that using notched box-and-whisker plots to determine differences between datasets with large differences in sample size may cause apparently significant findings that are artifacts of the number of samples and the amount of variation in the datasets. The objective of providing the plots was to compare data from WY2012 to those in previous individual permit water years (WY1998–WY2011) and previously established baseline datasets for the non-ECP discharge structures.

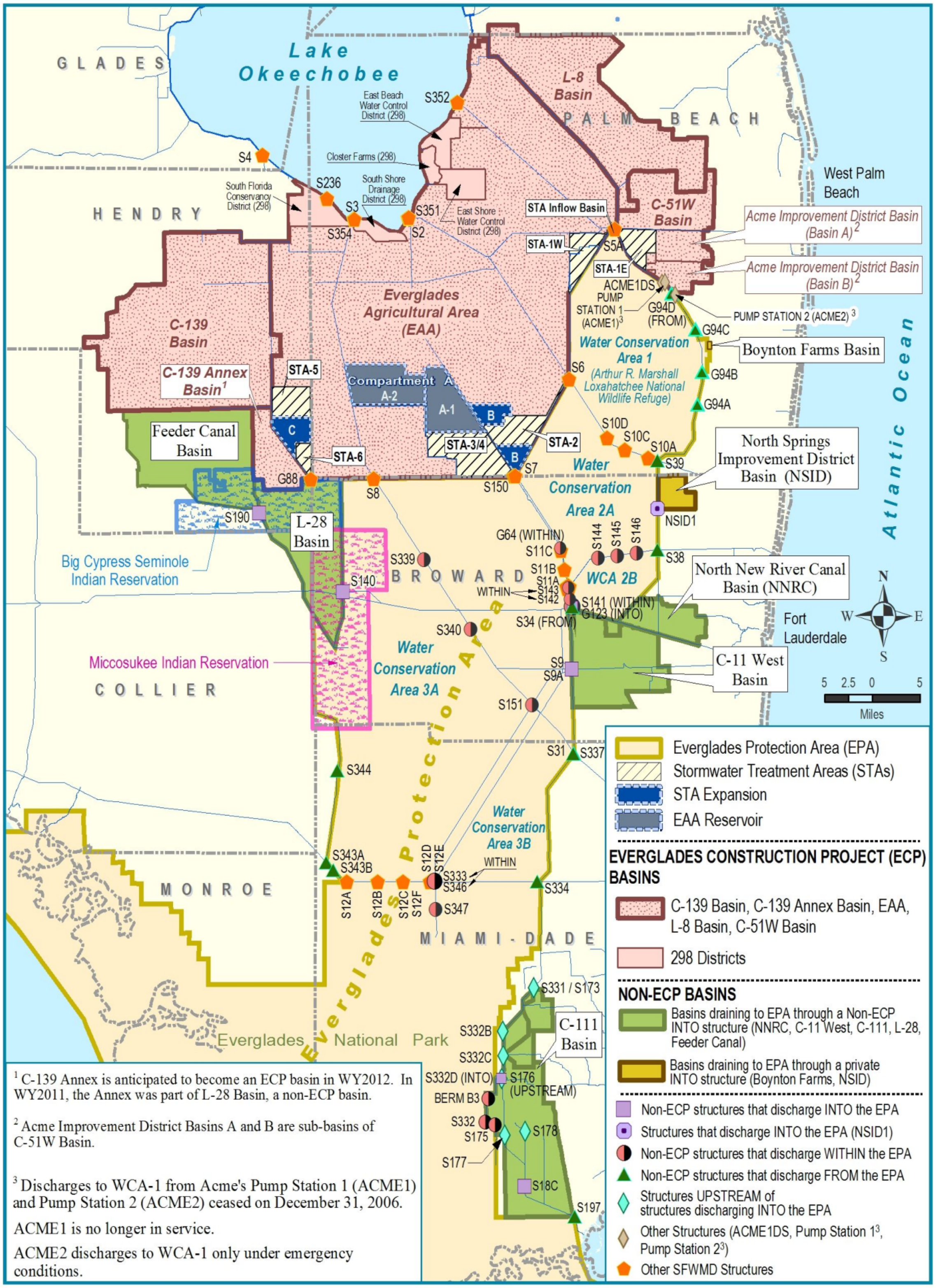
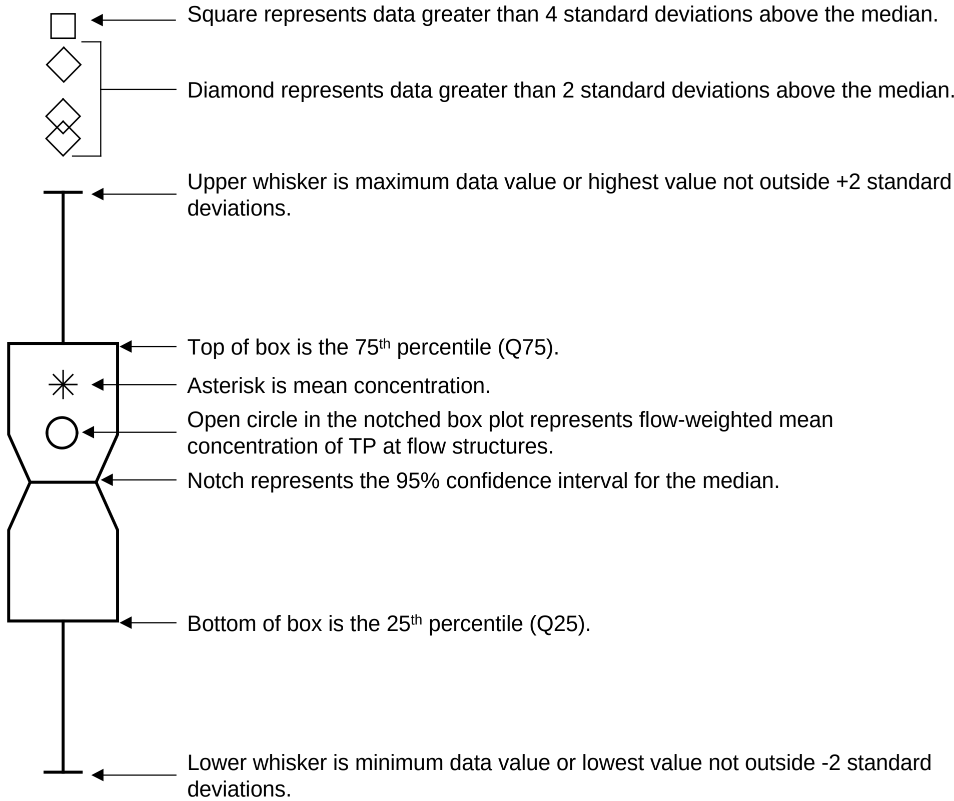


Figure 1. Non-Everglades Construction Project (non-ECP) discharge structures and additional upstream structures.

Table 3. Description of notched box-and-whisker plots used in this report.



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 dataset 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 2a-2d**

RESULTS: WATER QUALITY EVALUATION AND EXCURSION ANALYSIS

In accordance with Specific Conditions 5 and 12(h) of the non-ECP permit, this section presents an update of constituent concentrations and physical properties measured during WY2012, the fifteenth year of non-ECP permit monitoring. For standards with numeric criteria, the 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 WY2012 (**Attachment C**, Table C-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 C**, Table C-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 (25th and 75th), 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 the 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 11 water quality parameters (with numeric criteria), shown in **Table 4**, 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 7 parameters listed in **Table 4**, two parameters—pH and conductivity—exhibited excursions during WY2012. 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 4** summarizes the previously reported information and compares those annual results to WY2012. A summary of observed excursions from Class III criteria for individual non-ECP monitoring locations during WY2012 is presented in **Table 5**. 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 4. Summary of total number of excursions from state Class III criteria for all non-ECP monitoring sites during Water Year 2012 (WY2012) (May 1, 2011–April 30, 2012) 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)

First number indicates number of excursions; 2nd number indicates total number of samples collected. ND = no data

WY2012 (May 1, 2011–April 30, 2012) through WY1998 (May 1, 1997–April 30, 1998); Non-ECP Baseline (October 1, 1988 through 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).

*Dissolved oxygen limit was adjusted from 5 milligrams per liter (mg/L) to site-specific alternative criterion (SSAC) since WY2011.

For parameters that exceeded Class III criteria, time-series plots and notched box-and-whisker plots are provided in **Attachment D**. These plots report the range of the data and the magnitude of the excursions and assist with detecting whether there are any increasing or decreasing trends observed in the data. To assess how far a physical parameter or major ion deviated above or below a Class III numeric criterion, a percent-departure line has been added to the time-series plots and notched box-and-whisker plots. These departure lines indicate whether a parameter value ranges more than 1, 10, or 100 percent beyond the numeric criteria. The physical parameters appear as horizontal lines across the plots. For the major ions and trace metals, the criteria change from sample to sample because the criteria for each parameter for a particular sample were calculated based on the hardness data calculated from the same sample. For data that show an excursion, the percentage departure is annotated on the plot above the value.

Dissolved Oxygen

It should be noted that even unimpacted areas of the Everglades commonly have dissolved oxygen (DO) concentrations that are below the 5 milligrams per liter (mg/L) standard as part of the warm natural water conditions found in South Florida. Because natural levels commonly fall below the existing standard, the FDEP has adopted a site-specific alternative criterion (SSAC) for DO in the EPA that better reflects naturally occurring conditions (see Volume I, Chapter 3A). DO conditions for the non-ECP were compared to the Everglades DO site-specific alternative criterion (SSAC). Because 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 equation:

$$\begin{aligned} \mathrm{DOL} &= [-\ 3.70 - \{1.50 \cdot \mathrm{sine}\ (2\mathrm{p}/1440 \cdot t_i) - (0.30 \cdot \mathrm{sine}\ [4\mathrm{p}/1440 \cdot t_i])\} \\ &\quad + 1/(0.0683 + 0.00198 \cdot C_i + 5.24{\cdot}10^{-6} \cdot C_i^2)] - 1.1 \end{aligned}$$

Where:

$\mathrm{DOL}_{\boldsymbol{i}}$ = lower limit for the i^{th} annual DO measurement in milligrams per liter (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 °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 above equation. During WY2012, there were no DO excursions at individual stations (**Table 5)**.

Table 5. Summary of excursions from state Class III surface water criteria for individual non-ECP monitoring sites and additional upstream monitoring locations during WY2012.

Area	Structure	Sampling Site	Alkalinity	SSAC Pass/Fail	Specific Conductance	pH	Turbidity	Un-Ionized Ammonia	Iron
Into	G-123	G123	-ND-	Pass	(0 : 12)	(0 : 12)	(0 : 14)	-ND-	-ND-
	S-9	S9	-ND-	Pass	(0 : 52)	(0 : 52)	(0 : 19)	-ND-	-ND-
	S-9A	S9A	-ND-	Pass	(0 : 53)	(0 : 53)	(0 : 17)	(0 : 1)	-ND-
	S-18C	S18C	-ND-	Pass	(0 : 54)	(0 : 54)	(0 : 6)	-ND-	-ND-
	S-332D	S332DX	-ND-	Pass	(0 : 54)	(0 : 54)	(0 : 6)	-ND-	-ND-
	S-140	S140	-ND-	Pass	(0 : 53)	(0 : 53)	(0 : 22)	-ND-	-ND-
	S-190	S190	-ND-	Pass	(0 : 52)	(0 : 52)	(0 : 23)	-ND-	-ND-
Within	G-64	G64	No Data (Structure Closed)						
	S-346, S-347	S12D	-ND-	Pass	(0 : 32)	(0 : 32)	-ND-	-ND-	-ND-
	S-141	S34	Same as Data for S34, shown Below						
	S-142	S142	-ND-	Pass	(0 : 13)	(0 : 13)	(0 : 13)	-ND-	-ND-
	S-143	S11A	(0 : 13)	Pass	(0 : 13)	(0 : 13)	(0 : 13)	(0 : 12)	(0 : 4)
	S-144, S-145, S146	S145	(0 : 19)	Pass	(0 : 19)	(0 : 19)	(0 : 19)	(0 : 17)	(0 : 4)
	S-151	S151	-ND-	Pass	(0 : 15)	(0 : 15)	(0 : 15)	-ND-	-ND-
	S-333	S333	-ND-	Pass	(0 : 52)	**(1 : 52)**	(0 : 4)	-ND-	-ND-
	S-339, S-340	C123SR84	-ND-	Pass	(0 : 12)	(0 : 12)	(0 : 12)	-ND-	-ND-
	S-175	S175	-ND-	-ND-	-ND-	-ND-	-ND-	-ND-	-ND-
	S-332	S332	-ND-	-ND-	-ND-	-ND-	-ND-	-ND-	-ND-
	BERMB3	BERMB3	-ND-	Pass	(0 : 4)	(0 : 4)	(0 : 2)	-ND-	-ND-
From	G-94A, G-94B, G-94C	G94B	-ND-	Pass	**(1 : 14)**	(0 : 14)	(0 : 14)	-ND-	-ND-
	G-94D	G94D	(0 : 1)	-ND-	(0 : 1)	(0 : 1)	(0 : 1)	-ND-	-ND-
	S-31, S-337	S31	-ND-	Pass	(0 : 13)	(0 : 13)	(0 : 15)	-ND-	-ND-
	S-34	S34	-ND-	Pass	(0 : 19)	(0 : 19)	(0 : 19)	-ND-	-ND-
	S-38	S38	(0 : 27)	Pass	(0 : 27)	(0 : 26)	(0 : 27)	(0 : 25)	(0 : 4)
	S-39	S39	(0 : 19)	Pass	(0 : 22)	(0 : 22)	(0 : 22)	(0 : 19)	(0 : 4)
	S-197	S197	-ND-	Pass	**(1 : 5)**	(0 : 5)	(0 : 3)	(0 : 1)	-ND-
	S-334	S356-334	-ND-	Pass	(0 : 53)	(0 : 53)	(0 : 4)	-ND-	-ND-
	S-343A, S-343B	US41-25	-ND-	Pass	(0 : 18)	(0 : 18)	(0 : 6)	-ND-	-ND-
	S-344	S344	-ND-	Pass	(0 : 4)	(0 : 4)	(0 : 4)	-ND-	-ND-
C-111 Basin	S-176	S332DX	-ND-	Pass	(0 : 54)	(0 : 54)	(0 : 6)	-ND-	-ND-
	S-177	S177	-ND-	Pass	(0 : 43)	(0 : 43)	(0 : 7)	(0 : 40)	-ND-
	S-178	S178	-ND-	Pass	(0 : 25)	(0 : 25)	(0 : 6)	(0 : 22)	-ND-
	S-331, S-173	S331-173	-ND-	Pass	(0 : 53)	**(1 : 53)**	(0 : 4)	-ND-	-ND-
Totals			(0 : 79)	(pass : 28)	**(2 : 787)**	**(2 : 786)**	(0 : 317)	(0 : 136)	(0 : 16)

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.

Specific Conductance

During WY2012, specific conductance was measured in 787 samples collected from the monitoring sites. Two samples (G-94B and S-197) exhibited an excursion exceeding the Class III criteria for specific conductance. The criteria for Class III waters requires that specific conductance not exceed a level greater than 50 percent above background, or 1,275 microhms per centimeter (µmhos/cm), whichever is greater.

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 WY2012, two samples (S-331-173 and S-333) exhibited an excursion for the pH criterion among 786 samples collected.

Alkalinity

The criterion for Class III waters requires that alkalinity not measure below 20 mg/L. Alkalinity parameter was deleted from monitoring plan of Everglades National Park Inflows East (PIE) dated on April 1, 2008; none of the 79 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 15 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, then 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 79 samples collected during WY2012, as shown in **Table 5**.

Evaluation of Total Phosphorus

The non-ECP permit established the monitoring schedule shown in **Attachment B** 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. Starting from October 2009, grab samples were taken biweekly when there was recorded flow at S-38, S-39, S-145, and S-11A.

During WY2012, auto-samplers collected TP samples at the S-9, S-9A, S-18C, S-190, S-140, and S-332D structures. Deployment of the auto-samplers at these locations was previously identified as an improvement in the monitoring program for collecting TP data at "into structures." The TP concentration data collected for all monitoring locations during WY2012 are plotted in time-series and notched box-and-whisker plots in **Attachment E**. The plots provide a comparison of TP concentration data between WY2012 and previous periods (WY1998–WY2011, 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 and notched box-and-whisker plots. TP concentrations are reported in ppb (or µg/L), unless otherwise noted.

For WY2012, a statistical comparison of TP concentration data for all monitoring locations is presented as notched box-and-whisker plots in **Figures 2a** through **2d**. The figures represent "into" (**Figure 2a**), "within" (**Figure 2b**), and "from" (**Figure 2c**) monitoring locations. Additionally, notched box-and-whisker plots were constructed for TP concentration data for the upstream C-111 Basin monitoring locations (**Figure 2d**). Summary statistics of TP data collected for all monitoring locations are presented separately as **Attachment C**, Table C-3 (grab and auto-sampler data are reported separately).

"Into" Structures

The highest TP concentrations for non-ECP structures discharging directly to the EPA during WY2012 were observed for the monitoring locations at S-140 (L-28 Basin), followed by the Feeder Canal (S-190), with median TP concentrations of 38 ppb (grab) and 39.5 ppb (auto) at S-140, and 28 ppb (grab) and 39 ppb (auto) at S-190. During WY2012, structures S-140 and S-190 discharged 85,591 and 49,988 acre-feet (ac-ft), respectively, into the western portion of Water Conservation Area 3A (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 structures are now modified as "into" structures and S-174 was plugged in September 2007; S-175, S-332, and BERMB3 are modified as "within" structures. These structures discharge to the southeastern portion of the Park via the C-111 Canal and Taylor Slough. The TP data for these monitoring locations had median concentrations of 4 ppb (grab) and 8 ppb (auto) for S-18C, and 7 ppb (grab) and 7 ppb (auto) for S-332D, with 75 percent of the samples having concentrations below 6 ppb (grab) and 11 ppb (auto) for S-18C, and 8 ppb (grab) and 10 ppb (auto) for S-332D. During WY2012, the structure discharged 65,550 ac-ft from S-332D to the Park, a significant decrease from last year (105,084 ac-ft). The S-18C structure discharged approximately 104,721ac-ft to the lower C-111 Canal, which was also a significant decrease from last year (130,130 ac-ft). S-178 had a median concentration of 22 ppb for the grab samples, the highest TP concentration in the C-111 Basin; the structure discharged 515 ac-ft in WY2012. The TP concentrations are usually slightly lower in grab samples than in auto-samples. There are multiple factors that could cause higher TP in auto-samples than in grab samples. Some major factors could be that the auto-sampler can pick up the peak flow that the grab sample could normally miss, or the auto-sampler could pick up sediments when water depth is shallow, which could avoid picking up such sediments by grab sample.

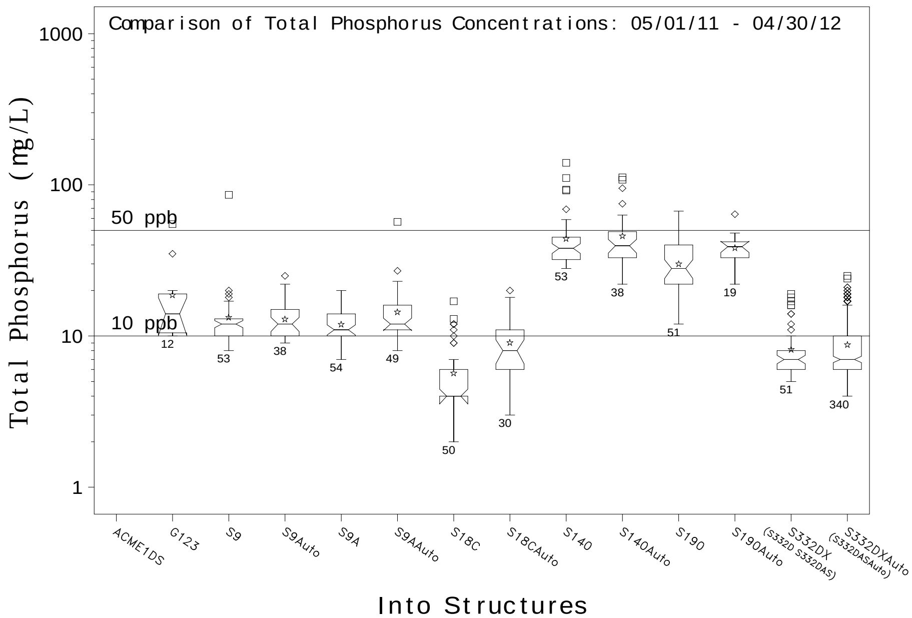


Figure 2a. Comparison of total phosphorus (TP) concentrations for "into" structures during WY2012.

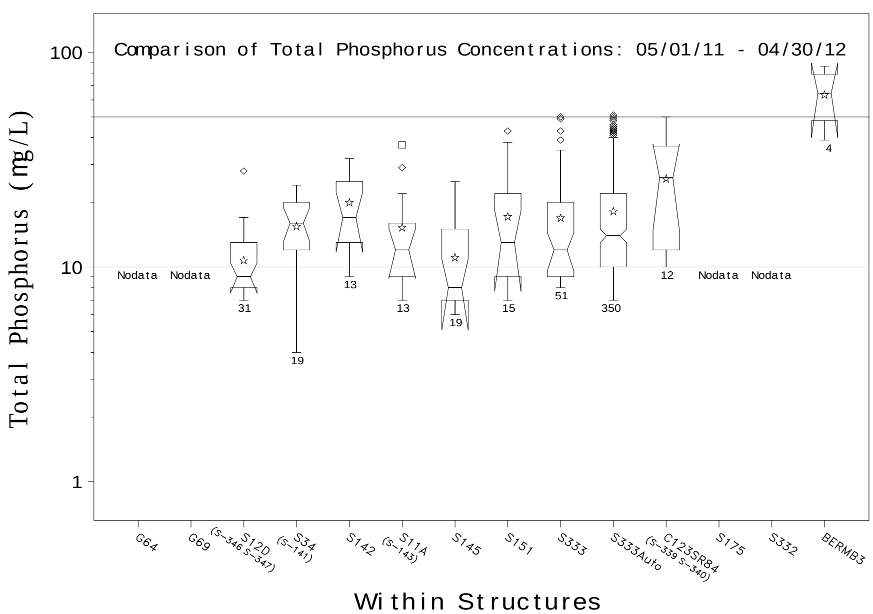


Figure 2b. Comparison of TP concentrations for "within" structures during WY2012.

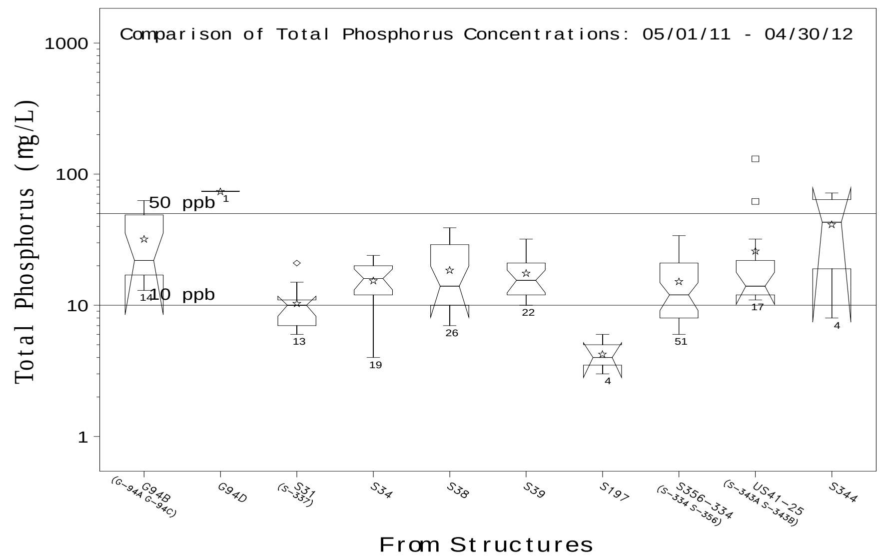


Figure 2c. Comparison of TP concentrations for "from" structures during WY2012.

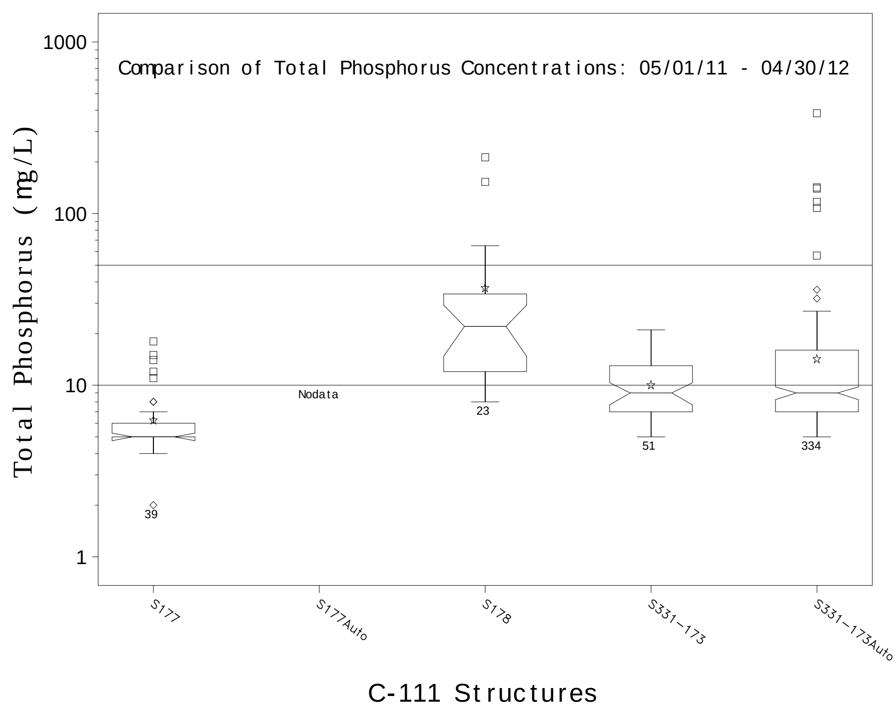


Figure 2d. Comparison of TP concentrations for C-111 structures during WY2012.

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 13 ppb for 75 percent of the data, a median concentration of 12 ppb, and a maximum concentration of 86 ppb (**Figure 2a**). Seventy-five percent of the data collected by the auto-sampler at S-9 was below 15 ppb, with a median concentration of 12 ppb, and a maximum concentration of 25 ppb. The notched box-and-whisker plot for S-9A, which is based on grab-sample data, indicates a TP concentration of less than 14 ppb for 75 percent of the data, a median concentration of 11 ppb, and a maximum concentration of 20 ppb (**Figure 2a**). Seventy-five percent of the data collected by the auto-sampler at S-9A was below 16 ppb, with a median concentration of 12 ppb and a maximum concentration of 57 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 WY2012 at G-123; therefore, no sample was collected from the auto-sampler. During WY2012, 12 grab samples were collected. The grab samples at G-123 had a median TP concentration of 14 ppb. Seventy-five percent of the data collected by grab samples at G-123 was below 19 ppb, with a maximum concentration of 55 ppb.

"Within" Structures

For structures discharging within the EPA during WY2012, low TP concentrations were observed for structures S-12D and S-333, which convey discharges from WCA-3A to the Park (**Figure 2b**). The monitoring location for S-12D serves as a surrogate monitoring location for the non-ECP permit structures S-346 and S-347. The median TP concentrations at these monitoring locations were 9 ppb at S-12D and 12 ppb at S-333, with 75 percent of the data below 13 ppb at S-12D and 20 ppb at S-333. The maximum concentration observed was 28 ppb for S-12D and 51 ppb at S-333. The discharge volumes for the period were 176,995 ac-ft for S-346 and S-347, and 146,748 ac-ft for S-333.

Structures S-145 and S-146 convey discharges from WCA-2A to WCA-2B. The structures usually operate simultaneously. The maximum concentration was 25 ppb, the median value was 8 ppb, and 75 percent of the data (25 samples) were below 15 ppb at S-145. Discharge volumes ranged from 50,316 ac-ft at S-145 to 19,346 ac-ft at S-146.

In addition to monitoring the water quality at S-34, the data from this location are considered to be representative of the water quality conditions for S-141, which conveys discharges from WCA-2B to the North New River Canal just upstream of S-34. The TP concentrations from the S-34 location ranged from 4 ppb to 24 ppb, with a median value of 16 ppb.

The highest TP concentrations were observed at the monitoring site C123SR84 (the surrogate location for structures S-339 and S-340), with levels ranging from 10 to 50 ppb, with a median value of 26 ppb. S-151 discharged approximately 81,304 ac-ft during WY2012. TP concentrations ranged from 7 to 43 ppb, with a median value of 13 ppb. Both S-339 and S-340, located upstream of S-151 in the Miami Canal, discharged 0 ac-ft in WY2012.

During WY2012, TP concentration was not monitored at S-332 because there was no flow at this site. S-175 discharged 2 ac-ft, with a FWM TP concentration of 6 ppb. Four grab samples were collected at BERMB3 with an average TP concentration of 63.5 ppb; there was no discharge at BERMB3 during the reporting period.

"From" Structures

TP concentrations observed during WY2012 for the structures classified as "from" are summarized in the notched box-and-whisker plot shown in **Figure 2c**. One water quality sample was collected at structure G-94D (although there was no flow at this structure), with a TP concentration of 74 ppb. G-94B exhibited the highest TP concentrations, which ranged from 13 to

63 ppb. The median TP concentration at G-94B was 22 ppb, with 75 percent of the data below 49 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 Refuge and provide water supply releases from the Refuge to the LWDD. G-94A, G-94B, and G-94C, when open, 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 WY2012 were 1,455 ac-ft at G-94A, 2 ac-ft at G-94B, and no flow at G-94C and G-94D.

In WY2012, the TP concentrations observed at S-39 ranged from 10 to 32 ppb, with a median value of 15.5 ppb; the structure discharged approximately 12,764 ac-ft. During this period, 51 grab samples and 331 samples from the auto-sampler were collected at S-356-334. At this location, TP concentrations ranged from 6 to 34 ppb (grab) and from 5 to 38 ppb (auto), with a median concentration of 12 ppb (both grab and auto). The TP concentrations observed at S-31 ranged from 6 to 21 ppb, with a median value of 10 ppb; the structure discharged approximately 152 ac-ft; the TP concentrations observed at S-34 ranged from 4 to 24 ppb, with a median value of 16 ppb; the structure discharged approximately 2,849 ac-ft; the TP concentrations observed at S-38 ranged from 7 to 39 ppb, with a median value of 14 ppb; the structure discharged approximately 43,944 ac-ft; US41-25 is a surrogate station for S-343A, and S-343B structures, the TP concentrations observed at US41-25 ranged from 11 to 131 ppb, with a median value of 14 ppb; the structure did not discharged at S-343A and S343B structures during WY2012. S-344 had the highest TP concentration; 75 percent of the observed TP concentrations at S-344 were below 64 ppb, with median value of 43 ppb.

C-111 Basin Upstream Structures

Structures S-176, S-177, S-178, and S-331/S-173, shown in **Figure 2d**, are C-111 Basin structures located upstream of into structures S-18C and S-332D. Auto-samplers were installed at S-176, S-331-173 sites. For S-331/S-173, 75 percent of the TP concentration data collected for this structure was below 13 ppb, with the median value of 9 ppb; S332DX is a surrogate of S-176, 75 percent of the TP concentration data collected was below 8 ppb, with the median value of 7 ppb; for S-177, 75 percent of the TP concentration data collected for this structure was below 6 ppb, with the median value of 5 ppb. The maximum TP measured at S-178 was 213 ppb, with a median TP concentration of 22 ppb for grab samples, which was higher than the rest of the C-111 Basin upstream structures. In WY2012, there was 515 ac-ft discharged at S-178 and grab samples were collected at upstream of S178 structure.

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 WY2012. FWM TP concentrations were collected only for those structures having sufficient TP data and available flow data for WY2012. The annual FWM TP concentrations and monthly and annual flow volumes for the “into,” “within,” “from,” and C-111 Basin structures during WY2012 are provided in **Attachment B**, Table B-2**.** A more detailed analysis of the WY2012 annual FWM TP concentration data for each into structure is shown in **Table 6**. The calculations use an estimation algorithm to determine TP concentrations on all days with positive flow for which no observed values are available.

Table 6 presents the results for the FWM TP concentrations at “into” sites during WY2012. The highest FWM TP concentration for the “into” structures during WY2012 was observed in the L-28 Basin at S-140 (48 ppb) and in the Feeder Canal Basin at S-190 (41 ppb). S-9 and S-9A had FWM TP concentrations of 16 and 14 ppb, respectively, which is slightly higher than FWM TP of WY2011 (13 ppb at S-9 and 12 ppb at S-9A) due to the impact of water supply from Lake

Okeechobee during the dry season in WY2012. The Feeder Canal, L-28, and C-11 West basins are designated as sites of potential concern for TP.

The lowest FWM TP concentrations were observed at S-332D (7 ppb) and at S-18C (9 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 6. Annual flow-weighted mean TP concentrations and TP loads for WY2012.

Basin	Structure	Water Quality Station	Total Flow (acre-feet)	Days with Positive Flow	Sample Type	Sample Size (Grab)	Arithmetic Average (Grab) (ppb)	Sample Size (Comp)	Arithmetic Average (Flow) (ppb)	Arithmetic Average (Non-Flow) (ppb)	Flow-Weighted Mean Concentration (ppb)	TP Load (kg)
North New River	G-123	G123	0	0	Auto[2] & Grab[1]	12	19	0	N/F[3]	19	N/F[3]	0
C-11 West	S-9	S9	113,688	161	Auto[2] & Grab[1]	53	13	38	14	11	16	2179
	S-9A	S9A	77,413	332	Auto[2] & Grab[1]	54	12	49	13	15	14	1,300
C-111	S-332D	S332DX	65,550	168	Auto[2] & Grab[1]	51	8	49	8	10	7	557
	S-18C	S18C	104,721	266	Auto[2] & Grab[1]	50	6	30	7	6	9	1,212
L-28	S-140	S140	85,591	214	Auto[2] & Grab[1]	53	44	38	47	38	48	5,055
Feeder Canal	S-190	S190	49,988	166	Auto[2] & Grab[1]	51	30	19	25	37	41	2,509

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

The quarterly surface water and semiannual sediment pesticide sampling events at the 11 non-ECP sites (**Figure 3**) for WY2012 were conducted during July 2011, October 2011, and February 2012. The non-ECP requirement for sampling at S-142 is only during discharge or flow events. For this reporting period, samples were not collected for any of the sampling events. Representative MDLs and PQLs for the pesticide analytes are listed in **Table 7**. The Department of Environmental Protection Central Laboratory in Tallahassee, FL performed all the pesticide analyses. Any limitations on data validity that might influence the utility of these data are summarized in the Quality Assurance Evaluation section of the individual pesticide event reports, which are available 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 U.S. Environmental Protection Agency (USEPA) under Section 304 (a) of the Clean Water Act (CWA) 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 8** lists representative toxicity levels for selected freshwater aquatic invertebrates and fishes.

Table 9 lists the pesticides detected in surface water samples collected during WY2012. Three surface water samples were collected at each site and 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. None of the pesticide detections were of concern.

Table 10 lists the pesticides detected in the sediment samples collected during WY2012. 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 one location (S-177) at a level of "potential concern."

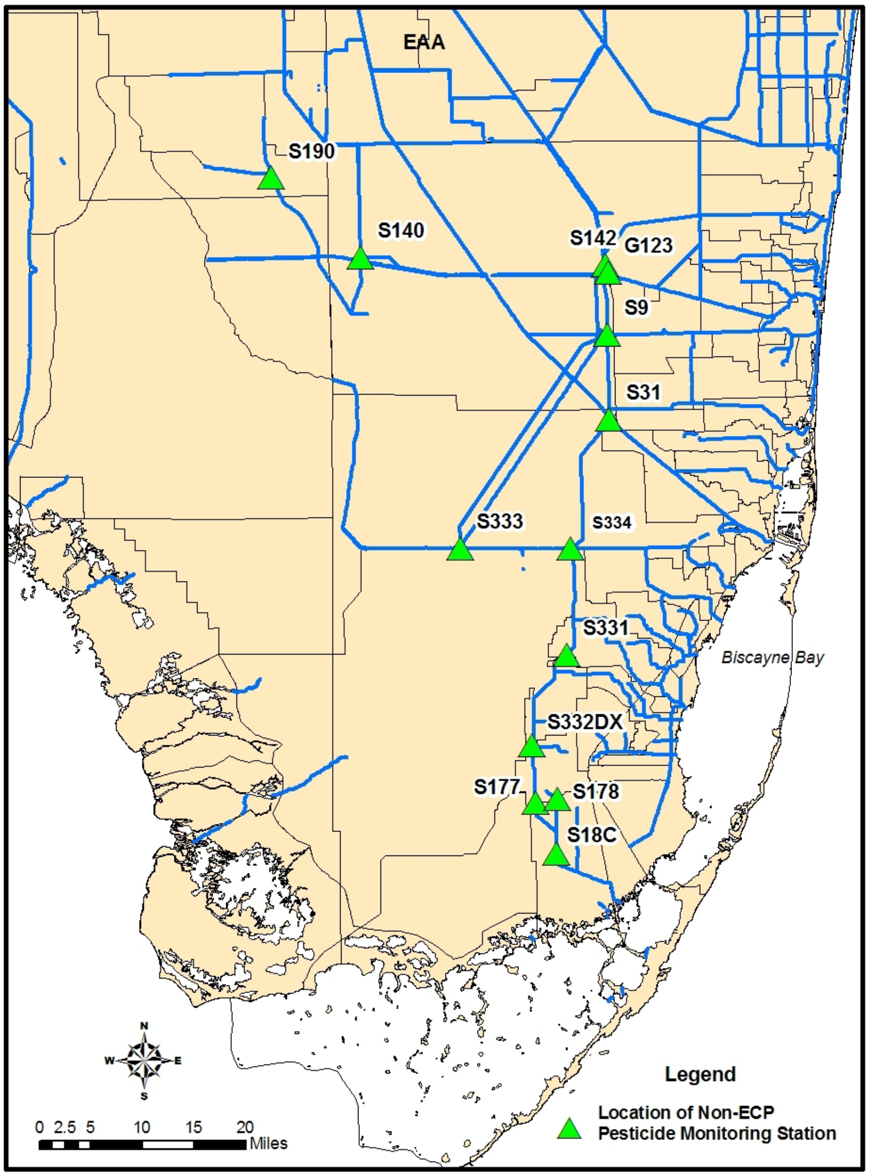


Figure 3. Pesticide monitoring network for non-ECP structures

Table 7. Method detection limits (MDLs) and practical quantitation limits (PQLs) for pesticides, determined in February 2012.

Pesticide or Metabolite	Water: Range of MDLs - PQLs (µg/L)	Sediment: Range of MDLs - PQLs (µg/Kg)
2,4-D	0.2 - 0.62	9.3 - 150
2,4,5-T	0.2 - 0.62	9.3 - 150
2,4,5-TP (silvex)	0.2 - 0.63	9.3 - 150
acifluorfen	0.2 - 0.62	9.3 - 150
alachlor	0.056 - 0.24	14 - 390
Aldrin	0.0019 - 0.008	0.48 - 13
ametryn	0.0093 - 0.04	2.4 - 65
atrazine	0.0094 - 0.13	2.4 - 65
atrazine desethyl	0.0093 - 0.04	N/A
atrazine desisopropyl	0.0093 - 0.04	N/A
azinphos methyl (guthion)	0.028 - 0.12	7.1 - 190
α-BHC (alpha)	0.0019 - 0.008	0.48 - 13
β-BHC (beta)	0.0019 - 0.008	0.48 - 13
δ-BHC (delta)	0.0019 - 0.008	0.48 - 13
γ-BHC (gamma) (lindane)	0.0019 - 0.008	0.48 - 13
bromacil	0.047 - 0.2	9.5 - 260
butylate	0.019 - 0.08	N/A
carbophenothion (trithion)	0.0056 - 0.024	1.4 - 39
chlordane	0.019 - 0.08	4.8 - 130
chlorothalonil	0.0075 - 0.032	1.4 - 39
chlorpyrifos ethyl	0.0093 - 0.04	2.4 - 65
chlorpyrifos methyl	0.019 - 0.08	4.8 - 130
cypermethrin	0.011 - 0.048	2.4 - 65
DDD-P,P’	0.0037 - 0.016	0.95 - 26
DDE-P,P’	0.0037 - 0.016	0.95 - 26
DDT-P,P’	0.0037 - 0.016	1.4 - 39
demeton	0.028 - 0.12	7.1 - 190
diazinon	0.019 - 0.08	2.4 - 65
dicofol (kelthane)	0.022 - 0.096	5.7 - 150
dieldrin	0.0019 - 0.008	0.48 - 13
disulfoton	0.019 - 0.08	2.4 - 65
Diuron	0.21 - 0.68	8.6 - 130
α-endosulfan (alpha)	0.0019 - 0.016	0.48 - 13
β-endosulfan (beta)	0.0019 - 0.016	0.48 - 13
endosulfan sulfate	0.0037 - 0.036	0.95 - 26
Endrin	0.006 - 0.026	1.5 - 41

Pesticide or Metabolite	Water: Range of MDLs - PQLs (µg/L)	Sediment: Range of MDLs - PQLs (µg/Kg)
endrin aldehyde	0.0037 - 0.016	0.95 - 26
ethion	0.0093 - 0.04	2.4 - 65
ethoprop	0.0093 - 0.04	2.4 - 65
fenamiphos	0.037 - 0.16	4.8 - 130
fonofos	0.0093 - 0.04	2.4 - 65
heptachlor	0.0019 - 0.008	0.48 - 13
heptachlor epoxide	0.0019 - 0.008	0.48 - 13
hexazinone	0.019 - 0.092	4.8 - 130
imidacloprid	0.21 - 0.68	N/A
linuron	0.21 - 0.68	8.6 - 130
malathion	0.028 - 0.12	4.8 - 130
metalaxyl	0.047 - 0.2	N/A
methamidophos	N/A	24 - 650
methoxychlor	0.0093 - 0.04	3.3 - 90
metolachlor	0.056 - 0.24	14 - 390
metribuzin	0.019 - 0.08	4.8 - 130
mevinphos	0.056 - 0.24	9.5 - 260
mirex	0.0037 - 0.016	0.95 - 26
monocrotophos	N/A	24 - 650
naled	0.075 - 0.32	19 - 520
norflurazon	0.019 - 0.08	4.8 - 130
parathion ethyl	0.019 - 0.08	4.8 - 130
parathion methyl	0.019 - 0.08	4.8 - 130
PCB-1016	0.019 - 0.08	4.8 - 100
PCB-1221	0.019 - 0.08	9.5 - 210
PCB-1232	0.019 - 0.08	4.8 - 100
PCB-1242	0.019 - 0.08	4.8 - 100
PCB-1248	0.019 - 0.08	4.8 - 100
PCB-1254	0.019 - 0.08	7.1 - 150
PCB-1260	0.019 - 0.08	4.8 - 100
permethrin	0.0093 - 0.04	2.4 - 65
phorate	0.0093 - 0.04	2.4 - 65
prometryn	0.019 - 0.08	4.8 - 130
prometon	0.019 - 0.08	N/A
simazine	0.0093 - 0.04	2.4 - 65
toxaphene	0.093 - 0.4	29 - 770
trifluralin	0.0075 - 0.034	1.9 - 52

N/A - Not analyzed

Table 8. Toxicity of pesticides (in µg/L) to selected freshwater aquatic invertebrates and fishes.

Common Name	48 hr EC_{50}				96 hr LC_{50}				96 hr LC_{50}			96 hr LC_{50}			
	Water flea *(Daphnia magna)*		**Acute Toxicity***	**Chronic Toxicity***	**Bluegill** *(Lepomis macrochirus)*		**Acute Toxicity***	**Chronic Toxicity***	**Largemouth Bass** *(Micropterus salmoides)*	**Acute Toxicity***	**Chronic Toxicity***	**Channel Catfish** *(Ictalurus punctatus)*		**Acute Toxicity***	**Chronic Toxicity***
ametryn	28,000	(3)	9,333	1,400	4,100	(2)	1,367	205	-	-	-	-		-	-
atrazine	6,900	(3)	2,300	345	16,000	(2)	5,333	800	-	-	-	7,600	(2)	2,533	380
DDE-p,p'	-		-	-	240	(1)	80	12	-	-	-	-		-	-
norflurazon	15,000	(3)	5,000	750	16,300	(3)	5,433	815	-	-	-	>200,000	(2)	>67,000	>10,000
	>15000	(4)	>5,000	>750	16,300	(4)	5,433	815	-	-	-	-		-	-

(*) Florida Administrative Code (FAC) 62-302.200, 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 LC50 is the lowest value which has been determined for a species significant to the indigenous aquatic community.

(1) Johnson, W. W. and M.T. Finley (1980). Handbook of Acute Toxicity of Chemicals to Fish and Aquatic Invertebrates. U.S. Department of the Interior, Fish and Wildlife Service Resource Publication 137. Washington, DC.

(2) Hartley, D. and H. Kidd. (Eds.) (1987). The Agrochemicals Handbook. Second Edition, The Royal Society of Chemistry. Nottingham, England.

(3) U.S. Environmental Protection Agency (1991) Pesticide Ecological Effects Database, Ecological Effects Branch, Office of Pesticide Programs, Washington, DC.

(4) U.S. Environmental Protection Agency (1996) Registration Eligibility Decision Norflurazon List A Case 0229

Table 9. Pesticide detections and excursions for surface water samples collected from July 2011 to February 2012.[1]

Structure	Ametryn	Atrazine	Atrazine Desethyl	Norflurazon
G-123	--	--	--	--
S-9	--	1:2:0*	1:0:0	--
S-18C	--	0:1:0	--	--
S-140	--	--	--	1:0:0
S-190	--	0:1:0	1:0:0	1:0:0
S-31	1:0:0	0:1:0	--	--
S-332DX	--	1:1:0	--	--
S-177	--	1:1:0	--	--
S-178	--	--	--	--
S-331	--	1:1:0	--	--

[1] Three 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 10. Pesticide detections and excursions for sediment samples collected in October 2011 and February 2012.[1]

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

[1] Two sediment samples were collected for each site (except S142) 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).

LITERATURE CITED

Akpoji, G.A., E. Damisse, M. Imru, C. James and N.D. Mtundu. 2003. Standard Operating Procedures for Flow Data Management in the District's Hydrologic Database. Hydrology and Hydraulics Division, Environmental Monitoring and Assessment Department, South Florida Water Management District, West Palm Beach, FL.

McGill, R., J.W. Tukey and W.A. Larsen. 1978. Variations of Box Plots. *Am. Statistician*, 32(1): 12-16.

Novak, C.E. 1985. Preparation of Water-Resources Data Reports: U.S. Geological Survey, *Open File Report*, 85-480.

SFWMD. 2011a. Chemistry Laboratory Quality Manual. South Florida Water Management District, SFWMD-LAB-QM-2010-001, Effective November 3, 2011. West Palm Beach, FL.

SFWMD. 2011b. Field Sampling Quality Manual. South Florida Water Management District, SFWMD-FIELD-QM-001-07, Effective June 21, 2011. West Palm Beach, FL.

Attachment A: Specific Conditions and Cross-References

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

Specific Condition	Description	Applicable Phase	Action Taken	Reported in the 2013 SFER 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	1-23	1-3	1-10	A-I
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	23, SFWMD. 2011a. Chemistry Laboratory Quality Manual			G
11	Mercury Screening Program	Operation	Done annually as required	90-119			F
12(a)	Permit number	Operation	Done annually as required	1-2		1	
12(b)	Sampling and analysis dates or code	Operation	Done annually as required	121			H
12(c)	Description of methods for collection, handling, storage and analysis of samples;	Operation	Done annually as required	121			H
12(d)	Map indicating sampling locations;	Operation	Done annually as required	6 and 19	1 and 3		
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	120			G

12(f)	Documentation that lab performing sampling and analyses has an approved Comprehensive Quality Assurance Plan on file with DEP;	Operation	Done annually as required	23, SFWMD. 2011a. Chemistry Laboratory Quality Manual; SFWMD. 2011b.Field Sampling Quality Manual.			G
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	121			H
12(g)iv	Weather conditions at time of sampling;			121			H
12(g)v	Flow period preceding sampling	Operation	Done annually as required	122			I
12(g)vi	Monthly flow volumes	Operation	Done annually as required	29-30		B-2	B
12(h)	Evaluation of water quality data, including comparison of samples with applicable water quality standards	Operation	Done annually as required	1-23, 27-89	1-3	3-10	C, D, E and 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	18		6	
14	Reporting Flow and Non-Flow Samples	Operation	Done annually as required	18		6	
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				

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

Shi Kui Xue

Table B-1. Water quality monitoring schedule for Non-Everglades Construction Project discharge structures and additional upstream monitoring locations.

Area	Non-ECP Permit Structure	Water Quality Site	Water Quality Monitoring Schedule: Physical	Nutrients	Major Ions	Pesticides in Water	Pesticides in Sediment	Water Quality Comments
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

Table B-2. Flow volume, total phosphorus (TP) loads, and annual flow-weighted mean TP concentrations for non-ECP structures during WY2012.

