NEW HARPER STATEWIDE MODEL FOR FLORIDA
TECHNICAL EVALUATION

Overview

The new statewide Harper model for Florida contains a variety of revisions that were not included in Dr. Harper's previous model for southwest Florida and it addresses many of the concerns expressed by the U.S. Environmental Protection Agency's (EPA) prior peer review report. Because of the significant implications for future water quality in Florida, EPA has been closely following Dr. Harper's recommendations. EPA Region 4 cannot verify the conclusions of the new statewide model. For this reason, we would recommend that Florida DEP conduct an independent peer review of the new model to verify the reports conclusions.

Specific Comments

Wetland Pollutant Loads

A significant issue that remains is how to best address existing wetlands in the pollutant loading calculations for the pre- versus post-development scenarios. A recommendation from the EPA funded peer review of Dr. Harper's previous storm water treatment design model for southwest Florida was that wetlands and lakes should be used as wet weather controls, rather than land uses. While this would be one way to address our concerns, Dr. Harper chose a different approach. The new statewide Harper method treats wetlands as land uses and leaves determination of pollutant loading rates for natural wetlands up to the user. The model recommends referencing regional and/or site-specific wetland data. Unfortunately, such regional and/or site-specific data are rarely available for site characterization. Therefore, in considering the adoption of a statewide rule the State should carefully consider what monitoring and modeling requirements would need to be included by the land owner to ensure the technical validity of applying this approach.

Some have argued that such an approach implies that natural wetlands create pollution, a concept that is contrary to the goal of the Clean Water Act, which is to restore and maintain our nation's waters, including natural wetlands. While this is true, wetlands are also known to play an important role in the biogeochemical cycling of nutrients from both natural and anthropogenic sources. Wetland export of naturally occurring nutrients to downstream waters augments plant growth, which then nourishes wildlife. However, wetland export of excess, anthropogenic pollution can lead to water quality degradation. Naturally occurring nutrient levels are quite low in south Florida and the challenge is to assign values that represent only natural nutrient cycling and not anthropogenic pollution.

The approach leaves wide room for user interpretation with minimal references for such interpretation. This could result in inaccurate analyses, poor project designs that do not achieve pollutant removal targets and ultimately, degraded water quality. In addition, the differences in function between isolated and flow through wetlands are not addressed. Isolated wetlands would

not be expected to contribute significantly to nutrient export. Resolving this issue is important for ensuring proper application of the model and protecting water quality.

Pre-project Conditions

A model application issue that raised serious concerns with the implementation of Dr. Harvey Harper's previous storm water treatment design model for southwest Florida was the interpretation that "pre-project" condition was equivalent to current site condition, regardless of current land use. To address this concern, the new Harper statewide model for Florida states, "To achieve the goal of no net increase in loadings following development, discharges of total nitrogen and total phosphorus from the land parcel following development cannot exceed the pre-development values listed in Table 6-8." This table provides a listing of estimated annual mass loadings of nitrogen and phosphorus for undeveloped, natural areas. EPA supports this recommendation. However, the model also specifies the use of site specific data, where it exists. While this specification is generally desirable, it should be clarified in any subsequent rule development to specify that pre-project conditions refer to the natural state prior to any type of development, including agriculture and silviculture.

Data Gaps

The EPA funded peer review of Dr. Harper's previous storm water treatment design model for southwest Florida recommended use of additional data sources for establishing mean storm water characteristics for specific land use categories. In response to this recommendation, the new Harper statewide model for Florida includes some additional data sources. However, the available data sources are still minimal for most land use categories and pollutant types. According to Dr. Harper, data for all land use categories generally exists only for suspended solids, total nitrogen and total phosphorus. Availability of data on metals and oxygen demanding substances is variable for different land uses. The greatest amount of data exists for commercial, residential and highway land uses. Information on pathogens, dissolved nitrogen and phosphorus, and oils, greases and hydrocarbons is limited in the literature. This data gap, particularly for dissolved nutrients, may affect the accuracy of the pollutant removal efficiencies calculated using this model. Given the data limitations for development of models for the design of storm water treatment systems in Florida, long term monitoring and benchmarks should be considered. These could provide data for incorporation into the model to improve its accuracy over time.

Source Control/Non-structural Best Management Practices (BMPs)/Green Infrastructure/Low Impact Development (LID)

One of the recommendations from the EPA funded peer review of Dr. Harper's model for design of storm water treatments systems in southwest Florida was to incorporate source controls and BMP treatment trains into system designs. In response to this recommendation, the new statewide Harper model recommends maximum inlet and outlet separation, oil and grease skimmers, slope stabilization and littoral zones as design criteria for treatment ponds, as well as use of a treatment train approach for certain combinations of designs and site conditions. We

support this recommendation and suggest that FDEP consider specifying those design criteria in any subsequent rules.

Source control is not addressed in this new model. FDEP should consider adding source control and non-structural BMPs to their requirements as part of the BMP treatment train. The Draft Southwest Florida Basin Rule was developed to support this type of approach. The challenge is to develop a defensible credit system for such a treatment train.

Groundwater Issues

Compared to existing designs, the new criteria would require retention of more storm water runoff, longer residence times, and more dry retention pre-treatment. They would, however, allow deeper ponds. The following recommendations regarding potential ground water issues were included in the EPA funded peer review of Dr. Harper's previous storm water treatment design model for southwest Florida:

- Pond depths below the groundwater table could cause impacts,
- Increase the distance above seasonal high ground water for dry retention basins,
- Ground water may prevent stratification at depth,
- Coastal ground water salinity may cause stratification and
- Limnologists should evaluate the anoxic depth calculation.

The new statewide Harper model recommends use of a mathematical formula for calculating anoxic depth, so that treatment ponds may be designed to avoid stratification of deep water layers. Alternatively, the report suggests use of aerators to help maintain circulation. The report does not address potential aerator failure and/or long-term maintenance. Missing from the new statewide Harper model is a discussion of ground water interaction with deep ponds. Many of the high growth areas of Florida are low lying with water tables near the ground surface. Saltwater intrusion is an ever present concern for low lying coastal areas. EPA recommends further evaluation to link design criteria with soil type and to develop separate source controls to address groundwater concerns.