Florida Oceanographic Society

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October 11, 2019

The Honorable Senator Gayle Harrell
310 Senate Building
404 South Monroe Street
Tallahassee, FL 32339-1100

Dear Senator Gayle Harrell:

It was great to see you again, and to serve with you on the Stuart Rotary Water Forum Panel regarding public health associated with water quality. The Florida Oceanographic Society supports the work of the state in reducing pollution loading to Lake Okeechobee and estuaries, and understands the critical link between good water quality entering the lake and reduced risk of public health impact when lake discharges are made to the estuaries (Attachment 1).

I am writing to ask your assistance in requesting that the Florida Dept. of Environmental Protection (FDEP) improve their reporting on the ***lack of progress in achieving pollution reduction goals*** in the Lake Okeechobee watershed. FDEP has repeatedly miscommunicated the pollution loading to Lake Okeechobee in their annual progress reports. In the last three years, the discrepancy between the phosphorus loads reported by FDEP and the loads entering Lake Okeechobee measured by the South Florida Water Management District (SFWMD) has ranged from 28% to 61% (see **Figure 1**). Unfortunately, the average phosphorus loading is now 14 percent ***worse*** than in the Starting Period used in FDEP's Basin Management Action Plan. Sadly the FDEP reports also failed to mention catastrophic impacts of the historic high phosphorus loading during 2017, when almost 2.3 million pounds entered the lake from its watershed. It was not surprising that in 2018 the Lake experienced the worst bloom of toxic algae ever recorded, when more than 90% of the open water surface of the lake was covered with the *microcystis* cyanobacteria. This tragic fact was also omitted in the FDEP report that covered 2018 conditions. FDEP sends these reports to the Governor and the Legislature. How can the Governor and Legislature appropriately address the continuing pollution problem, and the associated public health issues related to toxic blue green algae, if the reports they rely on from FDEP contain incomplete and misleading information? Other recommendations to improve the BMAPs for the Lake and the St. Lucie Estuary have been provided to FDEP (Attachment 2).

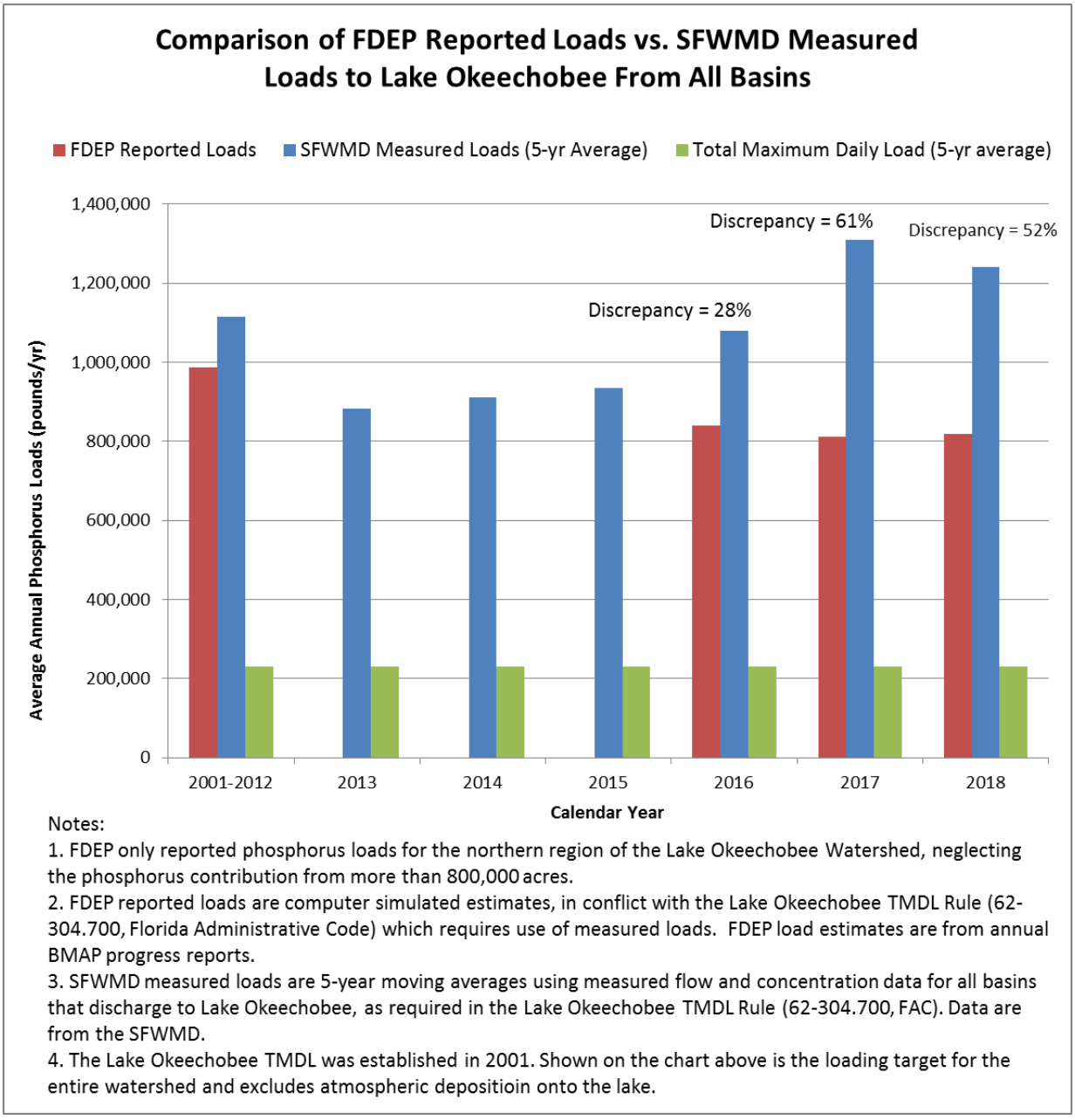
I will be happy to provide additional information as you would like. Thank you in advance for assisting with this very critical issue.