Area	Non-ECP Permit Structure	Water Quality Site	Flow		Monthly Flow Volumes (ac-ft) (May 1, 2011–April 30, 2012)												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			
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	0	430	3,649	13,867	16,296	38,137	16,143	3,118	435	8,954	4,443	8,217	113,688	2,179	16
	S-9A	S9A	S-9A_P	TA415	1,749	364	6,803	10,702	7,781	7,616	9,582	9,603	7,033	7,007	4,698	4,475	77,413	1,300	14
	S-332D	S332DX	S-332D_P	TA413	0	0	143	5,675	8,988	17,998	22,526	9,165	797	0	7	250	65,550	557	7
	S-18C	S18C	S18C_S	15760	2,662	275	8,312	19,882	17,869	32,367	15,336	2,844	1,607	671	335	2,559	104,721	1,212	9
	S-140	S140	S140_TOT	06754	0	0	10,890	16,741	15,009	16,400	16,547	5,723	1,925	1,669	309	378	85,591	5,055	48
	S-190	S190	S190_S	K5501	0	0	4,900	12,593	13,272	8,184	9,699	1,331	0	8	0	0	49,988	2,509	41
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	S12D	S12D_S	FE774	0	0	0	1,202	16,395	36,522	67,583	30,869	13,519	5,802	4,705	399	176,995	2,236	10
	S-141	S34	S141_W	K5493/MC700	0	0	0	0	0	169	5,161	806	0	0	0	0	6,136	97	13
	S-142	S142	S142_C	K5494/F9554	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N/F
	S-143	S11A	S143_C	K5495/JM599	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N/F
	S-144	S145	S144_C	K5497/VM880	0	0	6,881	10,617	10,981	0	0	0	0	0	0	0	28,479	453	13
	S-145	S145	S145_C	K5498/VM881	0	0	6,160	9,268	10,232	1,458	0	8,344	7,347	5,281	2,228	0	50,316	619	10
	S-146	S145	S146_C	K5499/VM882	0	0	4,097	7,401	7,847	0	0	0	0	0	0	0	19,346	297	12
	S-151	S151	S151_C	K5500/JM155	0	0	3,151	0	0	0	20,737	28,320	20,452	0	2,872	5,772	81,304	1,076	11
	S-333	S333	S333_S	15042	19,039	5,991	0	0	17,886	17,647	25,702	24,480	16,374	7,675	3,704	8,249	146,748	2,962	16
	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	0	0	0	0	0	0	0	0	1	N/F
	S-175	S175	S175_C	15752	0	0	0	0	0	0	0	0	0	0	1	0	2	0	6
	S-332	S332	S332_P	15753	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N/F
	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 B-2. Continued.

Area	Non-ECP Permit Structure	Water Quality Site	Flow Station	Flow DBKEY	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total Flow Volume (acre-ft)	Total TP Load (kg)	Annual Flow-Weighted Mean TP (ppb)
					Monthly Flow Volumes (acre-ft) (May 1, 2011 - April 30, 2012)														
From	G-94A	G94B	G94A_C	TA422/VB272	0	0	0	0	3	0	0	0	863	324	265	0	1,455	48	27
	G-94B	G94B	G94B_C	TA423/V7591	0	0	0	0	2	0	0	0	0	0	0	0	2	0	46
	G-94C	G94B	G94C_C	TA424/OR446	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N/F
	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	5	0	146	0	0	0	0	152	2	10
	S-34	S34	S34_C	K5487/15954	1	0	0	0	0	87	2,525	229	5	2	0	0	2,849	43	12
	S-38	S38	S38_C	K5488/06760	3,236	1,535	3,146	1,918	2,364	2,750	2,983	7,278	11,228	2,991	2,998	1,518	43,944	735	14
	S-39	S39	S39_S	K5489/06733	3,575	2,015	0	22	0	0	0	120	1,799	1,623	2,399	1,210	12,764	288	18
	S-197	S197	S197_C	15763	0	0	0	0	0	12,281	0	0	0	0	0	0	12,281	72	5
	S-334	S356-334	S334_S	FB752	18,094	5,609	17	24	16	17	20,077	535	19	18	2,346	7,935	54,707	1,289	19
	S-337	S31	S337_C	K5505/SP560	0	0	0	0	0	0	0	0	0	0	2,566	5,748	8,314	113	11
	S-343A	US41-25	S343A_C	K5508/16193	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N/F
	S-343B	US41-25	S343B_C	K5509/16196	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N/F
	S-344	S344	S344_C	K5511/16199	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N/F
C-111 Basin	S-176 +	S332DX	S176_S	15762/12286	10,656	2,837	0	1,374	148	1,672	0	0	2,431	1,834	1,694	4,080	26,725	391	12
	S-177 +	S177	S177_S	15772/13156	7,904	1,580	4,145	16,134	14,113	25,204	10,942	2,849	2,049	783	929	4,505	91,136	662	6
	S-178 +	S178	S178_C	SO632/PT624	0	0	24	45	212	144	23	0	0	6	0	60	515	18	28
	S-331 +	S331-173	S331_P	P6935	2	3	38	4,193	2,124	16,594	42,130	21,516	2,259	0	0	388	89,245	1,990	18
	S-173 +	S331-173	S173_C	FB759/P7712	3,060	874	0	576	66	0	0	0	3,712	4,057	5,081	1,513	18,939	260	11

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 C: Summary Statistics of Non-Everglades Construction Project Water Quality Monitoring Data for Water Year 2012

Shi Kui Xue and Steven Hill

NOTES:

Summary statistics are tabulated in **Table C-3** of this attachment for all parameters collected during Water Year 2012 (WY2012) (May 1, 2011–April 30, 2012) at the non-Everglades Construction Project (non-ECP) water quality monitoring sites. **Table C-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, Florida Administrative Code (F.A.C.)]. Additionally, the parameter summary statistics shown in **Table C-3** are sequenced according to the order shown in **Table C-1**. The monitoring sites are sequenced based on the order shown in **Table C-2**. The non-ECP structure locations are depicted in **Figure 1** of this report.

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

Parameter	Abbreviation	Units	SFWMD Test Number	Class III Criteria Predominantly Fresh Surface Waters Section 62-302.530, F.A.C.
PHYSICAL				
% Saturation, Dissolved Oxygen	% SAT. DO	percent	76	None
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
Color	COLOR	units	13	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
Nitrite	NO2	mg N/L	19	narrative criteria
Nitrate	NO3	mg N/L	78	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 Arsenic	TOT. AS	µg/L	106	Less than or equal to 50 µg/L
Total Cadmium	TOT. CD	µg/L	103	Less than or equal to calculated value using: $e^{(0.7852[\ln(\text{Hardness})-3.49])}$ µg/L
Total Copper	TOT. CU	µg/L	104	Less than or equal to calculated value using: $e^{(0.8545[\ln(\text{Hardness})-1.702])}$ µg/L
Total Mercury	TOT. HG	µg/L	102	Less than or equal to .012 µg/L
Total Lead	TOT. PB	µg/L	107	Less than or equal to calculated value using: $e^{(1.273[\ln(\text{Hardness})-4.705])}$ µg/L
Total Zinc	TOT. ZN	µg/L	105	Less than or equal to calculated value using: $e^{(0.8473[\ln(\text{Hardness})+0.884])}$ µg/L
Total Iron	TOT. FE	mg/L	177	Less than or equal to 1.0 mg/L
BIOLOGICAL				
Carotenoid	CAROTENOID or CAROT	mg/m^3	63	None
Chlorophyll-A	CHLA	mg/m^3	61	None
Chlorophyll-A2	CHLA2	mg/m^3	112	None
Chlorophyll-B	CHLB	mg/m^3	62	None
Chlorophyll-C	CHLC	mg/m^3	113	None
Pheophytin-A	PHEOPHYTIN A	mg/m^3	64	None

Table C-2. Reference 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	The site is a new non-ECP structure
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	
	S-334	S356-334	
	S-343A, S-343B	US41-25	
	S-344	S344	
C-111 Basin	S-176 +	S332DX	Not a non-ECP structure; data are for information only
	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 C-3. Summary statistics and excursions of non-ECP water quality monitoring data (physical parameters, nutrients, major ions, and trace metals) collected during WY2012.

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	03MAY2011 - 03APR2012	12	2.0375	1.407675	0.46	1.065	1.635	2.9	4.65	0	0	0.00%
G123	FLDCOND.	UMHOS/CM	9	03MAY2011 - 03APR2012	12	779.5833	83.30171	537	765.5	795.5	827	857	0	0	0.00%
G123	PH	UNITS	10	03MAY2011 - 03APR2012	12	7.375	0.249089	7	7.15	7.45	7.55	7.8	0	0	0.00%
G123	TURBIDITY	NTU	12	03MAY2011 - 03APR2012	14	1.65	0.773354	0.8	1	1.45	2.1	3.1	0	0	0.00%
G123	HARDNESS	mg/L CACO3	35	03MAY2011 - 03APR2012	5	278.06	14.68172	262.5	264.2	281.1	285.3	297.2	0	0	0.00%
G123	TEMP	CENT	7	03MAY2011 - 03APR2012	12	24.80833	2.477704	22	22.55	24.55	26.45	29.3	0	0	0.00%
G123	TN	mg N/L	80	03MAY2011 - 03APR2012	12	1.569167	0.236237	1.098	1.4555	1.537	1.6925	2.016	0	0	0.00%
G123	NOX	mg N/L	18;180	14JUN2011 - 03APR2012	11	0.035455	0.049292	<0.005	0.007	0.016	0.024	0.152	2	0	0.00%
G123	TKN	mg N/L	21	03MAY2011 - 03APR2012	12	1.5375	0.227401	1.09	1.445	1.505	1.585	2	0	0	0.00%
G123	OPO4	mg P/L	23	03MAY2011 - 03APR2012	12	0.002	0	<0.002	<0.002	<0.002	<0.002	0.002	10	0	0.00%
G123	TP	mg P/L	25	03MAY2011 - 03APR2012	12	0.01875	0.013383	0.01	0.0105	0.014	0.019	0.055	0	0	0.00%
G123	DIS. CA	mg/L	30	03MAY2011 - 03APR2012	5	81.72	4.617034	76.8	76.9	83.1	85.2	86.6	0	0	0.00%
G123	DIS. K	mg/L	29	03MAY2011 - 03APR2012	5	4.24	0.207364	4	4.1	4.2	4.4	4.5	0	0	0.00%
G123	DIS. MG	mg/L	31	03MAY2011 - 03APR2012	5	17.96	0.960729	17.1	17.6	17.6	17.9	19.6	0	0	0.00%
G123	DIS. NA	mg/L	28	03MAY2011 - 03APR2012	5	59.96	3.486115	57.4	58.6	58.7	59	66.1	0	0	0.00%
G123	TOT. CL	mg/L	32	03MAY2011 - 03APR2012	7	49.75143	45.88819	<0.1	0.76	80.3	87.3	92.8	1	0	0.00%
G123	TOT. SO4	mg/L	33	03MAY2011 - 03APR2012	5	1.6	1.394633	0.1	1.2	1.4	1.4	3.9	0	0	0.00%
G123	CA_I	mg/L	188	26OCT2011 - 14FEB2012	2	0.87	0.749533	0.34	0.34	0.87	1.4	1.4	0	0	0.00%
S9	DO	mg/L	8	03MAY2011 - 24APR2012	52	2.619231	1.323159	0.52	1.6	2.4	3.715	5.87	0	0	0.00%
S9	FLDCOND.	UMHOS/CM	9	03MAY2011 - 24APR2012	52	758.5577	59.30163	607	723.5	787	805.5	832	0	0	0.00%
S9	PH	UNITS	10	03MAY2011 - 24APR2012	52	7.375	0.183511	7.1	7.2	7.3	7.5	7.9	0	0	0.00%
S9	TURBIDITY	NTU	12	03MAY2011 - 03APR2012	19	3.226316	1.641423	0.9	2.5	2.8	3.4	8.1	0	0	0.00%
S9	HARDNESS	mg/L CACO3	35	12JUL2011 - 03APR2012	4	272.95	15.26488	250.5	263.45	278.85	282.45	283.6	0	0	0.00%
S9	TEMP	CENT	7	03MAY2011 - 24APR2012	52	25.99038	2.83094	20.4	23.45	25.7	28.5	31.1	0	0	0.00%
S9	TN	mg N/L	80	03MAY2011 - 03APR2012	17	1.533118	0.134296	1.329	1.467	1.542	1.596	1.81	0	0	0.00%
S9	NOX	mg N/L	18;180	03MAY2011 - 03APR2012	17	0.076647	0.042264	0.022	0.051	0.058	0.099	0.179	0	0	0.00%
S9	TKN	mg N/L	21	03MAY2011 - 03APR2012	17	1.456471	0.157914	1.23	1.3	1.45	1.56	1.72	0	0	0.00%
S9	OPO4	mg P/L	23	03MAY2011 - 03APR2012	17	0.002	0	<0.002	<0.002	<0.002	<0.002	0.002	13	0	0.00%
S9	TP	mg P/L	25	03MAY2011 - 24APR2012	53	0.01334	0.010514	0.008	0.01	0.012	0.013	0.086	0	0	0.00%
S9	DIS. CA	mg/L	30	12JUL2011 - 03APR2012	4	84.15	3.553871	78.9	82.05	85.5	86.25	86.7	0	0	0.00%
S9	DIS. K	mg/L	29	12JUL2011 - 03APR2012	4	3.7	0.294392	3.3	3.5	3.75	3.9	4	0	0	0.00%
S9	DIS. MG	mg/L	31	12JUL2011 - 03APR2012	4	15.25	1.634013	13	14.2	15.55	16.3	16.9	0	0	0.00%
S9	DIS. NA	mg/L	28	12JUL2011 - 03APR2012	4	57.7	3.631345	52.8	55	58.5	60.4	61	0	0	0.00%
S9	TOT. CL	mg/L	32	12JUL2011 - 03APR2012	6	59.75	42.14327	5.3	5.7	84.2	89	90.1	0	0	0.00%
S9	TOT. SO4	mg/L	33	12JUL2011 - 03APR2012	4	3.275	2.324328	1.3	1.6	2.65	4.95	6.5	0	0	0.00%
S9	CA_I	mg/L	188	25OCT2011 - 15FEB2012	2	1.95	0.777817	1.4	1.4	1.95	2.5	2.5	0	0	0.00%
S9Auto	TN	mg N/L	80	05JUL2011 - 24APR2012	37	1.543297	0.145919	1.374	1.485	1.524	1.568	2.284	0	0	0.00%
S9Auto	NOX	mg N/L	18;180	05JUL2011 - 24APR2012	35	0.071771	0.040672	0.014	0.033	0.065	0.104	0.163	0	0	0.00%
S9Auto	TKN	mg N/L	21	05JUL2011 - 24APR2012	37	1.475405	0.168829	1.28	1.38	1.45	1.55	2.27	0	0	0.00%
S9Auto	TP	mg P/L	25	05JUL2011 - 24APR2012	38	0.012974	0.003643	0.009	0.01	0.012	0.015	0.025	0	0	0.00%
S9A	DO	mg/L	8	03MAY2011 - 24APR2012	53	2.549245	1.310217	0.53	1.8	2.3	3.16	6.2	0	0	0.00%
S9A	FLDCOND.	UMHOS/CM	9	03MAY2011 - 24APR2012	53	763.4717	54.95089	630	735	788	807	832	0	0	0.00%

Table C-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	03MAY2011 - 24APR2012	53	7.349057	0.177182	7.1	7.2	7.3	7.4	7.9	0	0	0.00%
S9A	TURBIDITY	NTU	12	03MAY2011 - 03APR2012	17	2.770588	0.885836	1.2	2.2	2.7	3.2	4.9	0	0	0.00%
S9A	HARDNESS	mg/L CACO3	35	12JUL2011 - 03APR2012	4	275.2	11.40029	258.8	267.7	278.75	282.7	284.5	0	0	0.00%
S9A	TEMP	CENT	7	03MAY2011 - 24APR2012	53	26.0566	2.844665	20.9	23.5	26.1	28.5	31.3	0	0	0.00%
S9A	TN	mg N/L	80	03MAY2011 - 03APR2012	17	1.591706	0.115766	1.358	1.536	1.576	1.654	1.822	0	0	0.00%
S9A	NOX	mg N/L	18;180	03MAY2011 - 03APR2012	16	0.055563	0.036115	0.009	0.033	0.0435	0.089	0.119	0	0	0.00%
S9A	TKN	mg N/L	21	03MAY2011 - 03APR2012	17	1.539412	0.126613	1.26	1.49	1.54	1.62	1.72	0	0	0.00%
S9A	OPO4	mg P/L	23	03MAY2011 - 03APR2012	17	0.002118	0.000332	<0.002	<0.002	<0.002	<0.002	0.003	13	0	0.00%
S9A	TP	mg P/L	25	03MAY2011 - 24APR2012	54	0.011981	0.003031	0.007	0.01	0.011	0.014	0.02	0	0	0.00%
S9A	DIS. CA	mg/L	30	12JUL2011 - 03APR2012	4	84.575	2.805203	80.6	82.6	85.55	86.55	86.6	0	0	0.00%
S9A	DIS. K	mg/L	29	12JUL2011 - 03APR2012	4	3.75	0.173205	3.5	3.65	3.8	3.85	3.9	0	0	0.00%
S9A	DIS. MG	mg/L	31	12JUL2011 - 03APR2012	4	15.55	1.103026	14	14.85	15.8	16.25	16.6	0	0	0.00%
S9A	DIS. NA	mg/L	28	12JUL2011 - 03APR2012	4	58.1	3.025448	54.3	55.7	58.55	60.5	61	0	0	0.00%
S9A	TOT. CL	mg/L	32	12JUL2011 - 03APR2012	4	87.6	2.871701	83.4	85.75	88.75	89.45	89.5	0	0	0.00%
S9A	TOT. SO4	mg/L	33	12JUL2011 - 03APR2012	4	4.55	2.871121	1.5	2.1	4.85	7	7	0	0	0.00%
S9AAuto	TP	mg P/L	25	03MAY2011 - 24APR2012	49	0.014469	0.007419	0.008	0.011	0.012	0.016	0.057	0	0	0.00%
S18C	DO	mg/L	8	02MAY2011 - 30APR2012	52	5.955192	2.309497	1.51	4.15	6.185	8.045	9.81	0	0	0.00%
S18C	FLDCOND.	UMHOS/CM	9	02MAY2011 - 30APR2012	54	583.5926	67.70734	514	543	555	595	787	0	0	0.00%
S18C	PH	UNITS	10	02MAY2011 - 30APR2012	54	7.62963	0.387361	6.7	7.3	7.6	8	8.3	0	0	0.00%
S18C	TURBIDITY	NTU	12	11JUL2011 - 02APR2012	6	4.883333	5.980106	0.8	1	1.25	11	14	0	0	0.00%
S18C	TSS	mg/L	16	02MAY2011 - 30APR2012	40	3	0	<3	<3	<3	<3	<3	40	0	0.00%
S18C	HARDNESS	mg/L CACO3	35	02MAY2011 - 30APR2012	40	221.94	23.92621	191.7	210	216.75	219.4	306	0	0	0.00%
S18C	TEMP	CENT	7	02MAY2011 - 30APR2012	54	26.15556	2.694555	19.6	24.5	26	28.6	30.2	0	0	0.00%
S18C	TN	mg N/L	80	02MAY2011 - 30APR2012	39	0.730256	0.261468	0.469	0.596	0.628	0.695	1.497	0	0	0.00%
S18C	NOX	mg N/L	18;180	02MAY2011 - 30APR2012	35	0.079286	0.059671	<0.005	0.044	0.064	0.095	0.267	1	0	0.00%
S18C	TKN	mg N/L	21	02MAY2011 - 30APR2012	39	0.659231	0.230564	0.42	0.53	0.56	0.63	1.23	0	0	0.00%
S18C	OPO4	mg P/L	23	02MAY2011 - 30APR2012	39	0.002051	0.000223	<0.002	<0.002	<0.002	<0.002	0.003	36	0	0.00%
S18C	TP	mg P/L	25	02MAY2011 - 30APR2012	50	0.0057	0.003138	0.002	0.004	0.004	0.006	0.017	0	0	0.00%
S18C	DIS. CA	mg/L	30	02MAY2011 - 30APR2012	40	74.955	5.717492	65.3	72.6	74.6	76.05	94.8	0	0	0.00%
S18C	DIS. K	mg/L	29	02MAY2011 - 30APR2012	40	4.4725	0.75038	2.7	3.8	4.5	5.05	6	0	0	0.00%
S18C	DIS. MG	mg/L	31	02MAY2011 - 30APR2012	40	8.4575	2.860508	6.4	7.05	7.2	8.15	16.9	0	0	0.00%
S18C	DIS. NA	mg/L	28	02MAY2011 - 30APR2012	40	34.43	9.050378	27.6	29.4	30.25	34.75	61	0	0	0.00%
S18C	TOT. CL	mg/L	32	02MAY2011 - 30APR2012	41	52.73171	17.06913	9.7	46.5	48.2	53.6	94.3	0	0	0.00%
S18C	TOT. SO4	mg/L	33	11JUL2011 - 02APR2012	4	9.725	3.253075	7.9	8.05	8.2	11.4	14.6	0	0	0.00%
S18C	CA_I	mg/L	188	24OCT2011 - 09FEB2012	2	2.35	1.909188	1	1	2.35	3.7	3.7	0	0	0.00%
S18CAuto	TN	mg N/L	80	02MAY2011 - 30APR2012	36	0.780222	0.285637	0.501	0.6095	0.666	0.8085	1.542	0	0	0.00%
S18CAuto	NOX	mg N/L	18;180	02MAY2011 - 30APR2012	31	0.080581	0.056237	0.012	0.044	0.068	0.108	0.232	0	0	0.00%
S18CAuto	TKN	mg N/L	21	02MAY2011 - 30APR2012	36	0.710833	0.245873	0.46	0.555	0.615	0.755	1.31	0	0	0.00%
S18CAuto	TP	mg P/L	25	02MAY2011 - 30APR2012	30	0.009067	0.004193	0.003	0.006	0.008	0.011	0.02	0	0	0.00%
S140	DO	mg/L	8	03MAY2011 - 24APR2012	53	5.108302	2.252504	1.75	2.75	5.34	7.08	9.21	0	0	0.00%
S140	FLDCOND.	UMHOS/CM	9	03MAY2011 - 24APR2012	53	643.7736	162.2218	311	533	630	678	1039	0	0	0.00%
S140	PH	UNITS	10	03MAY2011 - 24APR2012	53	7.615094	0.325456	7.1	7.3	7.5	7.9	8.2	0	0	0.00%

Table C-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
S140	TURBIDITY	NTU	12	03MAY2011 - 03APR2012	22	1.867727	0.888262	0.6	1.1	1.8	2.2	4.4	0	0	0.00%
S140	HARDNESS	mg/L CACO3	35	12JUL2011 - 03APR2012	4	213.225	17.29015	199.5	201.55	207.7	224.9	238	0	0	0.00%
S140	TEMP	CENT	7	03MAY2011 - 24APR2012	53	25.21321	3.751309	17.2	22.3	25.6	28.7	30.1	0	0	0.00%
S140	TN	mg N/L	80	03MAY2011 - 03APR2012	21	1.238476	0.22755	<0.5	1.174	1.278	1.342	1.614	1	0	0.00%
S140	NOX	mg N/L	18;180	03MAY2011 - 03APR2012	21	0.070381	0.046262	0.01	0.038	0.059	0.09	0.198	0	0	0.00%
S140	TKN	mg N/L	21	03MAY2011 - 03APR2012	20	1.206	0.160342	0.86	1.105	1.185	1.275	1.58	0	0	0.00%
S140	OPO4	mg P/L	23	03MAY2011 - 03APR2012	21	0.019857	0.016954	<0.002	0.013	0.016	0.025	0.081	2	0	0.00%
S140	TP	mg P/L	25	03MAY2011 - 24APR2012	53	0.044208	0.021302	0.028	0.032	0.038	0.045	0.14	0	0	0.00%
S140	DIS. CA	mg/L	30	12JUL2011 - 03APR2012	4	74.65	6.069871	70.2	71.05	72.4	78.25	83.6	0	0	0.00%
S140	DIS. K	mg/L	29	12JUL2011 - 03APR2012	4	5.775	2.877933	3.9	3.95	4.6	7.6	10	0	0	0.00%
S140	DIS. MG	mg/L	31	12JUL2011 - 03APR2012	4	6.5	0.752773	5.8	5.85	6.5	7.15	7.2	0	0	0.00%
S140	DIS. NA	mg/L	28	12JUL2011 - 03APR2012	4	40.3	9.497719	29.2	34.25	39.8	46.35	52.4	0	0	0.00%
S140	TOT. CL	mg/L	32	12JUL2011 - 03APR2012	6	38.04167	29.90345	0.55	1.6	49.05	59.1	68.9	0	0	0.00%
S140	TOT. SO4	mg/L	33	12JUL2011 - 03APR2012	4	20.6	13.32967	11.4	13.2	15.3	28	40.4	0	0	0.00%
S140	CA_I	mg/L	188	26OCT2011 - 14FEB2012	2	0.24	0	0.24	0.24	0.24	0.24	0.24	0	0	0.00%
S140Auto	TP	mg P/L	25	21JUN2011 - 24APR2012	38	0.046132	0.020461	0.022	0.033	0.0395	0.049	0.112	0	0	0.00%
S190	DO	mg/L	8	03MAY2011 - 24APR2012	52	5.483077	1.85551	1.54	3.785	6.06	6.77	8.63	0	0	0.00%
S190	FLDCOND.	UMHOS/CM	9	03MAY2011 - 24APR2012	52	558.3788	72.56873	399.4	536.5	566	584	736	0	0	0.00%
S190	PH	UNITS	10	03MAY2011 - 24APR2012	52	7.719231	0.299043	7.1	7.5	7.75	8	8.4	0	0	0.00%
S190	TURBIDITY	NTU	12	10MAY2011 - 24APR2012	23	2.03913	1.574726	0.6	1.1	1.5	2.5	7	0	0	0.00%
S190	HARDNESS	mg/L CACO3	35	10MAY2011 - 10APR2012	5	221.62	22.30341	198.8	211.6	219.2	220	258.5	0	0	0.00%
S190	TEMP	CENT	7	03MAY2011 - 24APR2012	52	25.79231	3.96983	17.1	22.65	26.05	29.35	31.9	0	0	0.00%
S190	TN	mg N/L	80	10MAY2011 - 24APR2012	22	1.074227	0.217297	<0.5	0.949	1.039	1.209	1.45	1	0	0.00%
S190	NOX	mg N/L	18;180	10MAY2011 - 24APR2012	20	0.0145	0.011941	<0.005	<0.005	0.009	0.0225	0.039	7	0	0.00%
S190	TKN	mg N/L	21	10MAY2011 - 24APR2012	21	1.09	0.185284	0.89	0.95	1.04	1.2	1.45	0	0	0.00%
S190	OPO4	mg P/L	23	10MAY2011 - 24APR2012	21	0.007238	0.007536	<0.002	<0.002	0.002	0.013	0.025	8	0	0.00%
S190	TP	mg P/L	25	03MAY2011 - 24APR2012	51	0.030098	0.011488	0.012	0.022	0.028	0.04	0.067	0	0	0.00%
S190	DIS. CA	mg/L	30	10MAY2011 - 10APR2012	5	72.92	14.58448	49.8	74.6	74.7	75.1	90.4	0	0	0.00%
S190	DIS. K	mg/L	29	10MAY2011 - 10APR2012	5	4.02	2.428374	1.8	2.4	3.3	4.7	7.9	0	0	0.00%
S190	DIS. MG	mg/L	31	10MAY2011 - 10APR2012	5	9.6	4.817676	6.1	7.9	7.9	8	18.1	0	0	0.00%
S190	DIS. NA	mg/L	28	10MAY2011 - 10APR2012	5	35.06	18.72306	19.8	26.3	29.3	32.4	67.5	0	0	0.00%
S190	TOT. CL	mg/L	32	10MAY2011 - 10APR2012	7	38.75714	34.81187	3.6	6.2	36.9	46	108	0	0	0.00%
S190	TOT. SO4	mg/L	33	10MAY2011 - 10APR2012	5	17.1	13.17118	8.4	9.6	11	16.5	40	0	0	0.00%
S190	CA_I	mg/L	188	26OCT2011 - 14FEB2012	2	0.985	0.162635	0.87	0.87	0.985	1.1	1.1	0	0	0.00%
S190	TOT. DIS. P	mg P/L	26	10MAY2011 - 14FEB2012	10	0.0172	0.008483	0.006	0.009	0.0175	0.025	0.029	0	0	0.00%
S190Auto	TP	mg P/L	25	17MAY2011 - 20DEC2011	19	0.038474	0.008688	0.022	0.033	0.039	0.042	0.064	0	0	0.00%
S12D	DO	mg/L	8	30AUG2011 - 27MAR2012	32	3.899063	1.377753	1.39	2.92	3.85	4.605	6.64	0	0	0.00%
S12D	FLDCOND.	UMHOS/CM	9	30AUG2011 - 27MAR2012	32	493.875	88.11677	357	405	506.5	559	628	0	0	0.00%
S12D	PH	UNITS	10	30AUG2011 - 27MAR2012	32	7.28125	0.153323	7	7.2	7.3	7.4	7.7	0	0	0.00%
S12D	TEMP	CENT	7	30AUG2011 - 27MAR2012	32	23.41875	3.396909	17.3	21.4	22.95	25.25	29.9	0	0	0.00%
S12D	TP	mg P/L	25	30AUG2011 - 27MAR2012	31	0.010774	0.004372	0.007	0.008	0.009	0.013	0.028	0	0	0.00%

Table C-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	DO	mg/L	8	03MAY2011 - 03APR2012	19	4.588421	2.276487	1.5	2.22	5.49	6.35	8.78	0	0	0.00%
S34	FLDCOND.	UMHOS/CM	9	03MAY2011 - 03APR2012	19	635.8421	121.6225	359	601	616	667	858	0	0	0.00%
S34	PH	UNITS	10	03MAY2011 - 03APR2012	19	7.552632	0.307983	7.1	7.3	7.5	7.8	8.4	0	0	0.00%
S34	TURBIDITY	NTU	12	03MAY2011 - 03APR2012	19	1.610526	0.898081	0.6	1	1.4	2	3.7	0	0	0.00%
S34	HARDNESS	mg/L CACO3	35	12JUL2011 - 03APR2012	4	215.125	36.48071	190.1	192.15	200.85	238.1	268.7	0	0	0.00%
S34	TEMP	CENT	7	03MAY2011 - 03APR2012	19	24.52632	3.410416	18	22.2	23.3	28.2	28.9	0	0	0.00%
S34	TN	mg N/L	80	03MAY2011 - 03APR2012	19	1.374842	0.290951	0.949	1.109	1.339	1.648	1.993	0	0	0.00%
S34	NOX	mg N/L	18;180	03MAY2011 - 03APR2012	18	0.052611	0.048657	<0.005	0.013	0.039	0.081	0.172	1	0	0.00%
S34	TKN	mg N/L	21	03MAY2011 - 03APR2012	19	1.325263	0.301134	0.9	1.07	1.21	1.57	1.98	0	0	0.00%
S34	OPO4	mg P/L	23	03MAY2011 - 03APR2012	19	0.002158	0.000501	<0.002	<0.002	<0.002	0.002	0.004	14	0	0.00%
S34	TP	mg P/L	25	03MAY2011 - 03APR2012	19	0.015474	0.005125	0.004	0.012	0.016	0.02	0.024	0	0	0.00%
S34	DIS. CA	mg/L	30	12JUL2011 - 03APR2012	4	58.5	9.215205	52	52.3	55.1	64.7	71.8	0	0	0.00%
S34	DIS. K	mg/L	29	12JUL2011 - 03APR2012	4	5.35	0.660808	4.6	4.8	5.4	5.9	6	0	0	0.00%
S34	DIS. MG	mg/L	31	12JUL2011 - 03APR2012	4	16.75	3.319136	14.6	14.95	15.35	18.55	21.7	0	0	0.00%
S34	DIS. NA	mg/L	28	12JUL2011 - 03APR2012	4	56.175	10.93446	47.9	49.45	52.3	62.9	72.2	0	0	0.00%
S34	TOT. CL	mg/L	32	12JUL2011 - 03APR2012	4	86.8	15.91226	75.4	76.5	80.9	97.1	110	0	0	0.00%
S34	TOT. SO4	mg/L	33	12JUL2011 - 03APR2012	4	10.6	5.388259	5.4	5.95	10.85	15.25	15.3	0	0	0.00%
S142	DO	mg/L	8	02MAY2011 - 02APR2012	13	4.444615	1.352748	1.76	3.61	4.95	5.52	6.01	0	0	0.00%
S142	FLDCOND.	UMHOS/CM	9	02MAY2011 - 02APR2012	13	769.3846	105.033	631	713	744	807	989	0	0	0.00%
S142	PH	UNITS	10	02MAY2011 - 02APR2012	13	7.561538	0.236426	7.2	7.4	7.5	7.6	8	0	0	0.00%
S142	TURBIDITY	NTU	12	02MAY2011 - 02APR2012	13	2.323077	1.31095	0.8	1.4	2.1	3	5.7	0	0	0.00%
S142	HARDNESS	mg/L CACO3	35	11JUL2011 - 02APR2012	4	257.1	35.59635	212.8	232.25	258.35	281.95	298.9	0	0	0.00%
S142	TEMP	CENT	7	02MAY2011 - 02APR2012	13	24.77692	4.075977	16	22.2	25.9	28.5	29.2	0	0	0.00%
S142	TN	mg N/L	80	02MAY2011 - 02APR2012	13	1.676923	0.234355	1.382	1.465	1.669	1.919	2.066	0	0	0.00%
S142	NOX	mg N/L	18;180	02MAY2011 - 02APR2012	13	0.054615	0.035606	0.022	0.029	0.042	0.071	0.134	0	0	0.00%
S142	TKN	mg N/L	21	02MAY2011 - 02APR2012	13	1.622308	0.227785	1.3	1.43	1.63	1.88	1.97	0	0	0.00%
S142	TP	mg P/L	25	02MAY2011 - 02APR2012	13	0.02	0.008436	0.009	0.013	0.017	0.025	0.032	0	0	0.00%
S142	DIS. CA	mg/L	30	11JUL2011 - 02APR2012	4	66.625	11.05754	56.3	58.35	64.4	74.9	81.4	0	0	0.00%
S142	DIS. K	mg/L	29	11JUL2011 - 02APR2012	4	5.675	1.192686	4.5	4.75	5.5	6.6	7.2	0	0	0.00%
S142	DIS. MG	mg/L	31	11JUL2011 - 02APR2012	4	22.025	3.095561	17.5	20.2	23.05	23.85	24.5	0	0	0.00%
S142	DIS. NA	mg/L	28	11JUL2011 - 02APR2012	4	66.35	8.624191	56.4	59.65	66.3	73.05	76.4	0	0	0.00%
S142	TOT. SO4	mg/L	33	11JUL2011 - 02APR2012	4	27.45	15.90587	14.2	14.3	24.6	40.6	46.4	0	0	0.00%
S11A	DO	mg/L	8	11JUL2011 - 02APR2012	13	6.094615	2.387707	1.14	5.21	7.03	7.91	8.77	0	0	0.00%
S11A	FLDCOND.	UMHOS/CM	9	11JUL2011 - 02APR2012	13	653.9231	131.0391	475	557	660	711	864	0	0	0.00%
S11A	PH	UNITS	10	11JUL2011 - 02APR2012	13	7.8	0.219848	7.5	7.6	7.8	7.9	8.2	0	0	0.00%
S11A	TURBIDITY	NTU	12	11JUL2011 - 02APR2012	13	1.8	0.718795	0.8	1.4	1.8	2.3	3.2	0	0	0.00%
S11A	TSS	mg/L	16	11JUL2011 - 02APR2012	13	3	0	<3	<3	<3	<3	<3	13	0	0.00%
S11A	HARDNESS	mg/L CACO3	35	11JUL2011 - 02APR2012	13	203.3769	52.42334	141.6	170	183.3	221.8	311.3	0	0	0.00%
S11A	TEMP	CENT	7	11JUL2011 - 02APR2012	13	24.46923	3.86876	17.4	22	24.8	28.7	29.1	0	0	0.00%
S11A	ALKALINITY	mg/L	67	11JUL2011 - 02APR2012	13	166.0769	28.4091	128	148	161	170	212	0	0	0.00%
S11A	TN	mg N/L	80	11JUL2011 - 02APR2012	13	1.609615	0.353405	1.188	1.445	1.56	1.715	2.419	0	0	0.00%
S11A	NOX	mg N/L	18;180	11JUL2011 - 02APR2012	13	0.056154	0.106881	<0.005	0.005	0.015	0.022	0.379	3	0	0.00%

Table C-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	NH4	mg N/L	20	08AUG2011 - 02APR2012	12	0.01625	0.009919	<0.005	0.01	0.014	0.021	0.036	2	0	0.00%
S11A	UN-IONIZED A	mg/L	NONE	11JUL2011 - 02APR2012	12	0.000659	0.000323	0.000123	0.00041	0.0006441	0.00094	0.0012135	0	0	0.00%
S11A	NNH4	mg N/L	92	08AUG2011 - 02APR2012	12	0.043417	0.042049	0.009	0.02	0.028	0.0485	0.156	0	0	0.00%
S11A	ORGN	mg N/L	79	08AUG2011 - 02APR2012	12	1.49875	0.268944	1.158	1.2495	1.493	1.6835	2.024	0	0	0.00%
S11A	TKN	mg N/L	21	11JUL2011 - 02APR2012	13	1.554615	0.301154	1.17	1.3	1.5	1.7	2.06	0	0	0.00%
S11A	OPO4	mg P/L	23	11JUL2011 - 02APR2012	13	0.002769	0.001922	<0.002	<0.002	<0.002	<0.002	0.008	11	0	0.00%
S11A	TP	mg P/L	25	11JUL2011 - 02APR2012	13	0.015308	0.008976	0.007	0.009	0.012	0.016	0.037	0	0	0.00%
S11A	DIS. CA	mg/L	30	11JUL2011 - 02APR2012	13	52.17692	14.55611	36.8	43.8	45	56.6	84.1	0	0	0.00%
S11A	DIS. K	mg/L	29	11JUL2011 - 02APR2012	13	5.715385	1.856002	3.4	4.3	5.7	6.3	9.9	0	0	0.00%
S11A	DIS. MG	mg/L	31	11JUL2011 - 02APR2012	13	17.74615	4.144397	12	14.7	17.4	19.7	24.6	0	0	0.00%
S11A	DIS. NA	mg/L	28	11JUL2011 - 02APR2012	13	54.43077	11.91766	39.4	45	51.1	60.9	82.2	0	0	0.00%
S11A	TOT. CL	mg/L	32	11JUL2011 - 02APR2012	13	86.33077	20.27332	60.3	74.6	83.3	96.3	134	0	0	0.00%
S11A	TOT. SO4	mg/L	33	11JUL2011 - 02APR2012	13	23.7	15.72636	10.3	11.3	14	39.8	50.9	0	0	0.00%
S11A	DIS. SILICA	mg/L	27	11JUL2011 - 02APR2012	13	14.2	2.885019	9.2	12.5	14.2	15.7	18.9	0	0	0.00%
S11A	TOT. FE	mg/L	177	11JUL2011 - 02APR2012	4	0.016	0.007348	0.01	0.0105	0.014	0.0215	0.026	0	0	0.00%
S11A	DIS. KJEL N	mg N/L	22	11JUL2011 - 02APR2012	13	1.473077	0.270844	1.11	1.28	1.4	1.66	1.98	0	0	0.00%
S11A	DIS. ORGAN. C	mg/L	89;181	11JUL2011 - 02APR2012	13	24.9	4.606517	17.9	20.7	24.4	28.4	32.3	0	0	0.00%
S11A	TOT. DIS. P	mg P/L	26	11JUL2011 - 02APR2012	13	0.006385	0.005635	0.003	0.003	0.004	0.006	0.019	0	0	0.00%
S11A	TOT. ORGAN. (	mg/L	100	11JUL2011 - 02APR2012	13	24.83077	4.814974	19	19.9	23.8	28.2	32.6	0	0	0.00%
S145	DO	mg/L	8	16MAY2011 - 02APR2012	19	4.192105	1.267542	1.83	3.12	4.23	5.39	5.98	0	0	0.00%
S145	FLDCOND.	UMHOS/CM	9	16MAY2011 - 02APR2012	19	575.4737	153.0829	384	449	521	766	841	0	0	0.00%
S145	PH	UNITS	10	16MAY2011 - 02APR2012	19	7.473684	0.179016	7.2	7.4	7.5	7.6	7.9	0	0	0.00%
S145	TURBIDITY	NTU	12	16MAY2011 - 02APR2012	19	1.210526	0.484074	0.5	0.9	1.1	1.5	2.4	0	0	0.00%
S145	TSS	mg/L	16	16MAY2011 - 02APR2012	19	3	0	<3	<3	<3	<3	<3	19	0	0.00%
S145	HARDNESS	mg/L CACO3	35	16MAY2011 - 02APR2012	19	174.0684	51.86583	114.2	127.2	167.9	199.8	282.4	0	0	0.00%
S145	TEMP	CENT	7	16MAY2011 - 02APR2012	19	25.17895	4.155395	16.7	22	25.7	29.6	31	0	0	0.00%
S145	ALKALINITY	mg/L	67	16MAY2011 - 02APR2012	19	143.3684	29.27117	106	116	139	163	200	0	0	0.00%
S145	TN	mg N/L	80	16MAY2011 - 02APR2012	19	1.429684	0.403966	0.92	1.069	1.34	1.795	2.372	0	0	0.00%
S145	NOX	mg N/L	18;180	16MAY2011 - 02APR2012	18	0.050778	0.088052	<0.005	0.005	0.0125	0.061	0.352	4	0	0.00%
S145	NH4	mg N/L	20	16MAY2011 - 02APR2012	17	0.026882	0.036549	<0.005	0.013	0.017	0.026	0.163	2	0	0.00%
S145	UN-IONIZED A	mg/L	NONE	16MAY2011 - 02APR2012	17	0.000918	0.002091	2.98E-05	0.00028	0.0004306	0.00054	0.0089734	0	0	0.00%
S145	NNH4	mg N/L	92	16MAY2011 - 02APR2012	16	0.059813	0.080953	0.016	0.024	0.032	0.065	0.35	0	0	0.00%
S145	ORGN	mg N/L	79	16MAY2011 - 02APR2012	17	1.339	0.317438	0.89	1.088	1.324	1.483	1.988	0	0	0.00%
S145	TKN	mg N/L	21	16MAY2011 - 02APR2012	19	1.382632	0.35752	0.89	1.04	1.34	1.73	2.02	0	0	0.00%
S145	OPO4	mg P/L	23	16MAY2011 - 02APR2012	18	0.002	0	<0.002	<0.002	<0.002	<0.002	0.002	16	0	0.00%
S145	TP	mg P/L	25	16MAY2011 - 02APR2012	19	0.011105	0.00599	0.006	0.007	0.008	0.015	0.025	0	0	0.00%
S145	DIS. CA	mg/L	30	16MAY2011 - 02APR2012	19	44.81053	12.27888	31.6	35	43.5	47.3	74.4	0	0	0.00%
S145	DIS. K	mg/L	29	16MAY2011 - 02APR2012	19	4.715789	1.810851	3	3.3	4.1	6.2	9	0	0	0.00%
S145	DIS. MG	mg/L	31	16MAY2011 - 02APR2012	19	15.09474	5.289032	8.6	9.7	14.8	19.8	24.5	0	0	0.00%
S145	DIS. NA	mg/L	28	16MAY2011 - 02APR2012	19	49.00526	13.47246	34.7	38.6	43.2	61	78.5	0	0	0.00%
S145	TOT. CL	mg/L	32	16MAY2011 - 02APR2012	19	73.06842	23.13605	47.6	54.5	62.9	91.7	126	0	0	0.00%

Table C-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	TOT. SO4	mg/L	33	16MAY2011 - 02APR2012	19	24.28947	22.98871	4	4.8	11.9	45.7	71	0	0	0.00%
S145	DIS. SILICA	mg/L	27	16MAY2011 - 02APR2012	18	13.59111	6.126493	5.74	9.11	12.4	19.7	23.8	0	0	0.00%
S145	TOT. FE	mg/L	177	11JUL2011 - 02APR2012	4	0.01275	0.007544	0.008	0.0085	0.0095	0.017	0.024	0	0	0.00%
S145	DIS. KJEL N	mg N/L	22	16MAY2011 - 02APR2012	19	1.345263	0.329332	0.84	1.06	1.27	1.6	1.99	0	0	0.00%
S145	DIS. ORGAN. C	mg/L	89;181	16MAY2011 - 02APR2012	19	22.72632	4.888745	15.8	19.7	21.4	26	32.2	0	0	0.00%
S145	TOT. DIS. P	mg P/L	26	16MAY2011 - 02APR2012	19	0.004	0.001826	0.002	0.003	0.004	0.004	0.01	0	0	0.00%
S145	TOT. ORGAN. (	mg/L	100	16MAY2011 - 02APR2012	19	22.54737	4.909783	15.4	19.3	21.8	25.6	32.8	0	0	0.00%
S151	DO	mg/L	8	02MAY2011 - 16APR2012	15	3.691333	1.198343	1.62	3.08	3.46	4.43	6.98	0	0	0.00%
S151	FLDCOND.	UMHOS/CM	9	02MAY2011 - 16APR2012	15	735.0667	113.1992	598	671	692	745	1039	0	0	0.00%
S151	PH	UNITS	10	02MAY2011 - 16APR2012	15	7.473333	0.183095	7.2	7.3	7.4	7.6	7.9	0	0	0.00%
S151	TURBIDITY	NTU	12	02MAY2011 - 16APR2012	15	1.846667	0.692683	0.7	1.2	1.8	2.5	3	0	0	0.00%
S151	HARDNESS	mg/L CACO3	35	11JUL2011 - 02APR2012	4	252.5	44.69832	228.6	229	230.95	276	319.5	0	0	0.00%
S151	DO	mg/L	8	02MAY2011 - 16APR2012	15	3.691333	1.198343	1.62	3.08	3.46	4.43	6.98	0	0	0.00%
S151	FLDCOND.	UMHOS/CM	9	02MAY2011 - 16APR2012	15	735.0667	113.1992	598	671	692	745	1039	0	0	0.00%
S151	PH	UNITS	10	02MAY2011 - 16APR2012	15	7.473333	0.183095	7.2	7.3	7.4	7.6	7.9	0	0	0.00%
S151	TURBIDITY	NTU	12	02MAY2011 - 16APR2012	15	1.846667	0.692683	0.7	1.2	1.8	2.5	3	0	0	0.00%
S151	HARDNESS	mg/L CACO3	35	11JUL2011 - 02APR2012	4	252.5	44.69832	228.6	229	230.95	276	319.5	0	0	0.00%
S151	TEMP	CENT	7	02MAY2011 - 16APR2012	15	24.83333	3.751888	17	22	24.5	28.6	29.8	0	0	0.00%
S151	TN	mg N/L	80	02MAY2011 - 16APR2012	15	1.598333	0.341772	1.249	1.379	1.498	1.666	2.521	0	0	0.00%
S151	NOX	mg N/L	18;180	02MAY2011 - 16APR2012	15	0.113667	0.130804	0.033	0.039	0.068	0.128	0.471	0	0	0.00%
S151	TKN	mg N/L	21	02MAY2011 - 16APR2012	15	1.484667	0.218072	1.21	1.34	1.44	1.54	2.05	0	0	0.00%
S151	OPO4	mg P/L	23	02MAY2011 - 16APR2012	15	0.0026	0.002063	<0.002	<0.002	<0.002	<0.002	0.01	13	0	0.00%
S151	TP	mg P/L	25	02MAY2011 - 16APR2012	15	0.0172	0.011264	0.007	0.009	0.013	0.022	0.043	0	0	0.00%
S151	DIS. CA	mg/L	30	11JUL2011 - 02APR2012	4	71.275	13.48663	63.1	63.65	65.3	78.9	91.4	0	0	0.00%
S151	DIS. K	mg/L	29	11JUL2011 - 02APR2012	4	4.775	0.826136	4.2	4.3	4.45	5.25	6	0	0	0.00%
S151	DIS. MG	mg/L	31	11JUL2011 - 02APR2012	4	18.075	2.902154	15.4	16.3	17.35	19.85	22.2	0	0	0.00%
S151	DIS. NA	mg/L	28	11JUL2011 - 02APR2012	4	59.025	9.124829	52.7	53.5	55.45	64.55	72.5	0	0	0.00%
S151	TOT. CL	mg/L	32	11JUL2011 - 02APR2012	4	92	12.07173	84.3	85.25	86.85	98.75	110	0	0	0.00%
S151	TOT. SO4	mg/L	33	11JUL2011 - 02APR2012	4	20.725	12.05802	7.1	10.85	21.1	30.6	33.6	0	0	0.00%
S333	DO	mg/L	8	03MAY2011 - 24APR2012	52	3.581154	1.162863	1.06	2.73	3.665	4.475	6.1	0	0	0.00%
S333	FLDCOND.	UMHOS/CM	9	03MAY2011 - 24APR2012	52	548.3846	132.2944	341	439	540.5	631.5	893	0	0	0.00%
S333	PH	UNITS	10	03MAY2011 - 24APR2012	52	7.348077	0.277588	7	7.2	7.3	7.4	9	0	1	1.92%
S333	TURBIDITY	NTU	12	13JUL2011 - 04APR2012	4	1.25	0.718795	0.6	0.7	1.1	1.8	2.2	0	0	0.00%
S333	TSS	mg/L	16	03MAY2011 - 24APR2012	41	3.634146	1.699354	<3	<3	<3	<3	11	32	0	0.00%
S333	HARDNESS	mg/L CACO3	35	03MAY2011 - 24APR2012	41	192.6049	43.44199	134.9	157.8	189.4	214.3	330.7	0	0	0.00%
S333	TEMP	CENT	7	03MAY2011 - 24APR2012	52	25.30769	3.64325	17.3	22.55	25.5	28.7	30.7	0	0	0.00%
S333	TN	mg N/L	80	03MAY2011 - 24APR2012	41	1.306171	0.225762	1.07	1.16	1.22	1.401	2.11	0	0	0.00%
S333	NOX	mg N/L	18;180	03MAY2011 - 24APR2012	35	0.067657	0.073376	<0.005	0.025	0.038	0.086	0.34	1	0	0.00%
S333	TKN	mg N/L	21	03MAY2011 - 24APR2012	41	1.248537	0.168724	1.05	1.13	1.2	1.32	1.77	0	0	0.00%
S333	OPO4	mg P/L	23	03MAY2011 - 24APR2012	40	0.00315	0.004098	<0.002	<0.002	<0.002	<0.002	0.023	33	0	0.00%

