



# Florida Department of Environmental Protection Office of Ecosystem Projects

## Water Conservation Area 1 and Everglades National Park Annual Total Phosphorus Criteria Compliance Assessment – WY2015

Everglades Technical Oversight Committee  
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# Everglades Phosphorus Criterion: Impacted Station Assessment

62-302.540 (4)(d)2 F.A.C. states:

*“...individual stations in the network shall be deemed to be unimpacted for purposes of this rule if the five-year geometric mean is less than or equal to 10 ppb ( $\mu\text{g/L}$ ) ...”*

Long term (i.e. 5 Year) geometric mean total phosphorus (expressed as  $\mu\text{g/L}$ ) for impacted stations within the Refuge by Florida Water Year (May 1 – April 30).

<b>Station</b>	<b>2005 - 2009</b>	<b>2006 - 2010</b>	<b>2007 - 2011</b>	<b>2008 - 2012</b>	<b>2009 - 2013</b>	<b>2010 - 2014</b>	<b>2011 - 2015</b>
LOXA101							
LOXA105				13	14	15	15
LOXA124				12	12	12	11
LOXA130				11	10	10	10
LOXA137				11	11	10	10
LOXA140							
X1						29	27
Z1				35	26	27	26



# Everglades Phosphorus Criterion: Impacted Station Assessment

62-302.540 (4)(d)2 F.A.C. states:

*“...and the annual geometric mean is less than or equal to 15 ppb( $\mu\text{g/L}$ ).”*

Annual geometric mean total phosphorus (expressed as  $\mu\text{g/L}$ ) for impacted stations within the Refuge by Florida Water Year (May 1 – April 30). All data were screened consistent with the TP rule methodology.

Station	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOXA101	19	15		14	10	13	11		18	14	13
LOXA105	38	15		15	11	12	13	17	17	17	13
LOXA124	30	11		13	13	12	10	11	12	13	11
LOXA130	27	15		11	10	10	10	13	9	8	10
LOXA137	23	14		9	10	11	11	15	10	9	10
LOXA140	18	12		8	8	11	9		10	8	11
X1				47		34	27	38	27	26	21
Z1				96	21	26	33	49	18	23	24



# Water Quality Standards for Phosphorus Within the Everglades Protection Area (62-302.540 F.A.C.)

Achievement of the criterion for the ambient monitoring network is evaluated based on data collected monthly from stations in both impacted and unimpacted areas within the WCAs. This presentation focuses on compliance assessment within Water Conservation Area-1

To achieve the criterion, the following four provisions must be met within each network (impacted and unimpacted):

1. The five year geometric mean averaged across all stations is less than or equal to 10  $\mu\text{g/L}$ .
2. The annual geometric mean averaged across all stations is less than or equal to 10  $\mu\text{g/L}$  for three of five water years.
3. The annual geometric mean averaged across all stations is less than or equal to 11  $\mu\text{g/L}$ ; and
4. The annual geometric mean at all individual stations is less than or equal to 15  $\mu\text{g/L}$ .



# TP Rule: Part 1

1. The water body will have achieved the criterion if the five year (WY2011-WY2015) geometric mean averaged across all stations is less than or equal to  $10 \mu\text{g/L}$ .

Assessment results:

- Unimpacted:  $7 \mu\text{g/L}$  (Passed)
- Impacted:  $17 \mu\text{g/L}$  (Failed)



# TP Rule: Part 2

2. The annual geometric mean averaged across all stations is less than or equal to 10  $\mu\text{g/L}$  for three of five water years.

