Date: October 1, 2020

To: Florida Department of Environmental Protection

From: John Cassani, Calusa Waterkeeper

Subject: Public comments solicited regarding Statewide Stormwater rulemaking, stormwater design, relevant scientific information and operation considerations. Recommendations for modifying Chapter 62-330, F.A.C. and the Applicant's Handbooks, Volumes I and II.

Sent by electronic mail to: Stormwater2020@floridadep.gov

I am providing comments below in the context of having managed stormwater ponds in southwest Florida between 1978 and 2014 as part of my professional responsibilities as a resource manager while employed by the Lee County Hyacinth Control District (LCHCD). The focus of these responsibilities were primarily associated with aquatic vegetation management and a significant part of the LCHCD public service involved managing vegetation problems associated with nutrient over-enriched stormwater ponds.

My current professional responsibilities as the Calusa Waterkeeper focus on harmful algal blooms and related public health issues as well as policy reform in various water quality contexts relating to compliance or enforcement. Nutrient over-enriched stormwater ponds are a part of this focus, including the effect of wet detention pond effluent on receiving waters.

Landscape conversion to stormwater wet detention systems

The degree of landscape conversion involving wet detention systems in many coastal regions of Florida is alarming (Fig. 1). As such, it could be argued that problems associated with the cumulative impacts of stormwater runoff and inadequate treatment can be closely correlated with the rate of urban development, verified impairment in receiving waters and the need to address increases in impervious cover. In the illustration (Fig. 1), all of the wet detention ponds discharge directly or indirectly to tributaries of Estero Bay having a non-degradation standard associated with waterbodies designated as Outstanding Florida Waters[1]. Unfortunately, all of the OFW Estero Bay tributaries are verified impaired for various parameters.

Dr. Serge Thomas of Florida Gulf Coast University has determined that the planar area of wet detention ponds in Lee and Collier Counties represents 39.7 square miles equivalent to the area of the Caloosahatchee estuary.

[1] FDEP, (62-302.700 F.A.C.)

Figure 1. Landscape changes in the Estero Bay watershed in Lee County, coastal southwest Florida, 1944 and 1998.

Factors associated with wet detention treatment and presumed compliance under 62-25, and 62-330 F.A.C. and Applicants Handbooks, Volumes I and II, SFWMD

1. Current stormwater treatment criteria have not been updated by rule since 2007 and is widely acknowledged in Florida as being ineffective for reasonable assurance that stormwater effluent will not violate state water quality criteria. Problems associated with wet detention (WD) permanent pool control elevation (CE) and relationship to hydraulic residency time (HRT) need to be addressed with new guidelines or criteria. Stormwater treatment design guidance on establishing the CE is not providing effective treatment in many WD systems. Establishing the CE relatively low, presumably to reduce the probability of flooding, often results in attenuated HRT of less than 14 days. In many cases, observed and documented WD systems discharge continuously during the wet season in southwest Florida and storm event recovery of 72 hours is rarely achieved until the onset of the dry season where treatment is less relevant. Figure 2 illustrates a few examples of WD performance associated with on-site rainfall not in compliance with presumed criteria in 62-25 F.A.C. relating to recovery performance and adequate HRT. Each of the examples were from WD systems permitted in Lee County.

Pond 1
Seasonal Pond Level and Precipitation
40
35
30
25
20
15
10
5
0
20
18
16
14
12
10
8
6
4
2
0
7/13/2004
7/23/2004
8/3/2004
8/18/2004
9/2/2004
9/16/2004
9/30/2004
10/22/2004
11/23/2004
1/17/2005
3/10/2005
4/7/2005
5/4/2005
5/27/2005
6/8/2005
6/28/2005
8/3/2005
8/24/2005
9/9/2005
9/28/2005
10/20/2005
11/7/2005
12/6/2005
1/6/2006
2/20/2006
4/5/2006
6/1/2006
Pond Level (inches)
Control Level
Rain Fall

Pond 2
Seasonal Pond Levels
60
50
40
30
20
10
0
20
18
16
14
12
10
8
6
4
2
0
7/9/2004
7/20/2004
7/30/2004
8/9/2004
8/26/2004
9/9/2004
9/24/2004
10/15/2004
11/5/2004
12/17/2004
3/1/2005
3/29/2005
4/28/2005
5/23/2005
6/6/2005
6/20/2005
7/20/2005
8/19/2005
9/1/2005
9/21/2005
10/5/2005
11/2/2005
11/22/2005
12/16/2005
2/3/2006
3/24/2006
5/2/2006
Pond Level (inches)
Control Level
Rain Fall