Sincerely,

GF Goforth

Gary Goforth, P.E., Ph.D., Member Board of Directors
Florida Oceanographic Society
Attachments

Figure 1.



Notes:

1. FDEP only reported phosphorus loads for the northern region of the Lake Okeechobee Watershed, neglecting the phosphorus contribution from more than 800,000 acres.
2. FDEP reported loads are computer simulated estimates, in conflict with the Lake Okeechobee TMDL Rule (62-304.700, Florida Administrative Code) which requires use of measured loads. FDEP load estimates are from annual BMAP progress reports.
3. SFWMD measured loads are 5-year moving averages using measured flow and concentration data for all basins that discharge to Lake Okeechobee, as required in the Lake Okeechobee TMDL Rule (62-304.700, FAC). Data are from the SFWMD.
4. The Lake Okeechobee TMDL was established in 2001. Shown on the chart above is the loading target for the entire watershed and excludes atmospheric depositioin onto the lake.

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Resolution

WHEREAS, for more than 95 years, the public health, economies and environments of the St. Lucie Estuary and the Caloosahatchee Estuary have been damaged by the willful diversion of Lake Okeechobee overflow away from its natural course south to the Everglade; and

WHEREAS, the damage to the public health, economies and environments of the estuarine regions result not only from the diversion of overflow water from Lake Okeechobee that lowers salinity, but also from the massive amounts of toxic algae, nutrient pollution and suspended sediment carried by these regulatory releases; and

WHEREAS, the pollution of Lake Okeechobee has been steadily increasing for the last several years, with historically high phosphorus loads entering the Lake in 2017 of 2.3 million pounds and at more than five (5) times the Total Maximum Daily Load (TMDL) established for the watershed in 2001 under the provisions of the federal Clean Water Act; and

WHEREAS, as a result of this historic pollution of the Lake, a massive bloom of toxic blue green algae formed during the summer of 2018 that covered 90 percent of the open water surface of the Lake, and was present in the water that was diverted to the St. Lucie and Caloosahatchee estuaries; and

WHEREAS, over the last decade 2.9 trillion gallons of polluted water from Lake Okeechobee has been diverted to the St. Lucie and Caloosahatchee estuaries, and this water has brought with it toxic algae, 2.9 million pounds of phosphorus, 35 million pounds of nitrogen, and 421 million pounds of suspended sediment. This pollution has endangered public health, resulted in significant economic harm to the regions, destroyed massive amounts of seagrass and oyster beds, and exacerbated red tide events; and

WHEREAS, the estuarine regions contain numerous state and federal environmentally sensitive waterbodies, as well as dozens of threatened and endangered species; and

WHEREAS, the State of Florida is responsible for establishing and enforcing water quality regulations designed to protect public health and environmentally sensitive waterbodies; and

WHEREAS, the process established by the State of Florida for controlling pollution in the Lake Okeechobee Watershed, known as the Basin Management Action Plan, has been demonstrated to be ineffective;

WHEREAS, the U. S. Environmental Protection Agency has oversight of the Clean Water Act programs;

NOW, THEREFORE, BE IT RESOLVED THAT:

The Florida Oceanographic Society supports state and federal measures that reduce pollution sufficiently to achieve TMDLs within the watersheds of Lake Okeechobee and the St. Lucie and Caloosahatchee estuaries. These measures include;

