

US EPA ARCHIVE DOCUMENT



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA, GEORGIA 30303-8960

JUL 03 2013

Herschel T. Vinyard  
Secretary  
Florida Department of Environmental Protection  
3900 Commonwealth Boulevard  
Tallahassee, Florida 32399-3000

Dear Secretary Vinyard:

The U. S. Environmental Protection Agency has completed its review of the site specific alternative criterion (SSAC) for nitrate nitrogen (nitrate-N) for the Suwannee River, Santa Fe River, Manatee Springs, Fanning Springs, Branford Spring, Ruth Spring, Troy Spring, Royal Spring and Falmouth Spring. Florida Department of Environmental Protection submitted revised Chapter 62-302, including the SSAC, to the EPA on June 13, 2012, as new or revised water quality standards with the necessary certification by FDEP general counsel, pursuant to 40 CFR Part 131. The SSAC were included in the list of site specific numeric interpretations of paragraph 62-302.530(47)(b), Florida Administrative Code (F.A.C.), referenced in paragraph 62-302.531(2)(a), F.A.C. and published at FDEP's website at <http://www.dep.state.fl.us/water/wqssp/swq-docs.htm>. FDEP submitted the numeric interpretation of the state narrative nutrient criteria for WBIDs 3422, 3422A, 3422B, 3422D, 3605A, 3605B, 3605C, 3422R, 3422S, 3422J, 3422L, 3422T, 3422U and 3422Z expressed in the Suwannee River, Santa Fe River, Manatee Springs, Fanning Springs, Branford Spring, Ruth Spring, Troy Spring, Royal Spring and Falmouth Spring Total Maximum Daily Load report as the SSAC. FDEP intends for the SSAC to serve as the numeric nutrient criteria for nitrate-N for the Suwannee River, Santa Fe River, Manatee Springs, Fanning Springs, Branford Spring, Ruth Spring, Troy Spring, Royal Spring and Falmouth Spring.

In accordance with section 303(c) of the Clean Water Act, I am hereby approving the SSAC for the Suwannee River, Santa Fe River, Manatee Springs, Fanning Springs, Branford Spring, Ruth Spring, Troy Spring, Royal Spring and Falmouth Spring as the revised water quality standard for nitrate-N. Any other criteria applicable to these waterbodies remain in effect. Specifically as to nutrients, the nitrate-nitrite criterion for springs consistent with paragraphs 62-302.531(2)(b)2., F.A.C., the total nitrogen and total phosphorus criteria for streams consistent with 62-302.531(2)(c), F.A.C. and any applicable federal criteria at 40 CFR Part 131.43(c)(3) continue to apply, as well as the requirements of paragraph 62-302.530(47)(a), F.A.C. The details of the SSAC are discussed in the enclosed documentation. We would like to commend you and your staff for your continued efforts in environmental protection for the State of Florida.

If you have any questions regarding the EPA's approval, please contact me at (404) 562-9345 or have a member of your staff contact Ms. Annie M. Godfrey, Water Quality Standards Section Chief at (404) 562-9967.

Sincerely,



James D. Giattina  
Director  
Water Protection Division

Enclosure

cc: Matthew Z. Leopold, FDEP  
Daryll Joyner, FDEP

**Decision Document for Hierarchy 1 Site Specific Alternative Criterion  
for the Suwannee River (Lower and Estuary), Santa Fe River, Manatee Springs, Fanning  
Springs, Branford Spring, Ruth Spring, Troy Spring, Royal Spring, and Falmouth Spring**

Summary Information Table (Table)

<b>WBID</b>	<b>Description</b>	<b>Class</b>	<b>Waterbody Type Impaired Waters Rule (IWR) Run 40</b>	<b>Listing Parameter</b>
3422 3422A 3422B	Suwannee River	Class III Freshwater Outstanding Florida Water (OFW)	Stream	Nutrients and Dissolved Oxygen
3422D	Suwannee River Estuary	Class III Marine OFW	Estuary	
3605A 3605B 3605C	Santa Fe River	Class III Freshwater Outstanding Florida Water (OFW)	Stream	
3422R	Manatee Springs	Class III Freshwater Outstanding Florida Water (OFW)	Spring	
3422S	Fanning Springs	Class III Freshwater	Spring	
3422J	Branford Spring		Spring	
3422L	Ruth Spring		Spring	
3422T	Troy Spring		Spring	
3422U	Royal Spring		Spring	
3422Z	Falmouth Spring		Spring	

