

Town of Palm Beach
MS4 Permit No. FLS000018-004
Part V.- Monitoring Requirements;
Sub-part A.- Assessment Report
Year 3

Assessment Program Objective

The purpose of this assessment report is to provide information for the Town of Palm Beach to determine the overall effectiveness of its Stormwater Management Program (SWMP) in reducing stormwater pollutant loadings from its Municipal Separate Storm Sewer System (MS4) to receiving water bodies.

Assessment Program Components

As required by the MS4 Permit, the following parts make up this Assessment Program:

- A. **A Water Quality Monitoring** -The water quality monitoring is intended to identify local sources where urban stormwater is adversely affecting surface water resources.
- B. **A Pollutant Loading Estimate** -The pollutant loading exercise is to estimate the Pollutant Loading from the MS4 contributing area, based on land uses and BMPs.
- C. **An Evaluation and Response** - Based on the results from A. and B. and data will be used to:
 - 1. evaluate trends in pollutants loading from the MS4
 - 2. evaluate trends in water quality (of discharge from the MS4)
 - 3. identify portions of the MS4 to be targeted for loading reduction/corrective action

Part A - Water Quality Monitoring Program

The Town's MS4 lies within the Lake Worth Lagoon Segments Central and South referred by FDEP as WBIDS 3226F1 and 3226F2 respectively (See Figure 1). WBID 3226F1 was listed as impaired for nutrient (phosphorus and chlorophyll-a) and copper during the last Group 3 Cycle 3 assessment in 2016. WBID 3226F2 was listed for copper only. The Town utilizes the Palm Beach County MS4 Groups water quality monitoring data.

Monitoring Locations

Based on the location of the outfalls of the Town's MS4 and representative stations of the water quality in the LWL, the following ambient water quality monitoring stations to be used in this assessment program are identified in the following table, along with relevant information about each location.

Ambient Water Quality Monitoring Stations Table

Monitoring Station Number	Location Description	Northing/ Easting	Type	Watershed WBID
LWL-8 {ERM}	Southern Boulevard Bridge	N856238.64 E968284.93	Marine	LWLC 3226F1
LWL-11 {ERM}	Lake Avenue Bridge	N830580.53 E967926.64	Marine	LWLC 3226F1
LWL-13 {ERM}	Ocean Avenue Bridge	N819086.28 E968516.09	Marine	LWLS 3226F2

The location of the monitoring stations relative to the FDEP identified WBIDs is shown in Figure 1.

Figure 1: Water Quality Monitoring Stations



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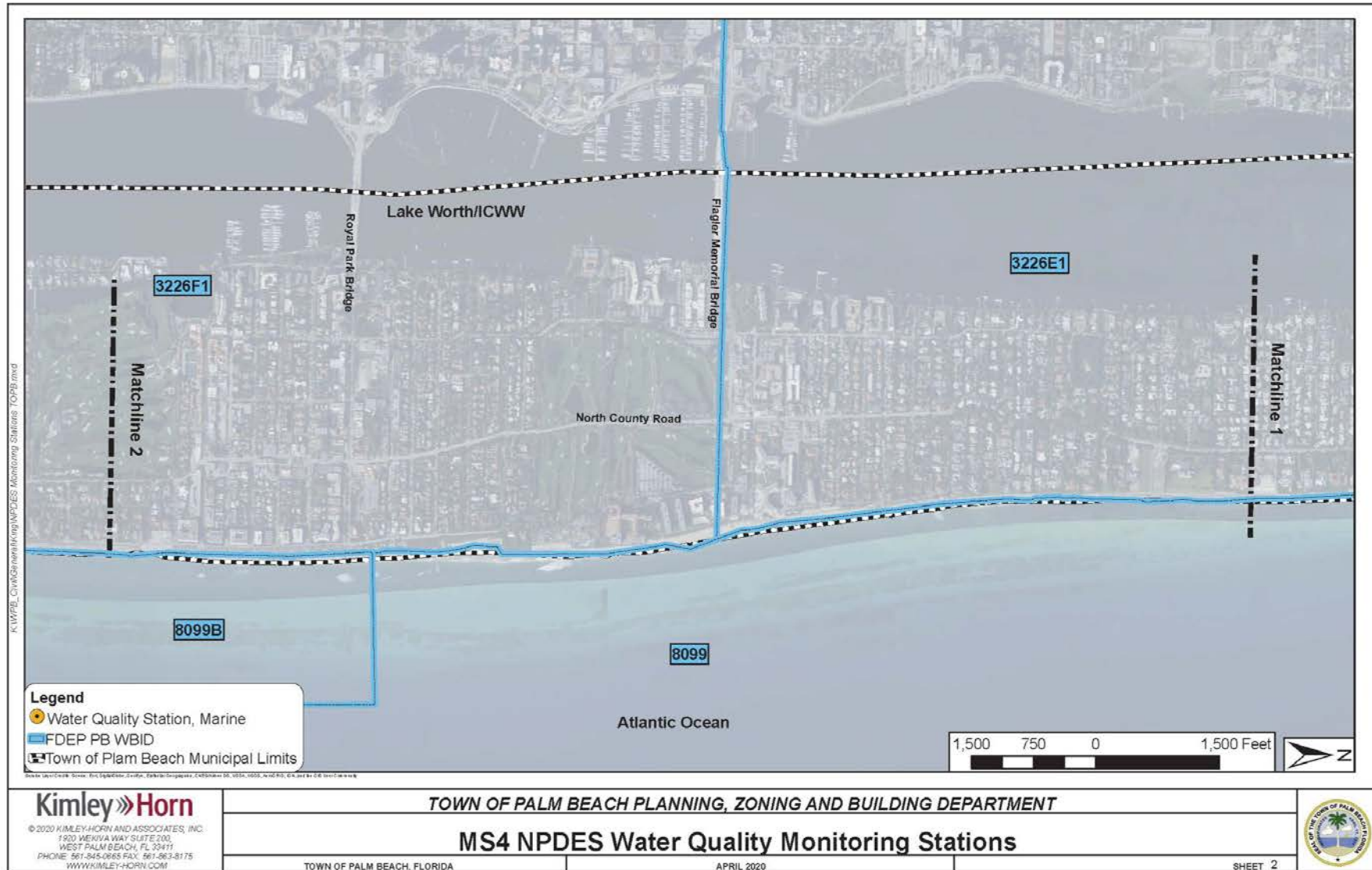