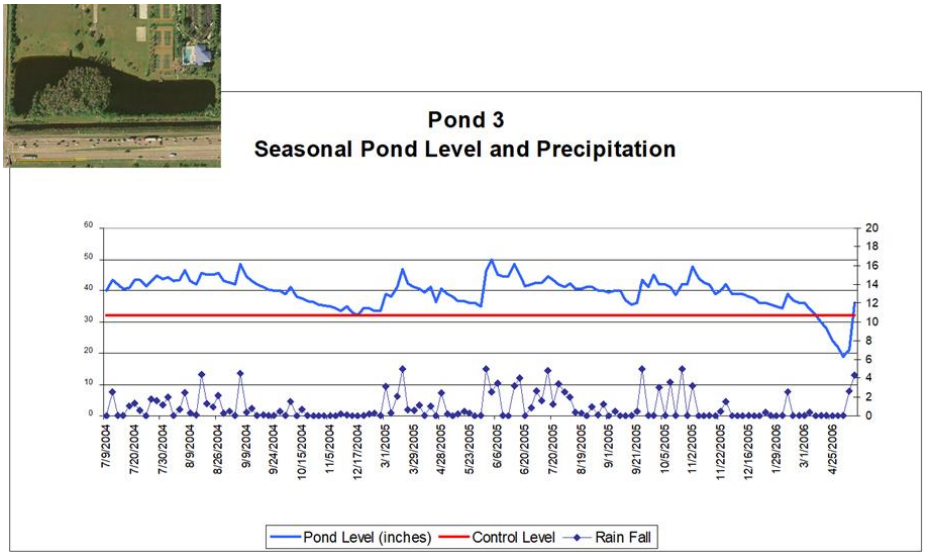

Figure 2. Examples of ineffective recovery and HRT related to control elevations set too low from WD systems permitted in Lee County, Florida.

2. WD systems in proximity to rivers or coastal waters can have less vertical water elevation fluctuation reflecting potentially less recovery between storm events as compared to WD systems located further inland. Figure 3 illustrates seasonal elevation fluctuation of the WD permanent pool from near coastal areas to WD systems located at a higher landscape elevation inland. These observations were determined from a LCHCD study of 11 WD systems in Lee County Florida over multiple years during the mid-2000s. The inland WD systems likely have greater water level fluctuation as they are “perched” higher in relation to the surficial water table and have relatively higher evapotranspiration rates compared to WD ponds with lower surface to volume ratios. Additionally, WD systems with relatively high surface to volume ratios had higher seasonal vertical fluctuation (Figure 4). These observations may be relevant to sea level rise (SLR) and the placement of WD systems located near coastal areas and should be considered with respect to new stormwater design criteria in relation to treatment efficiency.

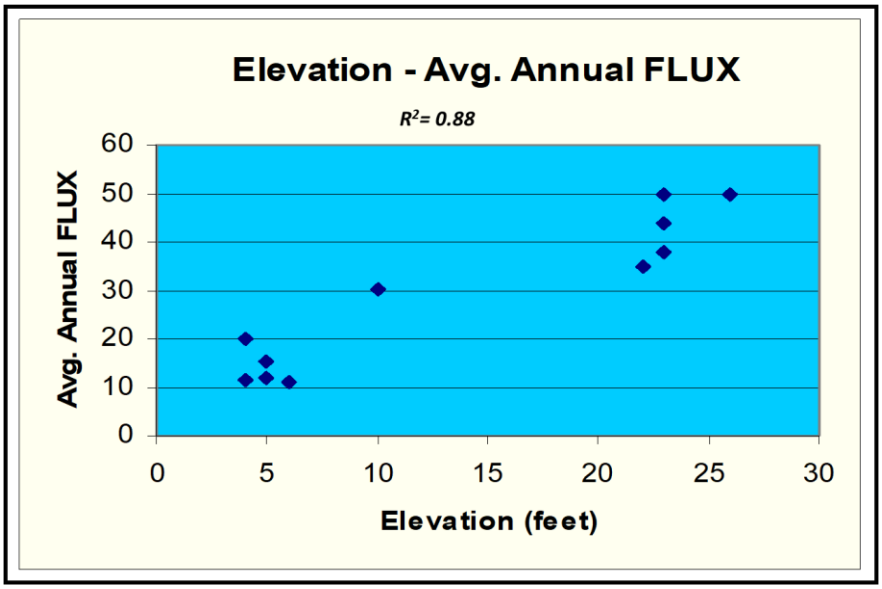

Figure 3. A comparison of vertical annual fluctuation in 11 WD systems between those constructed at lower landscape elevations (near the coast or a major river) vs. those constructed at higher landscape elevations inland in Lee County.

