



Florida Department of Environmental Protection

Office of Ecosystem Projects

Water Conservation Area 1 and Everglades National Park Annual Total Phosphorus Criteria Compliance Assessment – WY2017

Everglades Technical Oversight Committee
October 24, 2017

Alyssa Freitag





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 (µg/L) ...”

Long term (i.e. 5 Year) geometric mean total phosphorus (expressed as µg/L) for impacted stations within the Refuge by Florida Water Year (May 1 – April 30).

Station	2005 - 2009	2006 - 2010	2007 - 2011	2008 - 2012	2009 - 2013	2010 - 2014	2011 - 2015	2012 - 2016	2013 - 2017
LOXA101	-	-	-	-	-	-	-	-	14
LOXA105	-	-	-	14	14	15	16	16	15
LOXA124	-	-	-	12	12	12	11	13	14
LOXA130 ^a	-	-	-	11	10	10	10	10	9
LOXA137 ^a	-	-	-	11	11	11	11	11	10
LOXA140 ^a	-	-	-	-	-	-	-	-	10
X1	-	-	-	-	-	30	28	27	23
Z1	-	-	-	45	30	30	29	27	21

^a Station has transitioned from impacted to unimpacted



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($\mu\text{g/L}$).”

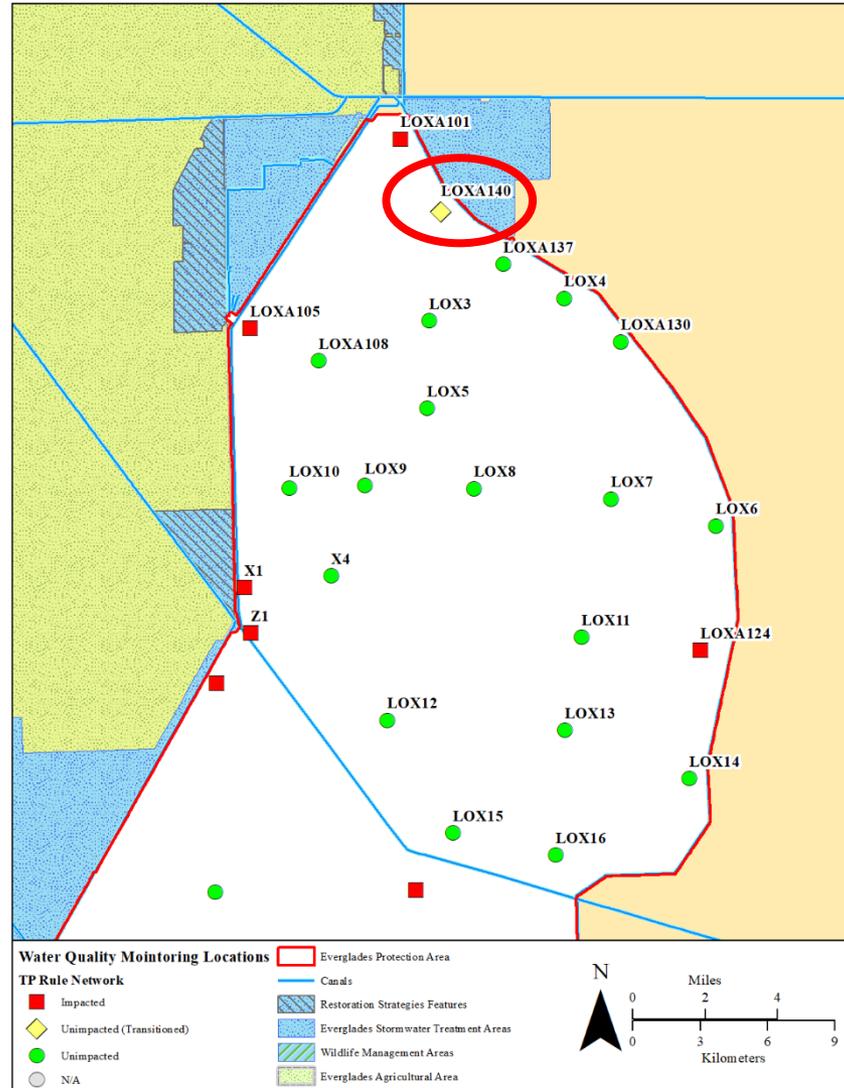
Annual geometric mean total phosphorus (expressed as $\mu\text{g/L}$) for impacted stations within the Refuge by Florida Water Year (May 1 – April 30). All data were screened consistent with the TP rule methodology.