Assessment results:

Water Year (May 1 - April 30)	Total Phosphorus ( $\mu\text{g/L}$ )	
	Unimpacted	Impacted
2011	7	15
2012	8	24
2013	7	16
2014	7	17
2015	7	15
<i>Status</i>	<i>Pass</i>	<i>Fail</i>



# TP Rule: Part 3

3. The annual (WY2015) geometric mean averaged across all stations is less than or equal to 11  $\mu\text{g/L}$ .

Assessment status:

- Unimpacted: 7  $\mu\text{g/L}$  (Passed)
- Impacted: 15  $\mu\text{g/L}$  (Failed)

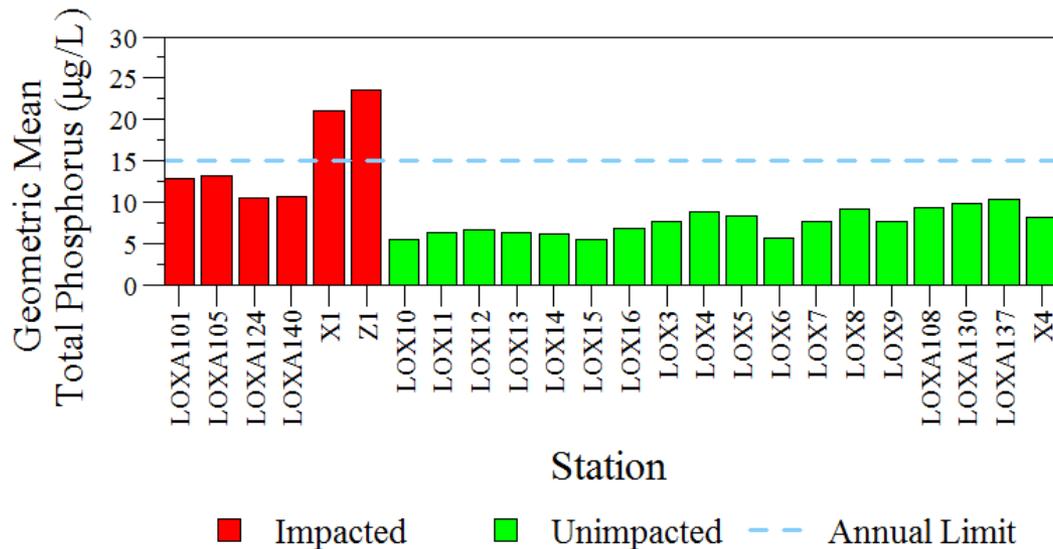


# TP Rule: Part 4

4. The annual (WY2015) geometric mean at all individual stations is less than or equal to 15  $\mu\text{g/L}$ .

Assessment results:

- Unimpacted: Passed
- Impacted: Failed (X1 and Z1)





