



June 16, 2010

Eric Livingston
Bureau of Watershed Management
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

RE: Proposed March 2010 Draft Statewide Stormwater Rule Language and Technical Support Document

1450 Merrihue Drive

Naples, Florida 34102

Dear Mr. Livingston:

239.262.0304

The Conservancy of Southwest Florida first wishes to sincerely thank the Florida Department of Environmental Protection for appointing us to the Technical Advisory Committee (TAC) in the development of the Statewide Stormwater Rule. We have appreciated the opportunity to participate in the development of this important proposed regulation and support more effective stormwater regulation being implemented statewide.

We have reviewed the revised 3/17/2010 draft rule and March 2010 draft handbook language and offer the following comments for your consideration. In addition, we would refer you to our previous written comments, some of which support changes made by FDEP in the latest draft. We particularly support the change that would eliminate most wetland communities from the post = pre nutrient loading calculations, the use of natural conditions as predevelopment conditions in the calculations, and the inclusion of Total Nitrogen as well as Total Phosphorous in the performance standard for stormwater management systems.

Not Preempting More Stringent Regional or Local Stormwater Regulations

Proposed Rule 62-347.010(2) would preempt stormwater treatment rules adopted by each of Florida's Water Management Districts, including provisions that are more stringent than the proposed rule and handbook. The Conservancy supports consistency to establish a minimum baseline statewide, but opposes preemption of more stringent requirements implemented by Water Management Districts and local governments.

Both inside and outside the TAC meetings, FDEP staff promoted that the statewide stormwater rule will provide "consistency" including at a recent Florida Stormwater Association meeting on June 9, 2010 when FDEP staff again reiterated the need for one uniform approach to stormwater regulation state-wide. The Conservancy supports the statewide stormwater rule being utilized to establish a baseline statewide, but it should not preempt or attempt to preempt local or regional governmental entities from enacting more stringent regulations should they desire and are able to do so. In essence, it should be the new floor, not the ceiling. Not all regions of the state are equally impaired and thus warrant the same level of stringency with regard to stormwater treatment.

Therefore, we would urge FDEP to emphasize that this regulation as a new baseline, but revise Rule 62-347.010(2) to not preempt or discourage more stringent effective stormwater regulations being enacted by other governmental entities. The statewide rule is not likely to take effect for several years and thus, local regulations are essential in order to stem water quality degradation and ensure sufficient stormwater management is being implemented in the meantime. Even after the statewide regulation takes effect, there will be some areas that warrant additional stringency, and they should be encouraged to enact localized protective standards where warranted.

Not Weakening Other FDEP Stormwater/Surface Water Rules

In addition to superseding Water Management District Rules, proposed Chapter 62-347 is inconsistent with other existing FDEP rules for stormwater treatment. FDEP should acknowledge the inconsistencies and make it clear if it intends to amend these other rules. For instance, the proposed rule is inconsistent with F.A.C. 62-40.432(2) for minimum stormwater treatment standards and with F.A.C. 62-40.431 for stormwater management. We oppose provisions of this proposed regulation that would weaken or lessen the stringency of other existing water quality regulations, such as requiring the removal of 80% pollutants or 95% when discharging into Outstanding Florida Waters.

Limitation to Use of Off-site Stormwater Treatment

Part I, Section 1.2 of the March 2010 draft handbook regarding the use of off-site stormwater treatment, establishes a new potentially wide loophole for the improved regulation of stormwater discharges intended by the proposed rule. Current Water Management District Rules, e.g. F.A.C. 40E-4.301, require stormwater treatment to be on-site with the possibility of off-site mitigation for water quality impacts, where "the applicant is unable to meet water quality standards because existing ambient water quality does not meet standards." The new draft section would appear to establish a whole new regime of stormwater treatment rules without adequate criteria for when off-site treatment can be used or how it will be required to comply with the prescribed stormwater discharge performance standards.

First, the Conservancy believes that there should be more limitation to the use of this option in order to ensure that stormwater retention and treatment is provided on-site where feasible. This section should be revised to explicitly require the applicant to provide a feasibility analysis to demonstrate that the performance standard cannot be provided on-site. With the use of additional alternative BMPs such as pervious pavement or green roofs, it is often feasible to meet these new standards - even on a highly developed commercial or industrial lot. In such cases, the applicant should be required to do so. In cases where it truly is infeasible, only the proportion of the retention or treatment requirements that cannot be met on-site should be allowed to be provided through off-site stormwater treatment and this should be explicitly included in this section as well. There should also be a definition provided for what is on-site versus off-site means.

Second, the language of the draft section is too vague about how an off-site stormwater system would be regulated. It simply states, "(b) The applicant shall use modeling, loading calculations, or other data analysis techniques to provide reasonable assurance that the off-site treatment system provides the required stormwater treatment." There is no apparent reason why an off-site system should not be governed by the same design and performance rules that govern on-site systems. What does "the required stormwater treatment" refer to? Does this mean the performance standards of Section 3.1? How would this alternative regime satisfy the requirement of § 373.414(1) Fla. Stat. that the applicant provide "reasonable assurance that state water quality standards applicable to waters will not be violated"? This section needs to be revised to provide more clarity that the same design and performance rules will govern off-site systems.

Ongoing Inspection and Recertification of Stormwater Treatment Systems

In Part I, Section 1.5 of March 2010 draft handbook, it proposes a system of on-going inspection and recertification of stormwater treatment systems that we strongly support. As the US EPA fact sheet on wet detention ponds so aptly states, "Without proper maintenance, the performance of the pond will drop off sharply" as well as "The accumulation of sediments in the pond will reduce the pond's storage capacity and cause a decline in its performance."¹ We agree and commend FDEP for tackling this difficult issue in setting out specific maintenance monitoring and compliance guidelines. The inspection and recertification periods proposed are a good start.

In addition to the inspection and recertification, however, we believe that periodic monitoring of effluent water quality is needed to determine whether the systems are producing the treatment performance required by the rule. This is particularly important in the early years of the implementation of the rule. If, after several years of monitoring of a large number of systems, there are enough data to ensure that the presumption of compliance is being met, monitoring could be phased out.

"Post equals pre" Definition Based on Not Exceeding Natural Loadings

Part II, Section 2 of the March 2010 draft handbook proposes in the definitions that "pre-development means the natural vegetative community type of the project area" and that "Post equals pre" means post-developments loads that do "not exceed the loading of natural vegetative types." The Conservancy strongly supports such a definition in order to ensure that this policy does not vest pollution rights, and inadvertently spur the conversion of natural lands. See our previous comments on this issue for more information.

