

Waters of the United States
Regulations Proposed by the
US EPA and US ACOE

Estimated Fiscal Impacts on Selected Municipal Separate Storm Sewer System Permittees

Prepared for:



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Prepared by



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ATM provides environmental engineering and sciences, water resources, site/civil, coastal engineering and surveying services, and marina and waterfront development services to public and private clients. Our current staff of 48 includes Professional Engineers, Ecologists, Environmental Scientists and a Professional Surveyor/Mapper.

ATM has been assisting clients with water resource issues for 30 years. ATM's technical diversity allows us to provide effective studies and solutions for any water-related environmental or developmental issue. From projects involving sensitive headwaters to coastal systems, we provide customized data collection, assessments, computer modeling, alternatives analysis, management planning, design and regulatory guidance. ATM specializes in performing hydrodynamic and water quality modeling of receiving waters, watershed assessments, and water quality management services. ATM provides clients with comprehensive technical support related to watershed assessments, MFLs, waterbody impairment listings, TMDLs and BMAPs. ATM integrates GIS with all projects, including field studies, data collection, asset management, geospatial analysis, watershed, hydrodynamic and water quality model pre- and post-processing. We have performed detailed data analysis and computer modeling to determine the water quality impacts of nonpoint and point source discharges throughout Florida, the United States and internationally.

ATM provides both screening-level and detailed dynamic evaluations of watershed hydrology and pollutant loadings. Models utilized include SWMM5, HEC-HMS, ICPR, SWAT, PLOAD, BASINS/HSPF, LSPC, WAM and WMM.

ATM also performs hydrodynamic pollutant transport and/or water quality assessments in rivers, lakes, reservoirs, estuaries and oceans using 1-D, 2-D and 3-D models. Models utilized include EFDC, ECOMSED, ADCIRC, RMA2, HEC-RAS, WASP, CE-QUAL-R1V1, CEQUAL-W2, CEQUAL-ICM, QUAL2E, CORMIX, the full MIKE suite of models, and VisualPLUMES.

Fiscal Impacts on Selected Municipal Separate Stormwater Systems (MS4s) from EPA/USACE Proposed Regulations on Waters of the United States

Overview

On April 21, 2014, the U.S. Environmental Protection Agency (EPA) and U.S. Army Corps of Engineers (USACE) jointly proposed regulations to revise the definitions of “waters of the United States” or “WOTUS,” as the term is to be used in the application of the Clean Water Act (CWA) and USACE jurisdictional regulations. EPA has indicated that the purpose of the proposed rule is to clarify what waters are (and are not) covered by the CWA. In addition, EPA has said that the new regulations will not have substantial direct effects on the states since it will not significantly change what is currently considered WOTUS. However, there are some areas that, depending on the interpretation, could constitute a very significant expansion of the WOTUS definition and include waters previously not deemed jurisdictional under previous USACE and EPA practice or guidance.

First, is the water body “adjacent” or does it have a “significant nexus” to classic WOTUS or a tributary thereof? To be adjacent, the water body must be within a classic WOTUS’s floodplain or be a tributary that is directly or indirectly connected to a classic WOTUS. To have a significant nexus, a water body must be within the classic WOTUS’s watershed, the flow from which significantly affects the classic WOTUS.

From this test, a water body that is adjacent is WOTUS, unless specifically excluded. If a water body is not adjacent but has a significant nexus, then the water body is WOTUS, unless specifically excluded.

Additionally, all tributaries (e.g. ditches) that have a direct connection and contribution to WOTUS – even if not “adjacent” or do not have a “significant nexus” – will be considered to be WOTUS.

Given the assessment of the proposed regulations as provided above (and considering all tests in total), in many areas of Florida, the following types of water bodies will now be considered WOTUS:

- Manmade or man-altered ditches and stormwater ponds (designed to attenuate stormwater runoff) within the floodplain of a classic WOTUS; and

- Manmade or man-altered ditches and stormwater ponds (designed to attenuate stormwater runoff) that have a direct connection to WOTUS.

Note that the expansion of the number of jurisdictional waters will be especially pronounced in coastal areas.

Ditches are excluded if they are built in uplands, drain uplands and have less than perennial flow. But in Florida's coastal areas and most inland areas, there are many ditches that are built in and drain uplands but have significant groundwater inputs. Since they have constant flows, they may be WOTUS even if constructed in uplands.

