UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

JUN 21 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 criteria (SSAC) for total nitrogen (TN) and total phosphorus (TP) for the freshwater segments of the Lower St. Johns River (LSJR). Florida Department of Environmental Protection (FDEP) submitted the 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 the 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 interpretations of the state narrative nutrient criterion for WBIDs 2213I, 2213J, 2213K, 2213L, 2213M, and 2213N expressed in the LSJR Total Maximum Daily Load report as SSAC. FDEP intends for these SSAC to serve as the numeric nutrient criteria for TN and TP for the freshwater segments of the LSJR in place of the otherwise applicable TN and TP criteria set out in paragraphs 62-302.531(2)(b)1. and 62-302.531(2)(c), F.A.C.

In accordance with section 303(c) of the Clean Water Act, I am hereby approving the SSAC for the LSJR WBIDs 2213I – 2213N as revised water quality standards for TN and TP. Any other criteria applicable to these waterbodies remain in effect, including other applicable criteria at 62-302.531(2)(b)1. and 62-302.531(2)(c), F.A.C. and any applicable federal criteria at 40 CFR Part 131.43(c)(1). The requirements of paragraph 62-302.530(47)(a), F.A.C. also remain applicable. 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: Thomas M. Beason, FDEP
Daryll Joyner, FDEP

**Decision Document for Hierarchy I Site Specific Alternative Criteria For Lower St. Johns River (LSJR)**

Summary Information

| WBID | Description | Class | Waterbody Type *Impaired Waters Rule (IWR) Run 40* | Listing Parameter |
|---|---|---|---|---|
| 2213I | St. Johns River above Black Creek | Class III freshwater | Lake | Nutrients (Trophic State Index (TSI)) |
| 2213J | St. Johns River above Palmo Creek | | Lake | Nutrients (TSI) |
| 2213K | St. Johns River above Tocio | | Lake | Nutrients (TSI) |
| 2213L | St. Johns River above Federal Point | | Lake | Nutrients (TSI) |
| 2213M | St. Johns River above Rice Creek | | Stream | Nutrients (chlorophyll-*a* (chl-*a*)) |
| 2213N | St. Johns River above Dunns Creek | | Stream | Nutrients (chl-*a*) |

A nutrient Total Maximum Daily Load (TMDL) for the LSJR WBIDs 2213I – 2213N was developed by the Florida Department of Environmental Protection (FDEP) and approved by the Environmental Protection Agency on September 23, 2008 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 total nitrogen (TN) load of 8,571,563 kilograms/year (kg/yr) and a total phosphorus (TP) load of 500,325 kg/yr, not to be exceeded as annual loads, would meet its narrative criterion and adopted these loads as TMDL values at subsection 62-304.415(1), F.A.C. FDEP has submitted the TN and TP loads from the TMDL for EPA review as hierarchy 1 site specific alternative nutrient criteria (SSAC) for the LSJR WBIDs 2213I – 2213N, pursuant to section 303(c) of the CWA and EPA's implementing regulations at 40 CFR Part 131. This decision document approves the SSAC for TN of 8,571,563 kg/yr and for TP of 500,325 kg/yr, not to be exceeded as annual loads, as hierarchy 1 criteria for the LSJR WBIDs 2213I - 2213N. Any other criteria applicable to these waterbodies remain in effect. Specifically as to nutrients, chlorophyll *a* criteria consistent with paragraphs 62-302.531(2)(b)1. and 62-302.531(2)(c), F.A.C. and any applicable federal criteria at 40 CFR Part 131.43(c)(1) 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 interpretations of the state narrative nutrient criterion for WBIDs 2213I - 2213N as expressed in the LSJR TMDL as the SSAC for the LSJR WBIDs 2213I - 2213N. These SSAC serve as primary site specific interpretations 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)(a), F.A.C. Pursuant to section 303(c) of the CWA, these revised water

quality standards are subject to review and approval by the EPA, since FDEP intends for these SSAC to serve as numeric nutrient criteria for the LSJR in place of the otherwise applicable TN and TP criteria set out in paragraphs 62-302.531(2)(b)1. 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 criteria 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. By approving the standards "subject to the results of consultation," the EPA retains its discretion to take appropriate action if the consultation identifies deficiencies in the standards 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 the SSAC have been proposed