Redevelopment Definition Based on Prior Commercial, Industrial or Residential Use Only

In Part II, Section 2 of March 2010 draft handbook, it proposes in the definitions that redevelopment "means construction of a stormwater treatment system on sites having existing commercial, industrial, institutional, or multi-family land uses where the existing impervious surface will be removed as part of the proposed activity". We strongly support this definition but suggest clarifying by rewording to say "construction of projects" rather than just "stormwater treatment systems." This would ensure that the whole project fits the definition of redevelopment, not just the portion being used for the stormwater treatment system. If this is not the intent, there should at least be a specified percentage of the project site which would fit this redevelopment definition in order to qualify. We would support entirely, and think the language could be strengthened by addressing this more explicitly in order to avoid confusion.

At Least 85% Removal of Each Nitrogen and Phosphorus as the Performance Standard

In Part III, Section 3.1 of the March 2010 draft rule, the FDEP solicited for comment on the target performance standards. We applauded the current rule draft for not only focusing on the removal of phosphorus, but also explicitly including Nitrogen removal.

Addressing Nitrogen and Phosphorus separately is appropriate due to the fact that "phosphorus and metals are primarily transported bound to sediments, and nitrogen is often a dissolved

¹ US EPA Office of Water. 1999. Storm Water Technology Fact Sheet: Wet Detention Ponds. [cited 2010 June 14] Available from: www.epa.gov/owm/mtb/wetdtnpn.pdf

pollutant"² – resulting in significant differences in the amount and types of stormwater Best Management Practices (BMPs) needed to effectively treat either. The standard wet detention pond stormwater treatment approach is designed to effectively remove total suspended solids; therefore, is more effective at removing phosphorus bound in the sediments than nitrogen (which is typically dissolved). This is demonstrated in the following table of pollutant removal estimates derived from the Center for Watershed Protection's National Pollutant Removal Performance Database for Stormwater Treatment Practices:

Table 2. Pollutant Removal Efficiency of Stormwater Wet Ponds (Winer, 2000)	
Pollutant	Removal Efficiency (%)
TSS	80±27 ¹
TP	51±21
TN	33±20
NOx	43±38
Metals	29-73
Bacteria	70±32
1: ± values represent one standard deviation	

Therefore, other structural and non-structural BMPs in addition to the standard wet retention/detention systems are necessary in order to effectively address nitrogen. As nitrogen is the limiting factor in estuarine and coastal systems, it is also the primary pollutant of concern when trying to reduce nutrient impairment in such waterbodies.

The Conservancy of Southwest Florida strongly supports that the performance standards for the statewide stormwater rule be at least 85% removal of Total Nitrogen as well as Total Phosphorus. Reducing the percentage removal below 80% would weaken the current statewide requirement found in F.A.C. 62-40.342(2)(a)1. Therefore, the Conservancy would suggest that Part III, Section 3.1(a)(i) be revised to say at least 85% reduction of "each Nitrogen and Phosphorus" as opposed to "nutrients" in order to ensure it is understood that 85% removal would be minimally required for each. As mentioned above, with current wet detention facilities able to reach 85% TP removal but not 85% TN removal, additional BMPs would be necessary to reach adequate (80%+) Total Nitrogen removal. Inversely, nothing different than status quo will necessarily be needed under these proposed regulations if the two are lumped and regulated together as "nutrients".

Furthermore, the standard should be 85% removal or post = pre, whichever is the greater level of removal, not whichever is less. As Section 3.3 points out, post = pre could allow Total Nitrogen removal requirements to be as little as 55%. This level of Nitrogen reduction would be inadequate to protect downstream estuarine uses and water quality standards, allowing applicants to essentially do nothing different than required currently since wet detention alone can provide 55% level of treatment. Overall, not rectifying this would result in regulations that do not sufficiently address dissolved Nitrogen, a growing problem leading to the increased eutrophication of estuarine waters.

95% Pollutant Removal or Greater for Outstanding Florida Waters (OFWs).

The Conservancy supports a higher performance standard for stormwater discharges that impact Outstanding Florida Waters ("OFWs"). As Section 3.3 pointed out, setting the standard to post = pre, may not accomplish this goal. Current F.A.C. 62-40.342(2)(a)2 requires at least 95%

² Environmental Protection Agency. October 1996. *Protecting Natural Wetlands: A Guide to Stormwater Best Management Practices*. www.epa.gov/OWOW/wetlands/pdf/protecti.pdf Office of Water, Washington, DC.

removal for OFW. We recommend that the OFW performance standard be 95% removal or post = pre, whichever is greater.

The Conservancy may support FDEP's proposal to include protection of a greater portion of the watershed containing OFWs as outlined in 3.1.b. once we are clear on the size of the 12-digit HUC subwatersheds. We support a holistic approach to protecting downstream water quality through adequate source controls.

We would also strongly urge additional language be added to the alternatives paragraph in this section in order to give clear guidelines on what would serve as an appropriate analysis and justification for demonstrating that a project would not be causing or contributing to a water quality violation in that basin if the proposed approach were not utilized. The draft language does not meet the requirement of § 373.414(1) that the applicant provide "reasonable assurance that state water quality standards applicable to waters will not be violated." This is imperative in order to provide adequate guidance to the applicant, reviewer and public as to what the FDEP is expecting with regard to adherence to this regulation. If an applicant can readily deviate, then the proposed standards do not provide much assurance in resulting in a net improvement over status quo.

Same Standards for Redevelopment, with Flexibility in How Attained.

In Section 3.1.c, the proposed regulation outlines lesser stormwater requirements for redevelopment. While the Conservancy heartily supports incentivizing redevelopment, but does not believe relaxing stormwater regulatory standards is the appropriate way to incentivize redevelopment. Instead, other incentives such as increased development density would be more appropriate. The reason why more lenient stormwater regulations for redevelopment do not make sense is that many of the areas where we have the largest stormwater retention and treatment problems are within areas targeted for redevelopment. Even urbanized communities like Broward County do not favor reduced stormwater standards for redevelopment and have adopted stringent standards that they do not believe to have hampered redevelopment activity in their area (see Broward County letter attachment).

Instead of lessening stormwater requirements for retrofit projects; recognizing that these projects are sometimes land limited, the Conservancy suggests that the same performance standard apply with the flexibility of using off-site mitigation in the same waterbody as necessary to meet requirements. At the very least, Section 3.1.c should be revised to explicitly require that stormwater treatment levels not be lessened to below the existing conditions on-site. Having similarly stringent standards with off-site mitigation options would ensure stormwater improvements would be made on-site where possible, as well as downstream water quality standards met.

Adequate Groundwater Protection Outside Karst Areas

In Section 3.2 of the March 2010 draft handbook, it outlines specific objectives to protect groundwater that the Conservancy heartily supports; specifically, that stormwater treatment systems "avoid breaching an aquitard that will allow in direct mixing of untreated water between surface water and an aquifer system for drinking water." However, the draft rule and handbook do not provide requirements to meet such objectives outside Karst areas. In south Florida where water tables are high and there is a high degree of interaction between surface and groundwater, simply digging a wet detention pond that is too deep can create a similar result as a sinkhole in allowing pollutants to directly enter into the groundwater.