Since EPA and USACE jointly issued the regulations, there are at least two significant consequences to local governments:

- Municipal Separate Storm Sewer System (MS4) permit requirements and water quality standards must be met in stormwater conveyances and retention structures that are determined to be WOTUS, including numeric or narrative nutrient criteria applicable to Class III ("recreational") water bodies, antidegradation requirements, and other permit conditions.
- USACE dredge and fill policies would be applicable in WOTUS. Therefore, stormwater attenuation ponds (with no water quality treatment) and drainage ditches that are in the floodplain would be required to meet jurisdictional requirements – even during routine maintenance activities, unless an exemption is granted by the USACE.

Of specific concern is the potential for the inclusion of "flooded" areas as providing connectivity and bringing portions of the various counties' MS4s into WOTUS. The potential cost of compliance if those areas are now deemed WOTUS and are subject to the criteria under the CWA is enormous.

Determination of Fiscal Impacts

To assess the potential levels of fiscal impact associated with the proposed rule, a geographic information system (GIS) based analysis was performed to estimate the area currently delineated as WOTUS and to estimate the increase in WOTUS jurisdiction due to the inclusion of flooded areas and resultant connectivity to upstream waters, including stormwater conveyances and ditches. Data sources utilized included:

- MS4 infrastructure/areas – from County GIS departments
- Federal Emergency Management Agency (FEMA) Flood Hazard Areas (100-year floodplain)– FEMA Special Flood Hazard Layer
- Soils - Natural Resources Conservation Service (NRCS)
- Land use maps – from regional water management districts through the Florida Geographic Data Library
- Sub-watershed/water body segment (WBID) coverages for counties
- National Hydrography Dataset (NHD) – U.S. Geological Survey (USGS)
- Parcel boundaries and associated subdivisions- from county GIS departments

GIS data processing was performed for two scenarios: Under current WOTUS practice and guidelines and under the proposed WOTUS rule. For the current WOTUS guideline scenario, the parcel layer was intersected with the soils and land use layer. Using the NHD layer, which represents the drainage network with features such as rivers, streams, canals, lakes, ponds and coastline, man-made features such as canals and ditches were removed. A 500-foot buffer was then placed around the resultant NHD layer. This served as the baseline estimate for WOTUS jurisdiction. This layer was then intersected with the parcel and sub-division layer. The assumption was that if the sub-division layer was intersected by the processed NHD layer, then it is likely that the whole sub-division, and therefore all parcels contained therein, drained to the nearest NHD stream. The parcels selected through this process became the contributing drainage area layer to the baseline WOTUS jurisdiction estimate. This layer, combined with the soils and land use layers, provided the data necessary to perform the current WOTUS nutrient loading estimates.

The proposed WOTUS scenario followed a similar scenario with a couple of exceptions. First, the whole NHD layer including canals and ditches was intersected with the FEMA layer delineation of the 100-year floodplain as the

initial estimate of connectivity and, thus, WOTUS jurisdiction. “Floodplain” is defined as an area bordering inland or coastal waters that was formed by sediment deposition from such water under present climatic conditions and is inundated during periods of moderate to high water flows. EPA has stated that it will use “best professional judgment” when determining where a floodplain exists. Given that uncertainty on where the area of the floodplain would be defined, the 100-year floodplain as delineated by FEMA was used for our analysis. The parcel-sub-division layer described above was intersected with the FEMA-NHD layer to estimate the contributing drainage areas to the new WOTUS jurisdiction estimate under the proposed rule. This layer, combined with the soils and land use layers provided the data necessary to perform the proposed WOTUS nutrient loading estimates.

Nutrient load calculations were performed for the contributing drainage areas for both WOTUS scenarios using the methods and data from the following references:

- Harper H. H. and D. M. Baker, 2007. Evaluation of Current Stormwater Design Criteria within the State of Florida. Final Report submitted to Florida Department of Environmental Protection. Environmental Research & Design, Inc. Orlando, FL.
- Reiss, K.C., Evans, J., and M. Brown, 2009. Summary of Available Literature on Nutrient Concentrations and Hydrology for Florida Isolated Wetlands. Final Report submitted to Florida. Department of Environmental Protection, Tallahassee, FL.

The nutrient load calculation described in Harper and Baker (2007) is sometimes referred to as the “constant concentration method” and is used routinely to develop stormwater pollutant loading estimates for state permitting agencies in Florida and through the United States and in basin water quality studies. The method essentially consists of (first) calculating the stormwater runoff volume that is estimated to occur in a year. The annual runoff volume is then multiplied by the average amount of nitrogen and phosphorus in the stormwater runoff, also known as the event mean concentration (EMC), to estimate the amount of nitrogen and phosphorus, or nutrient load that is being carried to WOTUS-jurisdictional waters in one year. The nutrient load difference between the two scenarios was calculated to estimate the additional nutrient loads that would be subject to treatment to meet Florida water quality criteria prior to discharge to the additional WOTUS jurisdictional areas.