# Summary

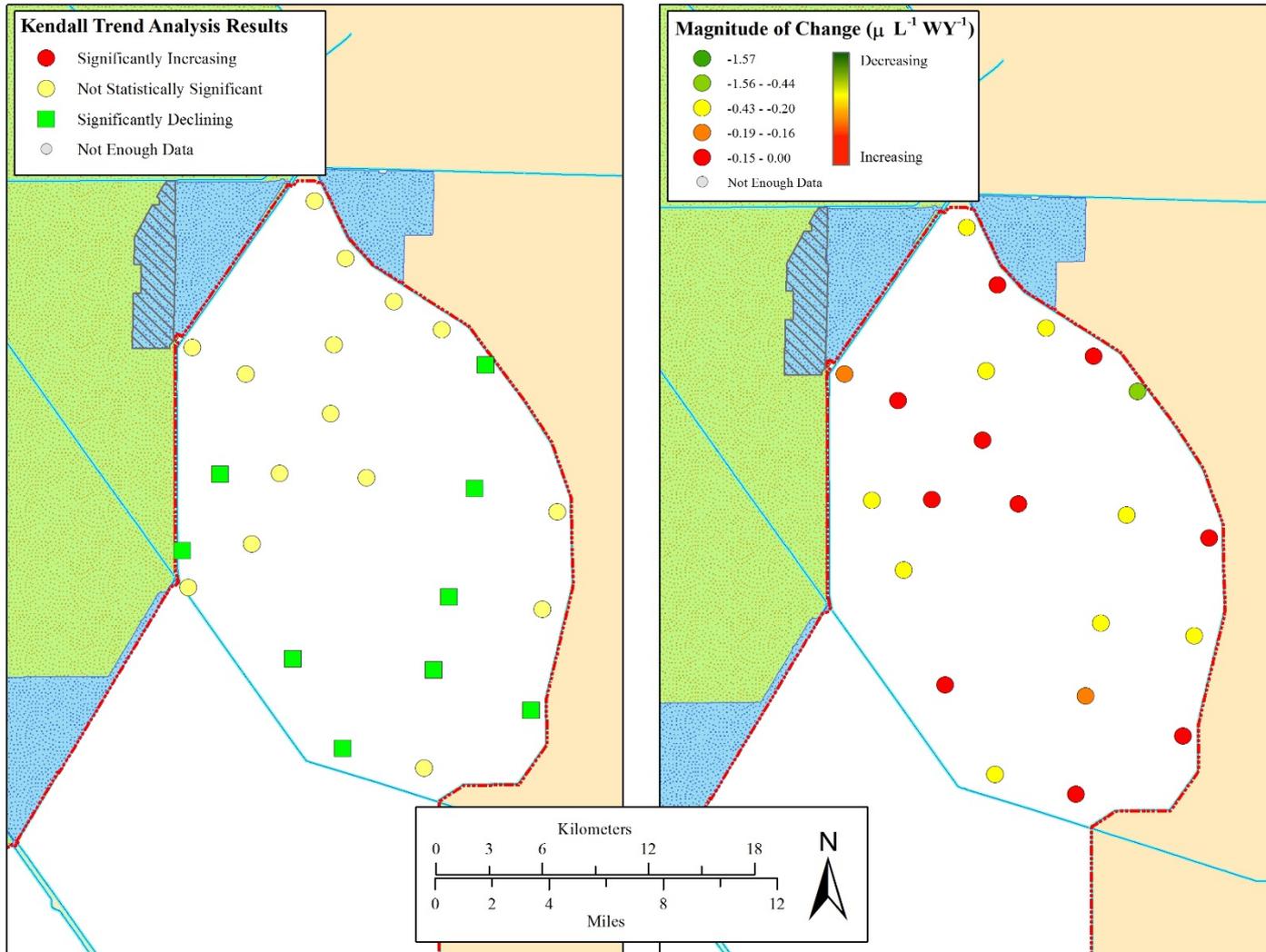
## Phosphorus Rule\* Compliance for WCA-1 (WY2011-2015)

Part	Description	Unimpacted		Impacted**	
		Actual Value (µg/L)	Passed?	Actual Value (µg/L)	Passed?
1	5-yr geometric mean TP averaged across all stations is less than 10 µg/L	7	Yes	17	No
2	Annual geometric mean TP averaged across all stations is less than 10 µg/L for 3 of 5 years	7, 8, 7, 7 and 7 (2011-2015 respectively)	Yes	15, 24, 16, 17 and 15 (2011-2015 respectively)	No
3	Annual geometric mean TP averaged across all stations is less than or equal to 11 µg/L	7	Yes	15	No
4	Annual geometric mean TP at all individual stations is less than or equal to 15 µg/L	See previous slide. (All below 15 µg/L)	Yes	See previous slide. (X1 and Z1)	No

\*F.A.C. 62-302.540 Water Quality Standards for Phosphorus Within the Everglades Protection Area