Figure 1: Water Quality Monitoring Stations

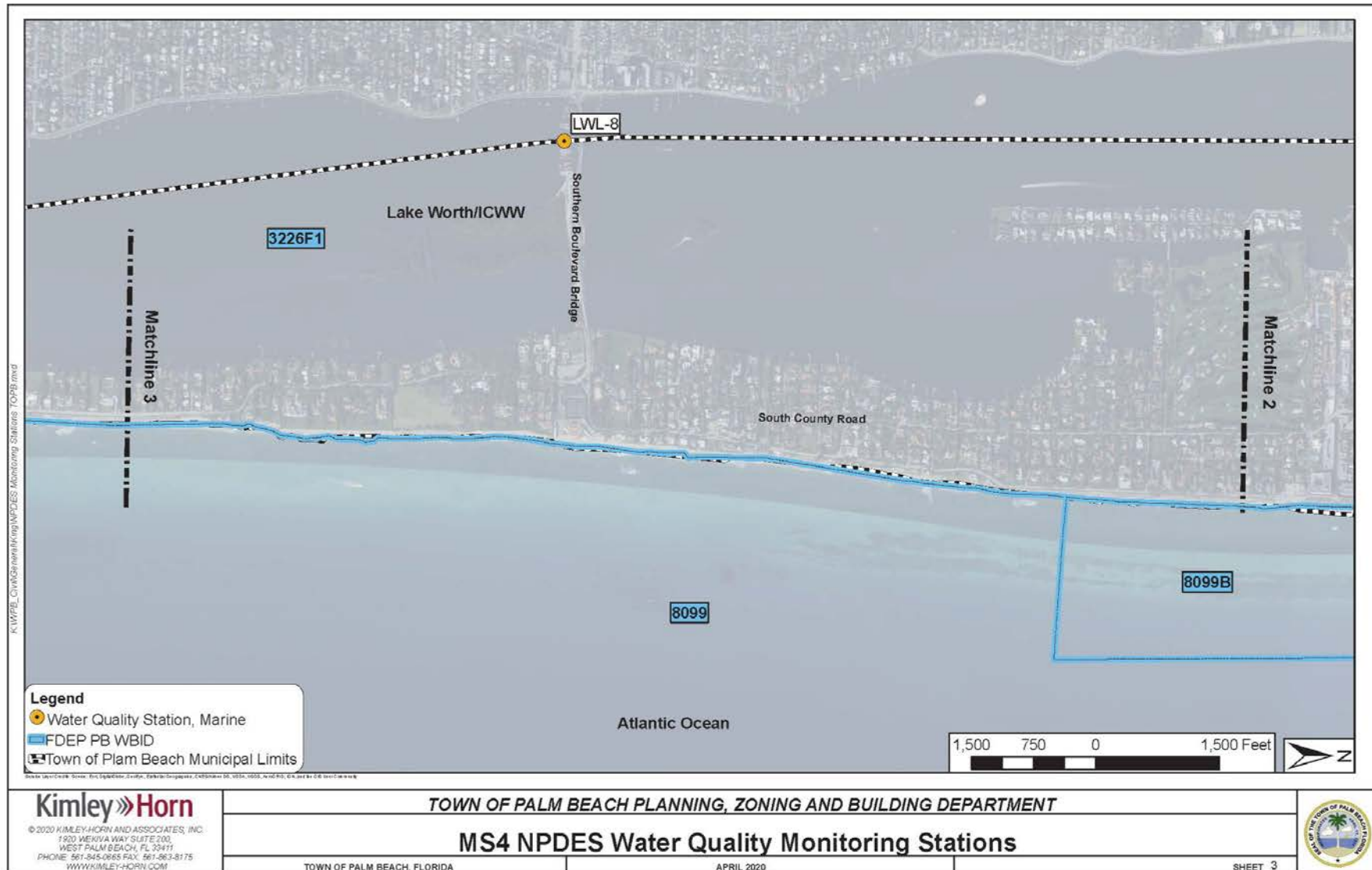


Figure 1: Water Quality Monitoring Stations

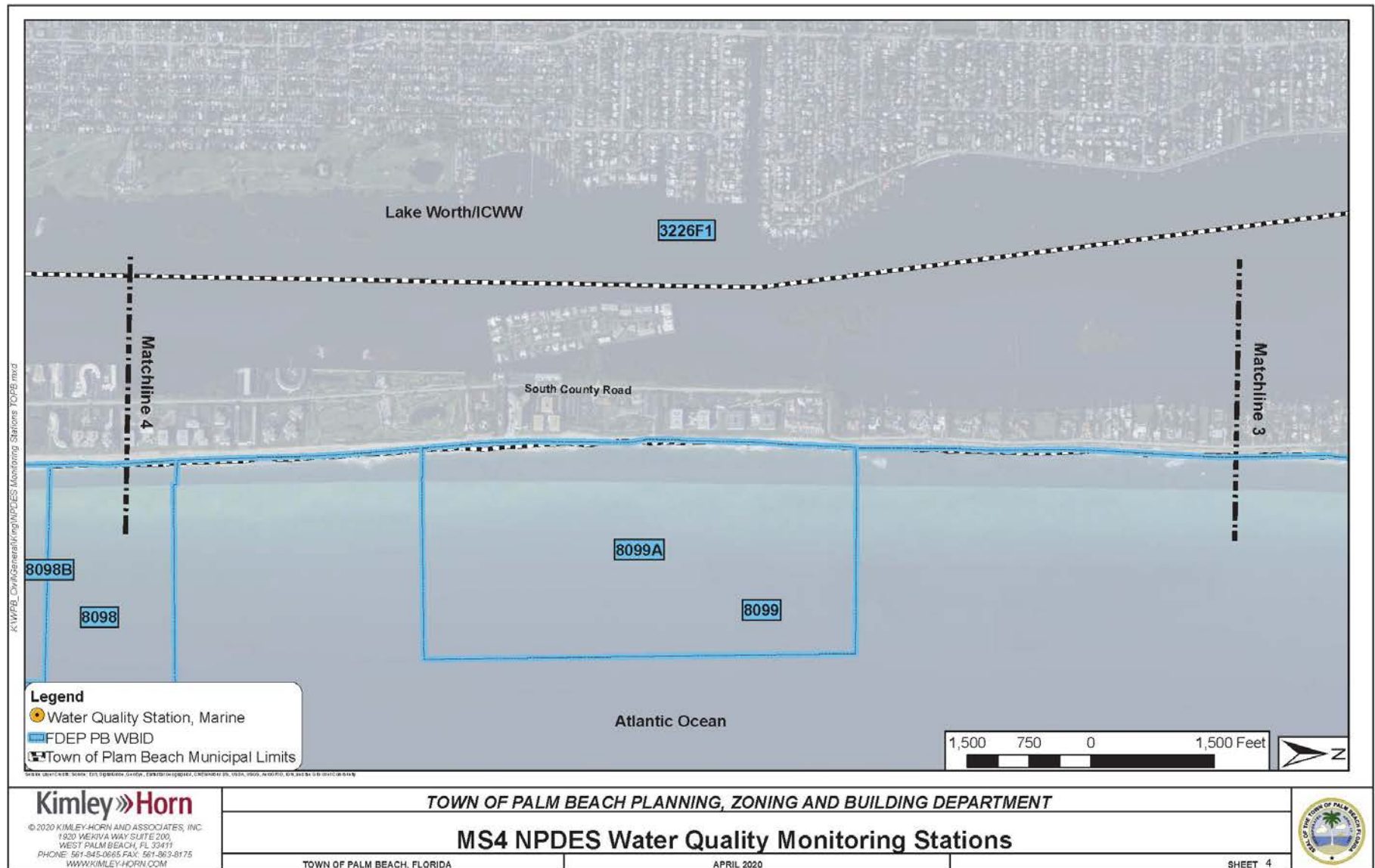
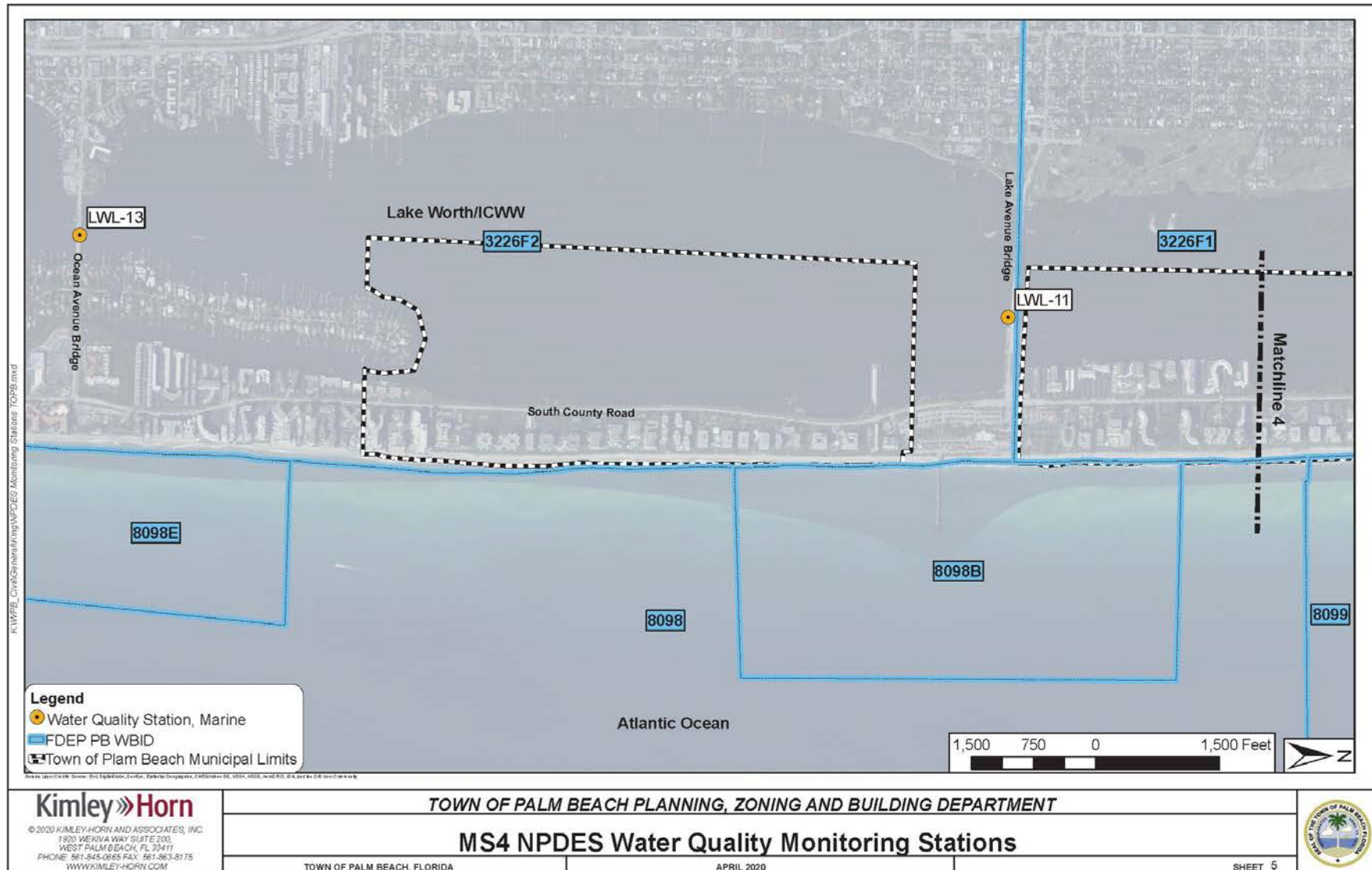


Figure 1: Water Quality Monitoring Stations



Monitoring Parameters

The primary interest that FDEP has regarding the stormwater permitting program is related to nutrients and what impacts these loads create by the introduction of nutrients into the receiving water body. The Town of Palm Beach has reviewed nutrient monitoring data results at the above location. The historical trend using the Mann-Kendall Tau Test Method referenced in the Palm Beach County MS4 Cycle 4, year 3, joint Annual Report was used for evaluating the nutrient levels. Specifically, Total Nitrogen (TN), total Phosphorus (TP) and Chlorophyll-A (a surrogate for nutrient enrichment) are analyzed and evaluated in the table below.