According to the TMDL, the waters included in this TMDL document are all segments of the LSJR and are identified as the portion of the St. Johns River between the mouth of the Ocklawaha River and the Atlantic Ocean (see map on page 5). This Decision Document addresses the fresh water segments of the LSJR TMDL. The LSJR is approximately 101 miles long, has a water surface area of approximately 115 square miles ( $mi^2$), and has a 2,750-$mi^2$ drainage area. Major population centers within the LSJR basin include Palatka in the south, Green Cove Springs around the midpoint of the LSJR, and the Orange Park, Middleburg, and Jacksonville Metropolitan Area in the northern portion of the basin. The LSJR is a sixth-order, darkwater river estuary, and has characteristics associated with riverine, lake, and marine aquatic environments along its length. The LSJR is divided into the three ecological zones based on salinity including a predominantly freshwater, tidal, lake-like zone that extends from the city of Palatka north to the mouth of Black Creek, an intermediate oligohaline (brackish water with very little salt) zone extending from Black Creek northward (downstream) to the Fuller Warren Bridge/I-95 in Jacksonville and a predominantly marine zone downstream from the I-95 bridge to the river mouth. All WBIDs are Class III waterbodies with designated uses of recreation, propagation, and the maintenance of a healthy, well-balanced population of fish and wildlife. WBIDs 2213I - 2213N are the furthest upstream waterbody segments in the Lower St. Johns River. The majority of flows for the Lower St. Johns are from upstream flows from the Middle St. Johns River. Major tributaries flowing into the Lower St. Johns River include Black Creek, Deep Creek, Sixmile Creek, Etonia Creek, Julington Creek, McCullough Creek, Arlington River, Broward River, Dunns Creek, Ortega River, Trout River, and the Atlantic Intracoastal Waterway.

Discussion of how the loads were derived

According to the TMDL, the WBIDs addressed by this TMDL document were verified as impaired for nutrients on the basis of water quality assessments revealing elevated chl-*a* and TSI levels. The TSI is a composite measurement used in evaluating the level of nutrient enrichment in lakes and estuaries. Consequently, these WBIDs were added to the verified list of impaired waters by Secretarial Order on September 4, 2003. Of the six freshwater segments in the TMDL, four segments (WBIDs 2213I, 2213J, 2213K, 2213L) are considered lake-like and FDEP considered exceedances in TSI as the cause of impairment. The remaining two stream segments, (WBIDs 2213M and 2213N) list chl-*a* as the cause of impairment. The lake-like segments were

listed as impaired for nutrients based on TSI measurements that exceeded the FDEP IWR Chapter 62-303, F.A.C. TSI threshold. All annual average TSI values from 1996-2001 exceeded the 40 TSI threshold for non-colored (≤ 40 Platinum Cobalt Units) lakes. WBIDs 2213M and 2213N were listed as impaired for nutrients based on exceeding the FDEP IWR threshold of an annual mean of chl-*a* of 20 µg/L. All annual mean chl-*a* values available from 1996 - 2001 for these WBIDs exceed the 20 µg/L threshold.

Nutrient impairment of WBIDs in the LSJR was also supported by a number of other indicators and studies documenting water quality problems indicative of an imbalance in the flora and fauna of the LSJR. These problems included fish kills, algal mats, excessive epiphyte growth, river sediment conditions indicative of low benthic animal diversity, excessive organic matter sedimentation, prolonged anoxia and the presence of potentially toxic dinoflagellates such as the *Pfiesteria*-like *Crytoperidiniopsoids* and *Prorocentrum minimum.* To address these nutrient impairments, FDEP developed a nutrient TMDL for the LSJR on December 3, 2003 which was approved by EPA on September 23, 2008. The TMDL loads for nutrients for the Lower St. Johns River WBIDs 2213I – 2213N adopted at subsection 62-304.415(1), F.A.C. were for TN of 8,571,563 kg/yr and for TP of 500,325 kg/yr, not be exceeded as annual loads.