In order to prevent such deleterious effects, these regulations should require soil borings in the locations of the deepest portions of the proposed stormwater treatment system that would be drilled deeper than the proposed pond bottom. This would provide a demonstration that no aquitard would be breached in the construction of the system; information that would be impossible to attain without such sampling. Additionally, if such an aquitard is discovered, the system should be modified to allow at least two feet separation between proposed pond bottom and aquitard or an appropriate liner should be used to ensure proper containment and filtration of pollutants prior to them entering the aquifer. These requirements should be incorporated into Section 13 of the proposed handbook relating to wet detention pond design.

Not Attributing Pollutant Loading Rates to Natural Wetlands

In Section 3.4.1 of the March 2010 draft handbook, it states that "Wetlands are excluded from loading calculations in both the pre-development and post-development conditions." The Conservancy vigorously supports this approach as all healthy natural wetlands are nutrient "sinks" – meaning they absorb more nutrients than they generate. The Conservancy strongly supports that wetlands should not be positive nutrient loading values. They act as 'sinks' by trapping excessive nutrients and other pollutants from runoff water. The nutrients are then absorbed by plants and microorganisms living in the soil. This process removes much of the water's nutrient and pollutant load by the time it leaves the wetland and enters surface and subsurface waters. In addition to water filtration wetlands also are important for "floodwater storage, fish and wildlife habitat, aesthetics, and biological productivity"³. For these reasons, wetlands are vital to the stability of the different ecosystems to which they are connected. That is why the stormwater treatment areas in Everglades restoration are so effective at reducing phosphorus.

Assigning a positive load to wetlands not only is erroneous, but threatens to seriously undermine the effectiveness of the rule in providing sufficient stormwater management. This is due to it overestimates the loads coming from sites in their predevelopment state; thus, requiring less load reduction for post-development levels to not exceed pre-development levels approach. Assigning a net annual positive load to wetlands also incentivizes wetland destruction, with the faulty notion that developments with stormwater systems are less polluting than natural wetlands. Additionally, we have provided several sets of written comments to FDEP that provide additional scientific support for wetlands being net nutrient reducers and thus, not generating a net annual positive nutrient load.

The Conservancy of Southwest Florida would like to sincerely commend the Florida Department of Environmental Protection for its new approach in the March 2010 draft handbook of excluding wetlands from the post = pre calculations (by not assigning them vegetative groups), specifically 10 - Cutthroat Seeps, 16 – Scrub Cypress, 17 - Cypress Swamp, 18 - Salt Marsh, 19 - Mangrove Swamp, 22 - Shrub Bog, 23 - Pitcher Plant Bog, 24 - Sawgrass Marsh, 25 - Freshwater Marsh and Ponds, and 26 – Slough wetland communities.

While this is a step in the right direction, the same philosophy should also apply for the three remaining wetlands that were not acknowledged and given a vegetative group. The following wetland vegetative communities need to be recognized and relisted without an assigned vegetation group as they do not produce excess amounts of nutrient loading: 12 - Wetland Hardwood Hammock, 20 - Bottomland Hardwoods, and 21 - Swamp Hardwoods. The Florida DEP used the Soil Conservation Service (SCS) classification system to develop

³ Environmental Protection Agency. September 2001. *Functions and Values of Wetlands*
http://www.epa.gov/owow/wetlands/pdf/fun_val.pdf Office of Water, Office of Wetlands, Oceans and Watersheds, Washington, DC.

Appendix B: Correlation of Natural Vegetative Community Types with Soil Series. In the SCS's *26 Ecological Communities of Florida*⁴ it defines all three of these vegetative communities as wetlands and is therefore unacceptable for them not to be labeled and treated as such.

The following are definitions from SCS defining these three wetland communities:

12 - The Wetland Hardwood Hammock - Synonyms: Hydric Hammock.

"A wetland forest on poorly drained soils, soils subject to seepage, or soils with high water tables. Topography is low and nearly level. These hammocks are not flooded for as long a period of time as are associated swamp hardwoods. The swamp hardwoods community is often found within depressional areas of the wetland hardwood hammock. Wetland hardwood hammock may be distinguished from bottomland hardwoods by the dominant plant species and the type of flooding. If the inundating water derives from river overflow, it is a bottomland hardwood; if inundated by local rainfall, it is wetland hardwood hammock."⁵

20 - Bottomland Hardwoods - Synonyms: Bottomland Forest, River/Stream Bottom, Lowland Hardwood Forest, Mesic Hammock.

"The moisture regime is probably the most significant factor in maintaining the bottomland hardwood community. The key to its perpetuation is the seasonal flooding and receding of water while depressional areas within the alluvial flood plain retain some water and support the associated community of swamp forests. Luxurious growth during the summer months and a deciduous forest during the winter season characterize the appearance of this community."⁶

21 - Swamp Hardwoods - Synonyms: Swamp Forest, Backwater Swamp.

"Found bordering rivers and in basins which are either submerged or saturated part of the year. The vegetation is primarily deciduous trees. Periodic flooding is characteristic of the community. This community does not include cypress swamps or bottomland hardwood areas. These are in separate ecological communities."⁷

It appears that because these three wetland systems were labeled as "hardwood" forests, ipso facto they were lumped in with other hardwood communities and given a TP Group 2 and TN Group 2. However, the scientific consensus is that the characteristics of these communities designate them as wetlands.^{8 9} These three ecological communities also meet the definition of wetlands stated in subsection 373.019(17), F.S., as "those areas that are inundated or saturated by surface water or ground water at a frequency and a duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soils."¹⁰

There are numerous scientific studies supporting that wetlands are net nutrient reducers (or "sinks") rather than producers (i.e. generating a positive load), stating that "Several studies in Florida were initiated to further investigate the value of wetlands as nutrient sinks. These studies, from the Center for Wetlands at the University of Florida, included studies of purposeful disposal of high-nutrient wastewater in cypress domes and long-term inadvertent disposal of

⁴ Soil Conservation Service. (1981). *26 ecological communities of Florida*. Retrieved from <http://ufdc.uflib.ufl.edu/ufdc/?m=hd1J&i=227488>