Table C-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	TP	mg P/L	25	03MAY2011 - 24APR2012	51	0.016961	0.010956	0.008	0.009	0.012	0.02	0.05	0	0	0.00%
S333	DIS. CA	mg/L	30	03MAY2011 - 24APR2012	41	59.30488	11.03084	48.7	51.7	57.7	63	103.7	0	0	0.00%
S333	DIS. K	mg/L	29	03MAY2011 - 24APR2012	41	3.573171	1.32458	1.4	3.2	3.5	4	7.1	0	0	0.00%
S333	DIS. MG	mg/L	31	03MAY2011 - 24APR2012	41	10.80976	4.438683	3.3	6.9	11	13.2	21.5	0	0	0.00%
S333	DIS. NA	mg/L	28	03MAY2011 - 24APR2012	41	38.17561	12.21544	15.2	31	37.6	45	72.2	0	0	0.00%
S333	TOT. CL	mg/L	32	03MAY2011 - 24APR2012	41	60.23415	19.92997	21.8	51.6	58.5	70.1	111	0	0	0.00%
S333	TOT. SO4	mg/L	33	13JUL2011 - 04APR2012	4	9.775	8.668862	0.4	4	8.7	15.55	21.3	0	0	0.00%
S333Auto	TN	mg N/L	80	03MAY2011 - 24APR2012	358	1.361536	0.23945	1	1.18	1.293	1.514	2.245	0	0	0.00%
S333Auto	NOX	mg N/L	18;180	03MAY2011 - 24APR2012	313	0.073498	0.074021	<0.005	0.024	0.042	0.1	0.362	13	0	0.00%
S333Auto	TKN	mg N/L	21	03MAY2011 - 24APR2012	358	1.297458	0.180844	1	1.15	1.26	1.41	1.9	0	0	0.00%
S333Auto	TP	mg P/L	25	03MAY2011 - 24APR2012	350	0.01824	0.010788	0.007	0.01	0.014	0.022	0.051	0	0	0.00%
C123SR84	DO	mg/L	8	03MAY2011 - 03APR2012	12	4.339167	2.747486	0.81	2.075	4.12	6.33	10.1	0	0	0.00%
C123SR84	FLDCOND.	UMHOS/CM	9	03MAY2011 - 03APR2012	12	705.5	135.0451	545	608	663	800.5	943	0	0	0.00%
C123SR84	PH	UNITS	10	03MAY2011 - 03APR2012	12	7.4	0.327525	7.1	7.2	7.25	7.6	8.2	0	0	0.00%
C123SR84	TURBIDITY	NTU	12	03MAY2011 - 03APR2012	12	2.65	2.299209	0.6	0.9	1.9	3.75	8.2	0	0	0.00%
C123SR84	HARDNESS	mg/L CACO3	35	12JUL2011 - 03APR2012	4	256.425	54.43696	211.7	219.1	240.1	293.75	333.8	0	0	0.00%
C123SR84	TEMP	CENT	7	03MAY2011 - 03APR2012	12	24.70833	3.886213	16.6	21.7	26.4	27.6	29.3	0	0	0.00%
C123SR84	TN	mg N/L	80	03MAY2011 - 03APR2012	12	1.528667	0.328733	1.169	1.2685	1.421	1.715	2.136	0	0	0.00%
C123SR84	NOX	mg N/L	18;180	14JUN2011 - 03APR2012	11	0.031727	0.045533	<0.005	0.006	0.011	0.036	0.143	1	0	0.00%
C123SR84	TKN	mg N/L	21	03MAY2011 - 03APR2012	12	1.5	0.297444	1.16	1.26	1.405	1.715	2.04	0	0	0.00%
C123SR84	OPO4	mg P/L	23	03MAY2011 - 03APR2012	12	0.004083	0.004274	<0.002	<0.002	0.002	0.003	0.015	5	0	0.00%
C123SR84	TP	mg P/L	25	03MAY2011 - 03APR2012	12	0.025833	0.014224	0.01	0.012	0.026	0.0365	0.05	0	0	0.00%
C123SR84	DIS. CA	mg/L	30	12JUL2011 - 03APR2012	4	82.2	16.74535	69.6	70.2	76.75	94.2	105.7	0	0	0.00%
C123SR84	DIS. K	mg/L	29	12JUL2011 - 03APR2012	4	5.375	1.534872	4.2	4.25	4.9	6.5	7.5	0	0	0.00%
C123SR84	DIS. MG	mg/L	31	12JUL2011 - 03APR2012	4	12.45	3.280752	9.2	10.35	11.8	14.55	17	0	0	0.00%
C123SR84	DIS. NA	mg/L	28	12JUL2011 - 03APR2012	4	46.525	6.882526	38.4	40.85	47.35	52.2	53	0	0	0.00%
C123SR84	TOT. CL	mg/L	32	12JUL2011 - 03APR2012	4	76.425	11.40654	62.9	67.95	76.4	84.9	90	0	0	0.00%
C123SR84	TOT. SO4	mg/L	33	12JUL2011 - 03APR2012	4	37.675	49.32899	6.7	8.7	16.5	66.65	111	0	0	0.00%
G94B	DO	mg/L	8	19MAY2011 - 05APR2012	14	5.567857	2.081871	2.84	4.31	5.145	6.34	9.83	0	0	0.00%
G94B	FLDCOND.	UMHOS/CM	9	19MAY2011 - 05APR2012	14	826.6429	219.4397	571	672	765	915	1291	0	1	7.14%
G94B	PH	UNITS	10	19MAY2011 - 05APR2012	14	7.5	0.308844	7	7.2	7.5	7.7	8	0	0	0.00%
G94B	TURBIDITY	NTU	12	19MAY2011 - 05APR2012	14	2.164286	2.079056	0.6	0.7	0.9	4.6	5.7	0	0	0.00%
G94B	HARDNESS	mg/L CACO3	35	11AUG2011 - 12JAN2012	3	186.5	17.78567	168.1	168.1	187.8	203.6	203.6	0	0	0.00%
G94B	TEMP	CENT	7	19MAY2011 - 05APR2012	14	25.47857	4.18958	17.5	21.9	25.8	29.3	31	0	0	0.00%
G94B	TN	mg N/L	80	19MAY2011 - 05APR2012	14	1.868643	0.634624	1.121	1.42	1.59	2.414	3.138	0	0	0.00%
G94B	NOX	mg N/L	18;180	19MAY2011 - 05APR2012	14	0.054357	0.086768	<0.005	<0.005	0.024	0.054	0.332	4	0	0.00%
G94B	TKN	mg N/L	21	19MAY2011 - 05APR2012	14	1.815714	0.615601	1.09	1.41	1.53	2.36	3.02	0	0	0.00%
G94B	TP	mg P/L	25	19MAY2011 - 05APR2012	14	0.032143	0.018212	0.013	0.017	0.022	0.049	0.063	0	0	0.00%
G94B	DIS. CA	mg/L	30	11AUG2011 - 12JAN2012	3	54.53333	9.629296	44.5	44.5	55.4	63.7	63.7	0	0	0.00%
G94B	DIS. K	mg/L	29	11AUG2011 - 12JAN2012	3	5.633333	0.404145	5.2	5.2	5.7	6	6	0	0	0.00%
G94B	DIS. MG	mg/L	31	11AUG2011 - 12JAN2012	3	12.2	1.509967	10.8	10.8	12	13.8	13.8	0	0	0.00%
G94B	DIS. NA	mg/L	28	11AUG2011 - 12JAN2012	3	71	9.669023	61.7	61.7	70.3	81	81	0	0	0.00%
G94B	TOT. SO4	mg/L	33	11AUG2011 - 12JAN2012	3	32.16667	15.46749	17.6	17.6	30.5	48.4	48.4	0	0	0.00%
S31	DO	mg/L	8	02MAY2011 - 02APR2012	13	3.717692	1.905676	1.61	2.47	3.07	4.29	8.24	0	0	0.00%
S31	FLDCOND.	UMHOS/CM	9	02MAY2011 - 02APR2012	13	743.6923	54.13776	659	717	743	783	840	0	0	0.00%
S31	PH	UNITS	10	02MAY2011 - 02APR2012	13	7.469231	0.26263	7.1	7.4	7.4	7.5	8.2	0	0	0.00%

Table C-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	TURBIDITY	NTU	12	02MAY2011 - 02APR2012	15	2.22	2.783933	0.6	0.7	1.4	1.7	11	0	0	0.00%
S31	HARDNESS	mg/L CACO3	35	11JUL2011 - 02APR2012	4	265.525	24.43595	230.9	248.35	273.7	282.7	283.8	0	0	0.00%
S31	TEMP	CENT	7	02MAY2011 - 02APR2012	13	24.17692	3.37914	18.3	21.5	25.1	26.5	29.5	0	0	0.00%
S31	TN	mg N/L	80	02MAY2011 - 02APR2012	13	1.329769	0.212725	1.185	1.204	1.283	1.36	1.997	0	0	0.00%
S31	NOX	mg N/L	18;180	02MAY2011 - 02APR2012	13	0.036308	0.04057	<0.005	0.013	0.015	0.046	0.157	1	0	0.00%
S31	TKN	mg N/L	21	02MAY2011 - 02APR2012	13	1.293846	0.17905	1.15	1.19	1.23	1.32	1.84	0	0	0.00%
S31	OPO4	mg P/L	23	02MAY2011 - 02APR2012	13	0.002	0	<0.002	<0.002	<0.002	<0.002	0.002	12	0	0.00%
S31	TP	mg P/L	25	02MAY2011 - 02APR2012	13	0.010385	0.004053	0.006	0.007	0.01	0.011	0.021	0	0	0.00%
S31	DIS. CA	mg/L	30	11JUL2011 - 02APR2012	4	80.225	8.119267	69.1	75.25	81.6	85.2	88.6	0	0	0.00%
S31	DIS. K	mg/L	29	11JUL2011 - 02APR2012	4	4.65	0.9	4.2	4.2	4.2	5.1	6	0	0	0.00%
S31	DIS. MG	mg/L	31	11JUL2011 - 02APR2012	4	15.85	2.022375	14.2	14.7	15.2	17	18.8	0	0	0.00%
S31	DIS. NA	mg/L	28	11JUL2011 - 02APR2012	4	54.025	7.99307	48.7	49.4	50.75	58.65	65.9	0	0	0.00%
S31	TOT. CL	mg/L	32	11JUL2011 - 02APR2012	6	57.11667	41.78399	4.2	5.1	76.05	79.3	102	0	0	0.00%
S31	TOT. SO4	mg/L	33	11JUL2011 - 02APR2012	4	17.225	10.50091	6	8.8	16.65	25.65	29.6	0	0	0.00%
S31	CA_I	mg/L	188	25OCT2011 - 13FEB2012	2	3.9	2.828427	1.9	1.9	3.9	5.9	5.9	0	0	0.00%
S38	DO	mg/L	8	02MAY2011 - 30APR2012	27	3.11963	1.32856	0.77	1.89	3.27	4.22	5.61	0	0	0.00%
S38	FLDCOND.	UMHOS/CM	9	02MAY2011 - 30APR2012	27	594.9259	207.6947	337	390	549	805	1076	0	0	0.00%
S38	PH	UNITS	10	02MAY2011 - 30APR2012	26	7.376923	0.226817	7	7.2	7.4	7.6	7.8	0	0	0.00%
S38	TURBIDITY	NTU	12	02MAY2011 - 30APR2012	27	1.403704	0.711165	0.6	0.9	1.2	1.9	3.3	0	0	0.00%
S38	TSS	mg/L	16	02MAY2011 - 30APR2012	27	3.037037	0.19245	<3	<3	<3	<3	4	26	0	0.00%
S38	HARDNESS	mg/L CACO3	35	02MAY2011 - 30APR2012	27	170.5778	59.89108	90.4	108.6	169.9	218.7	282.5	0	0	0.00%
S38	TEMP	CENT	7	02MAY2011 - 30APR2012	27	25.5037	3.537544	17.3	22.4	26.5	28.6	31.5	0	0	0.00%
S38	ALKALINITY	mg/L	67	02MAY2011 - 30APR2012	27	134.7778	45.06519	76	89	130	177	226	0	0	0.00%
S38	TN	mg N/L	80	02MAY2011 - 30APR2012	27	1.530296	0.44039	1.04	1.12	1.397	1.86	2.482	0	0	0.00%
S38	NOX	mg N/L	18;180	02MAY2011 - 30APR2012	25	0.05732	0.092429	<0.005	0.007	0.019	0.065	0.442	5	0	0.00%
S38	NH4	mg N/L	20	02MAY2011 - 30APR2012	26	0.038423	0.046479	<0.005	0.01	0.019	0.033	0.151	5	0	0.00%
S38	UN-IONIZED A	mg/L	NONE	02MAY2011 - 30APR2012	25	0.001014	0.001428	2.74E-05	0.00012	0.0003468	0.0011	0.0042131	0	0	0.00%
S38	NNH4	mg N/L	92	02MAY2011 - 30APR2012	24	0.080125	0.084622	0.01	0.016	0.047	0.108	0.307	0	0	0.00%
S38	ORGN	mg N/L	79	02MAY2011 - 30APR2012	26	1.419077	0.346715	1.01	1.11	1.3755	1.679	2.268	0	0	0.00%
S38	TKN	mg N/L	21	02MAY2011 - 30APR2012	27	1.478148	0.389754	1.01	1.12	1.39	1.84	2.4	0	0	0.00%
S38	OPO4	mg P/L	23	02MAY2011 - 30APR2012	27	0.003185	0.002842	<0.002	<0.002	<0.002	0.002	0.012	19	0	0.00%
S38	TP	mg P/L	25	02MAY2011 - 30APR2012	26	0.018577	0.009993	0.007	0.01	0.014	0.029	0.039	0	0	0.00%
S38	DIS. CA	mg/L	30	02MAY2011 - 30APR2012	27	43.93704	13.94586	24.7	29.8	45.2	53.8	74.7	0	0	0.00%
S38	DIS. K	mg/L	29	02MAY2011 - 30APR2012	27	5.540741	2.146062	2.8	3.1	5.1	7.4	9.5	0	0	0.00%
S38	DIS. MG	mg/L	31	02MAY2011 - 30APR2012	27	14.78519	6.355537	7	8.4	13.8	20.8	28.5	0	0	0.00%
S38	DIS. NA	mg/L	28	02MAY2011 - 30APR2012	27	52.29259	21.32061	28.9	35.2	42.6	71.6	114.9	0	0	0.00%
S38	TOT. CL	mg/L	32	02MAY2011 - 30APR2012	27	82.68889	33.9298	46.3	51.6	67.7	114	178	0	0	0.00%
S38	TOT. SO4	mg/L	33	02MAY2011 - 30APR2012	27	26.26667	16.94389	4.6	10.1	25.6	41.2	58.5	0	0	0.00%
S38	DIS. SILICA	mg/L	27	02MAY2011 - 30APR2012	27	9.631111	4.466294	2.81	5.9	9.37	11.9	20	0	0	0.00%
S38	TOT. FE	mg/L	177	11JUL2011 - 02APR2012	4	0.01525	0.0035	0.011	0.0125	0.0155	0.018	0.019	0	0	0.00%
S38	DIS. KJEL N	mg N/L	22	02MAY2011 - 30APR2012	27	1.431852	0.358276	0.96	1.12	1.33	1.74	2.28	0	0	0.00%
S38	DIS. ORGAN. C	mg/L	89;181	02MAY2011 - 30APR2012	27	24.0963	5.186631	16.7	19.7	23.7	27	37.8	0	0	0.00%

Table C-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	TOT. DIS. P	mg P/L	26	02MAY2011 - 30APR2012	26	0.007154	0.004929	0.003	0.004	0.005	0.008	0.02	0	0	0.00%
S38	TOT. ORGAN. (	mg/L	100	02MAY2011 - 30APR2012	27	24.06667	5.207908	16.8	19.7	23.2	27.3	37.7	0	0	0.00%
S39	DO	mg/L	8	05MAY2011 - 19APR2012	22	7.065	1.785755	4.54	5.96	7.105	7.7	11.9	0	0	0.00%
S39	FLDCOND.	UMHOS/CM	9	05MAY2011 - 19APR2012	22	733.7045	138.2428	405	648	737.5	800	1010	0	0	0.00%
S39	PH	UNITS	10	05MAY2011 - 19APR2012	22	7.918182	0.196726	7.6	7.8	7.9	8	8.4	0	0	0.00%
S39	TURBIDITY	NTU	12	05MAY2011 - 19APR2012	22	1.240909	0.670933	0.5	0.6	1.05	1.5	3.1	0	0	0.00%
S39	TSS	mg/L	16	05MAY2011 - 19APR2012	19	3.210526	0.535303	<3	<3	<3	<3	5	16	0	0.00%
S39	HARDNESS	mg/L CACO3	35	05MAY2011 - 19APR2012	19	175.4684	33.85933	100.2	141.4	180.3	203	224	0	0	0.00%
S39	TEMP	CENT	7	05MAY2011 - 19APR2012	22	25.53636	3.445708	18.6	22.9	25.8	29	30.3	0	0	0.00%
S39	ALKALINITY	mg/L	67	05MAY2011 - 19APR2012	19	130.6316	22.13647	86	114	130	143	177	0	0	0.00%
S39	TN	mg N/L	80	05MAY2011 - 19APR2012	22	1.616682	0.319629	1.27	1.39	1.4945	1.766	2.281	0	0	0.00%
S39	NOX	mg N/L	18;180	05MAY2011 - 19APR2012	22	0.011227	0.018467	<0.005	<0.005	<0.005	0.009	0.091	12	0	0.00%
S39	NH4	mg N/L	20	05MAY2011 - 19APR2012	19	0.023105	0.016934	0.008	0.012	0.019	0.026	0.077	0	0	0.00%
S39	UN-IONIZED A	mg/L	NONE	05MAY2011 - 19APR2012	19	0.001329	0.000859	0.000439	0.00063	0.001046	0.00153	0.0032684	0	0	0.00%
S39	NNH4	mg N/L	92	05MAY2011 - 19APR2012	19	0.031526	0.036802	0.008	0.012	0.019	0.033	0.168	0	0	0.00%
S39	ORGN	mg N/L	79	05MAY2011 - 19APR2012	19	1.599	0.316653	1.259	1.348	1.479	1.864	2.226	0	0	0.00%
S39	TKN	mg N/L	21	05MAY2011 - 19APR2012	22	1.608182	0.309017	1.27	1.39	1.49	1.76	2.27	0	0	0.00%
S39	OPO4	mg P/L	23	05MAY2011 - 19APR2012	22	0.002136	0.00064	<0.002	<0.002	<0.002	<0.002	0.005	20	0	0.00%
S39	TP	mg P/L	25	05MAY2011 - 19APR2012	22	0.017636	0.006758	0.01	0.012	0.0155	0.021	0.032	0	0	0.00%
S39	DIS. CA	mg/L	30	05MAY2011 - 19APR2012	19	43.91053	7.615474	26.7	37.3	44.3	50.2	57.7	0	0	0.00%
S39	DIS. K	mg/L	29	05MAY2011 - 19APR2012	19	6.815789	1.746827	2.9	5.5	6.8	8.4	9.7	0	0	0.00%
S39	DIS. MG	mg/L	31	05MAY2011 - 19APR2012	19	15.98421	4.156556	8.1	11.7	16.2	19.6	23.3	0	0	0.00%
S39	DIS. NA	mg/L	28	05MAY2011 - 19APR2012	19	78.08947	19.09883	36.4	68.9	72.3	90	115	0	0	0.00%
S39	TOT. CL	mg/L	32	05MAY2011 - 19APR2012	22	116.7455	23.76089	58.8	106	112	128	170	0	0	0.00%
S39	TOT. SO4	mg/L	33	05MAY2011 - 19APR2012	22	39.77273	14.51364	12.8	24.9	45	50.5	62.9	0	0	0.00%
S39	DIS. SILICA	mg/L	27	05MAY2011 - 19APR2012	19	10.50789	4.913016	4.14	6.08	10.3	13.9	20.7	0	0	0.00%
S39	TOT. FE	mg/L	177	11AUG2011 - 05APR2012	4	0.0145	0.004203	0.009	0.0115	0.015	0.0175	0.019	0	0	0.00%
S39	DIS. KJEL N	mg N/L	22	05MAY2011 - 19APR2012	19	1.523684	0.269469	1.2	1.32	1.4	1.73	2.06	0	0	0.00%
S39	DIS. ORGAN. C	mg/L	89;181	05MAY2011 - 19APR2012	19	26.38421	4.133638	21.6	23.2	24.7	30.6	35.9	0	0	0.00%
S39	TOT. DIS. P	mg P/L	26	05MAY2011 - 05APR2012	18	0.007444	0.002357	0.004	0.006	0.007	0.008	0.012	0	0	0.00%
S39	TOT. ORGAN. (	mg/L	100	05MAY2011 - 19APR2012	19	26.68947	4.287177	21.8	23.8	25.2	31.4	36.5	0	0	0.00%
S197	DO	mg/L	8	11JUL2011 - 09JAN2012	5	5.412	2.429582	2.74	4.21	4.7	6.29	9.12	0	0	0.00%
S197	FLDCOND.	UMHOS/CM	9	11JUL2011 - 09JAN2012	5	950.8	680.1211	543	612	682	758	2159	0	1	20.00%
S197	PH	UNITS	10	11JUL2011 - 09JAN2012	5	7.72	0.408656	7.3	7.6	7.6	7.7	8.4	0	0	0.00%
S197	TURBIDITY	NTU	12	11JUL2011 - 09JAN2012	3	0.933333	0.378594	0.5	0.5	1.1	1.2	1.2	0	0	0.00%
S197	TSS	mg/L	16	11JUL2011 - 09JAN2012	5	3	0	<3	<3	<3	<3	<3	5	0	0.00%
S197	HARDNESS	mg/L CACO3	35	11JUL2011 - 09JAN2012	5	239.34	65.90693	196.4	206.3	217.9	220.1	356	0	0	0.00%
S197	TEMP	CENT	7	11JUL2011 - 09JAN2012	5	25.7	3.647602	19.7	25.3	26.8	27.4	29.3	0	0	0.00%
S197	TN	mg N/L	80	11JUL2011 - 09JAN2012	5	0.6356	0.080494	0.539	0.617	0.62	0.64	0.762	0	0	0.00%
S197	NOX	mg N/L	18;180	11JUL2011 - 09JAN2012	3	0.039333	0.015373	0.029	0.029	0.032	0.057	0.057	0	0	0.00%

Table C-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	NH4	mg N/L	20	11OCT2011 - 11OCT2011	1	0.09		0.09	0.09	0.09	0.09	0.09	0	0	0.00%
S197	UN-IONIZED A	mg/L	NONE	11JUL2011 - 09JAN2012	1	0.00139		0.00139	0.00139	0.0013902	0.00139	0.0013902	0	0	0.00%
S197	ORGN	mg N/L	79	11OCT2011 - 11OCT2011	1	0.55		0.55	0.55	0.55	0.55	0.55	0	0	0.00%
S197	TKN	mg N/L	21	11JUL2011 - 09JAN2012	5	0.612	0.083487	0.51	0.56	0.62	0.64	0.73	0	0	0.00%
S197	OPO4	mg P/L	23	11JUL2011 - 09JAN2012	5	0.002	0	<0.002	<0.002	<0.002	<0.002	<0.002	5	0	0.00%
S197	TP	mg P/L	25	03OCT2011 - 09JAN2012	4	0.00425	0.001258	0.003	0.0035	0.004	0.005	0.006	0	0	0.00%
S197	DIS. CA	mg/L	30	11JUL2011 - 09JAN2012	5	70.54	4.563223	65.2	67.7	71.2	71.3	77.3	0	0	0.00%
S197	DIS. K	mg/L	29	11JUL2011 - 09JAN2012	5	6.84	3.803682	4.6	5	5.2	5.8	13.6	0	0	0.00%
S197	DIS. MG	mg/L	31	11JUL2011 - 09JAN2012	5	15.36	13.67509	7	8.2	10.2	11.8	39.6	0	0	0.00%
S197	DIS. NA	mg/L	28	11JUL2011 - 09JAN2012	5	96.7	103.6034	29.9	44.9	59.1	69.5	280.1	0	0	0.00%
S197	TOT. CL	mg/L	32	11JUL2011 - 09JAN2012	5	173.08	198.4087	48.4	75.7	99.3	117	525	0	0	0.00%
S197	TOT. SO4	mg/L	33	11JUL2011 - 09JAN2012	3	32.83333	36.97301	7.8	7.8	15.4	75.3	75.3	0	0	0.00%
US41-25	DO	mg/L	8	04MAY2011 - 05APR2012	18	2.428889	1.53373	0.77	1.27	2.19	2.86	6.24	0	0	0.00%
US41-25	FLDCOND.	UMHOS/CM	9	04MAY2011 - 05APR2012	18	408.0556	42.76402	324	383	407.5	419	496	0	0	0.00%
US41-25	PH	UNITS	10	04MAY2011 - 05APR2012	18	7.166667	0.164496	6.8	7.1	7.15	7.3	7.4	0	0	0.00%
US41-25	TURBIDITY	NTU	12	14JUL2011 - 05APR2012	6	2.816667	3.546501	0.9	1	1.5	2	10	0	0	0.00%
US41-25	TSS	mg/L	16	04MAY2011 - 05APR2012	18	5.111111	5.849976	<3	<3	<3	<3	25	15	0	0.00%
US41-25	HARDNESS	mg/L CACO3	35	04MAY2011 - 05APR2012	18	181.5722	18.01979	137.8	169.4	180.4	192	213.2	0	0	0.00%
US41-25	TEMP	CENT	7	04MAY2011 - 05APR2012	18	25.05	2.848168	19.1	22.8	25.05	28	28.6	0	0	0.00%
US41-25	TN	mg N/L	80	04MAY2011 - 05APR2012	18	0.976833	0.199255	0.74	0.805	0.9445	1.137	1.46	0	0	0.00%
US41-25	NOX	mg N/L	18;180	04MAY2011 - 05APR2012	12	0.020667	0.007632	<0.005	0.0155	0.024	0.026	0.03	1	0	0.00%
US41-25	TKN	mg N/L	21	04MAY2011 - 05APR2012	18	0.963333	0.200176	0.73	0.8	0.92	1.11	1.46	0	0	0.00%
US41-25	OPO4	mg P/L	23	04MAY2011 - 05APR2012	18	0.003278	0.002081	<0.002	<0.002	0.002	0.005	0.009	7	0	0.00%
US41-25	TP	mg P/L	25	04MAY2011 - 05APR2012	17	0.026059	0.029721	0.011	0.012	0.014	0.022	0.131	0	0	0.00%
US41-25	DIS. CA	mg/L	30	04MAY2011 - 05APR2012	18	67.30556	6.977735	50.9	63.1	66.6	71.3	79.6	0	0	0.00%
US41-25	DIS. K	mg/L	29	04MAY2011 - 05APR2012	18	0.816667	0.336505	0.4	0.5	0.75	1	1.6	0	0	0.00%
US41-25	DIS. MG	mg/L	31	04MAY2011 - 05APR2012	18	3.277778	0.438655	2.6	2.9	3.3	3.5	4.5	0	0	0.00%
US41-25	DIS. NA	mg/L	28	04MAY2011 - 05APR2012	18	13.86667	2.243946	9.6	12	14.15	15.1	18.6	0	0	0.00%
US41-25	TOT. CL	mg/L	32	04MAY2011 - 05APR2012	20	19.15	6.247736	1.1	17.1	20.65	22.75	27.3	0	0	0.00%
US41-25	TOT. SO4	mg/L	33	14JUL2011 - 05APR2012	4	1.7	2.741046	0.1	0.2	0.45	3.2	5.8	0	0	0.00%
US41-25	CA_I	mg/L	188	25OCT2011 - 13FEB2012	2	1.91	2.531442	0.12	0.12	1.91	3.7	3.7	0	0	0.00%
S344	DO	mg/L	8	15JUN2011 - 19MAR2012	4	3.5125	2.782258	0.51	1.57	3.185	5.455	7.17	0	0	0.00%
S344	FLDCOND.	UMHOS/CM	9	15JUN2011 - 19MAR2012	4	315	90.82951	236	242	297.5	388	429	0	0	0.00%
S344	PH	UNITS	10	15JUN2011 - 19MAR2012	4	7.4	0.432049	7	7.1	7.3	7.7	8	0	0	0.00%
S344	TURBIDITY	NTU	12	15JUN2011 - 19MAR2012	4	1.975	1.552149	0.4	0.95	1.7	3	4.1	0	0	0.00%
S344	HARDNESS	mg/L CACO3	35	15JUN2011 - 19MAR2012	4	141.65	37.83169	108.3	110.8	135.2	172.5	187.9	0	0	0.00%
S344	TEMP	CENT	7	15JUN2011 - 19MAR2012	4	26.25	2.986079	23.6	23.7	26	28.8	29.4	0	0	0.00%
S344	TN	mg N/L	80	15JUN2011 - 19MAR2012	4	1.402	0.63276	0.805	1.016	1.2535	1.788	2.296	0	0	0.00%
S344	NOX	mg N/L	18;180	15JUN2011 - 19MAR2012	4	0.00575	0.000957	<0.005	0	0.0055	0.0065	0.007	1	0	0.00%
S344	TKN	mg N/L	21	15JUN2011 - 19MAR2012	4	1.3975	0.632159	0.8	1.01	1.25	1.785	2.29	0	0	0.00%
S344	TP	mg P/L	25	15JUN2011 - 19MAR2012	4	0.0415	0.028255	0.008	0.019	0.043	0.064	0.072	0	0	0.00%
S344	DIS. CA	mg/L	30	15JUN2011 - 19MAR2012	4	52.275	13.75679	40	41	50.1	63.55	68.9	0	0	0.00%

Table C-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	DIS. K	mg/L	29	15JUN2011 - 19MAR2012	4	0.675	0.386221	0.3	0.4	0.6	0.95	1.2	0	0	0.00%
S344	DIS. MG	mg/L	31	15JUN2011 - 19MAR2012	4	2.7	0.83666	2	2.05	2.5	3.35	3.8	0	0	0.00%
S344	DIS. NA	mg/L	28	15JUN2011 - 19MAR2012	4	11.2	4.459447	7.6	7.75	10.05	14.65	17.1	0	0	0.00%
S344	TOT. SO4	mg/L	33	15JUN2011 - 19MAR2012	4	13.325	20.91337	0.2	0.2	4.5	26.45	44.1	0	0	0.00%
G94D	DO	mg/L	8	30JUN2011 - 30JUN2011	1	5.54		5.54	5.54	5.54	5.54	5.54	0	0	0.00%
G94D	FLDCOND.	UMHOS/CM	9	30JUN2011 - 30JUN2011	1	629		629	629	629	629	629	0	0	0.00%
G94D	PH	UNITS	10	30JUN2011 - 30JUN2011	1	7.5		7.5	7.5	7.5	7.5	7.5	0	0	0.00%
G94D	TURBIDITY	NTU	12	30JUN2011 - 30JUN2011	1	5.3		5.3	5.3	5.3	5.3	5.3	0	0	0.00%
G94D	TSS	mg/L	16	30JUN2011 - 30JUN2011	1	10		10	10	10	10	10	0	0	0.00%
G94D	HARDNESS	mg/L CACO3	35	30JUN2011 - 30JUN2011	1	265.3		265.3	265.3	265.3	265.3	265.3	0	0	0.00%
G94D	TEMP	CENT	7	30JUN2011 - 30JUN2011	1	28.7		28.7	28.7	28.7	28.7	28.7	0	0	0.00%
G94D	ALKALINITY	mg/L	67	30JUN2011 - 30JUN2011	1	196		196	196	196	196	196	0	0	0.00%
G94D	TN	mg N/L	80	30JUN2011 - 30JUN2011	1	2.265		2.265	2.265	2.265	2.265	2.265	0	0	0.00%
G94D	NOX	mg N/L	18;180	30JUN2011 - 30JUN2011	1	0.275		0.275	0.275	0.275	0.275	0.275	0	0	0.00%
G94D	TKN	mg N/L	21	30JUN2011 - 30JUN2011	1	1.99		1.99	1.99	1.99	1.99	1.99	0	0	0.00%
G94D	OPO4	mg P/L	23	30JUN2011 - 30JUN2011	1	0.002		0.002	0.002	0.002	0.002	0.002	0	0	0.00%
G94D	TP	mg P/L	25	30JUN2011 - 30JUN2011	1	0.074		0.074	0.074	0.074	0.074	0.074	0	0	0.00%
G94D	DIS. CA	mg/L	30	30JUN2011 - 30JUN2011	1	96.1		96.1	96.1	96.1	96.1	96.1	0	0	0.00%
G94D	DIS. K	mg/L	29	30JUN2011 - 30JUN2011	1	2.8		2.8	2.8	2.8	2.8	2.8	0	0	0.00%
G94D	DIS. MG	mg/L	31	30JUN2011 - 30JUN2011	1	6.2		6.2	6.2	6.2	6.2	6.2	0	0	0.00%
G94D	DIS. NA	mg/L	28	30JUN2011 - 30JUN2011	1	33.8		33.8	33.8	33.8	33.8	33.8	0	0	0.00%
G94D	TOT. CL	mg/L	32	30JUN2011 - 30JUN2011	1	49.7		49.7	49.7	49.7	49.7	49.7	0	0	0.00%
G94D	TOT. SO4	mg/L	33	30JUN2011 - 30JUN2011	1	42.6		42.6	42.6	42.6	42.6	42.6	0	0	0.00%
S177	DO	mg/L	8	02MAY2011 - 30APR2012	42	4.264286	1.988647	0.9	2.45	4.645	5.76	8.09	0	0	0.00%
S177	FLDCOND.	UMHOS/CM	9	02MAY2011 - 30APR2012	43	587.4186	70.98197	531	553	563	583	887	0	0	0.00%
S177	PH	UNITS	10	02MAY2011 - 30APR2012	43	7.374419	0.286267	6.6	7.1	7.4	7.6	7.9	0	0	0.00%
S177	TURBIDITY	NTU	12	11JUL2011 - 02APR2012	7	4.285714	5.306734	0.9	1	1.4	11	13	0	0	0.00%
S177	TSS	mg/L	16	02MAY2011 - 30APR2012	43	3	0	<3	<3	<3	<3	<3	43	0	0.00%
S177	HARDNESS	mg/L CACO3	35	02MAY2011 - 30APR2012	43	220.6581	24.42052	205.1	210.4	213.6	218.2	337.6	0	0	0.00%
S177	TEMP	CENT	7	02MAY2011 - 30APR2012	43	25.83721	2.166303	20.2	24.6	26.1	27.7	29.3	0	0	0.00%
S177	TN	mg N/L	80	02MAY2011 - 30APR2012	42	0.815214	0.284251	0.571	0.631	0.6975	0.85	1.782	0	0	0.00%
S177	NOX	mg N/L	18;180	02MAY2011 - 30APR2012	33	0.078455	0.076549	0.007	0.023	0.06	0.084	0.342	0	0	0.00%
S177	NH4	mg N/L	20	02MAY2011 - 30APR2012	40	0.05755	0.025366	0.015	0.0375	0.056	0.0775	0.117	0	0	0.00%
S177	UN-IONIZED A	mg/L	NONE	02MAY2011 - 30APR2012	40	0.001015	0.000553	8.95E-05	0.00058	0.0009249	0.00129	0.0026028	0	0	0.00%
S177	NNH4	mg N/L	92	02MAY2011 - 30APR2012	31	0.130774	0.078166	0.037	0.088	0.104	0.139	0.402	0	0	0.00%
S177	ORGN	mg N/L	79	02MAY2011 - 30APR2012	39	0.688205	0.233641	0.463	0.532	0.597	0.724	1.38	0	0	0.00%
S177	TKN	mg N/L	21	02MAY2011 - 30APR2012	42	0.753571	0.224617	0.53	0.6	0.65	0.8	1.44	0	0	0.00%
S177	OPO4	mg P/L	23	02MAY2011 - 30APR2012	42	0.002024	0.000154	<0.002	<0.002	<0.002	<0.002	0.003	41	0	0.00%
S177	TP	mg P/L	25	02MAY2011 - 30APR2012	39	0.006282	0.003316	0.002	0.005	0.005	0.006	0.018	0	0	0.00%
S177	DIS. CA	mg/L	30	02MAY2011 - 30APR2012	43	73.8	6.146466	65.7	71.4	72.4	73.9	103.1	0	0	0.00%
S177	DIS. K	mg/L	29	02MAY2011 - 30APR2012	43	3.42093	0.90962	2.4	2.6	3	3.9	6.1	0	0	0.00%

Table C-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	DIS. MG	mg/L	31	02MAY2011 - 30APR2012	43	8.832558	2.786081	7.1	7.5	7.9	8.2	19.5	0	0	0.00%
S177	DIS. NA	mg/L	28	02MAY2011 - 30APR2012	43	35.28372	8.294287	29.3	31.2	32.2	35	69.3	0	0	0.00%
S177	TOT. CL	mg/L	32	02MAY2011 - 30APR2012	44	52.60227	17.89706	<0.1	48.05	50.8	54.75	100	1	0	0.00%
S177	TOT. SO4	mg/L	33	11JUL2011 - 02APR2012	5	4.5	1.720465	2.7	3.6	4	5	7.2	0	0	0.00%
S177	CA_I	mg/L	188	24OCT2011 - 09FEB2012	2	1.9	0.141421	1.8	1.8	1.9	2	2	0	0	0.00%
S178	DO	mg/L	8	09MAY2011 - 30APR2012	25	4.0636	1.452888	1.83	2.93	4.15	4.89	6.81	0	0	0.00%
S178	FLDCOND.	UMHOS/CM	9	09MAY2011 - 30APR2012	25	552.56	41.56629	443	545	568	579	605	0	0	0.00%
S178	PH	UNITS	10	09MAY2011 - 30APR2012	25	7.284	0.215407	7	7.1	7.3	7.4	7.7	0	0	0.00%
S178	TURBIDITY	NTU	12	11JUL2011 - 02APR2012	6	7.25	8.06542	0.7	0.8	3.5	17	18	0	0	0.00%
S178	TSS	mg/L	16	09MAY2011 - 30APR2012	25	7	12.48332	<3	<3	<3	3	56	17	0	0.00%
S178	HARDNESS	mg/L CACO3	35	09MAY2011 - 30APR2012	25	203.092	28.49406	147.6	181.2	209.6	225.7	243.7	0	0	0.00%
S178	TEMP	CENT	7	09MAY2011 - 30APR2012	25	25.12	3.097311	17.4	23.4	26.2	27.2	29.3	0	0	0.00%
S178	TN	mg N/L	80	09MAY2011 - 30APR2012	25	0.95804	0.591553	0.392	0.67	0.76	1.124	2.955	0	0	0.00%
S178	NOX	mg N/L	18;180	09MAY2011 - 30APR2012	24	0.218167	0.284838	<0.005	0.016	0.0435	0.3985	0.82	1	0	0.00%
S178	NH4	mg N/L	20	09MAY2011 - 30APR2012	22	0.028318	0.032329	0.006	0.012	0.0185	0.027	0.154	0	0	0.00%
S178	UN-IONIZED A	mg/L	NONE	09MAY2011 - 30APR2012	22	0.000468	0.000644	5.4E-05	0.00011	0.0001743	0.00046	0.0024119	0	0	0.00%
S178	NNH4	mg N/L	92	09MAY2011 - 30APR2012	22	0.264591	0.288905	0.006	0.041	0.101	0.429	0.832	0	0	0.00%
S178	ORGN	mg N/L	79	09MAY2011 - 30APR2012	22	0.664864	0.530986	0.322	0.389	0.541	0.673	2.706	0	0	0.00%
S178	TKN	mg N/L	21	09MAY2011 - 30APR2012	25	0.7488	0.606261	0.33	0.4	0.61	0.74	2.86	0	0	0.00%
S178	OPO4	mg P/L	23	09MAY2011 - 30APR2012	24	0.004417	0.006494	<0.002	<0.002	0.002	0.0035	0.028	9	0	0.00%
S178	TP	mg P/L	25	09MAY2011 - 30APR2012	23	0.037043	0.048882	0.008	0.012	0.022	0.034	0.213	0	0	0.00%
S178	DIS. CA	mg/L	30	09MAY2011 - 30APR2012	25	71.8	11.77741	51.3	61.8	74.6	81.5	87.6	0	0	0.00%
S178	DIS. K	mg/L	29	09MAY2011 - 30APR2012	25	13.516	2.899092	9.4	11.8	12.4	15.9	21.6	0	0	0.00%
S178	DIS. MG	mg/L	31	09MAY2011 - 30APR2012	25	5.772	0.64	4.8	5.4	5.6	6	7.6	0	0	0.00%
S178	DIS. NA	mg/L	28	09MAY2011 - 30APR2012	25	25.516	6.368522	20.4	21.8	23.4	26.4	45.4	0	0	0.00%
S178	TOT. CL	mg/L	32	09MAY2011 - 30APR2012	27	41.4963	16.72539	<0.1	38.5	40.7	48.4	77.6	1	0	0.00%
S178	TOT. SO4	mg/L	33	11JUL2011 - 02APR2012	4	31.825	8.094597	24	24.9	31.65	38.75	40	0	0	0.00%
S178	CA_I	mg/L	188	24OCT2011 - 09FEB2012	2	9.6	0.565685	9.2	9.2	9.6	10	10	0	0	0.00%
S331-173	DO	mg/L	8	02MAY2011 - 30APR2012	51	3.60098	1.663375	1.22	2.09	3.57	4.72	7.54	0	0	0.00%
S331-173	FLDCOND.	UMHOS/CM	9	02MAY2011 - 30APR2012	53	625.8491	73.87916	536	568	610	657	849	0	0	0.00%
S331-173	PH	UNITS	10	02MAY2011 - 30APR2012	53	7.49434	0.404976	7	7.2	7.4	7.6	9.5	0	1	1.89%
S331-173	TURBIDITY	NTU	12	12JUL2011 - 03APR2012	4	1.75	0.858293	1.1	1.2	1.45	2.3	3	0	0	0.00%
S331-173	TSS	mg/L	16	02MAY2011 - 30APR2012	40	3	0	<3	<3	<3	<3	<3	40	0	0.00%
S331-173	HARDNESS	mg/L CACO3	35	02MAY2011 - 30APR2012	40	227.085	45.24467	<1	215.65	223.8	245.95	327.1	1	0	0.00%
S331-173	TEMP	CENT	7	02MAY2011 - 30APR2012	53	25.93585	2.825781	19.9	23.8	25.5	28.3	31.8	0	0	0.00%
S331-173	TN	mg N/L	80	02MAY2011 - 30APR2012	40	1.233225	0.186131	0.885	1.171	1.215	1.28	1.746	0	0	0.00%
S331-173	NOX	mg N/L	18;180	02MAY2011 - 30APR2012	29	0.062724	0.058322	0.012	0.028	0.043	0.07	0.226	0	0	0.00%
S331-173	TKN	mg N/L	21	02MAY2011 - 30APR2012	40	1.18775	0.155192	0.84	1.115	1.2	1.265	1.54	0	0	0.00%
S331-173	OPO4	mg P/L	23	02MAY2011 - 30APR2012	39	0.002	0	<0.002	<0.002	<0.002	<0.002	0.002	38	0	0.00%
S331-173	TP	mg P/L	25	02MAY2011 - 30APR2012	51	0.010059	0.004173	0.005	0.007	0.009	0.013	0.021	0	0	0.00%
S331-173	DIS. CA	mg/L	30	02MAY2011 - 30APR2012	40	75.4975	14.41611	<0.2	72.5	75.1	82.55	103.8	1	0	0.00%
S331-173	DIS. K	mg/L	29	02MAY2011 - 30APR2012	40	2.6675	0.847738	<0.1	2.3	2.55	2.7	5.3	1	0	0.00%
S331-173	DIS. MG	mg/L	31	02MAY2011 - 30APR2012	40	9.36	2.867931	<0.1	8.4	8.7	9.3	17.8	1	0	0.00%

Table C-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	TOT. CL	mg/L	32	02MAY2011 - 30APR2012	40	56.645	11.84606	44.4	48.95	53.05	58.85	93.1	0	0	0.00%
S331-173	TOT. SO4	mg/L	33	12JUL2011 - 03APR2012	4	8.275	8.154089	1.4	2.8	5.9	13.75	19.9	0	0	0.00%
S331-173	DIS. ORGAN. C	mg/L	89;181	12JUL2011 - 03APR2012	4	15.55	1.603122	14	14.6	15.2	16.5	17.8	0	0	0.00%
S331-173Auto	TN	mg N/L	80	02MAY2011 - 30APR2012	363	1.275752	0.368152	0.803	1.154	1.225	1.33	5.94	0	0	0.00%
S331-173Auto	NOX	mg N/L	18;180	02MAY2011 - 30APR2012	288	0.077319	0.063144	0.008	0.027	0.0505	0.116	0.305	0	0	0.00%
S331-173Auto	TKN	mg N/L	21	02MAY2011 - 30APR2012	363	1.214408	0.35305	0.78	1.12	1.2	1.27	5.94	0	0	0.00%
S331-173Auto	TP	mg P/L	25	02MAY2011 - 30APR2012	334	0.014266	0.024757	0.005	0.007	0.009	0.016	0.385	0	0	0.00%
S332DX	DO	mg/L	8	02MAY2011 - 30APR2012	52	3.894231	1.825258	0.85	2.205	4.01	5.11	7.68	0	0	0.00%
S332DX	FLDCOND.	UMHOS/CM	9	02MAY2011 - 30APR2012	54	597.6667	64.09192	544	557	574	603	834	0	0	0.00%
S332DX	PH	UNITS	10	02MAY2011 - 30APR2012	54	7.368519	0.249395	6.7	7.2	7.4	7.5	7.9	0	0	0.00%
S332DX	TURBIDITY	NTU	12	12JUL2011 - 03APR2012	6	5.533333	6.203117	0.8	1.4	2	13	14	0	0	0.00%
S332DX	TSS	mg/L	16	02MAY2011 - 30APR2012	41	3	0	<3	<3	<3	<3	<3	41	0	0.00%
S332DX	HARDNESS	mg/L CACO3	35	02MAY2011 - 30APR2012	42	223.9429	21.99119	202.2	212.2	216.75	225.4	307.2	0	0	0.00%
S332DX	TEMP	CENT	7	02MAY2011 - 30APR2012	54	26.01111	2.316444	20.5	24.7	26.1	27.7	30.2	0	0	0.00%
S332DX	TN	mg N/L	80	02MAY2011 - 30APR2012	41	0.962341	0.251879	0.666	0.776	0.888	1.115	1.62	0	0	0.00%
S332DX	NOX	mg N/L	18;180	02MAY2011 - 30APR2012	33	0.078364	0.077538	0.005	0.022	0.041	0.108	0.33	0	0	0.00%
S332DX	TKN	mg N/L	21	02MAY2011 - 30APR2012	41	0.899268	0.186137	0.65	0.74	0.85	1.04	1.3	0	0	0.00%
S332DX	OPO4	mg P/L	23	02MAY2011 - 30APR2012	41	0.002	0	<0.002	<0.002	<0.002	<0.002	0.002	39	0	0.00%
S332DX	TP	mg P/L	25	02MAY2011 - 30APR2012	51	0.008176	0.003621	0.005	0.006	0.007	0.008	0.019	0	0	0.00%
S332DX	DIS. CA	mg/L	30	02MAY2011 - 30APR2012	42	74.5881	5.835184	64.8	71.3	72.8	76.7	98.4	0	0	0.00%
S332DX	DIS. K	mg/L	29	02MAY2011 - 30APR2012	42	2.921429	0.912123	2.2	2.5	2.6	2.9	5.9	0	0	0.00%
S332DX	DIS. MG	mg/L	31	02MAY2011 - 30APR2012	42	9.152381	2.55498	7.1	8	8.2	8.5	18.3	0	0	0.00%
S332DX	DIS. NA	mg/L	28	02MAY2011 - 30APR2012	42	35.10952	7.692372	29.1	31.2	32.3	34.4	65	0	0	0.00%
S332DX	TOT. CL	mg/L	32	02MAY2011 - 30APR2012	43	52.43953	17.4721	<0.1	48.3	50.7	56.1	98	1	0	0.00%
S332DX	TOT. SO4	mg/L	33	12JUL2011 - 03APR2012	4	3.5	1.351542	1.8	2.5	3.6	4.5	5	0	0	0.00%
S332DX	TOT. ULTRA TR	ug/L	207	21JUL2011 - 17APR2012	4	0.00026	9.38E-05	0.0002	0.00021	0.00022	0.00031	0.0004	0	0	0.00%
S332DX	TOT. MTHY HG	ug/L	203	21JUL2011 - 17APR2012	4	3.63E-05	1.47E-05	0.000024	2.5E-05	0.000033	4.8E-05	0.000055	0	0	0.00%
S332DX	CA_I	mg/L	188	24OCT2011 - 09FEB2012	2	3.9	0.989949	3.2	3.2	3.9	4.6	4.6	0	0	0.00%
S332DX	DIS. ORGAN. C	mg/L	89;181	12JUL2011 - 03APR2012	4	13.2	3.040833	9.6	11.15	13.1	15.25	17	0	0	0.00%
S332DXAuto	TN	mg N/L	80	02MAY2011 - 30APR2012	370	0.989857	0.254136	0.638	0.77	0.9165	1.164	2.221	0	0	0.00%
S332DXAuto	NOX	mg N/L	18;180	02MAY2011 - 30APR2012	304	0.076536	0.069265	<0.005	0.02	0.071	0.1145	0.328	22	0	0.00%
S332DXAuto	TKN	mg N/L	21	02MAY2011 - 30APR2012	370	0.92727	0.196357	0.61	0.76	0.89	1.06	2.14	0	0	0.00%
S332DXAuto	TP	mg P/L	25	02MAY2011 - 30APR2012	340	0.008791	0.004259	0.004	0.006	0.007	0.01	0.025	0	0	0.00%
BERMB3	DO	mg/L	8	17OCT2011 - 14NOV2011	3	4.003333	2.173484	2.16	2.16	3.45	6.4	6.4	0	0	0.00%
BERMB3	FLDCOND.	UMHOS/CM	9	17OCT2011 - 12DEC2011	4	355.75	62.00739	278	311.5	359	400	427	0	0	0.00%
BERMB3	PH	UNITS	10	17OCT2011 - 12DEC2011	4	7.175	0.206155	7	7	7.15	7.35	7.4	0	0	0.00%
BERMB3	TURBIDITY	NTU	12	17OCT2011 - 31OCT2011	2	1.8	0.282843	1.6	1.6	1.8	2	2	0	0	0.00%
BERMB3	TSS	mg/L	16	17OCT2011 - 31OCT2011	2	3	0	<3	<3	<3	<3	<3	2	0	0.00%
BERMB3	HARDNESS	mg/L CACO3	35	17OCT2011 - 31OCT2011	2	145.7	10.04092	138.6	138.6	145.7	152.8	152.8	0	0	0.00%
BERMB3	TEMP	CENT	7	17OCT2011 - 12DEC2011	4	23.55	1.752142	21.5	22.1	23.75	25	25.2	0	0	0.00%
BERMB3	TN	mg N/L	80	17OCT2011 - 31OCT2011	2	0.97	0.070711	0.92	0.92	0.97	1.02	1.02	0	0	0.00%
BERMB3	NOX	mg N/L	18;180	31OCT2011 - 31OCT2011	1	0.005		<0.005	<0.005	<0.005	<0.005	<0.005	1	0	0.00%
BERMB3	TKN	mg N/L	21	17OCT2011 - 31OCT2011	2	0.97	0.070711	0.92	0.92	0.97	1.02	1.02	0	0	0.00%
BERMB3	OPO4	mg P/L	23	17OCT2011 - 31OCT2011	2	0.017	0.011314	0.009	0.009	0.017	0.025	0.025	0	0	0.00%
BERMB3	TP	mg P/L	25	17OCT2011 - 12DEC2011	4	0.0635	0.020174	0.039	0.048	0.0645	0.079	0.086	0	0	0.00%
BERMB3	DIS. CA	mg/L	30	17OCT2011 - 31OCT2011	2	53.45	3.464823	51	51	53.45	55.9	55.9	0	0	0.00%
BERMB3	DIS. K	mg/L	29	17OCT2011 - 31OCT2011	2	2.3	0.707107	1.8	1.8	2.3	2.8	2.8	0	0	0.00%
BERMB3	DIS. MG	mg/L	31	17OCT2011 - 31OCT2011	2	3	0.282843	2.8	2.8	3	3.2	3.2	0	0	0.00%
BERMB3	DIS. NA	mg/L	28	17OCT2011 - 31OCT2011	2	5.9	3.535534	3.4	3.4	5.9	8.4	8.4	0	0	0.00%
BERMB3	TOT. CL	mg/L	32	17OCT2011 - 31OCT2011	2	8.75	6.29325	4.3	4.3	8.75	13.2	13.2	0	0	0.00%
BERMB3	TOT. SO4	mg/L	33	17OCT2011 - 31OCT2011	2	0.2	0	0.2	0.2	0.2	0.2	0.2	0	0	0.00%

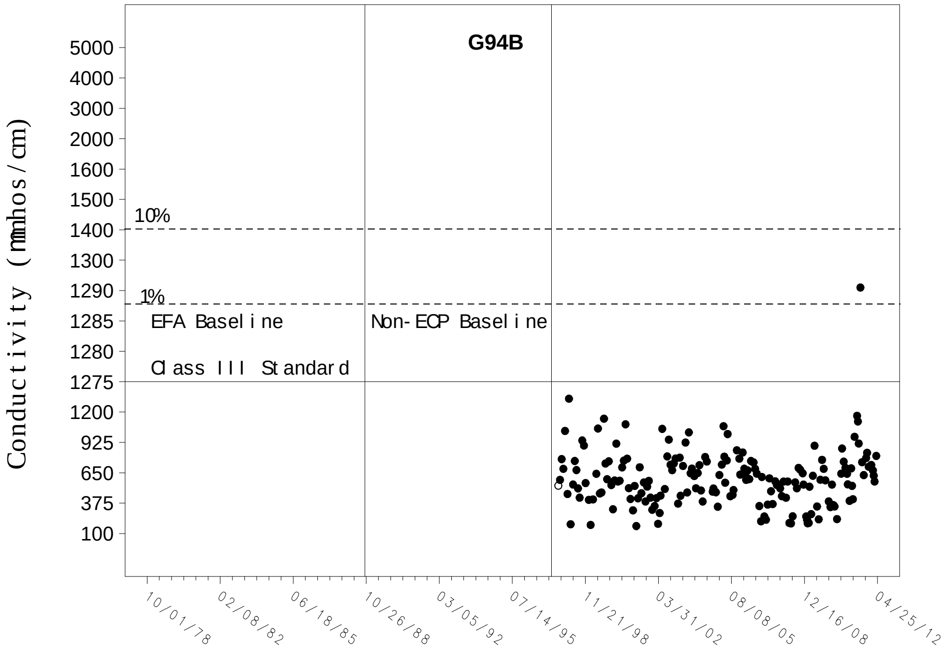
Table C-3. Continued.