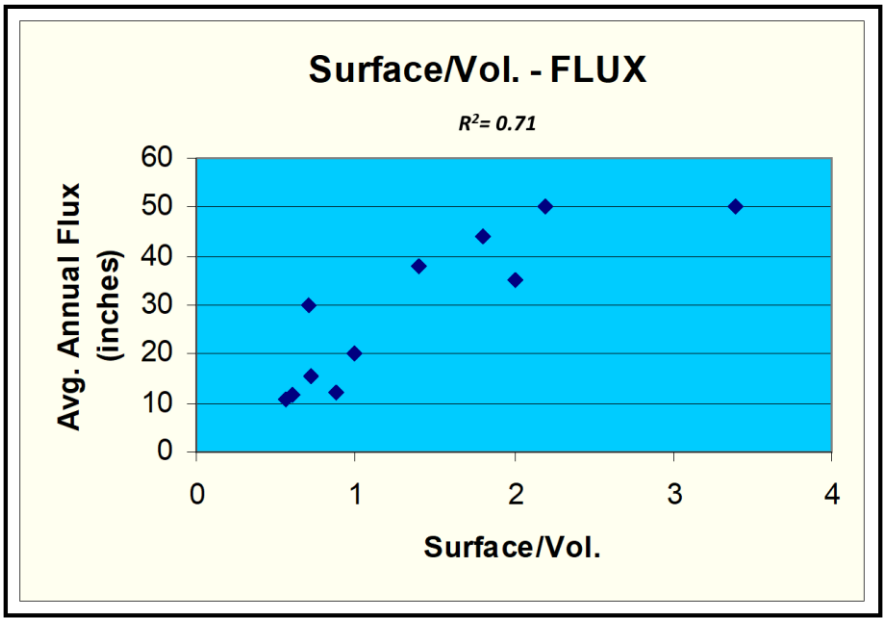

Figure 4. A comparison among 11 WD systems in Lee County, Florida comparing annual seasonal water level fluctuation and the surface to volume ratio of the WD permanent pool.

3. WD system pollutant sequestering capacity is an issue dependent on variables associated with age of the permanent pool and pollutant loading rates relevant to the associated basin. Using aquatic vascular plant and algal observations and related complaints received by LCHCD from residents requesting in-pond treatments, indicated that of the thousands of ponds managed, most would have reached their capacity to sequester pollutants in the sediments after a period of 7-10 years. Unless pond de-mucking is undertaken or other mitigation efforts, it's likely nutrient buildup exceeding sequestering capacity will lead to

increased internal loading further reducing the WD system presumed compliance of minimum stormwater treatment standards outlined in Rule 62-40.432 F.A.C.

4. Average annual statewide rainfall is trending up since rainfall records were started in 1895[2]. Figure 5 illustrates this trend. Since 1990, wet season and total annual rainfall exhibited an abrupt increase in southeast Florida [3]. A 10-year assessment of wet season (June-October) total rainfall derived from daily observations at 18 monitoring stations in Lee County Florida indicate an increasing trend between 2009 and 2018 (Fig. 6)[4]. Increasing rainfall and associated runoff in the future will necessitate stormwater treatment design with a higher capacity.