To address algal biomass in the freshwater WBIDs, FDEP established a chl-*a* threshold of 40 µg/L, not to be exceeded more than 10 percent of the time on a long-term basis. This target was developed by the St. Johns River Water Management District (SJRWMD) as part of pollutant load reduction goal development. The target was based upon the maximum algal biomass levels that would maintain phytoplankton community diversity and facilitate upward transfer of primary production to higher trophic levels that maintain zooplankton diversity. The target minimizes detrimental algal species and toxins and controls algal bloom duration. FDEP found that loss of phytoplankton diversity and dominance of cyanobacteria during blooms are prevalent in the LSJR and that cyanobacteria composition of the overall phytoplankton community is minimal when chl-*a* concentrations are below 40 µg/L. Concentrations above 40 ug/L coincide with cyanobacteria becoming dominant and harmful. FDEP applied EPA's conceptual primary production model described in the *Chesapeake Bay Water Quality Criteria Guidance Manual* using plankton monitoring data from the LSJR to compare zooplankton abundance with chl-*a* concentrations. A discernible pattern in this relationship suggested that the linear rate of increase in zooplankton biomass with increasing chl-*a* concentrations began to decline between 40-60 µg/L chl-*a*. FDEP also utilized a study which examined the relationship between chl-*a* concentrations and the presence of algal toxins, such as microcystin, in the LSJR. The results indicated that above chl-*a* concentrations of 40 µg/L, the potential for instances of microcystin increases greatly. To obtain the duration component of the target (not to be exceeded more than 10 percent of the time), FDEP used a distribution of chl-*a* data scaled to a level of chl-*a* that would maintain phytoplankton and zooplankton diversity. Using the 10 percent exceedance rate, algal bloom duration was then linked to chl-*a* concentrations of greater than 40 µg/L.

Three computer models which accounted for nonpoint source contributions, hydro-dynamically simulated nutrient movement in the river, and the transformation of nutrients and effects on eutrophication were then used to develop the TMDL. For the freshwater WBIDs, the exceedance of the chl-*a* target, as well as the anthropogenic load reduction necessary to meet the chl-*a* target, was calculated for each modeled year (1995, 1997, 1998, and 1999). SJRWMD recommended a