# WY2005 – 2015 Annual Trend Analysis

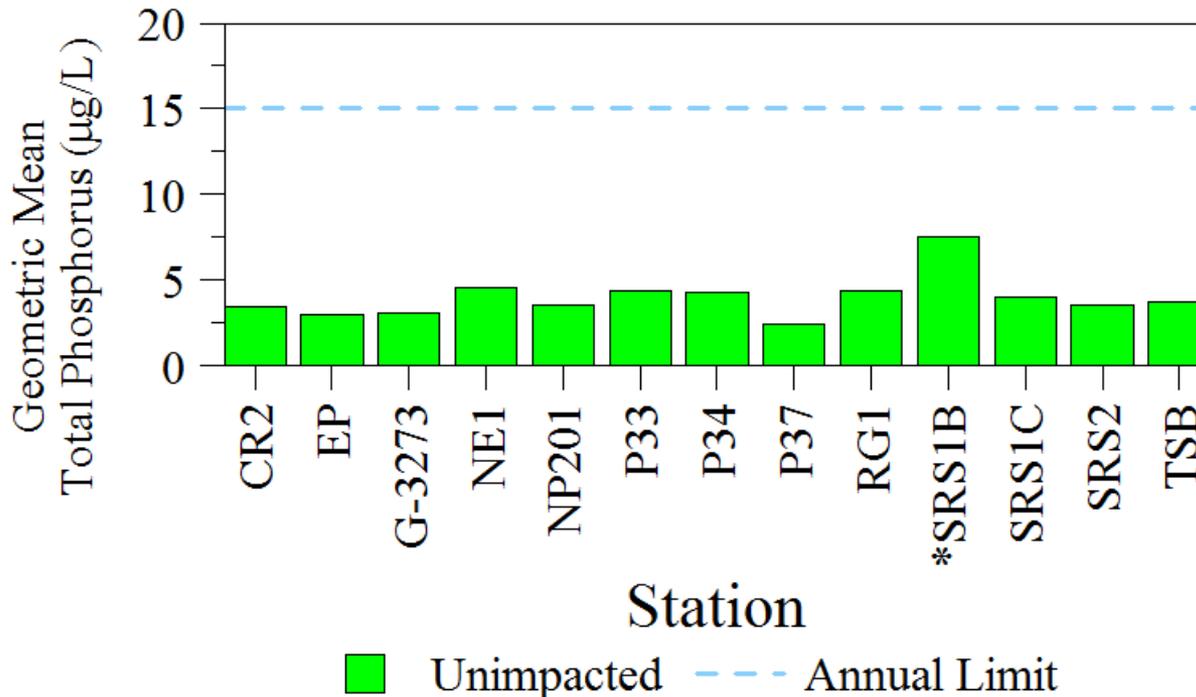




# Marsh TP Trends in ENP

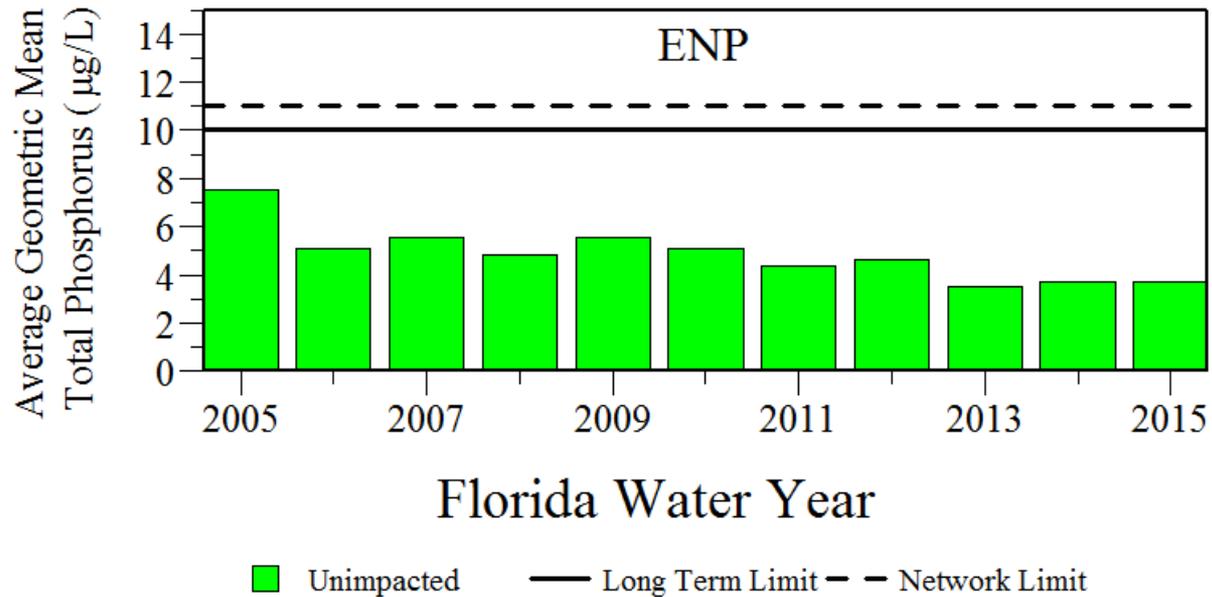
62-302.540 (4)(b) F.A.C. states:

*“... achievement of the phosphorus criteria shall be assessed for all water bodies in the EPA, which includes Everglades National Park (ENP or Park)... Achievement of the phosphorus criterion in the Park shall be based on the methods as set forth in Appendix A of the Settlement Agreement unless the Settlement Agreement is rescinded or terminated. “*



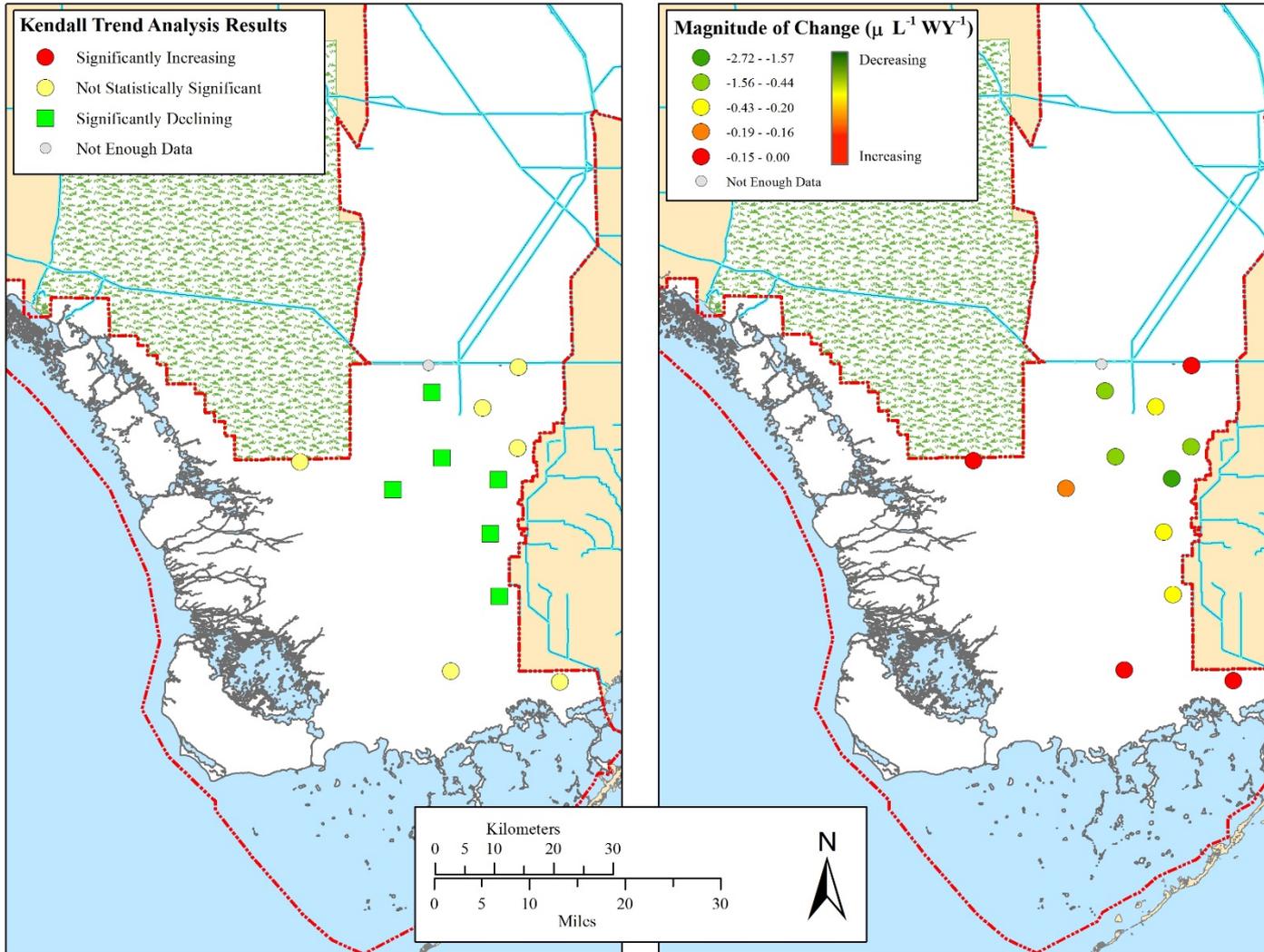


# Marsh TP Trends in ENP





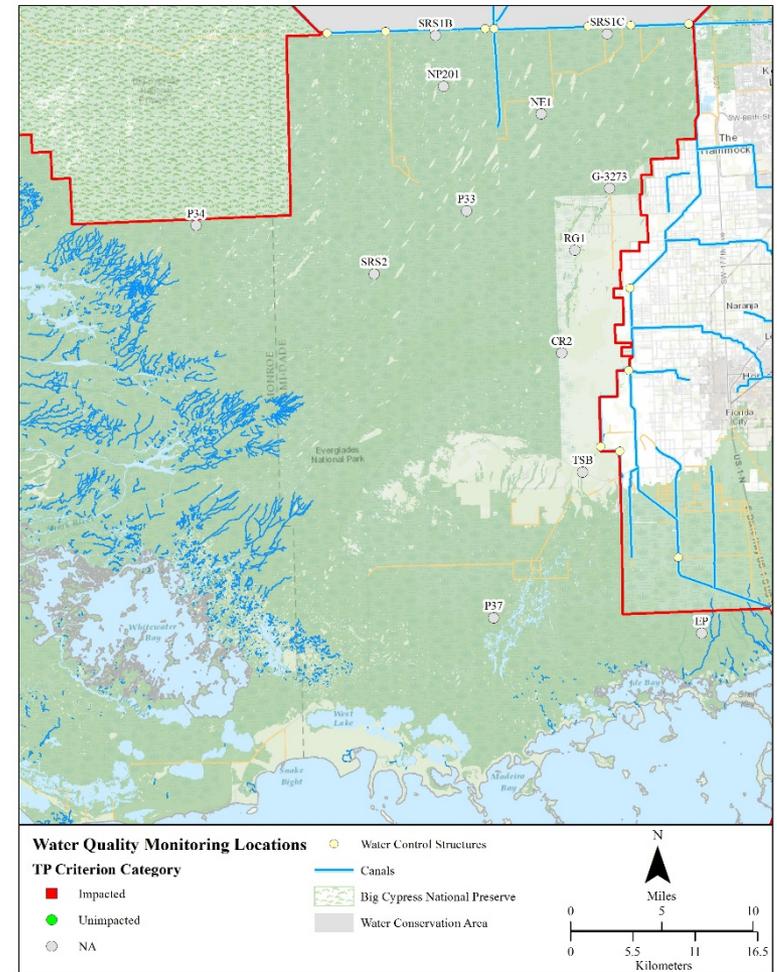
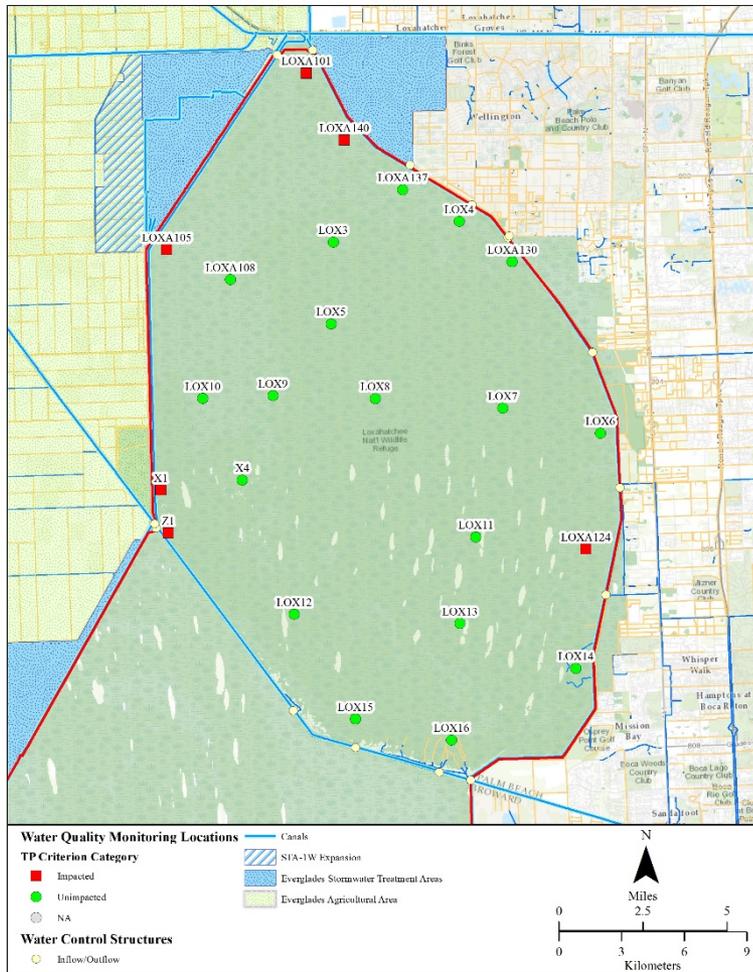
# WY2005 – 2015 Annual Trend Analysis







