

# **Fiscal Impacts of EPA's Proposed Numeric Nutrient Criteria On Stormwater Conveyances and Drainage Ditches**

Briefing Paper Prepared by the  
Florida Stormwater Association

*FSA wishes to thank Steve Peene, Ph.D.,  
of Applied Technology and Management for his assistance  
in the calculation and preparation of the cost estimates  
contained in this report.*

# Fiscal Impacts of EPA's Proposed Numeric Nutrient Criteria On Stormwater Conveyances and Drainage Ditches

Briefing Paper Prepared by the  
Florida Stormwater Association

Stormwater Runoff is rainfall that does not seep into the ground but runs off over yards, streets, parking lots, buildings and open land. To prevent flooding, Stormwater Runoff is managed to avoid impacts to local property owners. Stormwater conveyances, or drainage ditches and canals, are constructed or maintained for the purpose of providing flood control.

## Water Quality Protection Programs in Florida

The State of Florida initiated the development of its modern-day water quality protection programs in the 1980s, culminating with the adoption of legislation implementing the Total Maximum Daily Loads (TMDL) program in 1999 and in 2005, and with the implementation of corresponding regulatory measures over the past eight years

While Florida's growth in population over the past 25 years has brought many challenges in pollution control and abatement, Florida's water quality protection programs are second to none in the United States. No other state in the Environmental Protection Agency's (EPA) Region 4 (the southeastern US) has stormwater management programs and policies equal to Florida's, nor do any of the larger states, including California, New York and Texas.

As part of the TMDL implementation process, the Florida Department of Environmental Protection (FDEP) established technical committees to provide advice on the identification of impaired waters, water quality credit trading and the allocation of pollutant load reductions responsibilities within various watersheds, held numerous public workshops and hearings on the development of science-based numeric nutrient criteria (NNC); and, spent over \$20 million in developing Florida's NNC regulations alone. Florida remains one of the few states (if not the *only* state) where water quality goals are actually implemented after their establishment.

Although Florida had already initiated the development of new (numeric) approaches to set water quality criteria, in 2008 a federal lawsuit was filed against the EPA seeking to force the adoption of numeric nutrient criteria for Florida (and only Florida) waterbodies.

While nutrients such as nitrogen and phosphorus naturally occur in nature, excessive concentrations often lead to harmful conditions in our lakes, streams and springs. Florida's approach to NNC has been to set criteria but then confirm the health of the waterbody by a supplemental method called biological confirmation. The FDEP rules also provide that ditches and conveyances remain covered by Florida's narrative nutrient criteria, not numeric criteria.

In contrast with FDEP's approach, EPA's proposed NNC would apply the same level of protection for stormwater conveyances and drainage ditches as proposed for natural streams, without a biological confirmation process to determine that the level of nutrient are at unhealthy levels.

The scientific basis of the EPA NNC has been questioned and concerns expressed that the EPA criteria would likely result in the needless expenditure of large amounts of the public's tax dollars on ditches and conveyances (with little or no human or environmental benefit) at the expense of making improvements to more important waters.

## **Proposed Solution**

Floridians know Florida's waters best. After negotiations spanning the past two years (and especially over the past three months) the following are a set of Florida-based legislative actions necessary to establish a full set of comprehensive, integrated (numeric) nutrient water quality protections that allow the State to proceed with implementation to protect and restore Florida's waterways, while avoiding unnecessary expenditure of scarce public resources on waters with little or no human or environmental benefit.

- Codify in Florida Statutes that FDEP must complete its estuary and coastal waters nutrient criteria rulemaking by December 1, 2014. Until that rulemaking is complete, those estuaries would be covered by nutrient criteria that prevent any degradation in water quality.
- Codify in Florida Statutes that FDEP must manage nutrient loads from all stormwater conveyances and canals so that downstream waterbodies are protected.
- Codify in Florida Statutes the FDEP NNC implementation document ("Implementation of Florida's Numeric Nutrient Standards") which clearly describes how Florida's nutrient criteria will be immediately implemented once effective.
- Codify in Florida Statutes the conditions in which EPA will withdraw its NNC, ensuring implementation of one set of rules and bringing resolution to the issue.

Once codified by Florida Statutes, water quality standards will be established for all rivers, streams, lakes, estuaries, and coastal waters, paving a clear and distinct path for EPA to take action to terminate their consent decree, withdraw federal rules, and start the process of implementing actions to protect and restore Florida's waters from nitrogen and phosphorus pollution.