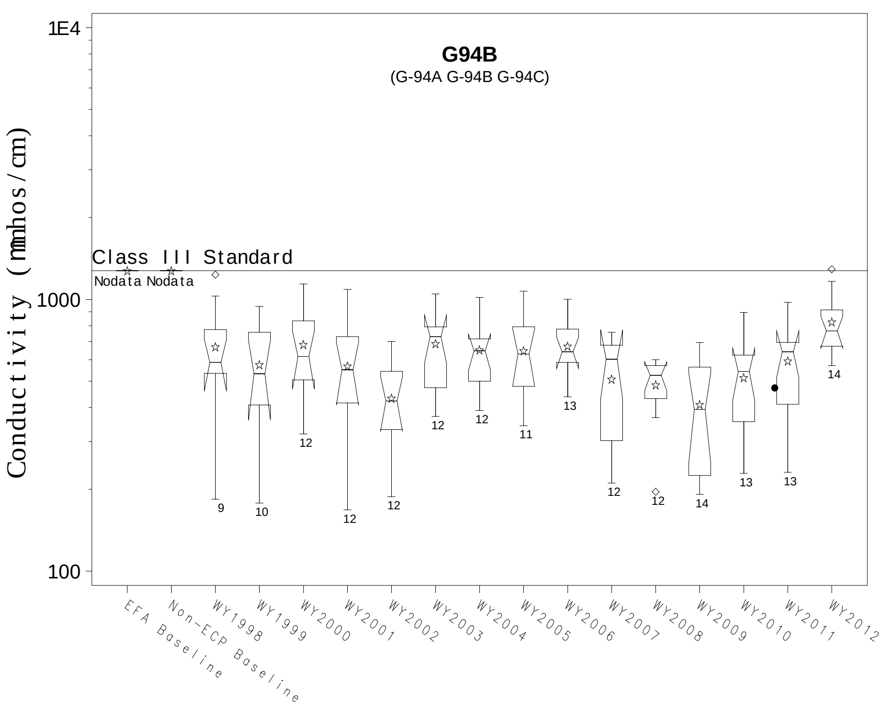
STATION	TEST NAME	UNITS	TEST NUMBER	PERIOD OF RECORD	# OF SAMPLES	MEAN	STD	MIN	Q25	MEDIAN	Q75	MAX	# BELOW DETECTION LIMIT	# OF EXCURSIONS	% EXCURSIONS
S356-334	DO	mg/L	8	03MAY2011 - 24APR2012	53	3.660943	1.79488	0.55	2.14	3.4	5.08	7.05	0	0	0.00%
S356-334	FLDCOND.	UMHOS/CM	9	03MAY2011 - 24APR2012	53	604.9245	98.52115	420	536	605	658	972	0	0	0.00%
S356-334	PH	UNITS	10	03MAY2011 - 24APR2012	53	7.288679	0.282612	6.8	7.1	7.2	7.4	8.3	0	0	0.00%
S356-334	TURBIDITY	NTU	12	13JUL2011 - 04APR2012	4	1.975	1.627626	0.8	0.85	1.4	3.1	4.3	0	0	0.00%
S356-334	TSS	mg/L	16	03MAY2011 - 24APR2012	22	3.545455	1.223861	<3	<3	<3	4	8	16	0	0.00%
S356-334	HARDNESS	mg/L CACO3	35	03MAY2011 - 24APR2012	22	231.7318	51.43779	154.8	197.5	226.95	264.6	356.3	0	0	0.00%
S356-334	TEMP	CENT	7	03MAY2011 - 24APR2012	53	26.02264	2.718006	21.5	23.6	25.9	28.3	32.1	0	0	0.00%
S356-334	TN	mg N/L	80	03MAY2011 - 24APR2012	22	1.455591	0.218934	1.182	1.302	1.434	1.533	2.091	0	0	0.00%
S356-334	NOX	mg N/L	18;180	03MAY2011 - 24APR2012	21	0.093714	0.08413	<0.005	0.032	0.062	0.134	0.351	1	0	0.00%
S356-334	TKN	mg N/L	21	03MAY2011 - 24APR2012	22	1.366364	0.170616	1.13	1.25	1.335	1.42	1.74	0	0	0.00%
S356-334	OPO4	mg P/L	23	03MAY2011 - 24APR2012	21	0.002	0	<0.002	<0.002	<0.002	<0.002	0.002	18	0	0.00%
S356-334	TP	mg P/L	25	03MAY2011 - 24APR2012	51	0.015235	0.008145	0.006	0.008	0.012	0.021	0.034	0	0	0.00%
S356-334	DIS. CA	mg/L	30	03MAY2011 - 24APR2012	22	74.30455	15.36764	53.2	61.6	69.35	88	105.8	0	0	0.00%
S356-334	DIS. K	mg/L	29	03MAY2011 - 24APR2012	22	3.295455	1.668897	1.8	2.1	2.4	4.6	7.2	0	0	0.00%
S356-334	DIS. MG	mg/L	31	03MAY2011 - 24APR2012	22	11.22273	4.592741	5	8	9.95	16.5	22.4	0	0	0.00%
S356-334	DIS. NA	mg/L	28	03MAY2011 - 24APR2012	22	39.72273	13.57375	24.4	31.1	34.95	49.4	77.4	0	0	0.00%
S356-334	TOT. CL	mg/L	32	03MAY2011 - 24APR2012	22	62.79091	21.45687	37.1	48.1	55	82.3	115	0	0	0.00%
S356-334	TOT. SO4	mg/L	33	13JUL2011 - 04APR2012	4	7.775	10.15591	0.5	1.9	3.9	13.65	22.8	0	0	0.00%
S356-334Auto	TN	mg N/L	80	03MAY2011 - 24APR2012	339	1.476673	0.174391	1.141	1.372	1.465	1.575	2.043	0	0	0.00%
S356-334Auto	NOX	mg N/L	18;180	03MAY2011 - 24APR2012	296	0.06575	0.071932	<0.005	0.0145	0.036	0.0945	0.355	40	0	0.00%
S356-334Auto	TKN	mg N/L	21	03MAY2011 - 24APR2012	339	1.419853	0.163103	1.04	1.3	1.42	1.52	1.9	0	0	0.00%
S356-334Auto	TP	mg P/L	25	03MAY2011 - 24APR2012	331	0.014063	0.007546	0.005	0.009	0.012	0.017	0.038	0	0	0.00%

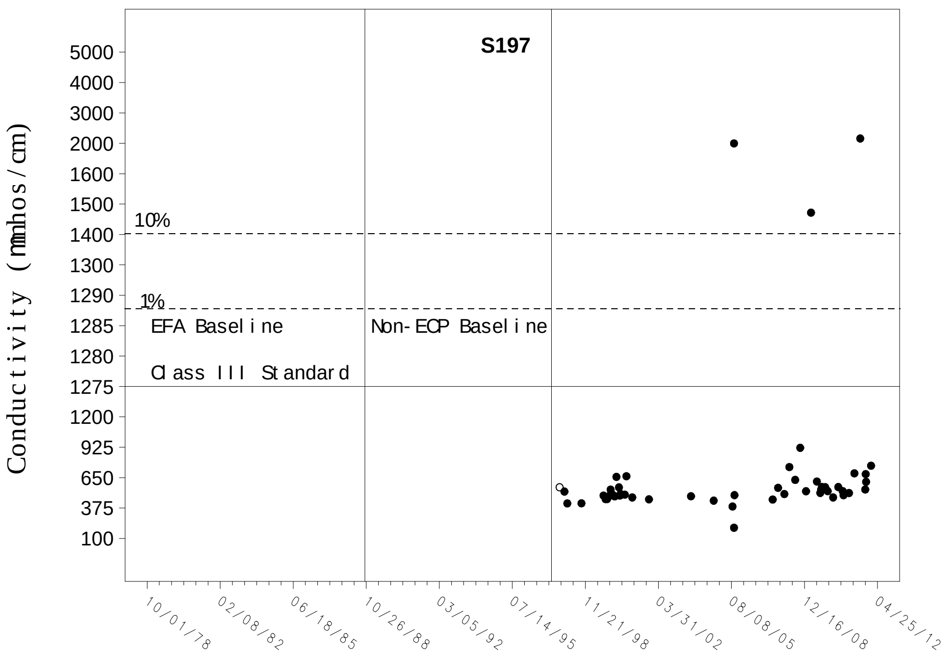
Attachment D: Time-Series and Box Plots for Non-Everglades Construction Project Water Quality Monitoring Data Exhibiting Excursions from Class III Numeric Standards for Water Year 2012

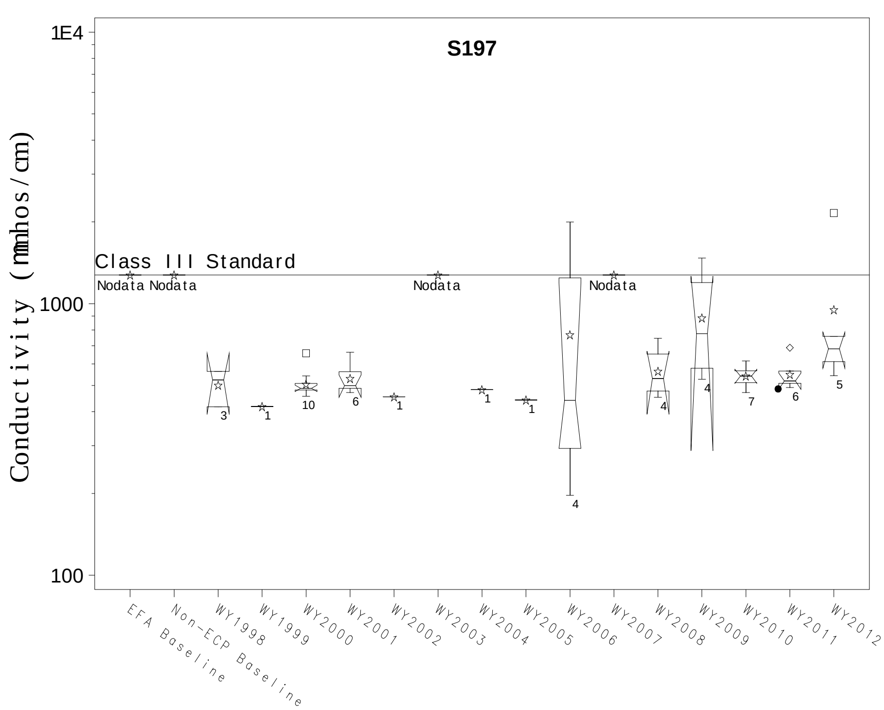
Shi Kui Xue and Steven Hill

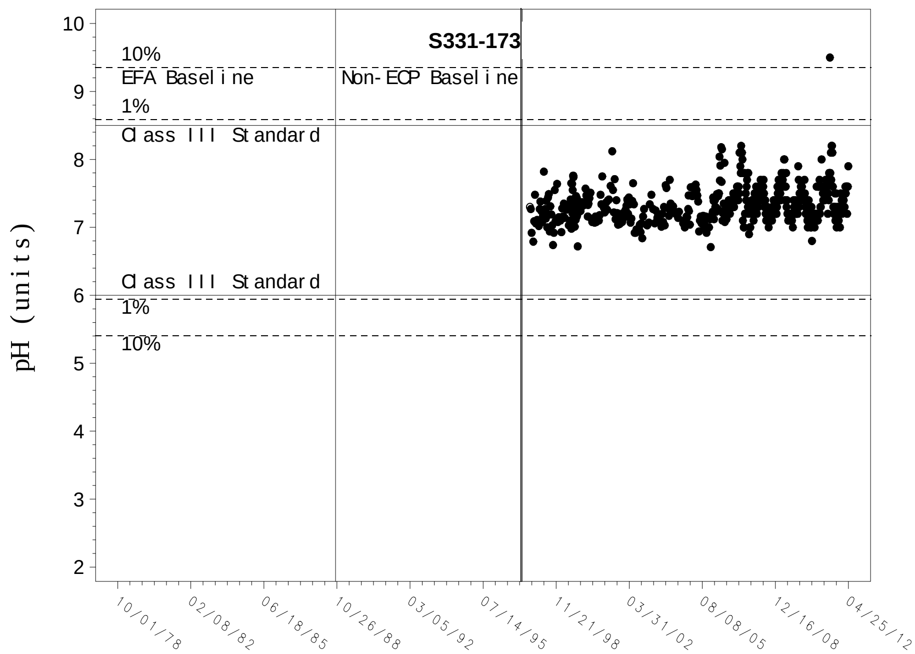
As shown in **Table C-3**, there were conductivity and pH excursions for the water quality parameters at the non-ECP structures, and excursion graphs are presented in Attachment D.

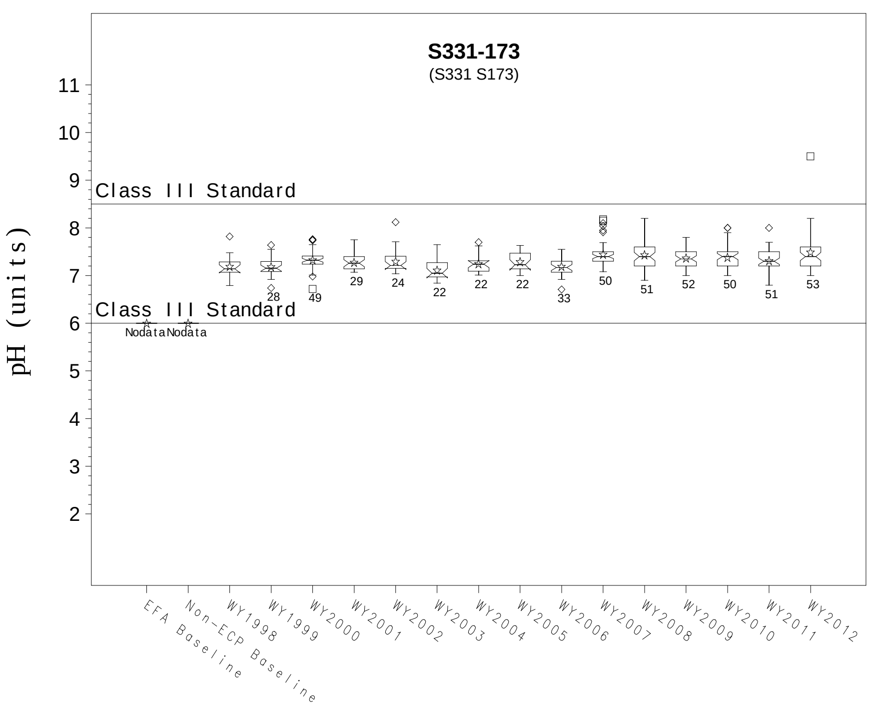

G94B
Conductivity (mmhos/cm)
5000
4000
3000
2000
1600
1500
1400
1300
1290
1285
1280
1275
1200
925
650
375
100
10%
1%
EFA Baseline
Non-ECP Baseline
Class III Standard
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

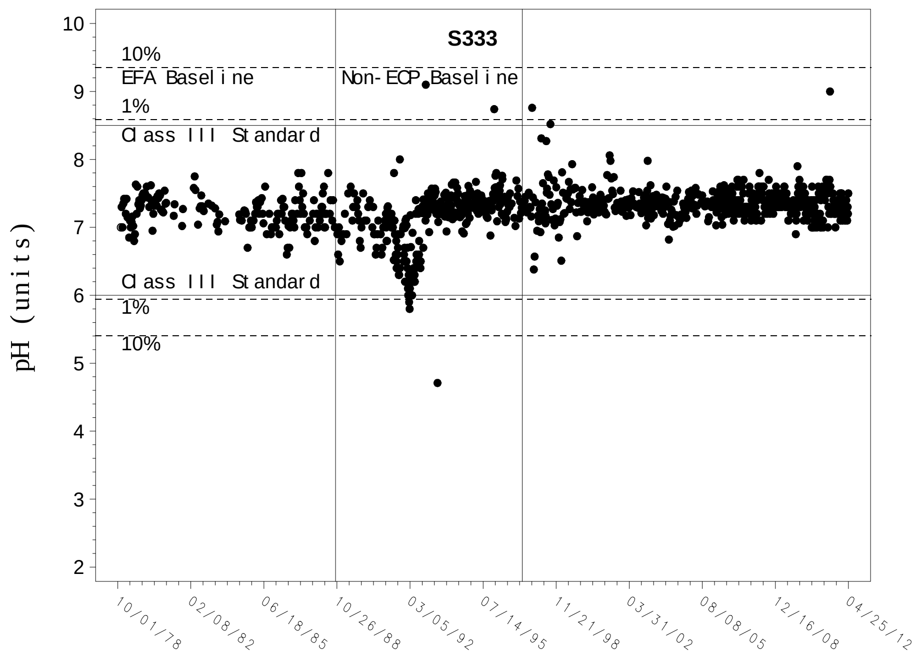

G94B
(G-94A G-94B G-94C)
Conductivity (mmhos/cm)
1E4
1000
100
Class III Standard
Nodata Nodata
9
10
12
12
12
12
12
11
13
12
12
14
13
13
14
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

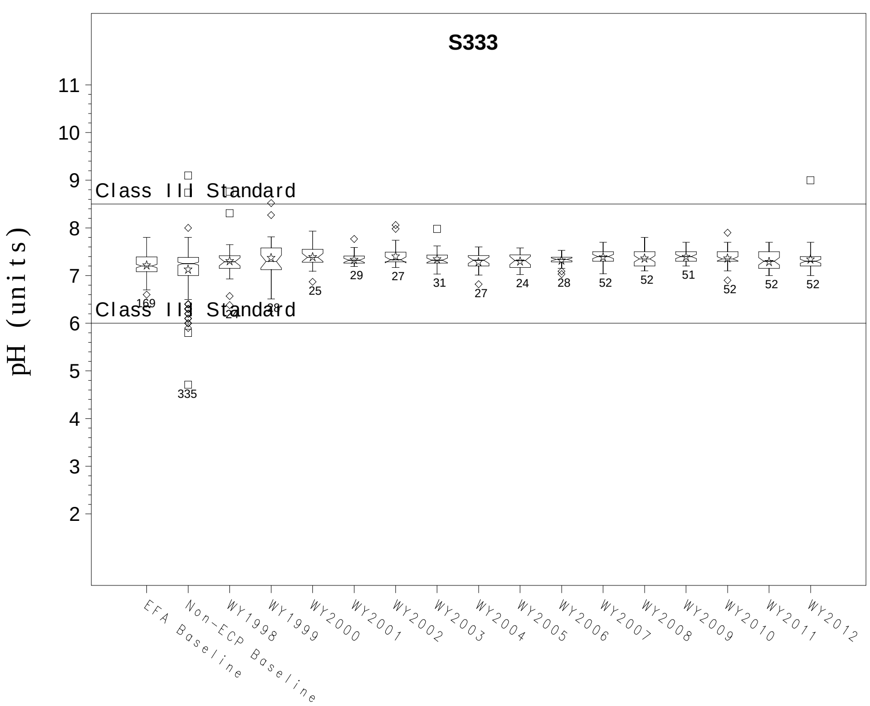

S197
Conductivity (mmhos/cm)
5000
4000
3000
2000
1600
1500
1400
1300
1290
1285
1280
1275
1200
925
650
375
100
10%
1%
EFA Baseline
Non-ECP Baseline
Class III Standard
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12


S197
Conductivity (mmhos/cm)
1E4
1000
100
Class III Standard
Nodata
Nodata
Nodata
Nodata
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012


S331-173
10%
EFA Baseline
Non-ECP Baseline
1%
Class III Standard
Class III Standard
1%
10%
pH (units)
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12


S331-173
(S331 S173)
Class III Standard
Class III Standard
Nodata Nodata
pH (units)
28
49
29
24
22
22
22
33
50
51
52
50
51
53
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012


S333
10%
EFA Baseline
Non-ECP Baseline
1%
Class III Standard
Class III Standard
1%
10%
pH (units)
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12


S333
Class III Standard
Class III Standard
pH (units)
169
335
25
29
27
31
27
24
28
52
52
51
52
52
52
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

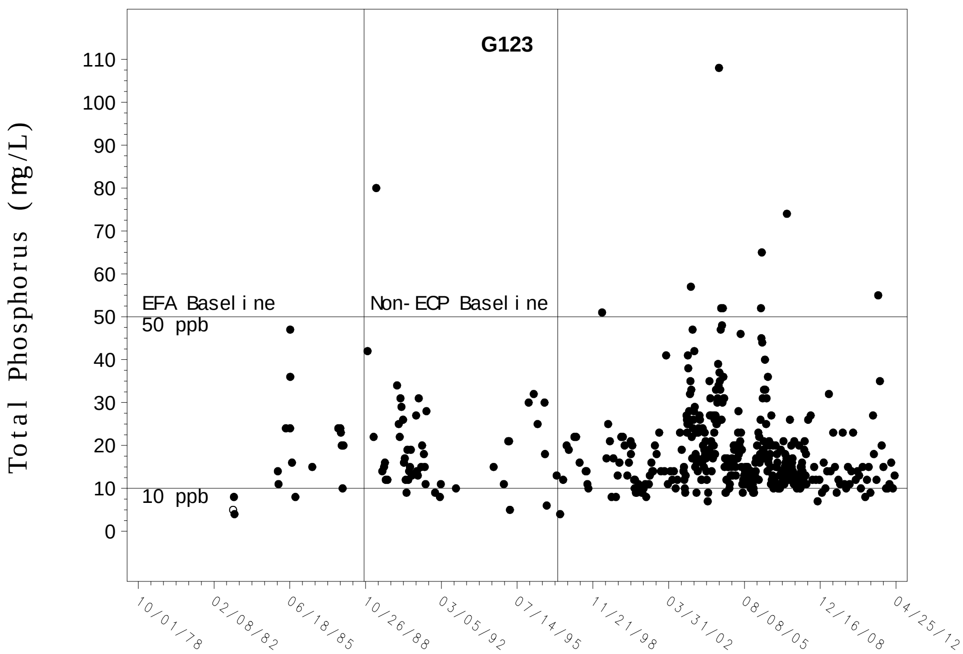
Attachment E: Time-Series and Box Plots of Total Phosphorus at Non-Everglades Construction Project Monitoring Sites for Water Year 2012 and Earlier Periods

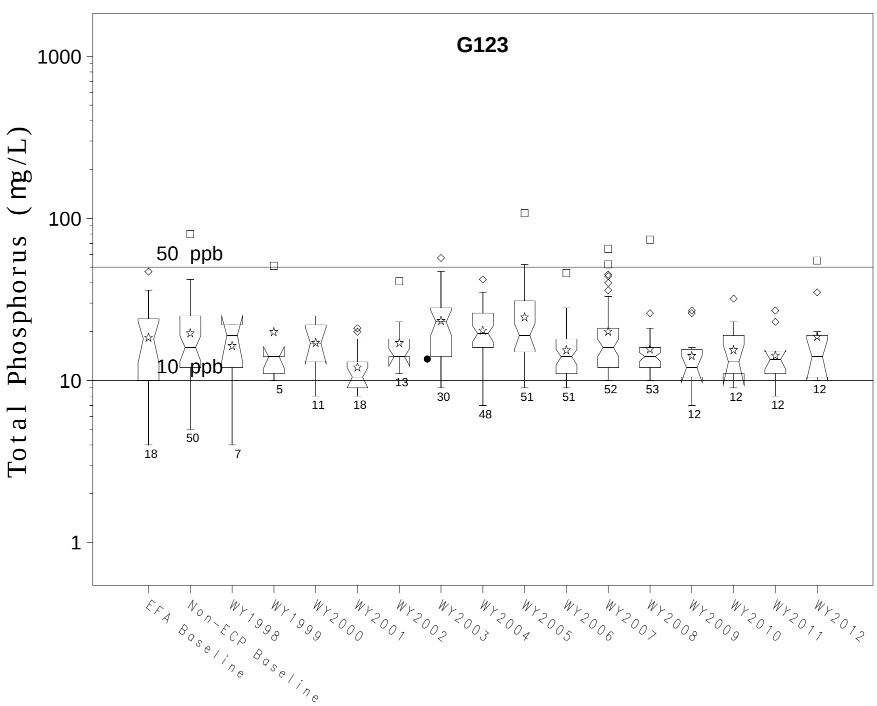
Shi Kui Xue and Steven Hill

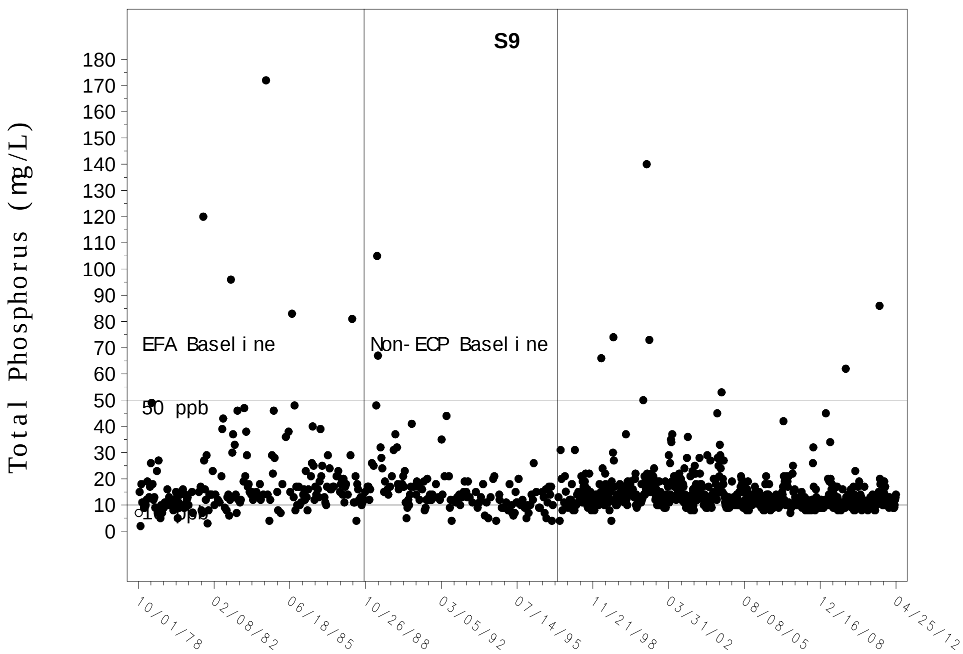
NOTES:

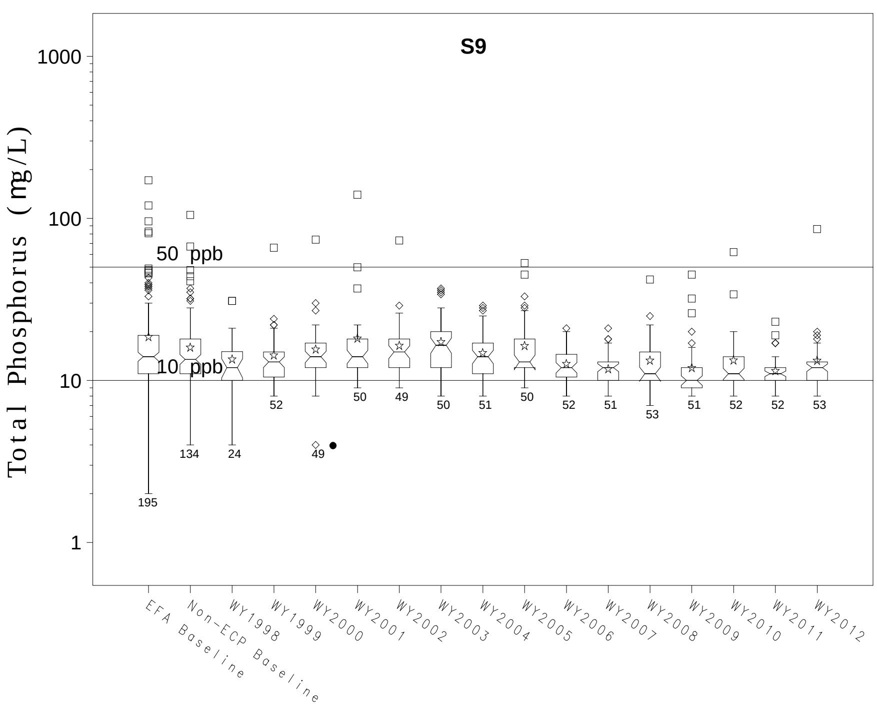
The graphs in this attachment depict total phosphorus (TP) concentration data collected from May 1, 1997 through April 30, 2012 for the non-Everglades Construction Project (non-ECP) water quality monitoring sites. The graph sequencing follows the station order shown in **Attachment B**, Table B-1. The non-ECP structure locations are depicted in **Figure 1** of this report. Additionally, the graphs are identified by monitoring site name. In most cases, the monitoring site name corresponds to the structure. If the monitoring site is a surrogate location for a structure, the structure name(s) is/are shown in parentheses below the monitoring site name.

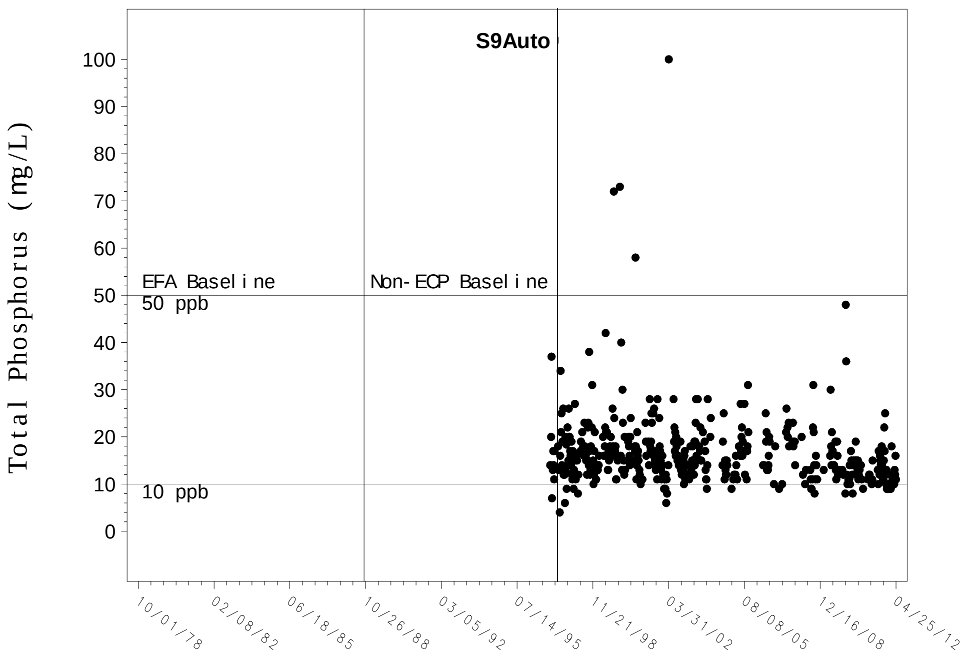
Most graphs depict TP data collected by grab sampling methods. The graphs for sites with auto-sampler data are annotated with "Auto." The TP data collected by both methods are not shown as combined data in the graphs.

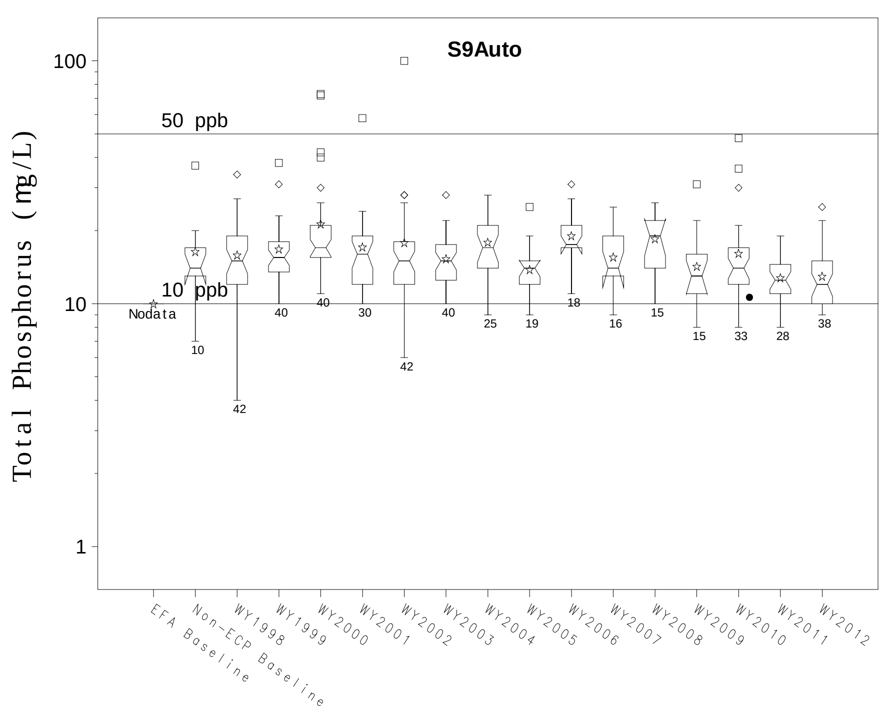

G123
Total Phosphorus (mg/L)
EFA Baseline
50 ppb
Non-ECP Baseline
10 ppb
110
100
90
80
70
60
50
40
30
20
10
0
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

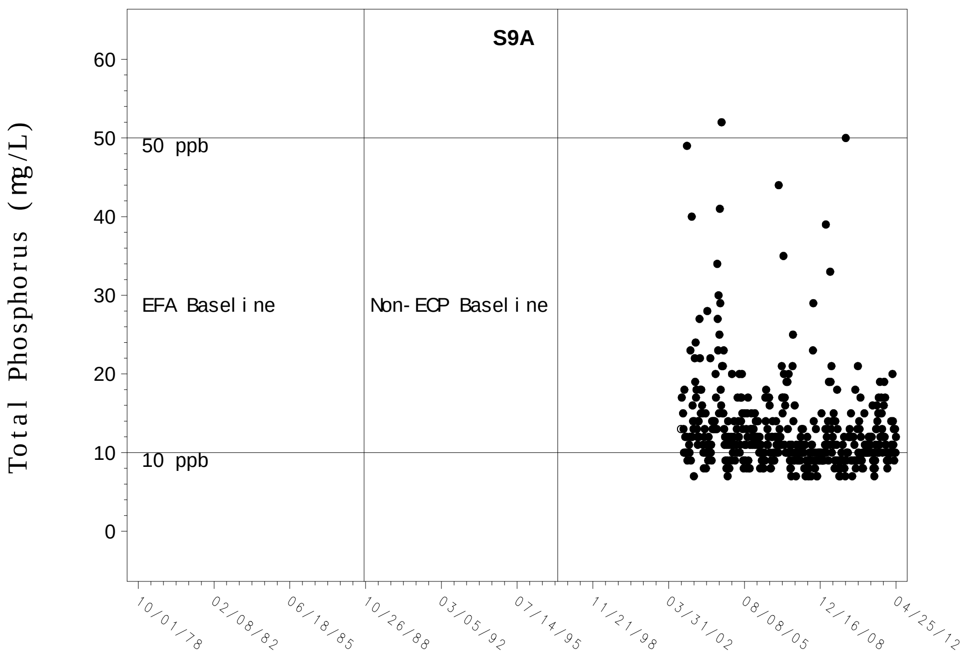

G123
Total Phosphorus (mg/L)
1000
100
10
1
50 ppb
10 ppb
18
50
7
5
11
18
13
30
48
51
51
52
53
12
12
12
12
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

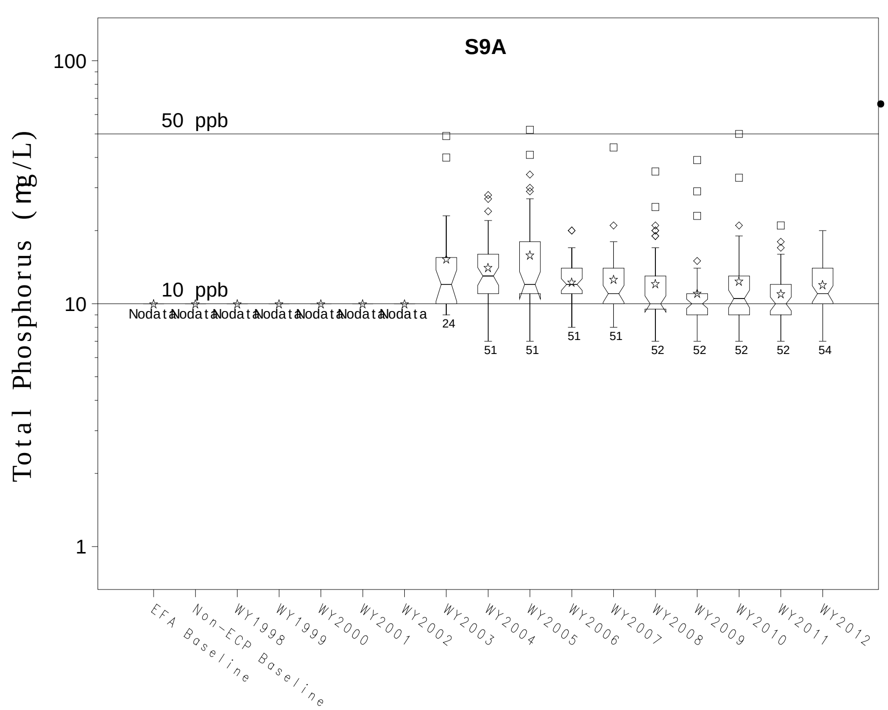

S9
Total Phosphorus (µg/L)
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

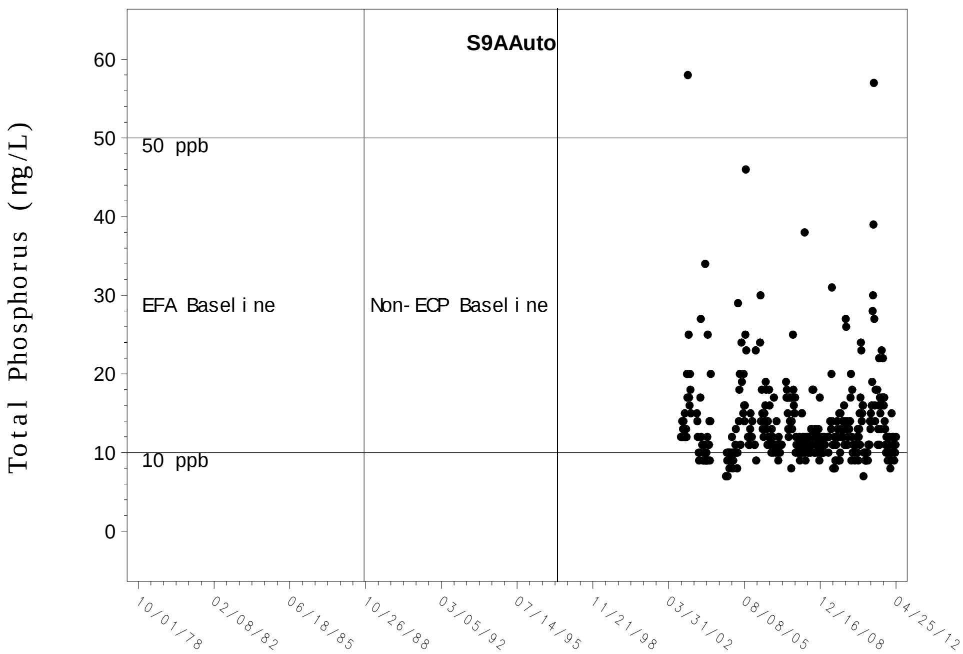

S9
Total Phosphorus (µg/L)
50 ppb
10 ppb
1000
100
10
1
195
134
24
52
49
50
49
50
51
50
52
51
53
51
52
52
53
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

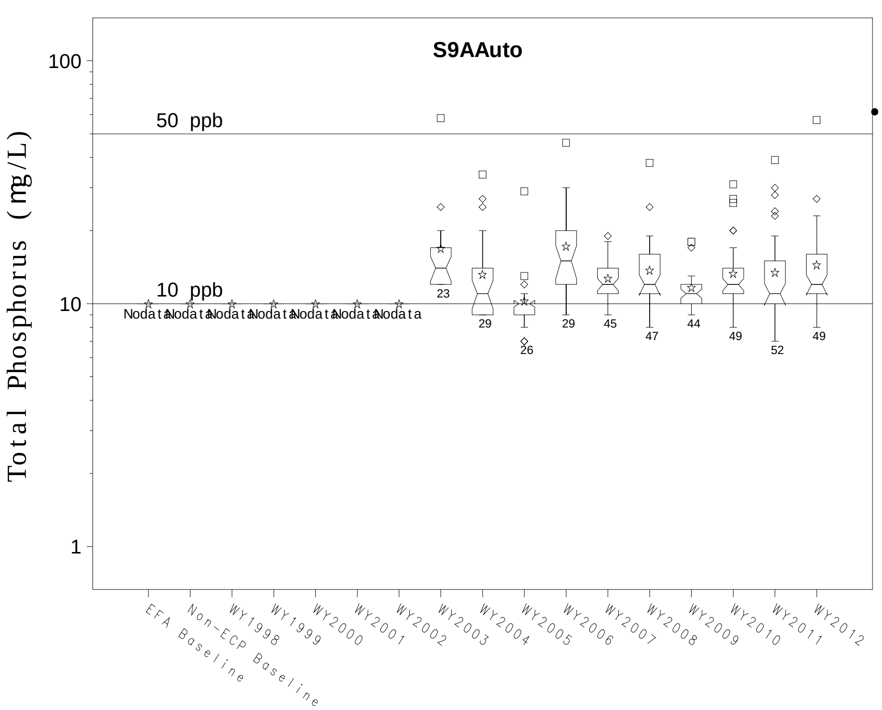

S9Auto
Total Phosphorus (mg/L)
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
100
90
80
70
60
50
40
30
20
10
0
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

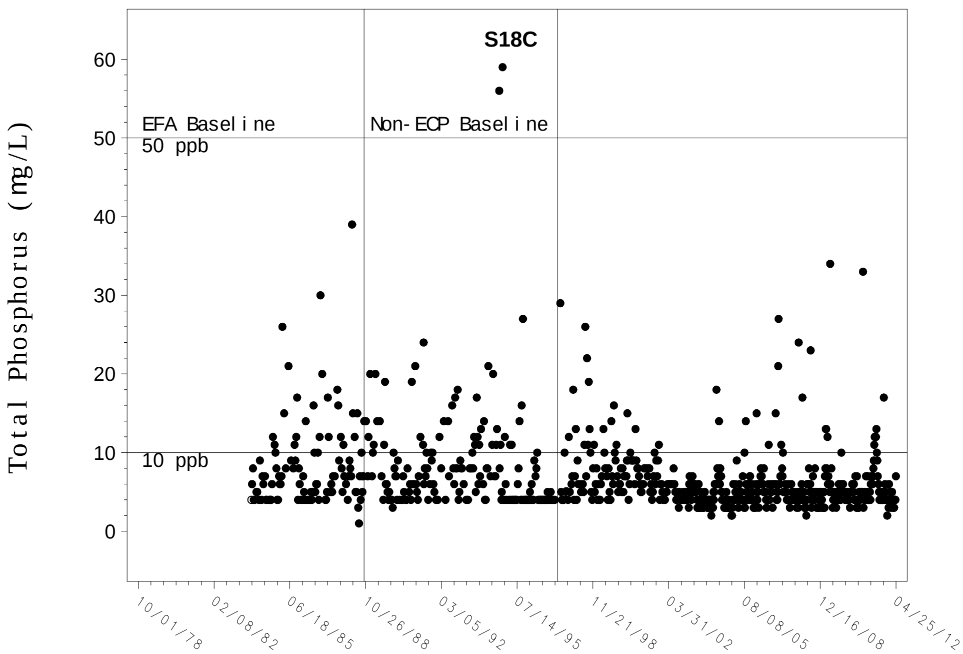

S9Auto
Total Phosphorus (mg/L)
50 ppb
10 ppb
Nodata
100
10
1
10
42
40
40
30
42
40
25
19
18
16
15
15
33
28
38
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