A Nutrient and Dissolved Oxygen (DO) Total Maximum Daily Load (TMDL) for Suwannee River (Lower and Estuary) (WBIDs 3422, 3422A, B, and D), Santa Fe River (WBIDs 3605A, B, and C), Manatee Springs (WBID 3422R), Fanning Springs (WBID 3422S), Branford Spring (3422J), Ruth Spring (WBID 3422L), Troy Spring (WBID 3422T), Royal Spring (WBID 3422U), Falmouth Spring (WBID 3422Z) was developed by Florida Department of Environmental Protection and approved by the Environmental Protection Agency on September 30, 2003, pursuant to section 303(d) of the Clean Water Act (CWA). This TMDL was developed to identify the level of nutrients that would prevent an imbalance of flora and fauna as required by the state's narrative nutrient criterion at paragraph 62-302.530(47)(b), Florida Administrative Code (F.A.C.). FDEP determined that a monthly average of 0.35 mg/L of nitrate nitrogen (nitrate-N), would meet its narrative criterion and adopted that concentration as the TMDL value at subsection 62-304.405 (1) and (2), F.A.C. FDEP submitted the nitrate-N concentration from the TMDL for the EPA review as a hierarchy 1 site specific alternative

nutrient criterion (SSAC) for the waterbodies listed in the Table pursuant to section 303(c) of the CWA and the EPA's implementing regulations at 40 C.F.R. Part 131. This decision document approves the SSAC of a monthly average of 0.35 mg/L for nitrate-N, as a hierarchy 1 criterion for the waterbodies listed in the Table. Any other criteria applicable to these waterbodies remain in effect. Specifically as to nutrients, the nitrate-nitrite criterion for springs consistent with paragraphs 62-302.531(2)(b)2., F.A.C., the total nitrogen and total phosphorus criteria for streams consistent with 62-302.531(2)(c), F.A.C. and any applicable federal criteria at 40 CFR 131.43(c)(3) continue to apply, as well as the requirements of paragraph 62-302.530(47)(a), F.A.C.

In a letter dated June 13, 2012, from Thomas M. Beason, General Counsel for FDEP, to Gwendolyn Keyes Fleming, Regional Administrator of the EPA's Region 4 Office, FDEP submitted the numeric interpretation of the state narrative nutrient criterion as expressed in the Suwannee River (Lower and Estuary), Santa Fe River, Manatee Springs, Fanning Springs, Branford Spring, Ruth Spring, Troy Spring, Royal Spring, and Falmouth Spring TMDL as the SSAC for same. This SSAC serves as a primary site specific interpretation of Florida's narrative water quality criterion for nutrients set out in paragraph 62-302.530(47)(b), F.A.C., in accordance with paragraph 62-302.531(2)(b)2. or 62-302.531(2)(c), F.A.C. Pursuant to section 303(c) of the CWA, this revised water quality standard is subject to review and approval by the EPA since FDEP intends for the SSAC to serve as a numeric nutrient criterion for nitrate-N for Suwannee River (Lower and Estuary) (WBIDs 3422, 3422A, B, and D), Santa Fe River (WBIDs 3605A, B, C), Manatee Springs (WBID 3422R), Fanning Springs (WBID 3422S), Branford Spring (3422J), Ruth Spring (WBID 3422L), Troy Spring (WBID 3422T), Royal Spring (WBID 3422U), Falmouth Spring (WBID 3422Z) in addition to the otherwise applicable criteria set out in paragraphs 62-302.531(2)(b)2., F.A.C. and 62-302.531(2)(c), F.A.C. In the June 13, 2012 letter, the FDEP General Counsel certified that the revised water quality standards were duly adopted pursuant to Florida law.