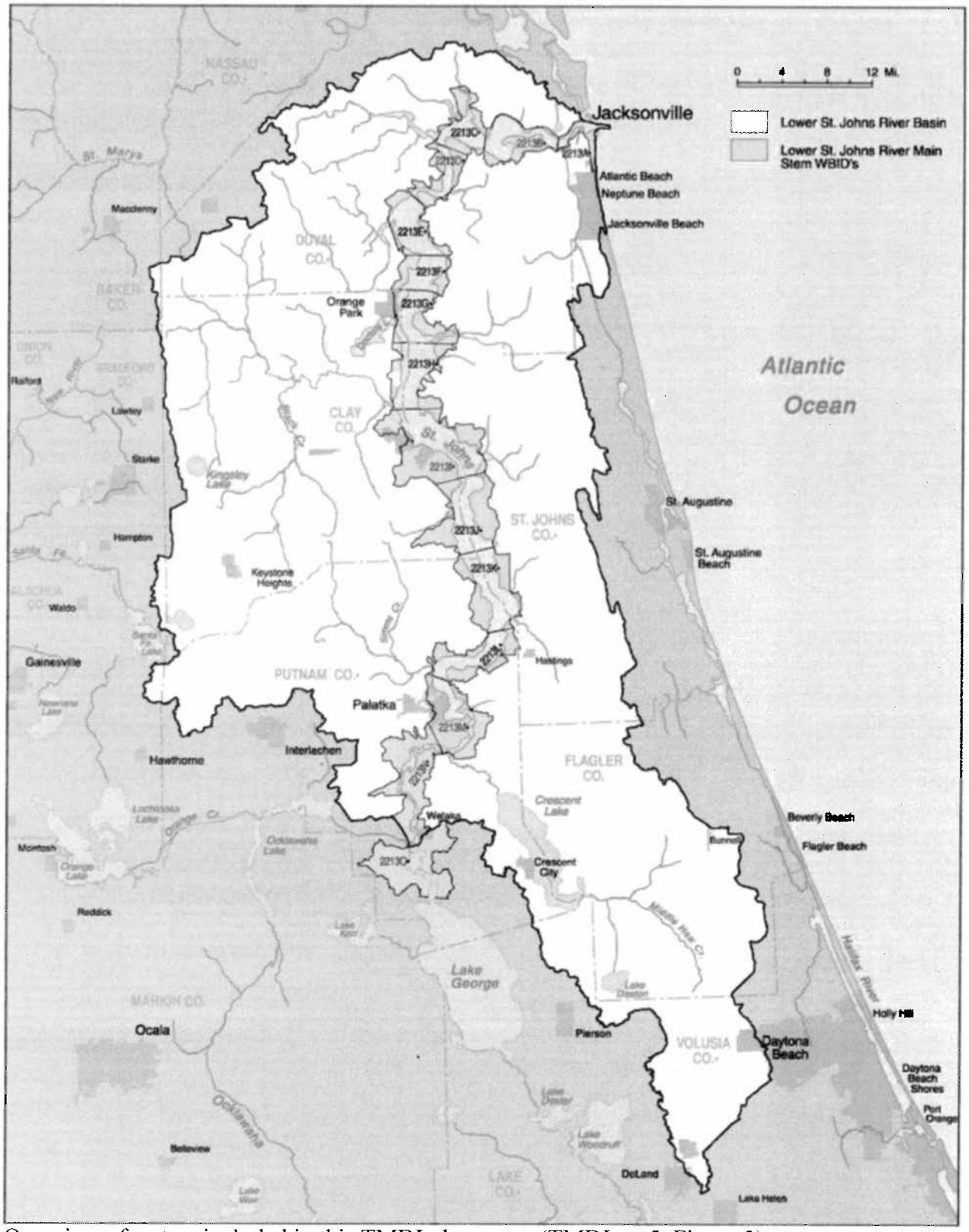
30 percent reduction in TN and TP loads to allowable loads of 8,571,563 kg/yr and 500,325 kg/yr, respectively, based on the analysis of long-term average annual results for the four modeled years. The final loads calculated using phytoplankton and algal bloom data similar to that used in EPA's *Chesapeake Bay Water Quality Criteria Guidance Manual* protect plankton ecology in the freshwater portions.

Consideration of TMDL loads as new or revised water quality standards

The final targets were selected based upon a 2003 study identifying a chl-*a* target for freshwater WBIDs. Three interconnected models were then used to develop loads connected to the targets. Several assumptions described in the TMDL were considered conservative including four years of nutrient loading modeled at lower flows than average, equal reductions of nitrogen and phosphorus even though both may not be limiting in the freshwater portion and worst-case WBID controlled reductions being applied throughout the entire freshwater portion. Therefore, the long term chl-*a* water quality target and associated reductions in TN and TP loads were determined to be protective to ensure flora and fauna balance.