The percentage of this increased nutrient load that would need to be removed prior to discharge to WOTUS to meet Florida’s numeric nutrient criteria in these areas was calculated by comparing the average nutrient concentration in the annual runoff to the nutrient concentration limits as specified in Florida’s Numeric Nutrient Criteria.

The estimated fiscal impact on counties as the result of the additional stormwater treatment requirements was estimated using project costs and nutrient removal data from FDEP’s TMDL Grant Program from 2010, which was the latest year available. The data covers projects located throughout Florida. Unit treatment costs were calculated for nitrogen and phosphorus for median, 25th percentile and 75th percentiles of the data to provide a cost range. These unit costs were then adjusted for inflation to estimate the 2013 costs using Florida Department of Transportation Advisory Inflation Factors for construction. The range of unit costs for treatment can vary greatly depending in land purchase costs and the particular stormwater treatment practice being constructed.

The resultant unit costs for treatment were:

	Total Nitrogen (\$/lb/yr)	Total Phosphorus (\$/lb/yr)
75 th Percentile	\$7,844	\$28,004
Median	\$3,781	\$12,615
25 th Percentile	\$1,005	\$4,957

Fiscal Impacts on MS4s from EPA/USACE-Proposed Regulations on Waters of the United States

Description

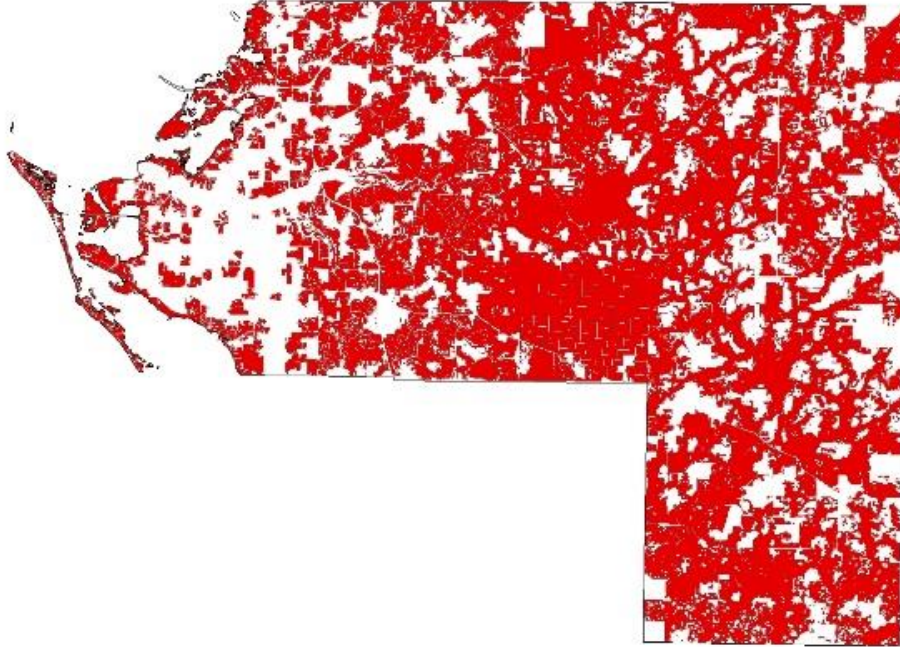
Manatee County, located in southwest Florida, is a Phase 1 MS4 that owns and operates many stormwater collection and treatment systems and is an ongoing participant in efforts to protect Tampa Bay and the Manatee River. If the proposed rule were implemented, Manatee County, its partner cities, and other stakeholders would need to expend significant resources to provide treatment so that these stormwater conveyances would meet Florida’s numeric nutrient criteria (NNC) for streams.