The EPA's decision to approve the criterion is subject to the results of consultation under section 7 of the Endangered Species Act with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service of the National Oceanic and Atmospheric Administration. By approving the standard "subject to the results of consultation," the EPA retains its discretion to take appropriate action if the consultation identifies deficiencies in the standard requiring remedial action by the EPA. The EPA will notify FDEP of the results of the section 7 consultation upon completion of the action.

#### Description of waters for which a SSAC has been proposed

The Suwannee Basin drains approximately 10,000 square miles of south Georgia and north Florida (see map on page 5). The Santa Fe River system drains about 1,400 square miles of north Florida and is a tributary to the Suwannee River that flows west from its headwaters in the Santa Fe Lakes area, joining the Suwannee River near Branford. Manatee Springs, Fanning Springs, Branford Spring, Ruth Spring, Troy Spring, Royal Spring, and Falmouth Spring all reside within FDEP's Middle and Lower Planning Units of the Suwannee River Basin. Most of the streams in the Upper Suwannee and Santa Fe watersheds are highly colored (blackwater). In the lower third of the basin, surface waterbodies are relatively absent because recharge flows directly to the aquifer through karst features, and springs are especially abundant. The WBIDs referenced in the

Table are Class III freshwater or marine Outstanding Florida Waters with designated uses of recreation and propagation and maintenance of a healthy, well-balanced population of fish and wildlife.

#### Discussion of how the concentration was derived

WBIDs referenced in the Table were verified as impaired for nutrients due to algal mats, elevated chlorophyll *a*, and DO based on assessment methodologies identified in Florida's IWR at Chapter 62-303, F.A.C. and were added to the verified list of impaired waters by Secretarial Order on June 3, 2008. A study conducted in 2003 by Quinlan (Quinlan, E. B. 2003.

*Consequences of Nutrient Loading In The Suwannee River And Estuary, Florida, USA.*

University of Florida, 152 pp.) examined nutrient loading in the Suwannee River and Suwannee River Estuary. The study found that nitrogen was most widely the limiting nutrient in the estuary and that total phosphorus (TP) was rarely the limiting nutrient. Impairments could not be linked with either phosphorus load or concentration and therefore, nitrate-N was targeted to achieve standards. In addition, a significant positive relationship was found between nitrate-N and total periphyton biomass and algal density but not for TP. A nitrate-N target concentration was established based on several lines of evidence, including an upper and lower confidence interval approach of the change point analysis for a dataset of 13 long-term periphyton monitoring sites. Incorporating conservation conditions as an implicit margin of safety, the final target is expressed as a monthly average nitrate-N concentration of 0.35 mg/L. This results in a 51% reduction from the Middle Suwannee Planning Unit, 58% reduction in the Lower Suwannee Planning Unit, and 35% reduction in the Lower Santa Fe Planning Unit.

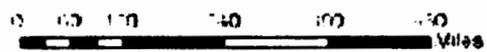
To address the nutrient impairments in the WBIDs referenced in the Table, FDEP developed a TMDL dated September 24, 2003, which was approved by EPA on September 30, 2003. The TMDL for Suwannee River (Lower and Estuary) (WBIDs 3422, 3422A, B, and D), Santa Fe River (WBIDs 3605A, B, C), Manatee Springs (WBID 3422R), Fanning Springs (WBID 3422S), Branford Spring (3422J), Ruth Spring (WBID 3422L), Troy Spring (WBID 3422T), Royal Spring (WBID 3422U), and Falmouth Spring (WBID 3422Z) adopted at subsection 62-304.405(1) and (2), F.A.C. for nitrate-N with a monthly average value of 0.35 mg/L. In addition, the spring criterion for nitrate-N that is based on a stressor-response relationship between nitrate-N and the presence of nuisance algal mats will prevent harmful algal blooms and will reduce the algae associated with diurnal fluctuations in DO, in turn meeting the DO criterion for this portion of the TMDL.