Trends

Period of Record	Station	Total Nitrogen	Total Phosphorus	Chlorophyll-a
1999-2019	LWL-8	Decreasing	Decreasing	Significant Increasing
1999-2019	LWL-11	Decreasing	Decreasing	Significant Increasing
2004-2019	LWL-13	Significant Decreasing	Significant Decreasing	Decreasing

All three water quality monitoring sites show a decreasing trend for the primary nutrients (Total Nitrogen and Total Phosphorus). Chlorophyll-a has an increasing trend for two stations (LWL-8 and LWL-11). Both of these stations are located in the Lake Worth Lagoon Central Segment and receive loading from several MS4 permittees and non-point private entities. Refer to the graphs at the end of this section for a complete historical plot of the data.

Part B - Pollutant Loading Estimate Plan

The Palm Beach County MS4 Group developed pollutant loading estimates for both Cycle 3 and Cycle 4 cycle, using the SIMPLE model based on input from all the co-permittees. In accordance with the MS4 Permit, pollutant loads were estimated for the following parameters: Biochemical Oxygen Demand {BOD₅}, Copper {Cu}, Total Nitrogen {TN}, Total Phosphorus {TP}, Total Suspended Solids {TSS}, Zinc {Zn}. Results are contained in the Group’s Joint Cycle 4 Year 3 Report “Summary of Average Annual Pollutant Loading Model Activities” report (2019). As seen in the table below the Town’s loads for all six (6) water quality parameters are decreasing between the Cycle 3 and Cycle 4.

**Lake Worth Lagoon Pollutant Loadings (lbs/year)
Town of Palm Beach**

Parameter	BOD₅	TSS	TP	CU	ZN	TN
Cycle 3 Loads	35,444	183,401	1,606	91	389	10,964
Cycle 4 Loads	35,452	183,437	1,606	91	398	10,967
Other Reductions:						
Public Education (6%)	2,127	11,006	96	5	23	658
Street Sweeping			144			224
Total Adjusted Cycle 4 Loads	33,325	172,431	1,366	86	363	10,085
Percent Reduction	6%	6%	15%	6%	6%	8%

Part C – Evaluation Response

The Town of Palm Beach stormwater management programs are effective in reducing nutrient loadings. This is supported by the water quality monitoring program and pollutant loading information. At this time there is no need to develop further stormwater management programs.