Determination of Fiscal Impacts

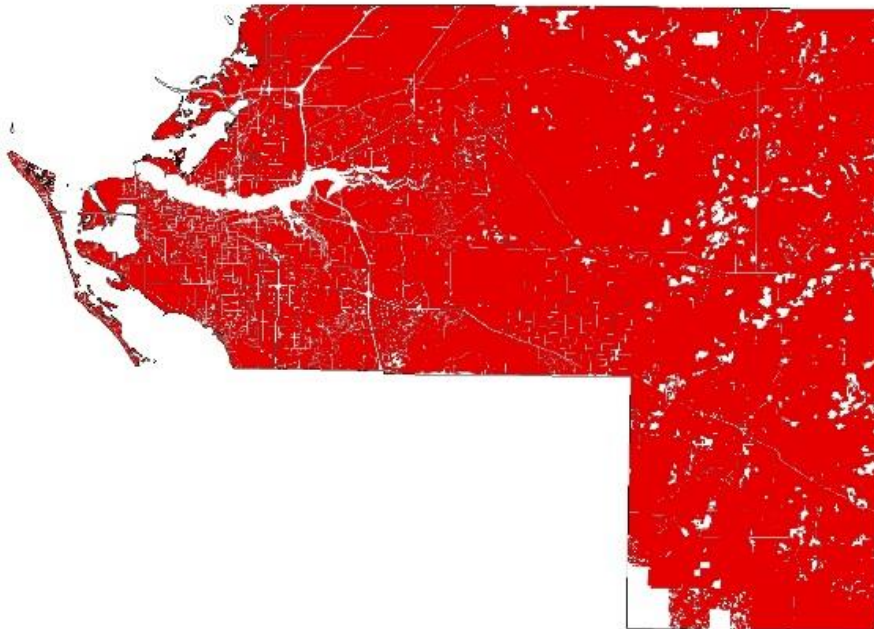
The results of the GIS analysis are presented on the following figures. The area shown in red represents the area estimated to contribute to WOTUS jurisdiction under the current WOTUS guidelines and practice and under the proposed WOTUS regulations. For Manatee County, a 31 percent reduction in total nitrogen (TN) would be needed to meet Florida’s NNC for streams. A reduction for total phosphorus (TP) is not required due to the higher TP limit in the west-central Florida region. Based upon the load to the system, the cost for designing and constructing treatment facilities is shown in the following table. The unit costs for treatment were applied to the required load reduction to get the estimated total cost to meet water quality criteria in the new WOTUS jurisdiction.

	Runoff (Acre-feet)	Total Nitrogen	Total Phosphorus
Nutrient Load Under Current WOTUS Practice (lb/yr)	377,857	2,476,409	460,062
Nutrient Load Under Proposed WOTUS Regulations (lb/yr)	534,399	3,496,239	648,790
Difference in Current and Proposed WOTUS Loads (lb/yr)	156,542	1,019,830	188,728
Average Runoff Concentration (mg/L)		2.40	0.44
Numeric Nutrient Criteria (NNC) (mg/L)		1.65	0.49
% Reduction Needed To Meet NNC in New WOTUS		31.27%	N/A
Load Reduction Needed To Meet NNC in New WOTUS (lb/yr)		318,940	N/A
Estimated Costs to meet WQ Criteria in New WOTUS (Median)		\$1,205,872,000	N/A

The estimated cost range to meet water quality criteria in the new WOTUS jurisdiction is \$320 million to \$2.3 billion for nitrogen.



Manatee County areas affected by current WOTUS practice and guidelines.



Manatee County areas potentially affected by proposed WOTUS regulations.

Fiscal Impacts on MS4s from EPA/USACE-Proposed Regulations on Waters of the United States

Description

Pinellas County currently has one of the best watershed protection programs in the State of Florida and is an active participant in the Tampa Bay Nitrogen Management Consortium (TBNMC). The TBNMC is a coalition of cities and counties whose sole mission is the restoration and protection of Tampa Bay. These programs are geared toward protecting the counties' critical surface water resources, including lakes, Tampa Bay, and the numerous small embayments along the Gulf of Mexico. If the proposed WOTUS rule were implemented, Pinellas County would have to divert significant funds from the protection of these critical waterbodies to meet Florida's numeric nutrient criteria (NNC) within all of its stormwater conveyances and drainage ditches.