⁵ IBID

⁶ IBID

⁷ IBID

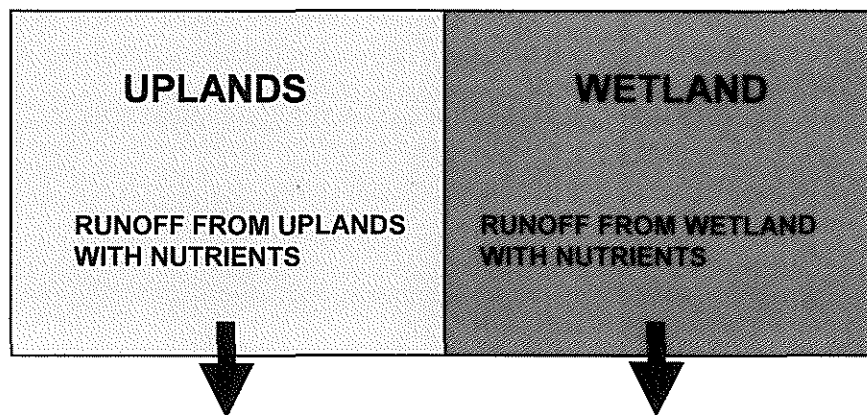
⁸ Florida Natural Areas Inventory. (1990). *Guide to the natural communities of Florida*. Prepared by FNAI and Florida Department of Natural Resources, Tallahassee FL. 111 pp.

⁹ Kawula, R. (2009). *Florida Land Cover Classification System*. Prepared by Center for Spatial Analysis, Fish and Wildlife Research Institute, and FWC, Tallahassee, FL. 64 pp.

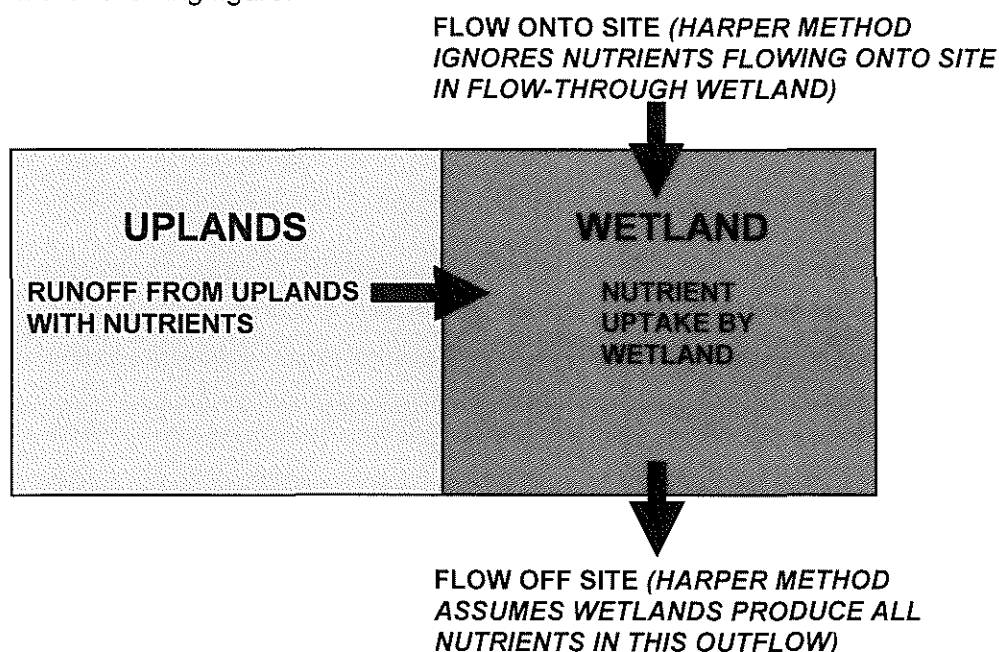
¹⁰ <http://www.dep.state.fl.us/legal/rules/surfacewater/62-340/62-340.pdf>

wastewater by small communities in forested wetlands. *In all of these studies, the wetlands acted as sinks for nitrogen and phosphorus (emphasis added).*"¹¹ Additionally, "In the cypress dome experiments, the nutrients were essentially retained in the water, the sediments and vegetation with little outflow. Bolt, Bayley, and Zoltek (1977) described nutrient uptake that occurred in a *mixed hardwood swamp* ... They found that total phosphorus and total nitrogen in the outflow were reduced by 98% and 90%, respectively, compared with the inflow."¹²

Because some wetlands remain assigned pre-development nutrient loadings in the methodology, we still believe that the methodology can still suffer from the issue we previously raised about double counting nutrients in runoff from uplands to wetlands together with nutrients in "runoff" from wetlands as illustrated below. The first figure illustrates the calculation performed using the Harper methodology for a given parcel of land with uplands and a flow-through wetland.



This is simply an incorrect conceptual model for such a site, and the use of this model will yield pre-development pollutant loadings that more than double-count the actual loadings from the site. The true conceptual model of a site with uplands and a flow-through wetland is presented in the following figure.



¹¹ Mitsch, William J. and James G. Gosselink. *Wetlands*. New York: Van Nostrand Reinhold Company; 1986.

¹² Ibid

The Harper methodology that is the underpinning for the draft rule and handbook would count the nutrient loading from the uplands runoff twice: once as runoff from the uplands and again as runoff from the wetland. It would also ignore any nutrients flowing onto the site in the flow-through wetland, and therefore, over count (fail to subtract) those nutrients from the total amount flowing off site. For instance, if 100 lbs of TN were flowing into a flow-through wetland on a development site from adjacent upland areas and 80 pounds were flowing onto the site from "upstream" in the flow-through wetland, there would be 180 pounds of TN flowing into the wetland portion of the property. If the wetland took up 40 lbs through various biological processes and then exported 140 lbs to the property "downstream," the wetland itself would not have generated the 140 lbs TN loading. The Harper methodology, by calculating the loading from the uplands and the wetland separately and ignoring the loading flowing onto the property, would calculate 240 lbs as the pre-development TN loading from the upland and the wetland on the property. Instead, the correct amount generated by the property would be the 100 lbs total generated by the uplands.

Therefore, we urge FDEP to remove vegetative community numbers and loading values from the 12 - Wetland Hardwood Hammock, 20 - Bottomland Hardwoods, and 21 - Swamp Hardwoods wetland communities in the proposed handbook.

The Conservancy also opposes loading values being assigned to isolated wetlands. It is unclear how isolated wetlands are being handled in the new draft handbook because, while most wetland vegetative communities are excluded from being counted in nutrient loadings, some wetland vegetative communities are included (See Appendix B of the March 2010 draft handbook). If any of the wetland vegetative communities that are assumed to have nutrient loadings are part of isolated wetlands, then they should not be included in the pre-development nutrient loading calculations due to the following.