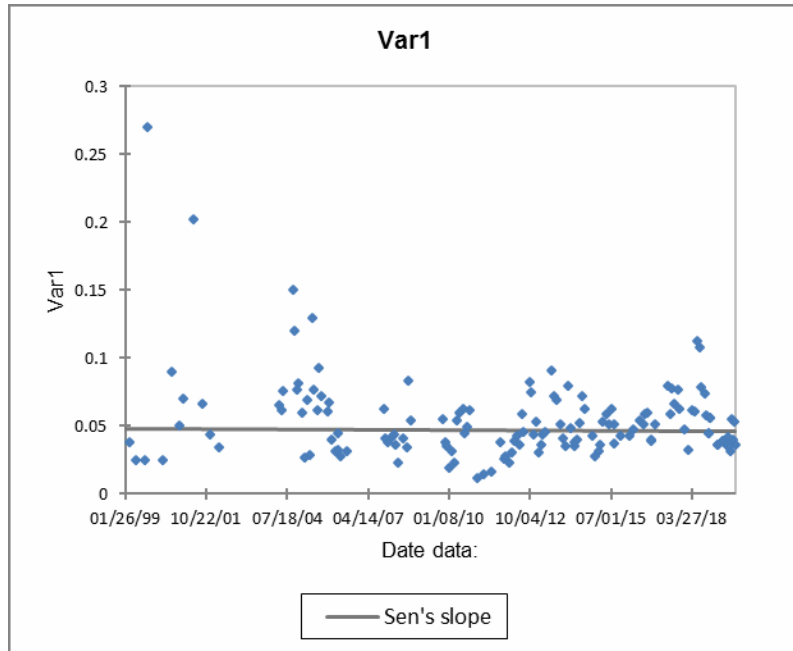


Figure 1: LWL-8-TP Source: Group/Joint Activities - Water Quality Monitoring

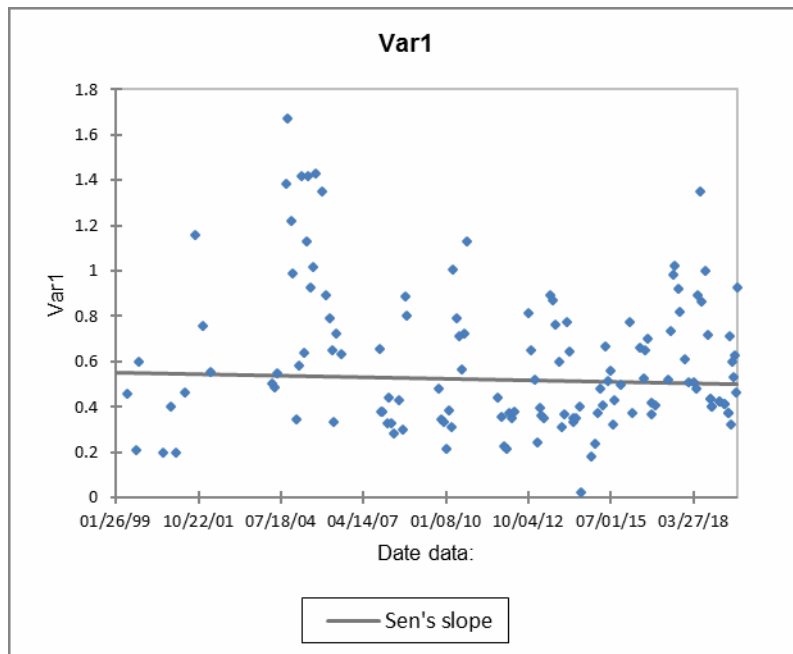


Figure 2: LWL-8-TN Source: Group/Joint Activities - Water Quality Monitoring

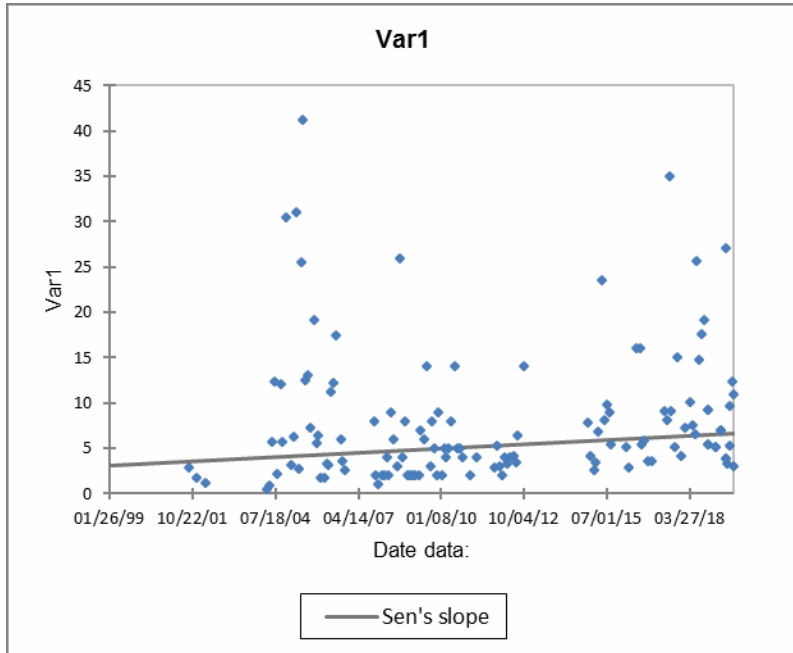


Figure 3: LWL-8- Chlorophyll-A Source: Group/Joint Activities - Water Quality Monitoring