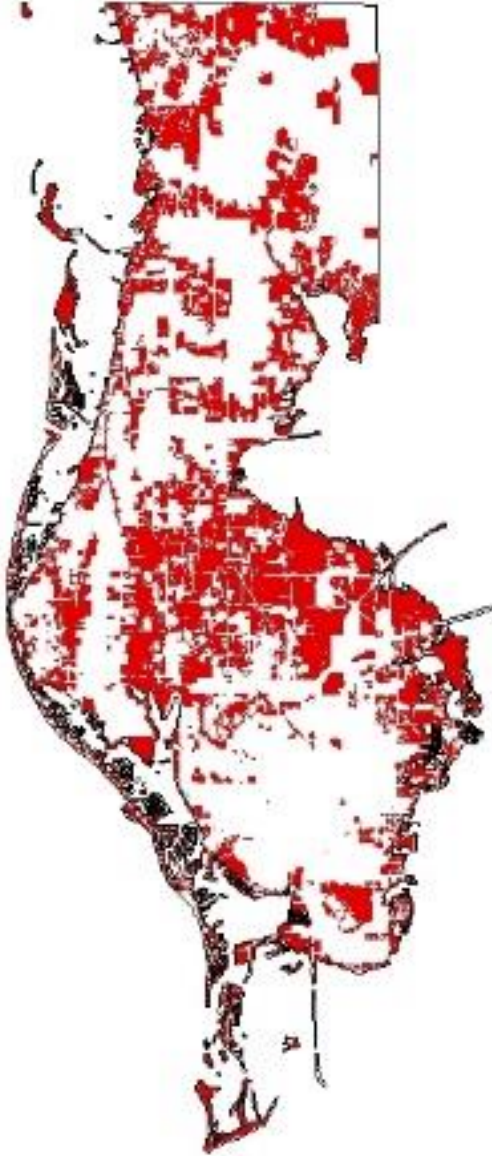
Determination of Fiscal Impacts

The results of the GIS analysis are presented on the following figures. The area shown in red represents the area estimated to contribute to WOTUS jurisdiction under the current WOTUS guidelines and practice and under the proposed WOTUS regulations. For Pinellas County, a 32 percent reduction in total nitrogen (TN) and a 73 percent reduction in total phosphorus (TP) would be needed to meet Florida's NNC for streams. Based upon the load to the system, the cost for designing and constructing treatment facilities is shown in the following table. The unit costs for treatment were applied to the required load reduction to get the estimated total cost to meet water quality criteria in the new WOTUS jurisdiction.

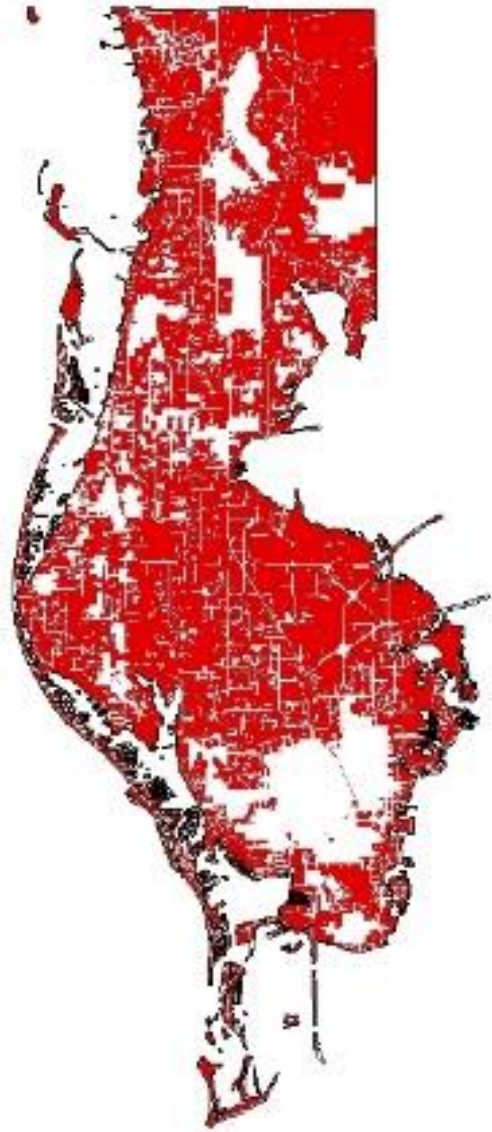
	Runoff (acre-feet)	Total Nitrogen	Total Phosphorus
Nutrient Load Under Current WOTUS Practice (lb/yr)	98,680	584,164	109,267
Nutrient Load Under Proposed WOTUS Regulations (lb/yr)	166,032	996,395	191,421
Difference in Current and Proposed WOTUS Loads (lb/yr)	67,352	412,231	82,154
Average Runoff Concentration (mg/L)		2.26	0.45
Numeric Nutrient Criteria (NNC) (mg/L)		1.54	0.12
% Reduction Needed To Meet NNC in New WOTUS		31.72%	73.30%
Load Reduction Needed To Meet NNC in New WOTUS (lb/yr)		130,776	60,223
Estimated Costs to meet WQ Criteria in New WOTUS (Median)		\$494,445,000	\$759,703,000

The estimated cost range to meet water quality criteria in the new WOTUS jurisdiction is \$131 million to \$1.03 billion for nitrogen and \$299 million to \$1.69 billion for phosphorus.