The literal definition of "isolated wetlands" would mean that the wetlands do not typically discharge stormwater and are not hydrologically connected to a stream or other body of water. FDEP has drafted a revised definition of "isolated wetlands" for the Northwest Florida ERP program. For that program "isolated wetland" means any area that is determined to be a wetland in accordance with Chapter 62-340, F.A.C., but that does not have any connection via wetlands or other surface waters, including excavated waterbodies or a series of excavated waterbodies, to the landward extent of the Atlantic Ocean, the Gulf of Mexico, bays, bayous, sounds, estuaries, lagoons and natural channels and natural tributaries, rivers, streams and natural tributaries, natural lakes, and the Everglades. A wetland without any connection obviously does not contribute stormwater runoff or nutrient loadings to surface waterbodies.

Additionally, on p. 241 of the Storm Quality Handbook under soil series Allanton, Wetland Hardwood Hammock is identified as type 11. This needs to be replaced to a 12. Also "Flatwood categories (6-South, 7-North, and 8-Cabbage Palm) may also include wetland communities dependent upon soil type, elevation, proximity to water table, or wetland definition¹³". It is recommended that during environmental site assessments, the type of vegetative community be determined based on these variables.

Furthermore, while we agree with the decision to exclude most wetlands from the post versus pre calculations, the methodology for allocating nutrient runoff concentrations to certain soil types and vegetative communities is unclear. Dr. Harper's Technical Memorandum, dated

¹³ Doherty, S, Lane, C, & Brown, M. May 2000. *Proposed classification for biological assessment*. Prepared by Center for Wetlands, Gainesville FL. 33 pp.

September 21, 2009, titled Natural Vegetation Runoff Characteristics, contains the following statement:

This analysis indicated that there are no statistical similarities in runoff characteristics between natural vegetation communities associated with the same HSG. Both low and high runoff concentrations of TN and TP were observed in runoff from natural communities in the same HSG. The data indicate that runoff characteristics for natural areas are not related to soil types.

Yet, the table in Appendix B of the handbook and the pre-development loading approach used bases the predevelopment runoff characteristics on soil types. The more detailed report cited by Harper, "Runoff Characteristics of Natural Vegetation Characteristics in Florida" dated September 2009, was not provided to the public or to the TAC. We believe this new methodology must be reviewed by the public and peer reviewed by experts in the field before it can be used as the basis for calculating predevelopment nutrient loadings for compliance with a Florida statewide stormwater rule; therefore, we recommend that the FDEP disseminate this document to the public and to a group of independent scientific peer reviewers in order to ensure its scientific validity for use in this rule.

Not Counting Volume Below 12 Foot Depth for the Water Quality Treatment Calculations.

Section 13.4.c of the March 2010 draft handbook regarding pond depths in the wet detention pond design includes a formula for calculating if stratification will occur based on estimated Secchi depth and Chl-a levels. The rationale is that the development of an anoxic zone (an aquatic zone without dissolved oxygen) is dependent on the anticipated algal productivity of the lake. This formula and rationale has not been peer reviewed and is not supported by the numerous scientific studies in our region that show that small deep lakes routinely become anoxic at depth of 10-16 feet (3-5 meters) due thermal stratification from the lack of adequate vertical mixing. The anoxic water below the level at which this stratification is occurring may in fact be *contributing* to low dissolved oxygen, a pollutant condition.

Examples of literature supporting this include:

1. For a Florida small deep lake named Johnson Pond, a study indicated that "Dissolved color and algal turbidity limit light and heat penetrations, causing steep gradients in temperature, oxygen, dissolved inorganic C, and remobilized sedimentary P during stratification from March through November. Water below 5 m is cool and anoxic throughout the year." *Stratification of a Florida Lake during Winter Mixing*. Limnology and Oceanography: Vol. 36, No. 3 (May, 1991), pp. 557-585
2. Another study of Lake Jasmine in Lee County, FL (1.2 ha. with a 3m depth) monitored phosphorus, nitrogen, turbidity, conductivity, temperature, dissolved oxygen, chlorophyll a, etc. noted that "the mean dissolved oxygen concentration dropped sharply in May 1981 and May 1982, the month when summer stratification occurred."
3. In a study that analyzed the impacts of weather and wind, lake shape, lake turbidity and other factors that may influence stratification, it concluded that ratio of surface area to mean depth (R) "proved to be superior to mean depth as a predictor of stratification." *A simple model for predicting the date of spring stratification in temperate and subtropical lakes*. Limnol. Oceanogr. 38(5), 1993, 1077-1081.
4. In a study of 55 shallow lakes, the results indicated that "The relative importance of lake size, chlorophyll a, and color in explaining variation in percent oxygen saturation was examined using multiple regression. Percent oxygen saturation was negatively correlated with color during the winter, spring, and summer, and positively correlated with lake size in the winter and spring. *However, percent oxygen saturation showed no relationship with chlorophyll a during any season.*" (emphasis added) Crisman T.L., Chapman L.J., Chapman C.A. *Predictors of Seasonal Oxygen Levels in Small Florida*

Lakes: The Importance of Color. Hydrobiologia, Volume 368, Numbers 1-3, 1998, pp. 149-155 (7).

The idea that stratification and resulting anoxia are primarily dependent upon chlorophyll *a* levels and are not directly correlated with lake depth, as proposed in this report, is not scientifically supported and from a practicality standpoint, could not be predicted by an engineer in an office somewhere with any accuracy anyhow. In fact, a local limnological expert from Lee County has been conducting ongoing studies which indicate that the primary factor that affects thermal stratification, the type of stratification we most often experience in Southwest Florida, is fetch (the ability to have enough wind and surface area for adequate vertical mixing), which is directly correlated to the ratio of surface area to mean depth (*R*, as indicated in the scientific study reference above). The method for determining anoxia proposed in the "Evaluation of Current Stormwater Design Criteria in Florida" report and the March 2010 draft handbook does not reflect this.

Instead, a more rigorous approach would be to assess the approximate size of an average retention/detention pond and survey corresponding scientific literature to create a depth limitation standard that would prevent anoxia from occurring in the majority of applications. At the very least, the water volume below that level should not be counted toward water treatment crediting calculations. To allow ponds deeper than twelve feet to have their entire volume included in water quality treatment calculations is falsely inflating the amount of treatment that will actually occur in most instances. Therefore, we request FDEP initiate an independent peer review of the anoxic conditions formula and revise this section to incorporate a scientifically sound method for determining depth of anoxia, or to include a prohibition of using the volume below 12 foot depth for calculating the permanent pool volume for the water quality treatment calculations.