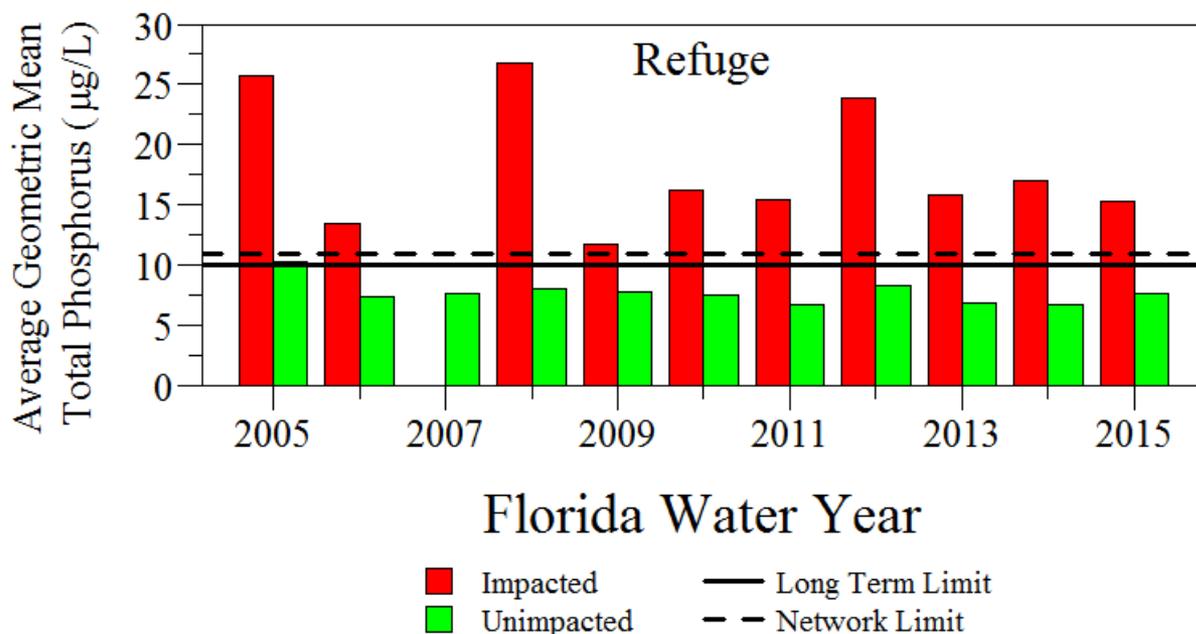
# Supplemental Information – Sampling Locations



**Figure 1.** Total phosphorus (TP) criterion assessment network stations within the Water Conservation Area-1 and Everglades National Park. Sites identified were used in the Water Year 2011 – 2015 (WY2011-WY2015; May 1, 2010 – April 30, 2015) evaluation.



## Supplemental Information – Network Trends



**Figure 2.** Network (Impacted and Unimpacted) trends for the Refuge from WY2005 to WY2015 relative to the 10 µg/L long-term (5 Year) and the 11 µg/L network limits.\*Due to extreme weather events and drought conditions a data gap exists for WY2007 within the Refuge.