## **Examples of EPA NNC on Stormwater Conveyances and Ditches**

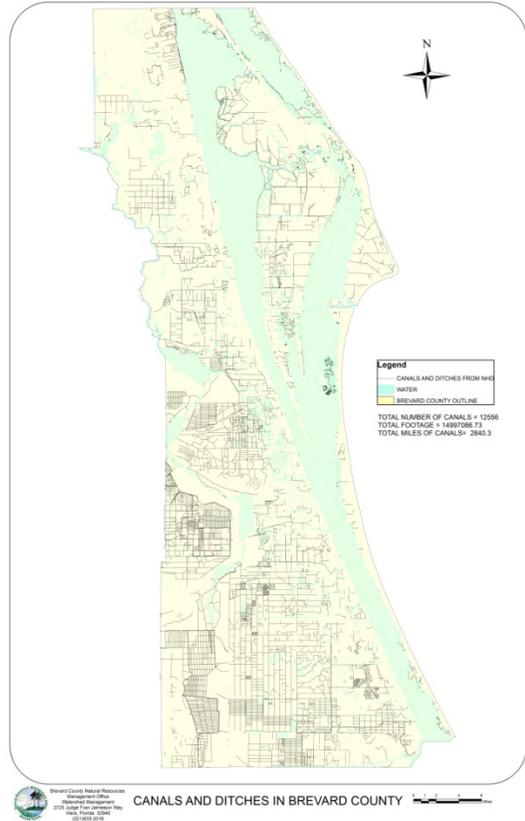
What follows are examples of the financial impacts of the EPA NNC on stormwater conveyances and drainage ditches if the Agency's criteria become effective later this year.

## Problem Description – Brevard County

In Brevard County, there are over 2,840 miles of drainage canals and ditches. The adjacent figure shows the extent of canals and ditches throughout the County. Many of these drain into the Indian River Lagoon, with some draining west to the St. Johns River. The figure shows the extent of the conveyances throughout Brevard County. While many are in marine waters, there are numerous reaches that are freshwater draining down to the estuarine areas.

The following photos are examples of drainage systems within Brevard County.

The first photo is of Pluckebaum Ditch in West Cocoa. Depending upon rainfall patterns, this stormwater conveyance will flow east to the Indian River Lagoon or west to the St. Johns River. Numerous drainage improvement projects have been initiated in West Cocoa along the Pluckebaum Ditch.



Pluckebaum Ditch

The second photo is Hickory Ditch, which drains high-density residential portions of the City of Melbourne. Recently, the City has undertaken a project to stabilize portions of the Hickory Ditch drainage area. The work includes the installation of gabions -- arrangements of rock-filled wire baskets -- designed to prevent erosion. Tropical Storm Fay caused significant damage along reaches of this drainage system.

Brevard County and the various Cities within Brevard County are ongoing participants in efforts to restore and protect the Indian River Lagoon, where many of the canals/ditches ultimately discharge. The efforts are focused on determining long-term nutrient load limits that are protective of the Lagoon’s seagrass community.



If the proposed U.S. Environmental Protection Agency (EPA) criteria are implemented, Brevard County and many of its partner Cities and Agencies involved in Lagoon protection and restoration would be required to divert significant funds from the protection of the National Estuary to meet the “natural stream” numeric nutrient criteria (NNC) values within all of their stormwater conveyances and drainage ditches. This approach would not represent the cost-effective approach to Lagoon protection and restoration.

**Determination of Fiscal Impacts**

To provide an example of the levels of fiscal impact associated with the proposed criteria, data from Hickory Ditch were analyzed against EPA’s proposed criteria. Based upon available data from Florida Department of Environmental Protection (FDEP), it was

determined that a 30.7 percent reduction in total phosphorus (TP) would be required to meet EPA’s proposed criteria for “natural” stream criteria. Using an average capital treatment cost of \$18,000 to treat 1 lb/year of TP, the cost would be \$22,553,842. The following table shows the calculations.

TP Concentration (mg/L)	Reduction Needed (%)	Flow (cfs)	Total Load (lb/yr)	Load Reduction (lb/yr)	Cost
0.17	30.7%	12.0	4088	1253	\$ 22,553,842

This example represents only one of many stormwater conveyances within Brevard County that would be impacted by the proposed criteria. As such, it is clear that implementation of EPA’s proposed NNC for stormwater conveyances and drainage ditches could equate to significant and unnecessary fiscal burden for the County’s residents, with little benefit in terms of protection of critical surface water resources.