#### Consideration of TMDL concentration as a new or revised water quality standard

The TMDL concentration target for the WBIDs referenced in the Table for nitrate-N is set at a monthly average of 0.35 mg/L. This nitrate-N concentration was established based on several lines of evidence, including laboratory nutrient amendment bioassays; comparing metabolic rates, specifically ecological efficiency of aquatic communities; examining the ecological condition of algae and nutrients in the Florida Springs Report; and examining the relationship between periphyton biomass and cell density and the nitrate-N concentration in the Suwannee and Santa Fe River Basins. The approaches used for the TMDL were appropriate for ensuring protection of water quality and aquatic life.

### Conclusion

Based on the chemical, physical and biological data presented in the development of the SSAC, the EPA concludes that the SSAC value of 0.35 mg/L as a monthly average, for nitrate-N established for the Suwannee River (Lower and Estuary) (WBIDs 3422, 3422A, B, and D), Santa Fe River (WBIDs 3605A, B, C), Manatee Springs (WBID 3422R), Fanning Springs (WBID 3422S), Branford Spring (3422J), Ruth Spring (WBID 3422L), Troy Spring (WBID 3422T), Royal Spring (WBID 3422U), and Falmouth Spring (WBID 3422Z) protects healthy, well-balanced biological communities in the waters to which the SSAC applies and is consistent with the CWA and its implementing regulations. More specifically, the SSAC is consistent with both 40 CFR 131.11(b)(1)(ii) and the EPA's 304(a) guidance on nutrient criteria. FDEP did not address downstream protection in this TMDL. Paragraph 62-302.531(4) will apply to these WBIDs in conjunction with the Hierarchy 1 SSAC to ensure attainment and maintenance of water quality standards of downstream waters, in accordance with 40 CFR 131. In accordance with section 303(c) of the CWA, the SSAC for the Suwannee River (Lower and Estuary), Santa Fe River, Manatee Springs, Fanning Springs, Branford Spring, Ruth Spring, Troy Spring, Royal Spring, and Falmouth Spring for a concentration target of 0.35 mg/L nitrate-N as a monthly average is hereby approved as consistent with the CWA and 40 CFR Part 131.



<b>Suwannee and Santa Fe Reaches</b>	
Florida Counties	Santa Fe Reach 1
Districts Boundary	Santa Fe Reach 2
GullyScarp	Suwannee Reach 1
	Suwannee Reach 2
	Suwannee Reach 3
	Suwannee Reach 4
	Suwannee Reach 5
	Suwannee Reach 6



Map of Suwannee and Santa Fe Rivers Covered in the TMDL

**Appendix 1 – Summary of the TMDL Background**

<b>Name(s) of Addressed Water(s)</b>	Suwannee River (Lower and Estuary), Santa Fe River, Manatee Springs, Fanning Springs, Branford Spring, Ruth Spring, Troy Spring, Royal Spring, and Falmouth Spring
<b>Waterbody Type(s)</b>	As identified on Florida's Verified List: Lower Suwannee Estuary – Estuary All other waterbodies - Stream
<b>WBIDs</b>	3422, 3422A, 3422B, 3422D, 3422R, 3422S, 3422J, 3422L, 3422T, 3422U, 3422Z, 3605A, 3605B, 3605C
<b>Description</b>	<p>The Suwannee Basin drains approximately 10,000 square miles of South Georgia and North Florida. The Santa Fe River, a tributary to the Suwannee River, flows west from its headwaters in the Santa Fe Lakes area, joining the Suwannee River near Branford. Manatee Springs, Fanning Springs, Branford Spring, Ruth Spring, Troy Spring, Royal Spring, and Falmouth Spring all reside within FDEP's Middle and Lower Planning Units of the Suwannee River Basin.</p> <p>Most of the streams in the Upper Suwannee and Santa Fe watersheds are highly colored (such blackwater streams are characterized as having low DO concentrations). In the lower third of the basin, surface waterbodies are relatively absent because recharge flows directly to the aquifer through karst features. In these areas, along the Suwannee River, springs are especially abundant.</p>
<b>Classification(s)</b>	Class III, OFW Both the Suwannee River and Santa Fe River are Class III waterbodies, and both are designated as Outstanding Florida Waters.
<b>Basin</b>	Suwannee River Basin
<b>Date Placed on Verified List</b>	June 3, 2008
<b>Date TMDL was approved</b>	September 30, 2008
<b>Reference Streams</b>	N/A
<b>Source of majority of flow</b>	<p>The Suwannee River is the second largest river in the state in terms of flow. The upper portions of the watershed are dominated by surface water runoff, and groundwater discharges from springs and diffuse seepage strongly influence the Suwannee River and makes up the baseflow of the river, after it crosses the Cody Scarp.</p> <p>The Upper Santa Fe watershed is dominated by surface water runoff until it goes underground and reemerges supplemented by groundwater flow at the Cody Scarp. The Lower Santa Fe is mostly a spring-fed river, as groundwater dominates its flow.</p>
<b>Indicators</b>	Elevated chlorophyll <i>a</i> and photographic evidence of extensive growth of