Natural Wetlands Should Not be Used for Stormwater Treatment

Section 16 of the March 2010 handbook outlines using natural wetlands for stormwater treatment. While it says in Section 16.1 that the statutes "encourage the use of wetlands", the actual statute language specifies that is "provides for the use of certain wetlands"; thus, it does not "encourage" nor does it provide for all wetlands to be used. The Conservancy supports the use of constructed wetlands or filter marshes as a stormwater best management practice, but we adamantly opposes using natural wetlands as such because (1) they won't provide the assumed stormwater treatment over time, (2) it is wrong to use waters of the state and the US for private development pollution treatment – they are receiving waterbodies and should be maintained to Class III water quality standards with pollution treatment prior to discharge into them, and (3) using natural wetlands for stormwater treatment will result in degraded wetland systems. These three adverse impact would be caused by this policy regardless of whether the wetlands are "isolated" and "wholly owned" or not. Therefore, we urge FDEP to revise this section to limit stormwater treatment to only within constructed wetlands, eliminating the language indicating that the statutes "encourage the use of wetlands".

Using natural wetlands for stormwater treatment will result in lost pollutant removal efficiency over time, eventually leading to an ineffective and insufficient stormwater treatment system. Constructed wetlands, such as stormwater treatment areas (STAs), are useful stormwater BMPs as they are maintained to ensure that their assimilative capacity is not surpassed and therefore, their removal efficiency is maintained. If they are not maintained routinely, their assimilative capacity decreases and eventually is lost. However, who is going to monitor to ensure the natural wetlands' assimilative capacity is not being exceeded? Who is going to bulldoze, scrape, and replant a natural cypress swamp if it is? When natural wetlands are used for stormwater treatment, they will not only become degraded – they will no longer provide the

stormwater treatment that they were anticipated to, resulting in insufficient stormwater treatment which this rule is supposed to prevent.

In response to this issue, EPA has created "Protecting Natural Wetlands: A Guide to Stormwater Best Management Practices."¹⁴ This 181-page publication details the deleterious effects of stormwater on natural wetlands and outlines how non-structural and structural stormwater BMPs should be used to provide stormwater treatment prior to discharge into natural wetlands. In using wetlands for "polishing" (i.e. treatment beyond regulatory standards), it also stresses that discharges "can adversely affect wetland functions and values" – stating that even when constructed wetlands are used, monitoring and maintenance should be incorporated. Furthermore, "Natural wetlands typically exhibit a high capacity for nutrient removal and have been used both incidentally and intentionally for this purpose. However, *this removal is associated with ecological changes (e.g. changes in species composition, increased rates of primary productivity and decomposition) that diminish the biotic integrity of these ecosystems.*"¹⁵ (emphasis added). Simply inserting a requirement as proposed in Section 16.5 for "reasonable assurance that wetlands characteristic and functions, including the value of functions provided to fish and wildlife and listed species will not be adversely impacted by the proposed activity" is unacceptable when it is known that degradation is inevitable from such activity.

In addition to the degradation that comes from overburdening natural wetlands with nutrient pollution, changes in the quantity of water to wetlands can cause deleterious effects as well. Scientific studies have shown that the greatest wetland losses have occurred to short-hydroperiod wetlands. These wetlands have particular importance in generating the prey base that supports numerous animals, especially for that of the endangered woodstork. Since short hydroperiod wetlands are defined by having a hydroperiod shorter than the wet season, using them for stormwater treatment would intrinsically lengthen their hydroperiods to at least the entire wet season – thus, causing a loss of their functionality as such and transitioning them to deeper long-hydroperiod wetlands. This is unacceptable, and contrary to the protection of wetland ecosystems.

Therefore, due to the fact that use of natural wetlands will result in deficient stormwater treatment and degradation to natural wetlands, we would urge that FDEP not support the use of any natural wetlands as stormwater treatment. As such, we would request that FDEP revise the proposed stormwater rule to distinguish between "natural" and "constructed" wetlands, making it explicit that natural wetlands should not be used in meeting the regulatory requirements of the rule. Additionally, there should be language included in the rule that "Discharges to any natural wetlands (regardless of whether it is isolated and wholly-owned) should be only after all treatment has been provided in a constructed stormwater treatment train system on-site and only if the rate and amount of discharge will not alter the hydroperiod or ecological functions of the downstream wetlands or receiving waterbodies. In cases where discharges are made to natural wetlands after the required treatment has been provided, monitoring is required in perpetuity."

¹⁴ Environmental Protection Agency. October 1996. *Protecting Natural Wetlands: A Guide to Stormwater Best Management Practices*. www.epa.gov/QWOW/wetlands/pdf/protecti.pdf Office of Water, Washington, DC.

¹⁵ McCormick, Paul V. and James A. Laing. "Effects of increased phosphorus loading on dissolved oxygen in a subtropical wetland, the Florida Everglades." *Wetlands Ecology and Management*. 11:199-216, 2003.

Fundamental Flaws in the Harper Methodology Still Remaining in Proposed Methodology

The Conservancy previously provided to FDEP a peer review of the 2007 Harper methodology by an expert peer review team assembled by the Center for Watershed Protection, which found fundamental flaws in the methodology. In addition to the lack of validation of the methodology, the flaws include the basic runoff calculations that are at the heart of the methodology.

The important conclusions of the Evaluation include:

1. The methodology as it currently exists is not a technically sound technique to estimate pollutant loads and develop stormwater design criteria.
2. The use of the SCS curve methodology for predicting annual runoff from development sites compromises the ability to accurately predict runoff rates and volumes. Estimates of annual runoff (depth) based on SCS predictions of rainfall event depths do not account for variable evapotranspiration, nor for overlapping of runoff events, nor for development of peak flows. A continuous simulation model, such as SWMM, should be used.
3. The methodology needs to be validated with properly designed long-term monitoring of facilities sized according to the Harper Method using a mass balance approach, considering surface water and groundwater, to determine how technically sound the method is.
4. The pollutant concentration data used to estimate loadings for different land uses are insufficient in number and highly variable, and very large error bands should be placed around any estimates or assumptions based on these data. At least there should be an expanded analysis of pollutant concentration and load data including reporting of statistical measures including variability of the data. The approach of using the mean of the separate categories for design purposes is not defensible, and a large safety factor should be included given the variability of the data.
5. Although the Harper Report uses the term Event Mean Concentrations ("EMCs") for the pollutant concentration data used, the studies referenced do not appear to have been performed in such a way that EMCs can be calculated from the data.
6. The International Stormwater BMP Database, supported by EPA, the American Society of Civil Engineers, and other professional societies, should have been used as a source of data on performance of BMPs. In addition, the data used for removal of TN and TP in wet detention ponds for long residence times should be presented completely with all of the parameters in the studies, because some of these results were apparently estimated or calculated rather than observed.
7. Discharge of pollutants to groundwater from dry retention and wet detention ponds should also be considered, because in many cases, dissolved pollutants in shallow groundwater readily flow into nearby surface waters.
8. Use of percent removals for estimating performance of stormwater treatment BMPs is not appropriate and would likely predict much lower effluent concentrations than would be achievable. The focus should be on water quality achieved.
9. Although stormwater treatment trains should be encouraged, the treatment train equation used in the Harper Report is seriously flawed. A unit process approach to pollutant removal by a treatment train should be used where different stages of a treatment train generally employ different unit processes. The overall efficiency of a treatment train for a specific pollutant would best be determined by considering the ability of the unit processes in each stage of the treatment train to remove the

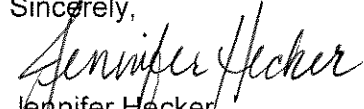
pollutant. Another consideration overall efficiency is the concept of an irreducible concentration.