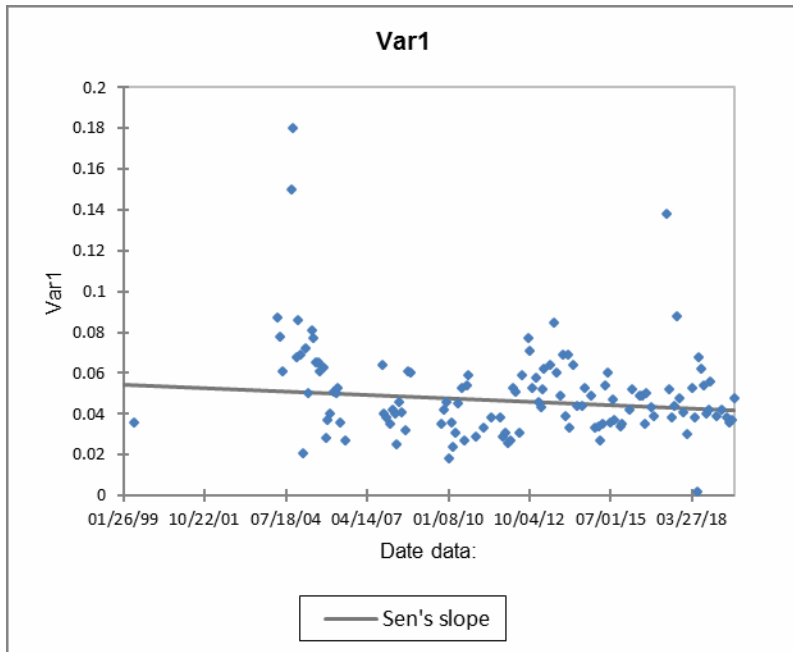


Figure 4: LWL-11-TP Source: Group/Joint Activities - Water Quality Monitoring

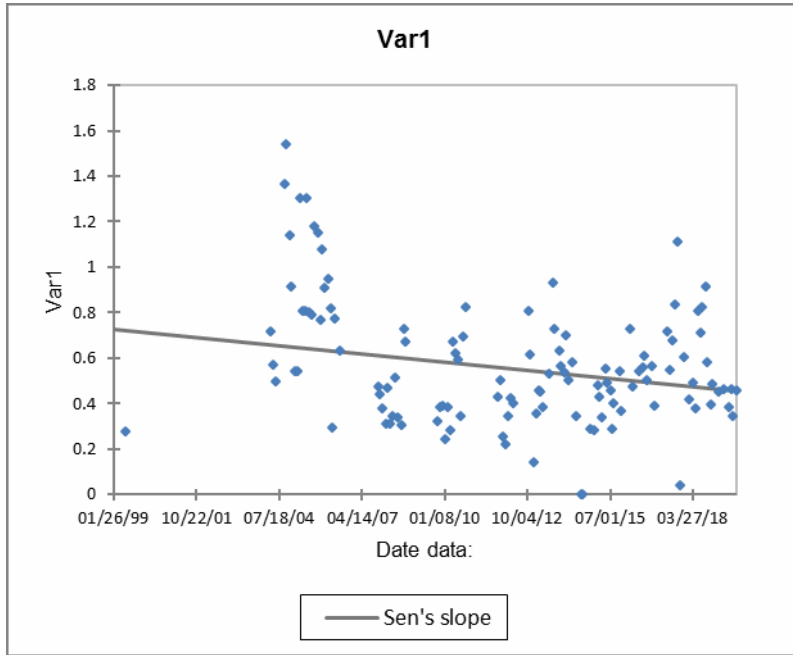


Figure 5: LWL-11-TN Source: Group/Joint Activities - Water Quality Monitoring

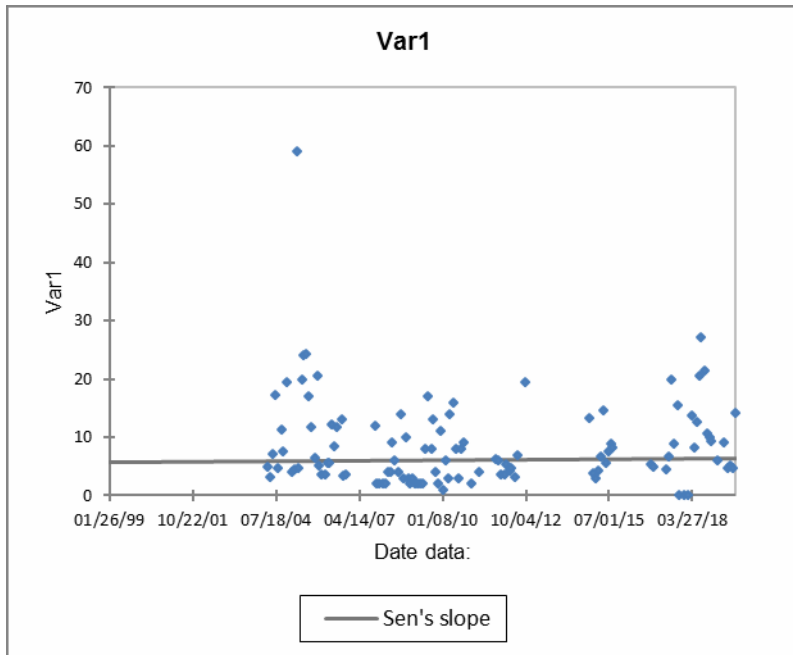


Figure 6: LWL-11- Chlorophyll-A Source: Group/Joint Activities - Water Quality Monitoring