Station	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
LOXA101	19	15		14	10	13	11		18	14	13	14	11
LOXA105	38	15		15	11	12	13	17	17	17	13	17	10
LOXA124	30	11		13	13	12	10	11	12	13	11	17	16
LOXA130 ^a	27	15		11	10	10	10	13	9	8	10	9	10
LOXA137 ^a	23	14		9	10	11	11	15	10	9	10	9	10
LOXA140 ^a	18	12		8	8	11	9		10	8	11	10	10
X1				47		34	27	38	27	26	21	23	20
Z1				96	21	26	33	49	18	23	24	19	21

^a Station has transitioned from impacted to unimpacted



Everglades Phosphorus Criterion: Impacted Station Assessment





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 (WY2013-WY2017) 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: 16 $\mu\text{g/L}$ (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
2013	7	16
2014	7	17
2015	8	15
2016	8	17
2017	7	16
<i>Status</i>	<i>Pass</i>	<i>Fail</i>



TP Rule: Part 3

3. The annual (WY2017) geometric mean averaged across all stations is less than or equal to 11 $\mu\text{g/L}$.

Assessment results:

- Unimpacted: 7 $\mu\text{g/L}$ (Passed)
- Impacted: 16 $\mu\text{g/L}$ (Failed)

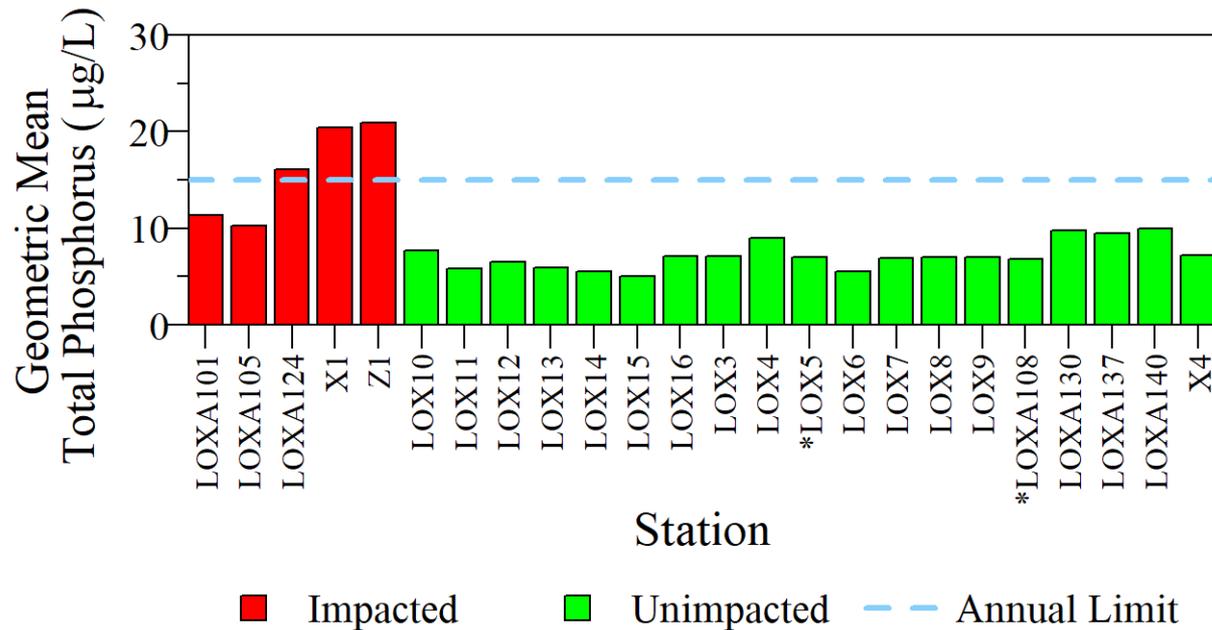


TP Rule: Part 4

4. The annual (WY2017) geometric mean at all individual stations is less than or equal to 15 $\mu\text{g/L}$.

Assessment results:

- Unimpacted: Passed
- Impacted: Failed (LOXA124, X1 and Z1)



* Fewer than six samples in WY2017



Summary

Phosphorus Rule* Compliance for WCA-1 (WY2013-2017)

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	16	No
2	Annual geometric mean TP averaged across all stations is less than 10 µg/L for 3 of 5 years	7, 7, 8, 8 and 7 (2013-2017 respectively)	Yes	16, 17, 15, 17 and 16 (2013-2017 respectively)	No
3	Annual geometric mean TP averaged across all stations is less than or equal to 11 µg/L	7	Yes	16	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. (LOXA124, X1 and Z1)	No