PINELLAS COUNTY



Pinellas County areas affected by current WOTUS practice and guidelines.



Pinellas County areas potentially affected by proposed WOTUS regulations.

Fiscal Impacts on MS4s from EPA/USACE-Proposed Regulations on Waters of the United States

Description

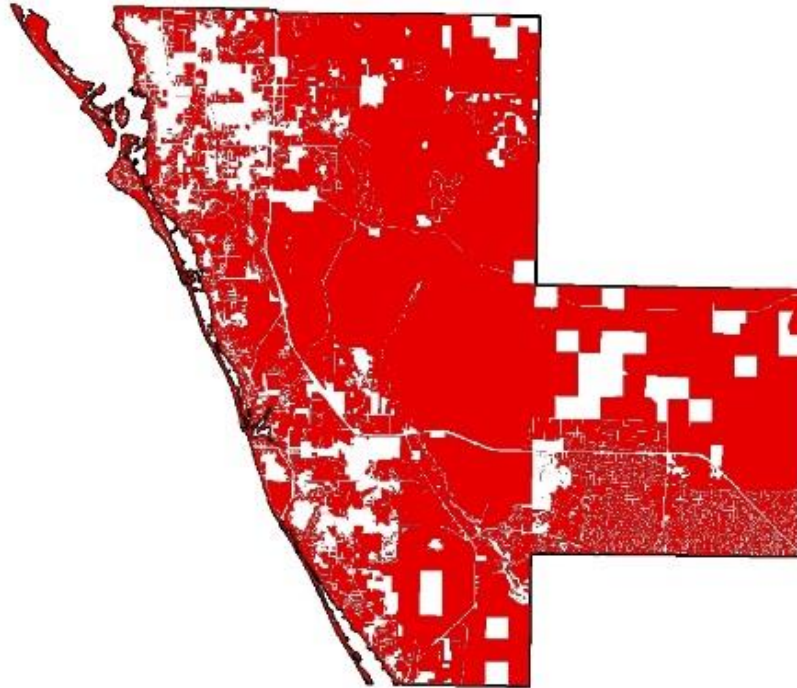
Sarasota County, located in southwest Florida, is a Phase 1 MS4 that owns and operates many stormwater collection and treatment systems and is an ongoing participant in efforts to protect Sarasota Bay, the Myakka River and Charlotte Harbor. If the proposed rule were implemented, Sarasota County, its partner cities, and other stakeholders would need to expend significant resources to provide treatment so that these stormwater conveyances would meet Florida’s numeric nutrient criteria (NNC) for streams.

Determination of Fiscal Impacts

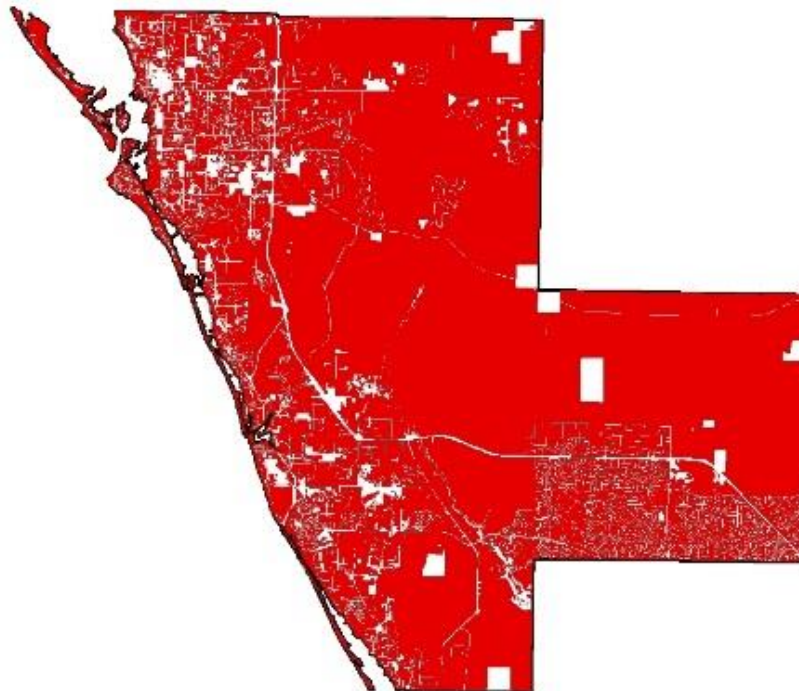
The results of the GIS analysis are presented on the following figures. The area shown in red represents the area estimated to contribute to WOTUS jurisdiction under the current WOTUS guidelines and practice and under the proposed WOTUS regulations. For Sarasota County, a 25 percent reduction in total nitrogen (TN) would be needed to meet Florida’s NNC for streams. A reduction for total phosphorus (TP) is not required due to the higher TP limit in the west-central Florida region. Based upon the load to the system, the cost for designing and constructing treatment facilities is shown in the following table. The unit costs for treatment were applied to the required load reduction to get the estimated total cost to meet water quality criteria in the new WOTUS jurisdiction.