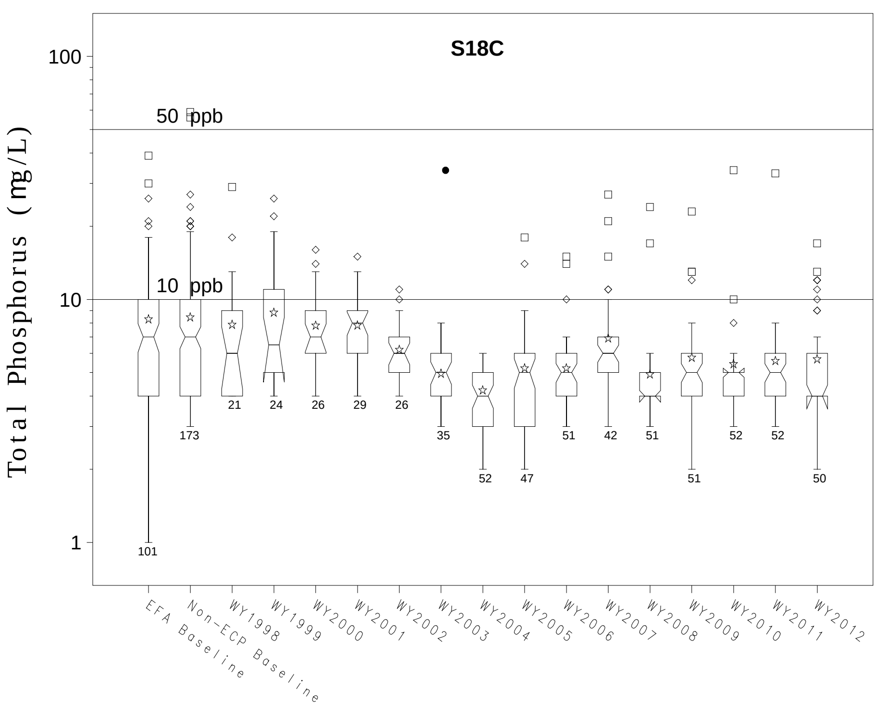

S9A
Total Phosphorus (mg/L)
50 ppb
10 ppb
EFA Baseline
Non-ECP Baseline
60
50
40
30
20
10
0
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

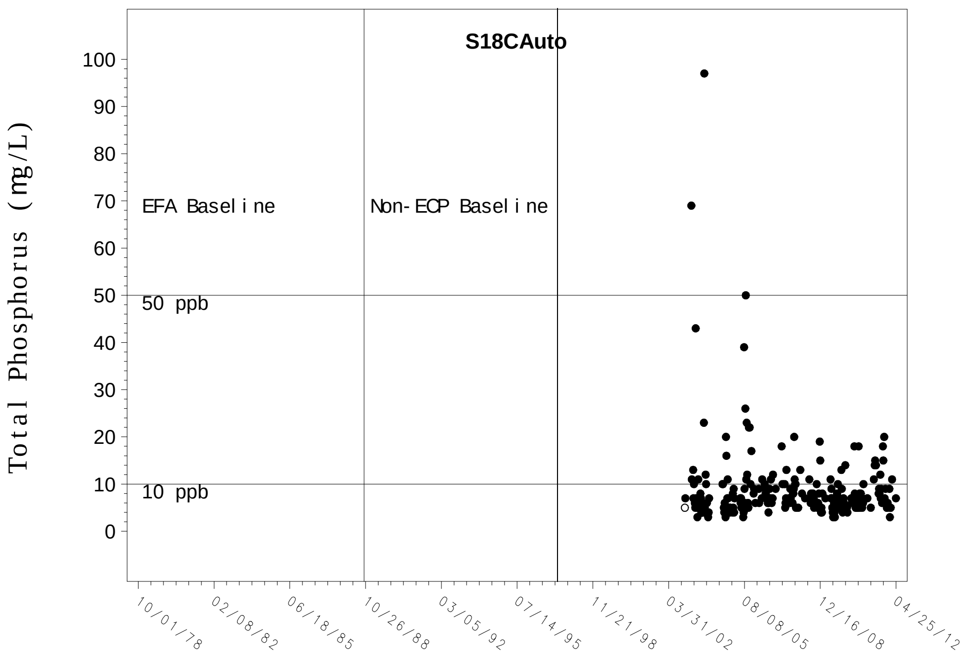

S9A
Total Phosphorus (mg/L)
100
10
1
50 ppb
10 ppb
Nodata Nodata Nodata Nodata Nodata Nodata Nodata
24
51 51 51 51 52 52 52 52 54
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

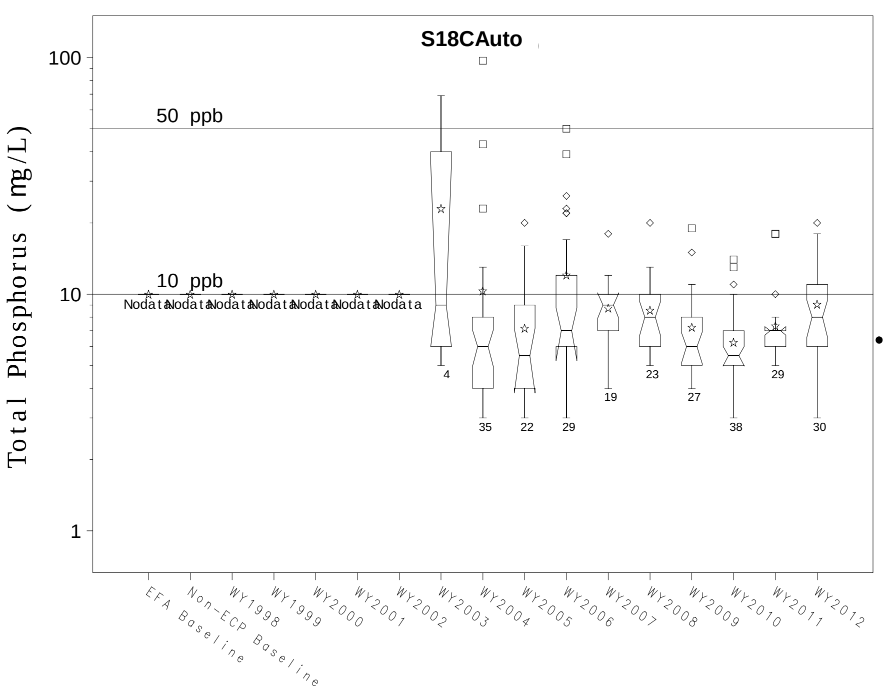

S9AAuto
Total Phosphorus (mg/L)
50 ppb
10 ppb
EFA Baseline
Non-ECP Baseline
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

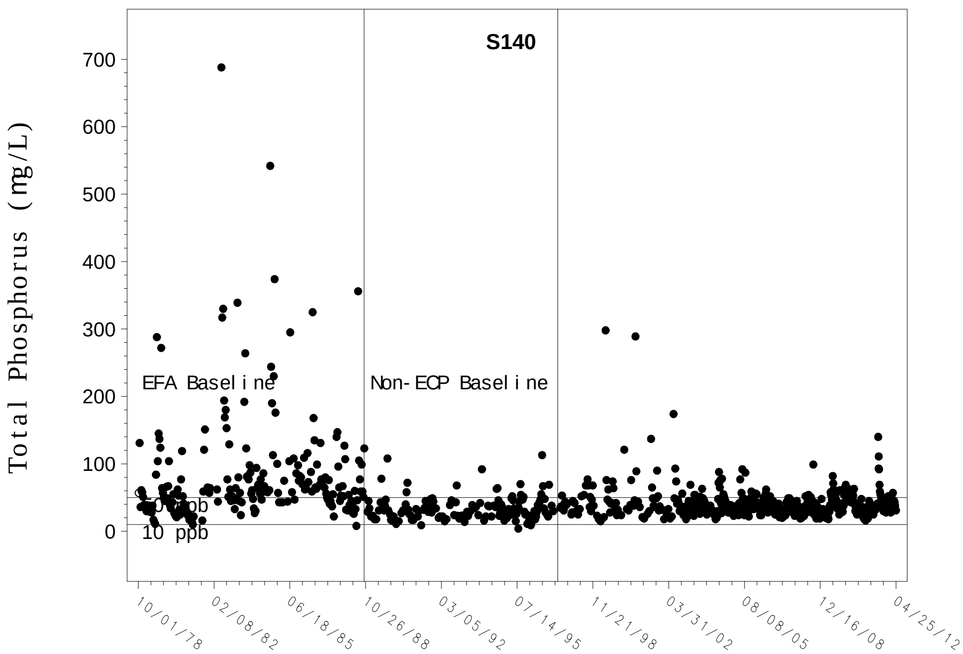

S9AAuto
Total Phosphorus (mg/L)
50 ppb
10 ppb
Nodata
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

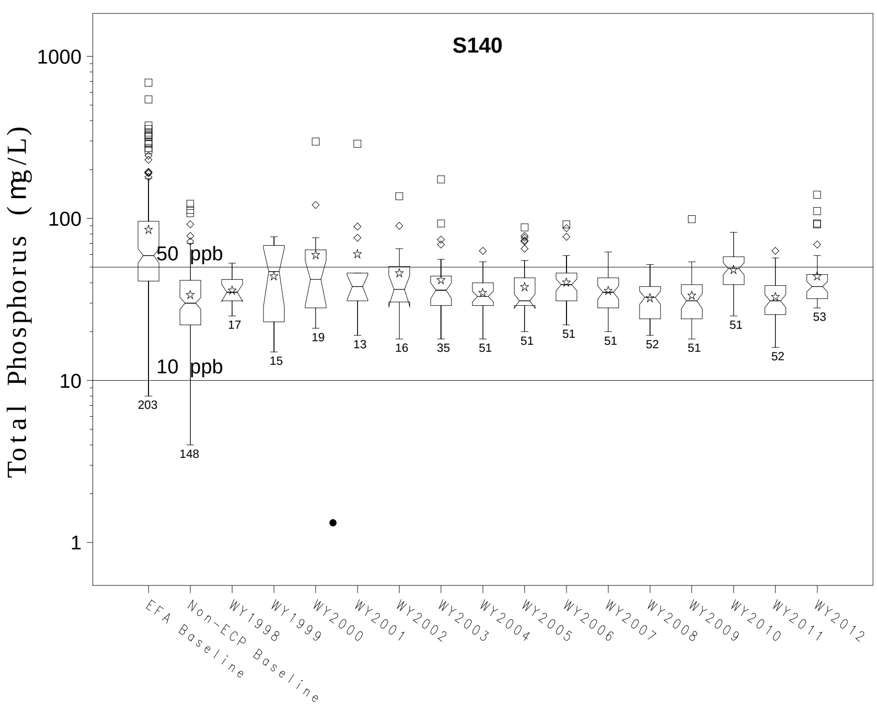

S18C
EFA Baseline
50 ppb
Non-ECP Baseline
10 ppb
Total Phosphorus (mg/L)
0
10
20
30
40
50
60
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

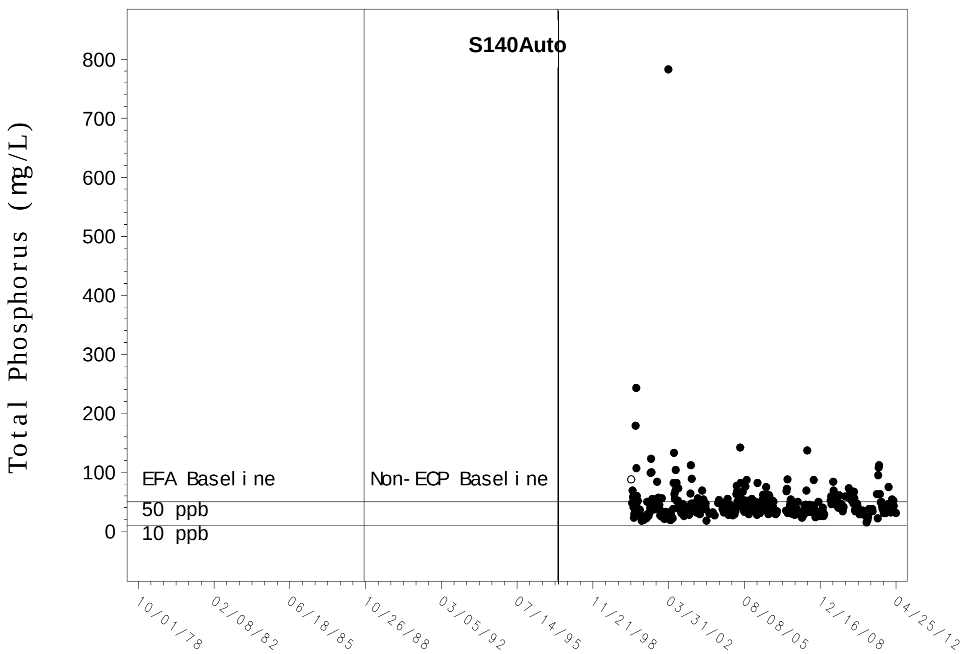

S18C
50 ppb
10 ppb
Total Phosphorus (mg/L)
1
10
100
101
173
21
24
26
29
26
35
52
47
51
42
51
51
52
52
50
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

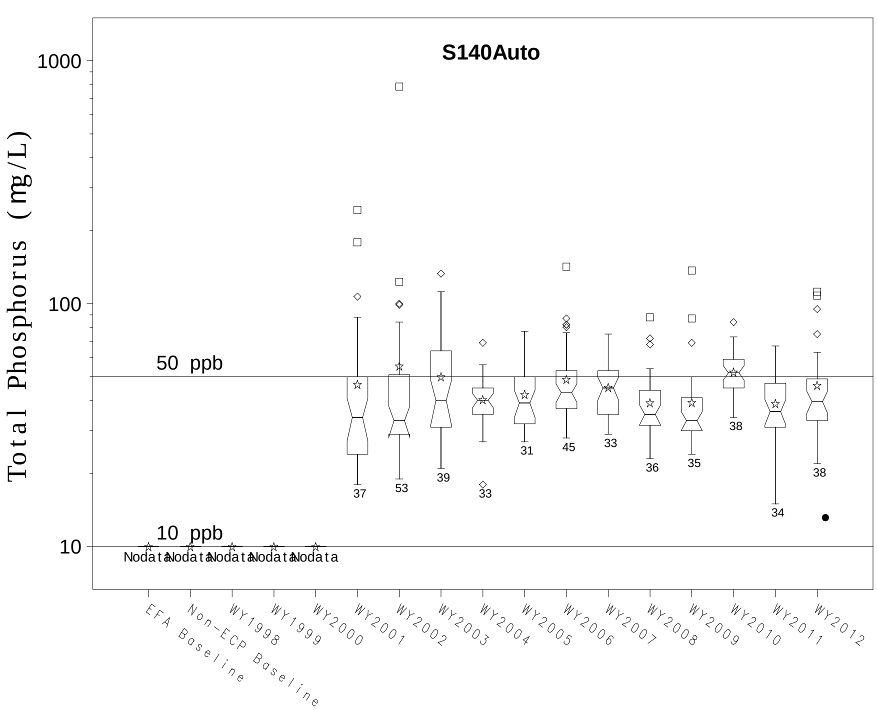

S18CAuto
Total Phosphorus (mg/L)
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
100
90
80
70
60
50
40
30
20
10
0
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

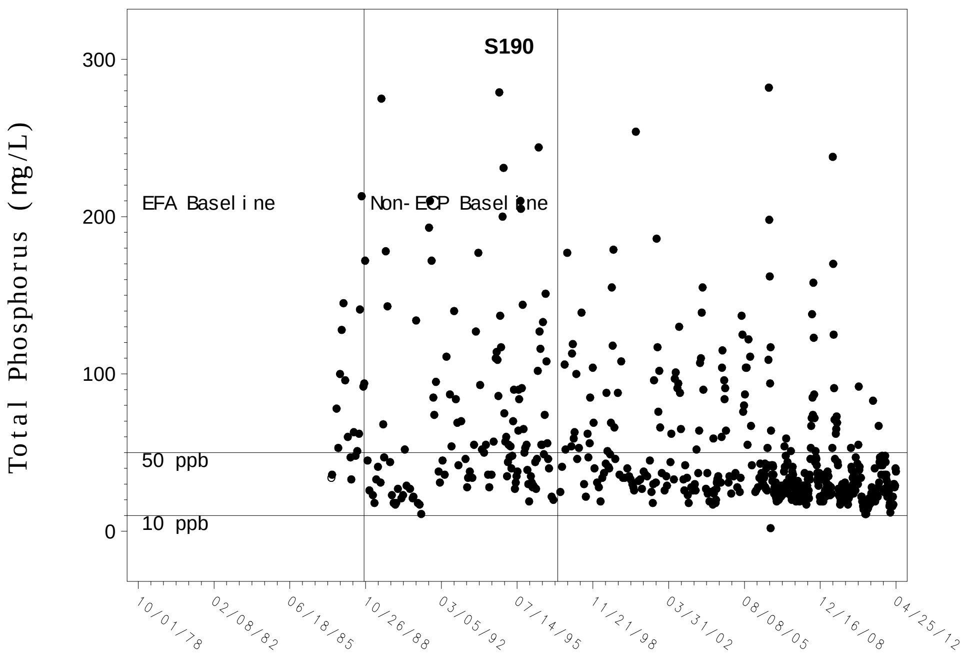

S18CAuto
Total Phosphorus (mg/L)
50 ppb
10 ppb
100
10
1
Nodata
Nodata
Nodata
Nodata
Nodata
Nodata
Nodata
4
35
22
29
19
23
27
38
29
30
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

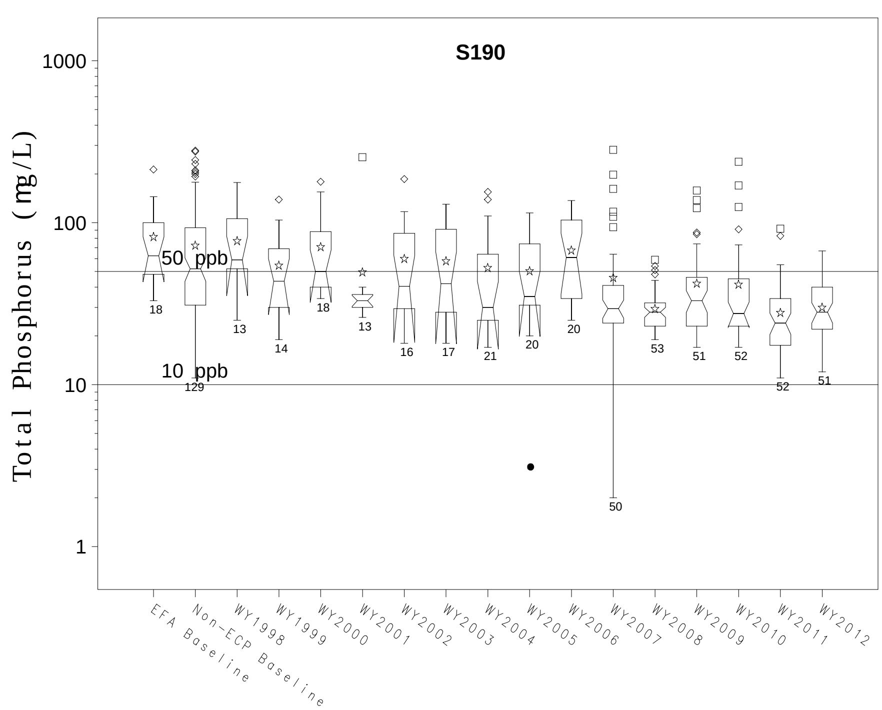

S140
Total Phosphorus (mg/L)
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

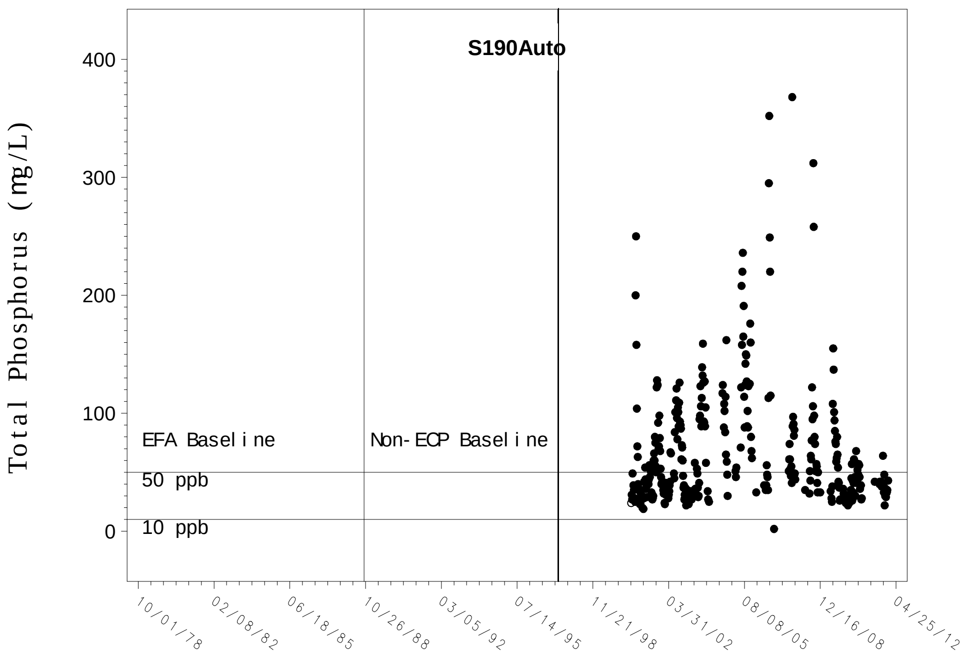

S140
Total Phosphorus (mg/L)
50 ppb
10 ppb
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012


S140Auto
Total Phosphorus (mg/L)
800
700
600
500
400
300
200
100
0
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

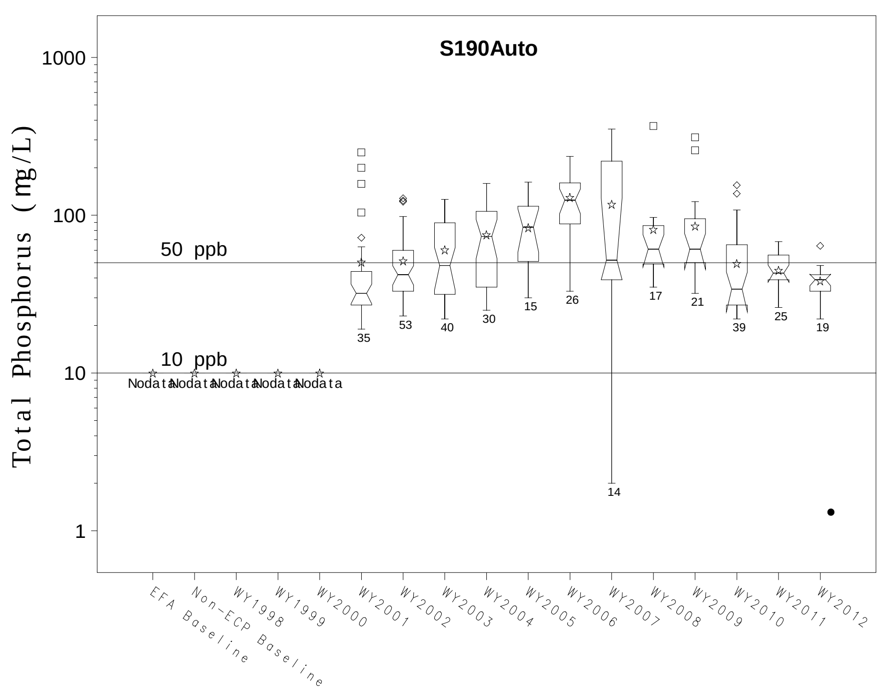

S140Auto
Total Phosphorus (mg/L)
1000
100
10
50 ppb
10 ppb
Nodata
Nodata
Nodata
Nodata
Nodata
37
53
39
33
31
45
33
36
35
38
34
38
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012


S190
Total Phosphorus (mg/L)
300
200
100
0
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

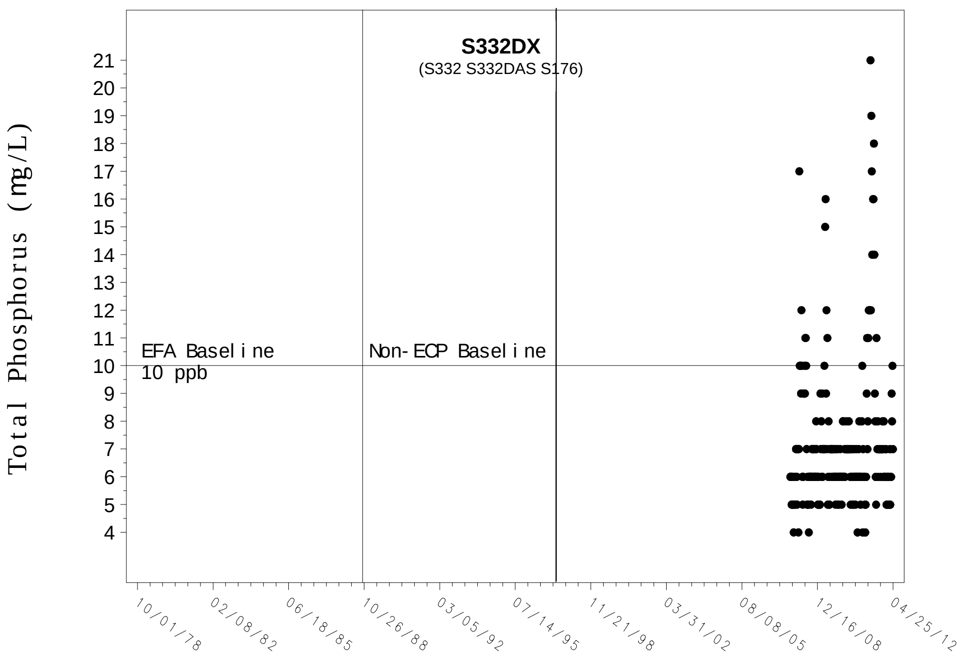

S190
Total Phosphorus (mg/L)
1000
100
10
1
50 ppb
10 ppb
18
129
13
14
18
13
16
17
21
20
20
50
53
51
52
52
51
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

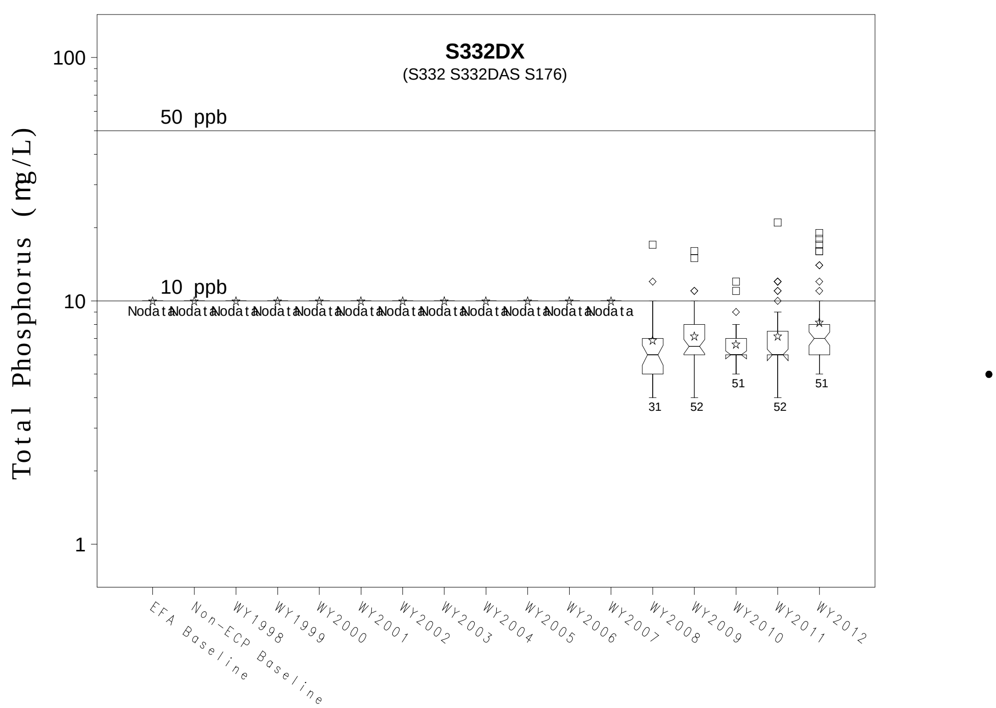


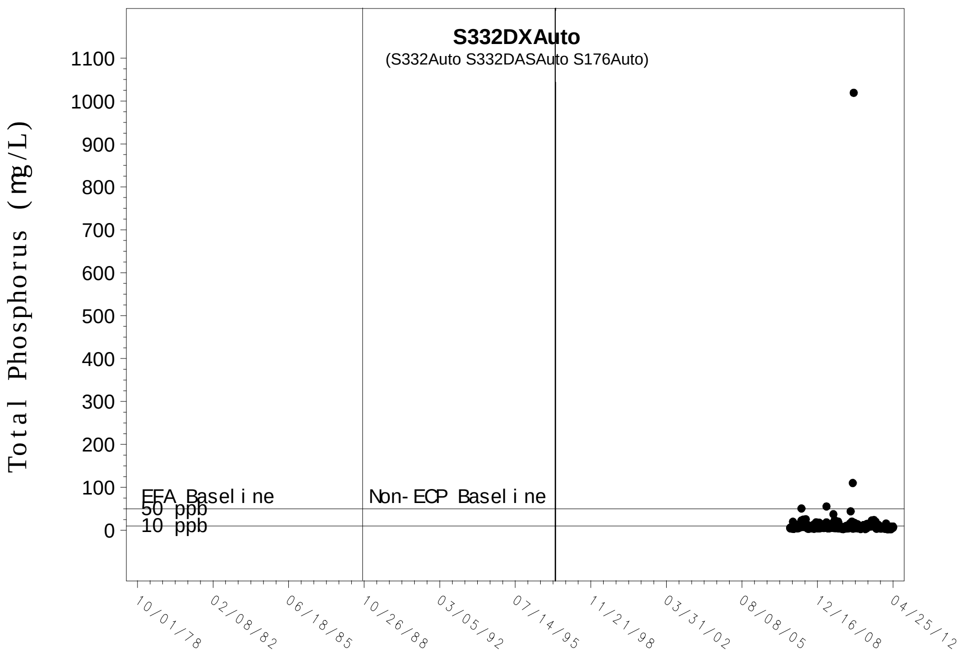
S190Auto
Total Phosphorus (mg/L)
400
300
200
100
0
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

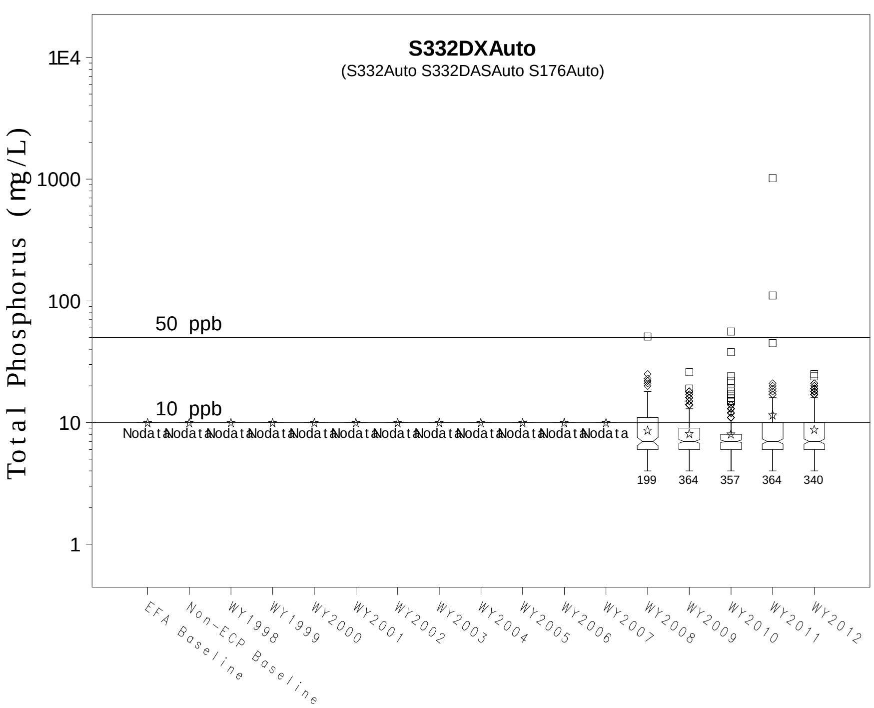


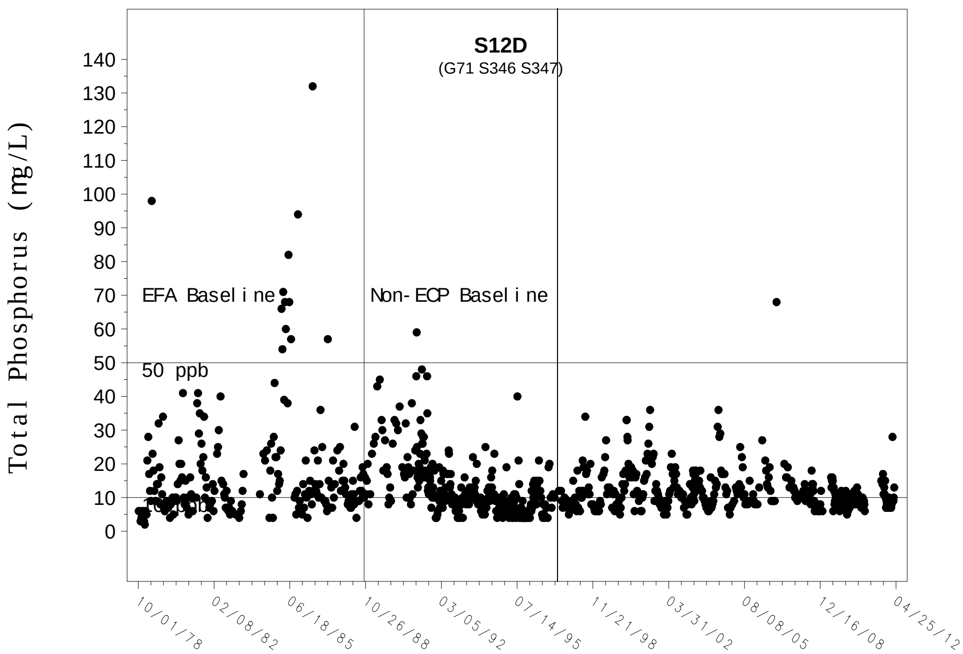
S190Auto
Total Phosphorus (mg/L)
1000
100
10
1
50 ppb
10 ppb
Nodata Nodata Nodata Nodata Nodata
35
53
40
30
15
26
14
17
21
39
25
19
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

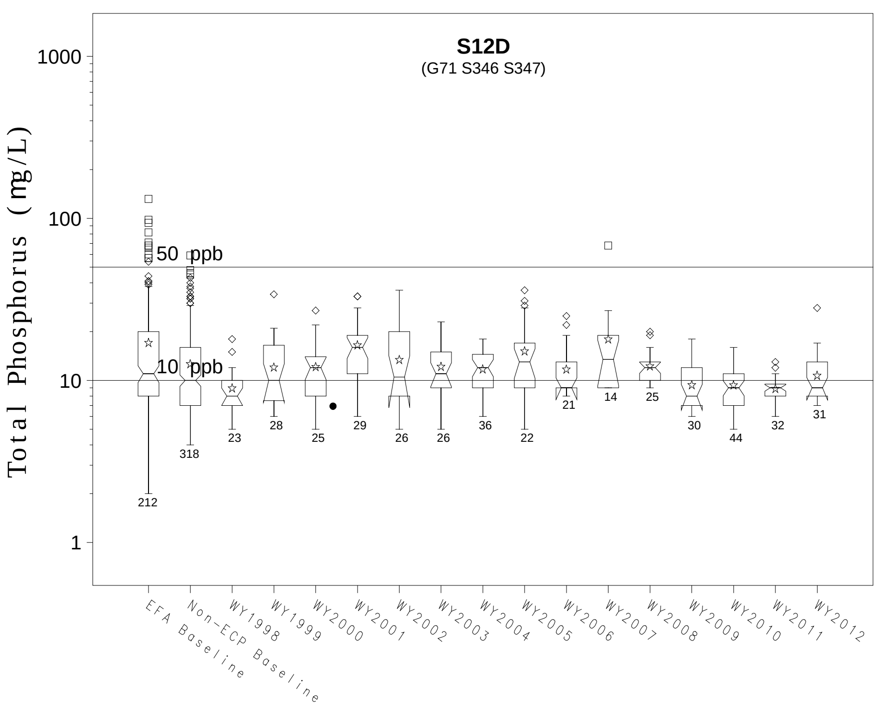

S332DX
(S332 S332DAS S176)
Total Phosphorus (mg/L)
EFA Baseline
10 ppb
Non-ECP Baseline
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

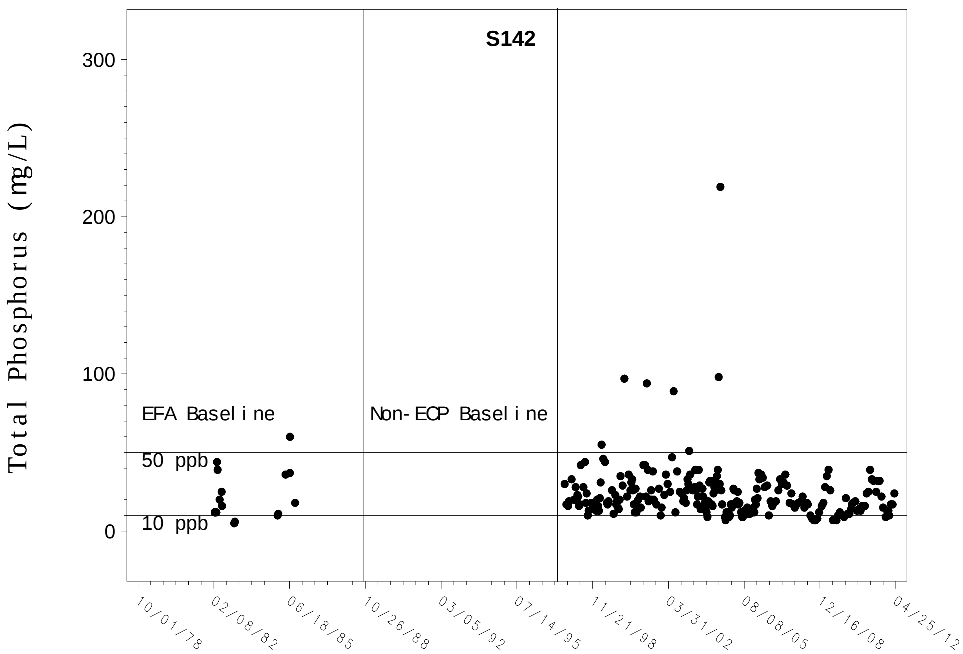

S332DX
(S332 S332DAS S176)
Total Phosphorus (mg/L)
50 ppb
10 ppb
Nodata
31
52
51
52
51
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

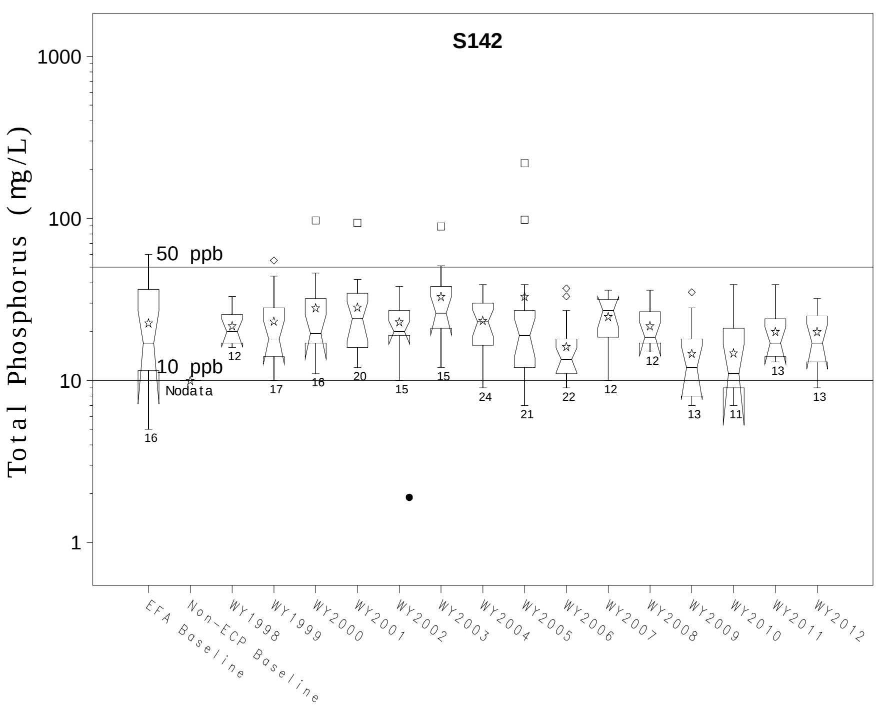

S332DXAuto
(S332Auto S332DASAuto S176Auto)
Total Phosphorus (mg/L)
1100
1000
900
800
700
600
500
400
300
200
100
0
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

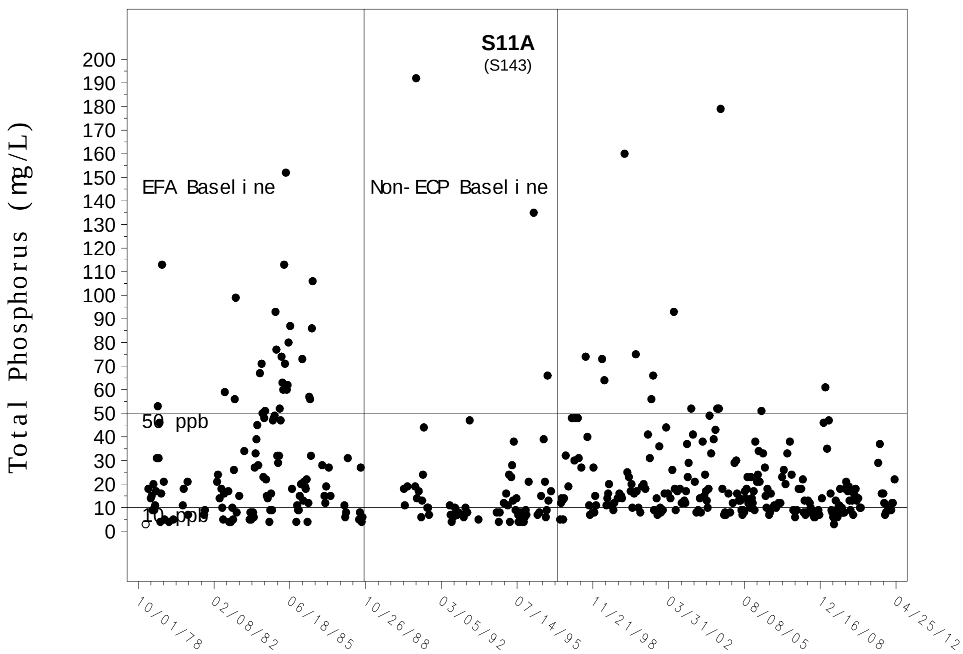

S332DXAuto
(S332Auto S332DASAuto S176Auto)
Total Phosphorus (mg/L)
1E4
1000
100
10
1
50 ppb
10 ppb
Nodata
199
364
357
364
340
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

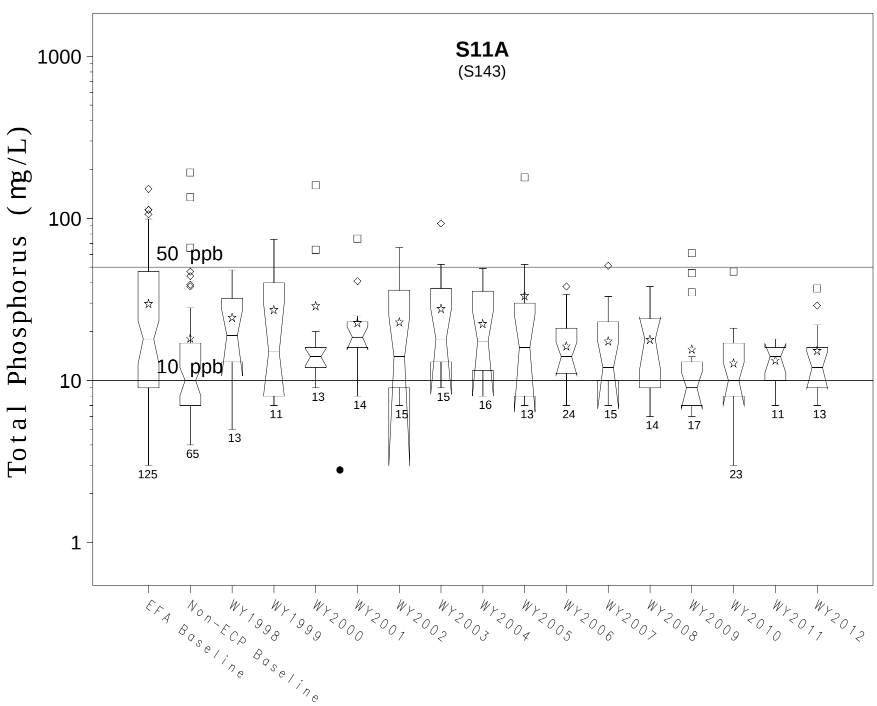

S12D
(G71 S346 S347)
Total Phosphorus (mg/L)
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

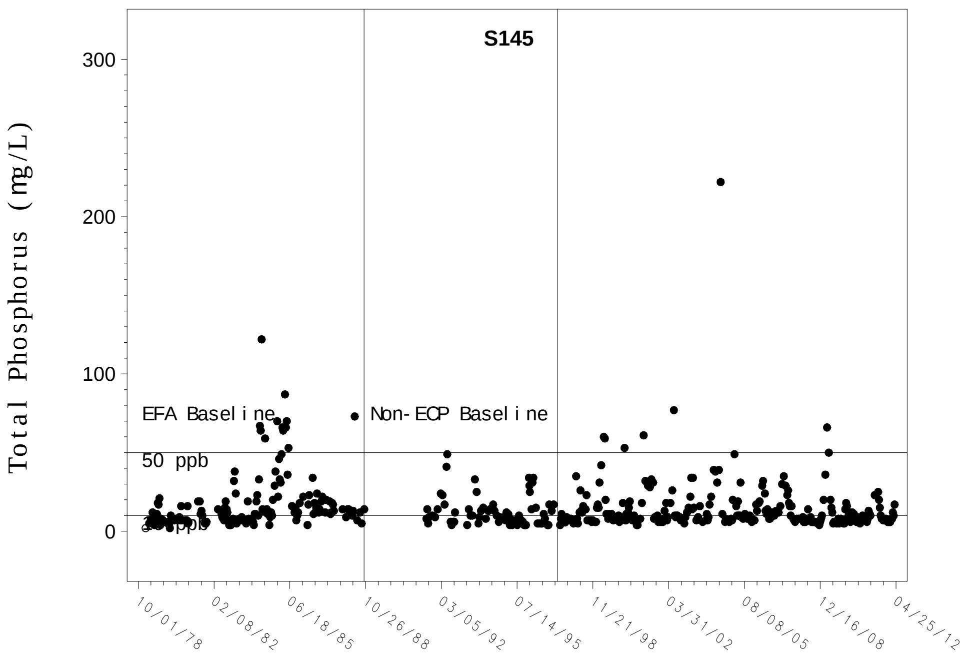

S12D
(G71 S346 S347)
Total Phosphorus (mg/L)
50 ppb
10 ppb
212
318
23
28
25
29
26
26
36
22
21
14
25
30
44
32
31
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

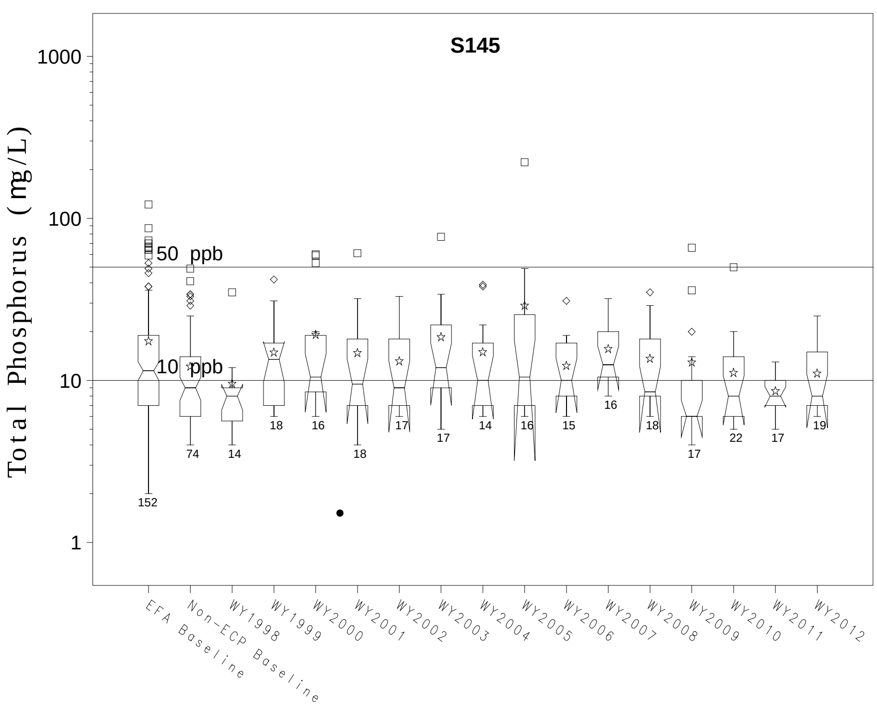

S142
Total Phosphorus (mg/L)
300
200
100
0
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