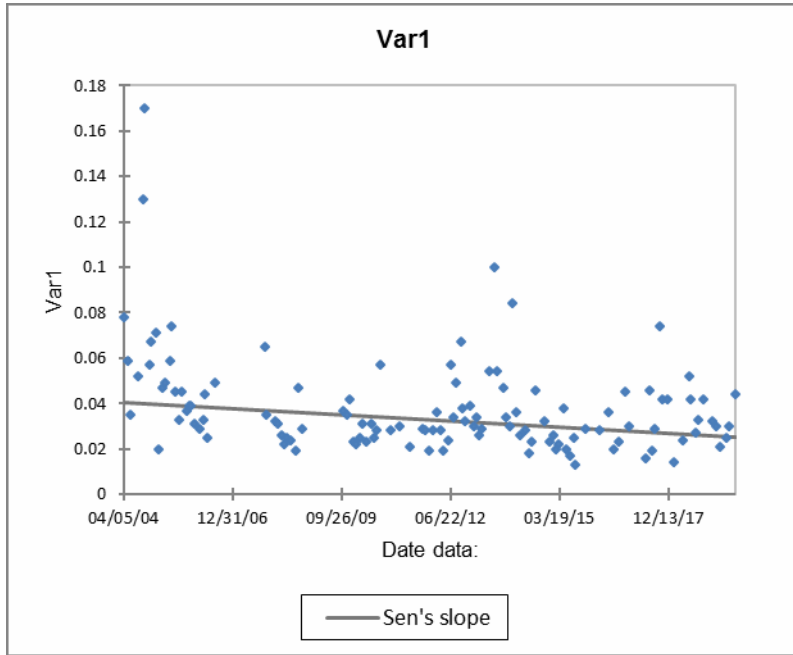


Figure 7: LWL-13-TP Source: Group/Joint Activities - Water Quality Monitoring

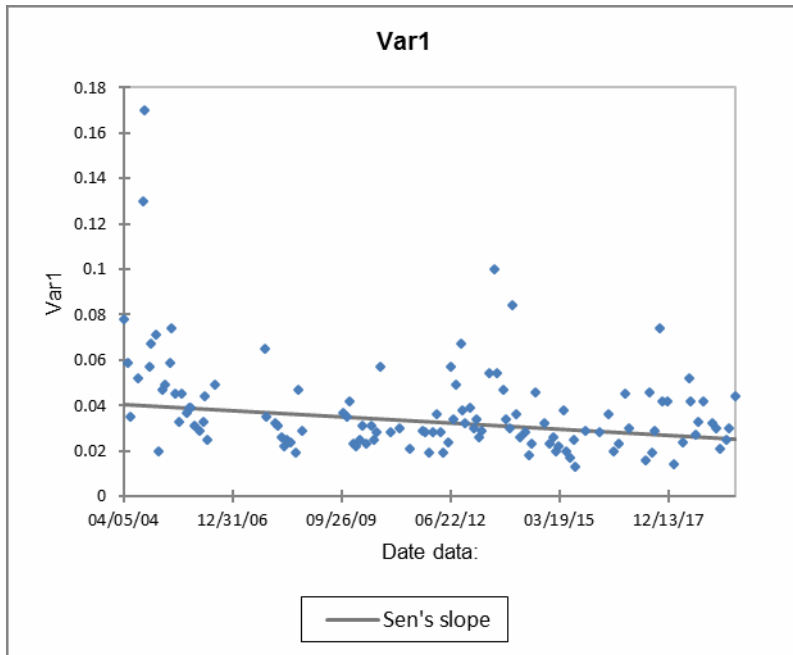


Figure 8: LWL-13-TN Source: Group/Joint Activities - Water Quality Monitoring

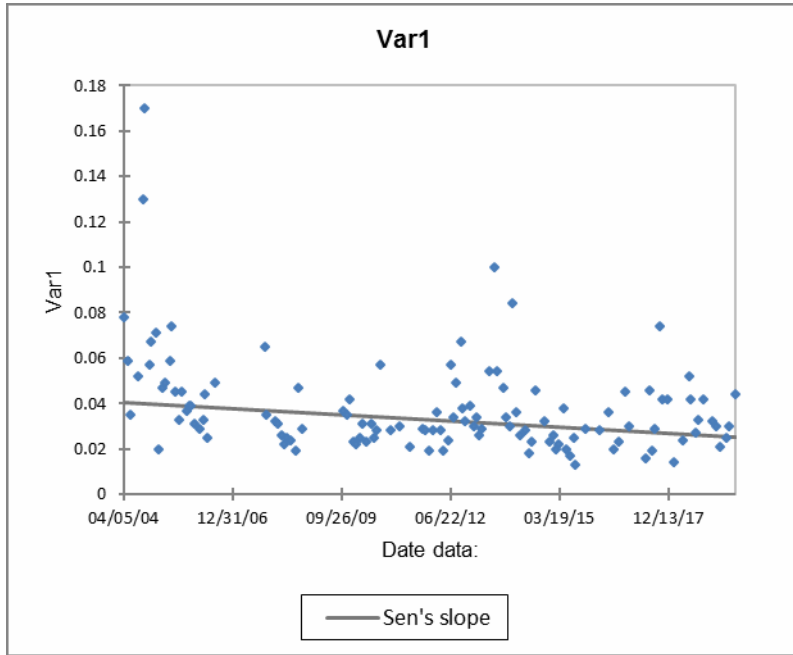


Figure 9: LWL-13-Chlorophyll-A Source: Group/Joint Activities - Water Quality Monitoring