	Runoff (acre-feet)	TN (lb/yr)	TP (lb/yr)
Nutrient Load Under Current WOTUS Practice (lb/yr)	352,795	2,183,457	404,726
Nutrient Load Under Proposed WOTUS Regulations (lb/yr)	392,694	2,422,741	447,803
Difference in Current and Proposed WOTUS Loads (lb/yr)	39,899	239,285	43,077
Average Runoff Concentration (mg/L)		2.21	0.40
Numeric Nutrient Criteria (NNC) (mg/L)		1.65	0.49
% Reduction Needed To Meet NNC in New WOTUS		25.34%	N/A
Load Reduction Needed To Meet NNC in New WOTUS (lb/yr)		60,642	N/A
Estimated Costs to meet WQ Criteria in New WOTUS (Median)		\$229,281,000	N/A

The estimated cost range to meet water quality criteria in the new WOTUS jurisdiction is \$61 million to \$476 million for nitrogen.



Sarasota County areas affected by current WOTUS practice and guidelines.



Sarasota County areas potentially affected by proposed WOTUS regulations.

Fiscal Impacts on MS4s from EPA/USACE-Proposed Regulations on Waters of the United States

Description

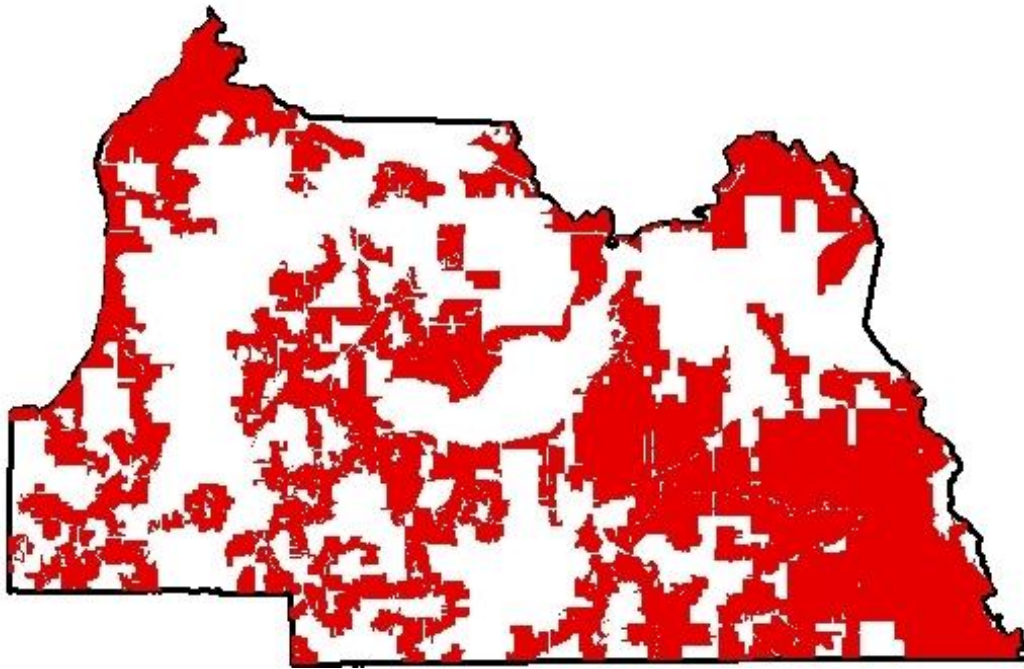
Seminole County, located in central Florida, is a Phase 1 MS4 that owns and operates many stormwater collection and treatment systems and is an ongoing participant in efforts to protect Lake Jesup and the St. Johns River. If the proposed rule were implemented, Seminole County, its partner cities, and other stakeholders would need to expend significant resources to provide treatment so that these stormwater conveyances would meet Florida’s numeric nutrient criteria (NNC) for streams.