1 -strengthening water quality regulations, including establishing discharge limits for parcels that discharge into state waters (including "Works of the District"), appropriate monitoring, requirements for landowner collaboration, and when necessary, enforcement;
2 - strengthening the Basin Management Action Plans, including accelerating timeframes to achieve the TMDLs; establishing subwatershed-specific load allocations; annual assessments based on measured nutrient loads (or concentrations for tidal basins); increasing staffing to verify and monitor the implementation of Best Management Practices; and incorporating estimates of pollution loading from the application of Class AA and Class B biosolids.
3 - strengthening reporting requirements, monitoring and overall regulation of the application of Class AA and Class B biosolids.

IN TESTIMONY WHEREOF, the Board Chair of Florida Oceanographic Society authorizes and forwards this Resolution on behalf of Florida Oceanographic Society by signature below:

DULY PASSED AND ADOPTED THE 19TH DAY OF December, 2018.

Allen Herskowitz, Chair, Board of Directors
Florida Oceanographic Society

Mark Perry, Executive Director
Florida Oceanographic Society

Attachment 2A - Key Recommendations for Enhancing the Lake Okeechobee BMAP (page 1 of 2)

No.	Deficiency	Reason This is a Problem	Recommended Remedy
1	The Lake Okeechobee TMDL Rule (Ch. 62.304.700(1)) requires loads to be reported as a 5-yr annual average of measured values. However, the BMAP does not use available measured data when calculating nutrient loads, instead uses a computer simulated best case scenario that ignores many sources of pollution, including Class AA biosolids, excess fertilization, and legacy nutrients	The BMAP underestimates pollution load to Lake Okeechobee. For example, the measured 5-yr average load into Lake Okeechobee for the period ending Dec. 2017 was 60% greater than the load reported in the 2018 BMAP progress report.	Use available flow and concentration data collected, analyzed, made available to the public and reported by the SFWMD when calculating and reporting nutrient loads for attainment of the TMDL. This is required by the TMDL Rule and will be consistent with relevant regulatory programs.
2	The BMAP loading estimate ignores loads from more than 800,000 acres (23%) of the Lake Okeechobee watershed.	The BMAP underestimates pollution load to Lake Okeechobee	Include all of the Lake's watershed when estimating loads to the lake, as required by the TMDL Rule.
3	The BMAP does not identify projects that collectively achieve the TMDL.	The BMAP is not a complete plan to achieve the TMDL.	Identify sufficient projects to achieve the TMDL.
4	There is no deadline to achieve the TMDL. The Florida Legislature removed the January 2015 deadline, established in 2000, and replaced it with an ambiguous 15-20 year timeframe.	With no deadline, there is no sense of urgency, no accountability, and likely, no attainment of the required load reductions.	The legislature should establish a hard deadline to achieve the TMDL with suitable consequences for failure to attain it.
5	The state's nutrient control program for the lake, which is based on the BMAP, does not contain an annual assessment for compliance purposes.	Without an annual assessment for compliance purposes, landowners are not held accountable for implementing timely measures to reduce excessive nutrient levels leaving their property. Without accountability, there is no mechanism to identify what projects and BMPs are working, or to implement additional measures.	Establish an annual assessment for compliance; see e.g., the EAA and C-139 Basin Rules (40E-63 or Goforth et al. 2013, http://www.garygoforth.net/Draft_LOW_TSD_-_Feb_2013.pdf)
6	The BMAP does not establish sub-watershed level performance measures which would focus efforts in the most critical areas. Instead it establishes a single value for the entire watershed. Related, the BMAP does not give an accounting of the status and water quality conditions within the nine sub-watersheds.	Without sub-watershed level performance measures, it is impossible to identify trends, focus on hot spots, and to better understand what BMPs are working well in some basins so these lessons learned could be applied in other basins that may not be working as well.	Establish sub-watershed level performance measures for sub-watersheds, and give an annual accounting of the status and water quality conditions within the nine sub-watersheds (see Goforth et al. 2013)
7	The BMAP has changed reporting periods since its initial development, and these are different from established water year consistent with data reports from SFWMD	This unnecessarily creates conflict and confusion when cross referencing reports and loading estimates.	Use a May 1 to April 30 water year, which is the standard period used by the SFWMD.
8	The BMAP does not calculate or report nitrogen loads to the Lake, in part because the state has failed to set a TMDL for total nitrogen.	The explosive growth of toxic blue green algae (microcycstis) in Lake Okeechobee requires high levels of water-borne nitrogen, and due to the public health, economic and environmental consequences of these blooms, particularly when discharged to the estuaries, nitrogen loading to the lake must be controlled.	The state should adopt a Lake Okeechobee TMDL for nitrogen. In the interim, the BMAP could report the nitrogen loads to the lake using available data collected and reported by SFWMD.