## Problem Description – Indian River County

In Indian River County there are numerous stormwater conveyances that provide drainage and flood control for agricultural areas west of I-95 and various urban areas such as the City of Sebastian and Vero Beach located between I-95 and the Indian River Lagoon. The stormwater conveyances discharge to the Indian River Lagoon.

The attached photos show examples of two drainage canals managed by the Water Management District. North Canal is six miles long and passes between the towns of Gifford and Winter Beach prior to discharging to the Indian River Lagoon.



South Canal is a five mile long canal located in Indian River County. The canal drains an undetermined acreage of agricultural lands west of I-95 as well as providing drainage to portions of the urbanized areas of Vero Beach west of I-95.



Indian River County is an ongoing participant in efforts to protect the Indian River Lagoon where many of the canals/ditches ultimately discharge. The efforts are focused on protection of the Lagoon's seagrass community.

At present the areas of the Indian River Lagoon adjacent to Indian River County (Central portion of the Indian River Lagoon) are meeting their seagrass targets. If the proposed EPA criteria are implemented, Indian River County, its partner cities, and agricultural interests would need to expend significant resources to provide treatment so that these stormwater conveyances would meet the natural streams criteria. This is despite the fact that the critical water resources, Indian River Lagoon, are meeting their designated uses.

### Determination of Fiscal Impacts

In order to assess the potential levels of fiscal impact associated with the proposed criteria, data from North and South Canals were analyzed against the proposed criteria.

For North Canal, based upon recent nutrient data, a 46% reduction in total phosphorus (TP) would be needed in order to meet the “natural” stream criteria. Based upon the load to the system, the cost for designing and constructing treatment facilities would be on the order of \$178,000,000. The costs are determined as shown below:

TP Concentration (mg/L)	Reduction Needed (%)	Flow (cfs)	Total Load (lb/yr)	Load Reduction (lb/yr)	Cost
0.22	46%	49	21420	9862	\$ 177,524,489

For South Canal, based upon recent nutrient data, a 44% reduction in total phosphorus (TP) would be needed in order to meet the “natural” stream criteria. Based upon the load to the system, the cost for designing and constructing treatment facilities would be on the order of \$160,000,000. The costs are determined as shown below:

TP Concentration (mg/L)	Reduction Needed (%)	Flow (cfs)	Total Load (lb/yr)	Load Reduction (lb/yr)	Cost
0.22	44%	47	20107	8914	\$ 160,453,951

The examples presented above represent only two stormwater conveyances within Indian River County that would be impacted by the proposed criteria. However, it is clear that implementation of EPA’s proposed NNC for stormwater conveyances and drainage ditches would equate to significant, unnecessary fiscal burden for the County and other stakeholders with little improvement in terms of protection of those surface water resources where a human or environmental benefit can be achieved.

## Problem Description – Orlando Area

In the greater Orlando Metropolitan Area there are numerous stormwater conveyances that provide drainage and flood control for urban and agricultural areas. These ditches drain to the various lakes, rivers and streams dotted throughout the Orlando area. Additionally there are numerous canals that provide interconnection between the lake systems.

One such conveyance is the Apopka Beauclair Canal which provides a direct connection between Lake Apopka and Lake Beauclair. The Apopka Beauclair Canal was constructed in the late 1900s and is approximately seven miles long. It contains a lock and dam structure that regulates flow between Lake Apopka and Lake Beauclair. The overall width and depth are relatively uniform over the entire length of the canal. The canal also receives drainage from adjacent land areas most of which are in agricultural use.



Orange County, Lake County, the City of Orlando and the Water Management District have an extensive program for the management and restoration of the lakes throughout the area. Lake Apopka has been actively working on improving the water quality conditions through numerous programs for many years.



If the proposed EPA criteria are implemented, these entities would have to have to divert significant funds from the protection of these critical waterbodies in order to meet the “natural stream” NNC values within all of their stormwater conveyances, drainage ditches and connecting canals. These efforts may not be in line with efforts directed specifically at restoration and protection of their lakes.

### Determination of Fiscal Impacts

In order to provide an example of the levels of fiscal impact associated with the proposed criteria, data from Apopka-Beauclair Canal were analyzed against the proposed criteria.