Determination of Fiscal Impacts

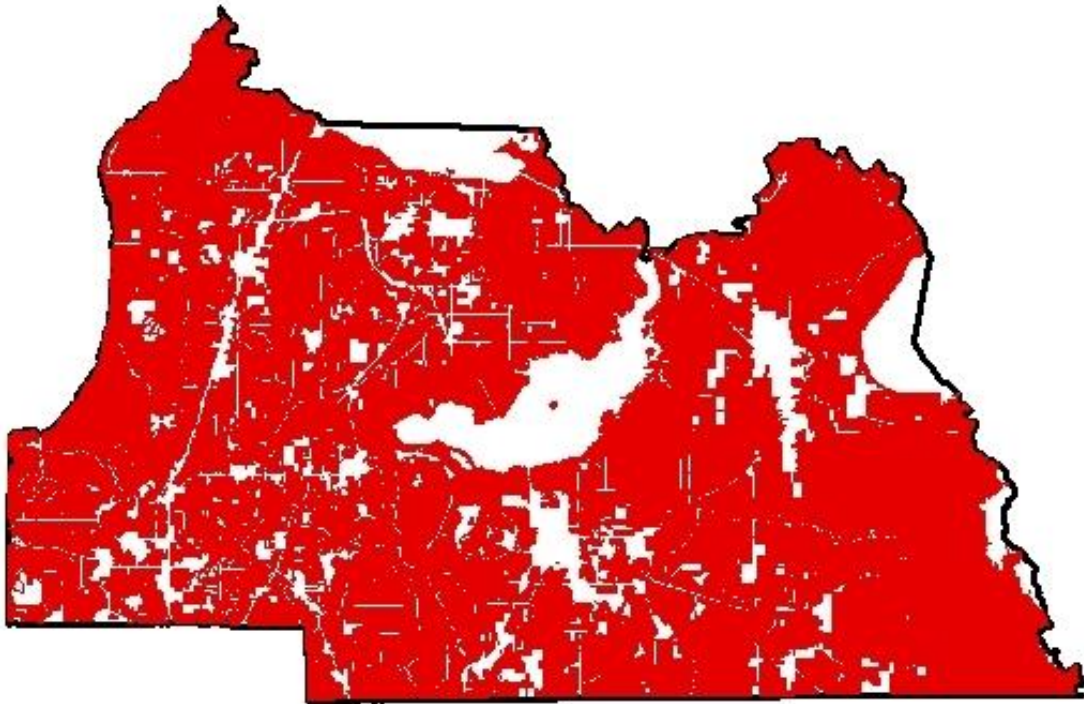
The results of the GIS analysis are presented on the following figures. The area shown in red represents the area estimated to contribute to WOTUS jurisdiction under the current WOTUS guidelines and practice and under the proposed WOTUS regulations. For Seminole County, a 34 percent reduction in total nitrogen (TN) and a 73 percent reduction in total phosphorus (TP) would be needed to meet Florida’s NNC for streams. Based upon the load to the system, the cost for designing and constructing treatment facilities is shown in the following table. The unit costs for treatment were applied to the required load reduction to get the estimated total cost to meet water quality criteria in the new WOTUS jurisdiction.

	Runoff (acre-feet)	Total Nitrogen	Total Phosphorus
Nutrient Load Under Current WOTUS Practice (lb/yr)	155,545	1,093,746	231,281
Nutrient Load Under Proposed WOTUS Regulations (lb/yr)	235,626	1,599,295	327,035
Difference in Current and Proposed WOTUS Loads (lb/yr)	80,080	505,549	95,754
Average Runoff Concentration (mg/L)		2.33	0.44
Numeric Nutrient Criteria (NNC) (mg/L)		1.54	0.12
% Reduction Needed To Meet NNC in New WOTUS		33.81%	72.77%
Load Reduction Needed To Meet NNC in New WOTUS (lb/yr)		170,905	69,678
Estimated Costs to meet WQ Criteria in New WOTUS (Median)		\$649,169,000	\$878,983,000

The estimated cost range to meet water quality criteria in the new WOTUS jurisdiction is \$172 million to \$1.34 billion for nitrogen and \$345 million to \$1.95 billion for phosphorus.



Seminole County areas affected by current WOTUS practice and guidelines.



Seminole County areas potentially affected by proposed WOTUS regulations.