	<p>filamentous algae and blooms in the Suwannee and Santa Fe Rivers.</p> <p>Parameter identified on Verified List:          Suwannee River (Lower) – nutrients (high Chlorophyll)          Lower Suwannee Estuary – Chorophyll          Manatee Springs – nutrients (algal mats)          Fanning Springs – nutrients (algal mats)          Branford Spring – nutrients (algal mats)          Ruth Spring – nutrients (algal mats)          Troy Spring – nutrients (algal mats)          Royal Spring – nutrients (algal mats)          Falmouth Spring – nutrients (algal mats)          Santa Fe River – dissolved oxygen</p>
<p><b>Identification of Causative Pollutants</b></p>	<p>Nitrate-N, based on several lines of evidence:</p> <ol style="list-style-type: none"> <li>1. Laboratory experiments showed that algal biomass and growth rate increase with nitrate-N concentrations above 0.300 mg/L.</li> <li>2. A study of the effects of nutrient concentrations on community metabolic rates in the Wekiva River, Rock Springs Run, Alexander Springs Creek, and Juniper Creek found that a target ecological efficiency was correlated with a nitrate-N concentration of 0.293 mg/L.</li> <li>3. A study of 28 Florida springs (including Troy, Fanning, and Manatee Springs) found excessive growth and cover of <i>Vaucheria</i> in the field with nitrate-nitrite concentrations at or above 0.454 mg/L; and, <i>L. wollei</i> and <i>Vaucheria</i> to have saturating nitrate-N concentrations of 0.230 mg/L and 0.261, respectively, in the laboratory setting.</li> <li>4. Based on a change-point analysis of Suwannee River algal data, nitrate-N levels around 0.441 mg/L caused major changes in mean abundance and biomass.</li> </ol> <p>Various analyses did not show a relationship between TP and algal biomass or density, and a 2003 study found that nitrogen was most widely the limiting nutrient in the estuary.</p>
<p><b>Sources of Nutrient Enrichment</b></p>	<p>A 1999 study found that the porous karst topography in the region has facilitated increased nitrate-N concentrations in the groundwater inflow to the river stemming from increases in anthropogenic activities. Agricultural activities and atmospheric deposition are cited to have contributed large quantities of nitrogen to the groundwater in the Suwannee River Basin.</p> <p>Agriculture was identified as the second largest land use (at 24%, behind forest) in the Middle and Lower Suwannee River and Santa Fe River basins. Estimates of TN based on the percentage of TN in raw waste and population sizes calculated that fertilizer is the largest potential nonpoint sources of TN in the Middle and Lower Suwannee and Santa Fe Rivers. Other potential sources include humans, beef, dairy, poultry, and atmospheric.</p>

	NPDES permitted facilities do not discharge into waterbodies identified above and were determined not to have a direct effect on nutrient levels. Similarly, there are 4 Phase II MS4 permittees, but they are not within the Middle and Lower Suwannee River Planning Units.
<b>Nutrient Watershed Region in Proposed 62.302</b>	n/a
<b>Proposed Nitrate-N SSAC and Frequency</b>	0.35 mg/L (monthly average) TMDL Target concentration
<b>Proposed Phosphorus SSAC and Frequency</b>	N/A
<b>SCI Scores</b>	N/A