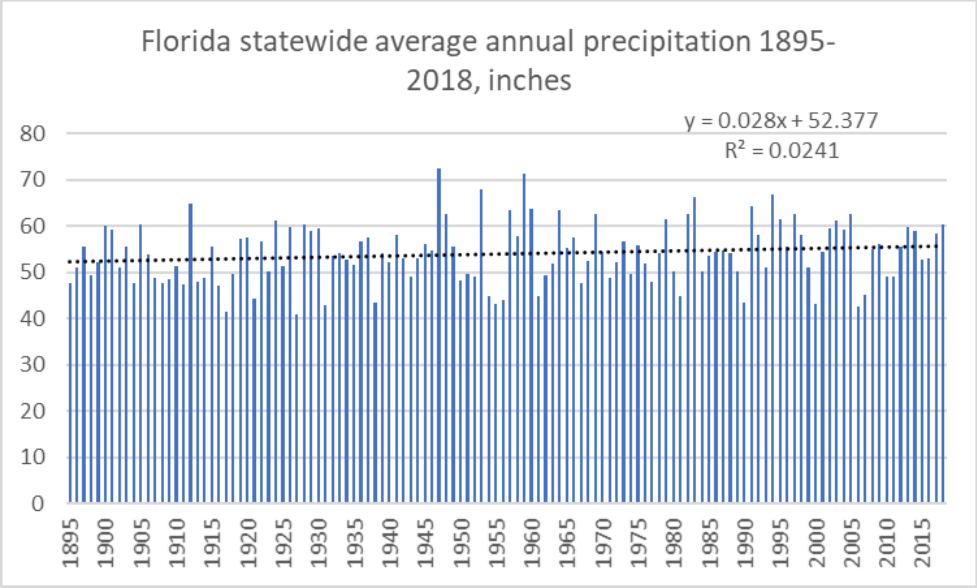

Figure 5. Average statewide average annual precipitation in Florida 1895-2018.

[2] Florida Climate Center, https://climatecenter.fsu.edu/products-services/data/statewide-averages/precipitation

[3] Abiy AZ, Melesse AM, Abtew W, Whitman D (2019) Rainfall trend and variability in Southeast Florida: Implications for freshwater availability in the Everglades. PLoS ONE 14(2): e0212008. https://doi.org/10.1371/journal.pone.0212008

[4] Rain Guage Data, Lee County, Florida, https://www.leegov.com/naturalresources/hydrological-monitoring/rainfall/raingaugedata

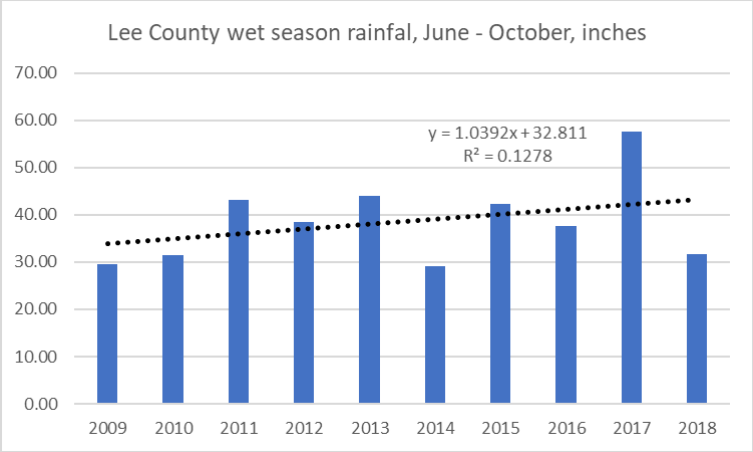

Figure 6. Wet seasons total rainfall from 2009 to 2018 in Lee County Florida.

5. Postconstruction monitoring is necessary to verify and achieve reasonable assurance that state water quality standards will not be violated. The rate of verified impaired state waters has increased in the last eight years. The number of specific and unique impairments on the 2020 FDEP comprehensive list of verified impairments is 1724. Sixty five percent of those impairments have occurred in the last eight years. The required increased level of stormwater treatment that discharge to OFWs or impaired waters (50% increased water quality treatment volume and other requirements in the SFWMD ERP Stormwater Applicants Treatment Handbook Volume II), as one example of compliance, will necessitate that a greater proportion of new applications achieve this standard, at least within the SFWMD.

   This most recent stormwater treatment standards have been in-affect for applicants in the SFWMD since 2016 yet there has been no verification of presumed compliance of this requirement as documented by decreased loading to associated receiving waters. In this context, post construction monitoring should be required to document presumed compliance based only on treatment design and or pollution prevention plans. Post construction monitoring is encouraged by SFWMD rule[5] as a method of verifying compliance in sensitive waters. Volume II of the SFWMD ERP Applicants Handbook states:

   4.9.3 There are two reasons for requiring water quality monitoring by permittees, as follows:
   (a) Such data can be used to determine if the pollution abatement practices incorporated into the design for the drainage system are functioning properly.
   (b) In some cases there may be a real and immediate concern regarding degradation of quality in the receiving waters, regardless of the apparent pollutant removal efficiency of the drainage system.

[5] SFWMD ENVIRONMENTAL RESOURCE PERMIT APPLICANT'S HANDBOOK, VOLUME II, FOR USE WITHIN THE GEOGRAPHIC LIMITS OF THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT, EFFECTIVE MAY 22, 2016, Volume II (including Appendices A, B, C, D and E) is incorporated by reference in Rule 40E-4.091(1)(a) and Rule 62-330.010, F.A.C.))