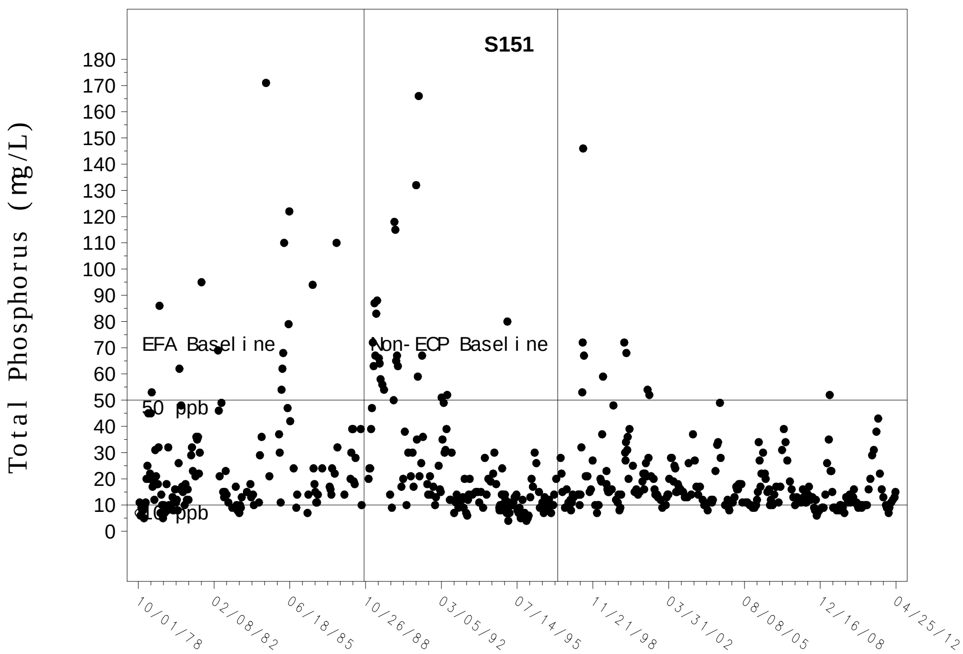

S142
Total Phosphorus (mg/L)
1000
100
10
1
50 ppb
10 ppb
No data
16
12
17
16
20
15
15
24
21
22
12
12
13
11
13
13
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

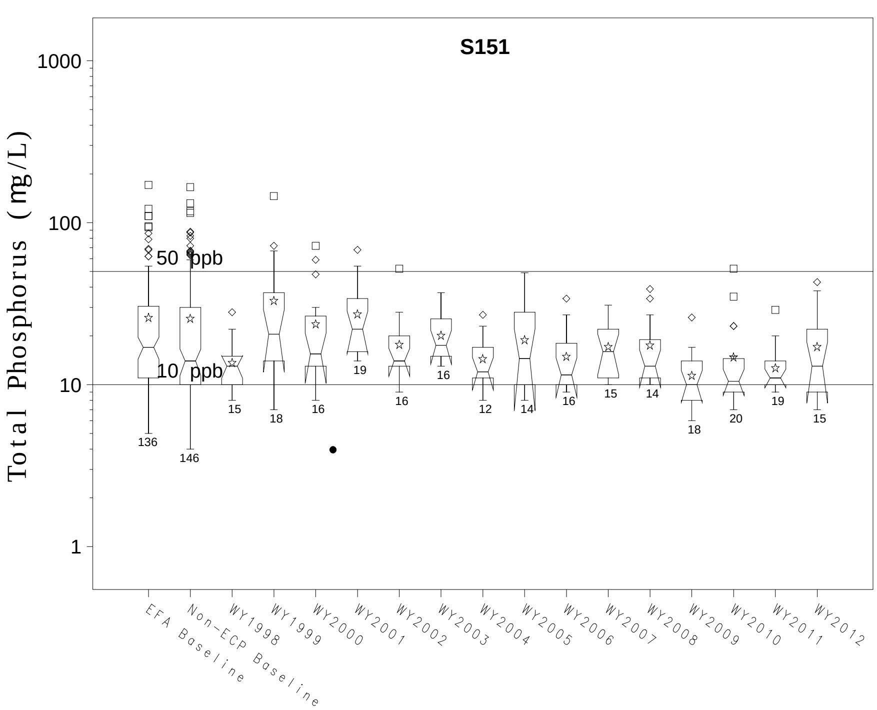

S11A
(S143)
Total Phosphorus (mg/L)
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

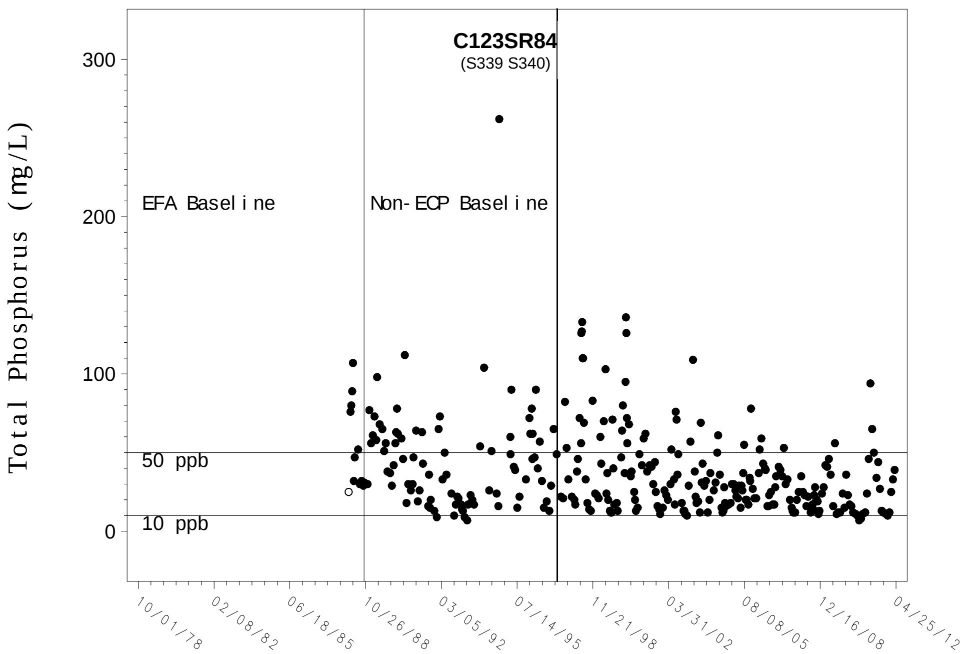

S11A
(S143)
Total Phosphorus (mg/L)
50 ppb
10 ppb
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

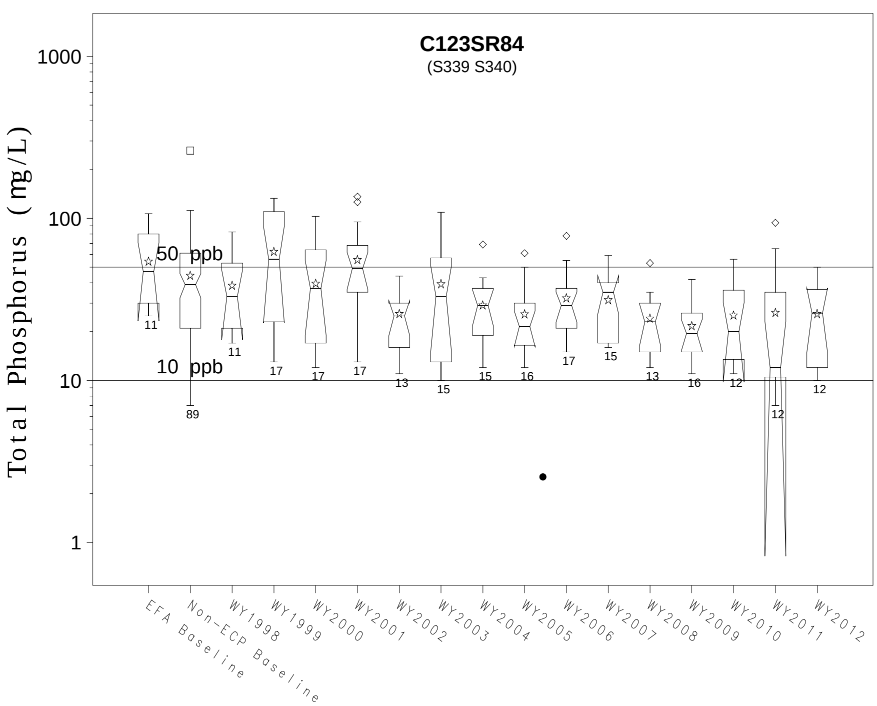

S145
Total Phosphorus (mg/L)
300
200
100
0
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

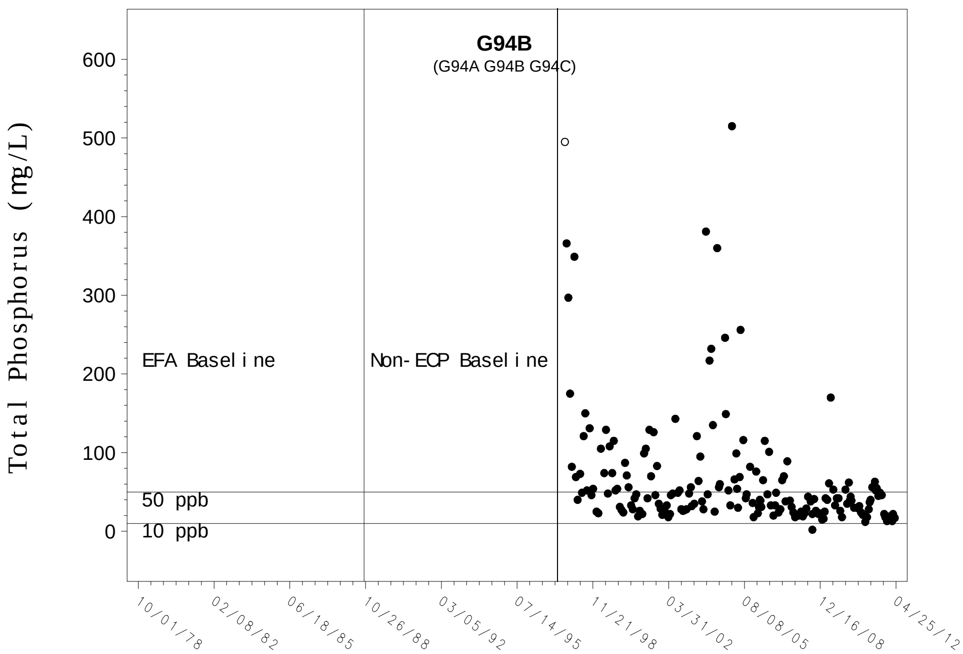

S145
Total Phosphorus (mg/L)
1000
100
10
1
50 ppb
10 ppb
152
74
14
18
16
18
17
17
14
16
15
16
18
17
22
17
19
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

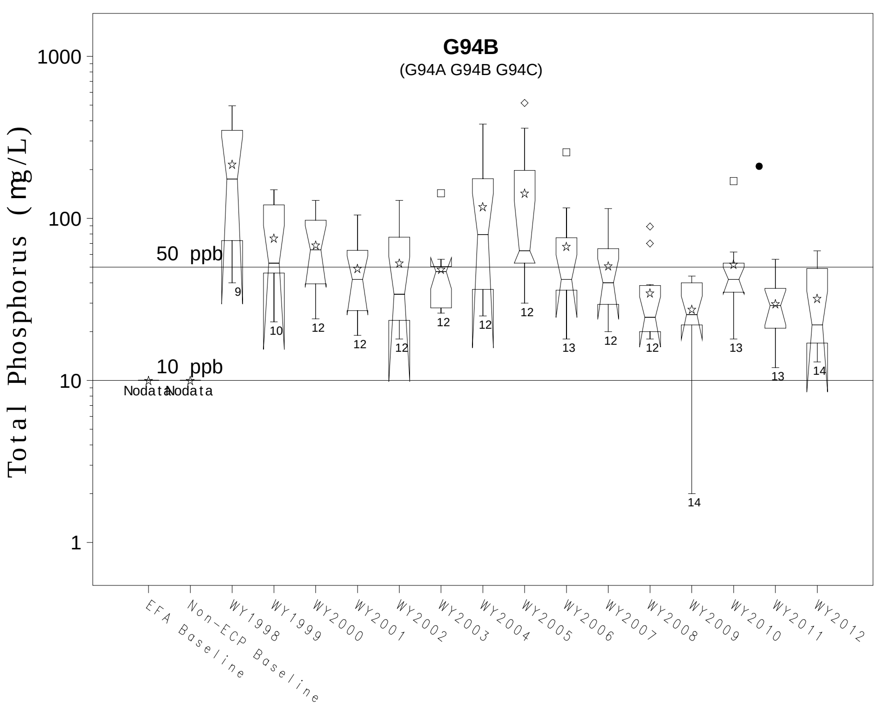

S151
Total Phosphorus (mg/L)
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

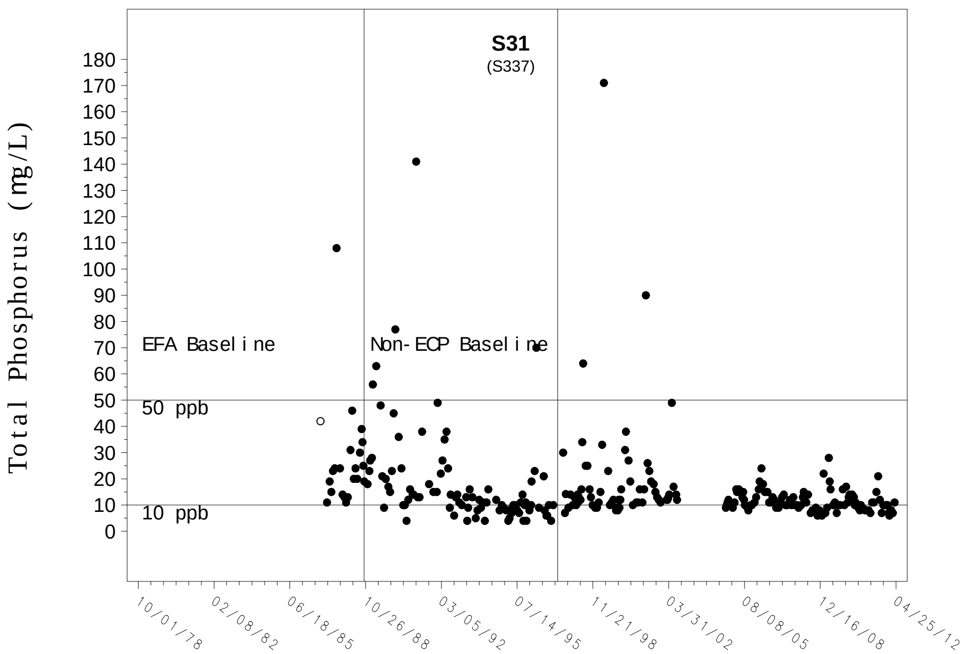

S151
Total Phosphorus (mg/L)
1000
100
10
1
50 ppb
10 ppb
136
146
15
18
16
19
16
16
12
14
16
15
14
18
20
19
15
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

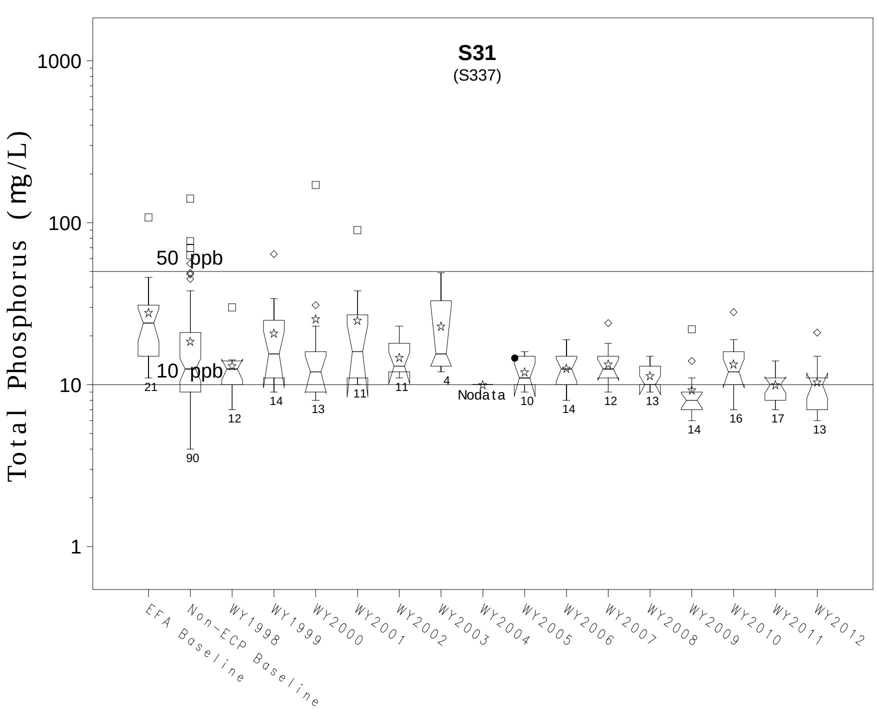

C123SR84
(S339 S340)
Total Phosphorus (mg/L)
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
300
200
100
0
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

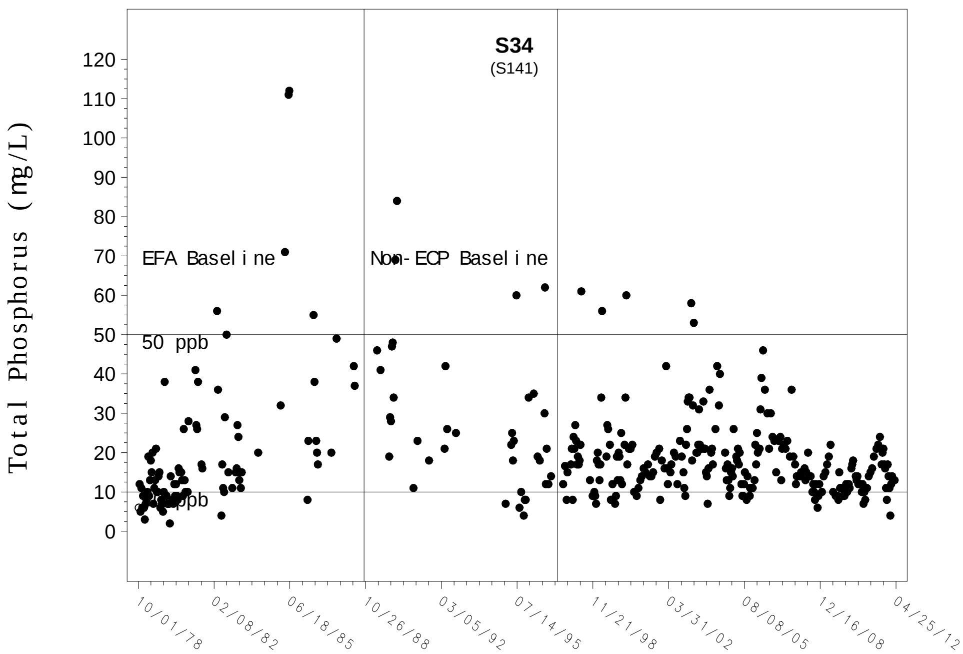

C123SR84
(S339 S340)
Total Phosphorus (mg/L)
50 ppb
10 ppb
1000
100
10
1
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

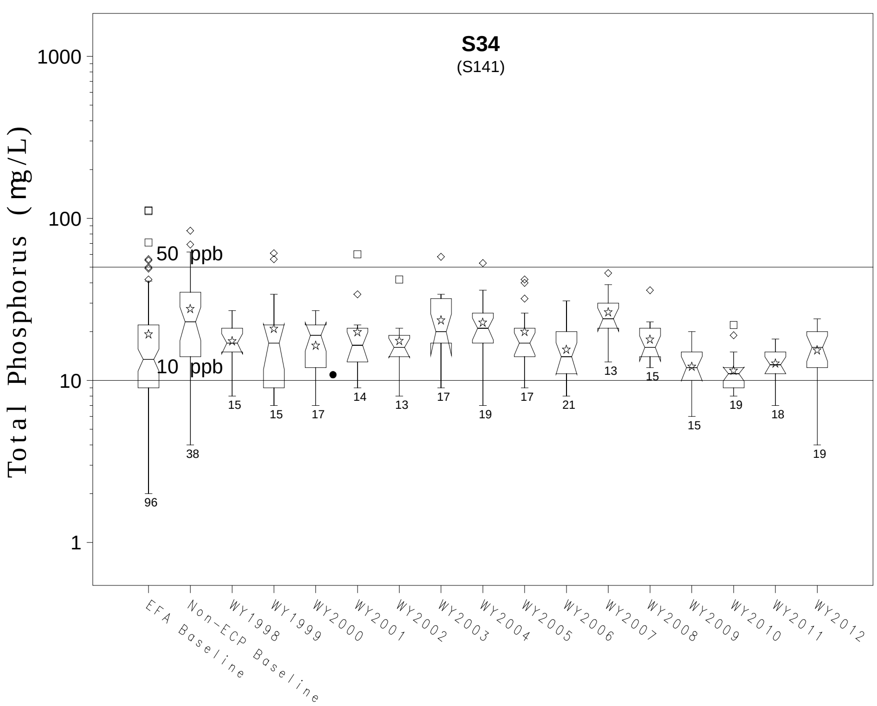

G94B
(G94A G94B G94C)
Total Phosphorus (µg/L)
600
500
400
300
200
100
0
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

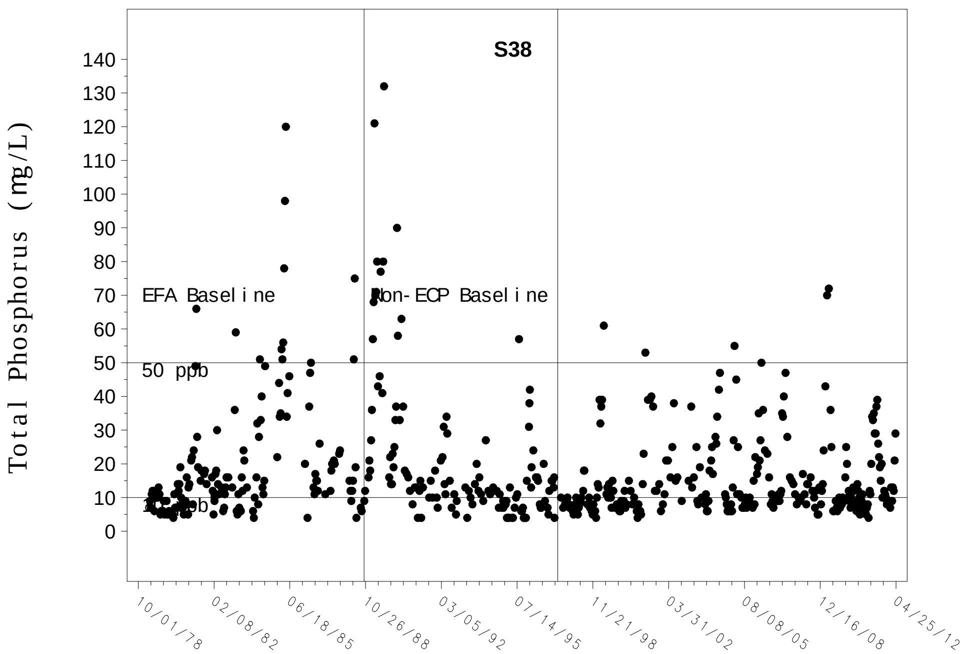

G94B
(G94A G94B G94C)
Total Phosphorus (µg/L)
1000
100
10
1
50 ppb
10 ppb
No data
No data
9
10
12
12
12
12
12
12
13
12
12
14
13
13
14
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

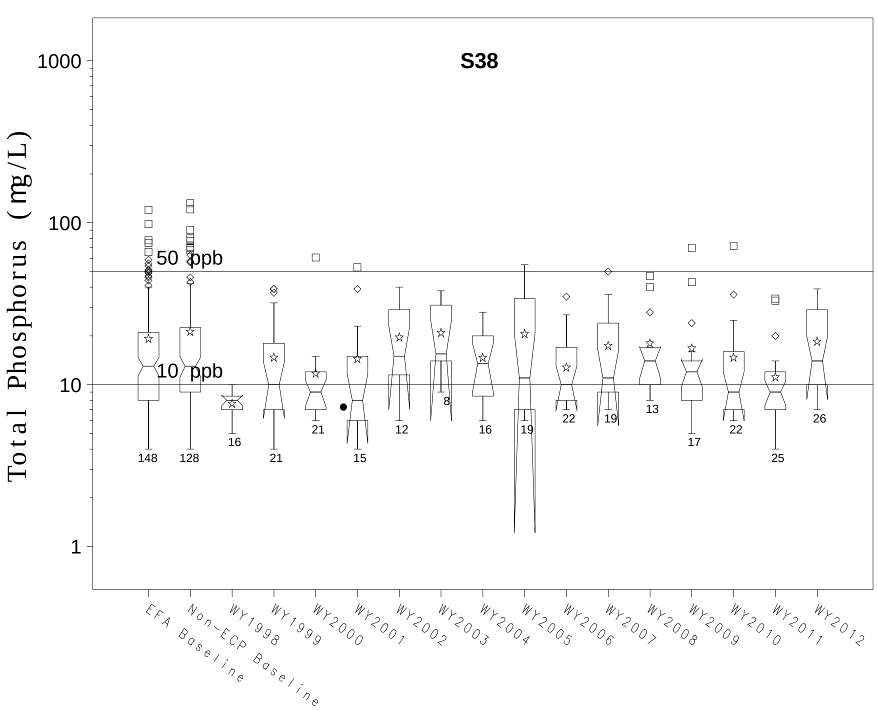

S31
(S337)
Total Phosphorus (mg/L)
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

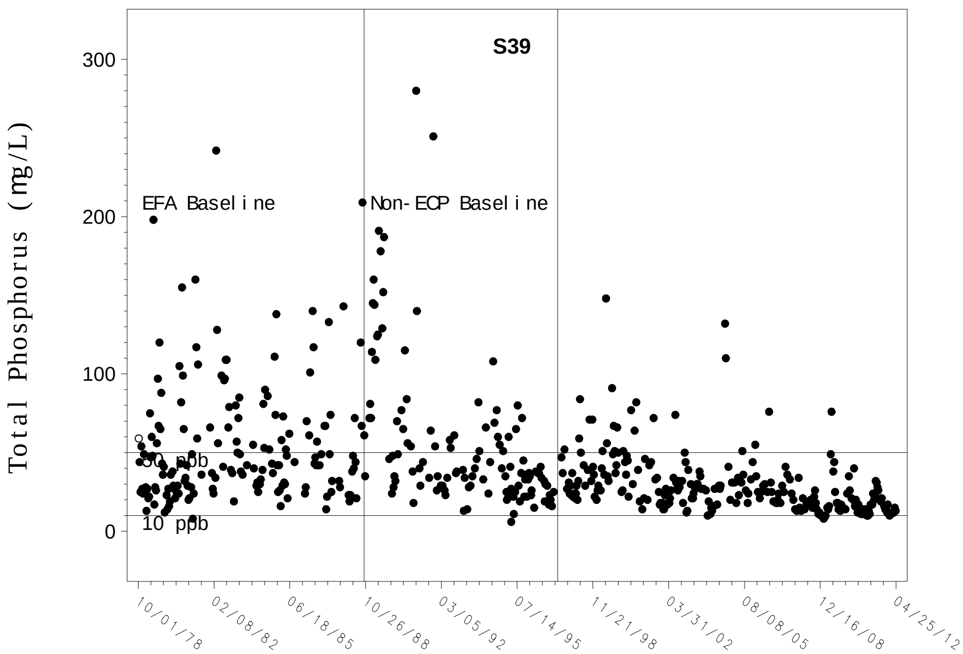

S31
(S337)
Total Phosphorus (mg/L)
50 ppb
10 ppb
Nodata
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

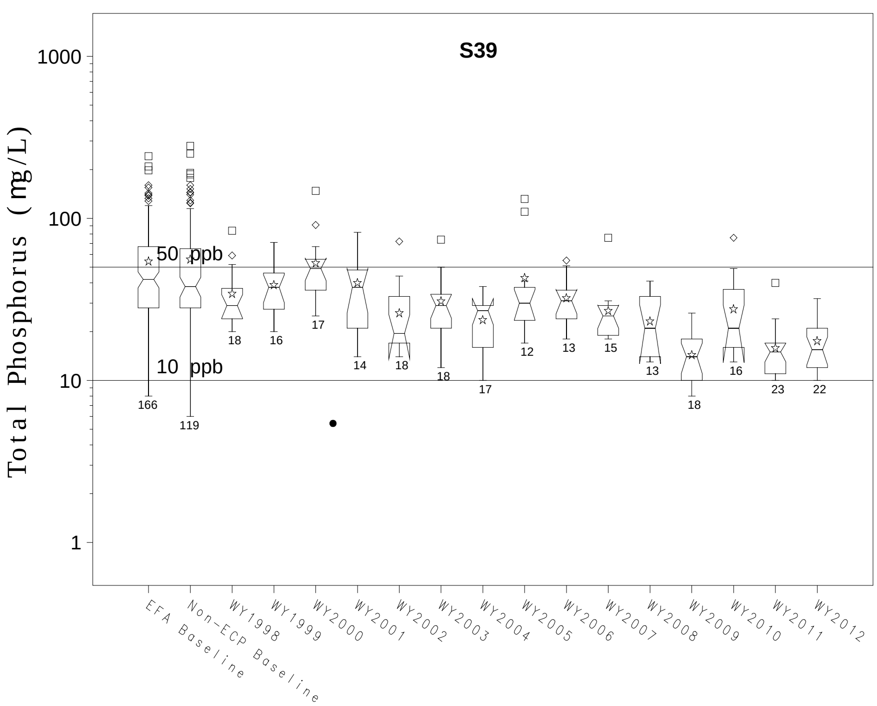

S34
(S141)
Total Phosphorus (mg/L)
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
120
110
100
90
80
70
60
50
40
30
20
10
0
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

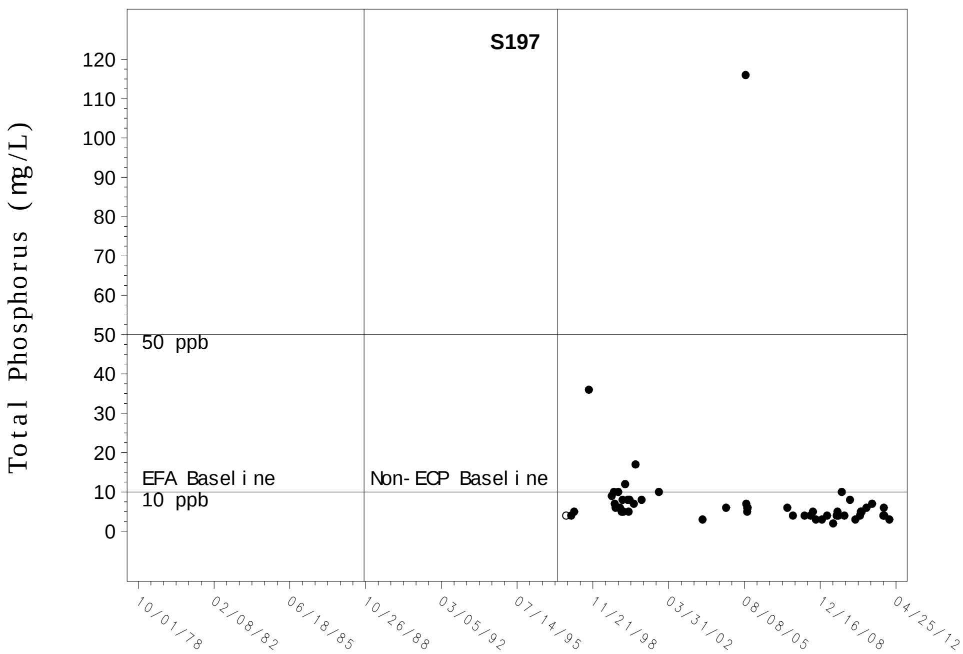

S34
(S141)
Total Phosphorus (mg/L)
1000
100
10
1
50 ppb
10 ppb
96
38
15
15
17
14
13
17
19
17
21
13
15
15
19
18
19
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

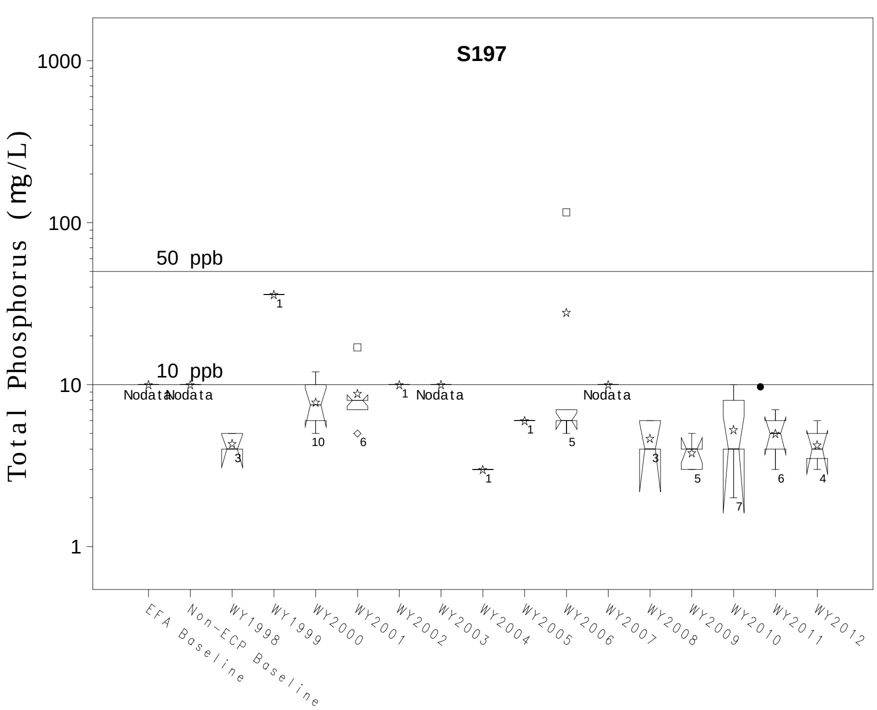

S38
Total Phosphorus (mg/L)
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

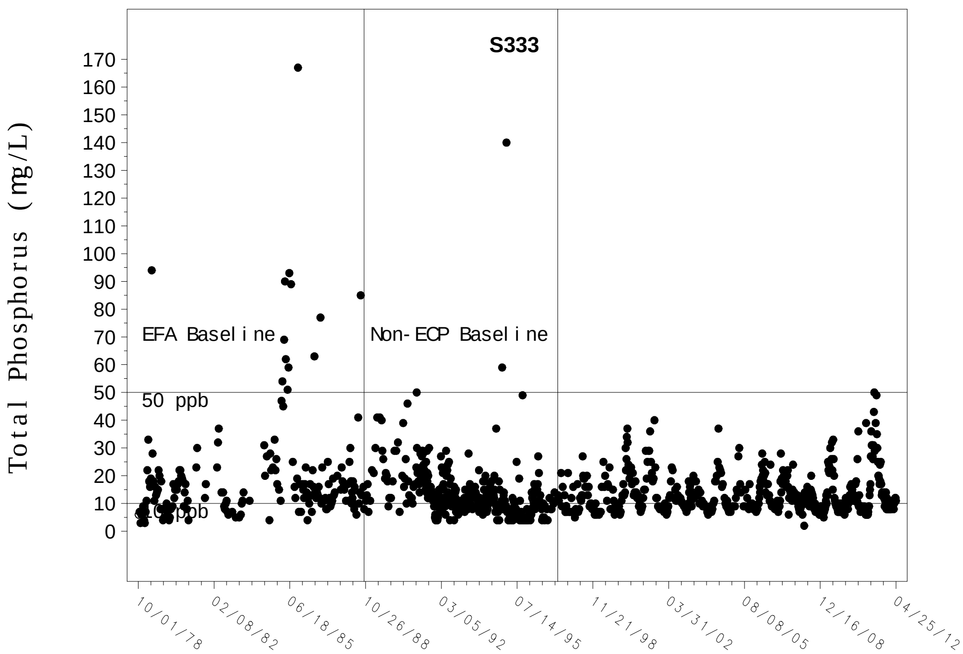

S38
Total Phosphorus (mg/L)
50 ppb
10 ppb
148
128
16
21
21
15
12
8
16
19
22
19
13
17
22
25
26
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

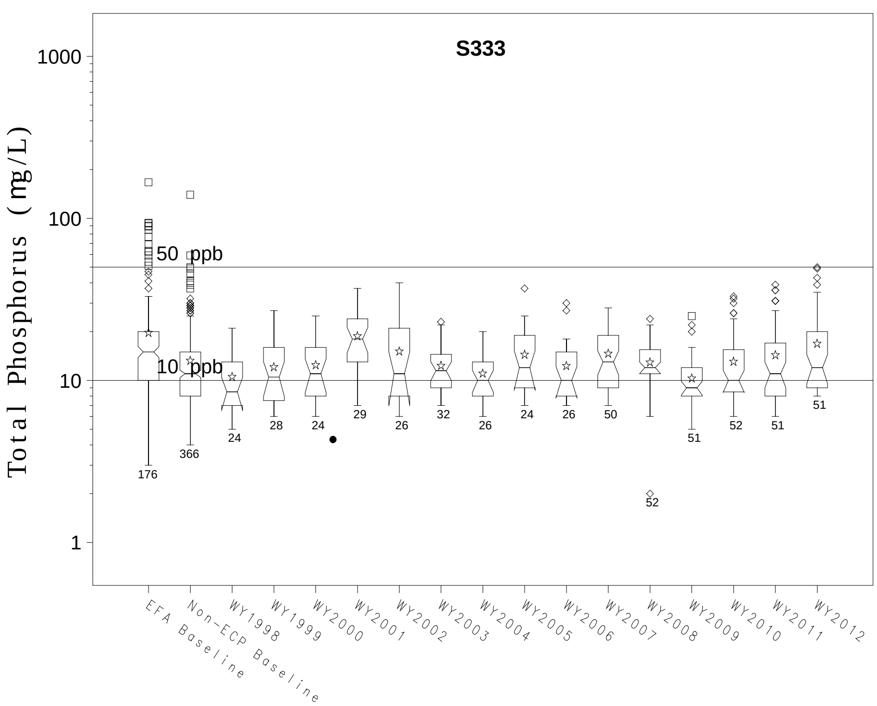

S39
Total Phosphorus (mg/L)
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
0
100
200
300
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

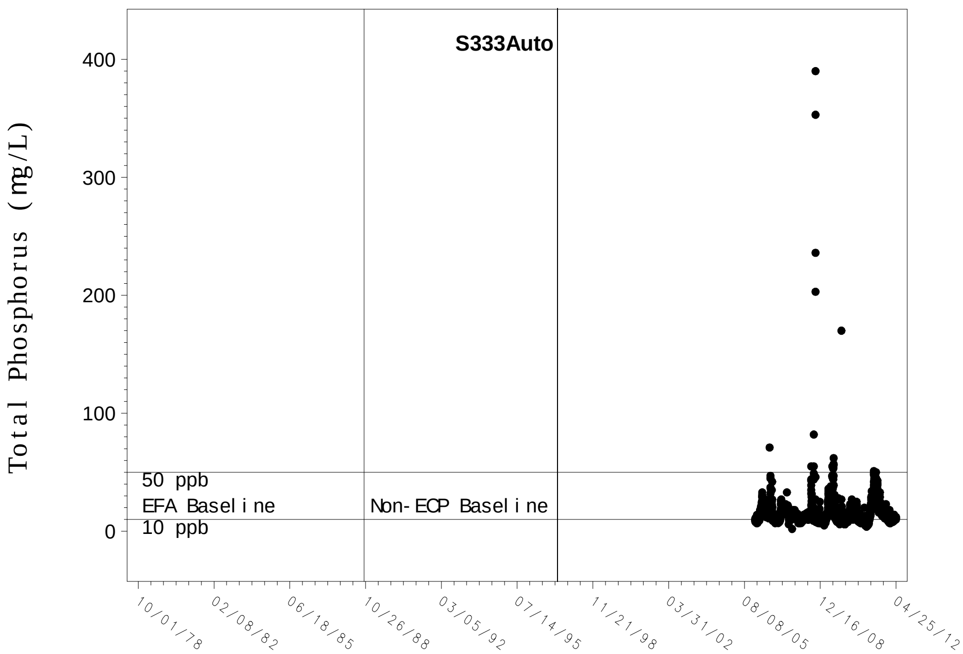

S39
Total Phosphorus (mg/L)
50 ppb
10 ppb
1
10
100
1000
166
119
18
16
17
14
18
18
17
12
13
15
13
18
16
23
22
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

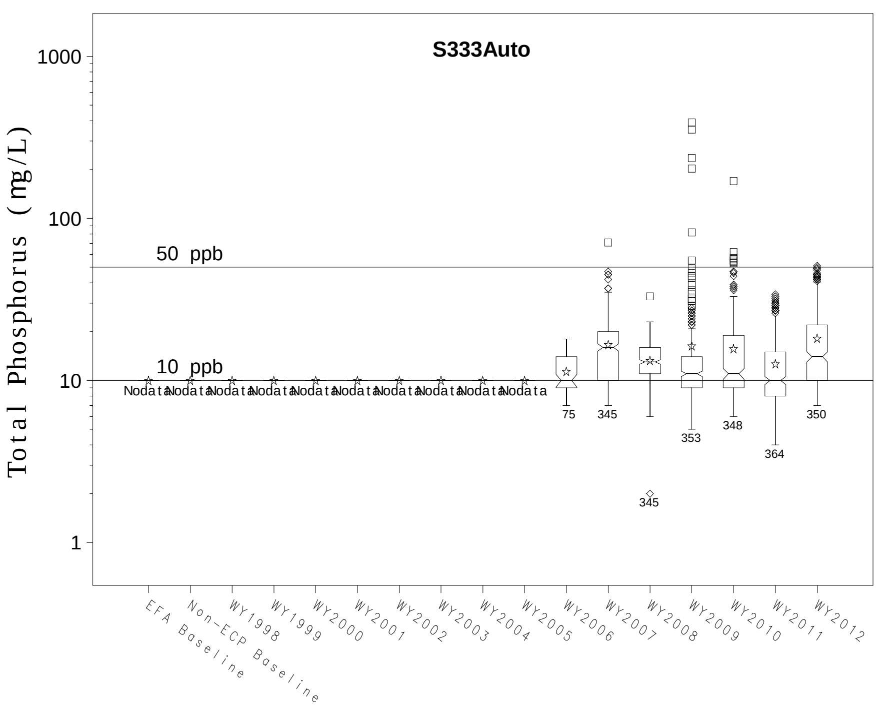

S197
Total Phosphorus (mg/L)
120
110
100
90
80
70
60
50
40
30
20
10
0
50 ppb
EFA Baseline
10 ppb
Non-ECP Baseline
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

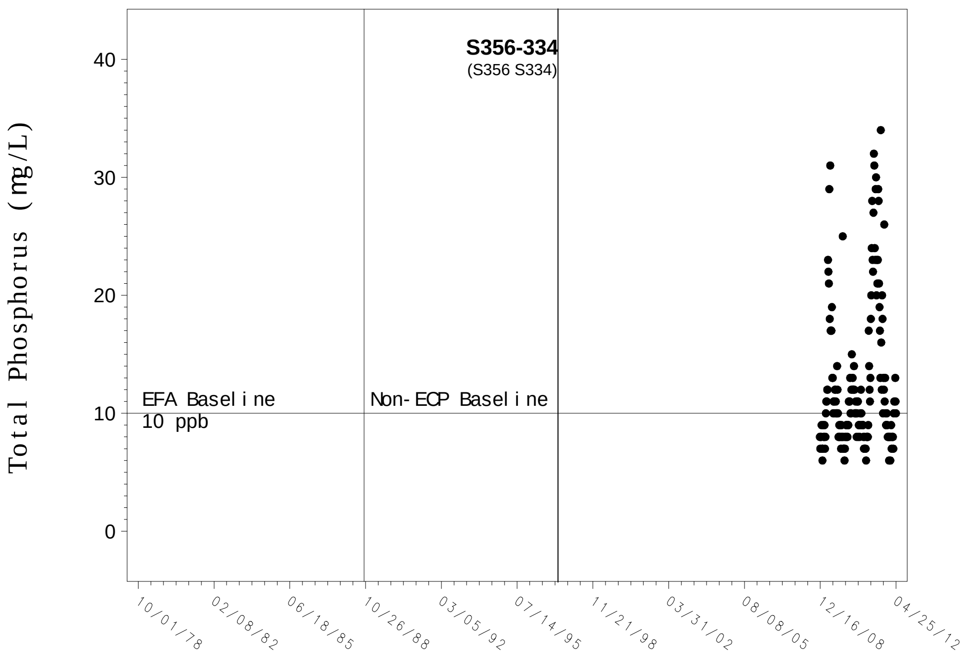

S197
Total Phosphorus (mg/L)
1000
100
10
1
50 ppb
10 ppb
Nodata
Nodata
Nodata
Nodata
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

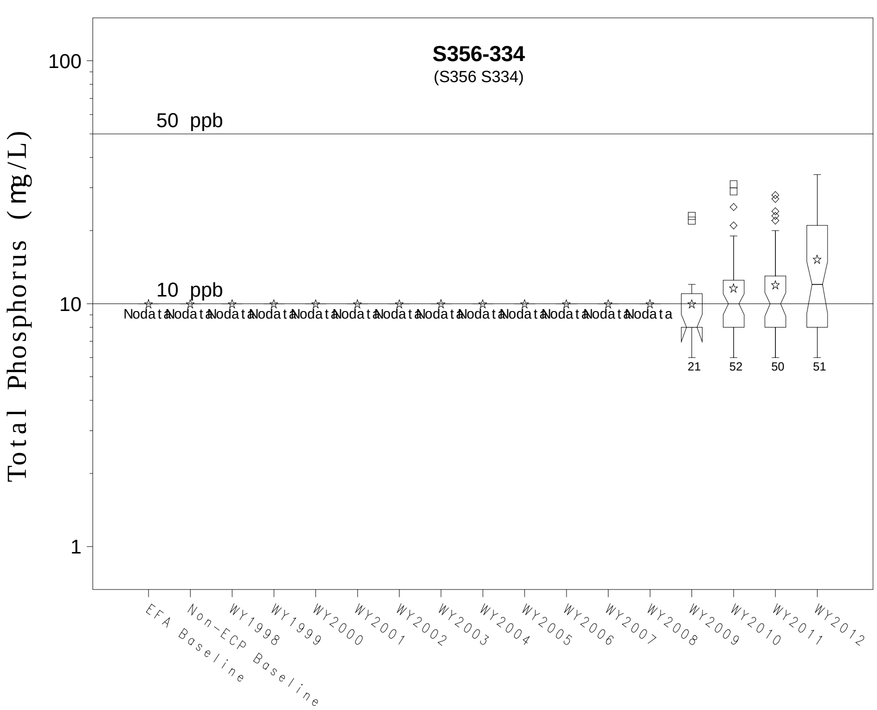

S333
Total Phosphorus (mg/L)
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

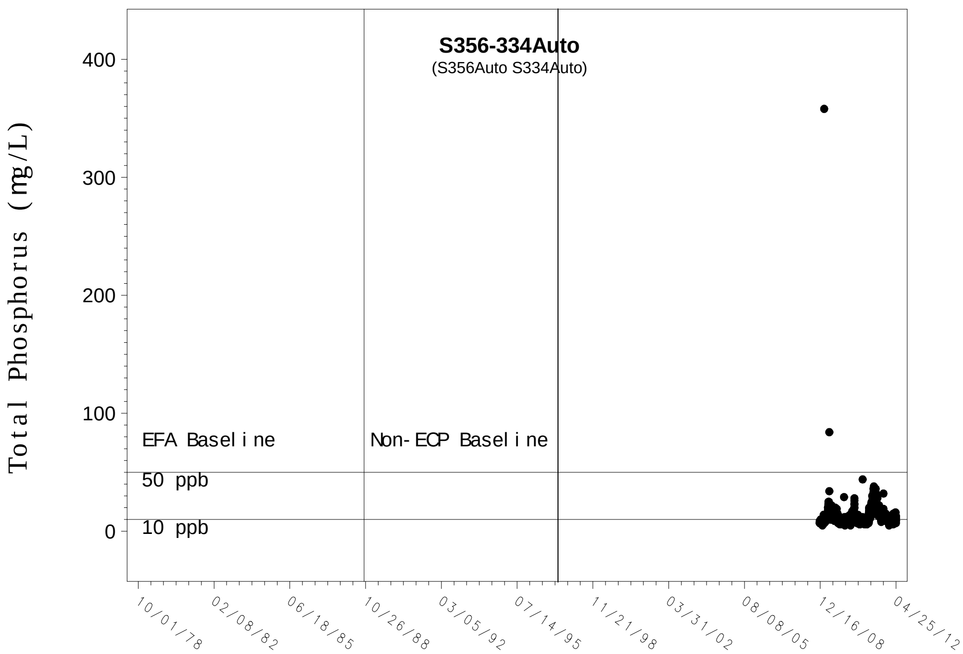

S333
Total Phosphorus (mg/L)
50 ppb
10 ppb
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

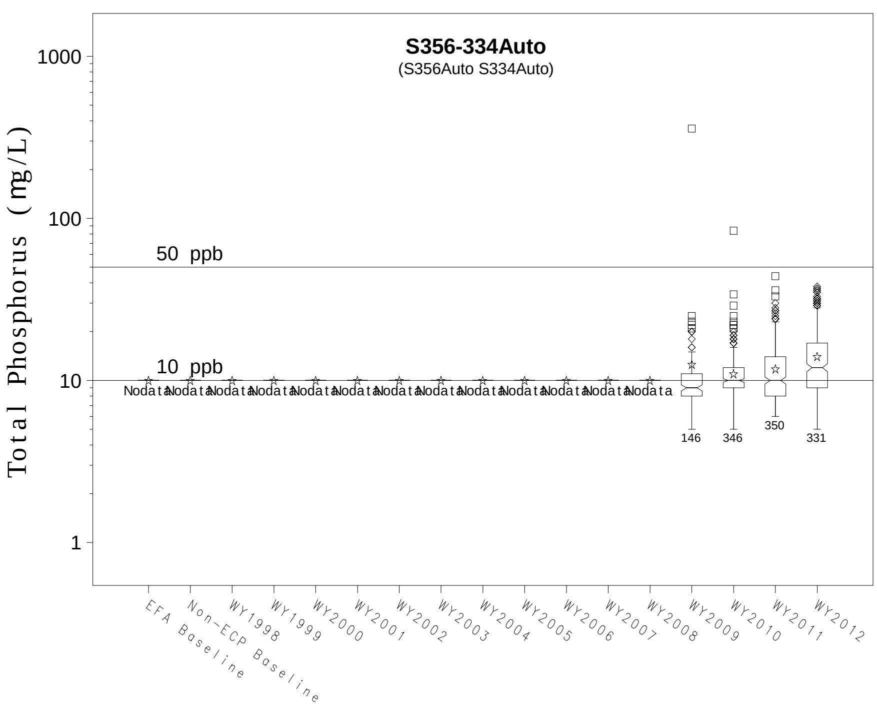

S333Auto
Total Phosphorus (mg/L)
400
300
200
100
0
50 ppb
EFA Baseline
10 ppb
Non-ECP Baseline
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