Attachment 2A - Key Recommendations for Enhancing the Lake Okeechobee BMAP (concluded)

No.	Deficiency	Reason This is a Problem	Recommended Remedy
9	The BMAP assumes that agricultural BMPs have been implemented (many without field verification) and are working at 100% effectiveness (most without monitoring) as long as landowners sign a notice of intent to voluntarily implement BMPs.	Agriculture is the largest land use within the watershed, and was responsible for more than 75% of the phosphorus load during the starting period. The significant discrepancy between reported and actual phosphorus loading to the Lake is clear evidence that the assumption of 100% effectiveness is flawed.	Multiple actions are needed. 1. Additional staff and agency budget are needed to field verify the implementation of ag BMPs. 2. Additional staff and agency budget are needed to implement reasonable monitoring programs at secondary and perhaps tertiary tiers within each sub-watershed in order to verify the effectiveness of ag BMPs. 3. Report measured loads for each sub-watershed, and if available each tier within the sub-watersheds. This will help identify basins with the higher unit area loads that could be prioritized. 4. if computer simulations continue to be used, they should be re-calibrated each year to estimate the loading from each land use.
10	The BMAP method does not directly account for hydrologic variability, inherent in south Florida rainfall and runoff, and therefore cannot produce a reliable annual assessment. Instead the BMAP uses a computer simulation to represent the overall hydrologic variability of a "long-term period."	Loads are a function of runoff volume which varies from year-to-year with rainfall. Without a method that directly incorporates hydrologic variability, the assessment method cannot ascertain whether source controls are effective, or the loads are variable resulting from variable rainfall patterns.	Establish performance measures that directly account for hydrologic variability; see for example the EAA and C-139 Basin regulatory programs (40E-63, F.A.C.) and the draft assessment method contained in Goforth et al. 2013.
11	The BMAP is not in synch with the Works of the District permitting program establish in 1989 to limit phosphorus levels entering the lake (Rule 40E-61).	There is presently no regulatory program that holds individual landowners accountable for pollution leaving their property. Without accountability, there is no mechanism to identify what projects and BMPs are working or to implement additional measures.	Complete the revisions to 40E-61 as directed by the 2007 NEEPP legislation. Until the BMAP process began, the District was reinforcing the Works of the District regulatory program as directed by the Legislature through the 2007 Northern Everglades and Estuaries Protection Plan (373.4595). A Technical Support Document was drafted (see Goforth et al. 2013) that can be used as a foundation.
12	The BMAP in general requires more rigorous monitoring for projects implemented by municipalities than by agricultural landowners.	A reasonable monitoring program is essential for an effective program and there should be a minimum standard for all projects, or projects within a geographical area.	FDEP should establish a minimum standard for monitoring for all projects, or projects within a geographical area.
13	Inadequate funding opportunities exist for full BMAP implementation.	Water quality improvement projects require adequate funding.	Assist landowners and municipalities with Increased state or federal funding opportunities.

Attachment 2B – Key Recommendations for Enhancing the St. Lucie Estuary BMAP (page 1 of 2)