Conclusion

Based on the chemical, physical and biological data presented in the development of the SSAC, the EPA concludes that the SSAC for TN and TP established for the LSJR WBIDs 2213I - 2213N protect healthy, well-balanced biological communities in the waters to which the SSAC apply and are consistent with the CWA and its implementing regulations. More specifically, the SSAC are consistent with both 40 CFR Part 131.11(b)(1)(ii), and the EPA's 304(a) guidance on nutrient criteria. The TN and TP SSAC for the St. Johns River above Black Creek WBID 2213I, St. Johns River above Palmo Creek WBID 2213J, St. Johns River above Tocio WBID 2213K, St. Johns River above Federal Point WBID2213L, St. Johns River above Rice Creek WBID 2213M, and St. Johns River above Dunns Creek WBID 2213N which provide for TN and TP annual loads of 8,571,563 kg/yr and 500,325 kg/yr, respectively, will protect water quality and aquatic life. FDEP did not address downstream protection in this TMDL. Paragraph 62-302.531(4), F.A.C. will apply to this WBID in conjunction with the Hierarchy 1 SSAC to ensure attainment and maintenance of water quality standards of downstream waters, in accordance with 40 CFR Part 131.10. In accordance with section 303(c) of the CWA, the SSAC for the St. Johns River above Black Creek WBID 2213I, St. Johns River above Palmo Creek WBID 2213J, St. Johns River above Tocio WBID 2213K, St. Johns River above Federal Point WBID2213L, St. Johns River above Rice Creek WBID 2213M, and St. Johns River above Dunns Creek WBID 2213N for TN of 8,571,563 kg/yr and TP of 500,325 kg/yr, not to be exceeded as annual loads, are hereby approved as consistent with the CWA and 40 CFR Part 131.



Overview of waters included in this TMDL document (TMDL p. 5, Figure 3)

## Appendix 1 – Summary of the TMDL Background

| | |
|---|---|
| **Name(s) of Addressed Water(s)** | Lower St. Johns River – Freshwater portions |
| **Waterbody Type(s)** | Streams and Lakes (IWR Run 40) |
| **WBIDs** | 2213I, 2213J, 2213K, 2213L, 2213M, 2213N |
| **Description** | The waterbodies included in this TMDL document are all segments of the Lower St. Johns River (LSJR). The LSJR is identified as the portion of the St. Johns River between the mouth of the Ocklawaha River and the Atlantic Ocean. The LSJR is approximately 101 miles long, has a water surface area of approximately 115 mi, and has a 2,750-mi drainage area. Major population centers within the LSJR basin include Palatka (~11,000 people) in the south, Green Cove Springs (~5,000 people) around the midpoint of the LSJR, and the Orange Park, Middleburg, and Jacksonville Metropolitan Area (over 1 million people) in the northern portion of the basin. The LSJR is a sixth-order, darkwater river estuary, and has characteristics associated with riverine, lake, and estuarine aquatic environments along its length (TMDL p. 2). There are six freshwater WBIDs (2213I-2213N) along the mainstem of the LSJR, extending from below Little Lake George north (downstream) to the confluence of Black Creek. All six WBIDs are verified as impaired for nutrients (TMDL p. 3-7). |
| **Classification(s)** | Class III (freshwater) (TMDL p. 9) |
| **Basin** | Lower St. Johns River Basin (TMDL p. 1) |
| **Date Placed on Verified List** | September 4, 2003 (TMDL p. 6) |
| **Date TMDL was approved by EPA** | September 23, 2008 (EPA WATERS database – 6/4/12 query) |
| **Reference Streams/Lakes** | NA. |
| **Source of Majority of Flow** | The majority of flows to the LSJR are from upstream flows from the Middle St. Johns River. Major tributaries flowing into the Lower St. Johns River include Black Creek, Deep Creek, Sixmile Creek, Etonia Creek, Julington Creek, McCullough Creek, Arlington River, Broward River, Dunns Creek, Ortega River, Trout River, and the Atlantic Intracoastal Waterway. |
| **Indicators** | Multiple indicators were included in this TMDL to assess two distinct targets: DO (estuarine portion) and algal biomass (freshwater portion). The algal biomass (chl-*a*) target was based maintaining phytoplankton community diversity, facilitating upward transfer of primary production to higher trophic levels (maintaining zooplankton diversity), minimizing detrimental algal species and algal toxins, and limiting algal bloom duration (TMDL p. 11, 41-43). Additional indicators of imbalance for the LSJR were identified as (TMDL p. 7, 47):<br>(1) fish kills; (2) submerged aquatic shoreline vegetation covered in algal mats; (3) excessive epiphyte growth further blocking light |