For the Apopka-Beauclair Canal, based upon recent nutrient data, a 42% reduction in TN would be needed in order to meet the “natural” stream criteria. Using an average capital costs of \$4,282 to treat 1 lb/year of TN, the expense would be \$446,000,000. The table below shows the calculations.

TN Concentration (mg/L)	Reduction Needed (%)	Flow (cfs)	Total Load (lb/yr)	Load Reduction (lb/yr)	Cost
2.65	41.9%	47.6	248396	104180	\$ 446,098,719

This would be despite the fact that the majority of the efforts in the area are geared toward the reduction of phosphorus, which has generally been shown to be the limiting nutrient for protection. The example presented above represents only one conveyance within the Greater Orlando area that would be impacted by the proposed criteria.

The implementation of EPA's proposed NNC for stormwater conveyances and urban drainage ditches could equate to significant and unnecessary fiscal burden for the area with little benefit in terms of human uses or the protection of critical surface water resources.

## Problem Description – Pinellas County

In urban areas, which represent much of Pinellas County, it is critical that Stormwater Runoff is managed to prevent flooding and avoid impacts to local property owners. Stormwater conveyances, or drainage ditches, are constructed for the purpose of moving water out of urban areas. In Pinellas County there are hundreds of miles of drainage ditches and these ditches discharge into lakes, Tampa Bay, or coastal bays adjacent to the Gulf of Mexico.



The attached photos show two examples of drainage ditches in Pinellas County. The first is Long Branch Creek which drains an area of approximately 2.8 square miles or 1,800 acres. It is located in a highly urbanized area in central Pinellas County and it is mostly within the City of Largo limits. The canal is highly managed to avoid buildup of vegetation which could ultimately restrict flows and create upstream flooding issues during storm conditions. The drainage ditch ultimately discharges to Old Tampa Bay.

The second photo shows the Innisbrook Canal system, which drains to Klosterman Bayou. The Klosterman Bayou watershed is a 2,068-acre basin area located in northeast Pinellas County. The majority of the Klosterman Bayou watershed is located within unincorporated Pinellas County with northern portions of the watershed located in the City of Tarpon Springs.



Pinellas County is recognized as having one of the best watershed protection programs in the State of Florida. It is an active participant in the Tampa Bay Nitrogen Management Consortium (TBNMC), a coalition of cities and counties whose sole mission is the restoration and protection of Tampa Bay. These programs are geared toward protecting the areas critical surface water resources including lakes, Tampa Bay and the numerous small embayments along the Gulf of Mexico.

If the proposed EPA criteria are implemented, Pinellas County would have to divert significant funds from the protection of these critical waterbodies in order to meet the “natural stream” NNC values within all of their stormwater conveyances and drainage ditches.

**Determination of Fiscal Impacts**

In order to assess the potential levels of fiscal impact associated with the proposed criteria, data from Long Branch and Innisbrook Canal were analyzed against the proposed criteria.

For Long Branch, based upon recent nutrient data, a 21.6% reduction in total phosphorus (TP) would be needed in order to meet the “natural” stream criteria. Based upon the load to the system, the cost for designing and constructing treatment facilities would be on the order of \$3,900,000. The costs are determined as shown below:

TP Concentration (mg/L)	Reduction Needed (%)	Flow (cfs)	Total Load (lb/yr)	Load Reduction (lb/yr)	Cost
0.15	21.6%	3.3	1000	216	\$ 3,886,312

For Innisbrook Canal, based upon recent nutrient data, an 80% reduction in total phosphorus (TP) would be needed in order to meet the “natural” stream criteria. Based upon the load to the system, the cost for designing and constructing treatment facilities would be on the order of \$21,000,000. The costs are determined as shown below:

TP Concentration (mg/L)	Reduction Needed (%)	Flow (cfs)	Total Load (lb/yr)	Load Reduction (lb/yr)	Cost
0.60	80.0%	1.2	1453	1162	\$ 20,909,611

The examples presented above represent only two stormwater conveyances within Pinellas County that would be impacted by the proposed criteria. As such, it is clear that implementation of EPAs proposed NNC for stormwater conveyances and drainage ditches could equate to significant, unwarranted fiscal burdens for the County with little benefit in terms of protection of critical surface water resources. Additionally, the receiving waters are impaired for nitrogen (not phosphorus) making the application of the criteria to the conveyances completely unnecessary.