No.	Deficiency	Reason This is a Problem	Recommended Remedy
1	The BMAP does not use available data when calculating nutrient loads, instead uses a computer simulated best case scenario that ignores many sources of pollution, including Class AA biosolids, excess fertilization, and legacy nutrients	The BMAP underestimates pollution load to the estuary. For example, the most recent 5-yr average nitrogen load to the estuary was approximately 70% greater than the load reported in the 2018 BMAP progress report.	Use available data collected, analyzed, made available to the public and reported by the SFWMD when calculating and reporting nutrient loads. This will be consistent with relevant regulatory programs.
2	The BMAP loading estimate ignores loads from Lake Okeechobee regulatory releases.	The BMAP significantly underestimates the pollution load to the estuary. For example, in WY2018, the Lake contributed more than 350,000 pounds of phosphorus - which is more than twice the TMDL for the entire watershed.	Modify the BMAP to account for loads from Lake Okeechobee regulatory releases.
3	There is no deadline to achieve the TMDL.	With no deadline, there is no sense of urgency, no accountability, and likely, no attainment of the required load reductions.	The legislature should establish a hard deadline to achieve the TMDL with suitable consequences for failure to attain it.
4	The state's nutrient control program for the estuary, which is based on the BMAP, does not contain an annual assessment for compliance purposes.	Without an annual assessment for compliance purposes, landowners are not held accountable for implementing timely measures to reduce excessive nutrient levels leaving their property. Without accountability, there is no mechanism to identify what projects and BMPs are working, or to implement additional measures.	Establish an annual assessment for compliance; see e.g., the EAA and C-139 Basin Rules (40E-63 or Goforth et al. 2013, http://www.garygoforth.net/TSD%20for%20SLRW%20-%2012%2018%202013.pdf)
5	The BMAP does not establish sub-watershed level performance measures which would focus efforts in the most critical areas. Instead it establishes a single value for the entire watershed. Related, the BMAP does not give an accounting of the status and water quality conditions within the nine sub-watersheds.	Without sub-watershed level performance measures, it is impossible to identify trends, focus on hot spots, and to better understand what BMPs are working well in some basins so these lessons learned could be applied in other basins that may not be working as well.	Establish sub-watershed level performance measures for sub-watersheds, and give an annual accounting of the status and water quality conditions within the sub-watersheds (see Goforth et al. 2013).
6	The BMAP reporting period is different from established water year consistent with data reports from SFWMD.	This unnecessarily creates conflict and confusion when cross referencing reports and loading estimates.	Use a May 1 to April 30 water year, which is the standard period used by the SFWMD.

Attachment 2B – Key Recommendations for Enhancing the St. Lucie Estuary BMAP (concluded)

No.	Deficiency	Reason This is a Problem	Recommended Remedy
7	The BMAP assumes that agricultural BMPs have been implemented (many without field verification) and are working at 100% effectiveness (most without monitoring) as long as landowners sign a notice of intent to voluntarily implement BMPs.	Agriculture is the largest land use within the watershed, and was responsible for more than 75% of the phosphorus load during the starting period. The significant discrepancy between reported and actual phosphorus loading to the estuary is clear evidence that the assumption of 100% effectiveness is flawed.	Multiple actions are needed. 1. Additional staff and agency budget are needed to field verify the implementation of ag BMPs. 2. Additional staff and agency budget are needed to implement reasonable monitoring programs at secondary and perhaps tertiary tiers within each sub-watershed in order to verify the effectiveness of ag BMPs. 3. Report measured loads for each sub-watershed, and if available each tier within the sub-watersheds. This will help identify basins with the higher unit area loads that could be prioritized. 4. if computer simulations continue to be used, they should be re-calibrated each year to estimate the loading from each land use.
8	The BMAP method does not directly account for hydrologic variability, inherent in south Florida rainfall and runoff, and therefore cannot produce a reliable annual assessment. Instead the BMAP uses a computer simulation to represent the overall hydrologic variability of a "long-term period."	Loads are a function of runoff volume which varies from year-to-year with rainfall. Without a method that directly incorporates hydrologic variability, the assessment method cannot ascertain whether source controls are effective, or the loads are variable resulting from variable rainfall patterns.	Establish performance measures that directly account for hydrologic variability; see for example the EAA and C-139 Basin regulatory programs (40E-63, F.A.C.) and the draft assessment method contained in Goforth et al. 2013.
9	The BMAP is not in synch with the Works of the District permitting program establish in 1989 to limit phosphorus levels entering the lake (Rule 40E-61).	There is presently no regulatory program that holds individual landowners accountable for pollution leaving their property. Without accountability, there is no mechanism to identify what projects and BMPs are working or to implement additional measures.	Complete the revisions to 40E-61 as directed by the 2007 NEEPP legislation. Until the BMAP process began, the District was reinforcing the Works of the District regulatory program as directed by the Legislature through the 2007 Northern Everglades and Estuaries Protection Plan (373.4595). A Technical Support Document was drafted (see Goforth et al. 2013) that can be used as a foundation.
10	The BMAP in general requires more rigorous monitoring for projects implemented by municipalities than by agricultural landowners.	A reasonable monitoring program is essential for an effective program and there should be a minimum standard for all projects, or projects within a geographical area.	FDEP should establish a minimum standard for monitoring for all projects, or projects within a geographical area.
11	Inadequate funding opportunities exist for full BMAP implementation.	Water quality improvement projects require adequate funding.	Assist landowners and municipalities with Increased state or federal funding opportunities.
12	The FDEP BMAP method ignores the annual variability in the proportion of C-44 Canal Basin runoff that flows to the SLRE (as opposed to Lake Okeechobee).	The BMAP will fail to accurately document the load from the C-44 Canal Basin, by either underestimating or overestimating the load.	Modify the BMAP to account for loads from the entire C-44 Canal sub-watershed, and then separate those loads that are sent to the estuary.