| | |
|---|---|
| | from submerged aquatic vegetation; (4) anecdotal accounts of shoreline vegetation losses and reduced recreational fishing quality; (5) river sediment conditions indicative of low benthic animal diversity; (6) excessive organic matter sedimentation and prolonged anoxia; and the (7) presence of potentially toxic dinoflagellates such as the *Pfiesteria*-like *Crytoperidiniopsoids* and *Prorocentrum minimum.* |
| **Identification of Causative Pollutants (as determined by measurements of response endpoints or indicators)** | All eleven segments covered by this TMDL document were verified as impaired for nutrients (TMDL p. 6-7). Of the six freshwater segments, the four segments classified as waterbody type "Lakes" (WBIDs 2213I, 2213J, 2213K, 2213L) list TSI as the cause of impairment, while the remaining upstream two segments (WBIDs 2213M, 2213N) list chl-*a* as the cause of impairment (TMDL p. 7, 75). |
| **Sources and Concentrations of Nutrient Enrichment** | 36 NPDES permitted point sources discharge directly to the LSJR. These facilities contribute approximately 27 and 55 percent of the annual above background TN and TP loads, respectively, to the LSJR (TMDL p. 14-16). Of these 36 facilities, 5 discharge to the freshwater portion of the LSJR. In addition, 2 MS4s discharge to the freshwater portion of the LSJR (TMDL p. 78-79). Estimated average TN and TP loading to the LSJR from 1995-1999 indicated the majority of TN loading was from upstream sources while TP loading was split nearly in thirds between upstream, nonpoint, and point source contributions (calculated from Appendix D, TMDL p. 48-53): TN upstream: 67% (8,415 metric tons/yr), TN nonpoint: 17% (2,158 metric tons/yr),TN point (directly to LSJR): 14% (1,783 metric tons/yr), TN atmospheric deposition: 2% (243 metric tons/yr), TP upstream: 31% (370 metric tons/yr), TP nonpoint: 30% (360 metric tons/yr), TP point (directly to LSJR): 39% (467 metric tons/yr) |
| **Nutrient Watershed Region in Proposed 62.302** | 2213I-2213L: Peninsular Lakes<br>(color/alkalinity data unavailable in TMDL) (IWR Run 40)<br>2213M and 2213N: Peninsular Streams (IWR Run 40) |
| **Proposed Nitrogen SSAC and Frequency** | 8,571,563 kg/yr TN maximum annual load (30.0% reduction) (236,695 kg/yr WLA from point sources and 8,334,868 kg/yr LA from nonpoint sources) (TMDL p. 26, 30, 32). |
| **Proposed Phosphorus SSAC and Frequency** | 500,325 kg/yr TP maximum annual load (30.0% reduction) (46,357 WLA from point sources and 453,968 kg/yr LA from nonpoint sources) (TMDL p. 26, 30). |
| **Biological Index Score(s) (e.g. SCI, TSI, IBI)** | WBIDs 2213I-2213L were listed as impaired for nutrients based on TSI measurements that exceeded FDEP IWR TSI threshold of 60 for colored lakes (>40 PCU) or 40 for non-colored lakes (≤40 PCU). All annual average TSI values from 1996-2001 exceeded the 40 TSI non-colored lake threshold. In comparison to the 60-TSI threshold the following number of years exceeded the threshold for impairment for each WBID: 2213I (3 of 6 years), 2213J (4 of 6 years), 2213K (6 of 6 years), and 2213L (6 of 6 years) (TMDL p. 75). |