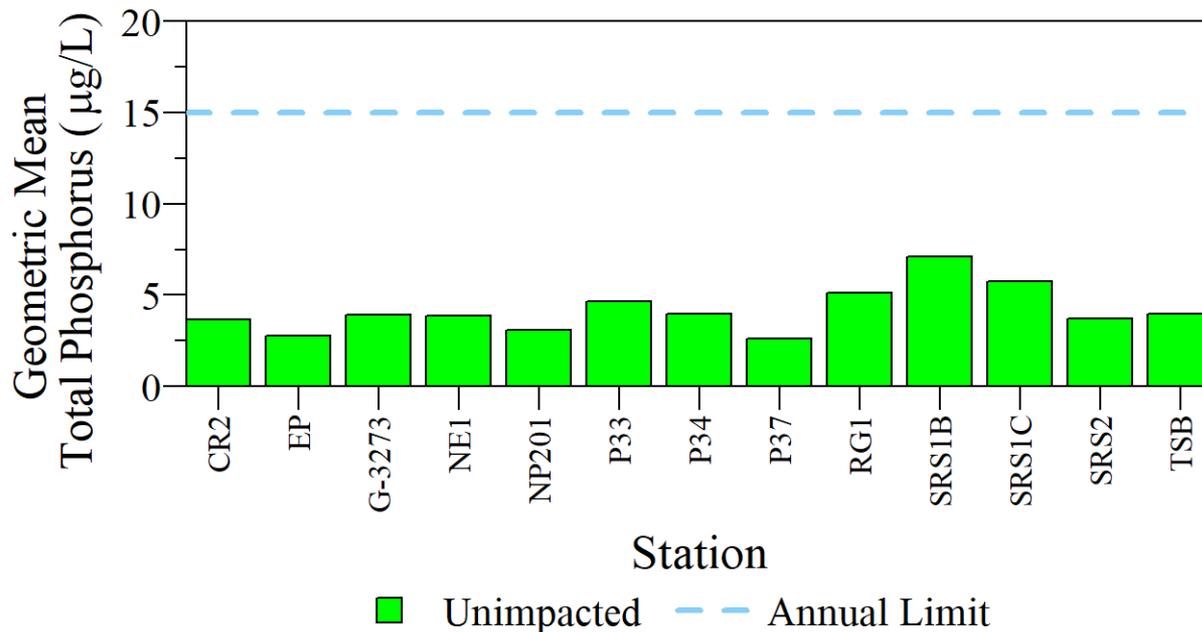
*F.A.C. 62-302.540 Water Quality Standards for Phosphorus Within the Everglades Protection Area



Marsh TP Trends in ENP

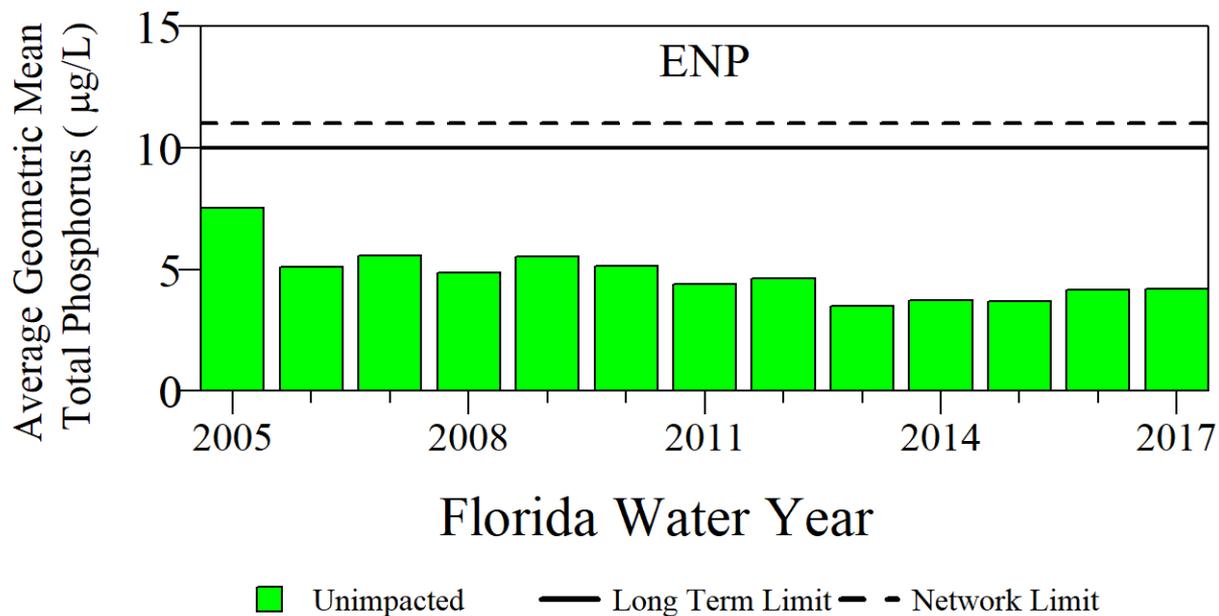
62-302.540 (4)(b) F.A.C. states:

“... 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



Network trends for ENP from WY2005 to WY2017 relative to the 10 µg/L long-term (5 Year) and the 11 µg/L network limits.