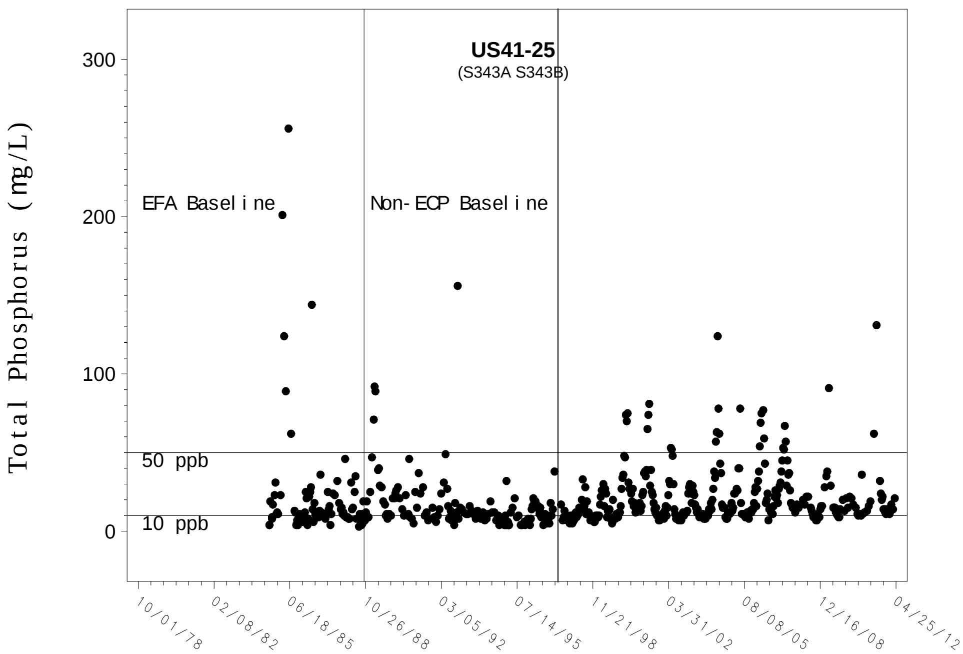

S333Auto
Total Phosphorus (mg/L)
1000
100
10
1
50 ppb
10 ppb
Nodata
75
345
353
348
364
350
345
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

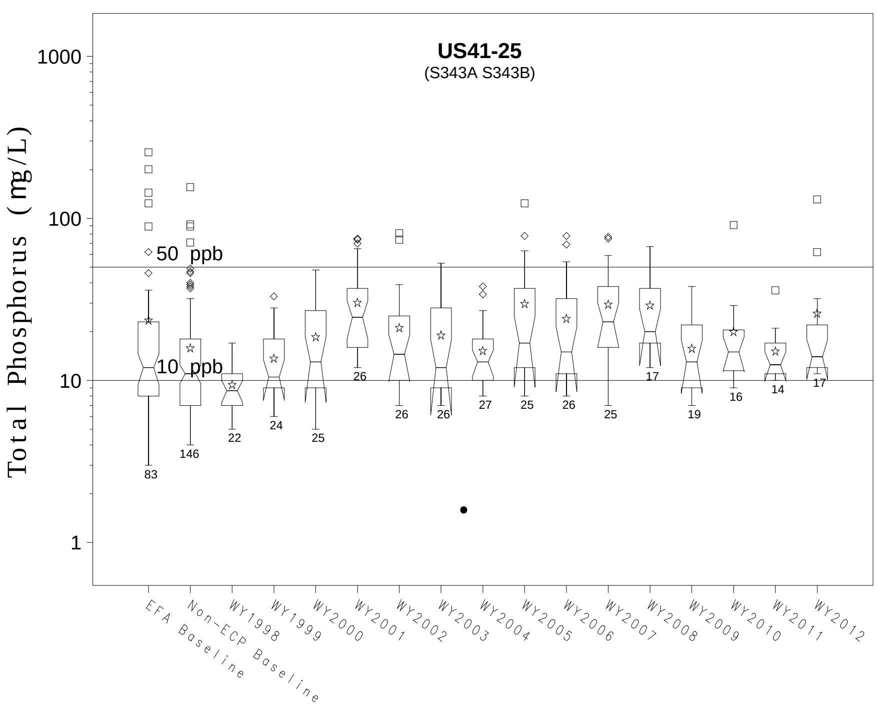

S356-334
(S356 S334)
Total Phosphorus (mg/L)
EFA Baseline
10 ppb
Non-ECP Baseline
0
10
20
30
40
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

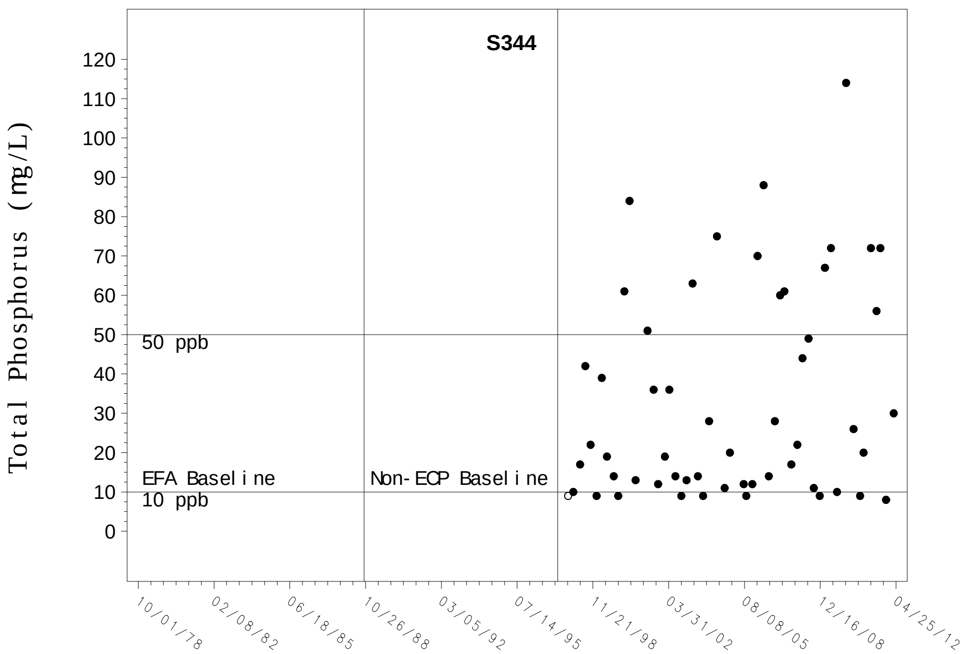

S356-334
(S356 S334)
Total Phosphorus (mg/L)
50 ppb
10 ppb
1
10
100
Nodata Nodata Nodata Nodata Nodata Nodata Nodata Nodata Nodata Nodata Nodata Nodata Nodata
21
52
50
51
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

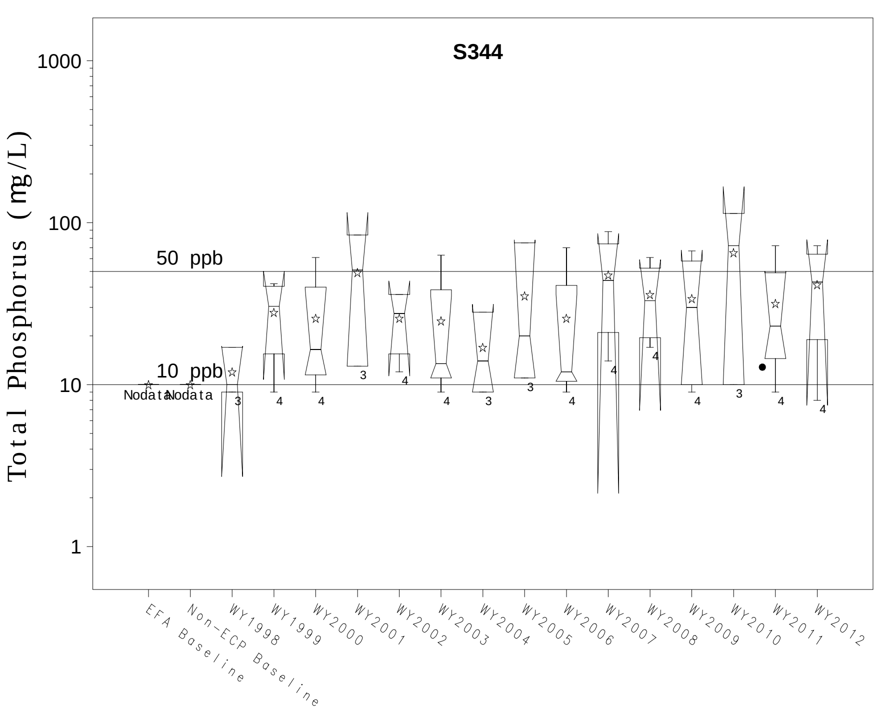

S356-334Auto
(S356Auto S334Auto)
Total Phosphorus (mg/L)
400
300
200
100
0
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

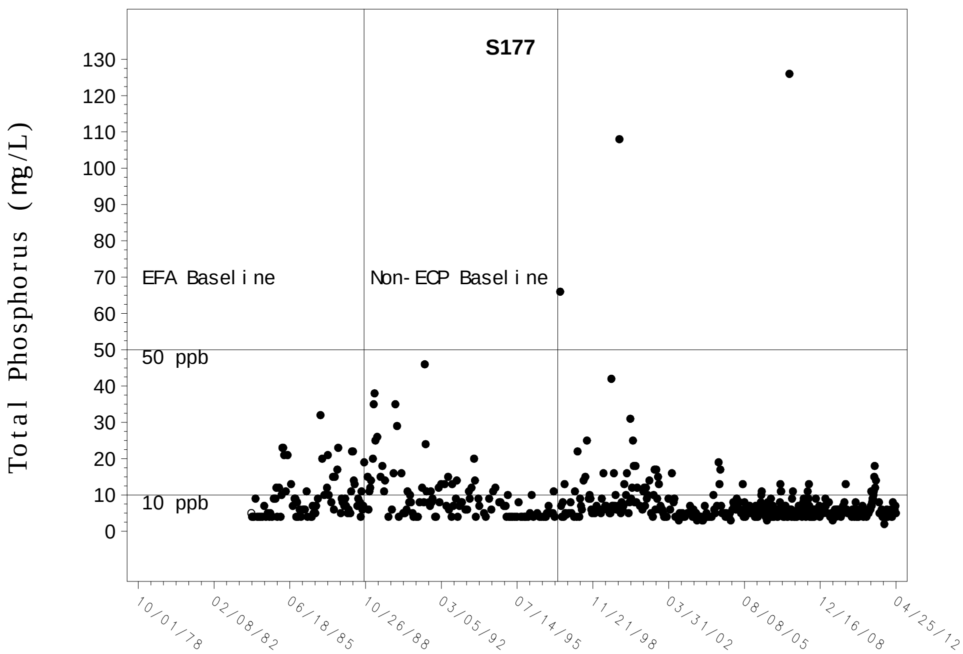

S356-334Auto
(S356Auto S334Auto)
Total Phosphorus (mg/L)
1000
100
10
1
50 ppb
10 ppb
Nodata
146
346
350
331
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

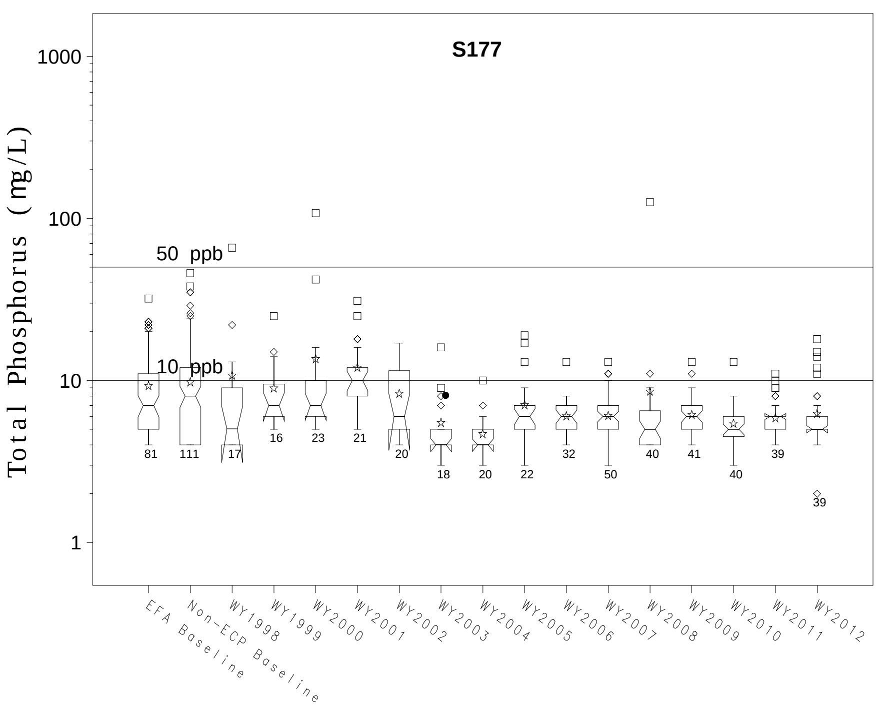

US41-25
(S343A S343B)
Total Phosphorus (µg/L)
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
300
200
100
0
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

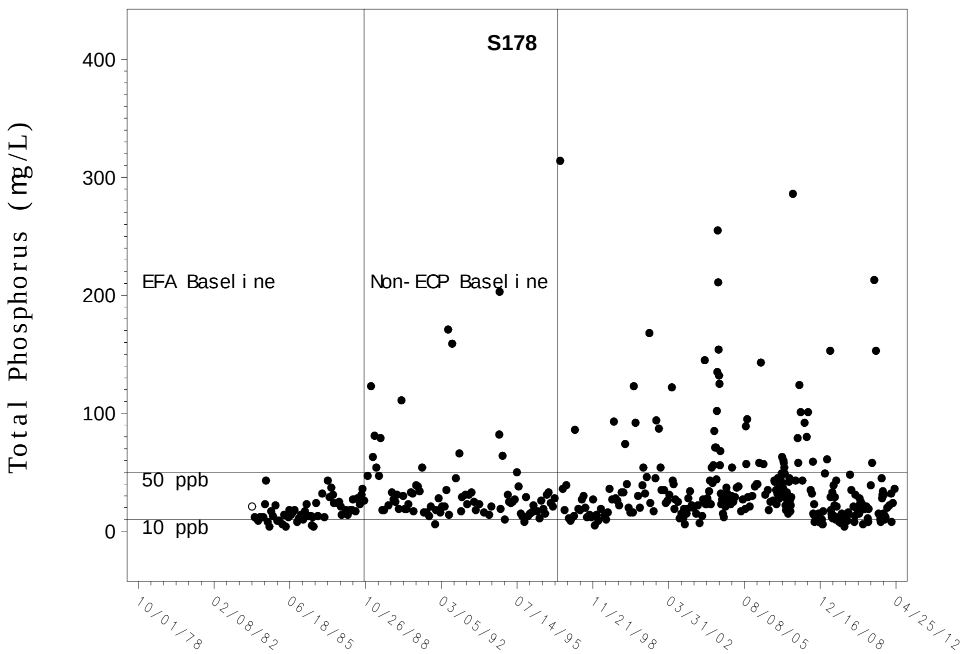

US41-25
(S343A S343B)
Total Phosphorus (µg/L)
1000
100
10
1
50 ppb
10 ppb
83
146
22
24
25
26
26
26
27
25
26
25
17
19
16
14
17
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

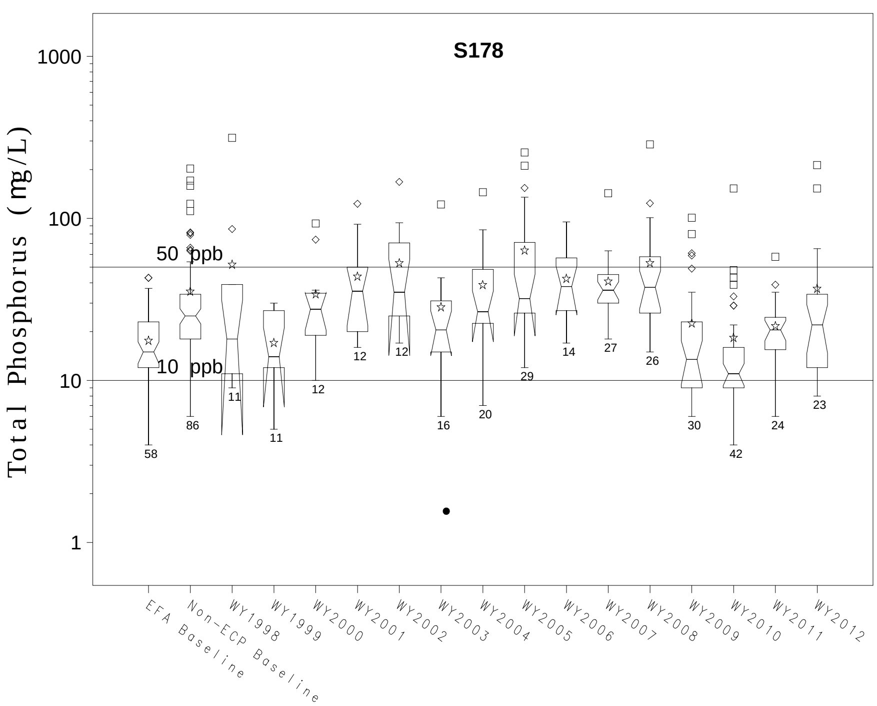

S344
Total Phosphorus (mg/L)
120
110
100
90
80
70
60
50
40
30
20
10
0
50 ppb
EFA Baseline
Non-ECP Baseline
10 ppb
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

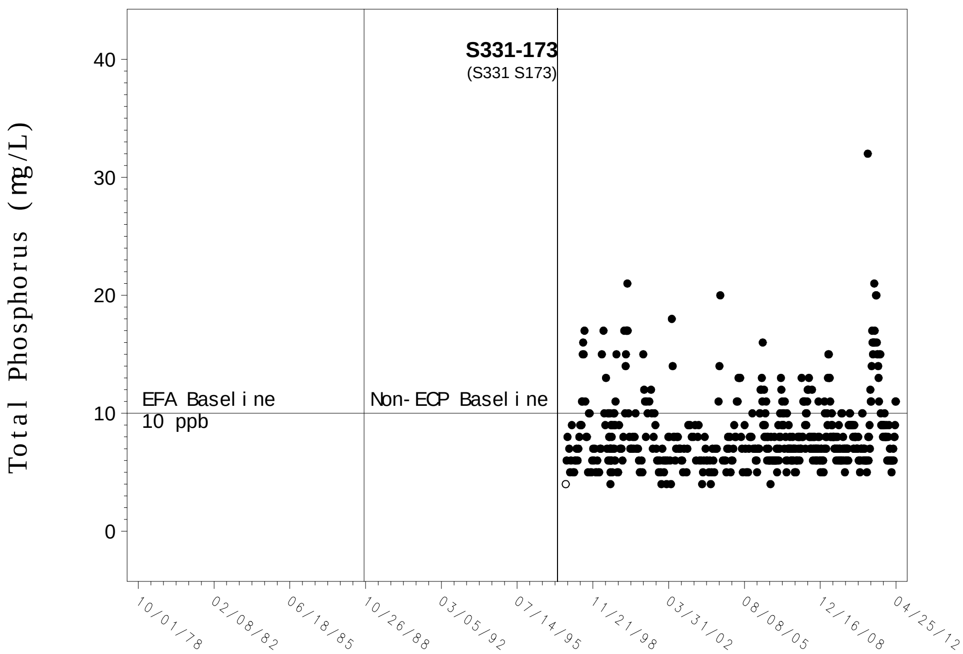

S344
Total Phosphorus (mg/L)
1000
100
10
1
50 ppb
10 ppb
Nodata
Nodata
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

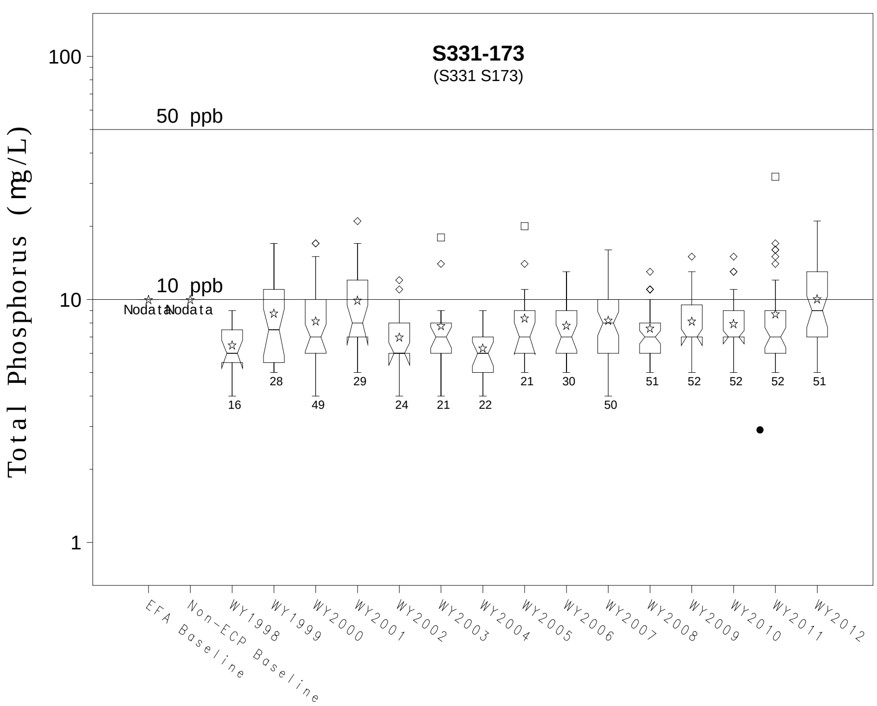

S177
Total Phosphorus (mg/L)
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
130
120
110
100
90
80
70
60
50
40
30
20
10
0
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

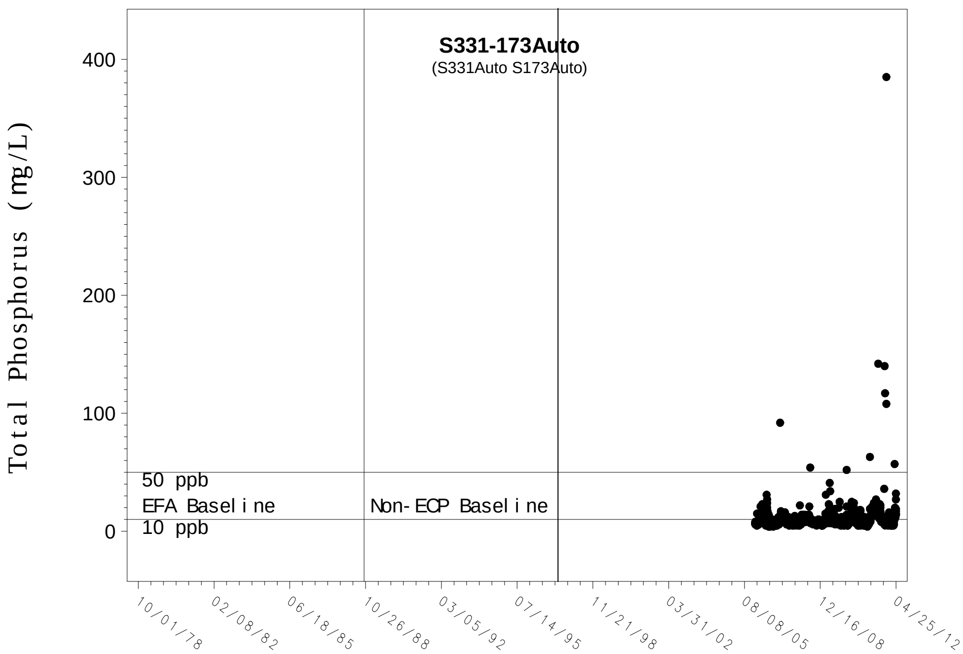

S177
Total Phosphorus (mg/L)
1000
100
10
1
50 ppb
10 ppb
81
111
17
16
23
21
20
18
20
22
32
50
40
41
40
39
39
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

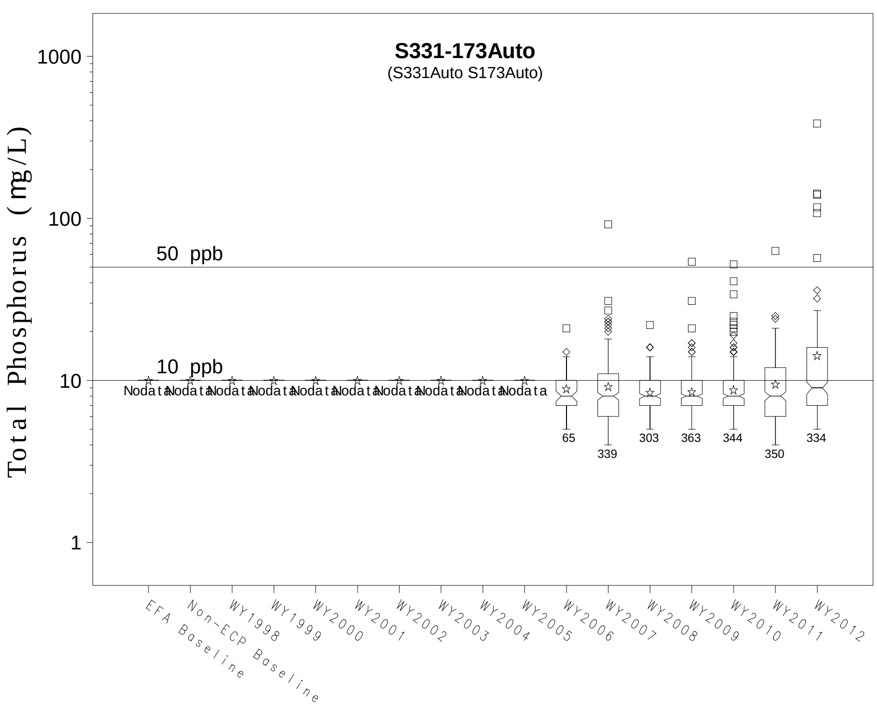

S178
Total Phosphorus (mg/L)
400
300
200
100
0
EFA Baseline
Non-ECP Baseline
50 ppb
10 ppb
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12

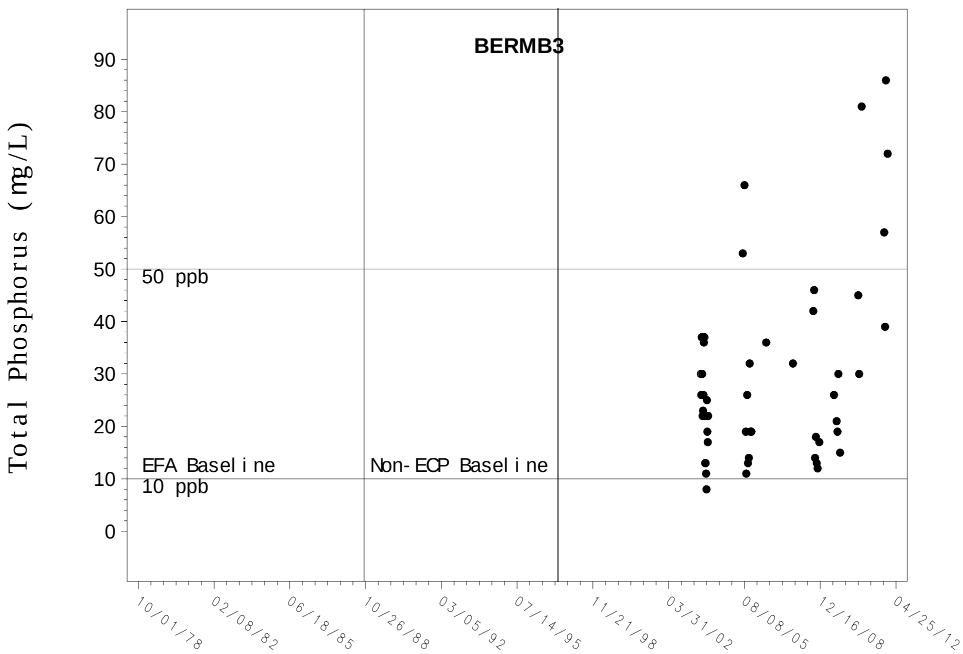

S178
Total Phosphorus (mg/L)
1000
100
10
1
50 ppb
10 ppb
58
86
11
11
12
12
12
16
20
29
14
27
26
30
42
24
23
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

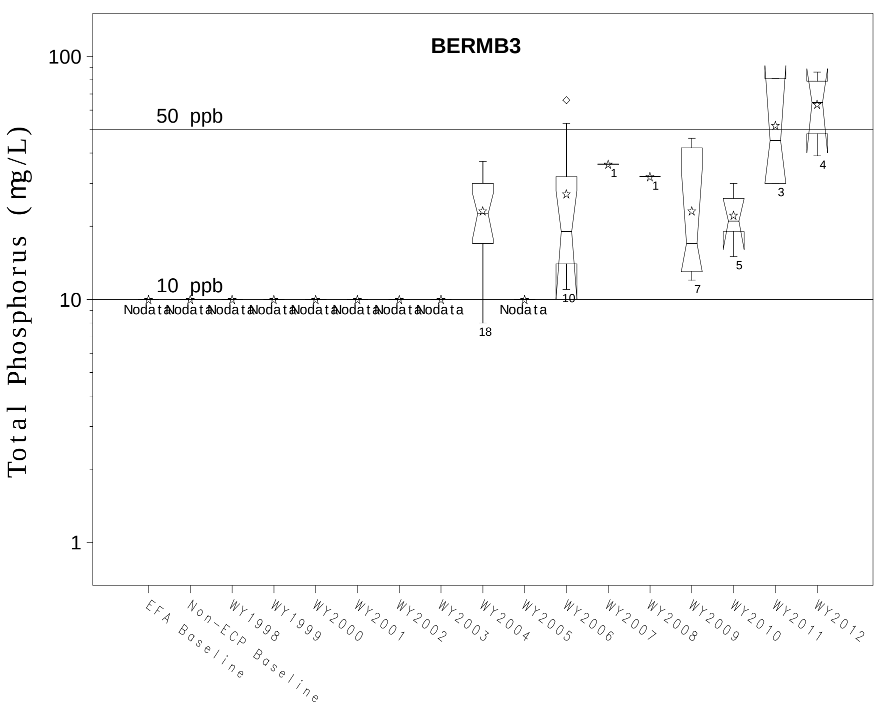

S331-173
(S331 S173)
Total Phosphorus (mg/L)
EFA Baseline
10 ppb
Non-ECP Baseline
40
30
20
10
0
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12


S331-173
(S331 S173)
Total Phosphorus (mg/L)
50 ppb
10 ppb
Nodata
Nodata
100
10
1
16
28
49
29
24
21
22
21
30
50
51
52
52
52
51
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012


S331-173Auto
(S331Auto S173Auto)
Total Phosphorus (mg/L)
50 ppb
EFA Baseline
Non-ECP Baseline
10 ppb
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12


S331-173Auto
(S331Auto S173Auto)
Total Phosphorus (mg/L)
50 ppb
10 ppb
Nodata
65
339
303
363
344
350
334
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012


BERMB3
Total Phosphorus (mg/L)
90
80
70
60
50
40
30
20
10
0
50 ppb
EFA Baseline
Non-ECP Baseline
10 ppb
10/01/78
02/08/82
06/18/85
10/26/88
03/05/92
07/14/95
11/21/98
03/31/02
08/08/05
12/16/08
04/25/12


BERMB3
Total Phosphorus (mg/L)
100
10
1
50 ppb
10 ppb
Nodata
18
10
1
1
7
5
3
4
EFA Baseline
Non-ECP Baseline
WY1998
WY1999
WY2000
WY2001
WY2002
WY2003
WY2004
WY2005
WY2006
WY2007
WY2008
WY2009
WY2010
WY2011
WY2012

Attachment F: 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, Jeff Johnson, Deena Ruiz, Erik Tate-Boldt, Richard Walker, Michael Wright and Yvette Rauscher

SUMMARY

This attachment summarizes data from compliance monitoring of mercury (Hg) influx and bioaccumulation in the downstream receiving waters of the Everglades Protection Area (EPA). Results in this attachment are based on Calendar Year 2011 (CY2011) (January 1, 2011–December 31, 2011) for atmospheric wet deposition and Water Year 2012 (WY2012) (May 1, 2011–April 30, 2012) for total mercury (THg) in fish.

The key findings presented in this attachment are as follows:

1. Total annual wet deposition for the EPA in CY2011 was 156 kilograms of mercury per year (kg Hg/yr), which represents the fourth year of decline since CY2008. In CY2011, annual volume-weighted maximum THg concentrations differed slightly among the three stations, with a slight decreasing trend from the north to the south station. 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 21 nanograms per gram (ng/g) at site WCA2F1 to 373 ng/g at site WCA2U3. The average basin-wide concentration in WY2012 was 109 ng/g, representing over a one fold increase from the basin-wide mean concentration in WY2011. The grandmean for the period of record (POR) (WY1999–WY2012) over all basins is 64 ng/g, which is below USEPA criterion for trophic level III fish. Several sites displayed considerable changes in THg concentration in WY2012: mosquitofish THg concentration increased by nearly 3 to over 4 fold at WCA2U3, CA315 and CA3F2 and decreased by 54 and 65 percent at CA33ALT and ROTENC, respectively. The elevated THg concentration in mosquitofish is likely associated with the drought condition in WY2012.
3. Sunfish (*Lepomis* spp.) collected from downstream sites had THg levels ranging from a minimum of 59 ng/g at site WCA2F1 to a maximum of 371 ng/g at site L67F1. The basin-wide average concentration for sunfish in WY2012 was 185 ng/g, representing a 21 percent decrease over WY2011. In WY2012, sunfish continued to show marked spatial variation in

Hg levels; fish from sites CA33ALT, CA35ALT, CA315, L67F1, WCA2U3 and ROTENC continued to show the highest median concentrations (ranging from 193–371 ng/g) and sites CA35ALT and L67F1 were greater than all other sites.

4. Fillets from individual largemouth bass (*Micropterus salmoides*) (LMB) were collected from only six of the twelve downstream sites due to low water depths and had tissue THg concentrations ranging from a minimum of 153 ng/g (age 0) at site CA2NF to a maximum of 2,350 ng/g (age 4) at site L67F1. Site-specific, age-standardized concentrations (estimated for a three-year-old bass, EHg3) ranged from 428 ng/g at site CA2NF to 1,431 ng/g at site L67F1. Standardized total mercury levels (EHg3) in WY2012 decreased by 15 percent from WY2011.
5. Collections of great egret *(Ardea alba*) feathers were attempted but not obtainable due to time constraints imposed by the Florida Fish and Wildlife Conservation Commission scientific collecting permit. Since collections began in 1999, wading bird feathers were collected from thirteen locations in Water Conservation Area 3A.
6. For WY2012, average THg concentrations doubled in mosquitofish and decreased 27 and 15 percent in sunfish and largemouth bass, respectively. Available data showed that the northernmost sites are still comparatively low in tissue Hg concentration in LMB. WCA-2U3 also displayed a considerable decline in LMB THg level while L67F1 remains high in LMB THg concentration. Site L67F1 had the highest sunfish and LMB THg concentrations in WY2012, but moderately high levels of THg in mosquitofish. Based on guidance from the U.S. Fish and Wildlife Service and the U.S. Environmental Protection Agency 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 Calendar Year 2011 (CY2011) (January 1, 2011–December 31, 2011) for atmospheric deposition and Water Year 2012 (WY2012) (May 1 2011–April 30, 2012) for fish, summarizing the results of mercury (Hg) monitoring in the downstream receiving waters of the Everglades Protection Area (EPA). Following the past three years of feather data collection by the University of Florida, in CY2012 the District brought feather collection back in-house; however, great egret (*Ardea alba*) data is not available for this reporting period due to permit constraints. This report, along with Attachment C, Appendix 3-1 of this volume, satisfies the mercury-related reporting requirements of the Florida Department of Environmental Protection (FDEP) Non-ECP Permit No. 0237803-11.

BACKGROUND

In 1994, the Florida legislature enacted the Everglades Forever Act [EFA; Chapter 373.4592, Florida Statutes (F.S.)], which established long-term water quality goals for the restoration and protection of the Everglades. To achieve these goals, the South Florida Water Management District (SFWMD or 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 Everglades Protection Area (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 (known as FDOH) and Florida Game and Fresh Water Fish Commission (currently the Florida Fish and Wildlife Conservation Commission, or 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 form. 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 total mercury (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, the FDEP, the U.S. Environmental Protection Agency (USEPA), and a consortium of southeastern U.S. power companies sponsored the Florida Atmospheric Mercury Study (FAMS). The FAMS 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 STA-1W (station FL34), Western Broward County (station FL97), and the ENP (station FL11) to measure wet deposition (i.e., dry deposition is not measured; for locations see **Figure 1**). Surface measurements at the Broward County station began at the end of November 2006, replacing former Andytown station (FL04).

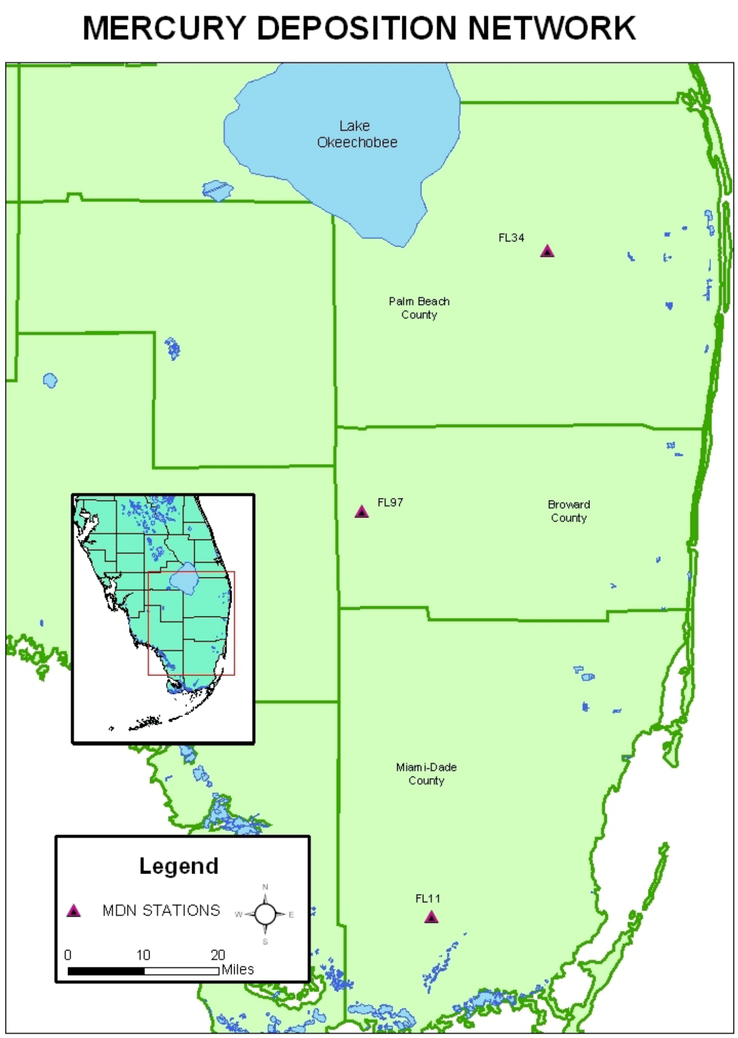


Figure 1. Mercury Deposition Network sites in South Florida.

PREYFISH

Grab samples of between 100 and 250 mosquitofish (*Gambusia* spp.) are collected with a dip net during single sampling events at 12 downstream interior marsh sites **(Figure 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.

SECONDARY PREDATOR FISH

Up to 20 sunfish (*Lepomis* spp.) are collected at the same 12 downstream interior marsh sites using electroshocking techniques (**Figure 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.

TOP-PREDATOR FISH

Using electroshocking techniques, up to 20 largemouth bass (*Micropterus salmoides*) (LMB) are also collected at the 12 downstream interior marsh sites (**Figure 2**); the fillets are analyzed for THg. Largemouth bass are long-lived (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 (TLs) with a requisite time lag for trophic exchange. While focusing on three-year-old bass 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.

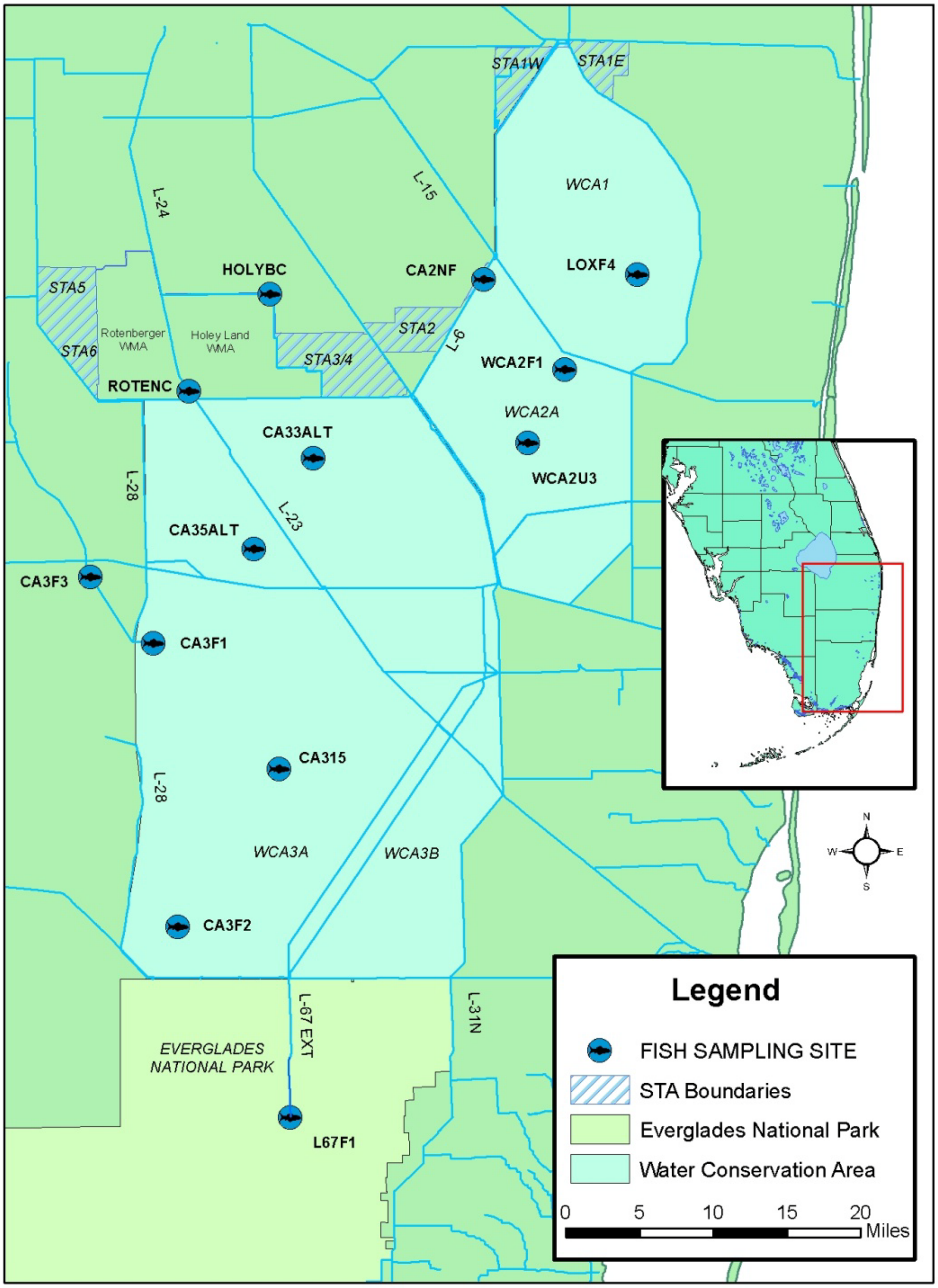


Figure 1. Collection sites for monitoring total mercury (THg) levels in mosquitofish (*Gambusia* spp.), sunfish (*Lepomis* spp.), and largemouth bass (*Micropterus salmoides*). CA3F1 was replaced with CA3F3 in WY2011 due to accessibility problem to CA3F1 which is located in Tribal Land. CA3F3 is located in the L-28 Interceptor Canal within the Big Cypress National Preserve. Monitoring at station CA3F3 began 10/7/10. The District has been unable to request a permit 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 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 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 (UF) to conduct annual juvenile great egret feathers collections. During that period, UF 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 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. In 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 permit constraints during this transition. 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.

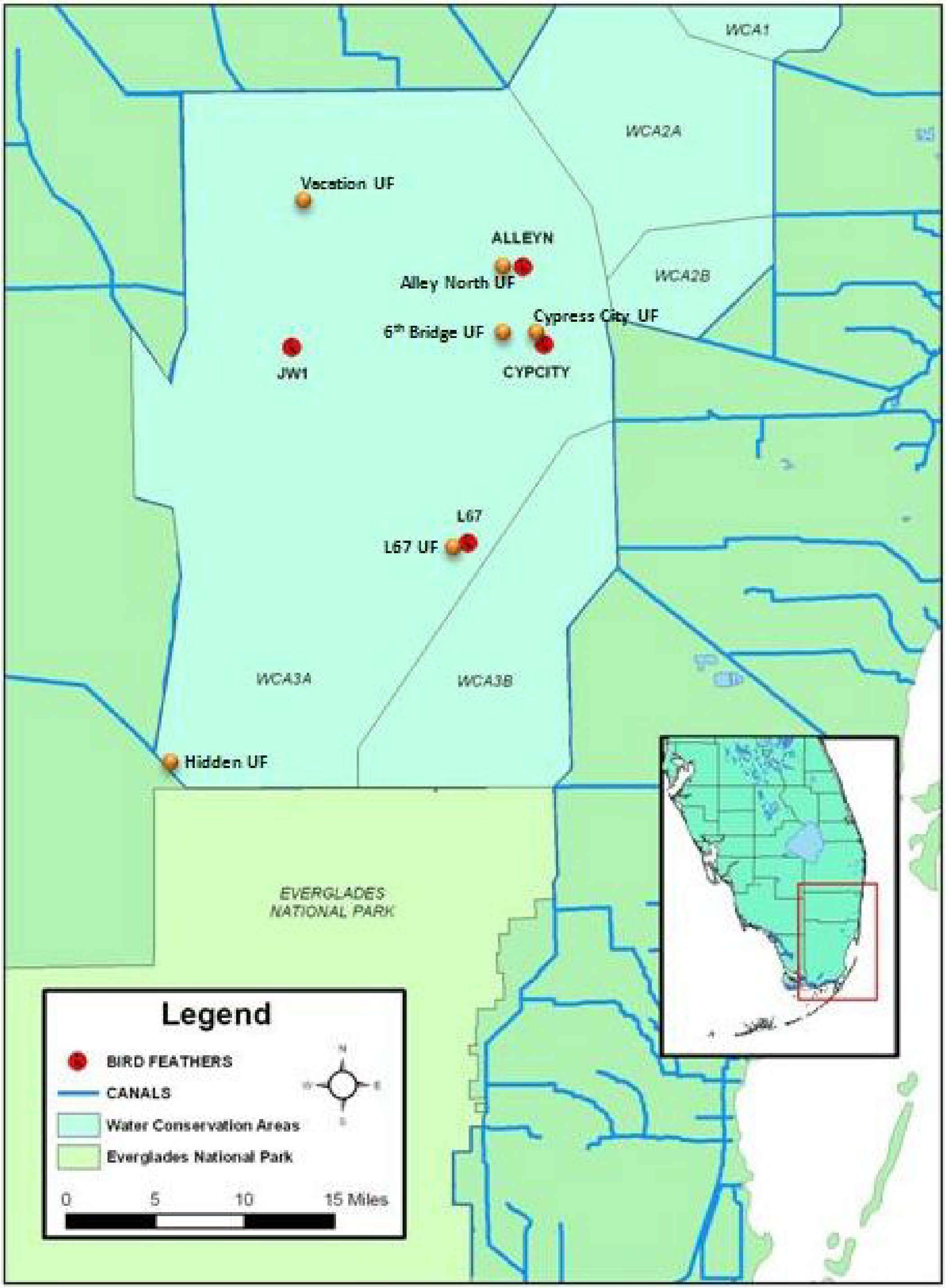


Figure 2. Collection sites for great egret (*Ardea alba*) nestling feathers. Although efforts to collect repeatedly from the same colony are made, colonies are sometimes inactive or abandoned, thus requiring collection at an alternate colony.

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 Attachment C, Appendix 3-1 of this volume.

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 datasets 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 datasets. Five years is the minimum dataset 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), Hg concentrations in LMB were standardized to an expected mean concentration in three-year-old fish (EHg3) at a given site by regressing Hg 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 LSM for chicks with a 7.1 centimeter (cm) bill.