10. A pollutant removal efficiency of 100% for dry retention practices is too optimistic, and there are no data presented in the document to support 100% removal for volume retained.

Many of these concerns and recommendations remain unaddressed in the proposed stormwater regulation. The Conservancy requests that this peer review be carefully reviewed and incorporated into the next set of revisions to the statewide stormwater rule revisions and draft handbook in order to ensure that this regulation is sufficient robust and effective to produce a net benefit over status quo with regard to stormwater retention and treatment.

In conclusion, we sincerely appreciate the revisions to the draft statewide stormwater rule and handbook that the eliminate most wetland communities from the post = pre nutrient loading calculations, the use of natural conditions as predevelopment conditions in the calculations, and the inclusion of Total Nitrogen as well as Total Phosphorous in the performance standard for stormwater management systems. We believe with the aforementioned suggestions incorporated and deficiencies rectified, that this regulation could provide greater effectiveness in proper stormwater management implementation. Please feel free to contact me at (239) 262-0304 x250 to discuss further and thank you for your time and consideration in this matter.

Sincerely,



Jennifer Hecker
Director of Natural Resource Policy

cc: Governor Charlie Crist
Secretary Mike Sole, FDEP
Mimi Drew, FDEP
Jerry Brooks, FDEP
Janet Llewellyn, FDEP
Stanley Meiburg, EPA
James Giattina, EPA
Veronica Fasselt, EPA

ATTACHMENT



Environmental Protection Department

WATER RESOURCES DIVISION

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September 14, 2007

Eric Livingston, Chief
Bureau of Watershed Management
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399

RE: "Evaluation of Current Stormwater Design Criteria within the State of Florida" and the proposed development of a Statewide Stormwater Rule

Dear Mr. Livingston:

Broward County appreciates the opportunity to provide comment on the June 2007 final report entitled "Evaluation of Current Stormwater Design Criteria within the State of Florida" (report), prepared by Dr. Harvey Harper for the Florida Department of Environmental Protection in support of the development of a Statewide Stormwater Rule. With over 1800 miles of canals, a vibrant coastal community with sensitive coral reef resources and the delicate Everglades ecosystem, Broward County has a vital interest in preserving and enhancing surface water quality and protecting the designated uses of our water resources. To that end, Broward County has maintained stringent water quality and redevelopment standards and has a long history of effective water resource management and regulation.

Broward County has reviewed the report and supports the need to revisit the water quality treatment requirements to address nutrient removal deficiencies presented by various existing treatment options. We also support efforts by FDEP to enhance the effectiveness of water quality treatment provided through development and redevelopment. While the report identifies several measures that could serve to improve water quality treatment as part of development and redevelopment projects, the County has concerns with other prominent themes that serve as the basis for some of the report's more significant recommendations. For example, the report's focus on the establishment of a pre-vs-post criterion for stormwater quality treatment has the potential to result in a reduced level of treatment required for a large percentage of projects in urban areas, thereby failing to provide the enhanced water quality treatment benefits presented as major goals of the report. The implementation of the pre-vs-post approach to water quality treatment with a stated goal to *"ensure that land developments do not cause a net degradation of water resources*

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within the state" (Page 6-1) may adversely impact the restoration and maintenance of natural system functions and the designated uses of waterbodies and compromise local government's ability to achieve compliance with TMDL requirements as required in 62-40.431 F.A.C.

Broward County is also concerned that the report, and later development of a Statewide Stormwater rule, may lead to the preemption of local governments' authority to regulate storm water discharges. Broward County opposes any changes to stormwater treatment standards that could reduce water quality treatment requirements or preempt local governments' authority over the nature and quality of stormwater discharges.

Broward County appreciates the opportunity to provide review on the referenced report and offers the following specific comments for consideration:

Pre-vs-Post Criterion for Stormwater Quality

Establishment of a pre-vs-post criterion for stormwater quality, thereby replacing the current requirement for 80% or 95% reduction in average annual load of pollutants from a developed site, is counter to the requirements established in Section 62-40.431 F.A.C.

The report establishes the need for a pre-vs-post water quality criterion in Objective #7 on Page 1-2 and later uses Section 62-40.431 F.A.C. on Page 6-1 to support the pre-vs-post water quality concept by pointing out that *"This objective is supported in Chapter 62-40.341 (reference should be to Chapter 62.431)...which states that "the primary goals of the State's Stormwater Management Program are to maintain, to the maximum extent practical, during and after construction and development, the pre-development stormwater characteristics of a site"."*

The term pre-development is commonly used today to refer to the existing condition of a site prior to a proposed new development state, regardless of whether the existing condition is developed or undeveloped. In Broward County, which has virtually no undeveloped land, the majority of development occurs on previously developed sites where the pre-condition is considered the existing state of development. This has been the interpretation used by both the County and the State in preparing pre-vs-post water quantity comparisons, with the reference to pre-development stormwater characteristics in Section 62-40.431 F.A.C. having long been interpreted to refer to the pre-development water quantity aspects of a site, not the water quality treatment aspects. This interpretation is further supported by the remainder of 62-40.431 F.A.C., which establishes the need *"...to protect surface water resources from stormwater pollution from existing and new land uses..."*, and which recognizes that there are various pre-development discharges that are of unacceptable water quality and thus establishes goals such as *"...it is a goal to eliminate the discharge of inadequately managed stormwater into waters..."* and *"It shall be a goal of stormwater management programs to reduce unacceptable pollutant loadings from older stormwater management systems, constructed before the adoption of Chapter 62-25, F.A.C., (February 1, 1982)..."*

Therefore, adoption of a pre-vs-post criterion for water quality treatment is in direct opposition to Section 62-40.431 F.A.C., which requires the protection of water resources from stormwater pollution from existing land uses, not the perpetuation of existing pollutant loadings that would

occur under a pre-vs-post water quality scenario. Section 62-40.431 F.A.C. also refers to the water quality produced by older surface water management systems as unacceptable and requires the reduction of stormwater pollutant loadings to preserve or restore designated uses. The current standard requiring 80% and 95% reduction of the average annual load of pollutants from a developed site should remain in effect and continue to be enforced. To allow pollutant loadings to remain at current levels would limit the ability to achieve pollutant loading reductions in support of TMDL implementation and severely impair the ability minimize existing adverse impacts on natural systems, property and public health. This change would have a particularly profound impact on Broward County, where redevelopment activity is extensive and represents the primary opportunity for continued development while achieving the stated goal of Section 62-40.431 F.A.C. *"to protect, maintain and restore the functions of natural systems and the designated uses of waters"*.