Due to the increasing rate of water quality impairment statewide, it's unlikely that treatment criteria will achieve reasonable assurance of presumed compliance in the short or long-term especially for projects discharging to OFWs or impaired waters unless a major revision of criteria and a post-construction verification process occurs as part of this stormwater rulemaking process.

Furthermore ERP applications regulated by the SFWMD that discharge directly to an unimpaired WBID are not required to achieve the additional water quality treatment volume required for projects discharging to impaired waters even if the water discharged represents a direct discharge to downstream impaired waters designated as a different WBID. This permit loophole needs to be closed as it contradicts the definition of "direct" discharge and the requirement of reasonable assurance.

6. The interaction of groundwater to and from WD systems can have a significant effect on permanent pool nutrient dynamics and presumed efficiency of design criteria. This interaction can be complex where the WD system seeps into the surficial aquifer and at other times groundwater seeps into the WD permanent pool. The very elevated concentration of nutrients and other constituents in groundwater could complicate evaluating new design criteria effectiveness or treatment evaluations unless the dynamic between groundwater and the WD permanent pool are more clearly understood. These uncertainties emphasize the need to perch the permanent pool or shift to other treatment criteria less integrated with groundwater.

Recommendations for Stormwater Rule Revision

1. Post-construction monitoring that enables verification of reasonable assurance that state water quality standards will be attained, needs to be a consistent addition to any element of stormwater rule revision. A tiered compliance outcome could be developed and applied to situations where treatment design is not enabling attainment of state water quality standards as revealed by post-construction monitoring. Conceptual compliance requirements could also include a type of water quality escrow account that funds appropriate and effective mitigation as one example. This verification of compliance and funding approach would likely be more receptive than retrofitting existing treatment systems, especially in residential communities.

2. Wet detention, as a principal stormwater treatment method may no longer be an effective treatment method in many coastal areas of Florida due to groundwater influence resulting from more extreme wet season hydrology and sea level rise. "Perching" the permanent pool to effect adequate recovery between storm events and to reduce uncertainty about control elevations may be necessary for compliance with recovery presumption in 62-25, and 62-330 F.A.C. and Applicants Handbooks, Volumes I and II. More effective treatment could be accomplished by shifting from on-site treatment to treatment at regional nodes where greater efficiency could be required by design (treatment trains, longer HRT) with less constraints and management problems associated with wet detention systems in residential communities.

3. Developing consistent funding sources for management of stormwater treatment systems, especially those operated by agencies or local governments is necessary to protect state waters. Stormwater utilities focused on water quality attainment as opposed to flood control can be an effective and consistent funding source for stormwater treatment and maintenance. Or, more novel approaches that bring certainty that WD effluent will not cause or contribute to downstream impairment should be considered.

4. Variable sources of background loading conditions and associated coefficients enables applicants to "cherry pick" the background baseline loading condition that requires the least applicable loading reduction (difference between background and loading attributed to the project). Some of the current loading coefficients in the 2020 UCF Stormwater Academy document[6] that represent less developed land use types such as pasture are 2-3x higher than those occurring in other documents such as the Caloosahatchee River Watershed Protection Plan[7]. Updating and standardizing runoff and loading coefficients with relevant research will be necessary for effective compliance. Furthermore "loopholes" in regulations related to direct or indirect discharges to impaired waters or OFWs where WBID boundaries define direct or indirect discharges within a homogenous waterway conveyance, need to be removed.

5. Developing a new statewide stormwater rule is an opportunity to integrate best available science with effective stormwater treatment design standards that effect compliance. Climate change driven increases in rainfall and groundwater interactions influenced by extreme hydrology that will influence future stormwater treatment design must be integrated in any new stormwater treatment rule.

6. The final statewide stormwater rule should be considered a minimum requirement, enabling water management districts to implement more rigorous and effective treatment and compliance standards relevant to regional differences in hydrology and other related treatment challenges.

Thank you for the opportunity to comment on FDEP's stormwater rulemaking initiative.

Respectfully,

John Cassani
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[6] University of Central Florida Stormwater Academy 2020,
https://stars.library.ucf.edu/cgi/viewcontent.cgi?article=1024&context=bmptrains
[7] CRWPP appendices: https://www.sfwmd.gov/sites/default/files/documents/ne_crwpp_append_123108.pdf