Where appropriate, an analysis of covariance (ANCOVA; SAS GLM procedure) was used to evaluate spatial and temporal differences in Hg 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 multigroup null hypotheses were rejected under ANOVA, then groups were compared using either Tukey HSD (Honestly Significant Difference; for equal-sized datasets) test or the Tukey-Kramer (for unequal-sized datasets). Assumptions of normality and equal variance were tested by the Kolmorogov-Smirnov and Levene Median tests, respectively. Datasets 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 datasets were evaluated using non-parametric Mann-Whitney or Kruskal-Wallis Rank sum tests. If the multigroup null hypothesis was rejected, then groups were compared using either Nemenyi test (for equal-sized datasets) or Dunn's Method (for unequal-sized datasets). 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: NATIONAL ATMOSPHERIC DEPOSITION PROGRAM, MERCURY DEPOSITION NETWORK

Samples of rainfall were collected weekly under the protocols of the National Atmospheric Deposition Program (NADP) Mercury Deposition Network (MDN) at STA-1W (FL34), the Baird Research Center in the Park (FL11), and the Western Broward County station (FL97) (**Figure 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 1**; **Figures 4** and **5**). As observed in previous years, THg concentrations in precipitation were substantially higher during the summer months (**Figure 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 4**).

In CY2011, the annual volume-weighted THg concentration was the lowest at the north (FL34) and similar between FL97 and FL11 at the central and south sites (**Table 2**). The average of the three stations in CY2011 was <1 ng/L lower than in CY2010. Annual THg deposition tracked annual precipitation depth closely (**Figure 4**) and displayed a north-south trend of increase (**Table 3**). Compared to CY2010, annual deposition decreased by nearly 8.8 $\mu g/m^2$ in site FL34, increased by 2.8 $\mu g/m^2$ in FL11, and virtually remained the same as in CY2010 in FL97 (**Table 3**).

Seasonal Kendall analyses (of ranks) revealed a significant decreasing trend in monthly mean THg concentrations at FL34 (1998–2011; n = 202 months; Tau = -0.226; p = 0.01); however, there was no trend for FL11 (1997–2011; n = 209 months; Tau = 0.023; p = 0.80) or FL04/97 (2007–2011; n = 196 months; Tau = -0.154; p = 0.15). 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. Seasonal Kendall analysis did not show any long-term trend in the monthly deposition and monthly total rainfall at all sites for the POR. Based on the average deposition rates measured at the three sites, wet-only atmospheric loading of THg to the EPA (9.01×10^9 m^2) was estimated at 156 kilograms of mercury per year (kg Hg/yr), which is the fourth year of continuous decline (**Table 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 156 kg Hg/yr has uncertainty as mechanical failure or collection efficiency issues are associated with several samples.

Table 1. THg concentration [nanograms per liter (ng/L); wet only] from compliance sites of the Mercury Deposition Network (MDN) in calendar year 2011 (CY2011).

Week ending	STA-1W (FL34)	Broward (FL97)	ENP (FL11)
1/4/11	NA	18.67	NA
1/11/11	10.5	4.48	NA
1/18/11	6.39	31.44	4.59
1/25/11	20.33	7.2	NA
2/1/11	10.06	10.01	14.17
2/8/11	NA	11.93	NA
2/15/11	10.47	NA	9.26
2/22/11	NA	NA	10.3
3/1/11	NA	7.89	NA
3/8/11	7.08	7.31	NA
3/15/11	9.98	NA	9.47
3/22/11	NA	17.57	NA
3/29/11	14.4	9.79	15.9
4/5/11	24.97	11.22	3.32
4/12/11	13.58	NA	9.3
4/19/11	31.52	NA	20.73
4/26/11	5.34	13.03	NA
5/3/11	2.54	16.82	NA
5/10/11	6.96	14.22	NA
5/17/11	7.36	18.62	12.56
5/24/11	14.16	22.32	NA
5/31/11	21.22	NA	28.14
6/7/11	NA	28.71	NA
6/14/11	19.61	21.07	26.57
6/21/11	18.95	17.86	18.64
6/28/11	20.73	14.03	17.91
7/5/11	15.32	8.71	20.44
7/12/11	16.55	27.33	5.36
7/19/11	19.87	34.07	28.61
7/26/11	33.35	11.92	23.32
8/2/11	NA	34.44	26.48
8/9/11	23.2	18.19	16.93
8/16/11	18.22	28.71	26.84
8/23/11	17.06	10.92	12.5
8/30/11	6.33	17.66	19.47
9/6/11	18.7	43.73	13.68
9/13/11	18.35	17.53	39.39
9/20/11	10.92	9.28	17.24
9/27/11	7.28	27.84	10.84
10/4/11	17.95	3.79	20.73
10/11/11	5.86	5.85	4.9
10/18/11	7.25	8.69	4.45
10/25/11	7.65	6.56	8.29
11/1/11	5.59	NA	10.17
11/8/11	4.64	NA	3.05
11/15/11	2.21	5.36	NA
11/22/11	6.61	NA	9.04
11/29/11	2.62	1.19	8.99
12/6/11	16.57	5.79	1.69
12/13/11	6.44	NA	6.09
12/20/11	4.21	10.85	23.56
12/27/11	5.19	NA	NA

NA - Not available

Table 2. Historical volume-weighted THg concentration (ng/L) from MDN compliance sites (CY1997–CY2011).

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

*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)
[b] Data just from the Andytown station (FL04)
[c] Combination of data from the Andytown (FL04) and the Broward County stations (FL97)
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

Table 3. Annual THg deposition (micrograms per square meter, or µg/m^2) from MDN compliance sites (CY1997–CY2011).

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

See notes for Table 2, above.

Table 4. Atmospheric THg loading to the Everglades Protection Area (EPA) (CY1994–CY2011).

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]

[a] USEPA (2001, as cited by FDEP, 2003) annual deposition derived from Florida Atmospheric Mercury Study (FAMS), 1993–1996; surface water loading derived from biweekly monitoring of into structures discharging from the Everglades Agricultural Area into the Everglades Protection Area

[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 + Park) of 7900 km^2

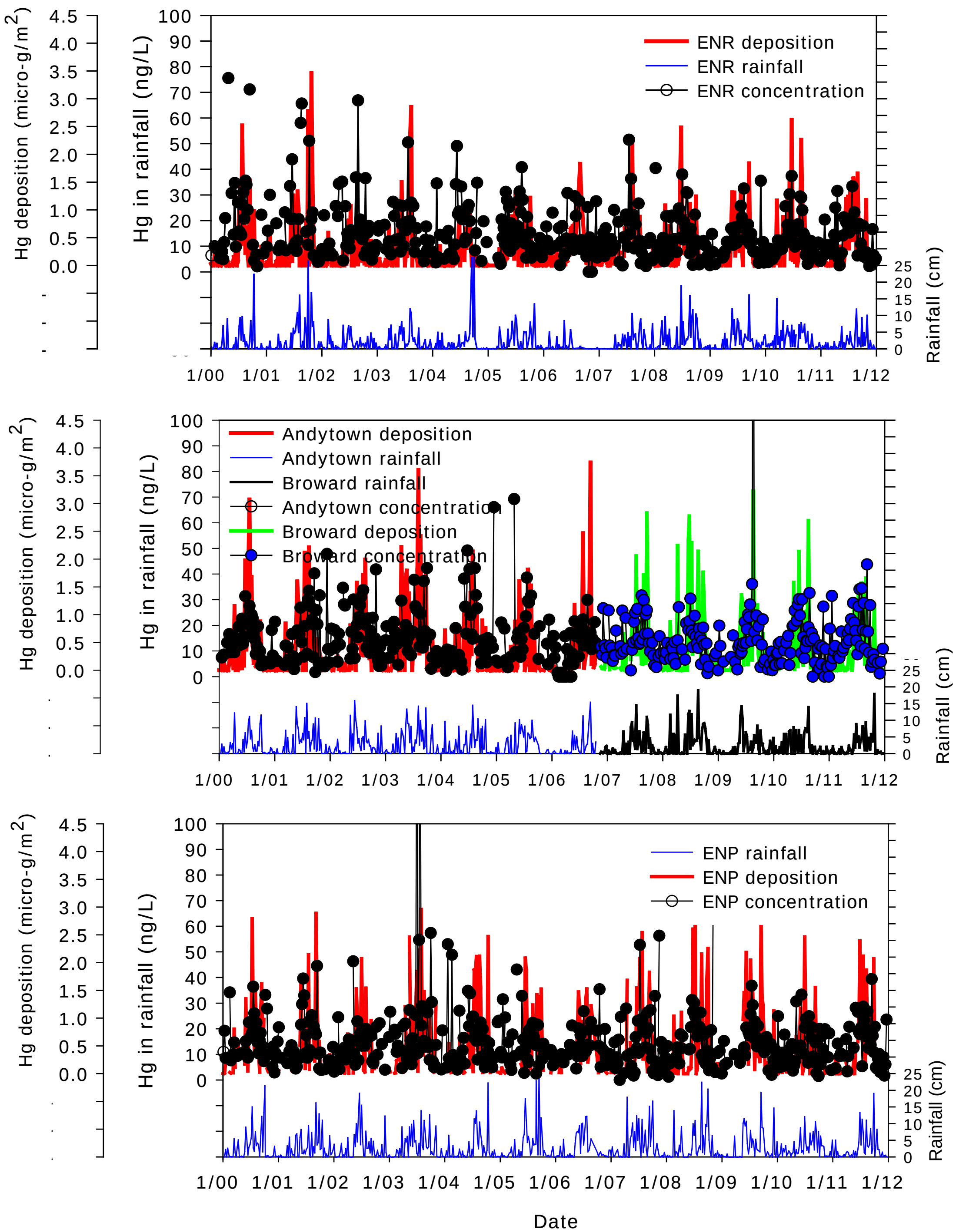


Figure 3. Time series of rainfall, rainfall Hg concentrations, and wet Hg deposition at STA-1W (FL34), Andytown (FL04), Everglades National Park (ENP) Bair Research Center (FL11), and Broward County (FL97), as reported by the MDN. STA-1W (FL34) is the same site as ENR.

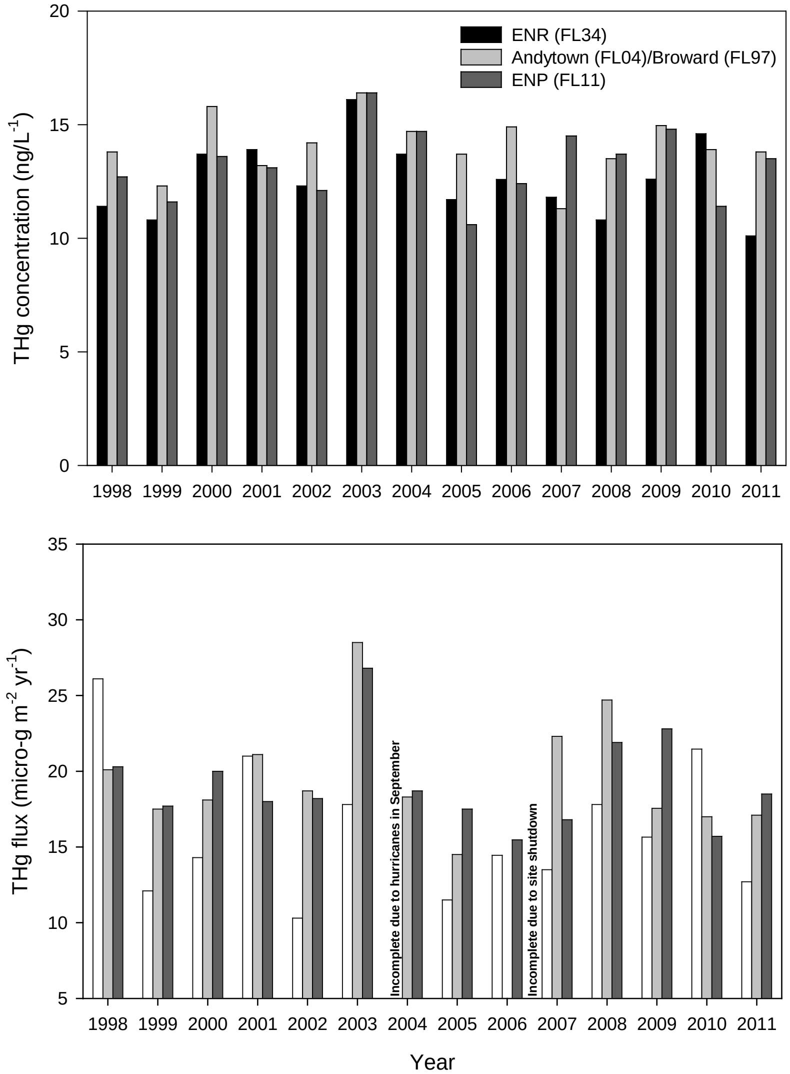


Figure 4. Time series of annual volume-weighted concentration (top) and annual THg flux (bottom) at three MDN stations. The Andytown site FL04 closed down in mid-2006 and was replaced with Broward County site FL97. STA-1W (FL34) is the same site as ENR.

FISH FROM NON-ECP INTERIOR MARSHES

Results from monitoring downstream interior marsh mosquitofish, sunfish, and LMB are summarized in **Tables 5 through 7**, respectively. Raw data for individual fish is available on the District's website at www.sfwmd.gov/dbhydro. In WY2012, 12 downstream marsh sites in the interior of the WCAs and the ENP (**Figure 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; correspondence from F. Nearhoof, FDEP). To preserve long-term datasets 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., sites 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 WY2012 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 5. THg concentrations [nanograms per gram (ng/g) wet weight] in mosquitofish (*Gambusia* spp.) composites collected in WY2011–WY2012 from downstream sites. Value presents the concentration of one aliquot.

Site	WY2011	WY2012	Between-Year Change (%)	Cumulative Mean
LOXF4	139	171	23	63
WCA2F1	11	21	91	10
CA2NF	20	32	60	25
HOLYBC	36	50	39	39
ROTENC	130	45	-65	60
WCA2U3	95	373	293	116
CA33ALT	114	53	-54	55
CA35ALT	93	167	80	87
CA3F1	20	37	85	28
CA315	29	149	414	84
CA3F2	20	95	375	43
L67F1	64	120	88	81
Annual Mean:	64	109	119	64

*[(2012–2011)/2011]*100
Note: Grandmean for period of record (POR) (WY1999–2011; aliquots pooled across time and space)
± 95% C.I. of mean: n = 511; 66 ± 5 ng/g; 50th, 75th, and 90th percentiles for POR were 52, 83, and 140 ng/g, respectively
† Mean includes dropped stations no longer under permit # data from CA3F3

Table 6. THg (mean±SD,n) in sunfish (*Lepomis* spp.) collected in WY2011–WY2012 from the non-ECP marsh sites. Mean= nanograms per gram (ng/g) wet weight; SD=standard deviation, n=number of sample (fish).

Site	2011	2012	Between-Year Change (%)$	Cumulative Mean
LOXF4	115±34, 20	135±48, 20	14.5	130
WCA2F1	44±23, 20	59±30, 2	24.8	53
CA2NF	84±67, 20	100±83, 20	16.0	114
HOLYBC	156±45, 20	182±64, 20	14.2	164
ROTENC	338±166, 20	193±115, 20	-74.7	209
WCA2U3	292±136, 20	261±103, 20	-11.9	209
CA33ALT	183±94, 20	201±64, 20	8.9	217
CA35ALT	359±126, 20	254±91, 20	-41.3	255
CA315	404±190, 20	228±81, 20	-77.6	279
CA3F1	112±68, 20	162±66, 20	30.9	122
CA3F2	164±130, 20	69±22, 20	-137.0	124
L67F1	448±233, 20	371±274, 20	-20.9	400
Annual Mean:	185	185	-21.2	190

$[(2011–2011)/2012]*100
NA – Data not available due to low water or no fish available
Note: Grandmean for period of record (POR) (WY1999–2012)
± 95% C.I. of mean: n = 2996; 188 ± 6 ng/g; 50th, 75th, and 90th percentiles for POR were 140, 241, and 380 ng/g, respectively
† Mean includes dropped stations no longer under permit

Table 7. Age-standardized (EHg3) and arithmetic mean concentrations of THg in largemouth bass (LMB; *Micropterus salmoides*) fillets (ng/g wet weight) collected in WY2012 from Non-ECP marsh sites. Arithmetic mean, standard deviation, and sample size are shown in parentheses.

Site	EHg3 ± 95th C.I. (mean ± 1 SD, n) ng/g wet	Between-Year Change (%) (WY2011 to WY2012)	Cumulative EHg3
LOXF4	NA NA	NA	448
WCA2F1	NA	NA	259
CA2NF	428±84 (451±222, 20)	32.8	426
HOLYBC	571±37 (551±120,20)	-37.9	604
ROTENC	NA (NA)	NA	806
WCA2U3	777±39 (512±226,20)	-60.9	8158
CA33ALT	NA (NA)	NA	1,311
CA3F3	621±97 (425±198,20)	-10.5	529
CA35ALT	NA	NA	NA
CA315	NA (NA)	NA	835
CA3F2	NA (424±208,2)	31.6	474
L67F1	1,431 ± 142 (1377±324,20)	-4.8	1,310

$[(WY2012–WY2011)/WY2012]*100
NA – Data not available due to low water or no fish available
Note: Cumulative mean for period of record (POR) (WY1999–WY2012)
± 95% C.I. of mean: n = 2460; 555 ± 19 ng/g; 50th, 75th, and 90th percentiles for POR were 437, 681, and 1011 ng/g, respectively
† Mean includes dropped stations no longer under permit

Mosquitofish

THg levels in mosquitofish collected from marsh sites in WY2012 ranged from 21 nanograms per gram (ng/g) at site WCA2F1 to 373 ng/g at site WCA2U3 (**Table 5**; **Figure 2**). The average annual basin-wide THg concentration in mosquitofish collected in WY2012 was 109 ng/g (**Table 5**; **Figure 6**), which is on average 45 ng/g above the basin-wide mean concentration in WY2011 (64 ng/g) and a 119 percent increase. The mean aliquot for tissue THg concentrations in mosquitofish for the POR (WY1999–WY2011; n = 511) was 66 ng/g. In WY2012, THg levels in mosquitofish increased at ten of the twelve sites (**Table 5**). The mosquitofish THg concentration in WCA2U3 in WY2012 was 373 ng/g, which is the highest value recorded for mosquitofish in the Everglades. **Figure 7** shows that the spatial variability in mean mosquitofish THg levels is relatively high. A few stations reveal consistently low (e.g., WCA2F1, CA2NF, CA3F2) or high (WCA2U3 and L67F1) levels. Several sites displayed marked changes in THg concentration in WY2012: mosquitofish THg concentration decreased by 65 and 54 percent in ROTENC and CA3ALT, respectively, and increased by 293, 375, and 400 percent in WCA2U3, CA3F2 and CA315, respectively (**Figure 6**). Since WY2006, sites WCA2U3, CA33ALT, CA35ALT, and ROTENC have shown increases in THg levels; however, none of the sites have shown statistically significant increases (Spearman Rank correlation, all $p>0.05$).

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 for WY2012 reflects the impact of a La Niña event on dry season hydrology. WY2012 was a drought year with the dry season rainfall below-average in the region. Following the drought months, there were three high rainfall events in October 2011 (for details, see Volume I, Chapter 2). A previous study conducted in STA-2 showed that the dry condition followed by rainfall is favorable for mercury methylation (Rumbold and Fink, 2006). Most mosquitofish samples in WY2012 were collected between October and November 2011 and may have been impacted by high methylmercury resulting from soil oxidation and flux upon rewetting.

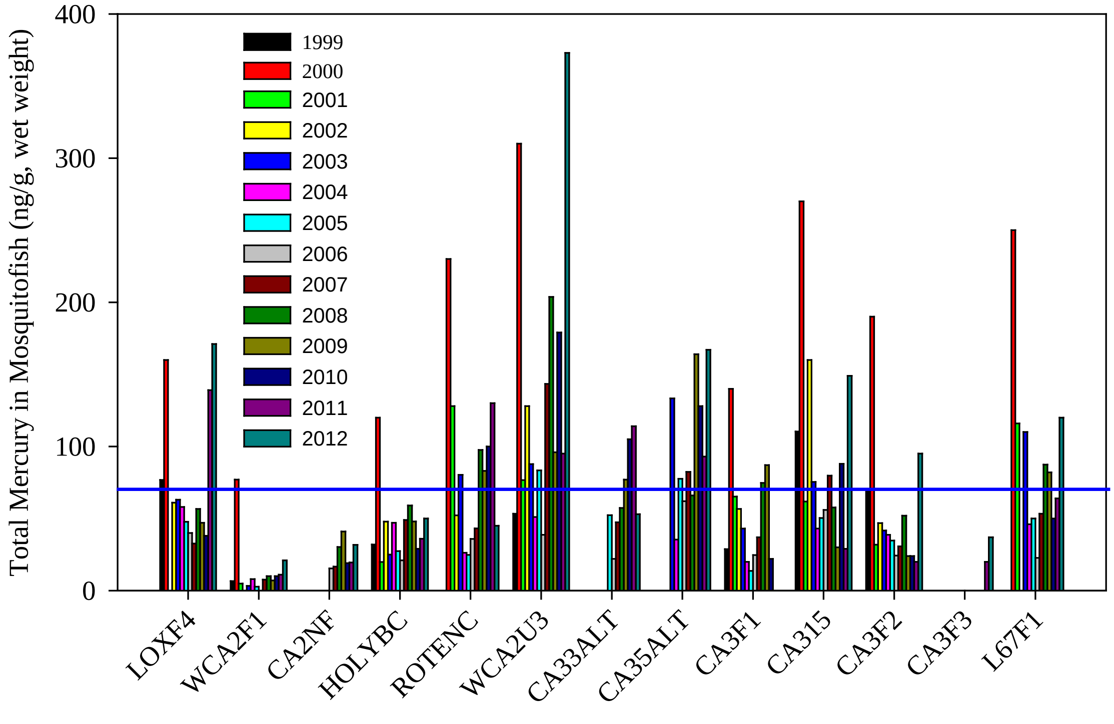


Figure 5. THg concentrations in mosquitofish (ng/g, wet weight) collected at current non-ECP marsh sites from WY1999–WY2012. The blue line is USEPA criterion of THg (77 ng/g) for trophic level 3 (TL3) fish. [Note: Not all sites were sampled in all years. TL3 criterion is used as a surrogate for mosquitofish, which is considered to be representative of fish species between TL2 and TL3.]

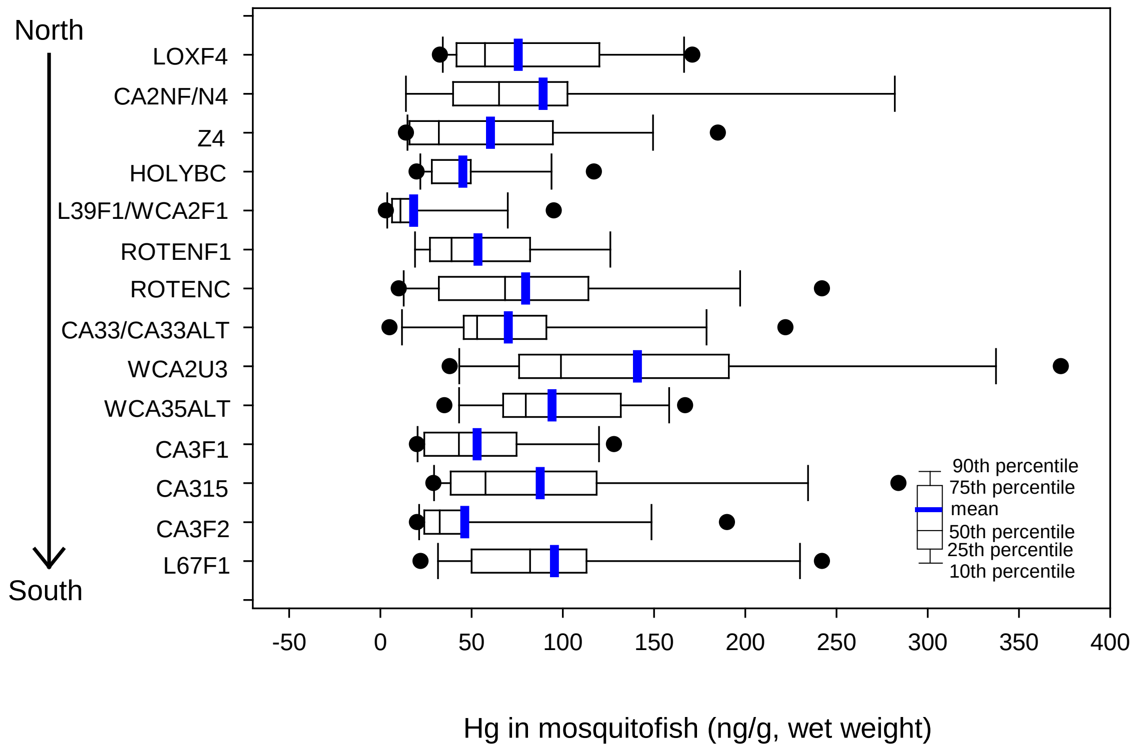


Figure 6. THg concentration (ng/g, wet weight) distributions in mosquitofish collected at non-ECP marsh sites from WY1999–WY2011. [Note: Not all sites were sampled in all years.]

Sunfish

Four species of sunfish—bluegill (*Lepomis macrochirus*), redear sunfish (*L. microlophus*), spotted sunfish (*L. punctatus*) and warmouth (*L. gulosus*) —have been sampled for THg analysis from across the EPA, Holey Land Wildlife Management Area, and Rotenberger Wildlife Management Area 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 6**) in the ENP Shark River Slough. Long-term low levels remain in or around L39F1 (WCA2F1). The grandmean of all sites in WY2012 was 193 ng/g, compared to the grandmean of 185 ng/g in WY2011, indicating a slight but significant increase (Mann Whiney U Test, $p < 0.05$). In WY2012, half of the sites showed decreases in THg concentration in sunfish with a range from 11.9 to 137 percent (CA3F2). The average decrease was 21.2 percent, compared to 30.1 percent between WY2011 and WY2010 (Gu and Howard 2012). Half of the monitoring sites showed increases in sunfish THg concentration with a range from 8.9 to 30.9 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 (Spearman Rank Correlation, $p < 0.05$) over time were found at CA35ALT ($r=0.54$, $n=12$ years), HOLYBC ($r=0.70$; $n=12$ years), and WCA2U3 ($r=0.75$, $n=14$ years).

In WY2012, sunfish continued to show significant spatial variation in THg levels (**Table 6**; **Figure 8**); One-way ANOVA on rank for sites showed significant differences among sites (df = 11; H = 80; p < 0.001). Fish from sites CA35ALT, CA315, L67F1, and WCA2U3 contained the highest median concentrations (ranging from 218–389 ng/g). WCA2F1 continued to show the lowest THg in sunfish (58 ng/g) while L67F1 remained the highest (389 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).

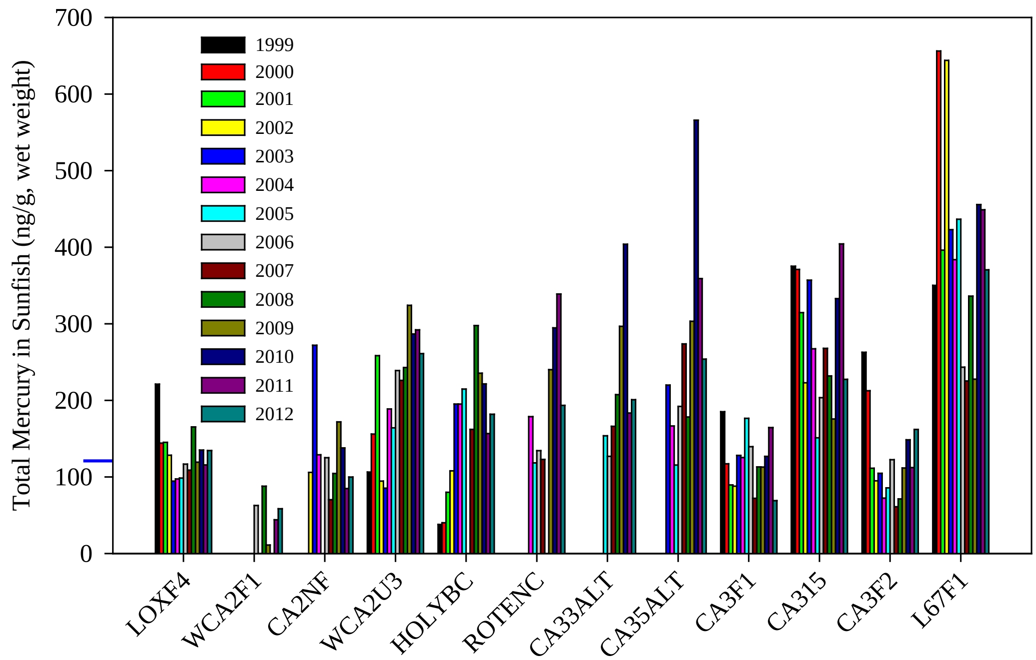


Figure 7. THg concentration of whole sunfish collected at non-ECP marsh sites from WY1999–WY2012. Prior to 2006, collections were made at site Z4 (CA2NF/N4 after January 1, 2006). Collections on CA3F1 between 1999 and 2010 were replaced by CA3F3 since WY2011.

As observed over the past several years, in WY2012 fish species were a significant factor in tissue mercury concentrations when data were pooled across sites (Kruskal-Wallis Analysis; df = 3; H = 10.28; p = 0.016). In WY2012, median THg levels were lowest in redear sunfish (138 ng/g) followed by bluegill sunfish (170 ng/g) and warmouth sunfish (176 ng/g), which are not statistically different from each other (Dunn's test, p > 0.05). Spotted sunfish had the highest THg concentration (454 ng/g) which is significantly different from bluegill and redear sunfish (Dunn's test, p<0.05), but is not different from warmouth sunfish (Dunn's test, p>0.05).

Largemouth Bass

During October–November 2011, 102 largemouth bass (LMB) (*Micropterus salmoides*) were collected at the downstream sites, which is considerably less than the number of samples (163 fish) collected in WY2011. As a result of low water levels, LMB could not be collected from 50 percent of the sites including LOXF4, WCA2F1, CA2F1, CA33ALT, CA35ALT; and CA315, and only two LMB were collected from CA3F2. The lowest THg value was 153 ng/g in a one-year-old LMB collected from CA2NF, and the highest THg concentration was 2,350 ng/g in a four-year-old LMB from L67F1. Site-specific, age-standardized concentrations (estimated for a three-year-old bass symbolized as EHg3) ranged from 428 ng/g at CA2NF to 1,431 ng/g at L67F1 (**Table 6** and **Figure 9**). Based on sites where it was appropriate to calculate site-specific EHg3 and with sufficient data, the grandmean value was 766 ng/g in WY2012, representing a 10 percent decrease over the grandmean estimated for WY2011.

Similar to previous years, in WY2012, LMB exhibited spatial patterns in tissue Hg concentrations (**Table 6**; **Figure 9**). 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 ETHg3 (estimated total mercury in 3-year old largemouth bass) concentration of 777 ng/g in WY2012 compared to 1055 ng/g in WY2011. This is likely related to the site-specific mercury methylation rate, which is controlled by the concentration of sulfate. One-way ANOVA analysis on EHg3 or age 3 LMB revealed significant differences ($p < 0.05$) in Hg concentration among sites. The high EHg3 concentrations were consistently observed in L67F1, exceeding 1,000 ng/g for all years except 2008. Corresponding to the highest LMB Hg level in L67F1 among the monitoring sites, sunfish THg concentration (371 ng/g) was also the highest at this site. However, mosquitofish THg concentration at this site was not the highest among sites. 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 9**) with two exceptions. LMB THg concentrations displayed a significant increasing trend at HOLYBC ($r=0.626$, $p = 0.01$, $n=14$ yrs) and a significant decreasing trend at CA315 ($r=-593$, $p=0.03$, $n=13$ yrs). 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 compared to those in WY2011. A similar pattern is also found in HOLYBC (**Figure 9**).

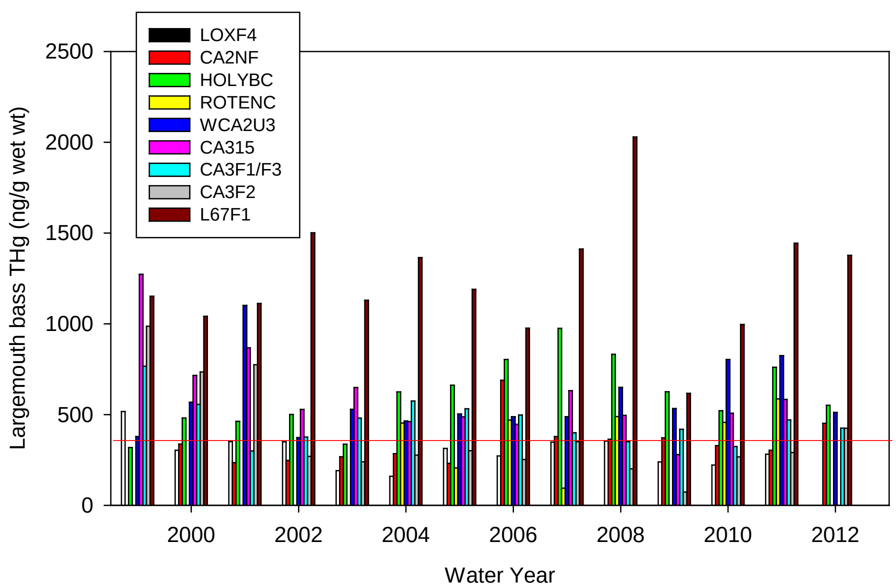


Figure 8. THg concentrations in largemouth bass collected at downstream sites from WY1999–WY2012. [Note: Site WCA2F1 is the same as L39F1. CA3F1 has been replaced by CA3F3 since WY2011.]

PREDATOR PROTECTION CRITERIA

Mercury levels in fish tissues can also be evaluated and put into perspective regarding mercury risk to wildlife. The U.S. Fish and Wildlife Service (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 TL 3 and TL 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 (TL2 and TL3, respectively), depending on age; Loftus et al., 1998] exceeded both the USEPA criterion of 77 ng/g[1] and USFWS criterion of 100 ng/g. These exceedances were from the LOXF4, WCA2U3, and CA33ALT, CA315, CA3F2, and L67F1 sites (**Table 5**). However, sunfish THg level decreased by 21 percent compared with WY2011. In WY2012, nearly 90 percent of all sunfish, which are TL3, exceeded the USEPA criterion of 77 ng/g, 80 percent exceeded the USFWS 100 ng/g criterion, and 14 percent exceeded the USEPA 346 ng/g criterion (**Table 6)**. As discussed in previous reports, these findings are significant because sunfish and mosquitofish represent the preferred prey item of many fish-eating species in the Everglades.

In WY2012, there was a decline in THg concentration for LMB although fish samples were collected from only six of the twelve monitoring sites (**Table 7**). Based on the equation developed for whole-body weighted THg concentration (whole body THg = 0.695 x fillet THg (Lange et al., 1998), 57 percent of all LMB exceeded the TL4 criteria in WY2012, which is virtually identical to WY2011. Exceedances in WY2012 were primarily at stations L67F1 (all fishes), followed by HOLYBC (75 percent), WCA2U3 (45 percent), and CA2NF (40 percent). In WY2012, 22.5 percent of fish samples exceeded the USEPA human health criterion of 850 ng/g, which is a limited consumption criterion for women of child-bearing age and young children. These samples came from station L67F1 (20 fish), CA3F3 (2 fish), and WCA2U3 (1 fish). No fish samples exceeded the FDOH human health no consumption advisory of 1,500 ng/g in WY2012. Further information on Florida fish consumption advisories is available on the FDOH website at www.doh.state.fl.us/floridafishadvice. Based on WY2012 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.

[1] TL3 criterion is used as a surrogate for mosquitofish, which is considered to be representative of fish species between TL2 and TL3.

WADING BIRD FEATHERS FROM WATER CONSERVATION AREA 3A

In WY2012, 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.

Table 8 summarizes great egret feather mercury concentration data collected within Water Conservation Area 3A from 1994 to 1995, and from 2009 to 2011.

Table 8. Standardized least square mean of THg (µg/g) for a chick with a 7.1 cm bill (arithmetic mean concentration ± 1SD, n) in growing scapular feathers collected annually from great egret nestlings (2-3 weeks old) at colonies within Water Conservation Area 3A. No samples were able to be collected in WY2012 due to permit constraints.

Year	JW1	L67/L67UF	Cypress City / Cypress City UF	Alley North / Alley North UF	Vacation	Hidden	6Bridge	Jourle	Twest	Younteau
1994[1,2]	21 ± 6 (25 ± 8, 9)	16 ± 4 (NA)	NS	NS	NS	NS	NS	NS	NS	NS
1995[2]	14 ± 3 (N/A ± 8)	16 ± 6 (16 ± 6, 14)	NS	NS	NS	NS	NS	NS	NS	NS
1999	7 ± 1 (4 ± 2, 13)	NC (4 ± 2, 20)	NS	NS	NS	NS	NS	NS	NS	NS
2000	7 ± 1 (3 ± 2, 10)	NC (3 ± 1, 10)	NS	NS	NS	NS	NS	NS	NS	NS
2001	Failed to initiate nesting	NC (7 ± 3, 13)	NS	NS	NS	NS	NS	NS	NS	NS
2002	Colony abandoned	NC (2 ± 0.5, 6)	NS	NS	NS	NS	NS	NS	NS	NS
2003	Failed to initiate nesting	NC (5 ± 2, 3)	NC (6 ± 2, 15)	NS	NS	NS	NS	NS	NS	NS
2004	Failed to initiate nesting	4 ± 2 (1 ± 1, 10)	5 ± 2 (2 ± 1, 10)	NS	NS	NS	NS	NS	NS	NS
2005	NS	Failed to initiate nesting	NS	NC (4 ± 2, 3)	NS	NS	NS	NS	NS	NS
2006	NS	NC (5 ± 2, 6)	NS	NC (3 ± 2, 8)	NS	NS	NS	NS	NS	NS
2007	NS	NC (6.7 ± 3.7, 10)	NC (2.2 ± 1, 10)	NS	NS	NS	NS	NS	NS	NS
2008[3]	NS	NA	NC (0.2, 2)	NA	NS	NS	NS	NS	NS	NS
2009[3]	NS	NC (5 ± 1, 2)	NC (8 ± 3, 7)	NC (11 ± 4, 4)	NC (8 ± 3, 8)	NC (4 ± 2, 10)	NC (9 ± 3, 6)	NS	NS	NS
2010[3]	NS	NC (7.7 ± 0.7, 2)	NC (7 ± 5, 10)	NC (9.7 ± 1.4, 10)	NS	NC (4 ± 1.7, 10)	NS	NS	NS	NS
2011[3]	NS	NS	NS	NS	NC (12.0 ± 3.3, 5)	NC (3.6 ± 0.4, 10)	NS	NC (15.6 ± 1.2, 5)	NC (8.3 ± 0.8, 8)	NC (7.2 ± 1.3, 6)

[1] Concentrations standardized to a bill length of 5.6 centimeters (cm)

[2] Data from P. Frederick et al. (1997)

[3] Data from P. Frederick, University of Florida

NA – Data not available

NC – Not calculated where slope of regression was not significant ($p > 0.05$)

NS – Not sampled

Estimated mean age of sampled nestlings based on bill length was 16 days in 1994; 24 days in 1995; 15 days in 1999; 16 days in 2000; 15 days in 2001; 13 days in 2002 and 2003; 12–14 days in 2004; 12 days in 2005; 28–29 days in 2006; 19 days in 2007; 28 days in 2008; 33 days in 2009; 33 days in 2010 and 26–42 days in 2011.

OPTIMIZING THE MONITORING NETWORK

Non-ECP mercury monitoring networks are reviewed routinely 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 the 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 WY2012.

DOWNSTREAM GREAT EGRET FEATHER MONITORING (PROGRAM HGBM):

- No changes or modifications in CY2011.

MERCURY DEPOSITION NETWORK (MDN) MONITORING:

- No changes or modifications in CY2011.

LITERATURE CITED

Atkeson, T. and P. Parks. 2002. Chapter 2B: Mercury Monitoring, Research and Environmental Assessment. In: *2002 Everglades Consolidated Report*, South Florida Water Management District, West Palm Beach, FL.

Bates, A.E., W.H. Orem, J.W. Harvey and E.C. Spiker. 2002. Tracing Sources of Sulfur in the Florida Everglades. *Journal of Environmental Quality*, 31: 287-299.

Bloom, N.S. 1992. On the Chemical Form of Mercury in Edible Fish and Marine Invertebrates. *Can. J. Fish. Aquat. Sci.*, 49: 1010-1017.

Cabral, J.A. and J.C. Marques. 1999. Life History, Population Dynamics and Production of Eastern Mosquitofish, *Gambusia holbrooki* (Pisces, Poeciliidae), in Rice Fields of the Lower Mondego River Valley, Western Portugal. *Acta Oecologica*, 20: 607-620.

Eisler, R. 1987. Mercury Hazards to Fish, Wildlife and Invertebrates: A Synoptic Review. *U.S. Fish Wildl. Serv. Biol. Rep.*, 85 (1.10).

FDEP. 2003. Integrating Atmospheric Mercury Deposition with Aquatic Cycling in South Florida: An Approach for Conducting a Total Maximum Daily Load Analysis for an Atmospherically Derived Pollutant. Florida Department of Environmental Protection, Tallahassee, FL.

Fink, L.E., D.G. Rumbold and P. Rawlik. 1999. Chapter 7: The Everglades Mercury Problem. G. Redfield, ed. In: *1999 Everglades Interim Report*, South Florida Water Management District, West Palm Beach, FL.

Frederick, P.C., M.G. Spalding, M.S. Sepulveda, G.E. Williams, Jr., S.M. Lorazel and D.A. Samuelson. 1997. Effects of Elevated Mercury on Reproductive Success of Long-Legged Wading Birds in the Everglades. Final Report. Prepared by the University of Florida for the Florida Department of Environmental Protection, Tallahassee, FL.

FTN Associates. 1999. Everglades Mercury Baseline Report for the Everglades Construction Project under Permit No. 199404532. Prepared for the South Florida Water Management District, West Palm Beach, FL.

Gabriel, M., N. Howard, F. Matson, S. Atkins and D. Rumbold. 2007. Appendix 3B-1: Annual Permit Compliance Monitoring Report for Mercury in Downstream Receiving Waters of the Everglades Protection Area. In: *2008 South Florida Environmental Report – Volume I*, South Florida Water Management District, West Palm Beach, FL.

Gilbert, R.O. 1987. *Statistical Methods for Environmental Pollution Monitoring.* Van Nostrand Reinhold, New York, NY.

Gilmour, C.C., E.A. Henry and R. Mitchell. 1992. Sulfate Stimulation of Mercury Methylation in Freshwater Sediments. *Environmental Science and Technology*, 26: 2281-2287.

Gilmour, C.C., G.S. Riedel, M.C. Ederington, J.T. Bell, J.M. Benoit, G.A. Gill and M.C. Stordal. 1998. Methylmercury Concentrations and Production Rates Across a Trophic Gradient in the Northern Everglades. *Biogeochemistry*, 40: 327-345.

Gilmour, C.C. and D.P. Krabbenhoft. 2001. Appendix 7-4: Status of Methylmercury Production Studies. G. Redfield, ed. In: *2001 Everglades Consolidated Report*, South Florida Water Management District, West Palm Beach, FL.

Grieb, T.M., C.T. Driscoll, S.P. Gloss, C.L. Schofield, G.L. Bowie and D.B. Porcella. 1990. Factors Affecting Mercury Accumulation in Fish in the Upper Michigan Peninsula. *Environ. Toxicol. Chem.*, 9: 919-930.

Gu, B. and N. Howard. 2012. Appendix 3-2, Attachment F: Annual Permit Compliance Monitoring Report for Mercury in Downstream Receiving Waters of the Everglades Protection Area. In: *2012 South Florida Environmental Report – Volume III,* South Florida Water Management District, West Palm Beach, FL.

Guentzel, J. 1997. The Atmospheric Sources, Transport and Deposition of Mercury in Florida. Ph.D. Thesis. Florida State University, Tallahassee, FL.

Haake, P.W. and J.M. Dean. 1983. Age and Growth of Four Everglades Fishes Using Otolith Techniques. Report to the National Park Service, Everglades National Park, Homestead, FL. May, 1983.

Hakanson, L. 1980. The Quantification Impact of pH, Bioproduction and Hg-Contamination on the Hg Content of Fish (Pike). *Environ. Pollut., (Series B)*, 1: 285-304.

Haynes, J. and C. Cashner. 1995. Life History and Population Dynamics of the Western Mosquitofish: A Comparison of Natural and Introduced Populations. *J. Fish Biol.,* 46: 1026-1041.

Jeremiason, J.D., D.R. Engstrom, E.B. Swain, E.A. Nater, B.M. Johnson, J.E. Almendinger, B.A. Monson and R.K. Kolka. 2006. Sulfate Addition Increases Methylmercury Production in an Experimental Wetland. *Environmental Science and Technology*, 40: 3800-3806.

Lai, S., T.M. Holsen, P.K. Hopke and P. Liu. 2007. Wet Deposition of Mercury at a New York State Rural Site: Concentrations, Fluxes, and Source. *Atmospheric Environment*. 41: 4337-4348.

Lange, T.R., D.A. Richard and H.E. Royals. 1998. Trophic Relationships of Mercury Bioaccumulation in Fish from the Florida Everglades. Annual Report. Florida Game and Fresh Water Fish Commission, Fisheries Research Laboratory, Eustis, FL. Prepared for the Florida Department of Environmental Protection, Tallahassee, FL.

Lange, T.R., D.A. Richard and H.E. Royals. 1999. Trophic Relationships of Mercury Bioaccumulation in Fish from the Florida Everglades. Annual Report. Florida Game and Fresh Water Fish Commission, Fisheries Research Laboratory, Eustis, FL. Prepared for the Florida Department of Environmental Protection, Tallahassee, FL.

Loftus, W.F., J.C. Trexler and R.D. Jones. 1998. Mercury Transfer through the Everglades Aquatic Food Web. Final Report submitted to the Florida Department of Environmental Protection, Tallahassee, FL.

Marsik, F.J., G.J. Keeler and M.S. Landis. 2007. The Dry-Deposition of Speciated Mercury to the Florida Everglades: Measurements and Modeling. *Atmospheric Environment*, 41: 136-149.

Mercury Technical Committee. 1991. Interim Report to the Florida Governor's Mercury in Fish and Wildlife Task Force and Florida Department of Environmental Regulation. Center for Biomedical and Toxicological Research, Florida State University, Tallahassee, FL. 60 pp.

Nilles, M. 2004. The Mercury Deposition Network (MDN) – National Status and Trends. Presented at the U.S. Geological Survey 2004 Mercury Workshop (August 17–18, 2004) Reston, VA.

Renner, R. 2001. Everglades Mercury Debate. *Environ. Science and Technology*, 35: 59A–60A.

Rumbold, D.G. 2005. Appendix 2B-1: Annual Permit Compliance Monitoring Report for Mercury in Downstream Receiving Waters of the Everglades Protection Area. G. Redfield, ed. In: *2005 South Florida Environmental Report – Volume I,* South Florida Water Management District, West Palm Beach, FL.

Rumbold, D., N. Niemeyer, F. Matson, S. Atkins, J. Jean-Jacques, K. Nicholas, C. Owens, K. Strayer and B. Warner. 2006. Annual Permit Compliance Monitoring Report for Mercury in Downstream Receiving Waters of the Everglades Protection Area. Appendix 2B-1 In: *2006 South Florida Environmental Report – Volume 1*, South Florida Water Management District, West Palm Beach, FL.

Selin, N.E. and D.J. Jacob. 2008. Seasonal and Spatial Patterns of Mercury Wet Depostion in the United States: Constraints on the Contribtuion for North American Anthropogenic Sources. *Atmopsheric Environment*, 42: 5193-5204.

Sepulveda, M., P.C. Frederick, M.S. Spalding and G.E. Williams Jr. 1999. Mercury Contamination in Free-Ranging Great Egret Nestlings (*Ardea albus*) from Southern Florida, U.S.A. *Environ. Tox. Chem.,* 18: 985-992.

USEPA. 1993. Statistical Methods for the Analysis of Lake Water Quality Trends. EPA-841-R-93-003. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.

USEPA. 1997. Mercury Study Report to Congress. Volume VI: An Ecological Assessment for Anthropogenic Mercury Emissions in the United States. EPA-452/R-97-008. U.S. Environmental Protection Agency, Washington, D.C.

Ware, F.J., H. Royals and T. Lange. 1990. Mercury Contamination in Florida Largemouth Bass. *Proc. Annual Conference of the Southeast Assoc. of Fish Wildlife Agencies*, 44: 5-12.

Wren, C.D. and H.R. MacCrimmon. 1986. Comparative Bioaccumulation of Mercury in Two Adjacent Freshwater Ecosystems. *Water Research*, 20: 763-769.

Zar, J.H. 1996. *Biostatistical Analysis* (3rd edition). Prentice-Hall, Upper Saddle River, NJ.

Attachment G: Statements of Authenticity for Analytical and Sampling Programs

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
WATER QUALITY ANALYSIS DIVISION 1480-9 Skees Road, West Palm Beach, FL 33411
(561) 681-2500 • Fax (561) 681-2539 • http://www.sfwmd.gov/site/index.php?id=339

STATEMENT OF AUTHENTICITY OF ANALYTICAL PROGRAM

DATE: July 26, 2012

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).

7/26/12

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

Date

STATEMENT OF AUTHENTICITY OF SAMPLING PROGRAM

DATE: July 9, 2012

PROJECT: Non-ECP

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

SUBJECT: **Permit Specific Condition 12(e)**
Reporting Period – May 1, 2011 through April 30, 2012

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

Linda Crean
Administrator, Water Quality Monitoring Section
Water Quality Bureau

Date

July 9, 2012

Attachment H:
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 is available upon request.

Attachment I: Hydrological Data

This project information is required by Specific Condition 12(g) of the Non-ECP permit (0237803) and is available upon request.