Current Water Quality Treatment Requirements

It is practical to meet 80% and 95% reduction targets using existing treatment methods as noted in the report.

The development of a pre-vs-post water quality design criterion *"to achieve a condition of no net increase in pollutant loadings following development"* (Objective #7, Page 1-2) in many instances will result in a decrease in the water quality treatment provided through development compared to the water quality treatment currently required under the 80% and 95% pollutant load reduction standards. This result is acknowledged in the conclusion on Page 7-57, which states *"Requiring stormwater management systems to be designed to achieve an arbitrary 95% pollutant removal goal will far exceed the required removals for both total nitrogen and total phosphorus..."*. Lowering the water quality treatment standards through the use of a pre-vs-post water quality criterion is unnecessary and is not based on an inability of conventional treatment systems to provide the currently required 80% and 95% removal efficiency. The report demonstrates that surface water management systems could be designed to provide the currently required removal efficiency (Conclusions on Pages 7-53 through 7-57) with adjustments to the storage volume requirements and the elimination of dry detention as a treatment option.

The rules should continue to require the current 80% and 95% removal efficiency, with an option to require development to meet a pre-vs-post water quality criterion in the limited number of cases where this approach may result in enhanced water quality treatment as compared to current stormwater quality treatment requirements.

Water Quality Treatment in Redevelopment

Reducing treatment requirements for redevelopment sites is unnecessary. Broward County has been successful in requiring redevelopment to meet current water quality treatment requirements for over a decade.

Although not specifically stated in the report, in the FDEP Proposed Legislative Concept for 2008 relating to the development of a Statewide Stormwater Rule, Item #5 of the **"Other Comments: Need for Stormwater Rulemaking Legislation"** notes that the proposed rule

would allow special provisions for urban redevelopment and retrofit projects, further substantiation that the term pre-development may be applied to the existing development state of a site. The item also notes *"Urban redevelopment and retrofit projects face special challenges in providing stormwater treatment"*.

Broward County has required major redevelopment projects to meet the current water quality treatment requirements for over a decade with notable success. There are no indications that requiring redevelopment projects to provide full water quality treatment affected the rapid pace of development within Broward County during the 2000-2005 real estate boom. In the past three years alone, Broward County has required over 1000 acres of redevelopment to provide full water quality treatment, thereby contributing to the preservation of designated uses and reducing unacceptably high pollutant loadings from older stormwater management systems, as required by 62-40.431 F.A.C.

Land Use Code and Classification

The event mean concentrations (EMC) established in the report require significant additional study before they should be applied throughout the state.

The Florida Land Use Code and Classification System (FLUCCS) includes numerous categories of land uses based on percent impervious, vegetative cover and development density. The report proposes to condense these various land uses into 12 less specific general land use categories based on the limited availability of data for many of the actual land uses in the state. These 12 general land use categories poorly represent the range of current land uses throughout the state, especially in urban areas. Oversimplification of the runoff characterization through the use of the 12 proposed land use categories may result in errors in the calculated runoff volume and pollutant load from proposed developments, as increases in land use intensity are generally accompanied by increases in runoff concentrations. (ref. Page 4-25 of the report and table 4-17 on Page 4-26).

Example #1: The report proposes to lump all single family residential projects into a single land use category. This single family residential land use category assumes 20-40% impervious area. However, a single family residential project in Broward County (likely other urban areas throughout the state as well) often has an impervious coverage in the 70% to 90% range, potentially resulting in a substantial underestimation of runoff concentration and therefore required treatment volume.

Example #2: The event mean concentrations established in the report for the high-intensity commercial land use are based on studies performed between 1981 and 1986. The report states *"Since most commercial activities themselves generate relatively little pollutant loading, the majority of pollutant deposition occurs as a result of automobiles and trucks operating within the commercial area."* (Page 4-16). A quick review of available data indicates that the annual average daily traffic count in Broward County increased 66% between 1990 and 2006, a period in which other areas throughout the state have likely experienced similar increases in traffic volume. The correlation between traffic volume and pollutant loading suggests that perhaps

newer studies that reflect current traffic volumes would be more appropriate to determine pollutant loads from certain land uses.

The report alludes to the preemption of local government authority over the nature and quality of stormwater discharges.

In numerous instances the report refers to the wide variation in stormwater quality criteria throughout the state and the need to establish uniformity. The FDEP document "2008 Agency Proposal" for the Statewide Stormwater Rule, Item #1 of the "Other Comments: Need for Stormwater Rulemaking Legislation" notes that proposed approach for the unified stormwater rule is the same as the approach authorized by section 373.414(18) F.S., which included preemption of local government authority over wetland mitigation assessment methodology. Item #2 of the same report states that the different stormwater rules around the state create confusion for applicants and that "*A single statewide rule would provide a consistent approach and treatment standard for stormwater discharges...*", potentially indicating that local governments would be preempted from regulating stormwater discharges from development and redevelopment by requiring more stringent standards than the state for stormwater quality and quantity control.

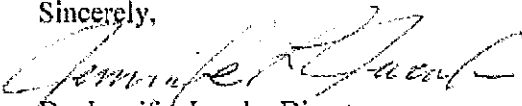
Broward County opposes changes to the stormwater requirements that preempt local government authority over the nature and quality of stormwater discharges.

Broward County commends FDEP for investigating the nutrient removal deficiencies in the current treatment design criteria and the associated failure of the requirements to consistently provide the 80% or 95% pollutant load reduction goals set by 62-40 F.A.C.

The report provides valuable information concerning revisions to current criteria in order to achieve the 80% and 95% pollutant load reduction goals established in 62-40 FAC. Broward County commends FDEP for their investigation into this issue and encourages that the appropriate revisions to the criteria be implemented to consistently achieve the 80% and 95% reductions. Broward County also supports the incorporation of low impact development principles into the stormwater rules to provide incentives for their inclusion in project designs throughout the state.

We look forward to future opportunities to actively participate in the development of a Statewide Stormwater Rule that addresses current nutrient removal efficiencies, incorporates low impact design principles, and provides for continued local government jurisdiction over the nature and quality of stormwater discharges. Thank you for your consideration of Broward County's comments and please feel free to direct any follow-up inquiries to Mr. Leonard Vialpando, PE (954-519-1473).

Sincerely,



Dr. Jennifer Jurado, Director
Water Resources Division

cc: Commissioner Kristin Jacobs, Broward County
Jennifer Hecker, Conservancy of Southwest Florida